

## CHAPTER 5 VERIFICATION OF TECHNICAL MEASURES AND FARMING MODEL

### 5.1 Verification of Technical Measures

#### 5.1.1 Outline of Verification

Technical measures are verified through assessment and evaluation on their effectiveness and applicability to the Master Plan based on the results of the pilot site activities carried out by Agricultural Technicians (ATs) in the Phase-2 (July 2015 to April 2016) and Phase-3 (July 2016 to April 2017). In the framework for verification shown below, 3 items are evaluated on i) economic aspect, ii) social aspect, and iii) applicability, and the overall evaluation on technical measures are derived from the results of each verification item:

**Framework for Verification of Technical Measures**

Verification Item	Crop Production Livestock Production	Farm Management
1. Economic aspect	Assessment on benefit / cost comparing with the conventional methods expressed as high, moderate or low	Not applied
2. Social aspect	Assessment on acceptance and perception by farmers leading to practice expressed as high, moderate or low	Not applied
3. Applicability	Not applied	Assessment on adoption to Support Plan prepared by ATs, Action Plan prepared by farmers and Practice by farmers
Overall verification on effectiveness expected under the Master Plan	High, moderate or low based on the combined assessment of economic and social aspects	Same as above

*Source: Prepared by the Study Team.*

In verifying the technical measures, the following 3 steps are taken to obtain the overall verification results:

- Step 1: Verification of technical measures at each site level
- Step 2: Verification of each technical measures by compilation of results at each site
- Step 3: Judgment of each technical measures by combination of such verification items of economic aspect and social aspect for crop and livestock production

For obtaining the proper understand on the verification results, verification is conducted taking into account the following issues:

- (1) Verification of technical measures for crop and livestock  
Technical measures for crop and livestock are verified in terms of economic and social aspects. Economic aspects are evaluated through comparing the cost and benefit with the conventional methods, and the social aspects are assessed on the perception and understanding of farmers.
- (2) Verification of technical measures for farm management  
Since technical nature and features of farm management are different from those of crop production and

livestock production, technical measures for farm management are separately verified applying the different method, focusing on the applicability of the technical measures to the process of pilot site activities.

(3) Particular situation at the King Kauluma site

Pilot site activities were conducted at 16 sites in the Phase-2 and 17 sites in the Phase-3, and 16 sites are the same sites in the Phase-2 and Phase-3. An additional site was newly selected in the Phase-3 in order to support the goat program of the “Small Stock Distribution and Development in Communal Areas”. The site is located in the territory of King Kauluma ADC in Nehale-lya-Mpingana Constituency of Oshikoto Region. The actual activities in King Kauluma have been delayed and the 1<sup>st</sup> and 2<sup>nd</sup> trainings for farmers groups were conducted in late November 2016 and late March 2017 respectively, then no results were obtained for verification. Therefore, this verification of technical measures for livestock production does not contain the results in King Kauluma.

(4) Wide variation of climate conditions by year

In general, arid and semi-arid climate shows the dry condition, average annual rainfall of 400 mm to 600 mm. In the North Central Division, the similar climate is prevailing and the average rainfall pattern can be appeared in the limited years. In this regard, it is necessary to understand the pilot site activities were carried out under the severe drought year in Phase-2 and the flood year of Phase-3. Climatic condition is out of technical control and needs to be taken into account in verification of technical measures.

The detailed verification results are described in the Attachment 3 in the following manner:

- Attachment 3-1 Verification Results by Site for Crop Production
- Attachment 3-2 Verification Results of Each Technical Measures for Crop Production
- Attachment 3-3 Verification Results by Site for Livestock Production
- Attachment 3-4 Verification Results of Each Technical Measures for Livestock Production
- Attachment 3-5 Verification Results by Site for Farm Management
- Attachment 3-6 Verification Results of Each Technical Measures for Farm Management

The verification results are summarized separately for crop production, livestock product and farm management below:

### 5.1.2 Verification Result for Crop Production

Details of verification results are shown in the Attachments 3-1 and 3-2, and summarized below:

**Summary of Verification Results of Technical Measures for Crop Production**

Technical Measure	Economic Aspect	Social Aspect	No. of Sites Applied
CR-1 Fertilizer application	High	Moderate	4 grain sites
CR-2 Cropping pattern and crop management			
CR-3 Conservation agriculture	High	Moderate	3 grain sites
CR-4 Flood- and drought-adaptive cropping (Rice-Mahangu Mixed Cropping System)	Low	Moderate	grain sites

Technical Measure	Economic Aspect	Social Aspect	No. of Sites Applied
CR-5 Water source / water harvesting	Moderate	Moderate	1 horticulture site, rehabilitation only
CR-6 Water saving cultivation	High	High	4 horticulture sites
CR-7 Crop selection and marketing	Moderate	Moderate	4 horticulture sites
CR-8 Cropping plan and horticulture crop management	Moderate	High	4 horticulture sites

Source: Prepared by the Study Team

Based on the above results of the economic and social aspects, the overall verification results are assessed for each technical measure with the conclusion as follows:

#### Conclusion of Technical Measures for Crop Production

Overall Verification	Technical Measures	Conclusion
High	CR-1 Fertilizer application CR-2 Cropping pattern and crop management	<ul style="list-style-type: none"> <li>• Better initial growth brought by basal manure application.</li> <li>• Proper thinning to utilize the limited soil moisture under the drought condition</li> <li>• More improvement expected by better understanding of crop development stages for better</li> </ul>
	CR-3 Conservation agriculture	<ul style="list-style-type: none"> <li>• Better growth and harvest through breaking shallow soil pan and increase soil moisture</li> <li>• Limited availability of ripper furrowing</li> </ul>
	CR-6 Water saving cultivation	<ul style="list-style-type: none"> <li>• Higher perception by some of farmers.</li> <li>• Essential for horticulture.</li> </ul>
Moderate	CR-5 Water source / water harvesting	<ul style="list-style-type: none"> <li>• Only 1 site applied for rehabilitation of the existing roof catchment.</li> <li>• Effective in back yard garden, but higher cost required</li> <li>• Proper maintenance and operation needed</li> </ul>
	CR-7 Crop selection and marketing	<ul style="list-style-type: none"> <li>• Essential to create the mind set of “agriculture as business”</li> </ul>
	CR-8 Cropping plan and horticulture crop management	<ul style="list-style-type: none"> <li>• Basic knowledge and techniques required for crop management, particularly pest and insect control.</li> </ul>
Low	CR-4 Flood- and drought-adaptive cropping (Rice-Mahangu Mixed Cropping System)	<ul style="list-style-type: none"> <li>• Only 1 site to apply</li> <li>• Mainly due to unstable stable water condition</li> <li>• Economic aspect to be improved under the favorable seasonal wet land</li> </ul>

Source: Prepared by the Study Team

### 5.1.3 Verification Result for Livestock Production

Details of verification results are shown in the Attachments 3-3 and 3-4, and summarized below:

#### Summary of Verification Results of Technical Measures for Livestock Production

Technical Measure	Economic Aspect	Social Aspect	No. of Sites Applied
LS-1 Fodder production	Moderate	Moderate	4 cattle and 1 goat sites,
LS-2 Range management	-	-	4 cattle sites, results not obtained
LS-4 Nutritious feed supply, particularly for pig and chicken	Moderate	Moderate	3 chicken sites

Technical Measure	Economic Aspect	Social Aspect	No. of Sites Applied
LS-5 Disease control	Moderate	Moderate	8 sites consisting of 4 cattle sites, 1 goat site and 3 chicken sites
LS-6 Large and small stock fattening	Moderate	Moderate	1cattle site
LS-7 Periodical production	Moderate	Low	1 cattle site
LS-11 Goat production	Moderate	Moderate	1 goat site
LS-13 Chicken production	High	Moderate	3 chicken sites

Source: Prepared by the Study Team

Based on the above results of the economic and social aspects, the overall verification results are assessed for each technical measure with the conclusion as follows:

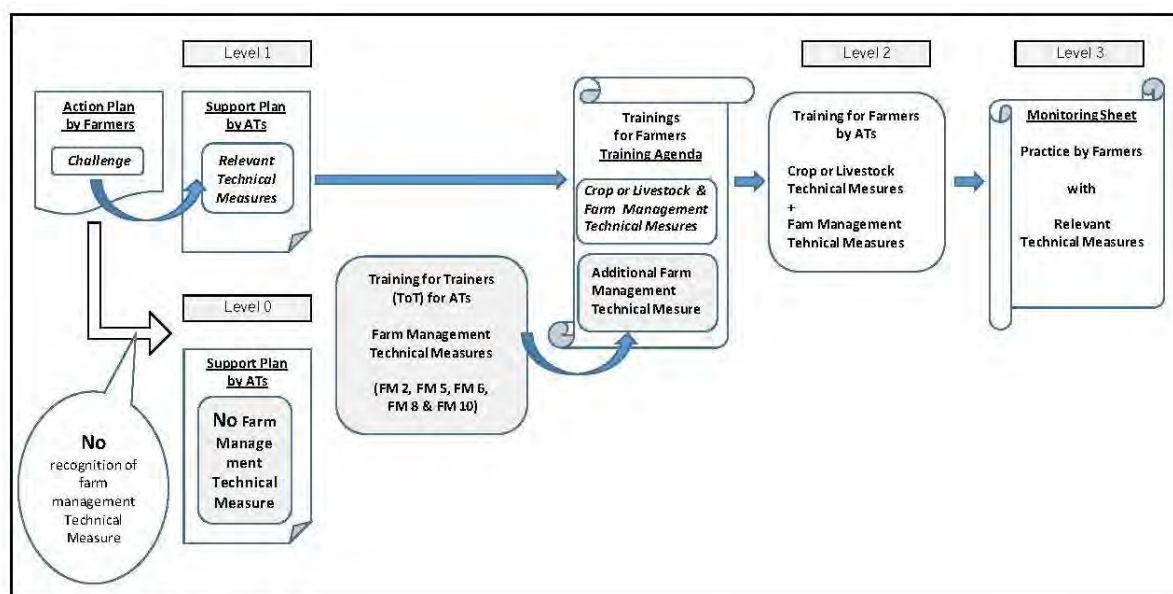
#### Conclusion of Technical Measures for Livestock Production

Overall Verification	Technical Measures	Conclusion
High	LS-13 Chicken production	<ul style="list-style-type: none"> <li>• High in “economic aspect” in all 3 pilot sites</li> <li>• Quick returns by introducing hatching skill</li> <li>• Easy raising management with lower investment</li> </ul>
Moderate	LS-4 Nutritious feed supply, particularly for pig and chicken	<ul style="list-style-type: none"> <li>• Use of feed material locally available in order to improve profitability</li> </ul>
	LS-5 Disease control	<ul style="list-style-type: none"> <li>• Applied and practiced by farmers in all 8 sites.</li> <li>• Essential for livestock production</li> <li>• Low accessibility to obtain medicines and vaccines</li> </ul>
	LS-6 Large and small stock fattening	<ul style="list-style-type: none"> <li>• Practiced in 1 site</li> <li>• Investment required to purchase materials for fattening</li> </ul>
	LS-11 Goat production	<ul style="list-style-type: none"> <li>• Quicker return and easy management</li> <li>• Less fodder requirement: 1/6 of cattle</li> </ul>
Low	LS-1 Fodder production	<ul style="list-style-type: none"> <li>• Separate and repeated planting required due to unstable rainfall</li> </ul>
	LS-7 Periodical production	<ul style="list-style-type: none"> <li>• Only 1 site applied for verification.</li> <li>• Low reproductive record keeping of herd reproduction</li> </ul>
No rating	LS-2 Range management	<ul style="list-style-type: none"> <li>• Mature understanding of importance of planned grazing with rotation against deterioration of pasture.</li> <li>• Difficult to solve within the short period of 2 years under N-CLIMP</li> </ul>

Source: Prepared by the Study Team

#### 5.1.4 Verification Result for Farm Management

In consideration of farmers’ application of each farm management technical measure, there are a few steps before achieving farmers’ practice. The process is summarized with the assumption that ATs and farmers need to take some actions for passing through to the next step. The standing point of after taking a kind of action is presented as a level. The next chart shows the process with the recognition of the levels.



Source: Prepared by the Study Team

### Process of application of farm management technical measures in pilot sites

In short, the four levels of application of farm management technical measure are summarized below.

- Level 0: No mention of the technical measure in the support plan prepared by ATs
- Level 1: Adoption of the technical measure in the support plan prepared by ATs
- Level 2: Implementation of farmers' training addressing the technical measure
- Level 3: Practice by farmers applying the technical measure

The result of application of farm management technical measures is presented in the next table.

### Conclusion of Technical Measures for Crop Production

Technical Measure	Number of Sites by Levels				Observation
	Level 0	Level 1	Level 2	Level 3	
FM-2 Record Keeping (Farm Record)	0	0	1	16	Farmers in all sites except King Kauluma keep farm records.
FM-5 Group Formation / Strengthening	3	1	4	9	Farmers in more than half of pilot sites are assumed that they work together for crop or livestock production related activities.
FM-6 Group Accounting Management	0	8	4	5	Farmers in about one third of pilot sites work using group account. ATs in the almost the same number of pilot sites explained to farmers but farmers do not practice.
FM-8 Collective Selling / Purchasing	6	0	4	7	Farmers in about 40% of pilot sites work through collective selling or purchasing, or discussed on the collective activities.
FM-10 Market Information Access Improvement	1	0	5	11	Farmers in more than 60% of sites practice any activities related to market information access improvement.

Note: Level 0: No mention of the technical measure in the support plan prepared by ATs  
 Level 1: Adoption of the technical measure in the support plan prepared by ATs  
 Level 2: Implementation of farmers' training addressing the technical measure  
 Level 3: Practice by farmers using or applying the technical measure

Source: Prepared by the Study Team

The table shows very limited part of verification as seen in the column of observation.

Details are described in Attachment 3-6 where 1) relationship between application levels and types of crop or livestock production, 2) relationship between FM 5, FM 6 and FM 8 technical measures and group-oriented and group-excepted sites' achievement, 3) effects of TOTs for enhancement of application of farm management technical measures, and 4) the effectiveness confirmation of each technical measure. The verification results described in Attachment 3-6 is based on the site level observation reported in Attachment 3-5.

## 5.2 Technical Measures Recognition by ATs and Farmers

A series of questionnaire survey were conducted in order to find how understanding of technical measures had changed before, during and after the Project, N-CLIMP. The summary of the result is presented below. Questionnaire forms used in the survey, summary tables, and the results and analysis are presented in Attachment 5.

### 5.2.1 Framework of the Survey

Verification results are examined for each site as mentioned in the preceding sections, then compiled into the followings.

#### (1) Summary of the Survey

The next table summarizes the questionnaire survey in terms of targets, timing, and used questionnaire sheets.

**Summary of the Questionnaire Survey on Technical Measures**

Target	Survey Timing and Date	Questionnaire Forms	The way of Response
Extension officers: ATs, CASO, ASO, CAT etc., total 53 respondents	During 3 <sup>rd</sup> TOT in each region; Omusati: March 23, 2017 Oshana: March 2, 2017 Oshikoto: March 16, 2017 Ohangwena: March 9, 2017	Attachment 5-1 in English	Each person answered to <b>all</b> technical measures
Demo and key farmers in pilot sites, total 144 respondents	During 3 <sup>rd</sup> trainings for farmers' groups in each pilot sites; Omusati: Mar. 27 to Apr. 3, 2017 Oshana: Mar. 13 to Apr. 20, 2017 Oshikoto: Mar 20 to 30, 2017 Ohangwena: Mar 15 to 27, 2017	Attachment 5-3 in Oshiwambo and English	Farmers answered <b>only</b> <b>the technical measures</b> <b>applied</b> to the pilot sites

Source: Prepared by the Study Team.

The detailed composition of respondents can be seen in Attachment 5-2-1: Summary Table: Respondents of Questionnaire Survey (for ATs and other officers of MAWF) and Attachment 5-4-1 Summary Table: Respondents of Questionnaire Survey (for farmers).

#### (2) Structure of Questionnaire Sheets

In the questionnaire, each technical measure is evaluated by officers or by farmers from the five points of view; 1) Awareness, 2) Experience, 3) Explanation, 4) Practice and 5) Effects. Questionnaire Sheets can be found in Attachment 5-1 for officers and Attachment 5-3 for farmers.

### Summary of Verification Results of CR-4

View Points	Questions	Time Span of Questions	
		Crop / Livestock Production	Farm Management
1: Awareness	Did/ Do you know the technical measure? Did / Do you know the needs of the technical measure?	Before N-CLIMP	Before + After N-CLIMP
2: Experience	Did / Do you have experience of using the technical measure?	Before N-CLIMP	Before + After N-CLIMP
3: Explanation	Did / Do you explain the technical measure to farmers?	With N-CLIMP	Before + After N-CLIMP
4: Practice	Did / Do farmers practice the technical measure?	With N-CLIMP	Before + After N-CLIMP
5: Effects)	Did / Do you find effects of the technical measure?	With N-CLIMP	Before + After N-CLIMP

Source: Prepared by the Study Team.

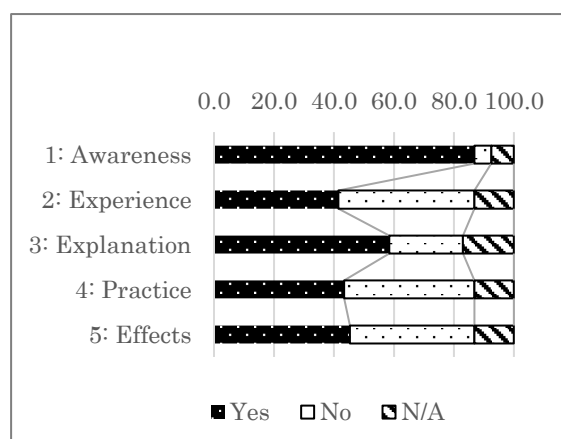
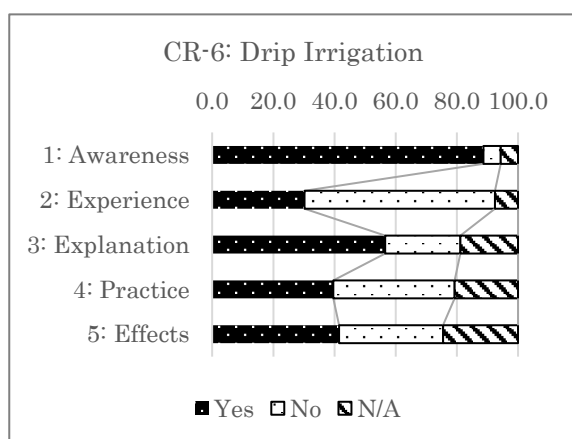
For technical measures on crop production and livestock, the time framework for 1) Awareness and 2) Experience is “before N-CLIMP” while other three points, 3) Explanation, 4) Practice and 5) Effects are addressed as “during N-CLIMP” or “after N-CLIMP”. In other words, it could be easily understood that there is time flow from 1) Awareness to 5) Effects in questions in crop and livestock production.

On the other hand, for technical measures on farm management, both “before N-CLIMP” and “after N-CLIMP” are asked for each point of view. In other words, the time flow is observed in each point of view in the questionnaire sheets for farm management technical measures.

## 5.2.2 Extraction of Analysis of Results

### (1) Crop Production Technical Measures

Among the results of the survey with ATs and other officers on crop production technical measures, the results on Drip Irrigation (CR-6) and Crop Selection (CR-7) are extracted here. They show the typical situations how ATs and other officers recognize the crop production technical measures.



Source: Prepared by the Study Team.

### Example of Recognition of Crop Production Technical Measures (ATs)

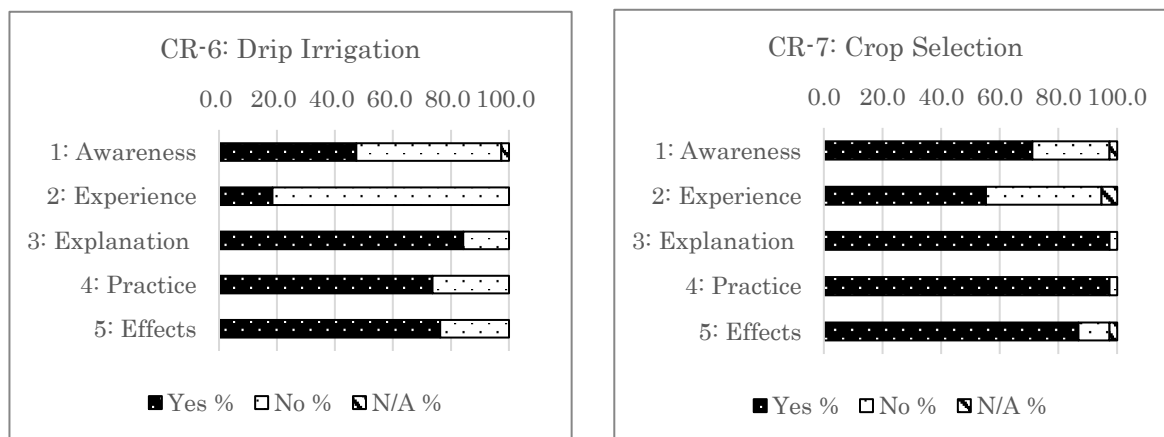
There are two issues commonly found:

- (1) Compared with the rates of affirmative responds for awareness (1 in each graph), the rates of affirmative responds for experience (2 in each graph) gained lower. This means that many ATs had been aware of (or knew) the technical measures even before N-CLIMP.

However, they did not experience at the field level.

- (2) Compared to the rates of affirmative responds for experience before N-CLIMP, the rates for explanation (3 in each graph) are higher. This implies that ATs recognize that they became able to explain to farmers. This can be attributed to the N-COIMP's effects through TOTs and pilot site activities.

For these technical measures, the following graphs present the results of survey with farmers.



Source: Prepared by the Study Team.

#### Example of Recognition of Crop Production Technical Measures (ATs)

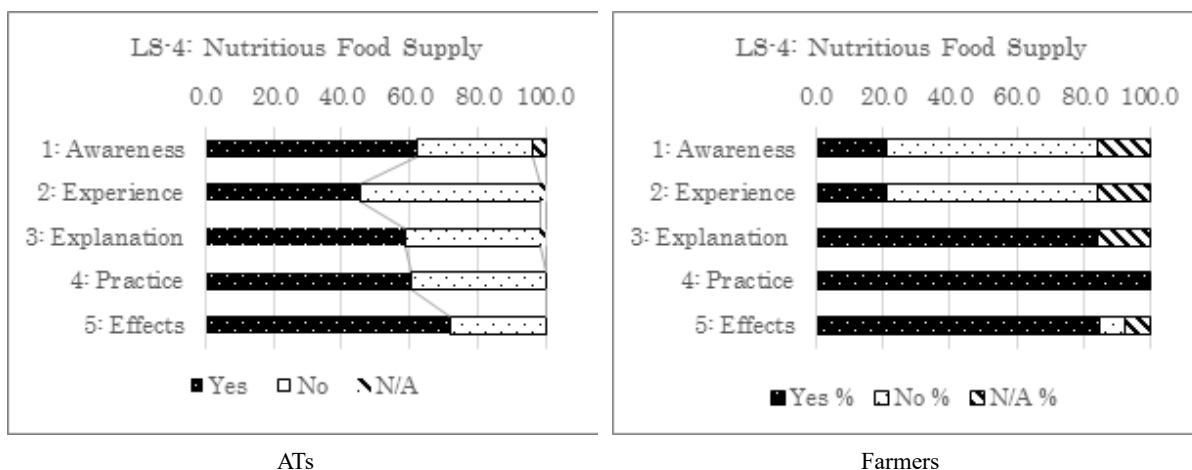
These graphs confirm the following three points.

- (1) Half of farmers did not know or were not aware of drip irrigation. Only about 20 % of farmers had experienced.
- (2) As the same with ATs, farmers also gained lower points for experience compared to awareness. This suggests that even those farmers who had been aware of the needs or knew about these technical measures did not have any experience at the field level.
- (3) For explanation (3 in each graph), practice (4 in each graph) and effects (5 in each graph) that are addressed to activities during or after the Project gained higher rates for affirmative responds.

#### (2) Livestock Production Technical Measures

Livestock production technical measures can be categorized into those for Large Stock (Cattle), Small Stock (Goat) and Small Stock (Chicken). The results on nutritious food supply (LS-4) represents the recognition by ATs and farmers.





Source: Prepared by the Study Team.

### Example of Recognition of Livestock Production Technical Measures

The following three points can be confirmed based on these results.

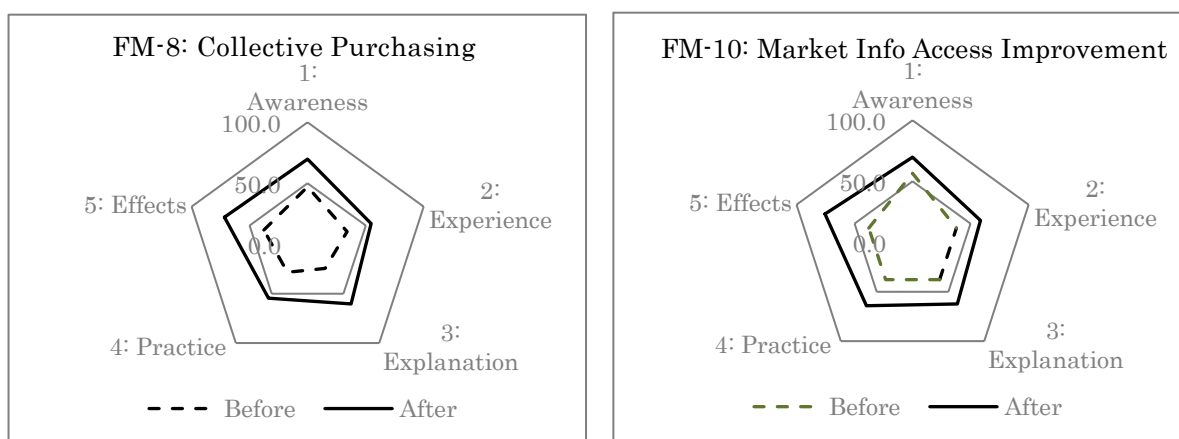
- (1) Similar to the results of the above-described crop cultivation, ATs have lower affirmative answers to experience, compared with affirmative answers or prior knowledge. About one-third of 60% of ATs with knowledge on the technical measure (nutritious food supply), did not have any experience at the field level. This means that only 40 % of them had experienced before the Project.
- (2) Farmers who had known or had been aware of the technical measure, and those who experienced the technical measure equally count only 20 % of the respondents.
- (3) The rates of affirmative responds for explanation (3 in each graph), practice (4 in each graph) and effects (5 in each graph) all related to activities during the Project period marked higher than the rates of experience (2 Experience).

The third point implies that the livestock technical measure is well disseminated to farmers. The high rates of affirmative responds by farmers also suggests the farmer to farmer extension was well carried out during the Project.

### (3) Farm Management Technical Measures

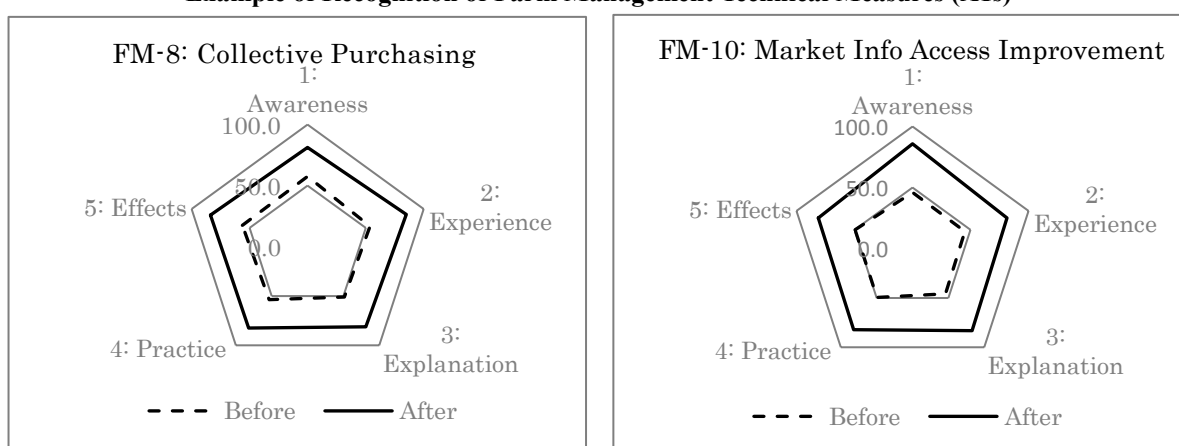
As noted above, the survey on farm management technical measure was designed to ask both before and after the Project for all five points of view of each technical measure. This allows comparison of recognition of ATs and farmers before and after the Project based on rates of affirmative responds.

The following graphs presents the recognition of ATs and farmers on FM-8: Collective Purchasing and FM-10: Market Information Access Improvement.



Source: Prepared by the Study Team.

### Example of Recognition of Farm Management Technical Measures (ATs)



Source: Prepared by the Study Team.

### Example of Recognition of Farm Management Technical Measures (Farmers)

These graphs can be understood with the following points.

- (1) Both ATs and farmers responded more affirmatively for after the Project with all five points of view; awareness, experience, explanation to farmers, practice by farmers and recognized effects. This confirms that the Project's effects are recognized by both ATs and farmers.
- (2) The responds by farmers also suggests the made progress of farmer to farmer extension for farm management technical measures.

These two points are shared with almost all farm management technical measures.

The first reason for the significant dissemination of farm management technical measure can be addressed to the fact that farm management technical measures were not well promoted before the Project. Therefore, effects of the intervention by the Project was clearly presented and recognized by respondents.

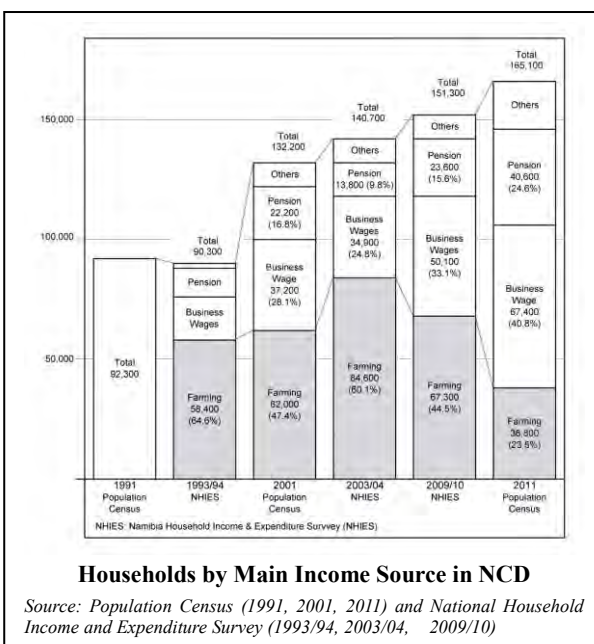
## 5.3 Expected Farming Models in the Master Plan

### 5.3.1 General

The statistical data shows the socio-economic situation in the 4 regions of the North Central Division (NCD) has been changing, and this changing trend is likely to continue in near future.

As shown in the right, number of households in the NCD has been increasing from 90,000 in 1991 to 165,000 in 2011. The latest population projection shows population will increase from 850,000 in 2011 to 1,024,000 in 2030 at about 20% for the next 20 years. This means that households may increase by 20% in the next 20 years, and may reach to 200,000 in 2030.

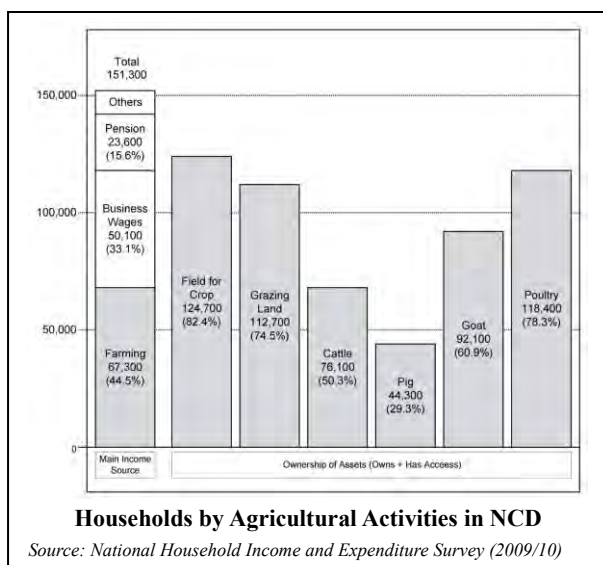
The same data show that households with main income of farming increased and reached to 85,000 (60% of total households) by 2003/04. After 2003/04, these households have been decreasing and account at 24% or 39,000 in 2011. This decreasing situation may continue in future caused by shifting of younger generation from farming in the communal lands to higher productivity of mining, industry and service sectors.



**Households by Main Income Source in NCD**

Source: Population Census (1991, 2001, 2011) and National Household Income and Expenditure Survey (1993/94, 2003/04, 2009/10)

Data in 2009/10 shows that households with their main income not from farming are also engaged in farming activities, like and crop production and livestock rearing, as shown in the right.



**Households by Agricultural Activities in NCD**

Source: National Household Income and Expenditure Survey (2009/10)

These households, their main income not from agriculture, may conduct mainly farming for home consumption (including sending to extended family, relatives and friends) and supplemental income.

It is also estimated that such grains like mahangu and beans cannot be the main household income and the majority of farm income is derived from livestock, particularly cattle.

Taking into account this situation together with the fact that farming population is aging, and younger generations are leaving rural area not to returning

from urban area, the prevailing farming models are assumed to estimate the farm income to provide the platform to discuss the future farming under the Master Plan.

### 5.3.2 Farm Size and Activities of Model and Technical Measures Applied

#### (1) Farming Size and Farming Activities of Model

Farm size is expressed in terms of the area under grains (mahangu: pearl millet), number of livestock, and size of horticulture garden. Under the present condition, majority of farmers are the small scale, estimated at about 3 ha of crop land for grain production with 10 heads of cattle.

In future, the present situation in the rural area may gradually change as discussed in the section 5.3.1,

and it is assumed that the medium scale farmers will increase due to decrease of the number of households with the main income from farming, then their main income will be generated from farming activities of crop and livestock. At the same time, small scale farmers will remain as the majority in the rural area and their main income will be off-farm income, supplemented by small farm income.

Assuming the above situation into account, farm models are created based on the farming sizes of cereal grains and cattle with newly introduced poultry and horticulture, since these two activities are likely effective for income generation according to the verification results of the pilot site activities. As a result, the following farming models are selected along with particular cases for discussion, shown in the below table:

**Farming Activities by Farm Size**

<b>Farming Model</b>	<b>Crop (grains &amp; horticulture)</b>	<b>Livestock (cattle &amp; chicken)</b>
1. Small Scale Farmer Main income: wage and others (off-farm income) Family labor: part time basis	3 ha of grain field 150 m <sup>2</sup> of garden with drip irrigation for vegetables for primarily self-consumption, and supplemental income	10 cattle for supplemental income 11 chickens (1 cock + 10 hens) for supplemental income
2. Medium Scale Farmer Main income: farming Supplemental income: wage & others Family labor: full time basis	6 ha of grain field for main income 150 m <sup>2</sup> of garden with drip irrigation for vegetables for primarily self-consumption, and supplemental income	30 cattle for main income 11 chickens (1 cock + 10 hens) for supplemental income
3. Small Scale Horticulture Farmer Main income: horticulture Full time basis + labors	3 ha of fully irrigated land, for main income from vegetables	-
4. Cattle Farming (larger scale) Full time basis + herder	-	114 cattle 40 cows + 2 bulls + 12 heifer 36 calves + 24 steer / oxen
5. Grain Farming (larger scale) Full time basis + labors + tractor	100 ha of grain field for main income from mahangu sales	-
6. Goat Farming Family labor: part time basis	-	21 goats 1 buck + 20 does
7. Chicken Farming (larger scale)	-	1 cock + 30 hens

Source: Prepared by the Study Team

## (2) Technical Measures Applied to Farming Model

In estimation of farm income, it is assumed that the following technical measures are applied to each farming models:

**Technical Measures Applied to Farming Model**

<b>Farming Model</b>	<b>Crop Production</b>	<b>Livestock Production</b>	<b>Farm Management</b>
1. Small Scale Farmer	CR-1, CR-2, CR-3	LS-1, LS-4, LS-5, LS-6,	FM-2, FM-5, FM-6, FM-8
2. Medium Scale Farmer	CR-6, CR-7 and CR-8	LS-7 and LS-12	and FM-10
3. Small Scale Horticulture Farmer	CR-6, CR-7 and CR-8	No technical measures applied	FM-2, FM-5, FM-6, FM-8 and FM-10

Farming Model	Crop Production	Livestock Production	Farm Management
4. Cattle Farming (scale: 114 cattle)	No technical measures applied	LS-1, LS-2, LS-4, LS-5, LS-6 and LS-7	FM-2, FM-5, FM-6, FM-8 and FM-10
5. Grain Farming (scale: 100 ha)	CR-1, CR-2 and CR-3	No technical measures applied	FM-2, and FM-10
6. Goat Farming (1 buck + 20 dose)	No technical measures applied	LS-1, LS-5 and LS-11	FM-2, FM-5, FM-6, FM-8 and FM-10
7. Chicken Farming (1 cock +30 hens)	No technical measures applied	LS-1, LS-4, LS-5 and LS-12	FM-2, FM-5, FM-6, FM-8 and FM-10
List of Technical measures	CR-1 Fertilizer application CR-2 Cropping pattern and crop management CR-3 Conservation Agriculture CR-6 Water saving cultivation CR-7 Crop selection and marketing CR-8 Cropping plan and horticulture crop management	LS-1 Fodder production LS-2 Range Management LS-4 Nutritious feed supply for chicken LS-5 Disease control LS-6 Large and small stock fattening LS-7 Periodical production LS-11 Goat production LS-13 Chicken production	FM-2 Record keeping (farm record) FM-5 Group formation / group strengthening FM-6 Group accounting management FM-8 Collective selling / purchasing FM-10 Marketing information access improvement

Source: Prepared by the Study Team

### 5.3.3 Production and Net Income by Farming Models

Based on the information collected from the field interviews as well as discussion with ATs and farmers made in the pilot site activities, production and net income derived from income-cost balance are preliminarily estimated for each of farming models, as shown below:

#### Net Income by Farming Models

Farming Model	Gross Income		Production Cost		Net Income	
1. Small Scale Farmer 3 ha of grain field 150 m <sup>2</sup> of garden 10 cattle 1 cock + 10 hen	Pearl millet	N\$3,700	Pearl millet	N\$1,500	Pearl millet	N\$2,200
	Horticulture	N\$2,400	Horticulture	N\$1,200	Horticulture	N\$1,200
	Cattle	N\$8,600	Cattle	N\$5,200	Cattle	N\$3,400
	Chicken	N\$14,400	Chicken	N\$6,400	Chicken	N\$8,100
	<b>Total</b>	<b>N\$29,100</b>	<b>Total</b>	<b>N\$14,300</b>	<b>Total</b>	<b>N\$14,900</b>
2. Medium Scale Farmer 6 ha of grain field 150 m <sup>2</sup> of garden 30 cattle 1 cock + 10 hen	Pearl Millet	N\$10,200	Pearl Millet	N\$3,800	Pearl Millet	N\$6,400
	Horticulture	N\$2,400	Horticulture	N\$1,200	Horticulture	N\$1,200
	Cattle	N\$34,400	Cattle	N\$20,800	Cattle	N\$13,600
	Chicken	N\$14,400	Chicken	N\$6,400	Chicken	N\$8,100
	<b>Total</b>	<b>N\$61,400</b>	<b>Total</b>	<b>N\$32,200</b>	<b>Total</b>	<b>N\$29,300</b>
3. Small Scale Horticulture Farmer 3 ha of full irrigated land	Horticulture	N\$10,500	Horticulture	N\$10,500	Horticulture	N\$10,500
4. Cattle Farming (larger scale: 114 cattle)	Cattle	N\$103,200	Cattle	N\$61,900	Cattle	N\$41,300
5. Grain Farming (larger scale: 100 ha)	Pearl millet	N\$213,200	Pearl millet	N\$158,100	Pearl millet	N\$55,100

Farming Model	Gross Income		Production Cost		Net Income	
6. Goat Farming 1 buck + 20 does	Goat	N\$17,600	Goat	N\$6,000	Goat	N\$11,600
7. Chicken 1 cock + 30 hens	Chicken	N\$64,800	Chicken	N\$27,200	Chicken	N\$37,600

Source: Prepared by the Study Team

The above results show the following points for each farming models

(1) Small Scale Farmer

- Main income is off-farm income like wages, and the farmer is engaged in farming on a part time basis. In terms of food security, more than sufficient foods are produced within the farm, and enough income can be obtained to improve livelihood. However, farm size cannot be expanded due to limitation of family labors and investment funds.
- Labor force is limited to family members. A house wife and family members are mainly working for poultry and horticulture, and employ a herder for raising cattle.
- It is estimated that N\$14,900 of annual farm income will be generated, mainly from poultry accounting for 50% of total income. Total amount is equivalent to N\$1,200 of monthly income is far lower than the minimum wage rate.

(2) Medium Scale Farmer

- All the family members work in the farm on a full time basis. Farm income as the main income of household is estimated at N\$29,300 annually, and this is equivalent to N\$2,400 of monthly income, still less than the minimum wage level. About 80% of income is generated from livestock, N\$21,700 consisting of N\$13,600 by selling 7 cattle and N\$8,000 by chicken.
- In terms of food security, more than enough production can be obtained, and their sales in a local market will contribute the local food security. Farm income seems enough to improve livelihood to cover education of children, health expenses, and other essential expenses.
- If the farmer can correctly apply the technical measures in his farming, farm income can be improved by using pearl millet for feeding chickens and cattle, because of enough surplus production of pearl millet and higher prices of feeds than the sales price of pearl millet.

(3) Small Scale Horticulture Farmer

- Main income is generated from horticulture farming, annually 2 crops of vegetables in 3 ha of irrigation plots, and is conservatively estimated at N\$105,000 annually, equivalent to N\$9,000 of monthly income.
- In this farming model, no cereal grains and no livestock products are produced for home consumption, and they have enough income to purchase these food stuff.
- Production of 60 ton of vegetables will be marketed in the regional markets to supply to the domestic demands, in place of imported vegetables. In this regards, farmers in this farming type should see the market situation according to the SHEP approach.
- Farmers can increase horticulture production from 2 crops in a year to 2.5 or 3 crops by improving their technical levels. Farmers can also improve the quality of vegetables and introduce new varieties according to the market demand.

(4) Larger Scale Grain Farming with Larger Scale (100 ha)

- In terms of farm income as a business, pearl millet production is not attractive. Even if the farming scale is expanded to 100 ha under mechanized farming operation, the net income still remains at N\$55,100, equivalent to N\$550 per ha, mainly due to low unit yield of 400 kg per ha as well as the high costs of machinery, labors and input materials.
- If the unit yield increases to more 600 kg/ha, the net income will improve drastically, after compensating the cost for machinery services. However, under the rainfed condition, it is not realistic to achieve this level of unit yield.

### 5.3.4 Effects to Increase of Net Income by Technical Measure

In order to estimate the monetary effects resulted by the technical measures, the net income of grains and goats is calculated for both the cases of

- 1) Applying technical measures: “with” technical measures, and
- 2) Not applying technical measures: “without” technical measure.

(1) Grain Production under Small Scale Farmer

Applied technical measures for the “with” case are:

CR-1: Fertilizer application

CR-2: Cropping pattern and crop management, and

CR-3: Conservation agriculture, particularly ripper furrowing.

These technical measures are designed to expect the effects of 1) improved utilization of rainfall and breaking shallow soil pan by ripper furrowing, 2) acceleration of initial growth by basal manure application, 3) improve panicle initiation by minimum top dressing, and 4) maximum use of soil moisture by thinning.

The above technical measures will bring the effect to increase the unit yield from 200 kg/ha under the “without” case to 400 kg/ha of the “with” case, then, the net income of the small scale farmer will increase from N\$0 (no income) under the without case to N\$2,200 per annum from 3 ha of farm land, as shown below:

**Comparison of Farming Model between “with” and “without” Technical Measures for Grain (Pearl Millet) Production**

Item	Farming Model “with” Technical Measures (technical measures applied)	Farming Model “without” Technical Measures (technical measures not applied)
<b>Assumption: Small Scale Farmer</b> - 3 ha of pearl millet under rainfed condition	<b>400 kg / ha by</b> (1) ripper furrowing every 2 to 3 years, (2) optimum basal manure application, (3) minimum top dressing, and (4) thinning for maximum utilization of soil moisture	<b>200 kg / ha by</b> (1) disc harrow every year, (2) minimum basal manure application, (3) no top dressing of fertilizer, and (4) no thinning
<b>Production and gross income</b> - Production - Home consumption - Marketable surplus - Gross income	400 kg / ha x 3 ha = 1,200 kg 100 kg / person x 5.1 persons = 510 kg 1,200 kg – 510 kg = 690 kg <b>690 kg x N\$5.4 / kg = N\$3,700</b>	200 kg / ha x 3 ha = 600 kg 100 kg / person x 5.1 persons = 510 kg 600 kg – 510 kg = 90 kg <b>90 kg x N\$5.4 / kg = N\$500</b>

Item	Farming Model “with” Technical Measures (technical measures applied)	Farming Model “without” Technical Measures (technical measures not applied)
<b>Production cost</b>		
- Input material	Certified seeds & fertilizer: N\$200	Own seeds & home manure only N\$0
- Labor & services (family labors)	Ripper furrowing: N\$1,200 N\$100	Disc harrow: by DCPD N\$450 N\$50
- Miscellaneous	N\$1,500	N\$500
- Total cost		
<b>Net Income</b>	<b>N\$2,200</b>	<b>N\$0</b>

Source: Prepared by the Study Team

(2) Goat Production under Small Scale Farmer

Applied technical measures for the “with” case are:

LS-1: Fodder production

LS-5: Disease control

LS-12: Goat production

These technical measures are designed to expect the effects of 1) improvement of pregnant rate by 30%, 2) reduction of mortality by control of disease, starvation and predator.

The above technical measures will bring the increase effect of off-take rate from 42% under the “without” case to 51% of the “with” case, then, the net income will increase from N\$7,800 under the without case to N\$11,600 per annum for the scale of 1 buck and 20 does:

**Comparison of Farming Model between “with” and “without” Technical Measures for Goat Production**

Item	Farming Model “with” Technical Measures (technical measures applied)	Farming Model “without” Technical Measures (technical measures not applied)
<b>Assumption: Small Scale Farmer</b> - Herd structure 1 buck + 20 does	<b>Off-take rate: 51%</b> (1) pregnant rate: 130% , (2) kid mortality rate: 15%, and (3) adult mortality rate: 2%	<b>Off-take rate: 51%: 42%</b> (1) pregnant rate: 100% , (2) kid mortality rate: 20%, and (3) adult mortality rate: 5%
<b>Production and gross income</b>	Reproductive cycle: 6 years (1years old to 7years old) 20 kids x 130% = 26 heads 26 kids x 15% = 4 heads 21 heads x 2% = 0.4 heads 21 + 26 - 4 - (0.4) = 43 heads 18 kids + 4 culling = 22 heads <b>22 heads x N\$800 = N\$17,600</b>	Reproductive cycle: 6 years (1years old to 7years old) 20 kids x 100% = 20 heads 20 does x 20% = 4 heads 21 heads x 5% = 1 heads 21 + 20 - 4 - 1 = 36 heads 12 kids + 3 culling = 15 heads <b>15 heads x N\$800 = N\$12,000</b>
<b>Production cost</b>		
- Renewal of 1 buck every 3 years	Every 3 years: N\$500	Every 3 years: N\$500
- Disease control	Medicines: N\$2,100	Medicines: N\$1,400
- Supplements, vitamins, etc.	Purchase N\$3,400	Purchase N\$2,300
- Herder	No herder employed N\$0	No herder employed N\$0
- <b>Total cost</b>	<b>N\$6,000</b>	<b>N\$4,200</b>
<b>Net Income</b>	<b>N\$11,600</b>	<b>N\$7,800</b>

Source: Prepared by the Study Team



## **CHAPTER 6            LESSONS LEARNT AND RECOMMENDATION TO MASTER PLAN**

### **6.1            Lessons Learnt**

Lessons learnt obtained in the Phase-2 and Phase-3 of N-CLIMP is described as follows:

(1)        **Work load of Agricultural Technicians and Senior Staff**

In conducting the pilot site activities, heavy work burden of ATs due to unfilled posts of ADCs resulted in reduction of input for the proper trainings for farmers groups and their monitoring. It was expected that senior staffs supervise field activities to support insufficient experiences of ATs but available CATs and CASOs / ASOs were also limited to cover the site activities. For the selection of number and sites to be implemented under the Master Plan, such burden of ATs and senior staff should be carefully avoided. Back-support from the headquarters of MAWF is also required through smooth communication and linkage between the headquarters and the regional office level

(2)        **Timely Disbursement of Budget and Arrangement of Equipment**

It was sometimes observed that delay in disbursement of budget, particularly for communication and transportation, brought difficult situation to implement pilot site activities timely. Similar situation was also observed in the research stations for researchers to participate in the pilot site activities for field extension. In this regard, smooth disbursement of budget will accelerate to implement the Master Plan,

(3)        **Selection of Key Farmers**

In the pilot site activities, target farmers were selected by ATs in charge, with the selection criteria such as 15 numbers of farmers, gender consideration, average farming scale and accessible location. However, key farmers tended to come from very far village and ATs have to go and pick them up. It is important to train people from wide area for extension point of view, but easy access of key farmers to demonstration farm makes their work easy for technical verification. For implementation of the Master Plan activities, it is important to think about the balance of extension and verification, for the selection of target farmers.

### **6.2            Recommendation to Implementation of the Master Plan**

(1)        **Budgetary Arrangement for Master Plan Implementation**

Budget for implementation of the Master Plan is to be arranged by MAWF. Necessity of budgetary arrangement was already under preparation by MAWF. The arrangement and disbursement should be assured from April 2017 and onward.

(2)        **Number and Selection of Pilot Sites**

In the Draft Master Plan Workshop in April 2016 by inviting members of stakeholder meetings of 4regions, different opinions regarding number and selection, however, major opinion is that the pilot site activities will be implemented at same sites for longer period more than 1 year in order to stabilize extension system and to expand to other areas stepwise.

(3)        **Strengthen of Farmer to Farmer Extension System**

During Phase-2 activities, target farmers have learned new or improved techniques and technical measures through trainings by ATs. In Phase-3 activities, those farmers are expected to be “trainer” of

other neighboring farmers. Continuous support for those farmers to be community mentor is required. In addition, organization of field days is one of possibility for community members to know widely about N-CLIMP activities and techniques and technical measures introduced, as well as motivate target farmers to teach their knowledge to visitors.

(4) Strengthening of Coordination among Relevant Organizations and programs

During the implementation of N-CLIMP, series of meetings and trainings were organized and relevant organizations were invited. N-CLIMP also participated the meetings and workshops held by Meat Board, National Comprehensive Conservation Agriculture Program, SATREPS, and so on. In addition, there were several meetings and discussion with AgriBusDev for implementation of pilot site activities in Etunda Irrigation Schemes. In the Master Plan implementation, the involvement of relevant organizations needs to be promoted more through close communication and appropriate and timely arrangement of activities in collaborative manner.

*Table*

*N-CLIMP*

**Table 1.4.1 List of ADCs and Staffs in 4 Regions (1/2)**

as of March 2017

Region (Sub-Division)	Name of ADC	Constituency	Staffs
<b>North Central Division (Location: Ongwediva / Outapi)</b>			<b>DD: Ms. Enny Namalambo (from Apr. 2017)</b> <b>Acting DD: Mr. Martin Embuudile (Jul. '15 to Mar. '17)</b> <b>DD: Mr. Bekko Imalwa (retired in July 2015)</b>
Ohangwena	Regional Office	(Location: Eenhana)	CASO: Ms. Margaret M. Matengu SASO: Ms. Megameno Amutenya (from Oct. 2016) ASO: Ms. Aina Uusiku ASO: Mr. Salomo Uusiku CAT: Mr. Immanuel Eelu CAT: Ms. Marina Kaambu
	1 Eenhana	Eenhana-North, South	SAT: Ms. Hambeleleni Nghipunya SAT: Ms. Helaria Mhanda SAT:
	2 Omafo	Engela, Ohangwena, Oshikango	SAT: Mr. Elikias Iyambo AT: Vacant SAT: Ms. Evelina Shuuluka
	3 Omauni	Okongo	SAT: Ms. Justah Nalushiya AT: Ms. Hiralia Mhanda
	4 Okongo	Okongo	SAT: (Mr. Paulus Mbaile, shited in Mar. 2016)
	5 Epembe	Epembe	SAT: (Mr. Bruce Kasaona, transferred Apr. 2016) Acting by CAT Mr. Immanuel Eelu
	6 Omundaungilo	Omundaun-gilo	SAT: (Mr. Immanuel Eelu) Vacant
	7 Ongula Ya Netanga	Omulonga	SAT: Mr. William Haishonga
	8 Ondobe	Ondobe	AT: Mr. Festus Nembia (from April 2016) (Mr. Henry Shilumba by Mar. 2016)
	9 Endola	Endola	AT: Mr. Nickolaus Endjala
	10 Ongenga	Ongenga	SAT: Vacant
	11 Ongha	Endola	AT: Mr. Henry Shilumba (from Apr. 2016)
	12 Oshikunde	Epembe	AT: Vacant
Omusati	Regional Office	(Location: Outapi)	CASO: Mr. Martin Embuudile ASO: (Ms. Anna Shivute by Apr. 2016) ASO: Mr. Toivo Shivute (Etunda by Apr. 2016) CAT: Mr. Sylvanus Naunyango CAT: Mr. Lucas Hipangelua
	1 Outapi	Outapi,	AT: (Ms. Aina Uusiku, to Ohangwena in Oct. '16) AT: Ms. Lina Aiyambo
	2 Okahao	Okahao	SAT: Ms. Rachel Anguwo SAT: Ms. Julia Shigwedha AT: Ms. Festus Iipumbu
	3 Onkani	Otamanzi	AT: Ms. Loide Shipateko
	4 Tsandi	Tsandi	AT: Ms. Monika Moses
	5 Onesi	Onesi	AET Ms. Agnes Akwenye
	6 Eunda	Onesi	AT: Vacant
	7 Iipanda (Ogongo)	Ogongo	AT: Vacant
	8 Oshikuku	Oshikuku	AT: Ms. Otilie Nawa
	9 Onaanda	Elim	AT: Mr. Andreas Ipinge
	10 Etayi	Etayi	SAT: Ms. Mirjiam Fikunawa
	11 Okalongo	Okalongo	AT: Ms. Kaunapawa Shapenga (support to Etayi)
	12 Oshifo (Ruacana)	Ruacana	AT: Mr. Pombili Sheehama AT: Ms. Lydia Sakeus
	13 Etunda	Ruacana	SAT: Ms. Lucia Naunyango AT: Mr. Lucas Moongela
	14 Onawa	Anamulenge	AT: Mr. Erkki Shitowomunhu
15 Omakange	Ruacana	AT: Mr. Jan Ua-Hapuka	

**Table 1.4.1 List of ADCs and Staffs in 4 Regions (2/2)**

as of March 2017

Region (Sub-Division)	Name of ADC	Constituency	Staffs
Oshana	Regional Office	(Location: Ongwediva)	Acting CASO: Ms. Vicky N. Ipinge ASO: Ms. Anna Shivute (from Apr. 2016) ASO: Mr. Charlie Mwaetako (goat program) ASO: Ms. Mvoyaha Nakaande (horticulture) CAT: Ms. Loide Endjala CAT: Mr. Nester Haufiku (support to pilot sites) SAT:
	1 Ompundja	Oshakati East	AT: Ms. Tuyenikelago Shitenda
	2 Uukwangula	Okatana	AT: Ms. Prucheria Mwanyangapo (AT: Ms. M. T. Hango by June 2016)
	3 Okau-Kamasheshe	Oshakati West	AT: Mr. Agast Amon SAT: Mr. Lucas K. Shimooshili (from Apr. 2016)
	4 Engombe	Uuvudhiya	SAT: Ms. Taimi Nambambi
	5 Enguwantale	Ompundja	SAT: Ms. Magdalena Haludilu
	6 Ongwediva	Ongwediva	SAT: Ms. Lucia Ipinge
	7 Uukwiyu-Uushona	Uukwiyu-Uushona	SAT: Ms. Kaarina Nghilwamo
	8 Okaku	Okaku	SAT: (vacant) AT: Ms. Elise Hasholo
	9 Okatyali	Okatyali	SAT: Ms. Anna Amwaalwa (support to Uukwiyu)
10 Ondangwa	Ondangwa	SAT: Ms. Klaudia Magano Mathias	
Oshikoto	Regional Office	(Location: Onankali)	CASO: Mr. Oswald Mwamyangapo (ASO: Ms. Benita Elago by Mar. 2016, support) CAT: Ms. Lucia Shimi (support to pilot sites)
	1 Onankali	Onyaanya	SAT: Ms. Hambelelni Shileka (support to Omuntele) ASO Isaack Nghaamwa (support to pilot sites) SAT: Ms. Veronika Nghishidimbwa
	2 Onayena	Onayena	(SAT: Ms. Hilja Nghipangelwa, passed away Oct. '14) SAT: Mr. Salmon Hosea AT: Ms. Ester Namushinga
	3 Tsumeb	Tsumeb	ASO Mr. Lukas Kaholongu: SAT: Under advertisement AT: Mr. Naholo Elias
	4 Onyuulaye	Okankolo	SAT: under Advertisement AT: Mr. George Haufiku from Feb. 2017
	5 Okapya	Guinas	AT: Mr. Sergius Kanyangela
	6 Oshigambo	Oniipa	SAT: Mr. Nuuyoma Erastus
	7 Omuntele	Omuntele	(AT: Mr. George Haufiku by Mar. 2016) AT: Mr. Joseph Jonas from Mar. 2017)
	8 Okashana	Omuthiya-qwiipundi	AT: Mr. Wilhelm Kashimba
	9 Olukonda	Olukonda	SAT: Ms. Patricia Sheehama
	10 Onamishu	Eengodi	AT: Mr. Moscow Neo
	11 King Kauluma	Nehale IyaMpingana	AT: Mr. Sergius Kanyangela
12 Olukupa	Nehale IyaMpingana	(AT: Mr. Joseph Jonas by Mar. 2017)	

NCD: North Central Division (4 Regions of Ohangwenena, Omusati, Oshana Oshikoto)

ADC: Agricultural Development Center

DD: Deputy Director of NCD

CASO; Chief Agricultural Scientific Officer, SASO Senior Agricultural Scientific Officer, ASO: Agricultural Scientific Officer

CAT: Chief Agricultural Technician, SAT: Senior Agricultural Technician, AT: Agricultural Technician

: in charge of pilot site, or support to pilot site.

**Table 1.6.1 Meetings under N-CLIMP**

**Meetings held during Phase-1 Study**

No.	Title / Major Participants	Date	Topic
1	Title: Steering Committee Meeting (1)  Participants: Steering Committee Members, MAWF	September 22 <sup>nd</sup> , 2014	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Presentation on Inception Report (outline, approach, methodology and arrangement to be required)</li> <li>◆ SHEP approach (movie, group discussion on SHEP approach, supplemental explanation and special consideration from MAWF)</li> <li>◆ Work schedule from September to December 2014</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ Number of activities of pilot project in phase 2</li> <li>◆ Confirmation on relation between agriculture extension system improvement through SHEP approach and the formulation of the Master Plan</li> <li>◆ Implementation structure for N-CLIMP</li> <li>◆ Budgetary arrangement by JICA and MAWF</li> <li>◆ Information flow of N-CLIMP</li> <li>◆ Participation of key MAWF staff for SHEP approach</li> <li>◆ Consideration to field work to commence from October 2014</li> <li>◆ Counterpart personnel for N-CLIMP</li> </ul>
2	Title: Divisional Committee Meeting (1)  Participants: Divisional Committee Members from Relevant Organizations	September 30 <sup>th</sup> , 2014	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Presentation on Inception Report (outline, approach and methodology)</li> <li>◆ SHEP approach (movie and supplemental explanation)</li> <li>◆ Technical measures for crop and livestock production (tentative)</li> <li>◆ Work schedule from September to December 2014</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ Member of stakeholder meeting</li> <li>◆ Proposed plan for livestock development</li> <li>◆ Scale of pilot site activities</li> <li>◆ Budgetary arrangement by JICA and MAWF</li> <li>◆ Cost burden for some organizations</li> <li>◆ Final products of N-CLIMP</li> <li>◆ Coordination among SC at the central, DC at the divisional and SM at the regional levels</li> <li>◆ Schedule of SMs</li> </ul>
3	Title: Stakeholder Meeting (1)  Participants: Stakeholder Meeting Members	October 6 <sup>th</sup> , 2014 at Outapi, Omusati	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Presentation on outline of N-CLIMP (outline, approach and methodology)</li> <li>◆ SHEP approach (movie and supplemental explanation)</li> <li>◆ Technical measures for crop and livestock production</li> <li>◆ Work schedule from September to December 2014</li> <li>◆ Explanation of questionnaire and survey schedule</li> </ul> <p>Discussion</p> <p><u>Omusati region</u></p> <ul style="list-style-type: none"> <li>◆ Livestock value chain in NCAs</li> <li>◆ Water harvesting technology to be applied for N-CLIMP</li> <li>◆ Production of horticulture crop in the North Central Division</li> <li>◆ Export of livestock</li> <li>◆ Budgetary arrangement by JICA and MAWF</li> <li>◆ Explanation of questionnaire to ATs</li> </ul>

No.	Title / Major Participants	Date	Topic
		October 7 <sup>th</sup> , 2014 at Oshana	<u>Oshana region</u> <ul style="list-style-type: none"> <li>◆ Target of pilot site activities</li> <li>◆ Overall review survey responsibility</li> <li>◆ Varieties recommended for fodder production</li> <li>◆ Explanation of questionnaire to ATs</li> </ul>
		October 9 <sup>th</sup> 2014 at Oshikoto	<u>Oshikoto region</u> <ul style="list-style-type: none"> <li>◆ Confirmation of objective of N-CLIMP</li> <li>◆ Necessity on explanation of N-CLIMP to regional governor</li> <li>◆ Training component under N-CLIMP</li> <li>◆ Utilization of government-developed infrastructure</li> <li>◆ Measures for fodder production</li> <li>◆ Northern Livestock Development Project by IFAD</li> <li>◆ Necessity of soil sampling</li> <li>◆ Importance of introduction of productive seed</li> <li>◆ Continuation of master plan</li> <li>◆ Issue for rangeland management through group grazing</li> <li>◆ Explanation of questionnaire contents to ATs under Oshikoto region</li> </ul>
		October 10 <sup>th</sup> 2014 at Ohangwena	<u>Ohangwena region</u> <ul style="list-style-type: none"> <li>◆ Discussion on outline of N-CLIMP (maximum utilization of existing techniques, improvement of coordination mechanism through proposed implementation structures and dissemination activities)</li> <li>◆ SHEP approach: (i) coordination with researchers in SHEP approach, (ii) administrative staff covered under step 3 and (iii) utilization of existing group</li> <li>◆ Technical measures for crop and livestock production: (i) establishment of directorate of animal production, (ii) goat production, (iii) effectiveness of drench, (iv) funding for the implementation and (v) livestock marketing in the future</li> <li>◆ Work schedule from October to December 2014 &amp; explanation of questionnaire and survey schedule: (i) intercropping to be considered for section C and (ii) explanation of questionnaire contents to ATs under Ohangwena region</li> </ul>
4	Title: Stakeholder Meeting (2)  Participants: Stakeholder Meeting Members	November 19 <sup>th</sup> , 2014 at Oshikoto November 24 <sup>th</sup> , 2014 at Oshana November 25 <sup>th</sup> , 2014 at Ohangwena November 26 <sup>th</sup> , 2014 at Omusati	Presentation <ul style="list-style-type: none"> <li>◆ Sharing of results of overall review survey by ATs</li> <li>◆ Technical measures for crop and livestock production</li> <li>◆ Explanation of detailed thematic survey</li> </ul> Discussion <u>Oshikoto region</u> <ul style="list-style-type: none"> <li>◆ Approach of range management</li> <li>◆ Necessity of prioritization of technical measures</li> <li>◆ Improvement of some farming practices: (i) weeding and (ii) land preparation</li> <li>◆ Other current major issues related with technical measures among regional farmers: (i) soil sampling, (ii) marketing, (iii) advantage of local varieties, (iv) differences of awareness between ATs and farmers and (v) promotion of horticulture crops through appropriate technology</li> <li>◆ Deadline of detailed thematic survey: by January 7<sup>th</sup> 2015</li> </ul> <u>Oshana region</u> <ul style="list-style-type: none"> <li>◆ Definition of commercial farmer</li> <li>◆ Other current major issues related with technical measures among regional farmers: (i) outsourcing for</li> </ul>

No.	Title / Major Participants	Date	Topic
			<p>livestock extension services, (ii) gender issues in livestock subsector, (iii) difficulties in the adoption of conservation agriculture and (iv) sustainability of group grazing for range management</p> <ul style="list-style-type: none"> <li>◆ Deadline of detailed thematic survey: by noon, December 18<sup>th</sup> 2014</li> </ul> <p><u>Ohangwena region</u></p> <ul style="list-style-type: none"> <li>◆ Current major issues related with technical measures among regional farmers: (i) sustainability of technical measures at the field level, (ii) number of ATs and (iii) target of pilot site activities in phase 2</li> <li>◆ Comment on the questionnaire for detailed thematic survey: (i) water source option in section C Living Conditions, (ii) questions to be categorized into 3, crop, livestock and horticulture in Section F Crop and Livestock Marketing and (iii) question for horticulture to be added in Section H Agriculture Support Services including Extension</li> <li>◆ Deadline of detailed thematic survey: to be informed to N-CLIMP Team later</li> </ul> <p><u>Omusati region</u></p> <ul style="list-style-type: none"> <li>◆ Discussion for the result from the overall review survey: (i) seed producer farmers, (ii) sheep husbandry and (iii) horticulture farmers in the region</li> <li>◆ Comment on the questionnaire for detailed thematic survey: (i) option of availability of items in section C Living Conditions, (ii) dipping to be added as a question in E2-3 disease control for livestock in section E Farming Management and (iii) include forage as one of the feeding method for livestock in question E2-4 in section E Farming Management</li> <li>◆ Deadline of detailed thematic survey: by December 18<sup>th</sup> 2014</li> </ul>
5	<p>Title: Stakeholder Meeting (3)</p> <p>Participants: Stakeholder Meeting Members</p>	<p>January 27<sup>th</sup>, 2015 at Oshana January 29<sup>th</sup>, 2015 at Oshikoto January 30<sup>th</sup>, 2015 at Ohangwena February 3<sup>rd</sup>, 2015 at Omusati</p>	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Sharing of results of overall review survey by ATs</li> <li>◆ Technical measures for crop and livestock production</li> <li>◆ Explanation of detailed thematic survey</li> </ul> <p>Discussion</p> <p><u>Oshana region</u></p> <ul style="list-style-type: none"> <li>◆ Findings from overall review survey: (i) insufficient number of ATs , (ii) necessity of coordination among DVS, research station and any other agriculture industry for livestock extension works, (iii) necessity of close working environment among DVS technicians, (iv) common recognition and/or constraints consisting of insufficient seed, fluctuation of rainfall pattern, insufficient number of machinery and relevant equipment, (v) necessity of livestock marketing support since CBRLM generally especially focused on management of animal health and (vi) necessity of enhancement of crop production and marketing through interdisciplinary team including AMTA, AgriBusDev and DAPEES</li> <li>◆ Progress of detailed thematic survey: 7 ADCs completed out of 10</li> <li>◆ Fixed point observation: Ompunja for crop production-based farmer and Okau-Kamasheshe for livestock production-based and horticulture farmers</li> </ul>



No.	Title / Major Participants	Date	Topic
			<ul style="list-style-type: none"> <li>◆ Schedule of JSM: agreed that JSM will be held on February 18<sup>th</sup>, 2015</li> </ul> <p><u>Oshikoto region</u></p> <ul style="list-style-type: none"> <li>◆ Findings from overall review survey: (i) insufficient number and field experiences of scientific officers, (ii) insufficient long-term meteo-hydrological data, (iii) necessity of younger staff to work with senior staff to enhance their capabilities, (iv) farmers' need covering extensively crop and livestock production and farm management, (v) research subject by UNAM not necessarily meet farmers' need and (vi) necessity of manual or guideline for crop and livestock production</li> <li>◆ Progress of detailed thematic survey: 10 ADCs completed out of 11</li> <li>◆ Fixed point observation: sites will be determined later</li> <li>◆ Schedule of JSM: agreed that JSM will be held on February 18<sup>th</sup>, 2015</li> </ul> <p><u>Ohangwena region</u></p> <ul style="list-style-type: none"> <li>◆ Findings from overall review survey: (i) insufficient number of ATs , (ii) use of improved seed, (iii) necessity of admin. officer at ADC, (iv) coordination among relevant organizations and (v) conservation tillage</li> <li>◆ Progress of detailed thematic survey: 8 ADCs completed out of 12</li> <li>◆ Fixed point observation: Ondobe for crop production-based farmer, Okongo for livestock production-based farmer and Endola for horticulture farmer</li> <li>◆ Schedule of JSM: agreed that JSM will be held on February 18<sup>th</sup>, 2015</li> </ul> <p><u>Omusati region</u></p> <ul style="list-style-type: none"> <li>◆ Findings from overall review survey: (i) insufficient number of ATs and (ii) major extension works in the region consisting of DCP, crop and livestock marketing support, range management support and green scheme management</li> <li>◆ Progress of detailed thematic survey: 11 ADCs completed out of 13</li> <li>◆ Fixed point observation: Okalongo for crop production-based farmer, Ruacana for livestock production-based farmer and Onesi for horticulture farmer</li> <li>◆ Schedule of JSM: agreed that JSM will be held on February 18<sup>th</sup>, 2015</li> </ul>
6	<p>Title: Joint Stakeholder Meeting</p> <p>Participants: Steering Committee, Divisional Committee and Stakeholder Meeting Members from 4 Regions</p>	February 18 <sup>th</sup> , 2015	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Summary of detailed thematic survey</li> <li>◆ Technical measures categorization</li> <li>◆ Dissemination system (group work including presentation)</li> <li>◆ Master plan framework</li> <li>◆ Work schedule for phase 1 (Feb. to May 2015) and phase 2 starting from July 2015</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ Findings from detailed thematic survey: (i) communal farmers' having higher mortality rate of animals than that of commercial farmers, (ii) highest concern among</li> </ul>

No.	Title / Major Participants	Date	Topic
			<p>farmers, (iii) technical justification of the survey and (iv) importance of periodical vaccination for animals</p> <ul style="list-style-type: none"> <li>◆ Categorization of proposed technical measures: (i) component of activities for flood- and drought-adaptive cropping system and (ii) reason for categorizing “establishment of crop production and marketing cooperatives” into category 3</li> <li>◆ Dissemination system: discussion on grain production by 3 regions and animal feed supply by 1 region</li> <li>◆ Framework of the master plan: (i) target corresponding to challenges, (ii) livestock product market in the future, (iii) importance of business mind by farmers, (iv) use of traditional knowledge and (v) limitation of technical measures</li> </ul>
7	<p>Title: Steering Committee Meeting (1)</p> <p>Participants: Steering Committee Members, MAWF</p>	August 8 <sup>th</sup> , 2015	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Review of background of N-CLIMP</li> <li>◆ Results of overall review survey and thematic survey by ATs in each region</li> <li>◆ Categorization of technical measures</li> <li>◆ Framework of master plan</li> <li>◆ Details of technical measures</li> <li>◆ Work schedule of phase-2</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ General understanding of technical measures,</li> <li>◆ Challenges and constraints identified by ATs,</li> <li>◆ Linkage and collaboration with projects and programs,</li> <li>◆ Budgetary arrangement for Phase-3,</li> <li>◆ Effects by supply of materials under KR2,</li> <li>◆ Rangeland potential in the North Central Regions,</li> <li>◆ Points to be taken into account for pilot site selection,</li> <li>◆ Points to be considered in pig production.</li> </ul>

Source: Prepared by the Study Team

#### Meetings held during Phase-2 Study

No.	Title / Major Participants	Date	Topic
1	<p>Title: Steering Committee Meeting (1)</p> <p>Participants: Steering Committee Members, MAWF</p>	August 8 <sup>th</sup> , 2015	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Confirmation on minutes of meeting for Steering Committee Meeting (1) in phase-3</li> <li>◆ Confirmation on output of phase-2 of N-CLIMP</li> <li>◆ Work schedule of phase-3 of N-CLIMP</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ Procurement of vehicles for each region, importance of water accessibility, budgetary arrangement by MAWF for the implementation of the draft master plan in the phase-3, needs of agriculture inputs, depression of crop product price, difficulty of promotion of pig production</li> <li>◆ Necessity of changing attitude of livestock farmers</li> <li>◆ Selection criteria for pilot site activities</li> <li>◆ Necessity of N-CLIMP briefing to regional governor, necessity of marketing survey by self-sufficient farmers</li> </ul> <p>SHEP task force at the regional level</p>

No.	Title / Major Participants	Date	Topic
2	Title: Stakeholder Meeting (1)  Participants: Stakeholder Meeting Members	August 4 <sup>th</sup> , 2016 at Omusati, August 5 <sup>th</sup> , 2015 at Oshikoto, August 17 <sup>th</sup> , 2015 at Oshana, August 25 <sup>th</sup> , 2015 at Ohangwena	Presentation <ul style="list-style-type: none"> <li>◆ Confirmation on output of phase-1 of N-CLIMP</li> <li>◆ Work schedule of phase-2 of N-CLIMP</li> <li>◆ Discussion on selection procedure of pilot site activities</li> <li>◆ Selection of pilot sites</li> </ul> Discussion <ul style="list-style-type: none"> <li>◆ Share of challenges in the region</li> <li>◆ Criteria for selection of target ADCs</li> <li>◆ Selection of target ADCs</li> </ul>
3	Title: Stakeholder Meeting (2)  Participants: Stakeholder Meeting Members	September 2 <sup>nd</sup> 2015 at Oshana, September 3 <sup>rd</sup> 2015 at Oshikoto, September 8 <sup>th</sup> 2015 at Omusati, September 9 <sup>th</sup> 2015 at Ohangwena	Presentation <ul style="list-style-type: none"> <li>◆ Preparation of AT's supporting plan based on farmers' group action plan</li> </ul> Discussion <ul style="list-style-type: none"> <li>◆ Operation of pilot site activities</li> <li>◆ Selection criteria for target farmers</li> <li>◆ Selection of technical measures</li> <li>◆ Estimation of necessary input</li> </ul>
4	Title: Draft Master Plan Workshop  Participants: Stakeholder Meeting Members from 4 Regions	April 12 <sup>nd</sup> 2016	Presentation <ul style="list-style-type: none"> <li>◆ Review of previous activities (Phase-1 and Phase-2)</li> <li>◆ Draft master plan to be formulated in the Phase-2</li> <li>◆ Review of pilot site activities</li> <li>◆ Work plan for Phase-3</li> </ul> Discussion <ul style="list-style-type: none"> <li>◆ Perspective of current constraints and future plan between ATs and farmers</li> <li>◆ Contents of the Draft Master Plan</li> <li>◆ Number and selection of pilot site activities in Phase-3</li> <li>◆ Technical measures to be applied in Phase-3</li> <li>◆ Implementation system</li> <li>◆ Work schedule based on the lesson learnt from pilot site activities in Phase-2</li> <li>◆ Budgetary arrangement by MAWF in Phase-3</li> </ul>
5	Title: Steering Committee Meeting (1)  Participants: Steering Committee Members, MAWF	May 10 <sup>th</sup> 2016	Presentation <ul style="list-style-type: none"> <li>◆ Review of the pilot site activities</li> <li>◆ Draft master plan formulated in the Phase-2</li> <li>◆ Work plan for Phase-3</li> </ul> Discussion <ul style="list-style-type: none"> <li>◆ Lesson learnt and suggestions from pilot site activities conducted in each Region</li> <li>◆ Implications for NDP-5 and PIF in the next fiscal year derived from the Draft Master Plan</li> <li>◆ Technical measures to be applied in Phase-3</li> <li>◆ Implementation system</li> <li>◆ Budgetary arrangement by MAWF in Phase-3</li> </ul>

Source: Prepared by the Study Team

### Meetings held during Phase-3 Study

No.	Title / Major Participants	Date	Topic
1	Title: Steering Committee Meeting (1)  Participants: Steering Committee Members, MAWF	August 3 <sup>rd</sup> 2016	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Confirmation on minutes of meeting for Steering Committee Meeting (2) in phase-2 (May 10<sup>th</sup> 2016)</li> <li>◆ Review of activities in the Phase-2</li> <li>◆ Work plan of the Phase-3 (Jul. 2016 to May 2017)</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ Measures to promote farmers to farmers extension</li> <li>◆ Namibian SHEP approach</li> <li>◆ Marketing activities for livestock</li> <li>◆ Technical measures for the increase of cereal grains production</li> <li>◆ Dissemination of guinea fowl</li> <li>◆ Action plan prepared by the SHEP trainees</li> <li>◆ SHEP approach for Green Scheme</li> <li>◆ Lesson learnt from the pilot site activities</li> </ul>
2	Title: Stakeholder Meeting (1)  Participants: Stakeholder Meeting Members	August 8 <sup>th</sup> 2016 at Omusati, August 9 <sup>th</sup> 2016 at Oshikoto, August 11 <sup>th</sup> 2016 at Oshana, August 12 <sup>th</sup> 2016 at Ohangwena	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Review of pilot site activities in phase-2 (Nov. 2015 to Apr. 2016)</li> <li>◆ Verification results of technical measures</li> <li>◆ Procedures for selection of pilot sites</li> <li>◆ Work plan for pilot site activities in Phase-3 (Nov. 2016 to Apr. 2017)</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ Action plan based on the resources by regions</li> <li>◆ Ownership of ATs</li> <li>◆ Learning by ATs through implementation of Draft Master Plan</li> <li>◆ Linkage with the existing programs and schemes</li> <li>◆ Farming models for horticulture</li> </ul>
3	Title: Stakeholder Meeting (2) & Preparatory Training for Famers Group  Participants: Stakeholder Meeting Members, Farmers from Pilot Sites, Stakeholders	August 17 <sup>th</sup> 2016 at Oshikoto, August 18 <sup>th</sup> 2016 at Oshana, August 19 <sup>th</sup> , 2016 at Omusati, August 23 <sup>rd</sup> 2016 at Ohangwena	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Outline of N-CLIMP</li> <li>◆ Bench mark survey</li> <li>◆ FABLIST forum</li> <li>◆ Gender training</li> <li>◆ Preparation of action plan by farmers</li> <li>◆ Preparation of supporting plan by ATs</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ Confirmation of farmers groups members and their situation</li> <li>◆ Constraints and challenges of farmers</li> <li>◆ Selection technical measures</li> <li>◆ Estimation of necessary input</li> </ul>
4	Title: Joint Stakeholder Meeting  Participants: Stakeholder Meeting Members from 4 Regions	April 5 <sup>th</sup> , 2017	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Review of Implementation of Draft Master Plan, farmers representatives from pilot sites and wrap-up by Regional Chief</li> <li>◆ Farming Model</li> <li>◆ Master Plan for Livestock and Crop Development</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ Activities by MAWF after N-CLIMP</li> </ul>
5	Title: Steering Committee Meeting (2)  Participants: Steering Committee Members, MAWF	April 12 <sup>nd</sup> , 2017	<p>Presentation</p> <ul style="list-style-type: none"> <li>◆ Review of Implementation of pilot site activities</li> <li>◆ Farming Model</li> <li>◆ Master Plan for Livestock and Crop Development</li> </ul> <p>Discussion</p> <ul style="list-style-type: none"> <li>◆ Activities by MAWF after N-CLIMP</li> </ul>

Source: Prepared by the Study Team

**Table 2.1.1 Categorization of Technical Measures for Crop Production, Livestock Production and Farm Management (1/2)**

No.	Name	Expected Impact	Necessity of Verification	Period required for Verification	Possibility of Dissemination after Verification			Coordination with other projects and programs	Category	Pilot Site Activities	Remarks
					Cost	Farmers no. for dissemination	Techniques Level				
<b>Crop Production</b>											
CR-1	Fertilizer application	Production increase by 20%	Necessary	5 years	Low	High	Basic	-DCPP -CAN	1, 2 to 3	Adopted	Stepwise approach
CR-2	Cropping pattern and crop management	Production increase by 20%	Necessary	2 years	Low	High	Basic	-DCPP -CAN	1, 2 to 3	Adopted	Prerequisite activity for any further measures
CR-3	Conservation agriculture	Production increase by 20%	Necessary	3 years	Low	High	Intermediate	-DCPP -CAN	1, 2 to 3	Adopted	
CR-4	Flood- and drought- adaptive cropping system (Rice-Mahangu mixed cropping)	Production increase by 20%	Necessary	2 years	Low	Moderate	Basic	SATREPS (UNAM and JICA Technical Cooperation Team)	1, 2 to 3	Adopted	Applicable to the area of Omusati, North-western Oshana and western Ohangwena regions using seasonal wetland
CR-5	Water source / water harvesting	Production increase by 20%	Necessary	2 years	High	Moderate	Basic to Advanced	-Okashana Crop Research Station -CAN	1, 2 to 3	Adopted	Roof catchment and/or surface run-off harvesting through small-scale civil works
CR-6	Water saving cultivation	Production increase by 20%	Necessary	3 years	Moderate	High	Intermediate	-Okashana Crop Research Station -CAN	1, 2 to 3	Adopted	Drip irrigation
CR-7	Crop selection and marketing	Profit increase by 20%	Necessary	3 years	Low	High	Intermediate	-CAN	1, 2 to 3	Adopted	Prerequisite activity for any further measures
CR-8	Cropping plan and horticulture crop management	Production increase by 20%	Necessary	3 years	Low	High	Intermediate	-CAN	1, 2 to 3	Adopted	Prerequisite activity for any further measures
CR-9	Establishment of crop production and marketing cooperatives	Profit increase by 10%	Necessary	3 years	High	High	Advanced	-DCPP -CAN -Meat Board mentorship program -FSP	3	Not adopted	Stepwise starting from small-scale group activities
<b>Livestock Production</b>											
LS-1	Fodder production	Production increase by 10%	Necessary	3 years	Low	High	Intermediate	Meat Board mentorship program	1	Adopted	To be implemented together with LS-2
LS-2	Range management	Production increase by 10%	Necessary	5 years	Moderate	High	Advanced	-CBRLM -Meat Board mentorship program -FSP	1, 2 to 3	Adopted	Initial activities to be implemented together with LS-1
LS-3	Water harvesting and/or construction of water resource facilities for animals	Production increase by 10%	Necessary	3 years	High	Moderate	Basic to Advanced	Meat Board mentorship program -FSP	1	Adopted	To be implemented at potential site as basic activities for animal health improvement
LS-4	Nutritious feed supply particularly for pig and chicken	Production increase by 10%	Necessary	3 years	Low	High	Intermediate	-Meat Board mentorship program -FSP	1	Adopted	To be implemented at potential site as basic activities for animal health improvement
LS-5	Disease control	Production increase by 20%	Necessary	3 years	Low	High	Intermediate	-Meat Board mentorship program -FSP	1	Adopted	To be implemented at potential site as basic activities for animal health improvement
LS-6	Large and small stock fattening	Production increase by 20%	Necessary	3 years	Low	High	Intermediate	-Meat Board mentorship program -FSP	1	Adopted	To be implemented at potential site as basic activities for animal health improvement

**Table 1.1.1 Categorization of Technical Measures for Crop Production, Livestock Production and Farm Management (2/2)**

No.	Name	Expected Impact	Necessity of Verification	Period required for Verification	Possibility of Dissemination after Verification			Coordination with other projects and programs	Category	Pilot Site Activities	Remarks
					Cost	Farmers no. for dissemination	Techniques Level				
LS-7	Periodical production	Production increase by 20%	Necessary	3 years	Low	High	Intermediate	-Meat Board mentorship program -FSP	1	Adopted	To be implemented at potential site as basic activities for animal health improvement
LS-8	Expansion of quality meat	Profit increase by 20%	Necessary	5 years	High	Low to moderate	Advanced	-Meat Board mentorship program -FSP	2 to 3	Not adopted	to be implemented followed by ensuring animal health and marketing activities
LS-9	Bull scheme	Production increase by 20%	Necessary	5 years		Low to moderate	Intermediate	-Meat Board mentorship program -FSP	2 to 3	Not adopted	
LS-10	Multiplication of Sanga bull	Production increase by 20%	Necessary	5 years	High	High	Intermediate	-Meat Board mentorship program -FSP	2 to 3	Not adopted	
LS-11	Goat production	Production increase by 20%	Necessary	3 years	Moderate	High	Intermediate	-Meat Board mentorship program -FSP	1	Adopted	to be implemented at potential sites as a part of small stock promotion
LS-12	Pig production	Production increase by 20%	Necessary	3 years	Moderate	High	Intermediate	-Meat Board mentorship program -FSP	1to2	Adopted	to be implemented at potential sites as a part of small stock promotion
LS-13	Chicken production	Production increase by 20%	Necessary	1 years	Moderate	High	Intermediate	-Meat Board mentorship program -FSP	1	Adopted	to be implemented at potential sites as a part of small stock promotion
LS-14	Promotion and strengthening of Auction for both large and small stocks	Profit increase by 10%	Necessary	3 years	Moderate	High	Advanced	-Meat Board mentorship program -FSP	2	Not adopted	Indirect support to existing auction
LS-15	Development of formal market for small stock	Profit increase by 10%	Necessary	5 years	High	High	Advanced	-Meat Board mentorship program -FSP	2	Not adopted	Indirect support for promoting informal marketing
LS-16	Establishment and strengthening livestock cooperatives	Profit increase by 10%	Necessary	3 years	High	High	Advanced	-Meat Board mentorship program -FSP	1,2to3	Adopted	focus given to strengthening existing cooperatives
<b>Farm Management</b>											
FM-1	Household accounting	Appropriate management of proposed measures for crop and livestock production	Necessary	-	Low	High	Intermediate	-	2	Not adopted	
FM-2	Record keeping (Farm Record)		Necessary	-	Low	High	Basic	-	1	Adopted	
FM-3	Post Harvest		Necessary	-	Moderate	Moderate	Intermediate	-	1,2 to 3	Not adopted	Trial at potential site
FM-4	Business plan		Necessary	-	Moderate	Moderate	Advanced	-	2	Not adopted	
FM-5	Group formation/ group		Necessary	-	Moderate	Moderate	Intermediate	-	1	Adopted	To be implemented together with FM-6
FM-6	Group accounting management		Necessary	-	Low	Moderate	Intermediate	-	1	Adopted	To be implemented together with FM-5
FM-7	Formulation of Water Users Association		Necessary	-	Moderate	Moderate	Intermediate	-	1	Not adopted	Newly established for water resource facilities to be constructed under pilot site activities
FM-8	Collective Selling / Purchasing		Necessary	-	Low	High	Intermediate	-	1	Adopted	Part of FM-6
FM-9	Rural finance accessibility		Necessary	-	Moderate	High	Intermediate	-	1	Not adopted	Part of FM-6
FM-10	Market information access		Necessary	-	Moderate	High	Intermediate	-	1	Adopted	Part of FM-6

Table .3.2.1 Revised Format of Farmres' Action Plan

Preparation Date: \_\_\_\_\_

Revised Date: \_\_\_\_\_

Implementation period: from [month year] to [month year]

1. General Information														
1.1 Region: <input type="checkbox"/> Omusati / <input type="checkbox"/> Oshana / <input type="checkbox"/> Oshikoto / <input type="checkbox"/> Ohangwena					1.5 Name of AT in charge:									
1.2 Constituency:					1.6 Relevant organizations:									
1.3 Village:														
1.4 Name of ADC:														
2. Group Information														
2.1 Group name:														
2.2 Representative:														
2.3 Number of Group Members:														
3. Major Activities								Major Challenges and Constraints						
3.1 Crop: <input type="checkbox"/> grains / <input type="checkbox"/> horticulture 3.2 Livestock: <input type="checkbox"/> cattle / <input type="checkbox"/> chicken / <input type="checkbox"/> 3.3 Farm Management:														
4. Work Schedule & Monitoring														
No.	Activity	Person in charge		Year						Next Year				
				June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan	Feb	Mar	Apr.
4.1			Plan											
			Actual											
4.2			Plan											
			Actual											
4.3			Plan											
			Actual											
4.4			Plan											
			Actual											
4.5			Plan											
			Actual											
4.6			Plan											
			Actual											
4.7			Plan											
			Actual											
4.8			Plan											
			Actual											

Table 3.2.2 Format of AT's Supporting Plan for Pilot Site Activities

Date: \_\_\_\_\_

Implementation period: \_\_\_\_\_ from [month, year] to [month, year]

1. General Information			
1.1 Region	<input type="checkbox"/> Omusati / <input type="checkbox"/> Oshikoto / <input type="checkbox"/> Oshana / <input type="checkbox"/> Ohangwena		
1.2 Constituency			
1.3 ADC			
1.4 AT in charge			
1.5 Activities	<input type="checkbox"/> Cereal/Grain / <input type="checkbox"/> Rice-Mahangu Mixed Cropping / <input type="checkbox"/> Horticulture / <input type="checkbox"/> Cattle / <input type="checkbox"/> Chicken / <input type="checkbox"/> Goat		
2. Relevant Techniques and Technical Measures			
Farmers' Challenge	Relevant Techniques	Necessary Inputs	
		By MAWF	By Farmers
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			



Table II-4.1.1 Training Details in Phase-2 (2/3 for Livestock Production)

No	Title	Work Procedure	Training				
			1st	2nd	3rd	4th	
1	LS-1	Fodder production	(1) Concept with farmers	*Explanation of fodder production *Kind of glass for fodder production (Not to be applied)		*Distribution of record format for fodder production	
			(2) Investigation of availability of fodder seeds and required amount of seeds				
			(3) Selection of land, demonstration of sowing, monitoring		*Selection of land (40m x 10m), division of plot *Fencing	*Land preparation and sowing	*Monitoring of growth
			(4) Training of harvesting and preservation of fodder			*Hay and silage making *Seed collection *Storage skill	
2	LS-2	Range management: Rotation	(1) Rotation concept	*Explanation of Rotation *Overgrazing and overstocking (Not to be applied)	*Follow up of understanding of the concept	*Follow up of understanding of the concept	*Follow up of understanding of the concept
			(2) Partition of rangeland and its plan of rotation with a fodder producer				
			(3) Implementation of rotation and monitoring	(Not to be applied)			
3	LS-4	Nutritious food supply for chicken	(1) Concept of nutritious food supply for chicken	*Explanation of nutritious food for chicken (Not to be applied)	*Follow up of understanding of the concept	*Follow up of understanding of the concept	*Follow up of understanding of the concept
			(2) Market research :kind of food , price , availability , factories				
			(3) Possibility to produce nutritious food in rural area		*Explanation of the method of producing nutritious feed	*Follow up of production of nutritious feed	*Follow up of production of nutritious feed
4	LS-5	Disease control	(1) Concept of disease control	*Main disease and its control *Explanation of vaccination, deworming and medication (Not to be applied)		*Distribution of record format for disease control	*Follow up
			(2) Increasing of vaccination places during vaccination campaign, increasing of drugs and vaccine at low price				
			(3) Animal handling and husbandry training	*Animal handling *Strain, dehorning, castration, injection, drenching oral administration pour on medicated, etc	*Explanation and display of animal husbandry kit: syringe and needle gloves, castration instrument (Castrator), deworming kit, drenching kit	demonstration of animal husbandry method	*Follow up
			(4) Training of medication and treatments		*Infectious disease vaccines, deworming medicines, antibiotics and their administration: injection, oral medication, drenching, etc.	demonstration of medication and treatment method	*Follow up
5	LS-6	Large and small stock fattening	(1) Concept of fattening	*Effect of deficiency of vitamin and minerals, supplemental feeds (Not to be applied)		*Distribution of record format for fattening	
			(2) Availability of foods and fodders for fattening				
			(3) Utilization of crop residues of grain and beans, fodder production		*Study of available crop residue, grain , beans	*Explanation of the method of producing nutritious feed	*Follow up
6	LS-7	Periodical production	(1) Concept of periodical production	*Explanation of the merit of periodical production	*Follow up of understanding	*Follow up of understanding	*Follow up of understanding
			(2) Training of feeding and breeding management	*Explanation of cattle life and timing of production	*Follow up of understanding	*Follow up of understanding	*Follow up of understanding
			(3) Accurate reproductive recording manner with breeding record	*Explanation of reproductive record	*Follow up of record keeping	*Distribution of record format for reproduction and balance sheet	*Follow up of record keeping
7	LS-11	Goat production	(1) Concept of goat production	*Explanation of goat raising management *Main disease and its control		*Explanation of animal husbandry kit: syringe and needle gloves, castration instrument (Castrator), deworming kit, drenching kit	
			(2) Training of feeding, breeding, disease control and securing of male goats	*Explanation of vaccination, deworming and medication *Effect of deficiency of vitamin and minerals, supplemental feeds *Reproduction of goat and its record		*Infectious disease vaccines, deworming medicines, antibiotics	
			(3) Accountant recording			*Distribution of record format for balance sheet, disease control, medication records	*Follow up of record keeping
8	LS-13	Chicken production (indigenous)	(1) Concept of chicken production	*Explanation of chicken production *Definition of chicken: layer, broiler, indigenous		*Importance of group formation for vaccination, medication and marketing	*Follow up for group formation
			(2) Lecture concerning management of housing, feeding, health, breeding and marketing	*Important disease and its control, vaccines, medicines, parasite control *Housing: ventilation, shadow, prevention from predators *Food making and watering instruments	*Medical administration: injection, spray, oral administration *Proper poultry house design and construction	*Improvement of poultry housing: Nests for laying and hatching, cleaning, dung collection *Explanation of Newcastle disease and parasite control	*Implementation of vaccination of Lasota vaccine (for Newcastle disease)
			(3) Accountant recording			*Distribution of record format for balance sheet, disease control, medication records	*Follow up of record keeping

Table 4.1.1 Training Details in Phase-2 (1/3 for Crop Production)

No	Title	Work Procedure	Training				
			1st	2nd	3rd	4th	
CR-1&2	Cropping Pattern and Crop management	(1) Crop growing calendar of pearl millet	(Not to be applied)		<i>*Explanation of cropping calendar</i>	<i>*Follow up of the plant growth and recording</i>	
		(2) Standard crop management of pearl millet	*Explanation of life cycle of pearl millet		<i>* Distribution of record formats for rainfall and pearl millet growth</i>		
		(3) Review of the present practice and explanation on fertilizer application method	*Explanation of basic fertilizer application methods				
		(4) Basal fertilizer application		*Field demonstration for basal fertilizer (manure) application on the initial growth *Proper thinning after 15 days from	*Follow up of thinning	<i>*Follow up of thinning</i>	
		(5) 1st & 2nd top dressing			<i>*Explanation for top dressing</i>	<i>*Follow up of top dressing</i>	
		(6) Modification of cropping calendar	(Not to be applied)				
3	Conservation Agriculture	(1) Land preparation by deep cultivation	*Explanation of lipper furrowing to increase soil moisture	*Implementation of lipper furrowing			
		(2) Furrow planting		*Explanation of appropriate sowing after lipper furrowing in order to utilize collected rainwater			
		(3) Mulching on the soil surface			*Explanation of the effect of mulching by crop residue, weed, thinned plant to avoid high temperature	*Follow up	
		(4) Crop rotation with fallow		*Explanation of the effect of fallow to avoid further soil degradation and improve soil fertility	*Follow up of fallow condition	*Follow up of fallow condition	
		(5) Contour furrowing		*Explanation of the effect of furrow along the contour line to catch the runoff water			
		(6) Inter-cropping with legume crops	(Not to be applied)				
4	Flood- and drought-adaptive cropping system (rice-mahangu mixed cropping)	(1) Introduction of mixed cropping	*Lecture on the Rice-mahangu project and utilization of seasonal wetland *Lecture on life cycle of rice and pearl millet *Discussion on utilization of seasonal wetland				
		(2) Preparation of cropping pattern	*Field inspection of seasonal wetland to be	*Preparation of cropping plan (Plot size)			
		(3) Land preparation and planting of rice and pearl millet		*Lecture on land preparation and transplanting	<i>*Demonstration of rice transplanting</i>	*Follow up of the plant growth	
		(4) Crop management			<i>*Explanation of cropping calendar</i> <i>* Distribution of record formats for rainfall and rice and pearl millet growth</i>	<i>*Follow up of recording</i>	
		(5) Harvesting, threshing, milling and marketing	(Not to be applied)				
		(6) Review of result and lesson learnt	(Not to be applied)				
5	CR-5	Water source / Water harvesting	(1) Roof catchment		*Lecture of calculation of water volume to be collected by roof catchment	<i>*Follow up of understanding</i>	<i>*measurement of roof size</i>
			(2) Utilization of seasonal wetland	(Not to be applied)			
6	CR-6	Water saving cultivation	(1) Low pressure drip irrigation system	*Explanation about low pressure drip irrigation system	*Installation of drip irrigation kit	*Explanation of the maintenance of drip irrigation kit	*Follow up of the utilization of drip irrigation kit
			(2) Simple drip irrigation system by PET	(Not to be applied)			
7	CR-7	Crop selection and Marketing	(1) Market visit		*Listing up of markets and visit for information gathering (type of vegetable, price, market needs, etc.) by SHEP approach		
			(2) Information sharing with stakeholder	(Not to be applied)			
			(3) Crop selection			*Crop selection based on market needs	
8	CR-8	Cropping plan and horticulture crop	(1) Cropping plan (Action plan)			*Preparation of farming schedule per crop based on market needs	
			(2) Horticulture crop management			*Lecture on basic cultivation techniques and knowledge of horticulture cultivation	*Follow up of the plant growth

Table II-4.1.1 Training Details in Phase-2 (3/3 for Farm Management)

	Title	Work Procedure	Training					
			1st	2nd	3rd	4th		
1	FM2	Book Keeping (Farm Record)	(1) Basic knowledge for keeping	General	*Explanation of importance and necessity of record keeping *Distribution of notebook for recording	*Confirmation of daily record		
				Crop	Plant growth			*Distribution of record formats for general cereal growth and horticulture
			Water				*Distribution of record formats for rainfall/ usage of tap water/ cost of fuel for pump/ cost of electricity for pump	*Monitoring for record keeping
			Live	LS1 Fodder production			*Distribution of record formats for fodder production	*Monitoring for record keeping
				LS4 Nutritious feed supply for pig and			*Distribution of record formats for nutritious feed supply	*Monitoring for record keeping
				LS5 Disease control			*Distribution of record formats for cow record, vaccination and disease control	*Monitoring for record keeping
				LS6 Large and small stock fattening			*Distribution of record formats for fattening	*Monitoring for record keeping
				LS7 Periodical production			*Distribution of record formats for periodical production and balance sheet	*Monitoring for record keeping
				LS11 Goat production			*Distribution of record formats for goat production and ewe record	*Monitoring for record keeping
				LS14 Chicken production			*Distribution of record formats for chicken production, vaccination and balance sheet	*Monitoring for record keeping
	(2) Analysis of result				*Analysis of progress of record keeping			
2	FM5	Group formation/ Group strengthening	(1) Formation of group	* Discussion for group profile	* Identification of group situation			
			(2) Motivating the members	*Explanation of the advantage of works as a group				
			(3) Establishment of the basic functions of group			*Formation of rules and regulation *Roles and responsibilities of group members *How to conduct regular meeting and how to keep meeting minutes	*Follow up for the activities, problem finding and solution	
3	FM-6	Group Account Management	(1) Budgeting and Monitoring of group cash flow			*Explanaion of basic group accounting *Confirmation of bank account and cash book	*Follow up for the group accounting	
4	FM-10	Market Information Access Improvement	(1)Introduction of marketing			*Market survey based on SHEP approach *Crop selection based on market survey result		
			(2) Marketing channels			*Selection of target market and buyer		
			(3) Tools for market information	(Not to be applied)				
			(4) Monitoring and Analysis of result				*Monitoring for activities (Access to market information, etc)	

Table 4.1.2 Training Plan in Phase-3 (1/3 for Crop Production)

No	Title	Components / Work Procedure / Step	Training			
			1st	2nd	3rd	
1&2	CR-1&2	Fertilizer Application and Cropping Pattern & Crop management	(1) Crop growing stage of pearl millet	*Review of Phase 2	*Review & discussion on farmers' cropping schedule by ATs	*Follow up and review of progress / result
			(2) Standard crop management of pearl millet	*Growing period, growth stages		
			(3) Land preparation	*Setting of ploughing schedule (ripper furrowing)		
			(4) Basal fertilizer application	-	*Explanation & discussion on practice, modification of cropping schedule and practices	
			(5) Planting			
			(6) Weeding			
			(7) Thinning			
			(8) Top dressing			
2	CR-3	Conservation Agriculture		*Review of Phase 2		*Follow up and review of progress / result
			(1) Ripper furrowing	*Scheduling of ploughing services with farmers contribution		
			(2) Minimum disturbance	-	*General explanation, discussion on application possibility and availability of materials, selection of principle to be applied	
			(3) Permanent organic soil cover			
(4) Crop rotation with fallow						
3	CR-4	Flood- and drought-adaptive cropping system (rice-mahangu mixed cropping)		*Review of Phase 2	*Review of the result of 1st training	*Follow up and review of progress / result
			(1) Outline of rice-mahangu mixed	*Growing period, growth stages *Overview of crop calendar with farming practice *Preparation of cropping schedule		
			(2) Preparation of cropping pattern	*Preparation of cropping plan	*General explanation	
			(3) Land preparation (ploughing)	*Preparation of ploughing schedule		
			(4) Basal fertilizer application			
			(5) Planting & transplanting			
			(6) Weeding			
(7) Harvesting, drying and threshing						
4	CR-5	Water source / Water harvesting	Oshana Region: Uukwangula ADC			*Follow up and review of progress / result
			(1) Water harvesting	*Explanation of water harvesting facilities in Okatana	*Installation of roof sheets	*Exposure visit to SATREPS (Ogongo UNAM Campus or farmers' field)
			(2) Procurement of material (Oshana)	*Obligation of farmers group (monthly group)		
			(3) Installation of roof sheets (Oshana)			
6	CR-6	Water saving cultivation	<u>Common Procedure &amp; Steps</u>			
			(1) Drip irrigation	*(Review of phase 2)	*(Visit of advanced farmer)	*Follow up and review of progress / result
7	CR-7	Crop selection and Marketing	(1) Market visit (to be done by FM-10)	(to be carried out by FM-10)	(to be carried out by FM-10)	*Follow up and review of progress / result
			(2) Information sharing with stakeholders (to be done by FM-10)			
			(3) Crop selection (to be done by FM-10)			
8	CR-8	Cropping plan and horticulture crop management	(1) Crop growing life of vegetables	*Review of Phase 2	*Review of the result of 1st training	*Follow up and review of progress / result
			(2) Cropping plan	*Explanation of crop growth (vegetable) and farming practices		
			(3) Crop management		*Visit of advanced farmer *Specific techniques according to the plant growth	
			(4) Cultivation techniques			

Table 4.1.2 Training Plan in Phase-3 (3/3 for Farm Management)

AT-D: Discussions by ATs

AT-F: Facilitation Practice by ATs

AT-P: Practical Training on the Issue

No	Title	Work Procedure	Key Words	Training			
				1st	2nd	3rd	
1	FM2	Record Keeping	(0) Brief Survey	Current Situation Confirmation	Reviewing and discussion on Previous Phase Activities (Questionnaire and Discussion)		
			(1) Benefits of Record Taking	Record Taking for Business-Oriented Agriculture	Benefits of Record Keeping (AT-F: Training on Benefits of Record Keeping )	Reviewing of Farmer Training	
			(2) Introduction of easy record Keeping	Dual Comparison: Inputs and Sales	Activities and Costs Vs. Sales	Reviewing of Farmer Training Sharing the Found Issues at Monitoring	Verification of Techniques, Extraction of Lessons Learnt
				Chronological Comparison:	Use of Calendar-like Framework	Reviewing of Farmer Training Sharing the Found Issues at Monitoring	Verification of Techniques, Extraction of Lessons Learnt
			(3) Record Keeping at the Field Level	Record Keeping for Crop and Livestock Production	Application to Crop and Livestock Production (AT-D: Methods of Monitoring)	Reviewing of Field Monitoring	Presentation and Extraction of Lessons Learnt
2	FM5	Group formation/ Group strengthening	(0) Brief Survey	Current Situation Confirmation	Reviewing and discussion on Previous Phase Activities (Questionnaire and Discussion)		
			(1) Formation of group	Reasons of Group Formation / Strengthening	Advantage of works as a group Advantage and disadvantage by member composition (AT-F: Motivate group activities )	Reviewing of Training Reviewing of Field Monitoring	
			(2) Basic functions of group	Decision Making of Group for Cooperation and Effective Use of Resources	Roles and responsibilities of group members Formation of rules and regulation (AT-F: Ways of Group Establishment) (AT-F: Conflict Resolution)	Reviewing of Training Reviewing of Field Monitoring	Presentation and Extraction of Lessons Learnt
			(3) Group Work in Agriculture	Group Function for Crop and Livestock Activities	Cooperative, WUA, and Procurement Groups (AT-D: Actual Groups working with, and the ways of monitoring their activities)	Reviewing of Training Reviewing of Field Monitoring	Presentation and Extraction of Lessons Learnt
3	FM-6	Group Account Management	(0) Brief Survey	Current Situation Confirmation		Reviewing and discussion on Previous Phase Activities (Questionnaire and Discussion)	
			(1) Basics of Group Accounting Management	Accountability		Ways of Account Information Disclosure to Members	
			(2) Group Accounting and Activity Plan	Budget and Activity Plan		Planning of Budget based on Records and Account book in previous seasons	
			(3) Application to Crop and Livestock Group Accounting	Analysis of Account Book and Budget Documents for Crop and Livestock Production		Ways of "reading" budget and account document (AT-P:Account Book Monitoring )	Reviewing of Training Reviewing of Field Monitoring Presentation and Extraction of Lessons Learnt

No	Title	Work Procedure	Key Words	Training			
				1st	2nd	3rd	
6	FM-8	Collective Selling/ Purchasing	(0) Brief Survey	Current Situation Confirmation		Reviewing and discussion on Previous Phase Activities (Questionnaire and Discussion)	
			(1) Basics of Collective Purchasing	Advantage of Collective Purchasing		Benefits of collective Purchasing	
			(2) Linkage between supplier/buyer and farmer group	Gaining information for the Business-Oriented Approaches		Information about supplier of agricultural input and/or buyer for agricultural products	
			(3) Application to Crop and Livestock Group Activities	Collective Purchase and Procurement for Crop and Livestock Production	Practical Methods and Cautions of Collective Purchase and Procurement (AT-D: Case Studies of Collective Purchasing of Chicken Vaccination / Fertilisers)	Reviewing of Training Reviewing of Field Monitoring Presentation and Extraction of Lessons Learnt	
8	FM-10	Market Information Access Improvement	(0) Brief Survey	Current Situation Confirmation	Reviewing and discussion on Previous Phase Activities and FABLIST Forum (Questionnaire and Discussion)		
			(1) Introduction of Market Survey	Market Survey for selection of crops /	Benefits of Market Survey Type of available markets in the neighbouring areas (AT-P: Ways of Filling the Market Survey Sheets for Horticulture)	Reviewing of Training Reviewing of Field Monitoring	Presentation and Extraction of Lessons Learnt
			(2) Various Market Information Resources	Sharing Opportunities with business partners	Market information Channel and Tools (MAWF, Meat Board, Radio, TV, internet, newspaper, SMS, etc) (AT-D: Available Information Channel for Cattle and Small Stocks)		
			(3) Class and Grades for Pricing	Knowing systems of crop and livestock prices based on the market demands	Official Class and Grading System (AT-P: Making Info Sheets for Farmers on Meat Board and MAWF System for Cattle and Millet based on Lecturing )		
			(4) Planning of Production based on Market Information	Market Survey for further strategic production	Planning of Crop / Livestock Production based on Market Information (AT-D: Ways of Monitoring )	Reviewing of Training Reviewing of Field Monitoring	Presentation and Extraction of Lessons Learnt

*Figure*

*N-CLIMP*

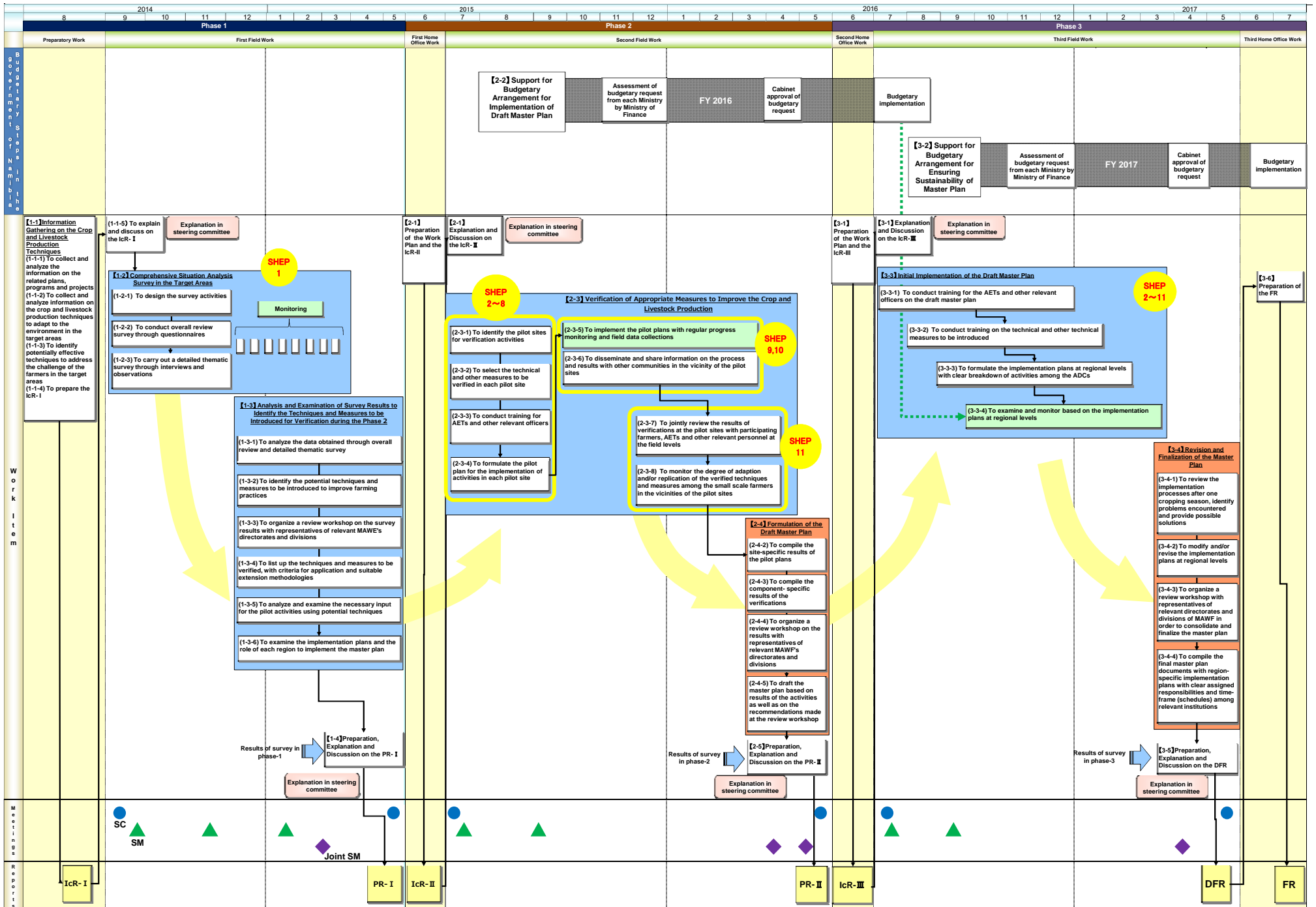


Figure 1.5.1 Work Flow





*Attachment 1*

*Minutes of Meetings*

*N-CLIMP*

*Attachment 1-1*

*1<sup>st</sup> Steering Committee Meeting in Phase 1*

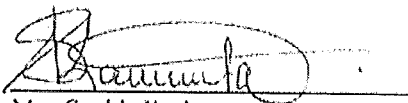
*September 22, 2014*

*N-CLIMP*

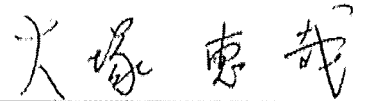
MINUTES OF THE 1<sup>ST</sup> STEERING COMMITTEE MEETING  
OF  
NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY  
IN  
THE REPUBLIC OF NAMIBIA

The 1<sup>st</sup> steering Committee meeting for Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP) took place on September 22, 2014 1<sup>st</sup> in Ongwediva at the Bennies Entertainment Park (Lekushila Hall). During the meeting the JICA Study Team briefly explained the concept of N-CLIMP, highlighting the technical and the operational approach, SHEP approach to be applied and the detailed work schedule from September to December 2014. Thereafter, a series of questions and fruitful discussions were made by the participants. The explanation from the Team was in principle accepted by the Steering Committee members. The main issues discussed during the meeting and the list of participants is shown in the ANNEXES attached hereto.

September 22, 2014

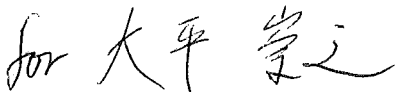


Mrs. Sophia Kasheeta  
Director of Directorate of  
Agricultural Production, Extension &  
Engineering Services  
Ministry of Agriculture, Water and Forestry  
The Republic of Namibia



Mr. Shigeya OTSUKA  
Team Leader/Agriculture Development  
The JICA Study Team

Witnessed by,



Mr. Shunsuke NAKAMURA  
Resident Representative  
JICA Namibia Office

**Main Issues Confirmed and Agreed at the Meeting**

1. Number and Activities of Pilot Project in Phase 2

MAWF inquired about the number and the activities of pilot projects to be implemented in phase 2. The JICA Study Team replied that the pilot project sites will be determined in the beginning of phase 2 through discussion with MAWF, however, 16 sites in total, say 4 sites per region, are tentatively planned to be selected in accordance with the Record of Discussions concluded in 2013 during the Detailed Planning Survey. The Team added that the activities will be also decided in the beginning of phase 2, some of which are single activities either crop or livestock production and others are dual activities depending upon the livelihood situation of selected areas or farmers.

2. Confirmation on Relation between Agriculture Extension System Improvement through SHEP Approach and the Formulation of the Master Plan

The participant asked the JICA Study Team to explain clearly about the relationship between agriculture extension system improvement by applying SHEP approach and the formulation of the Master Plan for 4 northern regions. The Team replied that the unique part of N-CLIMP is to include both macro and micro level component: (i) quantitative targeting through the master plan (macro level) and (ii) the technical measures listing and agriculture extension system improvement at the field level (micro level). The latter component is expected to contribute to the achievement of target setting as well as practical measures for achievement of set target in the former component. All the participants have agreed.

3. Implementation Structure for N-CLIMP

In relation to the implementation structure for N-CLIMP, the JICA Study Team proposed that N-CLIMP unit be established as a pipeline or bridge between the Steering Committee (SC) at the central level for overall supervision and management and the Stakeholder Meetings (SMs) at the each regional level for management of activities at the regional level. SC suggested that, instead of establishing N-CLIMP unit as proposed by the Team, divisional level unit, say Divisional Committee (DC) be established to perform as what the Team proposed. SC proposed DC members as listed below:

- |                                       |                   |
|---------------------------------------|-------------------|
| ◆ Mr. Veikko Imalwa, Chairperson      | ◆ AgriBank        |
| ◆ Dr. K.K. Shoombe, Vice Chair Person | ◆ DAPEES          |
| ◆ DARD                                | ◆ DWSSC           |
| ◆ DOF                                 | ◆ MeatCo.         |
| ◆ AMTA                                | ◆ Agronomic Board |
| ◆ Meat Board                          | ◆ AgriBusDev      |
| ◆ NNFU                                |                   |

All the participants have agreed to this proposal. The first DC meeting will be organized through the arrangement by the chairperson of DC before the Team starts regional level field works. Regional

level meeting to be organized in 4 regions, SMs schedule will be decided in the first DC meeting.

4. Budgetary Arrangement by JICA and MAWF

SC inquired about the demarcation of budgetary arrangement responsibility between MAWF and JICA Study Team during N-CLIMP implementation. The Team replied that the general budgetary arrangement responsibility and/or demarcation are as follows:

JICA Study Team	◆ Cost for the members of JICA Study Team (Transportation, per diem and other relevant cost for the field work)
	◆ Meeting cost (SC meetings, DC meetings and SM meetings)
	◆ Pilot project implementation cost (phase 2)
MAWF	◆ Cost (transportation, per diem and other relevant cost) for top management staff to participate in the meeting or supervision of the field works
	◆ Relevant cost of extension technicians for their field work (transportation, per diem etc.)
	◆ Draft master plan implementation (pilot projects' cost in phase 3)

SC members agreed to the points the Team explained. Mr. Ohira, JICA South Africa Office also pointed out the importance of budgetary arrangement by MAWF since, after the master plan formulation during N-CLIMP, its implementation will be by MAWF. Therefore, MAWF is requested to take necessary actions for budgetary arrangement facing up to the future implementation.

5. Information Flow of N-CLIMP

In relation to the implementation structure, the participant confirmed about information flow within MAWF for regular reporting and decision making of N-CLIMP. The steering committee replied that the report of the field activities are compiled by SMs and sent to SC through DC with the support by JICA Study Team. The chairperson of SC periodically report, in terms of administrative and budgetary issues for N-CLIMP, to the Permanent Secretary in the regular top management meeting of MAWF.

6. Participation of Key MAWF Staff for SHEP Approach

Two staff in MAWF, Ms. Paulina Shilunga and Mr. Martin Embuundile who have already attended SHEP approach training held in Japan and Kenya are expected to perform as resource staff for N-CLIMP since N-CLIMP is planned to fully apply SHEP approach for its implementation. In this regard, the participant raised the question of how such resource person will be involved in N-CLIMP for its effective implementation. SC replied that Mr. Martin will be a member of SM at Omusati Region to play an important role for continuous supervision and management of overall activities at the regional level while Ms. Paulina generally will be stationed in Windhoek although project information will be regularly delivered to her for necessary advice.

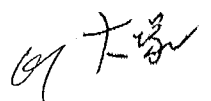
7. Consideration to Field Work to Commence from October 2014

As the Team explained, the field work will commence in full swing from the beginning of October 2014. The participant raised some concerns since the cropping season is about to start and the relevant staff particularly Agriculture Extension Technicians (AETs) need to be devoted to their regular

extension services in their own coverage. In this regard, as SC suggested, JICA Study Team is requested to consider carefully work schedule of AETs in each ADC to carry out the work together with AETs. The Team as well as the participants agreed to this suggestion.

8. Counterpart Personnel for JICA Study Team

JICA Study Team requested SC of nominating counterpart personnel (C/P) for the Team. In this regard, SC have replied that MAWF has the Project Support Services, however, they cannot closely work with JICA Study Team since the Services are located in Windhoek. Instead, each technical directorate and department in Windhoek, available technical staff in North Central Division (NCD) and the regions are expected to work closely together with the Team during the implementation.

A handwritten signature in black ink, appearing to be 'G. F. ...', located in the bottom right corner of the page.

## List of Participants

### 1. Namibian Side

#### 1.1 MAWF Headquarter (SC members)

- (1) Mrs. Sophia Kasheeta Director of Directorate of Agricultural Production, Extension & Engineering Services , Chair Person
- (2) Ms. Johanna F. N. Andowa Deputy Director of Directorate of Agricultural Research & Development, Deputy Chair Person
- (3) Dr. Albertina Shilongo Deputy Chief Veterinary Officer of Division of Epidemiology, Import/Export Control, Advisory Services and Traceability of Directorate of Veterinary Services
- (4) Mr. I. P. Mate Deputy Director of Division of Livestock Research & Production of Directorate of Agricultural Research & Development
- (5) Dr. Ben I. Malima Deputy Director of Division of Crop Research & Production of Directorate of Agricultural Research & Development
- (6) Mrs. Paulina Shilunga Agricultural Scientific Officer of Directorate of Agricultural Production, Extension & Engineering Services

#### 1.2 MAWF North Central Division

- (1) Mr. Veikko Imalwa Deputy Director of North Central Division of Directorate of Agricultural Production, Extension & Engineering Services
- (2) Mrs. Magdalena Hangula Chief Agricultural Scientific Officer of subdivision of Crop Research of Division of Crop Research & Production of Directorate of Agricultural Research & Development

#### 1.3 MAWF Relevant Regional Offices

- (1) Mr. Martin Embuudile Chief Agricultural Scientific Officer of Omusati Region, Directorate of Agricultural Production, Extension & Engineering Services
- (2) Mrs. Vicky Naudili Chief Agricultural Scientific Officer of Oshana Region, Directorate of Agricultural Production, Extension & Engineering Services

### 2. Japanese Side

#### 2.1 JICA South Africa Office

- (1) Mr. Takayuki Ohira Assistant Resident Representative

#### 2.2 N-CLIMP Team

- (1) Mr. Shigeya Otsuka Team Leader/ Agriculture Development
- (2) Mr. Naoto Morioka Deputy Team Leader/ Arid Area Agriculture Development
- (3) Mr. Takashi Nakamura Livestock Development
- (4) Dr. Yukiko Joho Farm Management/ Training



*Attachment 1-2*

*Joint Stakeholder Meeting in Phase 1*

*February 18, 2015*

*N-CLIMP*

MINUTES OF THE JOINT STAKEHOLDER MEETING  
OF  
NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY  
IN  
THE REPUBLIC OF NAMIBIA

Date: February 18<sup>th</sup>, 2015 9:50 – 15:40

Venue: Conference Room at Trade Fair Conference Hall in Ongwediva

The Joint Stakeholder Meeting for Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP) was held at the Conference Room at Trade Fair Conference Hall in Ongwediva on February 18<sup>th</sup>, 2015. The purpose of the meeting was: (i) to share findings and awareness of detailed thematic survey, (ii) to discuss categorization of proposed technical measures for crop production, livestock production and farm management, (iii) to confer dissemination system, (iv) to discuss draft master plan framework and (v) to share work schedule for phase 1 and phase 2 of N-CLIMP. Thereafter, a series of fruitful discussion was made among the participants. The main issues discussed in the meeting and the list of participants is shown as follows.

February 18<sup>th</sup>, 2015

**Main Issues Confirmed and Agreed at the Meeting**

**1. Findings from detailed thematic survey**

Major findings in relation to the detailed thematic survey shared and discussed during the meeting are as follows:

- ◆ Mortality rate of animals in sample livestock farmers is approximately 15%, extremely higher as compared with that of commercial livestock farmers which is 1 to 2% only. Since the rate of farmers conducting periodical dipping and drench are still low, awareness raising among communal livestock farmers will be important.
- ◆ Highest concern among farmers is related with water issues for crop and livestock followed by animal disease.
- ◆ Participants inquired about technical justification of the survey since the sample size would be too small to represent regional characteristics of crop and livestock production. JICA Study Team replied that the survey is designed, first and foremost, to enable N-CLIMP members particularly ATs to confirm issues, constraints and potential of each ADC coverage. Although sample size is small, the result delineates tendency and characteristics of crop and livestock production in communal farmers. In addition, follow-up survey will be carried out in phase 2 prior to the

commencement of pilot site activities.

- ◆ In addition to dipping and drench as mentioned above, periodical vaccination for animals needs to be promoted to improve animal health.

## **2. Categorization of Proposed Technical Measures**

In general, categorization of proposed technical measures is accepted by the participants. The discussion made in the meeting are as follows:

- ◆ Activities proposed for flood- and drought-adaptive cropping system: JICA Study Team replied that the techniques are currently implemented among the University of Namibia and Japanese Expert team to verify ideal combination of rice and millet cultivation using seasonal wet land in order to alleviate risk of flood and drought in northern Namibia. The Study Team is proposing this technique in the pilot site activities in phase 2 through coordination with the University and JICA Expert Team.
- ◆ Discussion on categorization of “establishment of crop production and marketing cooperatives”: this activity is categorized in 3 since the Study Team judged that production stabilization would be put first priority for crop production. At present, the Team has understood that there are production groups are in place in 4 regions, however, group marketing activities for crops are not necessarily active as compared with livestock cooperatives. Therefore, marketing activities are put second priority in case of crop production sub-sector.

## **3. Discussion on Dissemination System**

The group work is carried out in the meeting by formulating 4 groups with the purpose of the discussing how to verify effectiveness of proposed technical measures and also how to disseminate after verification. Out of 4 regions, 3 regions, Oshana, Oshikoto and Omusati regions selected grain production as discussion subject. On the other hand, Ohangwena region chose animal feed supply. Discussion result is shown in the *ATTACHMENT* hereto.

## **4. Framework of the Master Plan**

JICA Study Team explained the draft image of framework of the master plan as an output of phase 1 study. Major comments are as follows:

- ◆ Target corresponding to challenges: Target mentioned in the framework is generally appropriate, however, it should be prepared corresponding to challenges currently farmers have in each region. JICA Study Team replied that the target has been set based on the constraints and the future plan of farmers identified through overall review survey, detailed thematic survey and other field interviews. The suggestion will be carefully considered to prepare framework of the master plan

in the Progress Report (1).

- ◆ Livestock product market in the future: The participants inquired about whether Namibian livestock products can be exported to Japan in the future. JICA Study Team replied that, in consideration of current quality of meat products in Namibia and import regulation of Japan, export of meat products to Japan would be high challenge from the view point of institutional and technical level. Therefore, as mentioned by the Study Team, activation of communal meat industry is set as a target of northern communal livestock farmers.
- ◆ Business mind: It would be acceptable, as mentioned by the Study Team, for the farmers to have business mind in crop and livestock production.
- ◆ Traditional knowledge: Farmers are aware of practical farming techniques useful on the field. Such know-how, therefore, needs to be carefully considered for the master plan. The Study Team as well as the participants have agreed to the suggestion.
- ◆ Limitation of technical measures: The Study Team proposed several technical measures for crop production, livestock production and farm management, however, technical measures are not only solution to enhance farming activities as pointed out by the participant. JICA Study Team fully agreed to the comments and replied that, in addition to technical measures, enabling environment needs to be considered by the government to effectively utilize and disseminate proposed technical measures such as rural infrastructure development, continuous improvement and strengthening of extension system through increasing the number of technical staff, institutional reform and so forth.

### Result of Discussion on Dissemination System

Purpose of the session: Discussion among participants for how to verify effectiveness of proposed technical measures and also how to disseminate after verification

- (i) Method of verification in phase 2
- (ii) Training plan for pilot site activities
- (iii) Method of proposed technical measures dissemination after verification

Step	Item	Discussion output
Step-1	Please select one typical pilot site activity from following list. i. Grain production ii. Horticulture iii. Flood-drought adaptive cropping system iv. Animal feed supply v. Goat production vi. Chicken production	Selection of typical pilot site activity and technical measures to be required for selected activity
Step-2	Where will you want to disseminate selected measures in your region?	Name of village
Step-3	Please name your project title and define the objective.	Project title: Objective:
Step-4	Who will be involved in the project?	MAWF department: Other relevant organizations:
Step-5	Please prepare training schedule. Also consider carefully cropping season.	Training procedure (order): Implementer:
Step-6	How will you monitor the activities (reporting system)?	Frequency: Implementer
Step-7	If the technical measures are effective, how will you disseminate those measures? What additional inputs are required for dissemination?	Method of dissemination: Additional inputs to be required:

#### <Result>

#### Oshana Region

Step	Item	Discussion result
Step-1	Pilot site activities, please select from following list. i. Grain production ii. Horticulture iii. Flood-drought adaptive cropping system iv. Animal feed supply v. Goat production vi. Chicken production	Selected pilot site activities: Grain production Selected technical measures ◆ ◆ ◆ ◆
Step-2	Name of village	Omauni (Okongo)

Step-3	Project title and objective	Project title: Promotion of dry land cultivated Pasture_ Objective: Testing the production, Nutritional value, Adaptability and sustainability's of cultivated Pastures
Step-4	Stakeholders	MAWF department: DAPEES, Other relevant organizations: Farmers' Support Programm, DART, Regional Council, Ministry of Land, Traditional Authority Farmers group, if any: Livestock Marketing Co-operative, Ohangwena Farmers' Union

Step-5: Training schedule										
Training item	Implementer	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Exposure trip									X	X
Land Preparation		X	X							
Planting				X	X					
Weeding					X	X				
Seed Collection								X	X	X
Hay Making										X

Step	Item	Discussion result
Step-6	Monitoring	Frequency: Monthly and ongoing Implementer: Justa Nalushiya and Mbaile Paulus
Step-7	Method of dissemination after verification	Procedure: 1. Trial/Test (year1) information day 2. Demonstration (Year 2) on all steps Additional inputs to be required (equipment, facilities etc.): <ul style="list-style-type: none"> <li>• Seeds</li> <li>• Land</li> <li>• Fencing material</li> <li>• Fertilizer/Manure</li> <li>• Basic tools (hoes)</li> <li>• Fund (where from remain a quotation)</li> <li>• transport</li> </ul>

### Oshikoto Region

Step	Item	Discussion result
Step-1	Pilot site activities, please select from following list. i. Grain production ii. Horticulture iii. Flood-drought adaptive cropping system iv. Animal feed supply v. Goat production	Selected pilot site activities Grain production Selected technical measures <ul style="list-style-type: none"> <li>◆ Fertilizers application</li> <li>◆ Conservation agriculture</li> <li>◆ Crop selection</li> </ul>

	vi. Chicken production	
Step-2	Name of village	King Kauluma
Step-3	Project title and objective	Project title: King Kauluma Grain Production project Objective: Produce quality grains for market Increase Farmers income
Step-4	Stakeholders	MAWF department: DAPEES, DARD Other relevant organizations: FU, AMTA, NAB, Traditional Authority, Agribank, Regional Council Farmers group, if any: Farmers Association

Step-5: Training schedule										
Training item	Implementer	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Use of fertilizer	DAPEES, DARD	X								
Components of CA	DAPEES	X	X							X
Seed Selection	DAPEES, DARD	X								X

Step	Item	Discussion result
Step-6	Monitoring	Frequency: Twice a month Implementer: DAPEES, DART, King Kauluma Grain Production Farmers
Step-7	Method of dissemination after verification	Procedure: Farmers information day, field day, leaflets, media Additional inputs to be required (equipment, facilities etc.): Transport, Personnel, DSA

### Ohangwena Region

Step	Item	Discussion result
Step-1	Pilot site activities, please select from following list. i. Grain production ii. Horticulture iii. Flood-drought adaptive cropping system iv. Animal feed supply v. Goat production vi. Chicken production	Selected pilot site activities Animal feed supply Selected technical measures ◆ ◆ ◆ ◆
Step-2	Name of village	Omauni (Okongo)
Step-3	Project title and objective	Project title: Promotion of dry land cultivated Pasture Objective: Testing the production, Nutritional value, Adaptability and sustainability's of cultivated Pastures
Step-4	Stakeholders	MAWF department: DAPEES, Other relevant organizations: Farmers' Support Programm, DART, Regional Council, Ministry of

		Land, Traditional Authority Farmers group, if any: Livestock Marketing Co-operative, Ohangwena Farmers' Union
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Step-5: Training schedule										
Training item	Implementer	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Exposure trip									X	X
Land Preparation		X	X							
Planting				X	X					
Weeding					X	X				
Seed Collection								X	X	X
Hay Making										X

Step	Item	Discussion result
Step-6	Monitoring	Frequency: Monthly and ongoing Implementer: Justa Nalushiya and Mbaile Paulus
Step-7	Method of dissemination after verification	Procedure: 1. Trial/Test (year1) information day 2. Demonstration (Year 2) on all steps Additional inputs to be required (equipment, facilities etc.): <ul style="list-style-type: none"> <li>• Seeds</li> <li>• Land</li> <li>• Fencing material</li> <li>• Fertilizer/Manure</li> <li>• Basic tools (hoes)</li> <li>• Fund (where from remain a quotation)</li> <li>• transport</li> </ul>

### Omusati Region

Step	Item	Discussion result
Step-1	Pilot site activities, please select from following list. i. Grain production ii. Horticulture iii. Flood-drought adaptive cropping system iv. Animal feed supply v. Goat production vi. Chicken production	Selected pilot site activities Grain production Selected technical measures <ul style="list-style-type: none"> <li>◆ Fertilizers application</li> <li>◆ Conservation agriculture</li> <li>◆ Market information access improvement</li> </ul>
Step-2	Name of village	Omagalanga village, Oshikuku constituency
Step-3	Project title and objective	Project title: Omagalanga Grain Production project Objective: Produce more grains through utilization of improved pearl millet varieties.



Step-4	Stakeholders	MAWF department: DAPEES, DARD Other relevant organizations: NNFU, Seed Coop, AMTA Farmers group, if any: Farmers Association
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Step-5: Training schedule										
Training item	Implementer	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Land preparation	DAPEES, AT, CAT, ASO	X	X	X	X					
Planting			X	X	X	X				
Weeding				X	X	X	X			
Pesticide application					X	X	X			
Thinning				X	X	X	X			
Harvesting									x	x
Seed selection									x	x
Fertilizer application		x	x	x	x	x				
Threshing, Storage & Marketing										x

Step	Item	Discussion result
Step-6	Monitoring AT Farmers CAT	Frequency: Once a week Daily by the farmer Once a month Implementer: Farmers, AT and farmers
Step-7	Method of dissemination after verification	Procedure: Extension meetings, leaflets/posters, field days, exposure trips Additional inputs to be required (equipment, facilities etc.): Vehicles, tractors, rippers, cultivators, planters, granaries, hand hoes.

## List of Participants

### **Joint Stakeholder meeting**

**Date: 18 February 2015 –**

**Venue: Ongwediva Trade Fair Conference Hall**

#### **1. North Central Division of MAWF**

Mr. Veikko Imalwa  
Chairperson of Joint Stakeholders Meeting & Chairperson of Divisional Committee Meeting

#### **2. Oshana Region**

##### **2.1 DAPEES Oshana Region**

Mrs. Vicky Naudili  
Chair Person, CASO, Oshana Region (Ongwediva), NCD, DAPEES, MAWF,

Ms. Mvoyaha K Nakaande  
ASO, Oshana Region (Ongwediva), NCD, DAPEES, MAWF

Mr. Michael Ausiku  
Forestry Ranger – MAWF

##### **2.2. Other Organizations Oshana**

- (1) Mr. Tobias Emvula  
NNFU Chairperson
- (2) Ms. Menesia Nahum  
AMTA
- (3) Mr. A. P. Mongudhi  
Deputy Director Oshana RC
- (4) Ms. Martha Nuukongo  
Oshana Regional Farmers Union
- (5) Mr. Nambambi Thomas  
ORFU Deputy Director
- (6) Mr. Fillemon Shikongo  
MEATCO Oshakati
- (7) Ms. Mary V. Elago  
Oshana RLMC Administrator
- (8) Mr. Robert Tonateni Tobias  
NNFU
- (9) Mr. Jason Emvula  
NNFU
- (10) Mr. Petrus Shikomba  
Oshana Rural Development Center (ORDC)
- (11) Mr. Nico Aipumbu  
ORDC (Community Development) Head: Marketing
- (12) Mr. John Utoni  
MBN – Marketing Officer

#### **3. Omusati Region**

##### **3.1 DAPEES Omusati Region**

- (1) Mr. Martin Embundile  
Chair Person, Chief Agricultural Scientific Officer, Omusati Region, DADEEDS, MAWF
- (2) Mr. Mwanyangapo O.  
Chief Agricultural Technician (West & South, Omusati Region,

		DADEEDS, MAWF
(3)	Ms. Miriam Fikunawa	SAT/MAWF Etayi
(4)	Ms. Kaunapawa Shapenga	SAT/MAWF Okalongo
(5)	Mr. Erkki Shotwomunhu	SAT/MAWF Anamulenge
(6)	Ms. Veronica N. Katanga	SAT/MAWF Eunda
(7)	Ms. Wilhelmina Amashili	SAT/MAWF Ogongo
(8)	Mr. Pombili Sheehama	AT/MAWF Ruacana
(9)	Ms. Otilie Nawa	SAT Oshikuku
(10)	Ms. Agnes Akwenye	SAT/MAWF Onesi
(11)	Ms. Shipaleko Emily Loide	AT – Onkani

#### **4. Ohangwena Region**

##### **4.1 DAPEES Ohangwena Region**

(1)	Ms. Henry. Shilumba	AT MAWF DAPEES
(2)	Mr. Festus Nembia	Senior Agricultural Technician, , DAPEES NCD Ohangwena Regional Office, MAWF
(3)	Mr. Elikias Iyambo	MWAF
(4)	Ms. Marina Kaambu	CAT – MAWF
(5)	Ms. Ndilimeke. N. Josua	SASO – MAWF

##### **4.2 Other Organizations Ohangwena**

(1)	Ms. Penny Festus	SCO – AMTA
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#### **5. Oshikoto Region**

##### **5.1 DAPEES Oshikoto Region**

(1)	Ms. Vicky N. Ipinge	Chair Person, A/CASO, DAPEES Oshikoto Region (Onakali), MAWF
(2)	Mr. Nester Haufiku	CAT, DAPEES Oshikoto Region Office (Onakali), MAWF
(3)	Ms. Lucia Shimi	CAT, DAPEES Oshikoto Region Office (Onakali), MAWF
(4)	Ms. Veronica Nghishidimbwa	SAT Olukupa ADC (Onankali Constituency)
(1)	Mr. George Haufiku	MAWF DAEES – Omuntele
(2)	Ms. Patricia Sheehama	DAPEES –
(3)	Mr. Erastus Nuuyoma	DAPEES

- |     |                      |                   |
|-----|----------------------|-------------------|
| (4) | Mr. Salmon Hosea     | DAPEES            |
| (5) | Mr. Isack Nghaamwa   | ASO – MAWF DAPEES |
| (6) | Mr. G. Shangenge     | DAPEES            |
| (7) | Ms. Ester Namushinga | DAPEES            |

## **5.2 Other Organizations Oshikoto Region**

- |     |                       |   |
|-----|-----------------------|---|
| (1) | Mr. Tyapa M.          | Chief Agricultural Technician, Okashana Crop Research Station, MAWF |
| (2) | Mr. Abraham. Shikongo | Oshikoto Region Farmers Union                                       |
| (3) | Mr. Stephen Iimbili   | AMTA  |

## **6. Japanese Side**

### **6.1 JICA**

- |     |                       |  |
|-----|-----------------------|--|
| (1) | Mr. Nakamura Shunsuke | Resident Representative JICA Namibia Office                  |
| (2) | Mr. Takayuki Ohira    | Assistant Resident Representative – JICA South Africa Office |

### **6.2 N-CLIMP Team**

- |     |                      |  |
|-----|----------------------|--|
| (1) | Mr. Shigeeya Otsuka  | Team Leader / Agriculture Development                    |
| (2) | Mr. Naoto Morioka    | Deputy Team Leader / Arid Area Agriculture Development   |
| (3) | Mr. Iwami Orita      | Livestock Development                                    |
| (4) | Mr. Bertus Kruger    | AGRA Consultant (Livestock Development)                  |
| (5) | Ms. Bernadette Erago | Technical Assistant ( Farm Management)                   |
| (6) | Mr. Oswald Goraseb   | Technical Assistant (Arid Area Agricultural Development) |

*Attachment 1-3*

*2<sup>nd</sup> Steering Committee Meeting in Phase 1*

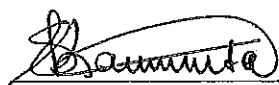
*May 7, 2015*

*N-CLIMP*

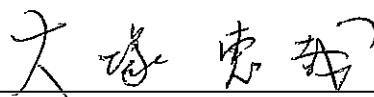
**MINUTES OF THE 2<sup>nd</sup> STEERING COMMITTEE MEETING  
OF  
NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY  
IN  
THE REPUBLIC OF NAMIBIA**

The 2<sup>nd</sup> Steering Committee Meeting for Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP) was held at the Conference Room at Windhoek Country Club in Windhoek on May 7<sup>th</sup>, 2015. The purpose of the meeting was: (i) to explain and discuss major outputs of N-CLIMP during the phase-1 including the framework of the master plan, (ii) to share proposed technical measures for crop and livestock production and farm management and (iii) to confer schedule of the phase-2 of N-CLIMP. Thereafter, a series of fruitful discussion was made among the participants. The main issues discussed in the meeting and the list of participants are shown in ANNEXES attached hereto.

May 7, 2015

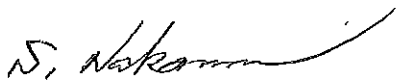


Mrs. Sophia Kasheeta  
Deputy Permanent Secretary  
Ministry of Agriculture, Water and Forestry  
The Republic of Namibia



Mr. Shigeya OTSUKA  
Team Leader/Agriculture Development  
The JICA Study Team

Witnessed by,



Mr. Shunsuke NAKAMURA  
Resident Representative  
JICA Namibia Office

**Main Issues Confirmed and Agreed at the Meeting**

1. Situation analysis and proposed plan for livestock production

Mr. I. P. Mate expressed that findings and proposed plan including technical measures for livestock production is generally agreeable. MAWF has recognized the common understanding for livestock production as the Study team explained such as necessity of fodder production, range management improvement, current overstocking, animal disease, lack of nutritious feed and so forth.

2. Comments to current constraints expressed by ATs

Comments particularly by the chairperson of the meeting, Ms. Johanna F. N. Andowa regarding current constraints faced by ATs for agriculture extension are as follows:

Necessity of equipment

Ms. Andowa mentioned that the working environment surrounding ATs in the 4 regions is challenging and necessity of physical facilities including vehicles, tractors and PCs stressed by ATs are understandable. Although improvement of such situation would take time, MAWF headquarters will take necessary actions to gradually improve the situation through step-wise procurement of necessary facilities.

Increase ATs in number

On the other hand, Ms. Andowa added that increasing ATs in number at the regional level has been approved under the restructuring plan of MAWF, therefore, new employment and allocation will be expected in the near future.

Improvement of water accessibility

Ms. Andowa also explained that as pointed out by ATs, improvement of water supply for crop production is one of the most important issues MAWF currently is considering. Since costly, large scale irrigation development is not necessarily feasible in northern communal areas, MAWF puts focus on disseminating micro level facilities such as drip irrigation kit to promote back yard garden.

Weak point of ATs' capability

Among the extensive knowledge required for extension works for crop and livestock production, ATs' are generally required to develop their skills in pest and disease for crop and livestock. In order to do so, training of ATs through on-the-job training (OJT) and/or mentorship program needs to be promoted.

Depression of crop product price

Price of crop product particularly cereal grains are declining recently, one of the reasons of which is the change of dietary habit particularly for young generation in communal areas. Such situation is currently addressed by MAWF as a part of crop management issue.

3. Importance of coordination with relevant programs and projects

As the Study team explained the importance of "Coordination with previous and on-going GRN scheme" as one of the approach for the master plan, Mr. Mate explained that MAWF needs to perform

as taking key role player for the coordination among N-CLIMP, relevant programs and projects.

4. Budgetary arrangement by MAWF for the implementation of the draft master plan in the phase-3  
The Study team inquired about the procedure of how budgetary arrangement by MAWF will be made for the implementation of draft master plan in the phase-3 of N-CLIMP in accordance with the agreement between MAWF and JICA. The chairperson replied that the Project Identification Form (PIF) would not be required since N-CLIMP is not a capital project involving large scale construction and/or procurement of equipment. Instead, the necessary budget will be estimated among MAWF and the Study team, and each relevant department will be requested to arrange budget for the implementation. The details will be continuously discussed in the phase-2 of N-CLIMP.
5. Effectiveness of agriculture input supply  
Mr. Murakami, assistant representative of JICA South Africa Office asked MAWF whether agriculture input supply can be utilized effectively at the field level by farmers if arrangement of such supply is made. The chairperson replied that, as previously MAWF has received the assistance from the Government of Japan under KR2 program, such assistance will be surely helpful by the use of farmers to improve agriculture production and livelihood of farmers at the field level. The chairperson also added as MAWF's recognition that capacity building for ATs and farmers is also an integral part in parallel with agriculture input supply.
6. Development potential assessment  
Mr. Mate mentioned that the result of development potential assessment the Study team explained would be appropriate. In particular, current stocking rate extremely exceeds carrying capacity. Therefore, range management and/or grazing for animals need to be improved as one of the most important challenges in livestock sub-sector.
7. Careful consideration to the selection of pilot site activities in the phase-2  
The representatives from NCD expressed the importance of careful consideration to the procedure of the selection of pilot site activities in the phase-2. Farmers would have feelings of unfairness and conflict would happen if relevant projects/programs are implemented intensively only at the very same constituency/village. Therefore, the selection criteria needs to be prepared carefully and agreed through discussion among ATs.
8. Difficulty of promotion of pig production  
Although the Study team proposed pig production as one of the technical measures and MAWF has also been putting effort on the promotion of pig production, it would be difficult from the view point of high cost of feeding. The Study team replied that they are aware of its difficulties, therefore, the team will carefully consult with ATs about farmers willingness and also assess the feasibility of pig production during the pilot site activities in the phase-2 of N-CLIMP.



## **List of Participants**

### **1. Namibian Side**

#### **1.1 MAWF Headquarter (SC members)**

- (1) Mrs. Sophia Kasheeta Director of Directorate of Agricultural Production, Extension & Engineering Services , Chair Person
- (2) Ms. Johanna F. N. Andowa Deputy Director of Directorate of Agricultural Research & Development, Deputy Chair Person
- (3) Mr. I. P. Mate Deputy Director of Division of Livestock Research & Production of Directorate of Agricultural Research & Development
- (4) Dr. Ben I. Malima Deputy Director of Division of Crop Research & Production of Directorate of Agricultural Research & Development

#### **1.2 MAWF North Central Division and Region**

- (1) Mr. Veikko Imalwa Deputy Director of North Central Division of Directorate of Agricultural Production, Extension & Engineering Services
- (2) Mrs. Magdalena Hangula Chief Agricultural Scientific Officer of subdivision of Crop Research of Division of Crop Research & Production of Directorate of Agricultural Research & Development
- (3) Mr. Martin Embundile Chair Person, Chief Agricultural Scientific Officer, Omusati Region, DADEEDS, MAWF

### **2. Japanese Side**

#### **2.1 JICA**

- (1) Mr. Toshio Murakami Assistant Resident Representative, JICA South Africa Office
- (2) Mr. Festus Unengu Programme Officer, JICA Namibia Office

#### **2.2 JICA Study Team**

- (1) Mr. Shigeya Otsuka Team Leader/ Agriculture Development
- (2) Mr. Naoto Morioka Deputy Team Leader/ Arid Area Agriculture Development
- (3) Mr. Iwami Orita Livestock Development
- (4) Dr. Yukiko Joho Farm Management/ Training
- (5) Mrs. Johanna Ekandjo Administrative Management
- (6) Mr. Nabot Mbeeli Technical Assistant

*Attachment 1-4*

*1<sup>st</sup> Steering Committee Meeting in Phase 2*

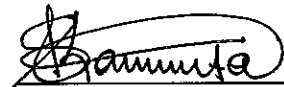
*July 24, 2015*

*N-CLIMP*


**MINUTES OF THE 1<sup>st</sup> STEERING COMMITTEE MEETING  
OF  
PHASE-2  
OF  
NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY  
IN  
THE REPUBLIC OF NAMIBIA**

The 1<sup>st</sup> Steering Committee Meeting of phase-2 for Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP) was held at the PS Board Room of the head office of the Ministry of Agriculture, Water and Forestry (MAWF) on July 24<sup>th</sup>, 2015. The purpose of the meeting was: (i) to confirm draft minutes of meeting of 2<sup>nd</sup> Steering Committee Meeting of phase-1, (ii) to confirm major outputs of phase-1 and (iii) to discuss work schedule of phase-2 of N-CLIMP. Thereafter, a series of fruitful discussion was made among the participants. The main issues discussed in the meeting and the list of participants is shown in ANNEXES attached hereto.

July 24, 2015



\_\_\_\_\_  
Mrs. Sophia Kasheeta  
Deputy Permanent Secretary  
Ministry of Agriculture, Water and Forestry  
The Republic of Namibia



\_\_\_\_\_  
Mr. Shigeya OTSUKA  
Team Leader/Agriculture Development  
The JICA Study Team

Witnessed by,



\_\_\_\_\_  
Mr. Shunsuke NAKAMURA  
Resident Representative  
JICA Namibia Office

**Main Issues Confirmed and Agreed at the Meeting**

***Confirmation of the Minutes of Meeting of 2<sup>nd</sup> Steering Committee Meeting of Phase-1***

1. Insufficient number of vehicles and ATs

The chairperson of the meeting mentioned that insufficient number of vehicles as expressed by ATs is common issues in all the Ministries in Namibia. Budget for the procurement of vehicles is limited, however, MAWF is planning to purchase 1 to 2 vehicles per region in this fiscal year. MAWF recognized the necessity of improving the situation stepwise. On the other hand, increase of the number of ATs is currently requested to the Ministry of Finance for their approval.

2. Importance of water accessibility

All the participants have agreed to the importance of water accessibility improvement for both crop and livestock production. DAPEES would like to strengthen the coordination with relevant department such as Directorate of Water Supply and Sanitation for implementing water accessibility improvement.

3. Budgetary arrangement by MAWF for the implementation of the draft master plan in the phase-3

Budgetary arrangement for the implementation of the draft master plan in the phase-3 of N-CLIMP will be made according to the discussion in the 2<sup>nd</sup> Steering Committee Meeting of the phase-1. JICA Study Team will be requested to estimate the cost together with MAWF for the arrangement. As for the implementation of the master plan after N-CLIMP is completed in July 2017, the Study Team together with MAWF is expected to prepare the Project Identification Form (PIF) in September 2016 to be attached with the output of the phase-2, draft master plan for budgetary arrangement.

4. Needs of agriculture inputs

Ms. Andowa mentioned that the needs of agriculture inputs at the field level remain high. As similar to KR-2 by the assistance of the government of Japan, MAWF would like to apply assistance to JICA. Mr. Murakami replied that it is impossible to provide agriculture inputs through KR-2 at present, however, JICA will carefully seek needs and possibility to provide MAWF with the assistance to improve northern crop and livestock production.

5. Depression of crop product price

The description of draft minutes of meeting, "Price of crop product particularly cereal grains are declining recently, one of the reasons of which is the change of dietary habit particularly for young generation in northern communal areas. Such situation is currently addressed by MAWF as a part of crop management issue." would be strange since the price of cereal grains is controlled by the government. The Study Team replied that this comment were given by ATs, however, the Team will confirm the reports as well as questionnaire result to appropriately revise the minutes of meeting.

6. Difficulty of promotion of pig production

The participants repeatedly mentioned the difficulty of promotion of pig production as discussed in the

previous meeting. JICA Study Team also aware of the situation, however, if the needs of farmers are clarified through the preparatory stage of the pilot site activities, pig production will be conducted through trial basis.

### ***Confirmation of Major Outputs of Phase-1***

#### **7. Comments to the outputs**

The participants have generally agreed to major outputs of phase-1 of N-CLIMP. Some minor comments discussed in the meeting are as follows:

##### Implementing organization of N-CLIMP

At the regional level, relevant donor-funded programs and projects need to be included in the Stakeholder Meeting for strengthening coordination.

##### Revision of Terminology

(i) Master Plan Approach-2: Coordination with previous and on-going GRN scheme

“Scheme” needs to be revised to “Programs and Projects.”

(ii) semi-commercial farmers

It should be revised to “Surplus farmers.”

Other minor revisions are to be made according to the discussion in the meeting.

##### Necessity of changing attitude of livestock farmers

The participants commented that social approach would be highly required for changing attitude of livestock farmers to sell their animals to the market. The Study Team also recognized the difficulties for reorienting farmers’ attitude and agreed to the suggestion and will carefully conduct pilot site activities together with ATs through interaction with livestock farmers.

### ***Discussion of the work schedule of phase-2***

#### **8. Selection criteria for pilot site activities**

The participants have generally agreed to the selection criteria for pilot site activities as the Study Team proposed. The team is also requested to carefully discuss with the member of the Stakeholder Meeting at the regional level to consider their opinions for deciding selection criteria. The criteria can be customized depending upon the discussion results and conditions of each region.

#### **9. Necessity of N-CLIMP briefing to regional governor**

JICA Study Team is requested to explain the progress of N-CLIMP to each regional governor for their understanding and support to N-CLIMP. The Study Team agreed and will request the chief of the Stakeholder Meeting of each region for arranging opportunity to meet regional governor.

#### **10. Necessity of marketing survey by self-sufficient farmers**

Although the Study Team proposed that the market survey will not be conducted for self-sufficient farmers during the preparatory training for farmers’ group, the participants suggested that the market survey be included under the said training in order to enhance their awareness of the importance of marketing. The Study Team agreed and the preparatory training will be designed together with ATs

based on the suggestion.

11. SHEP task force at the regional level

The Study Team recommended that the SHEP task force at the regional level will be established, with the support by MAWF officials who have participated in SHEP training in Japan and Kenya, particularly by active ATs interested in SHEP approach so as to lead other members to actively participate in phase activities of N-CLIMP. The participants have agreed to the suggestion.

12. Next steering committee meeting

The Study Team suggested that the interim meeting will be organized in the middle of phase-2 period around January 2016 to confirm the progress of phase-2 activities. The participants replied that the Team is requested to provide the members of the Steering Committee Meeting with appropriate timing and agenda based on the work schedule of the phase-2. The Study Team have agreed to the suggestion.

## **List of Participants**

### **1. Namibian Side**

#### **1.1 MAWF Headquarter (SC members)**

- (1) Mrs. Sophia Kasheeta Deputy Permanent Secretary , Chair Person
- (2) Ms. Johanna F. N. Andowa Deputy Director of Directorate of Agricultural Research & Development, Deputy Chair Person
- (3) Dr. Albertina Shilongo Deputy Chief Veterinary Officer of Division of Epidemiology, Import/Export Control, Advisory Services and Traceability of Directorate of Veterinary Services
- (4) Mr. I. P. Mate Deputy Director of Division of Livestock Research & Production of Directorate of Agricultural Research & Development

#### **1.2 MAWF North Central Division**

- (1) Mr. Veikko Imalwa Deputy Director of North Central Division of Directorate of Agricultural Production, Extension & Engineering Services
- (2) Mr. Martin Embundile Chief Agricultural Scientific Officer, Omusati Region, DADEEDS, MAWF
- (3) Ms. Vicky N. Ipinge A/CASO, DAPEES Oshikoto Region (Onakali), MAWF

### **2. Japanese Side**

#### **2.1 JICA South Africa Office**

- (1) Mr. Festus Unengu Programme Officer, JICA Namibia Office
- (2) Mr. Toshio Murakami Assistant Resident Representative email:

#### **2.2 N-CLIMP Team**

- (1) Mr. Shigeya Otsuka Team Leader/ Agriculture Development
- (2) Mr. Naoto Morioka Deputy Team Leader/ Arid Area Agriculture Development
- (3) Ms. Bernadette Erago Farm Management (Technical support staff)
- (4) Mrs. Johanna Ekandjo Administrative Management

*Attachment 1-5*

*Draft Master Plan Workshop in Phase 2*

*April 12, 2016*

*N-CLIMP*



**MINUTES OF DRAFT MASTER PLAN WORKSHOP  
OF  
PHASE-2  
OF  
NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY  
IN  
THE REPUBLIC OF NAMIBIA**

The Draft Master Plan Workshop of phase-2 for Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP) was held at the Trade Fair Conference Hall at Ongwediva on April 12<sup>th</sup>, 2016. The purpose of the meeting was: (i) to discuss Draft Master Plan for Crop and Livestock Development, (ii) to review pilot site activities in phase-2 and (iii) to discuss work plan of phase-3 of N-CLIMP. Thereafter, a series of fruitful discussion was made among the participants. The main issues discussed in the meeting and the list of participants is shown in ANNEXES attached hereto.

April 12, 2016

**Main Issues Confirmed and Agreed at the Meeting**

***Draft Master Plan for Crop and Livestock Development***

1. Perspective of current constraints and future plan between ATs and farmers  
Acting chief of NCD mentioned the difference of perspective on current constraints and future plan between ATs and farmers. In this regard, the acting chief suggested that ATs be requested to consider actual needs of farmers to carry out agriculture extension works.
2. Contents of the Draft Master Plan  
In general, the contents of the draft master plan was agreed by the participants

***Review of Pilot Site Activities in Phase-2***

3. Presentation by representative farmers in 4 regions  
The representative farmers in 4 regions made presentation of pilot site activities carried out in phase-2. The presenters were as follows: (i) Okau-Kamasheshe in Oshana region, (ii) Okahao in Omusati region, (iii) Onayena in Oshikoto region and (iv) Endola in Ohangwena region. The chief of each region summarized the activities of each region afterward.

***Work Plan for Phase-3***

Discussion was made for proposed work plan for phase-3 consisting of: (i) number and selection of pilot sites, (ii) techniques and technical measures to be applied, (iii) implementation system and (iv) work schedule based on the lesson learnt from pilot site activities in phase-2. As JICA N-CLIMP team explained, the work plan will be discussed and prepared at the beginning of the phase-3 in July, however, today's discussion will be carefully considered for the preparation of work plan.

4. Budgetary arrangement by MAWF in phase-3

As explained by JICA N-CLIMP team, budgetary arrangement by MAWF in phase-3 was already explained to the top management of MAWF and they have agreed in accordance with the agreement between MAWF and JICA for N-CLIMP.

5. Number and selection of pilot sites

There are different opinions regarding number and selection of pilot sites in phase-3, however, major opinion is that the pilot site activities will be implemented at same sites as phase-2 in order to stabilize extension system and to expand to other areas stepwise.

6. Techniques and technical measures

The participants have agreed to the explanation from JICA N-CLIMP team that 20 numbers of techniques and technical measures classified in category-1 will be applied in the pilot site activities in phase-3.

7. Implementation system

The participants have agreed that the phase-3 of N-CLIMP will be implemented based on the same implementation organization as explained in the workshop.

8. Work schedule

The participants have agreed to the proposed work schedule.

9. Budgetary arrangement for the implementation of proposed draft master plan

Another key discussion made among the participants is the budgetary arrangement for the implementation of proposed draft master plan over 2030. Japanese side including JICA N-CLIMP team mentioned that the arrangement of proposed draft master plan needs to be discussed among MAWF how the master plan will be implemented including budgetary arrangement. Some participants in MAWF stressed that, first and foremost, the master plan needs to be implemented using available resources of GRN with the strong ownership of MAWF in order to achieve the sustainability.

## List of Participants

### **Draft Master Plan Workshop**

**Date:** 12 April 2016 –

**Venue:** Ongwediva Trade Fair – Oshana Region

#### **1. North Central Division**

Mrs. Margret Matengu

Chairperson of Draft Master Plan Workshop – CASO DAPEES  
Oshana Region

#### **2. Oshana Region**

##### **2.1 DAPEES Oshana Region**

- |      |                           |                               |
|------|---------------------------|-------------------------------|
| (10) | Mrs. Loide P. Endjala     | CAT – MAWF – DAPEES           |
| (2)  | Ms. Lucia Iipinge         | SAT – MAWF DAPEES             |
| (3)  | Ms. Kaarina Nghilwa       | SAT – MAWF Uukwiyu            |
| (4)  | Ms. Elise Hasholo         | AT – MAWF – Okaku             |
| (5)  | Mr. Agasty Amon           | AT- MAWF – Okau-kamasheshe    |
| (6)  | Ms. Vicky N. Iipinge      | ASO – MAWF DAPEES             |
| (7)  | Mr. Nestor Haufiku        | CAT –MAWF DAPEES              |
| (8)  | Ms. Pulcheria Mwanyangapo | SAT MAWF DAPEES               |
| (9)  | Ms. Magdalena Haludilu    | AT – MAWF Enguwantale         |
| (10) | Ms. Mary V. Elago         | Oshana RLMC – Manager         |
| (11) | Mr. Uapindikiraje Kazah   | C.A.N Oshakati Office Manager |

##### **2.2 FARMERS - Oshana**

- |     |                  |                       |
|-----|------------------|-----------------------|
| (1) | Mr. Gino Amupolo | Uuvudhiya – Livestock |
|-----|------------------|-----------------------|

- |     |                          |                        |
|-----|--------------------------|------------------------|
| (2) | Ms. Kristofina Lyahulapo | Okatana – Horticulture |
| (3) | Mrs. Trefina Angolo      | Okau-Kaasheshe Crop    |

### **3. Omusati Region**

#### **3.1 DAPEES Omusati Region**

- |      |                           |   |
|------|---------------------------|---|
| (1)  | Mr. Martin Embundile      | Acting Deputy Director, Chief Agricultural Scientific Officer,<br>Omusati Region, DADEEDS, MAWF |
| (2)  | Mr. Toivo Shivute         | ASO – MAWF  |
| (3)  | Ms. Miriam Fikunawa       | SAT/MAWF Etayi T  |
| (4)  | Ms. Kaunapawa Shapenga    | SAT/MAWF Okalongo   |
| (5)  | Ms. Shigwedha Julia       | SAT – MAWF  |
| (6)  | Ms. Rachel Anghuwo        | SAT- MAWF   |
| (7)  | Ms. Lucia Naunyangano     | SAET-MAWF Etunda  |
| (8)  | Ms. Moses Monika          | SAT-MAWF  |
| (9)  | Ms. Emily Loide Shipateko | AT-MAWF   |
| (10) | Ms. Ndinela Weyulu        | CAT – MAWF  |

#### **3.2 FARMERS – Omusati**

- |     |                        |                                |
|-----|------------------------|--------------------------------|
| (1) | Mr. Kalenga J          | Etunda – Horticulture          |
| (2) | Ms. Amakali Helvi      | Tsandi – Small Stock (Chicken) |
| (3) | Mr. Kristian Hango     | Okahao – Livestock             |
| (4) | Mrs. Ehregardis Efraim | Etayi – Crop                   |

### **4. Ohangwena Region**

#### **4.1 DAPEES Ohangwena Region**

- |     |                     |                |
|-----|---------------------|----------------|
| (1) | Ms. Henry. Shilumba | AT MAWF DAPEES |
|-----|---------------------|----------------|

- |     |                        |  |
|-----|------------------------|--|
| (2) | Mr. Festus Nembia      | Senior Agricultural Technician, , DAPEES NCD Ohangwena Regional Office, MAWF |
| (3) | Mr. Paulus Mbaile      | CAT – MAWF - Okongo  |
| (4) | Mr. Nicklaus Endjala   | SAT – Endola   |
| (5) | Mr. Kasaona Bruce      | SAT – Epembe   |
| (6) | Ms. Johanna L. Amakali | ASO Ee– nhana  |

#### **4.2 Farmers Ohangwena**

- |      |                         |                              |
|------|-------------------------|------------------------------|
| (1.) | Ms. Tusnelde H.         | Endola – Small Stock (Goats) |
| (2.) | Ms. Helena P. Shitaleni | Epembe – Horticulture        |
| (3.) | Ms. Laimi Mateus        | Ondobe – Crop                |
| (4.) | Ms. Nashidengo Ndinela  | Okongo – Livestock (Cattle)  |

### **5. Oshikoto Region**

#### **5.1 DAPEES Oshikoto Region**

- |     |                            |   |
|-----|----------------------------|---|
| (1) | Mr. Oswald Mwanyangapo     | CASO – MAWF DAPEES                      |
| (2) | Mr. Joseph Jonas           | AT- MAWF DAPEES                         |
| (3) | Ms. Benita Elago           | ASO DAPEES                              |
| (4) | Ms. Lucia Shiimi           | CAT – DAPEES                            |
| (5) | Ms. Veronica Nghishidimbwa | SAT Olukupa ADC (Onankali Constituency) |
| (6) | Mr. George Haufiku         | MAWF DAEES – Omuntele                   |
| (7) | Mr. Kashimba Willem        | DAPEES - MAWF                           |
| (8) | Mr. Isack Nghaamwa         | ASO – MAWF DAPEES                       |

- (9) Ms. Ester Namushinga                      DAPEES
- (10) Mr. Erastus Nuuyoma                      MAWF – DAPEES

**5.2 Farmers Oshikoto Region**

- (1) Mr. John Amapindi.                              Onayena – Horticulture
- (2) Mr. Velen Mashina                              Onankali – Small Stock (Chicken)
- (3) Mr. Phillip P. Ngwena                              Omuntele – Livestock (Cattle)

**6. Stakeholders**

- (1) Mr. Mutero Joseph                              Agronomist – Etunda
- (2) Mr. Paulus Mungoba                              Acting Chief Agronomist - AgriBusDev
- (3) Ms. Maria Akiyama                              Project Coordinator – Rice/Mahangu Project
- (4) Mr. Kenta Tsuchiya                              Volunteer – Rice/Mahangu Project
- (5) Mr. Shogo Miyamoto                              Volunteer Rice/Mahangu Project
- (6) Mr. Simson Awala                              Rice/Mahangu Project
- (7) Mr. Yoshinori Watanabe                              Expert fo SATREPS
- (8) Mr. John Utoni                              Marketing Officer – Meat board of Namibia
- (9) Mr. Nico Aipumbu                              Head: Outreach & Marketing – RDC Ongwediva
- (10) Mr. Tobias Emvula                              President of NNFU
- (11) Ms. Maria Newaya                              Meat Board of Namibia Coordinator- Master Plan
- (12) Mr. Jason Emvula                              NNFU - Livestock

- (13) Mr. Ipinge Petrus                      Driver – Rice/Mahangu
- (14) Mr. Paulus Hangula                      Farm Management

**7. Japanese Side**

**7.1 JICA**

- (1) Mr. Nakamura Shunsuke                      Resident Representative JICA Namibia Office
- (2) Mr. Shinichi Hamada                      Embassy of Japan

**7.2 N-CLIMP Team**

- (3) Mr. Shigeya Otsuka                      Team Leader / Agriculture Development
- (4) Mr. Naoto Morioka                      Deputy Team Leader / Arid Area Agriculture Development
- (5) Mr. Iwami Orita                      Livestock Development
- (6) Ms. Yukoko Joho                      Farm Management /Training
- (7) Ms. Bernadette Erago                      Technical Assistant ( Farm Management)
- (8) Ms. Johanna Ekandjo                      Administration
- (9) Ms. Aini Amukoto                      Data Capturer
- (10) Mr. Daniel Imalwa                      Field Assistant Livestock
- (11) Mr. Benjamin Shikesho                      Field Assistant – Crop
- (12) Mr. Martin Mateus                      Head Driver
- (13) Mr. Amon Amupadhi                      Driver

*Attachment 1-6*

*2<sup>nd</sup> Steering Committee Meeting in Phase 2*

*May 10, 2016*

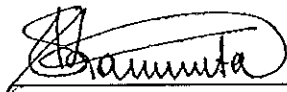
*N-CLIMP*



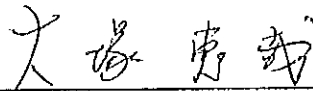
**MINUTES OF THE 2<sup>nd</sup> STEERING COMMITTEE MEETING in the Phase-2  
OF  
NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY  
IN  
THE REPUBLIC OF NAMIBIA**

A meeting for Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP) was held with the 2<sup>nd</sup> Steering Committee at Minister's Board Room of MAWF head office in Windhoek on May 10, 2016. In the meeting, the team leader of the JICA Study Team briefly explained the activities of the phase-2, highlighting the review of pilot site activities in phase-2, proposed draft master plan for crop and livestock development from July 2015 to May 2016, and proposed work plan for phase-3. Thereafter, a series of fruitful discussion was made among the participants. As the result of the discussions, the outputs in the phase-2 was in principle accepted by the Steering Committee. The main issues discussed in the meeting and the list of participants is shown in ANNEXES attached hereto.

May 10, 2016

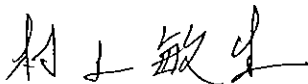


Mrs. Sophia Kasheeta  
Deputy Permanent Secretary  
Ministry of Agriculture, Water and Forestry  
The Republic of Namibia



Mr. Shigeya OTSUKA  
Team Leader/Agriculture Development  
The JICA Study Team

Witnessed by,



Mr. Toshio MURAKAMI  
Assistant Resident Representative  
JICA South Africa Office

Main Issues Confirmed and Agreed at the Meeting

*Review of Pilot Site Activities*

1. Summary of pilot site activities by each region

*Oshkoto region:* One of the key factors for the success of the pilot site activities is the involvement of all the staff consisting of senior staff (CASOs and CATs), ATs and stakeholders to select appropriate sites and activities for the pilot site activities. In addition, regional staff recognized that stepwise activities including preparatory training for farmers' group are important points for the activities in the phase-3.

*Ohangwena region:* As the team leader explained for the results of comprehensive information gathering, shortage of budget at the regional level is the constraints to be tackled at the regional level. In Ohangwena region, in order to promote range management activities currently getting to be more and more important, regulatory reform for the land management as well as budgetary arrangement would be keys for the success.

*Oshana region:* Quick-impact was materialized for small stock (chicken raising) at Uukwiyu-uushona. Since the pilot site activity of small stock in the phase-2 was small-scale, the regional office of MAWF is planning to expand the activities through corresponding to the need of farmers in the region.

*Omusati region:* Cattle raising in Okahao and small stock (chicken raising) in Tsandi has accomplished significantly successful result. As for the horticulture in Etunda, the region would like to continue in the phase-3 as a part of activation of irrigation schemes under the Green Scheme. On the other hand, difficulties are observed for rice-mahangu mixed cropping since the technique is highly dependent on weather conditions.

*Research station:* MAWF has been putting priority on strengthening linkages between extension and research. Effective linkage was carried out for horticulture crops production under the pilot site activities and the research station would like to continue similar approach in the phase-3.

*Draft Master Plan for Crop and Livestock Development*

2. Use of the Draft Master Plan for NDP-5 and PIF for next fiscal year

MAWF has recognized that the draft master plan has been prepared at the right time. MAWF is planning to use this plan as one of the materials for Fifth National Development Plan (NDP-5) currently under discussion among relevant ministries of GRN and Project Identification Form (PIF) for next fiscal year.

3. Conservation Agriculture as index of the target for the draft master plan

As the team leader explained, conservation agriculture (CA) needs to apply 3 principles and it would be appropriate as a first step that the master plan target adopted "number of farmers to use ripper furrow for land preparation". Since MAWF currently is promoting CA in northern communal area by trying to apply 3 CA principles, N-CLIMP is requested to support this process and in the future

MAWF would like to adopt all the 3 CA principles for the index of the monitoring of CA dissemination.

4. Budgetary arrangement for phase-3

MAWF explained that the budget to be required for phase-3 is within the expected and agreeable level of the amount. Since proposed draft master plan under N-CLIMP are consistent with the priority activities of MAWF such as conservation agriculture, cattle & small stocks etc., each region is requested to carry out the proposed activities by internalizing N-CLIMP activities into regional agriculture and livestock extension services.

*Work Plan for Phase-3*

5. Farmer to farmer extension system

Acting director of DAPEES explained that in order to facilitate farmer to farmer extension system under N-CLIMP, mentorship programme previously conducted by AgriBank and Meat Board would be one of the useful approaches. To do so, however, it will be required to consider motivation of farmers in each different social background to establish sustainable extension system.

6. Site and location of pilot site activities in phase-3

The chairperson felt that the pilot site activities should be carried out at the same sites as phase-2 based on the results obtained until now. However, each region is requested to discuss among stakeholders of the region to select appropriate sites by discussing the needs of each region.

7. Rangeland management in Oshikoto region

DAPEES of Oshikoto region would like to promote range management by expanding selected site in phase-2 (Omuntele constituency). The Oshikoto regional staff will continue discussion to select the site and activities to be carried out in phase-3.



**List of Participants**

**1. Namibian Side**

**1.1 MAWF Headquarter (SC members)**

- |     |                          |   |
|-----|--------------------------|---|
| (1) | Mrs. Sophia Kasheeta     | Deputy Permanent Secretary , Chair Person   |
| (2) | Mrs. Mildred N. Kambinda | Acting Director of Directorate of Agricultural Production, Extension & Engineering Services |

**1.2 MAWF North Central Division**

- |     |                        |   |
|-----|------------------------|---|
| (1) | Mrs. Magdalena Hangula | Chief Agricultural Scientific Officer of subdivision of Crop Research of Division of Crop Research & Production of Directorate of Agricultural Research & Development |
|-----|------------------------|---|

**1.3 MAWF Regional Offices**

- |     |                        |   |
|-----|------------------------|---|
| (1) | Mrs. Margret Matengu   | Chief Agricultural Scientific Officer of Ohangwena Region, Directorate of Agricultural Production, Extension & Engineering Services |
| (2) | Mr. Oswald Mwanyangapo | Chief Agricultural Scientific Officer of Oshikoto Region, Directorate of Agricultural Production, Extension & Engineering Services  |
| (3) | Mrs. Mvoyaha Nkaande   | Chief Agricultural Scientific Officer of Oshana Region, Directorate of Agricultural Production, Extension & Engineering Services    |
| (4) | Mr. Toivo Shivute      | Agricultural Scientific Officer of Omusati Region, Directorate of Agricultural Production, Extension & Engineering Services         |

**2. Japanese Side**

**2.1 Embassy of Japan**

- |     |                     |                 |
|-----|---------------------|-----------------|
| (1) | Mr. Shinichi Hamada | Counsellor      |
| (2) | Ms. Kaoru Yokotani  | First Secretary |

**2.2 JICA South Africa Office**

- |     |                     |                                   |
|-----|---------------------|-----------------------------------|
| (1) | Mr. Toshio Murakami | Assistant Resident Representative |
|-----|---------------------|-----------------------------------|

**2.3 N-CLIMP Team**

- |     |                      |                                      |
|-----|----------------------|--------------------------------------|
| (1) | Mr. Shigeeya Otsuka  | Team Leader/ Agriculture Development |
| (2) | Ms. Bernadette Erago | Assistant for Farm Management        |
| (3) | Ms. Johanna Ekandjo  | Secretary                            |

*Attachment 1-7*

*1<sup>st</sup> Steering Committee Meeting in Phase 3*

*August 3, 2016*

*N-CLIMP*

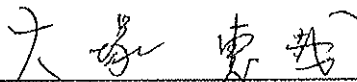
**MINUTES OF THE 1<sup>st</sup> STEERING COMMITTEE MEETING in the Phase-3  
OF  
NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY  
IN  
THE REPUBLIC OF NAMIBIA**

A meeting for Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP) was held with the 1<sup>st</sup> Steering Committee at PS Board Room of MAWF head office in Windhoek on August 3, 2016. In the meeting, the team leader of the JICA Study Team briefly explained the activities of the phase-2, highlighting the review of pilot site activities in phase-2, proposed draft master plan for crop and livestock development, and proposed work plan for phase-3. Thereafter, a series of fruitful discussion was made among the participants. The main issues discussed in the meeting and the list of participants is shown in ANNEXES attached hereto.

August 3, 2016

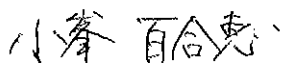


\_\_\_\_\_  
Mrs. Sophia Kasheeta  
Deputy Permanent Secretary  
Ministry of Agriculture, Water and Forestry  
The Republic of Namibia



\_\_\_\_\_  
Mr. Shigeya OTSUKA  
Team Leader/Agriculture Development  
The JICA Study Team

Witnessed by,



\_\_\_\_\_  
Ms. Yurie KOMINE  
Representative  
JICA South Africa Office

**Main Issues Confirmed and Agreed at the Meeting**

***Review of Previous Activities in Phase-2***

1. Measures to promote farmer to farmer extension

The participants discussed the measures to promote farmer to farmer extension system as one of the challenges in phase-3. MAWF explained that each village has traditional information sharing and dissemination system led by the village authority, therefore, farmer to farmer extension system is promoted using such system. JICA Study Team added, according to the discussion in the pilot site activities, that some business-oriented livestock farmer would like to disseminate his livestock management techniques so that he is planning to sublet some of his management works to those trained farmers. Together with ATs, JICA Study Team is planning to develop farmer to farmer extension system through the activities in phase-3

2. Namibian SHEP Approach

MAWF appreciated the effort and the outputs of regional staff for promoting agriculture extension using Namibian SHEP Approach. It is recommended that the approach is called Namibian Specific Approach and MAWF is planning to utilize this approach for agriculture extension in northern communal areas.

3. Marketing activities for livestock

MAWF explained that, in the future, MAWF would like to include marketing activities in the promotion of livestock subsector through enhancing awareness of farmers for livestock marketing. The potential market sites would be abattoir, AGRA, Meat Co., village meat market etc. Such activities will contribute to the strategy of promoting livestock cooperatives in the near future.

4. Dissemination of guinea fowl

MAWF appreciated the output from the trial of chicken production under the pilot site activities. Since MAWF currently considers to disseminate guinea fowl as one of climate change-adaptive measures, it is recommended that guinea fowl dissemination is promoted MAWF in the future under the master plan implementation.

***Work Plan for Phase-3***

5. Confirmation of member of SHEP team shown in the action plan formulated during SHEP training

JICA asked MAWF the member of SHEP team as shown in SHEP action plan prepared during SHEP training in 2016. MAWF replied that the member consists of Steering Committee Meeting at the central and Stakeholder Meeting at the regional level. In particular, there are 3 staff at the central and 4 staff at the regional level who participated in SHEP training in Japan and Kenya, and South Africa (follow-up training). They are expected to play leading role for implementing SHEP activities based on the action plan.

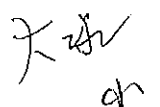
6. Use of SHEP approach for Green Scheme

The chairperson mentioned that MAWF would like to utilize SHEP approach to revitalize farming activities under the Green Scheme.

7. Lesson learnt from pilot site activities in phase-2

MAWF commented about the issues raised in lesson learnt from pilot site activities in phase-2 as follows:

- (i) Some of the issues have been already addressed by MAWF at the central level such as increase of ATs at the regional level.
- (ii) Tractors will be purchased gradually according to the needs of each region through budgetary arrangement at the central level.





**List of Participants**

**1. Namibian Side**

**1.1 MAWF Headquarter (SC members)**

- |     |                         |  |
|-----|-------------------------|--|
| (1) | Mrs. Sophia Kasheeta    | Acting Permanent Secretary , Chair Person  |
| (2) | Ms. Johanna F.N. Andowa | Acting Deputy Permanent Secretary cum Deputy Director of Directorate of Agricultural Research & Development  |
| (3) | Dr. Albertina Silong    | Deputy Chief Veterinary Officer of Division of Epidemiology, Import/Export Control, Advisory Services and Traceability of Directorate of Veterinary Services |
| (4) | Dr. Ben I. Malima       | Deputy Director of Division of Crop Research & Production of Directorate of Agricultural Research & Development  |
| (5) | Mrs. Pulina Shilunga    | Agricultural Scientific Officer of Directorate of Agricultural Production, Extension & Engineering Services  |

**2. Japanese Side**

**2.1 Embassy of Japan**

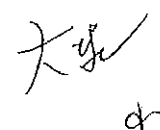
- |     |                     |           |
|-----|---------------------|-----------|
| (1) | Mr. Shinichi Hamada | Counselor |
|-----|---------------------|-----------|

**2.2 JICA South Africa Office**

- |     |                  |                |
|-----|------------------|----------------|
| (1) | Ms. Yurie Komine | Representative |
|-----|------------------|----------------|

**2.3 N-CLIMP Team**

- |     |                      |                                      |
|-----|----------------------|--------------------------------------|
| (1) | Mr. Shigeya Otsuka   | Team Leader/ Agriculture Development |
| (2) | Mr. Naoto Morioka    | Deputy Team Leader/Crop Production   |
| (3) | Mr. Iwami Orita      | Livestock Development                |
| (4) | Ms. Etsuko Akabane   | Farm Management and Training         |
| (5) | Ms. Bernadette Erago | Assistant for Farm Management        |
| (6) | Ms. Johanna Ekandjo  | Secretary                            |



*Attachment 1-8*

*Joint Stakeholder Meeting in Phase 3*

*April 5, 2017*

*N-CLIMP*

**MINUTES OF THE JOINT STAKEHOLDER MEETING  
OF  
PHASE-3  
OF  
NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY  
IN  
THE REPUBLIC OF NAMIBIA**

The Joint Stakeholder Holder Meeting of phase-3 for Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP) was held at the Trade Fair Conference Hall at Ongwediva on April 5<sup>th</sup>, 2017. The purpose of the meeting was: (i) to review pilot site activities in phase-3, (ii) to review dissemination of technical measures, (iii) to review farm model, (iv) to discuss Draft Master Plan for Crop and Livestock Development and (v) to discuss the way forward after the completion of N-CLIMP. Thereafter, a series of fruitful discussion was made among the participants. The main issues discussed in the meeting and the list of participants are shown in the following part of the minutes and in ANNEXES attached hereto.

April 5th, 2017

**Main Issues Confirmed and Agreed at the Meeting**

***Review of Pilot Site Activities in Phase-3***

1. Presentation by representative farmers in 4 pilot sites and 2 representatives of regions

The presenters were as follow: (i) Etayi, (ii) Etunda, (iii) Okahao and (iv) Tsandi in Omusati region. The chief of Omusati and Ohangwena regions summarized the activities and presented their planning for further activities. Due to time management, the other two regions' representatives were asked to use the discussion time in the afternoon.

***Review of Dissemination of Technical Measures based on the results of Questionnaire Survey***

2. The gap between awareness and experience

Responding to the question on the ways of turning awareness into experience of technical measures, an AT in Oshikoto region suggested that respects of interests of farmers. From this point of view, he appreciated the N-CLIMP's methodology. He clearly noted that the master plan is "our" (Namibian) master plan that the ministry it responsible to implement.

The representative of farmers of Etunda also confirmed the importance of farmers' interests. He also raised the importance of involvement of all stakeholders in order to enhance farmers' access to financial institutions.

### ***Review of Farming Model***

#### 3. Presentation of farming model

Farming model for small and medium scale farmers were presented with estimation of costs by the deputy team leader of N-CLIMP. The presentation also focused on the effects of technical measures to increase net income.

### ***Draft Master Plan for Crop and Livestock Development***

#### 4. Presentation on confirmation of the master plan

The presentation covered all parts of draft master plan, including the four steps of SHEP activities in N-CLIMP.

### ***Discussions and the Way Forward***

#### 5. Discussion on the master plan

In general, the master plan was agreed by the participants. Ms Kasheeta, Deputy Permanent Secretary re-confirmed that the Master Plan is to be Namibian plan although it was facilitated by the JICA study team. It was emphasized that from the time of the completion of the project, the GRN institutions, i.e. MAWF including the regional offices for extension as well as research institutions, are responsible for implementation.

#### 6. Questions and Comments by farmers and answers by MAWF

The representative of farmers in Etunda appreciated that the drip irrigation technical measures introduced by N-CLIMP. He made request for continuous supports by N-CLIMP and MAWF. As he commented that as he is working on the government land of the green scheme project, Ms Kasheeta made sure that individual farmers are free to invest on their plots in the green scheme project.

The model farmer from Okahao thanked the animal husbandry techniques as it improved the ways of livestock production. He raised the issues of the insufficiency of markets for cattle for communal livestock farmers. With some example of AMTA, UNAM and closure of grain border, Ms. Kasheeta explained that as the Ministry's strategy focused on activation of livestock market at the communal area, MAWF continue marketing support of livestock in Northern communal farmers including livestock farmers.

#### 7. Reviewing of pilot sites activities

On the question of which region or sites was the best, the Deputy Team Leader of N-CLIMP answered that the comparison is difficult as all the sites have different features. With re-cited example of Etayi, Ms. Kasheeta also agreed with the combination of limited time and weather conditions made difficulty for activities to be implemented as planned.

#### 8. JICA Headquarters' plan after the completion of N-CLIMP: continuous monitoring

Dr. Aikawa appreciated the output of N-CLIMP through implementation of pilot site activities in the N-CLIMP. He emphasized that all the stakeholders need to keep in mind for market needs firstly. He

confirmed that the JICA Headquarters plan to continuously monitor MAWF's master plan implementation after the completion of N-CLIMP.

## List of Participants

### Joint Stakeholder Meeting

**Date:** 12 April 2017 –

**Venue:** Ongwediva Trade Fair – Oshana Region

#### 1. MAWF HEAD OFFICE

- |    |                        |   |
|----|------------------------|---|
| 1  | Mrs. Sophie Kasheeta   | Chairperson of Joint Stakeholders Meeting Deputy Permanent Secretary – MAWF - DAD |
| 2  | Mrs. Mildrend Kambinda | Director – MAWF – DAPEES  |
| 3. | Dr. Benedict I. Malima | Deputy Director MAWF – Crop Research  |

#### 2. Oshana Region

##### 2.1 DAPEES Oshana Region

- |      |                           |                            |
|------|---------------------------|----------------------------|
| (1)  | Mrs. Loide P. Endjala     | CAT – MAWF – DAPEES        |
| (2)  | Ms. Lucia Iipinga         | SAT – MAWF DAPEES          |
| (3)  | Ms. Kaarina Nghilwa       | SAT – MAWF Uukwiyu         |
| (4)  | Ms. Elise Hasholo         | AT – MAWF – Okaku          |
| (5)  | Mr. Agasty Amon           | AT- MAWF – Okau-kamasheshe |
| (6)  | Ms. Vicky N. Iipinga      | ASO – MAWF DAPEES          |
| (7)  | Mr. Nestor Haufiku        | CAT –MAWF DAPEES           |
| (8)  | Ms. Pulcheria Mwanyangapo | SAT MAWF DAPEES            |
| (9)  | Ms. Anna Shivute          | ASO – MAWF DAPEES          |
| (10) | Ms. Taimi Nambambi        | SAT - DAPEES               |
| (11) | Mrs. Yaha Nakaande        | ASO – MAWF DAPEES          |
| (12) | Mr. Charlie L. Mweetako   | SASO – MAWF – DAPEES       |

(13) Ms. Anna Amwaalwa AT- DAPEES

(14) Mrs. Wilhelmina Amashili SAT – DAPEES

## **2.2. Farmers Oshana Region**

(1) Mrs. Esther Ipinge Uuvudhiya – Livestock

(2) Ms. Johanna Hango Uukwiyu – Small Stock

(3) Mrs. Trefina Angolo Okau-Kamasheshe – Crop

(4) Mrs. Toma Frans Okatana – Horticulture

(5) Mr. Jason Andreas Okau – Cereal

## **3. Omusati Region**

### **3.1 DAPEES Omusati Region**

(1) Mr. Martin Embundile Chief Agricultural Scientific Officer, Omusati Region, DADEEDS,

(2) Mr. Mikka Shilomphoka SAT – DARD - Omahenene – MAWF

(3) Ms. Miriam Fikunawa SAT/MAWF Etayi

(4) Ms. Kaunapawa Shapenga SAT/MAWF Okalongo

(5) Ms. Shigwedha Julia SAT – MAWF Okahao

(6) Ms. Rachel Anghuwo SAT- MAWF Okahao

(7) Ms. Lucia Naunyango SAET-MAWF Etunda

(8) Ms. Moses Monika SAT-MAWF - Tsandi

(9) Ms. Emily Loide Shipateko AT-MAWF

(10) Ms. Otilie Nawa SAT –DAPEES MAWF

(11) Mrs. Lucia Naunyango AT- MAWF – Etunda

(12) Mr. Lucas Moongela At – MAWF Etunda

(13) Mr. G. Shangenge AFM Etunda

(14) Mr. Andreas Ipinge SAT – MAWF DAPEES Onaanda

### **3.2 FARMERS Omusati Region**

- (1) Mr. S.M Tumelo Etunda – Horticulture
- (2) Ms. Maria Angula Tsandi – Small Stock (Chicken)
- (3) Mr. Kristian Hango Okahao – Livestock
- (4) Mrs. Thresia Halweendo Etayi – Crop

## **4. Ohangwena Region**

### **4.1 DAPEES Ohangwena Region**

- (1) Mrs. Margreth Matengu CASO - MAWF DAPEES
- (2) Ms. Megameno Amutenya SASO MAWF
- (3) Mr. Immanuel Eelu CAT – MAWF
- (4) Mrs. Marina Kaambu CAT – DAPEES
- (5) Mr. Nicklaus Endjala SAT – Endola
- (6) Mrs. Justah Nalushiya SAT – DAPEES

### **4.2 Farmers Ohangwena Region**

- (1.) Ms. Tusnelde H. Endola – Small Stock (Goats)
- (2.) Ms. Laimi Mateus Ondobe – Crop
- (3.) Ms. Lucia Nghishidimbwa Okongo – Livestock (Cattle)

## **5. Oshikoto Region**

### **5.1 DAPEES Oshikoto Region**

- (1) Mr. Oswald Mwanyangapo CASO – MAWF DAPEES



- |      |                            |   |
|------|----------------------------|---|
| (2)  | Mr. Joseph Jonas           | AT- MAWF DAPEES                         |
| (3)  | Mr. M. Tyapa               | CAT MAWF DARD                           |
| (4)  | Ms. Patricia Sheehama      | SAT – MAWF DAPEES                       |
| (5)  | Ms. Veronica Nghishidimbwa | SAT Olukupa ADC (Onankali Constituency) |
| (6)  | Mr. Salmon Hosea           | SAT - MAWF                              |
| (7)  | Mr. Kashimba Willem        | DAPEES - MAWF                           |
| (8)  | Mr. Isack Nghaamwa         | ASO – MAWF DAPEES                       |
| (9)  | Ms. Ester Namushinga       | DAPEES                                  |
| (10) | Mr. Erastus Nuuyoma<br>)   | MAWF – DAPEES                           |

## **5.2 Farmers Oshikoto Region**

- |     |                       |                                  |
|-----|-----------------------|----------------------------------|
| (1) | Mr. John Amapindi.    | Onayena – Horticulture           |
| (2) | Mr. Velena Mashina    | Onankali – Small Stock (Chicken) |
| (3) | Mrs. Esther. Ndeutapo | Okashana (Omuthiya) – Grain      |

## **6. Stakeholders**

- |     |                     |   |
|-----|---------------------|---|
| (1) | Mr. Petrus Matheus  | Horticulture Officer – AMTA               |
| (2) | Mr. Sakeus Enkono   | Marketing Manager - AMTA                  |
| (3) | Mr. Stephen Iimbili | NSFR - AMTA                               |
| (4) | Mr. Kenta Tsuchiya  | Volunteer – Rice/Mahangu Project          |
| (5) | Mr. Teophilus Lwina | UNAM                                      |
| (8) | Mr. John Utoni      | Marketing Officer – Meat board of Namibia |

## **7. Japanese Side**

### **7.1 Embassy of Japan**

- (1) Ms. Kaoru Yokotani First Secretary

### **7.2 JICA**

- (1) Dr. Jiro Aikawa Senior Advisor : JICA Headquarter  
(2) Mr. Hiroaki Kubota Assistant Representative – JICA Namibia

### **7.3 N-CLIMP Team**

- (1) Mr. Shigeya Otsuka Team Leader / Agriculture Development  
(2) Mr. Naoto Morioka Deputy Team Leader / Arid Area Agriculture Development  
(3) Ms. Etsuko Akabane Farm Management /Training  
(4) Ms. Bernadette Erago Technical Assistant ( Farm Management)  
(5) Ms. Johanna Ekandjo Administration  
(6) Ms. Aini Amukoto Field Assistant – Crop  
(7) Mr. Daniel Imalwa Field Assistant - Livestock  
(8) Mr. Benyamin Shikesho Field Assistant – Farm Management  
(9) Mr. Martin Mateus Head Driver  
(10) Mr. Amon Amupadhi Driver

End of List

*Attachment 1-9*

*2<sup>nd</sup> Steering Committee Meeting in Phase 3*

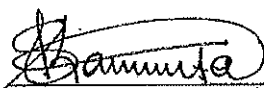
*April 12, 2017*

*N-CLIMP*

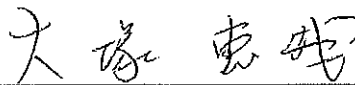
**MINUTES OF THE 2<sup>nd</sup> STEERING COMMITTEE MEETING in the Phase-3  
OF  
NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY  
IN  
THE REPUBLIC OF NAMIBIA**

A meeting for Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP) was held with the 2<sup>nd</sup> Steering Committee at Minister's Board Room of Ministry of Agriculture, Water and Forestry (hereinafter referred to as MAWF) head office in Windhoek on April 12, 2017. The team leader of the JICA Study Team reviewed the 1<sup>st</sup> Steering Committee Meeting in August, 2016. This was followed by the review of pilot site activities (Draft Master Plan Implementation) in phase 3 and explanation of farming model. The highlight of the meeting was discussions over master plan for crop and livestock development where participants assured the continuous implementation of the plan with their own initiatives. The main issues discussed in the meeting and the list of participants is shown in ANNEXES attached hereto.

April 12, 2017

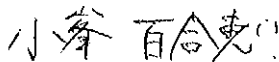


\_\_\_\_\_  
Mrs. Sophia KASHEETA  
Deputy Permanent Secretary  
Ministry of Agriculture, Water and Forestry  
The Republic of Namibia



\_\_\_\_\_  
Mr. Shigeya OTSUKA  
Team Leader/Agriculture Development  
The JICA Study Team

Witnessed by,



\_\_\_\_\_  
Ms. Yurie KOMINE  
Representative  
JICA South Africa Office

**Main Issues Confirmed and Agreed at the Meeting**

*Review of minutes of meeting of Steering Committee Meeting-1 in phase 3*

1. Confirmation of the discussion points in the previous meeting

The team leader of the JICA Study Team reviewed the 1<sup>st</sup> Steering Committee Meeting in August, 2016 highlighting the participants' comments and opinions. The participants have agreed to the minutes of meeting.

*Review of pilot site activities in phase 3*

2. Draft Master Plan implementation in the four regions

The activities in the pilot sites were summarized through showing the photographs. MAWF assured the continuous support to the farmers' groups of those pilot sites.

MAWF also appreciated the master plan in terms of its sustainability. Taking an example of chicken huts in Uukwiyu-Ushona, they pointed out that locally-available materials are utilized for the facilities. Therefore, farmers can use their own resources for improvement of farming.

*Farm Management Model*

3. Platform for future commercial farmers and effects of technical measures to increase net income

Deputy Team Leader of the Study Team presented the platform for farming model in communal land and examples of effects of technical measures to increase net income by types of small and medium scale farmers. MAWF commented that, as presented, support to farmers needs to be carried out continuously based on their farming scale.

*Master Plan for Crop and Livestock Development and Discussions*

4. Namibian Specific SHEP Approach

The Team Leader of the Study Team shared topics presented at the SHEP follow-up training in South Africa in February 2017 that Namibian specific SHEP is evaluated as the stage of "To make strategy for expansion" which is second to Kenya. First secretary of Embassy of Japan asked the reasons why Namibia is the second following Kenya, the SHEP-originated country.

Assistant Representative of JICA South Africa stressed active participation of MAWF staff from the central to regions as implementation organization contributing to SHEP approach dissemination under N-CLIMP in the process of formulating the master plan.

5. Implementation of the Master Plan by MAWF

MAWF commented that the concept and the approach of the master plan discussed is completely match up with the policy of MAWF. As discussed from the beginning of phase-3, MAWF has arranged budget for the implementation of our formulated master plan under N-CLIMP, therefore, the headquarters of MAWF will follow-up supporting regional levels to implement extension activities at the field level.

*Closing remarks*

First Secretary of Embassy of Japan showed her respects of fruitful discussions and the Namibian Side's initiatives on the Master Plan. She also confirmed the continuous cooperation with MAWF, through JICA in terms of training and monitoring.

*K. S.*  
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**List of Participants**

**1. Namibian Side**

**1.1 MAWF Headquarter (SC members)**

- |     |                      |  |
|-----|----------------------|--|
| (1) | Mrs. Sophia Kasheeta | Deputy Permanent Secretary , Chair Person  |
| (2) | Dr. Albertina Silong | Deputy Chief Veterinary Officer of Division of Epidemiology, Import/Export Control, Advisory Services and Traceability of Directorate of Veterinary Services |
| (3) | Dr. Ben I. Malima    | Deputy Director of Division of Crop Research & Production of Directorate of Agricultural Research & Development  |
| (4) | Mrs. Pulina Shilunga | Agricultural Scientific Officer of Directorate of Agricultural Production, Extension & Engineering Services  |

**1.2 MAWF North Central Division**

- |     |                    |   |
|-----|--------------------|---|
| (1) | Ms. Enny Namalambo | Deputy Director of North Central Division of Directorate of Agricultural Production, Extension & Engineering Services |
|-----|--------------------|---|

**2. Japanese Side**

**2.1 Embassy of Japan**

- |     |                    |                 |
|-----|--------------------|-----------------|
| (1) | Ms. Kaoru Yokotani | First Secretary |
|-----|--------------------|-----------------|

**2.2 JICA South Africa Office**

- |     |                  |   |
|-----|------------------|---|
| (1) | Ms. Yurie Komine | Assistant Representative JICA South Africa Office |
|-----|------------------|---|

**2.3 JICA Namibia Office**

- |     |                       |                                   |
|-----|-----------------------|-----------------------------------|
| (1) | Mr. Nakamura Shunsuke | Resident Representative           |
| (2) | Mr. Hiroaki Kubota    | Assistant Resident Representative |
| (3) | Ms. Mayday Thomas     | Program Officer                   |

**2.4 N-CLIMP Team**

- |     |                       |   |
|-----|-----------------------|---|
| (1) | Mr. Shigeya Otsuka    | Team Leader/ Agriculture Development                  |
| (2) | Mr. Naoto Morioka     | Deputy Team Leader/ Arid Area Agriculture Development |
| (3) | Ms. Etsuko Akabane    | Farm Management / Training                            |
| (4) | Ms. Bernadette Erago  | Farm Management/ Training                             |
| (5) | Mrs. Johanna Ekandjo  | Administrative Management                             |
| (6) | Mr. Daniel Imalwa     | Field Assistant                                       |
| (7) | Mr. Benyamin Shikesho | Field Assistant                                       |
| (8) | Ms. Ainy Amukoto      | Field Assistant                                       |

*Kise*  
dr

*Attachment 2*

*Technical Sheet for Crop Production,  
Livestock Production, and  
Farm Management*

*N-CLIMP*



*Attachment 2-1*

*Technical Sheet for*

*Crop Production*

*N-CLIMP*

<b>CR-1</b>	<b>Fertilizer Application</b>	
Purpose	Increase of production	
Target area	Pearl millet crop fields	
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers groups (about 15 members per group)	
Expected output	Higher unit yield of pearl millet	
Work procedure	(1) Review of the present practice and explanation on fertilizer application method (2) Basal fertilizer application (3) 1 <sup>st</sup> & 2 <sup>nd</sup> top dressing	
Work plan	This technique will be applied during the master plan period (Phase 2 & Phase 3 of N-CLIMP, short term, medium to long term). During the Phase 2, an action plan will be firstly prepared, and based on the action plan a series of the Work Procedure will be carried out	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Observation on crop growth: dates of germination, emergence of leaves (2<sup>nd</sup> to flag),</li> <li>➤ Weekly measurement of plants: number of plants/hills, plant height, tillers, panicles,</li> <li>➤ Daily rainfall record.</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Marking pegs (50 cm x 30 pcs) / poles 1.5 m x 9 pcs.) with lines / strings for plots, weighing scale, rain gauge</li> <li>➤ Ruler &amp; measuring tapes (10 cm / 30 cm / 1 m / 2 m / 30 m)</li> <li>➤ Camera for taking pictures</li> <li>➤ Manure: 100 kg/site, fertilizer: 2:3:2 + Zn 1.7 kg/site &amp; LAN 1 kg/ site</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ CR-01 Attachment 1: Review of the Present Practice</li> <li>➤ CR-01 Attachment 2: Pearl Millet Growth Stage</li> <li>➤ CR-01 Attachment 3: Basal Fertilizer Application</li> <li>➤ CR-01 Attachment 4: 1<sup>st</sup> &amp; 2<sup>nd</sup> Top Dressing</li> </ul>

**(1) Review of the present practice and explanation on fertilizer application method**

This is the class room type of training to be aware of the present practice.

Participants will discuss on the present manure and fertilizer application methods on the following points (refer to CR-01 Attachment 1: Review of the Present Practice):

- Basal fertilizer: timing, dosage, source, price, cost, challenge and constraints
- 1<sup>st</sup> & 2<sup>nd</sup> Top Dressing: timing, dosage, source, price, cost, challenge and constraints

After the results of review are summarized and concluded, the standard application methods will be explained according to the “crop development stages” (Refer to CR-01 Attachment 2: Pearl Millet Growth Stage), as well as necessity to modify the methods based on the actual rainfall conditions.

**(2) Basal Fertilizer Application**

This is the field demonstratio, to confirm effect of basal fertilizer application on the initial growth of pearl millet (refer to CR-01 Attachment 3: Basal Fertilizer Application). At the same time, proper thinning will be conducted after 15 days from germination to select the main seedling at each sowing point.

### (3) 1st & 2nd top dressing

This is the field demonstratio, to confirm effects and appropriate dosage of 1<sup>st</sup> and 2<sup>nd</sup> top dressing (refer to CR-01 Attachment 3: Basal Fertilizer Application).

### (4) Reference Information

Reference information is: .

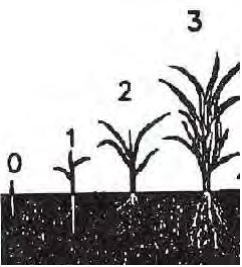
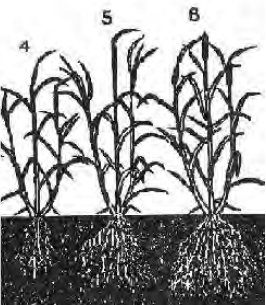
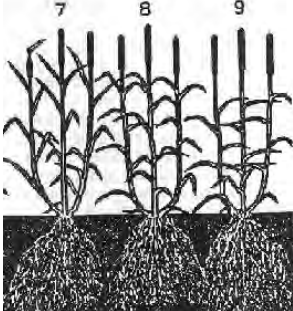
- Spotlight on Agriculture No. 7 “Pearl Millet Improvements – Plant Material Description – April 1998, Directorate of Agriculture Research and Training (DART), Ministry of Agriculture, Water and Rural Development (MAWRD).
- Spotlight on Agriculture No. 16 “Grain Legumes in Namibian Agriculture” March 1999, DART / MAWRD.
- Spotlight on Agriculture No. 23 “Agricultural Laboratory” August 1999, DART / MAWRD.
- Spotlight on Agriculture No. 24 “The Why, What, How, & When of Soil Sampling” August 1999, DART / MAWRD.
- Spotlight on Agriculture No. 50 “Seed is Life” November 2001, DART / MAWRD.
- Spotlight on Agriculture No. 51 “Soil Fertility Management for Sustained Crop Production” January 2002, DART / MAWRD.
- Spotlight on Agriculture No. 61 “Cereal-Legume Intercropping” November 2002, DART / MAWRD (N<sub>2</sub>-Fixation need higher density of cowpea in the intercrop and retaining residues in the field). .

Spotlight on Agriculture No. 69 “Cowpea The African Bean” November 2001, DART / MAWRD.

### (5) Feedback from Pilot Site

The forms made for farm record are shown below.

## CR-01 Attachment 2: Pearl Millet Growth Stage

	<p><u>Growth Phase 1: Vegetative Growth Stage</u></p> <p>Seedling establishment with root, leaf, and tiller development takes place during this phase. Panicle initiation also begins.</p> <p>Dry-matter accumulation is primarily in the roots and leaves. Inter-node elongation is limited.</p> <p>In late varieties, the floral initiation is considerably delayed. Size of the apex may range from 0.5 mm in early varieties to 1.0 mm in late varieties.</p>
	<p><u>Growth Phase 2: Panicle Development Stage</u></p> <p>Expansion of all the leaves, emergence of all the tillers, floral initiation in the tillers, and stem elongation through elongation of inter-nodes takes place during this phase.</p> <p>Dry-matter accumulation is in roots, leaves, stem, and panicle. Elongation of panicle and formation of floral parts are found.</p> <p>This stage comes to an end with the emergence of stigmas on the panicle (flowering).</p>
	<p><u>Growth Phase 3: Grain Filling Stage</u></p> <p>This phase begins with fertilization of florets and continues up to maturity of the plant.</p> <p>Dry-matter accumulation is mainly in the grain formation and partly in the enlargement of stem and leaves of the tillers. Tillers arising from upper nodes (nodal tillers) are late and produce small panicles which usually sterile.</p> <p>End of this phase, physiological maturity, is indicated by development of a small dark layer at the bottom of grain.</p>

### Summary of Growth Stages (Approx Days after Emergence / Germination)

Stage	Character	Short Duration Variety	Long Duration Variety
0	Coleoptile visible	0 days	0 days
1	3 <sup>rd</sup> Leaf Stage	6 days	6 days
2	5 <sup>th</sup> Leaf Stage	14 days	15 days
3	Panicle Initiation	22 days	28 days
	(Total Days in Phase 1)	(22 day)	(28 days)
4	Flag Leaf Visible	33 days	43 days
5	Boot Stage	36 days	47 days
6	50% Stigma Emergence	40 days	53 days
	(Total Days in Phase 2)	(18 days)	(25 days)
7	Milk Stage	49 days	61 days
8	Dough Stage	58 days	69 days
9	Physiological Maturity	65 days	75 days
	(Total Days in Phase 3)	(25 day)	(22 days)

Note: The above growth stages are the averages under the environmental conditions during June to September at Hyderabad, India.

Source: Prepared by the Study Team, based on the Management-Procedures-for-Pearl-Millet-Improvement, ICRISAT, 1992.

### CR-01 Attachment 3: Basal Fertilizer Application

Item	Contents				
Duration	[sowing:: date / month /year] to [harvest: date / month /year]				
Place / Venue:	[Region / Constituency / Address], [Traditional Authority / District / Village / Address] [land owner: name] , [Coordinates (latitude / longitude)]				
ADC and AT	[Agricultural Development Center], [CAT / SAT / AT]				
Participants	Agricultural Technician (Chairperson), Farmers Group (Leader, Assistant Leader, Secretary, Assistant Secretary, etc.), DAPEES Regional Office, JICA Team				
Plot Layout	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">(A) Plot A</td> <td style="text-align: center;">(B) Plot B</td> </tr> <tr> <td style="text-align: center;">(D) Plot D</td> <td style="text-align: center;">(C) Plot C</td> </tr> </table> <p style="text-align: right;">Typical Plot Layout (10 m x 10 m x 4 plots)</p>	(A) Plot A	(B) Plot B	(D) Plot D	(C) Plot C
(A) Plot A	(B) Plot B				
(D) Plot D	(C) Plot C				
Demonstration & Trial Specification	<ul style="list-style-type: none"> <li>- Standard row interval: 75 cm (13.3 rows per 10 m), plant interval within row: 50 cm, (20 plants per 10m row), accordingly 260 plants in 1 plot of 100 m<sup>2</sup>,</li> <li>- Same variety in all 4 plots (either local or improved varieties),</li> <li>- Land preparation preferably by ripper plough, chisel plough, or ripper-furrow, before rain comes,</li> <li>- Planting / seeding after the rain more than 20 mm within 3 consecutive days,</li> <li>- Manure for basal application, if manure available, before land preparation</li> <li>- Chemical fertilizer (N:P:K=2:3:2 + Zn) for basal application, if manure not available, after planting</li> </ul>				
Farmers Field Day	<ul style="list-style-type: none"> <li>- 1<sup>st</sup> Day for basal application, 2<sup>nd</sup> Day at thinning and identification of main seedling on 15 days after germination, 3<sup>rd</sup> Day for counting tillers on flag leaf emergence</li> </ul>				
Monitoring and reporting of progress and result	<ul style="list-style-type: none"> <li>- Reporting to the Regional monthly meeting on the progress and issues,</li> <li>- Result will be assessed by the flowering stage, on the number of plants, plant height, number of tillering &amp; panicles.</li> </ul>				

#### 1. Basal Fertilizer Dosage

[Variety employed]	Plot A	Plot B	Plot C	Plot D
Manure dosage	0 kg / 100 m <sup>2</sup> (0 ton / ha)	10 kg / 100 m <sup>2</sup> (1.0 ton / ha)	30 kg / 100 m <sup>2</sup> (2.0 ton / ha)	60 kg / 100 m <sup>2</sup> (6.0 ton / ha)
Chemical fertilizer dosage	0 kg / 100 m <sup>2</sup> (0 kg / ha)	0.2 kg / 100 m <sup>2</sup> (20 kg / ha)	0.5 kg / 100 m <sup>2</sup> (50 kg / ha)	1 kg / 100 m <sup>2</sup> (100 kg / ha)

#### 2. Record of Farm Operation (Operation Date)

(days from germination)	Plot A	Plot B	Plot C	Plot D
Sowing				
Supplemental sowing				
<b>[Germination date]</b>				
Thinning (15 days)				
1 <sup>st</sup> weeding (2-3 weeks)				
Plant protection				

3. Observation Record on Crop Development

	Plot A	Plot B	Plot C	Plot D
Sowing				
Supplemental sowing				
【Germination date】				
2 <sup>nd</sup> leaf emergence				
3 <sup>rd</sup> leaf emergence				
5 <sup>th</sup> leaf emergence				
7 <sup>th</sup> leaf emergence				
Flag leaf emergence				

4. Measurement Record on Crop Height

	Plot A	Plot B	Plot C	Plot D
【Germination date】				
1 week after	_____ cm			
2 weeks after				
4 weeks after				
5 weeks after				
6 weeks after				
7 weeks after				
9 weeks after				
12 weeks after				

5. Measurement Record on Tillers

	Plot A	Plot B	Plot C	Plot D
【Germination date】				
1 week after				
2 weeks after				
4 weeks after				
5 weeks after				
6 weeks after				
7 weeks after				
9 weeks after				
12 weeks after				

Plot Layout of Demonstration and Trial

10 m x 10 m = 100 m<sup>2</sup>, 75 cm of row interval, 13.3 rows in 10 m.

### CR-01 Attachment 4: 1<sup>st</sup> and 2<sup>nd</sup> Top Dressing

Item	Contents				
Duration	[sowing:: date / month /year] to [harvest: date / month /year]				
Place / Venue:	[Region / Constituency / Address], [Traditional Authority / District / Village / Address] [land owner: name] , [Coordinates (latitude / longitude)]				
ADC and AT	[Agricultural Development Center], [CAT / SAT / AT]				
Participants	Agricultural Technician (Chairperson), Farmers Group (Leader, Assistant Leader, Secretary, Assistant Secretary, etc.), DAPEES Regional Office, JICA Team				
Plot Layout	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">(A) Plot A</td> <td style="text-align: center;">(B) Plot B</td> </tr> <tr> <td style="text-align: center;">(D) Plot D</td> <td style="text-align: center;">(C) Plot C</td> </tr> </table> <p style="text-align: right;">Typical Plot Layout (10 m x 10 m x 4 plots)</p>	(A) Plot A	(B) Plot B	(D) Plot D	(C) Plot C
(A) Plot A	(B) Plot B				
(D) Plot D	(C) Plot C				
Demonstration & Trial Specification	<ul style="list-style-type: none"> <li>- Plant density and variety same as the basal fertilizer (Attachment 3: Basal Fertilizer Application).</li> <li>- 1<sup>st</sup> top dressing after 2 to 3 weeks after germination for better panicle initiation (possibly after thinning and 1<sup>st</sup> weeding),</li> <li>- 2<sup>nd</sup> top dressing after 4 to 5 weeks after germination for better grain filling,</li> <li>- Application timing of the 1<sup>st</sup> and 2<sup>nd</sup> top dressing to be judged according to the rainfall condition, Case 1: normal application under average rainfall (20 mm of rainfall within 1 week) Case 2: (dry spell) limited or no application under no rainfall more than 2 weeks after (based on the plant condition), Case 3: (flood) limited or no application under flood or inundation within 1 week (based on the plant condition),</li> <li>- Limestone ammonium nitrate (LAN) assumed for top dressing.</li> </ul>				
Farmers Field Day	- 1 <sup>st</sup> Field Day at 1 <sup>st</sup> top dressing, 2 <sup>nd</sup> Field Day at 2 <sup>nd</sup> top dressing, 3 <sup>rd</sup> Field Day at Flowering, 4 <sup>th</sup> Field Day at physical Maturity				
Monitoring and reporting of progress and result	<ul style="list-style-type: none"> <li>- Reporting to the Regional monthly meeting on the progress and issues,</li> <li>- Result will be assessed by the flowering stage, on the number of plants, plant height, number of tillering &amp; panicles.</li> </ul>				

#### 6. 1<sup>st</sup> and 2<sup>nd</sup> Top dressing Dosage

[Variety employed]	Plot A	Plot B	Plot C	Plot D
1 <sup>st</sup> Top Dressing (LAN)	0 kg / 100 m <sup>2</sup> (0 kg / ha)	0.1 kg / 100 m <sup>2</sup> (10 kg / ha)	0.2 kg / 100 m <sup>2</sup> (20 kg / ha)	0.4 kg / 100 m <sup>2</sup> (40 kg / ha)
2 <sup>nd</sup> Top Dressing (LAN)	0 kg / 100 m <sup>2</sup> (0 kg / ha)	0.1 kg / 100 m <sup>2</sup> (10 kg / ha)	0.2 kg / 100 m <sup>2</sup> (20 kg / ha)	0.4 kg / 100 m <sup>2</sup> (40 kg / ha)

#### 7. Record of Farm Operation (Operation Date)

(days from germination)	Plot A	Plot B	Plot C	Plot D
<b>[Germination date]</b>				
Thinning (15 days)				
1 <sup>st</sup> weeding (2-3 weeks)				
1 <sup>st</sup> top dressing				
2 <sup>nd</sup> weeding (4-5 weeks)				



2 <sup>nd</sup> top dressing				
Plant protection				

8. Observation Record on Crop Development

	Plot A	Plot B	Plot C	Plot D
Sowing				
Supplemental sowing				
【Germination date】				
2 <sup>nd</sup> leaf emergence				
3 <sup>rd</sup> leaf emergence				
5 <sup>th</sup> leaf emergence				
7 <sup>th</sup> leaf emergence				
Flag leaf emergence				

9. Measurement Record on Crop Height

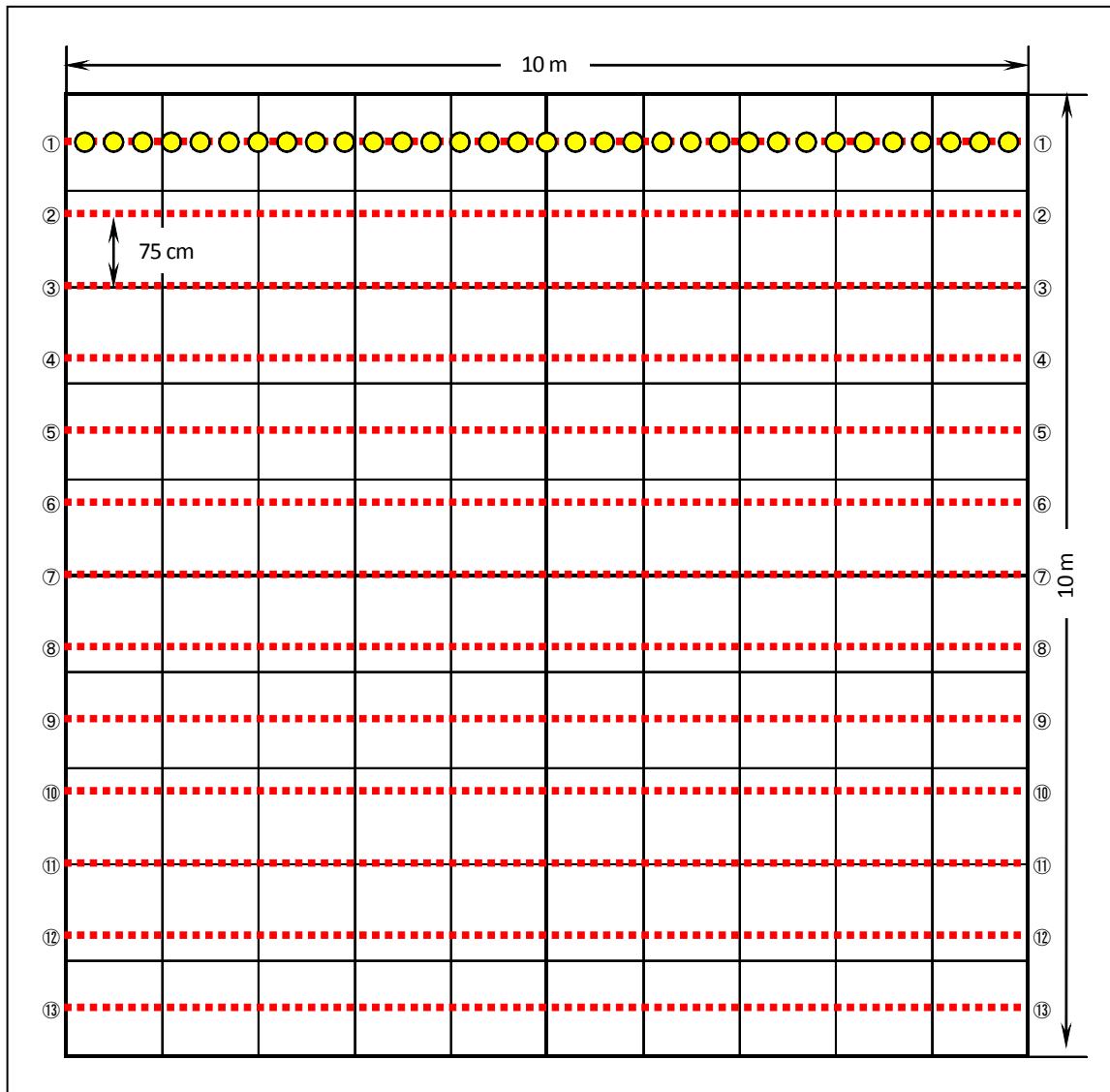
	Plot A	Plot B	Plot C	Plot D
【Germination date】				
1 week after	_____ cm			
2 weeks after				
4 weeks after				
5 weeks after				
6 weeks after				
7 weeks after				
9 weeks after				
12 weeks after				

10. Measurement Record on Tillers

	Plot A	Plot B	Plot C	Plot D
【Germination date】				
1 week after				
2 weeks after				
4 weeks after				
5 weeks after				
6 weeks after				
7 weeks after				
9 weeks after				
12 weeks after				

11. Plot Layout of Demonstration and Trial

10 m x 10 m = 100 m<sup>2</sup>, 75 cm of row interval, 13.3 rows in 10 m, as same as Basal Fertilizer Application: .



<b>CR-02</b>	<b>Cropping Pattern and Crop Management</b>	
Purpose	Reduction of risk due to unstable rainfall	
Target area	Pearl millet crop fields	
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers groups (about 15 members per group)	
Expected output	More stable production of pearl millet than the present production	
Work procedure	<ol style="list-style-type: none"> <li>(1) Review of the present pattern and crop management</li> <li>(2) Explanation of crop development stages of pearl millet</li> <li>(3) Crop growing calendar of pearl millet based on the crop development stages and average rainfall pattern</li> <li>(4) Standard crop management based on the crop growing calendar</li> <li>(5) Modification of cropping calendar based on the actual rainfall records</li> </ol>	
Work plan	This technique will be applied during the master plan period (Phase 2 & Phase 3 of N-CLIMP, short term, medium to long term). During the Phase 2, an action plan will be firstly prepared, and based on the action plan a series of the Work Procedure will be carried out	
Main monitoring item	➤ Number of farmers keeping records	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Projector/Laptop Computer</li> <li>➤ Hand-out</li> <li>➤</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ CR-02 Attachment 1: Pearl Millet Growth Calendar1</li> <li>➤ CR-02 Attachment 2: Variety List of Pearl Millet</li> <li>➤ CR-02 Attachment 3: Cropping Pattern of Pearl Millet</li> <li>➤ CR-02 Attachment 4: Crop Management Practice of Pearl Millet</li> <li>➤ CR-02 Attachment 5: Seed Selection and Germination Test of Pearl Millet</li> <li>➤ CR-02 Attachment 6: Seed Requirement and Plant Density of Pearl Millet</li> </ul>

### (1) Review of the present pattern and crop management

Farmers will briefly explained the present cropping pattern focusing on timing of such crop management like basal fertilizer application, ploughing and its method, planting, weeding, thinning, top dressing, pest control, bird attack, harvesting, threshing and storing. Farmers will also discuss each other on variation of their own practices.

### (2) Explanation of crop development stages of pearl millet

Each crop development stage will be explained along with symptom of stages.

### (3) Crop growing calendar of pearl millet based on the average rainfall pattern

The crop growing calendar is prepared based on the growth stage of pearl millet shown in CR-01 according to the average rainfall pattern (refer to CR-02 Attachment 1: Pearl Millet Growth Calendar1). The crop growing calendars are different by varieties due to different growing period (refer to CR-02 Attachment 2: Variety List of

Pearl Millet).

The crop growing calendar will be explained to and discussed with farmers, to review their cropping pattern (refer to CR-02 Attachment 3: Cropping Pattern of Pearl Millet) and crop management of pearl millet.

#### (4) Standard crop management of pearl millet

Standard crop management practices of pearl millet are assumed based on the above crop growing calendar (refer to CR-02 Attachment 4: Crop Management Practice of Pearl Millet)

1. Seed selection (refer to CR-02 Attachment 5: Seed Selection and Germination Test of Pearl Millet)
2. Plant spacing and density (refer to CR-02 Attachment 5: Seed Selection and Germination Test of Pearl Millet)
3. Furrow planting
4. Thinning
5. Weeding
6. Crop Protection

#### (5) Modification of cropping calendar

The standard cropping calendar needs to be modified to suite the actual rainfall and climatic condition.

#### Reference Information

Reference information is:

- Growth and Development of the Pearl Millet Plant, Research Bulletin No. 6, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Andhra Pradesh, India, October 1981.
- Management Procedures for Pearl Millet Improvement compiled by T. Nagur, B. Diwakar and D. L. Oswalt, Skill Development Series No. 5, Human Resources Development Program, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Andhra Pradesh, India, 1992.
- Trial/Demonstration, Tests and Trails Programme 1996/1997, North Central Division, NOLIDEP (Northern Regions Livestock Development Project under the National Agricultural Service Support Programme (NASSP).

#### Feedback from Pilot Site Activities in Phase-2

This technical measure was introduced in 4 sites in Phase-2. The following table summarizes the activities taken through trainings in pilot site activities.

1st Training (Nov. 2015)	<ul style="list-style-type: none"><li>- Present practices of farmers were reviewed together, and the most of farmers apply manure as basal fertilizer before ploughing. Dosage is 1 to 2 cart (750 kg to 1.5 ton), depending on availability.</li><li>- Crop development stages are outlined on the vegetative growth stage, panicle development stage and grain filling stage, and their symptoms. Farmers generally showed the initial understanding on the stages, but not deeply .</li><li>- Effects of fertilizer application were explained by the crop development stages. Fertilizer burn at the application was also explained together with a proper application method.</li><li>- Notebooks were distributed to the farmers to keep recording of each farming activity, and farmers started put record of this training.</li><li>- Field inspection was carried out in order to decide the demonstration plots, and discussed on the materials and services to be supplied by farmers or MAWF or N-CLIMP.</li></ul>
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<p>2nd Training (Nov. to Dec. 2015)</p>	<ul style="list-style-type: none"> <li>- Each farmer reported their records in notebooks, and most of them keeps no records since the 1<sup>st</sup> training, and farmers were requested to keep recording farming activities.</li> <li>- Crop development stages were repeatedly explained with fertilizer application, thinning and weeding. Discussion was made on fertilizer application with farmers, and it was decided that fertilizer is limited to apply manure for basal due to high risk by unstable rainfall and unavailability of chemical fertilizer.</li> <li>- Senior AT was requested to arrange the ploughing services of ripper furrowing for the demonstration farms and key farmers. After the training, he arranged the ploughing services of NCAP, and ploughing was conducted during the period from late November to early December, 2015 .</li> <li>- Field inspection was carried out in the demonstration plots with key farmers, and the demonstration plots were marked by poles for treatment and control.</li> </ul>
<p>3rd Training (Feb. 2016)</p>	<ul style="list-style-type: none"> <li>- Farm record formats were distributed to the farmers, and explained their contents to be recorded. Farmers generally understand the contents and way to record.</li> <li>- Progress of plant growth was reviewed</li> <li>- Field inspection with key farmers was conducted in the demonstration plot as well as other plots under the conventional method of cropping. Pearl millets were planted in the demonstration plot earlier than those in the conventional method, and plant growth was better in the demonstration plot.</li> </ul>
<p>4th Training (Apr. 2016)</p>	<ul style="list-style-type: none"> <li>- Present plant growth was reported by each farmers, and effect on basal application for manure were discussed and confirmed among the farmers though pearl millet was not harvested yet. They will continue basal application of manure in the next season.</li> <li>- Farmers reported plant growth in the plots ploughed by ripper furrowing, and their growth progress is better than the progress in the conventional ploughing. Farmers expressed their strong intension to use ripper furrowing for wider area in the next season.</li> <li>- Some farmers also reported that they replanted seeds in 2 to 4 times, and even after March in their plots under conventional methods due to severely poor rainfall.</li> <li>- Field inspection with key farmers was made in the demonstration plot and other plots under the conventional cropping methods. Due to unstable rainfall,</li> </ul>

### CR-02 Attachment 01: Pearl Millet Groth Calendar

#### Short Duration Variety

Days after Germination	1 to 10 days	11 to 20 days	21 to 30 days	31 to 40 days	41 to 50 days	51 to 60 days	61 to 70 days	71 to 80 days	81 to 90 days	91 to 100 days	
Sow ing											
Germination	Germination █ 0 days										
3rd Leaf Stage	3rd Leaf Stage █ 6 days										
5th Leaf Stage	5th Leaf Stage █ 14 days										
Panicle Initiation		Panicle Initiation █ 22 days									
Flag Leaf Visible			Flag Leaf Visible █ 33 days								
Boot Stage			Boot Stage █ 36 days								
Flow ering			Flow ering █ 40 days								
Milk Stage					Milk Stage █ 49 days						
Dough Stage					Dough Stage █ 58 days						
Physiological Maturity					Physiological Maturity █ 65 days						
Drying in the Field					Drying of Grains w hile Standing in the Field						

#### Long Duration Variety

Days after Germination	1 to 10 days	11 to 20 days	21 to 30 days	31 to 40 days	41 to 50 days	51 to 60 days	61 to 70 days	71 to 80 days	81 to 90 days	91 to 100 days
Sow ing										
Germination	Germination █ 0 days									
3rd Leaf Stage	3rd Leaf Stage █ 6 days									
5th Leaf Stage	5th Leaf Stage █ 15 days									
Panicle Initiation			Panicle Initiation █ 28 days							
Flag Leaf Visible				Flag Leaf Visible █ 43 days						
Boot Stage				Boot Stage █ 47 days						
Flow ering				Flow ering █ 53 days						
Milk Stage						Milk Stage █ 61 days				
Dough Stage						Dough Stage █ 69 days				
Physiological Maturity						Physiological Maturity █ 75 days				
Drying in the Field						Drying in the Field ling in the Field				

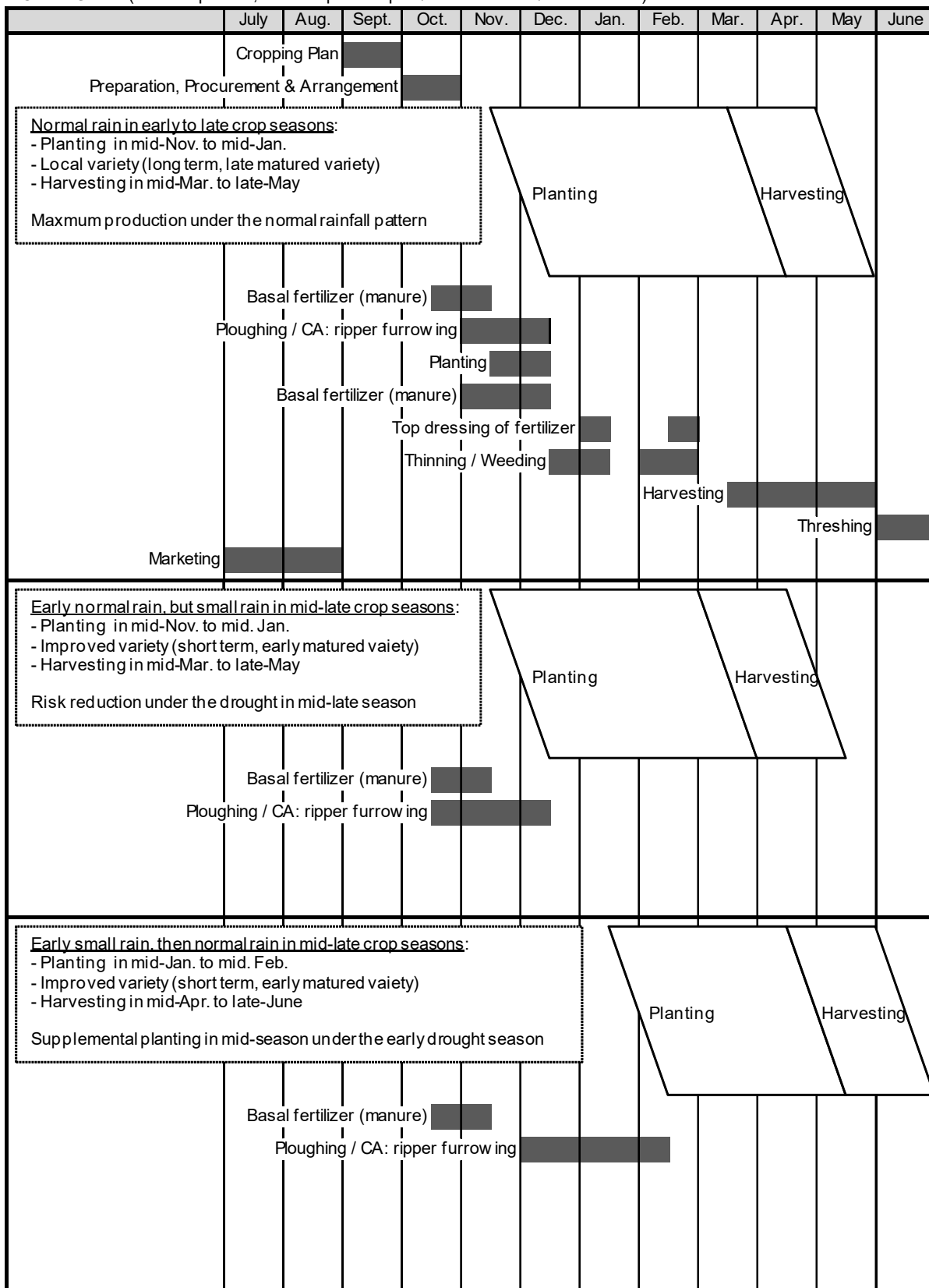
CR02 Attachment 02: Variety List of Pearl Millet

	Country		Denomination	Breeder/date	Days to maturity (days)	Potential yield (ton/ha)	Tillering ability (tillers)	Panicle length (cm)	Seed weight (/ 1000 seeds)	Agro-ecological zone	Other characteristics
1	Namibia	1	ICMV 88908 (Okashana 1)	ICRISAT India; 1988	75 - 90	1.9	2 - 4	17 - 25 cm	11 - 15 g	Northern Namibia	Drought tolerant; 130 - 190 cm plant height
2	Namibia	2	SDMV 93032 (Okashana 2)	SADC/ICRISAT/SMP (Matopos Research Station, Bulawayo); 1993	75 - 90	1.0 - 2.0	4 - 6	20 - 25 cm	11 - 13 g	Northern Namibia	Drought tolerant; 155 - 200 cm plant height
3	Namibia	3	SDMV 92040 (Kangara)	SADC/ICRISAT/SMP (Matopos Research Station, Bulawayo); 1992	75 - 85	0.8 - 2.20	3 - 5	20 - 25 cm	11 - 13 g	Northern Namibia	Drought tolerant; 155 - 185 cm plant height
4	Namibia	4	Kantana (Local Landrace)	Namibia; 2001	110 - 120	0.8 - 2.20	4 - 7	35 - 43 cm	11.7	Northern Namibia	Drought tolerant; 250 - 300 cm plant height
5	Botswana	1	Serere 6A	Serere, UGANDA/1974	120	1 - 1.5	High				Grey in color
6	Botswana	2	Bontle	SMP/OCRISAT/1998	90 - 100	1.5 - 1.8	Low	24 cm			Large bold grey grains
7	Botswana	3	Legakwe	SMP/OCRISAT/1998	100 - 110	1.8 - 2.4	High	31 cm			Grey in color
8	Malawi	1	Nyankhonimbo (Okashana 1)	ICRISAT (ICMV-88908) / 1999	75 - 80	2.5	Profuse tillering	20 - 30	11.4	Warm and dry area with adequate rainfall	
9	Malawi	2	Tupatupa	ICRISAT (SDMV-88905) / 1996	90 - 100	1.6 - 1.8	Profuse tillering	20	12.5	Warm and dry area with adequate rainfall	
10	Malawi	3	Thobwa	ICRISAT (SDMV-90031)	47 - 53	2.8	Less tillering	25 - 30	12	Warm and dry area with adequate rainfall	
11	Mozambique	1	Changara	2000 / IIAM	85 - 90	2.0		21 - 24	11.10	Center zone	Medium resistance to disease
12	Mozambique	2	Kuphanjala 1	2000 / IIAM	90	2.7		26 - 30	9.82	Center zone	Medium resistance to disease
13	Mozambique	3	Kuphanjala 2	2000 / IIAM	90	2.0		18 - 26	8.80	Center zone	Medium resistance to disease
14	Tanzania	1	Shibe	ARI Ilonga	100	1.8 - 2.0	Moderate	30 - 45	9.0 - 12	0 - 1,300 masl	Resistant to striga
15	Tanzania	2	Okoa	ARI Ilonga	87 - 92	2.0 - 2.5	Moderate	34 - 55	11.0 - 13.0	0 - 1,300 masl	
16	Zambia	1	L 197	1970s						Region lib	
17	Zambia	2	ZPMV 871	1987						Region lib	
18	Zambia	3	Kaugela	1989		1.24				Region lib	
19	Zambia	4	Lubasi	1993						Region lib	
20	Zimbabwe	1	PMV1	1987	80 - 95	2 - 3	High tillering, 5 - 10	18 - 23 cm	9	Agro-regions III, IV, and V	
21	Zimbabwe	2	PMV2	1992	80 - 90	2.3 - 3.2	3 - 5	20 - 25 cm	11.3	Agro-regions III, IV, and V	Moderately resistant to downy mildew
22	Zimbabwe	3	PMV3	1996	80 - 90	1.7 - 3.22	3 - 4	18 - 24 cm	13	Agro-regions III, IV, and V	Resistant to downy mildew; less than 5% incidence of smut and ergot

Source: National Variety Lists for Southern African Development Community (SADC) Countries, Iowa State University (Seed Science Center) & International Crops Research Institute for the Semi-Arid Tropics (ICRISAT, Matopos Research Station in Zimbabwe), USAID, 2009.

### CR-02 Attachment 3: Cropping Pattern of Pearl Millet

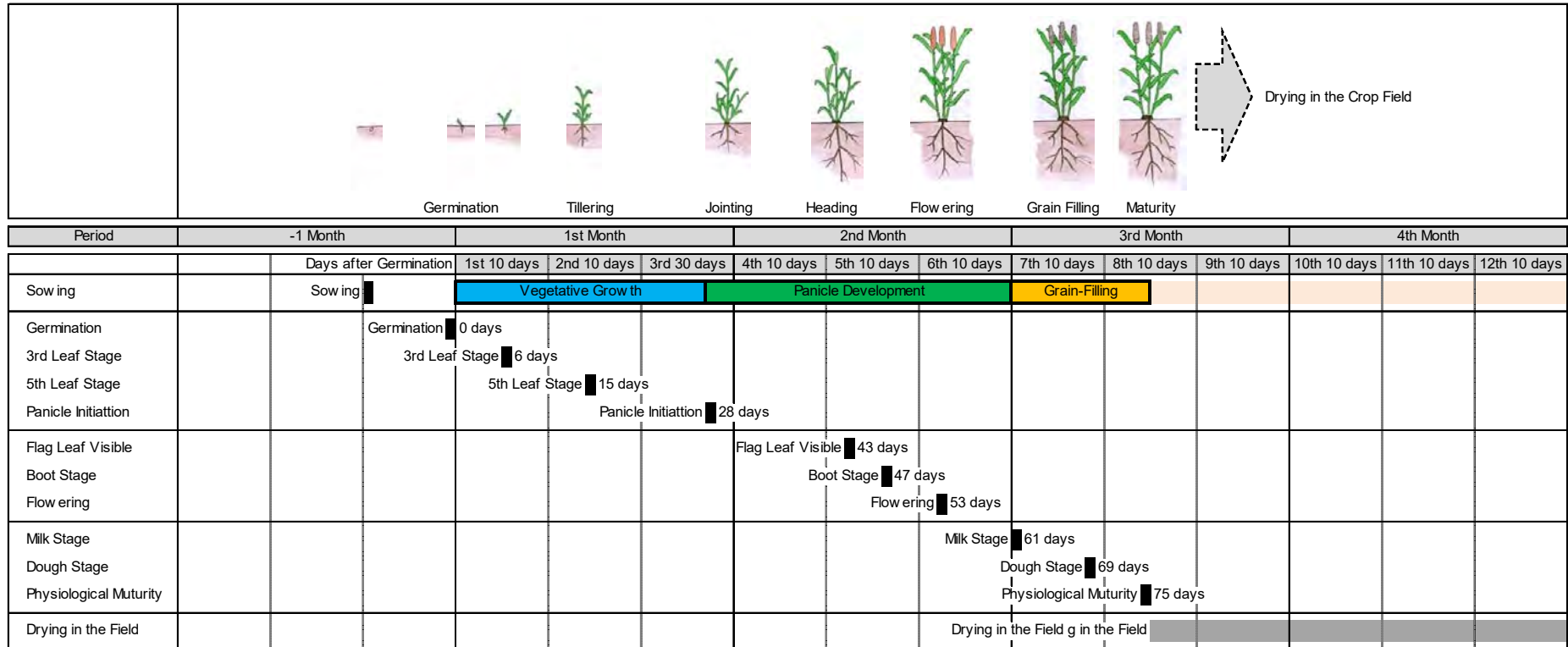
Cereal Grains (main crop: millet, inter-crops: cow pea / bambara nuts / water melon)





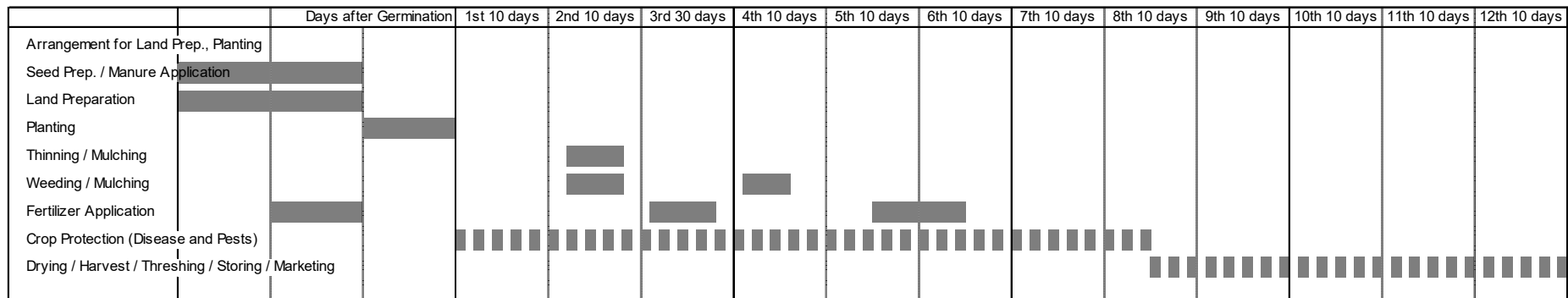
CR-02 Attachment 4: Crop Management Practice of Pearl Millet (Crop Development Stages and Farm Operation under Average Rainfall Condition)

1. Crop Development Stage (Long Duration Variety)



Source: Management Procedures for Pearl Millet Improvement, International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) 1992, modified by the JICA Study Team.

2. Crop Management (Farm Operation)



## CR-02 Attachment 5: Seed Selection and Germination Test of Pearl Millet

### 1. Counting of Seeds

Seeds are divided into packages (500 seeds per package), and 3 packages are prepared for each lot (variety, owner, etc.) after measuring the weight.

#### Seeds Package

Label	A	B	C	Total	Average
Variety / Lot					
No. of Seeds	200	200	200	600	200
Weight	grs	grs	grs	grs	grs

#### Materials required for Counting Seeds

Material	Specification, numbers, etc.
Seeds	Variety, owner, procured from, produced month, certified or not, etc.
Containers	Paper cups or envelopes for each package of 200 seeds
Weighing Scale	Minimum measurement of weight: 0.1 gram
Plastic Board	Tray for counting seeds

### 2. Seeds Fraction by Gravity (Water)

Seeds are put into water, and separated into two fractions (1) seeds floating on / in the water, and (2) seeds sinking at the bottom, as explained below.

#### Fraction of Seeds based on the Situation in the Water

Fraction	Explanation
Seeds floating on and in the surface of water	Seeds lighter than water (specific gravity: 1), seems to be low germination rate.
Seeds sinking at the bottom	Seeds heavier than water, seems to be higher germination rate than floating seeds.

The result (number of seeds by fraction) is recorded in the following manner:

#### Number of Seeds by Fraction

Label	A	B	C	Total	Average
Floating	00 ( %)				
Sinking	00 ( %)				
Total	200 (100%)	200 (100%)	200 (100%)	600 (100%)	200 (100%)

#### Materials required for Counting Seeds

Material	Specification, numbers, etc.
PET bottles	3 bottles (cut at middle), for containers for seed fraction by the water, 3 bottles (volumes 1 lit.)
Container	Paper cups, paper bags, plastic bags

### 3. Germination Test

Germination test will be carried out for each fraction of seeds, by putting on the trays in which seeds put with moisture, keeping in the room with good ventilation. Recording is made on the daily germination numbers in the following manner:

**Number of Germination Seeds (Fraction: Floating on and in the Water)**

Date	A	B	C	Total	Average
1 <sup>st</sup> day					
2 <sup>nd</sup> day					
3 <sup>rd</sup> day					
4 <sup>th</sup> day					
5 <sup>th</sup> day					
6 <sup>th</sup> day					
7 <sup>th</sup> day					
Total					

**Number of Germination Seeds (Fraction: Sinking in the bottom)**

Date	A	B	C	Total	Average
1 <sup>st</sup> day					
2 <sup>nd</sup> day					
3 <sup>rd</sup> day					
4 <sup>th</sup> day					
5 <sup>th</sup> day					
6 <sup>th</sup> day					
7 <sup>th</sup> day					
Total					

**Materials required for Counting Seeds**

Material	Specification, numbers, etc.
Germination Tray	Plastic dish, plate, saucer, or pan, with clean sand / cotton to keep moisture.
Pairs of Tweezers	Placing the seeds on the trays.

**Total Result of Germination Test**

Fraction	2 <sup>nd</sup> days	3 <sup>rd</sup> days	4 <sup>th</sup> day	5 <sup>th</sup> day	6 <sup>th</sup> day	7 <sup>th</sup> day
Floating on/in the water						
Sinking at the bottom						

**CR-02 Attachment 6: Seed Requirement and Plant Density of Pearl Millet**

- (1) Plant density: 100,000 plants / ha (Row: 0.75 m, 7.5 plants per m)
- (2) Tillers: 4 tillers per plants (4 panicles per plants)
- (3) Number of seeds: 200 to 400 seeds per panicle
- (4) Seed weight: 12g per 1,000 seeds (11g to 13g for Okashana 2)
- (5) Unit yield: 1.0 ton/ha to 12 ton/ha

Items	Case 1	Case 2	Remark
Yield (ton/ha)	1.0 ton/ha	2.0 ton/ha	
Plant Density (plants per ha)	100,000 plants	100,000 plants	Row: 0.75 m interval, 7.5 plants per m,
Tillers (Panicles)	400,000 tillers (400,000 panicles)	400,000 tillers (400,000 panicles)	Effective tillers (4 tillers per plant)
Seeds Weight per Panicle	2.5 g per panicle	5.0 g per panicle	
Weight of 1000 Seeds	Average 12g	Average 12g	Okashana 2: 11g-13g
Seeds per Panicle	210 seeds	420 seeds	

Unit Yield:	200 kg / ha	400 kg / ha	600 kg / ha	Remark
Panicle Requirement	80,000 panicles	160,000 panicles	240,000 panicles	2.5 g per panicle
Plant Requirement	40,000 plants	80,000 plants	120,000 plants	2 tillers / plant
Seed Requirement	47,000 seeds 564 g	94,000 seeds 1,128 g	141,000 seeds 1,682 g	85% germination 12 g per 1,000 seeds

Items	Case 1	Case 2	Remark
Weight of Seeds per ha	2 kg of seeds	3 kg of seeds	
Number of Seeds	167,000 seeds	250,000 seeds	12g per 1,000 g
Number of Plants	142,000 plants	212,000 plants	85% germination rat
Effective Tillers	284,000 tillers (284,000 panicles)	424,000 plants (424,000 panicles)	2 tillers per plant
Seed weight (harvest)	710 kg	1,060 kg	2.5 g seeds / panicle

<b>CR-03</b>	<b>Conservation Agriculture</b>	
Purpose	Reduction of risk due to unstable rainfall	
Target area	Pearl millet crop fields	
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers groups (about 5 members per group the 1 <sup>st</sup> year training for AT to familiarize the procedures and steps, then, about 10 members per group from the 2 <sup>nd</sup> year)	
Expected output	More stable production of pearl millet than the present production	
Work procedure	(1) Review of the conventional farming practice and explanation on the three principles of conservation agriculture (2) Land preparation by deep ploughing and high ridges (ripper furrowing) (3) Furrow planting (4) Mulching on the soil surface (5) Crop rotation with fallow (6) Contour furrowing (7) Inter-cropping with legume crops	
Work plan	This technique will be applied during the master plan period (Phase 2 & Phase 3 of N-CLIMP, short term, medium to long term). During the Phase 2, an action plan will be firstly prepared, and based on the action plan a series of the Work Procedure will be carried out	
Main monitoring item	➤ Number of farmers keeping records	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Tractor services with appropriate attachment of chisel plough, ripper plough or ripper furrow.</li> <li>➤ Water hose (20 m), marking poles/ pegs, rope/lines, measuring tape (50 m),</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ Daily rainfall records</li> <li>➤ Farming record for cereal grains</li> <li>➤</li> </ul>

### (1) Review of the conventional farming practice and explanation on the three principles of conservation agriculture

Conservation agriculture is an approach to manage agro-ecosystems for improved and sustained productivity and food security while preserving and enhancing resource base and the environment. These objectives are achieved through the application, in combination with complimentary Good Agriculture Practices (GAPs), under the following CA principles:

- Continuous minimum soil disturbance
  - Slower mineralization of soil organic matter,
  - Maintain soil biodiversity,
  - Improvement of soil structure and maintaining of soil health,
  - Improvement of water infiltration and nutrient retention.
- Permanent organic soil cover (mulching)
  - Protection of soils from erosion, extreme temperature and fluctuations,
  - Enhancement of soil moisture retention by reduced evaporation,

- Suppression of weeds,
- Increase of humus in soil.
- Crops in sequence and/ or association (crop rotation)
  - Improvement of soil fertility through leguminous nitrogen fixation,
  - Optimal use of available nutrients and water
  - Control of weeds, pests and diseases,
  - Higher crop diversity,
  - Biological tillage by roots.

## **(2) Land preparation by deep ploughing (ripper furrowing)**

Deep cultivation more than 30 cm depth will be effective to increase soil moisture content by percolating rain water as well as accelerate root development of pearl millet in the deeper layer of soils. Tractor service with chisel plough, ripper plough or ripper furrow will be required before rain comes.

## **(3) Furrow planting**

Planting of seeds will be made in the bottom of furrow made by land preparation, in order to utilize rainwater collected in the bottom.

## **(4) Mulching on the soil surface**

Mulch will avoid high temperature on the soil surface by strong sun light and reduce evaporation of water from the soil surface. Such mulching materials are available as 1) crop residue of last season, 2) weeds taken out by weeding, and 3) plant bodies taken by thinning.

## **(5) Crop rotation with fallow**

In order to avoid further soil degradation and improve soil fertility, fallow period will be introduced in the crop rotation along with decreasing grazing intensity. Reduction in cropped area of pearl millet will be partly compensated by increase of unit yield.

## **(6) Contour furrowing**

Furrows mad along the contour lines will catch the runoff water from the slope, and percolate into the root zone of soil. Root zone of pearl millet is deep as more than 2 m, and higher moisture contents by the contour furrowing will be utilized by pearl millet.

## **(7) Inter-cropping with legume crops**

Presently farmers are inter-cropping with such legumes as cowpea, bambara nuts, and ground nuts in the pearl millet field. These legumes crops will improve the soil fertility by fixing nitrogen, however, the present plant density of legume inter-cropping seems too low to fertile the soil. In this regards, appropriate plant density and crop management of legume crops will be examined.

## **Further information**

Reference information; .

- Crop production manual, compiled by Ingo Jacobi, published by the Joint Presidency Committee (Namibia Agricultural Union: NAU and Namibia Nature Foundation: NNF) under the Emerging Commercial Farmers' Support Program (ECFSP), 2008.
- Spotlight on Agriculture No. 16 "Grain Legumes in Namibian Agriculture" March 1999, DART / MAWRD.
- Spotlight on Agriculture No. 51 "Soil Fertility Management for Sustained Crop Production" January 2002, DART / MAWRD.
- Spotlight on Agriculture No. 61 "Cereal-Legume Intercropping" November 2002, DART / MAWRD

(N<sub>2</sub>-Fixation need higher density of cowpea in the intercrop and retaining residues in the field).

- Comprehensive Conservation Agriculture Programme for Namibia 2015 – 2019, Ministry of Agriculture, Water and Forestry (MAWF), March 17 2015.
- Training Manual for Tractor Owners / Drivers, Private Mechanized Tollage Service Provision for Small Holder Farmers, 2014, NCBC CULSA International / USAID

### Feedback from Pilot Site Activities in Phase-2

This technical measure was introduced in 3 sites in Phase-2. The following table summarizes the activities taken through trainings in pilot site activities.

<p>1st Training (Nov. 2015)</p>	<ul style="list-style-type: none"> <li>- Outline of conservation agriculture was explained to farmers with three principles and their effects, and the present farming practices were reviewed. Discussion was made on conservation agriculture and farmers accepted to adopt conservation agriculture focusing on ripper furrowing (deep ploughing).</li> <li>- Field inspection was carried out in order to decide the demonstration plots, and discussed on the materials and services to be supplied by farmers or MAWF or N-CLIMP.</li> </ul>
<p>2nd Training (Nov. to Dec. 2015)</p>	<ul style="list-style-type: none"> <li>- Conservation agriculture and crop development stages were repeatedly explained.</li> <li>- ATs were requested to arrange the ploughing services of ripper furrowing for the demonstration farms and key farmers. After the training, he arranged the ploughing services of NCAP, and ploughing was conducted during the period from late November to early December, 2015 .</li> <li>- Field inspection was carried out in the demonstration plots with key farmers, and the demonstration plots were marked by poles for treatment and control.</li> </ul>
<p>3rd Training (Feb. 2016)</p>	<ul style="list-style-type: none"> <li>- Farm record formats were distributed to the farmers, and explained their contents to be recorded. Farmers generally understand the contents and way to record.</li> <li>- Progress of plant growth was reviewed.</li> <li>- Field inspection with key farmers was conducted in the demonstration plot as well as other plots under the conventional method of cropping. Pearl millets were planted in the demonstration plot earlier than those in the conventional method, and plant growth was better in the demonstration plot.</li> </ul>
<p>4th Training (Apr. 2016)</p>	<ul style="list-style-type: none"> <li>- Present plant growth was reported by each farmers, and effects on deep ploughing (ripper furrowing) were discussed and confirmed among the farmers though pearl millet was not harvested yet.</li> <li>- Farmers reported plant growth in the plots ploughed by ripper furrowing, and their growth progress is better than the progress in the conventional ploughing. Farmers expressed their strong intension to use ripper furrowing for wider area in the next season.</li> <li>- Some farmers also reported that they replanted seeds in 2 to 4 times, and even after March in their plots under conventional methods due to severely poor rainfall.</li> <li>- Field inspection with key farmers was made in the demonstration plot and other plots under the conventional cropping methods. Due to unstable rainfall,</li> </ul>

<b>CR-04</b>	<b>Flood- and Drought- Adaptive Cropping System (Rice-Mahangu Mixed Cropping)</b>	
Purpose	To reduce the risk due to flood and drought	
Target area	Seasonal wetland with higher ground water level extending over the northern part of Omusati Region, western part of Ohangwena Region, and north-western part of Oshana Region.	
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers groups (about 15 members per group), having the crop fields with seasonal wet land	
Expected output	More stable production of cereal grains of rice and pearl millet	
Work procedure	<ol style="list-style-type: none"> <li>(1) Introduction of mixed cropping</li> <li>(2) Preparation of cropping plan</li> <li>(3) Land preparation and planting of rice and pearl millet</li> <li>(4) Crop management</li> <li>(5) Harvesting, threshing, milling and marketing</li> <li>(6) Review of result and lesson learnt</li> </ol>	
Work plan	This technique will be applied during the master plan period (Phase 2 & Phase 3 of N-CLIMP, short term, medium to long term). During the Phase 2, an action plan will be firstly prepared, and based on the action plan a series of the Work Procedure will be carried out	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Recording of date of each operation and crop growth from preparation of cropping plan to review (including 50% germination, 1st panicle emergence, .</li> <li>➤ Periodical recording of such crop growth as number of leaves till 1 month after planting, number of tillers, number of panicles) Number of farmers keeping records</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Poles, ropes, signboard</li> <li>➤ Hiring of power tiller (hand tractor), threshing and milling equipment</li> <li>➤ Rice seedlings, transplanting ropes (marking interval of 30 cm), manure for basal application, fertilizer for top dressing,</li> <li>➤ Resource persons from the Rice-Mahangu Project (Ogongo Campus UNAM)</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ CR-04 Attachment 1: General Cropping Calendar of Rice and Pearl Millet</li> </ul>

### (1) Introduction of mixed cropping

Introductory explanation will be made by explanation of cropping calendar of rice and pearl millet (refer to CR-04 Attachment 1: General Cropping Calendar of Rice and Pearl Millet).



- Lecture on the Rice-Mahangu Project and utilization of seasonal wetland
- Lecture on life cycle of rice and pearl millet
- Exposure visit of Rice-Mahangu Project at UNAM Ogongo Campus
- Discussion on utilization of seasonal wetland

## (2) Preparation of cropping plan

- Field Inspection of seasonal wetland to be utilized
- Lecture on life cycle of rice and pearl millet
- Preparation of cropping plan (plot size)
- Practice on estimation of requirement for work and inputs (labour, draught animal, machinery, seedlings)
- Estimation of necessary cost

## (3) Land preparation and planting rice and pearl mille

- Lecture on land preparation and transplanting
- Filed training on ploughing, paddling, leveling, furrowing, planting

## (4) Crop management during vegetative and ripening stages

- Training on recording of farming operation and crop growth
- Field training on weeding

## (5) Crop management during vegetative and ripening stages

- Field training on judgment of harvest time and reaping
- Field training on threshing, winnowing, and drying

## (6) Crop management during vegetative and ripening stages

- Yield estimation
- Calculation of cost
- Comparison of production between mixed cropping system and usual cropping

## Further information

- Explanation Notes on "Mixed Cropping in Seasonal Wetland" prepared by SATREPS, UNAM under Rice Mahangu Project, English and Oshivanbo versions, November 2015.

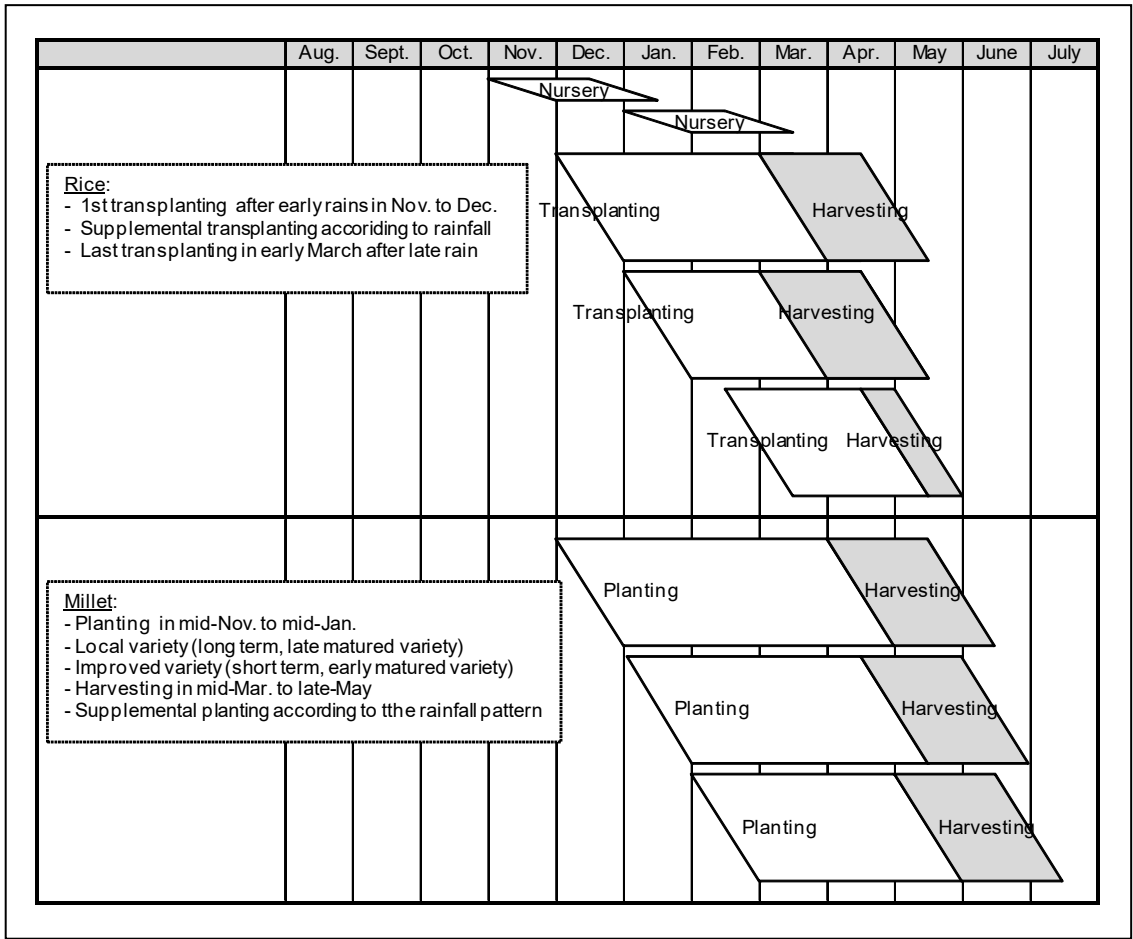
## Feedback from Pilot Site Activities in Phase-2

This technical measure was introduced in 1 site in Phase-2. The following table summarizes the activities taken through trainings in pilot site activities.

1st Training (Nov. 2015)	<ul style="list-style-type: none"> <li>- Outline of rice-mahangu mixed cropping was explained to farmers. Discussion was made on mixed cropping and farmers showed intension to adopt mixed cropping in their seasonal wetland within their homestead.</li> <li>- Field inspection was carried out in order to decide the demonstration plots, and discussed on the materials and services to be supplied by farmers or MAWF or N-CLIMP.</li> </ul>
2nd Training (Nov. to Dec. 2015)	<ul style="list-style-type: none"> <li>- Mixed cropping in seasonal wetland was repeatedly explained.</li> <li>- AT was requested to arrange the ploughing services of ripper furrowing for the demonstration farms and key farmers.</li> <li>- Field inspection was carried out in the demonstration plots with key farmers, and</li> </ul>

	the demonstration plots were marked by poles for treatment and control.
3rd Training (Feb. 2016)	<ul style="list-style-type: none"> <li>- Mixed cropping in seasonal wetland was repeatedly explained.</li> <li>- Transplanting of rice seedlings had not been taken place due to poor rainfall.</li> <li>- Field inspection was made at the demonstration plot, and transplanting of rice seedlings was demonstrated by the expert from SATREPS in the limited part, where soil moisture allowed transplanting.</li> </ul>
4th Training (Apr. 2016)	<ul style="list-style-type: none"> <li>- Rainfall records were reviewed on the rainfall pattern and progress of water inundation in seasonal wetland was discussed. Farmers still kept motivation to grow rice.</li> <li>- Field inspection with key farmers was made in the demonstration plot to observe the growing progress of rice. It was observed that some part of rice plants survived to put small panicles on their plants, but poor growth</li> </ul>

CR-04 Attachment 1: General Cropping Calendar of Rice and Pearl Millet



CR-5	Water Source / Water Harvesting	
Purpose	Increase of horticultural production in micro garden	
Target area	Micro garden system like home garden, kitchen garden, backyard garden in the house yard and homestead.	
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers groups (about 15 members per group)	
Expected output	Improvement of access to fresh horticulture produce and promotion of income from fresh produce.	
Work procedure	(1) Roof catchment (2) Utilization of seasonal wetland Reference information	
Work plan	This technique will be applied during the master plan period (Phase 2 & Phase 3 of N-CLIMP, short term, medium to long term). During the Phase 2, an action plan will be firstly prepared, and based on the action plan a series of the Work Procedure will be carried out	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Observation on crop growth: dates of germination, emergence of leaves (2<sup>nd</sup> to flag),</li> <li>➤ Weekly measurement of plants: number of plants/hills, plant height, tillers, panicles,</li> <li>➤ Daily rainfall record.</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Water tank, collection pipes</li> <li>➤ Civil work to deepen seasonal wet land</li> <li>➤ Movable water pump and hose (100 m)</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ To be prepared at the preparation period of the pilot projects</li> </ul>

### (1) Roof Catchment

Micro gardens are mainly located in the house yard and homestead, and usually besides the house building. If the roof catchment is available, rain water will be collected into the tank and utilized as irrigation water for micro garden. Available water volume is roughly estimated as below:

	Area of roof catchment	Annual Rainfall	Coefficient	Water Volume
Calculation	[a] m <sup>2</sup>	[b] mm	[c]%	$[a] \times [b/1000] \times [c/100] \text{ m}^3 = [a] \times [b] \times [c] \times 1/100 \text{ lit.}$
Example	6 m x 8 m = 48 m <sup>2</sup>	400 mm = 0.4 m	40%	7.68 m <sup>3</sup> = about 7,600 lit

Source: Prepared by the Study Team.

In the example, 7,700 liter of rain water will be stored in the tank. If this volume is utilized for micro garden of 30 m<sup>2</sup>, 7,700 liter is equivalent to about 253 mm of rainfall. Water consumption of micro garden is assumed at 6 mm/day, and irrigation water is available for about 6 weeks. Then, if the low pressured drip irrigation is equipped in the micro garden, irrigation water is available for 12 weeks (3 month) provided that the water consumption becomes a half of 6 mm/day.

Some of the advanced farmers have already been utilizing the roof catchment for various purpose like livestock, domestic and other uses. At the DAPEES Regional Office at Eenhana, roof catchment system was installed for the garage and warehouse, supported by the Research and Extension Management Programme under EC cooperation. For both cases, roof catchment system are shown in the photographs below;

<p>A farmer in Okaku Constituency is using the roof catchment.</p>	<p>Water from the roof is transfer to this tank.</p>
<p>Roof catchment at DAPEES Eenhana Office</p>	<p>Roof catchment at DAPEES Eenhana Office</p>

## (2) Utilization of Seasonal Wetland





One of the serious constraints is the unstable rainfall in the cropping season. Crop production has been suffering from the unstable rainfall as well as frequent drought and flood. Under such situation, seasonal wetlands like “oshana” and “ondombe” retain rain water as well as flood water flowing from Angola, but no one utilizes these water body probably due to the land tenure issue under the communal system.

Some farmers are utilizing the small “ondombe” within his/her land under the customary land right. In another case, embankment was constructed in the “oshana” in 1970s to 1980s to store water from the upstream, probably Angola. Some of these ponds are still working for livestock and fishing.

During the field survey, most of the field are dried up due to drought condition. In some area, pearl millet are poorly growing due to drought, but the crop field is situated about 30 to 50 m besides the water filled “oshana”. In this case, movable water pump and hose seems to be useful to give emergency irrigation water from “Oshana” to the crop field to secure the minimum grain filling. Similar situation of “ondombe” is observed within the fence

surrounding the homestead. It may be possible to deepen the “ondombe” for utilization of water retained.

The following photographs shows the situation of “ondombe” and embanked “Oshana”;

	
<p>A farmer in Okaku Constituency is utilizing the seasonal wetland, located within the farmers land. (Oct. 30, 2014)</p>	<p>The farmer is also utilizing the soils in the bottom of the seasonal wetland to convey to the crop fields. (Oct. 30, 2014)</p>
	
<p>In Okaku, embankment was constructed in 1970s, water is available at the end of the dry season. (Oct. 30, 2014)</p>	<p>From the pond, people are catching fish. In the rainy season, all the area is inundated. (Oct. 30, 2014)</p>

### Reference Information

- The Technical Toolkit for Rain- and Floodwater Harvesting (RFWH) Version 2, Cuve Waters Project – Integrated Water Resources Management in Northern Namibia, 2015.

### Feedback from Pilot Site Activities in Phase-2

This technical measure was introduced in 1 site in Phase-2. The following table summarizes the activities taken through trainings in pilot site activities.

<p>1st Training (Nov. 2015)</p>	<ul style="list-style-type: none"> <li>- Concept of N-CLIMP and pilot site activities were explained to the farmers.</li> <li>- Present situation was reviewed on facilities for the rainwater harvesting and roof catchment, and attendants discussed about present constraints to utilize the facilities. Particularly, plastic sheets for roof catchment are already deteriorated and need replacement.</li> <li>- Rainwater harvesting and roof catchment facilities were inspected, it was confirmed that plastic sheets needs to be replaced. Farmers were instructed to measure the size of plastic sheets and inform AT of the measurement result.</li> </ul>
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2nd Training (Nov. to Dec. 2015)	- Training was taken place on group strengthening and no training was conducted on water source / water harvesting.
3rd Training (Feb. 2016)	- Training was taken place on group strengthening and no training was conducted on water source / water harvesting.
4th Training (Apr. 2016)	- Training was taken place on group strengthening and no training was conducted on water source / water harvesting.

<b>CR-6</b>	<b>Water Saving Cultivation</b>	
Purpose	Increase of horticulture production in micro garden	
Target area	The area under the micro garden system like home garden, kitchen garden, backyard garden in the house yard and homestead.	
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers groups (about 15 members per group)	
Expected output	Improvement of access to fresh horticulture produce and promotion of income from fresh produce.	
Work procedure	(1) (2) Low pressure drip irrigation system (3) Simple drip irrigation system by PET bottles Reference information	
Work plan	This technique will be applied during the master plan period (Phase 2 & Phase 3 of N-CLIMP, short term, medium to long term). During the Phase 2, an action plan will be firstly prepared, and based on the action plan a series of the Work Procedure will be carried out	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Monthly water volume consumed from the tap,</li> <li>➤ Production, home consumption and sales of horticulture crops</li> <li>➤ Cost of production, sales and profit at monthly basis.</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Plastic bucket (20 lit.) / drum (200 lit.) / plastic tank (1,000 lit), Stands (1.3 m) for bucket / drum / tank, Hoses &amp; joints&amp; valves</li> <li>➤ Material required for demonstration and trial (marking pegs / poles, strings / lines, vegetable seeds, fertilizers, sign boards)</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ To be prepared at the preparation period of the pilot projects</li> </ul>

### (1) Low pressure drip irrigation system

Communal farmers, particularly women farmers, are conducting micro gardens to produce vegetables and fruits. Their most serious challenge is irrigation to vegetables and fruits. They usually use a bucket, watering can or hose taking water from tap, and this work is very laborious and heavy burden for them. In addition to this, it is very difficult for them to know the proper and volume and frequency of irrigation water for better growing of vegetables. In order to know the appropriate irrigation practice, farmers need to know the basic technique and knowledge on horticulture cultivation and plant characteristics.

To save irrigation water, the drip irrigation system is widely known for vegetables and fruits. Usual drip irrigation system is composed of sophisticated equipment like high quality pump, filter, regulator and hose to control the pressure and water volume. The cost is also high and minimum scale far larger than 30 to 50 m<sup>2</sup>. Different from the such a sophisticated and high cost drip irrigation system, a “low pressure drip irrigation system” is now available in a small scale without pump, particularly for micro garden, and the system under demonstration.

At the Okashana Crop Research Station, a sample of low pressure drip irrigation system has been demonstrated as shown in the following pictures.





## (2) Simple drip irrigation by PET bottles

Before introducing the low pressured drip irrigation, another primitive and simple watering method can be tried in the farmers field in the micro garden. This method is utilizing the PET bottle or glass bottle, and the procedure is below:

- (1) Bottle is selected with 1 lit. to 2 lit., made of harder PET or glass (soft PET is not preferable).
- (2) After washing bottle by water, the bottle is filled with water.
- (3) The bottle is buried besides the horticulture plant (at the root of plant), at the depth of 2/3 of the bottom.
- (4) Then, water is gradually going to around the root and keep moisture.



## Reference Information

Reference information on

- Spotlight on Agriculture No. 7 "Pearl Millet Improvements – Plant Material Description – April 1998, Directorate of Agriculture Research and Training (DART), Ministry of Agriculture, Water and Rural Development (MAWRD).
- The Technical Toolkit for Rain- and Floodwater Harvesting (RFWH) Version 2, Cuve Waters Project – Integrated Water Resources Management in Northern Namibia, 2015.

**Feedback from Pilot Site Activities in Phase-2**

This technical measure was introduced in 4 sites in Phase-2. The following table summarizes the activities taken through trainings in pilot site activities.

<p>1st Training (Nov. 2015)</p>	<ul style="list-style-type: none"> <li>- Concept of N-CLIMP and pilot site activities were explained to the farmers, and farmers' present activities were reviewed.</li> <li>- The main points of drip irrigation were explained to farmers along with the outline of horticulture crop cultivation, market survey and crop selection under SHEP approach.</li> <li>- Demonstration plot was inspected for setting up, and discussion was made to identify the materials and equipment as well as responsibility to procure them. The demonstration farmer was advised to apply simple drip irrigation by PET bottle to the present horticulture crops.</li> </ul>
<p>2nd Training (Nov. to Dec. 2015)</p>	<ul style="list-style-type: none"> <li>- The main points of drip irrigation were repeatedly explained to farmers along with the outline of horticulture crop cultivation, market survey and crop selection under SHEP approach.</li> <li>- Low pressure drip irrigation kits were explained to farmers, and discussion was made on their features.</li> <li>- In the demonstration farm, layout was marked by poles for setting drip lines and plant ridges with key farmers, and some crop management techniques were demonstrated in the present cropping plots.</li> <li>- Training for installation of low pressure drop irrigation kit was conducted in early December 2015 at Onayena in Oshikoto Region, and another training for installation was conducted in January 2016 at Epembe in Ohangwena Region.</li> </ul>
<p>3rd Training (Feb. 2016)</p>	<ul style="list-style-type: none"> <li>- The main points of drip irrigation were repeatedly explained to farmers along with the outline of horticulture crop cultivation, market survey and crop selection under SHEP approach.</li> <li>- In the demonstration plot, training on field preparation was conducted to farmers.</li> </ul>
<p>4th Training (Apr. 2016)</p>	<ul style="list-style-type: none"> <li>- Farming records were reviewed on rainfall records and farming records, and discussion was made on techniques obtained through training and adoption in their gardens.</li> <li>- The demonstration plot was inspected with farmers, and farmers observed the layout of drip irrigation and progress of planting.</li> <li>- At Etunda in Omusati Region, discussion was made on farmers contribution and decided at 50% of procurement cost to be born by farmers, and installation would start accordingly.</li> <li>- At Epembe in Ohangewna, trainings were made for nursery and seedling bed preparation.</li> </ul>

<b>CR-7</b>	<b>Crop Selection and Marketing</b>	
Purpose	Increase of horticulture production in micro garden	
Target area	Micro garden system like home garden, kitchen garden, backyard garden in the house yard and homestead.	
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers groups (about 15 members per group)	
Expected output	Information obtained on the markets, network established among the horticulture industry, and process of crop selection process standardized for improvement of access to fresh horticulture produce and promotion of income from fresh produce.	
Work procedure	(1) Market visit (2) Information sharing with stakeholder (3) Crop selection Reference information	
Work plan	This technique will be applied during the master plan period (Phase 2 & Phase 3 of N-CLIMP, short term, medium to long term). During the Phase 2, an action plan will be firstly prepared, and based on the action plan a series of the Work Procedure will be carried out	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Record of market visits (date, participants, market name and location, information collected: main commodity in the season, originated place, price, etc.)</li> <li>➤ Regular or periodical records of market information</li> <li>➤ Record of information sharing (date, participants, agenda, opinions, complaints, etc.)</li> <li>➤</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ To be prepared at the preparation period of the pilot projects</li> </ul>

### (1) Market visit

SHEP Approach is based on the concept of “farming is a business” and this comes to the concept of “growing crops after understanding its market”. As the first step to understand market, the farmers will visit market to get information. Before market inspection, available markets are listed up by the farmers, and classified into several categories according to the characteristics. Among the markets in each category, the farmers will regular visit the typical ones to know the demand and prices, and discuss among sell on the possibilities of particular vegetables. This information will be utilized to select the crops to grow. Demand and prices are always fluctuating, and the farmers need to visit markets periodically.

Market inspection may correspond to the step of “Market Research” at micro garden level in the SHEP Approach.

### (2) Information sharing with stakeholder

Based on the experience and information obtained in the market visit, the farmers get some ideas on the target crops. However, opinions and views from the stakeholders of horticulture industry are important to expand farmers’ knowledge and network. At the initial stage of growing horticulture, products may be mainly consumed by family members. But some time after, production will increase and the farmers may obtain marketable surplus.

In this occasion, knowledge and network acquired in the information sharing will help to sell the surplus.

Information sharing corresponds to the step of “Farm Business Linkage Stakeholder Form: FABLIST Forum” at micro garden level in the SHEP Approach.

### (3) Crop selection

This is the integration process of market information and plant physical characteristics for matching the market demand / family demand and physical supply potential from production. Out of the vegetables and fruits to be produced under the seasonal climatic conditions, farmers can select the crops according to the market needs leant by farmers.

In case of home consumption, farmers can compare the same vegetables in the market in terms of price, quality and volume. This information will be valuable, if they increase the production to get surplus.

### Reference Information

Reference information:

- SHEP Approach Guideline

### Feedback from Pilot Site Activities in Phase-2

This technical measure was introduced in 4 sites in Phase-2. The following table summarizes the activities taken through trainings in pilot site activities.

1st Training (Nov. 2015)	<ul style="list-style-type: none"> <li>- Concept of N-CLIMP and pilot site activities were explained to the farmers, and farmers' present activities were reviewed.</li> <li>- The main points of market survey and crop selection under SHEP approach were explained to farmers along with the outline of horticulture crop cultivation, drip irrigation.</li> </ul>
2nd Training (Nov. to Dec. 2015)	<ul style="list-style-type: none"> <li>- The main points of market survey and crop selection under SHEP approach were explained to farmers along with the outline of horticulture crop cultivation, drip irrigation.</li> <li>- In January 2016, trainings were carried out on market survey, crop selection and farming schedule at Onayena in Oshikoto Region and Epembe in Ohangwena Region.</li> <li>- Through the market survey, the demonstration farmer selected cabbage and green pepper and the farmers group selected green peppers and onion.</li> </ul>
3rd Training (Feb. 2016)	<ul style="list-style-type: none"> <li>- The main points of market survey and crop selection under SHEP approach were explained to farmers along with the outline of horticulture crop cultivation, drip irrigation.</li> </ul>
4th Training (Apr. 2016)	<ul style="list-style-type: none"> <li>- Marketing aspects were discussed through reviewing farmers' records, and discussion was made on sales of vegetables and fruits in the markets nearby their garden. Farmers were keeping higher motivation to sell vegetables by growing in their garden.</li> <li>- At Etunda in Omusati Region, sales prices of vegetables and their amount were discussed for determine the contribution in procurement of drip irrigation system.</li> </ul>

<b>CR-8</b>	<b>Cropping Plan and Horticulture Crop Management</b>	
Purpose	Preparation of the action plan and acquiring of the basic techniques and knowledge of horticulture.	
Target area	Micro garden system (home garden, kitchen garden, backyard garden in the house yard and homestead) as well as horticulture areas surrounding the Olshandja dam.	
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers groups (about 15 members per group) including micro garden famers and small scale horticulture farmers (scale below 30 ha)	
Expected output	Action plan prepared for the present cropping season, the basic techniques and knowledge of horticulture cultivation obtained, for improvement of access to fresh horticulture produce and promotion of income from fresh produce.	
Work procedure	(1) Cropping plan (action plan) (2) Horticulture crop management Reference information	
Work plan	This technique will be applied during the master plan period (Phase 2 & Phase 3 of N-CLIMP, short term, medium to long term). During the Phase 2, an action plan will be firstly prepared, and based on the action plan a series of the Work Procedure will be carried out	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Weekly activity records of the action plan (from preparation to sales),</li> <li>➤ Attendance record of training and farmers' field day,</li> <li>➤ Daily production of horticulture products.</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Texts on preparation of cropping plan</li> <li>➤ Material for demonstration plots (30 m<sup>2</sup>): pegs (30 cm x 18 pcs.), pole (1.5 m x 36 pcs.), strings &amp; lines, material for mulching (dried weeds / leaves &amp; stalks of millet,</li> <li>➤ Shading materials (local materials like stalks, palm branches and leaves, etc.)</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ To be prepared at the preparation period of the pilot projects,</li> </ul>

### (1) Cropping plan

Cropping plan is the action plan to produce horticulture products and to sell the products if surplus expected. Based on the selection of crops in the CR-07 Technical Sheet, target production will be set, for example 5 pieces of tomatoes to be supplied to the family members every day in the particular month, and required actions will be arranged with the schedules on monthly basis. Sample of cropping plan is shown below.

Cropping Plan of Tomato (Example)

Actions	Oct.			Nov.			Dec.			Jan.			Feb.			Mar.			Apr.			May		
	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L
Cropping Plan	█																							
Procurement of seeds		█																						
Nursery Preparation			█																					
Start seedlings				█	█	█																		
1st Transplant (2.5 leaves)							█	█	█															
2nd Transplant (10.5 leaves)										█	█	█	█	█	█									
Crop Management										(1)	(2)	(3)	(4)											
Harvesting																█	█	█	█	█	█	█	█	█

(1): Mulching, bud picking, branch training, (2) Support pole & lifting branch, (3) Top dressing  
 (4) Top dressing, branch training

Based on the selection of crops according to the climatic condition as well as

### Horticulture crop management

Some small scale horticulture farmers are producing the fresh horticulture produce in the western part of Omusati Region and selling to the market either through private dealers or through AMTA. According to the interview to them, they need the basic cultivation technique and knowledge to grow vegetables. In the same way, interview to the micro garden farmers also require the basic techniques and knowledge of horticulture cultivation. In this regards, the following basic techniques and knowledge will be focused in this technical measures.

- Crop rotation to avoid same vegetable group planting continuously (to change vegetable planting every season),

#### Rotation of Vegetable Groups

Group 1 Leafy Vegetables	Group 2 Root Vegetables	Group 3 Fruit Vegetables	Group 4 Legumes	Group 5 Others
Cabbage, cauliflower, Chinese cabbage, broccoli, Brussels sprout, kale leeks and celery.	Carrots, beetroots, sweet potatoes, turnips, kohlrabi, and onion	Tomatoes, potatoes, peppers, eggplant, lettuce and Swiss chard.	Beans, peas, and cowpeas.	Cucumbers, pumpkins, squashes, melons, watermelons, okra, sugar maize, and radishes.
Plenty of kraal manure, compost and inorganic fertilizer to be applied.	No manure to be applied at planting to avoid forking of roots, too much nitrogen fertilizer cause many leaves and fewer roots and tubers.	High sensitivity of nematodes, and particularly for tomato, potatoes, peppers and eggplant not to be planted consecutively into the same bed in subsequent seasons.	Nitrogen fixation to increase soil fertility, higher sensitivity of nematodes.	Rotation with other groups, but avoid to grown in the same bed for more than one consecutive season.

Source: Prepared by the Study Team, based on the Knott's Handbook for Vegetable Growers 5<sup>th</sup> Edition November 2006, and Crop Production Manual published by the Joint Presidency Committee of NAU and NNFU, 2008.

- Other basic techniques and knowledge: nursery bed preparation, raising of seedling, thinning and pruning, branch training, buds picking, branch lifting, shading preparation, compost preparation and application,

### Reference Information

- Implementation Process for 'SHEP' Approach, Guideline with Ideas and Sample Format used by SHEP UP, 2013.
- Spotlight on Agriculture No. 7 "Pearl Millet Improvements – Plant Material Description – April 1998,

Directorate of Agriculture Research and Training (DART), Ministry of Agriculture, Water and Rural Development (MAWRD).

- The Technical Toolkit for Rain- and Floodwater Harvesting (RFWH) Version 2, Cuve Waters Project – Integrated Water Resources Management in Northern Namibia, 2015.

#### Feedback from Pilot Site Activities in Phase-2

This technical measure was introduced in 4 sites in Phase-2. The following table summarizes the activities taken through trainings in pilot site activities.

1st Training (Nov. 2015)	<ul style="list-style-type: none"> <li>- Concept of N-CLIMP and pilot site activities were explained to the farmers, and farmers' present activities were reviewed.</li> <li>- The main points of outline of horticulture crop cultivation were explained to farmers along with drip irrigation and market survey and crop selection under SHEP approach.</li> <li>- Demonstration farm was inspected to decide the location, and delineated and marked by pole. In case of fencing required, necessary materials were identified with responsibility for procurement.</li> </ul>
2nd Training (Nov. to Dec. 2015)	<ul style="list-style-type: none"> <li>- The main points of horticulture crop cultivation were repeated explained to farmers along with drip irrigation and market survey and crop selection under SHEP approach, then discussion was made on direct seeding, transplanting seedlings, other practices.</li> <li>- The demonstration farm was inspected with farmers, training was conducted to prepare the furrows and ridges for vegetable planting. In the existing planting area, some cropping techniques were advised for pruning, mulching, and shading.</li> </ul>
3rd Training (Feb. 2016)	<ul style="list-style-type: none"> <li>- The main points of horticulture crop cultivation were repeated explained to farmers, particularly on the vegetable growing process, and discussion was made with farmers.</li> </ul>
4th Training (Apr. 2016)	<ul style="list-style-type: none"> <li>- Farming records were reviewed at each site, and discussion was made by farmers. Most of farmers were keeping higher interest on selling vegetables after producing.</li> <li>- At Etunda in Omusati Region, discussion was made on farmers contribution. Farmers discussed about sales prices of vegetables and their amount, and decided at 50% of procurement cost to be born by farmers, and installation would start accordingly.</li> </ul>

<b>CR-9</b>	<b>Establishment of crop production and marketing cooperatives</b>	
Purpose	Empowerment of farmers, sharing resources and facilities, better bargaining power	
Target area	Crop production area	
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers groups	
Expected output	Collective procurement and sales, proper dividend, provider of technical training and facilitation	
Work procedure	(1) Establishment of multi-purpose cooperative Reference information	
Work plan	This technical measure is assessed as the Category 3 (medium to long term in the master plan) in the categorization, because of high cost, high technical level to organize people and operate organization, and taking long time to establish the organization under the Cooperative Act. In this regard, this measure will be applied in the medium to long term period (probably more than 5 years) during the master plan period.	
Main monitoring item	<ul style="list-style-type: none"> <li>➤</li> <li>➤</li> </ul>	
Materials and Sample Formats	Necessary materials <ul style="list-style-type: none"> <li>➤ Not applicable</li> </ul>	Formats <ul style="list-style-type: none"> <li>➤ Not applicable</li> </ul>

#### (1) Establishment of multi-purpose cooperative

The present cooperatives are classified into two groups, and a group has been established supporting mainly to the commercial farmers. Another group is for livestock sector in the Northern Communal Area, and they are the regional livestock marketing cooperatives particularly strengthened under the support of donor agencies.

Present crop sector in the Northern Communal Area mostly remains at subsistence level, and heavily depending on the government support. However, structure of agricultural sector has been significantly changing due to such situations as low profitability, labor shortage, aging of farmers, and less returning of younger generation to rural area similar to the developed countries. Under this circumstance, it is necessary to change the agricultural sector to the viable crop sector under the support of MAWF. For this purpose, individual farmers and small groups may not have enough capacity to attain the goal of viable activities, and the large-scale collective actions of crop farmers are required. In this regard, multi-purpose cooperatives will be the reasonable body to carry out empowerment of farmers as well as sharing of resources and facilities by farmers in addition to the collective marketing of inputs and products.



## Reference Information

Reference information on

- Cooperative Act (No. 23 of 1996), Government Gazette No. 327 of 1996.
- National Agricultural Policy, Ministry of Agriculture Water and Rural Development, October 1995.

## Feedback from Pilot Site Activities in Phase-2

Not to be applied in Phase-2

*Attachment 2-2*

*Technical Sheet for*

*Livestock Production*

*N-CLIMP*

LS-1	Fodder production	
Purpose	To produce fodders on cultivated land	
Target area	Northern Central Area	
Trainer	ATs and Regional officers of fodder crop and Mentors	
Trainee	Farmers	
Expected output	Increased fodder production and spreading of the fodder production techniques for other purposes	
Work procedure	<p>(1) Concept with farmers</p> <p>(2) Investigation of availability of fodder seeds and required amount of seeds</p> <p>(3) Selection of land, demonstration of sowing, monitoring</p> <p>(4) Training of harvesting and preservation of fodder</p> <p>(5) Feedback course</p>	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs and Regional officers of fodder crop and Mentors : Setting of action plans, preparation of necessity tools, land preparation , sowing , transplantation of fodder trees , harvesting and preservation and collection of seeds</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Training for farmers/ groups, preparation of necessity tools, land preparation, sowing, transplantation of fodder trees, harvesting and preservation and collection of seeds</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s): Land preparation, sowing, monitoring, transplantation of fodder trees, harvesting and preservation, collection of seeds and their storage.</p> <p>By ATs &amp; Farmers: Feedback course , plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Numbers of farmers to cultivate fodder crops(nos.),</li> <li>➤ Total area of fodder production(ha)</li> <li>➤ Total amount of fodders(ton)</li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤ Seeds of fodders and fodder trees</li> <li>➤ Materials for fencing</li> <li>➤ Cultivation manual</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> </ul>

#### (1) Concept of fodder production with farmers

- Four regions of NCAs are facing insufficient fodder supply for livestock
- Carrying capacity of areas are remarkably lower for demands of livestock
- Insufficient fodder due to overgrazing in communal rangeland causes chronic insufficiency of feed

for livestock

- -Farmer and ATs are facing insufficient planting materials and insufficient fodder production experience
- Production of fodder and fodder crops will be able to highly contribute to ensuring feed for livestock

To be assigned by ATs and Regional officers of fodder crop and Mentors:

- Setting of action plans
- Preparation of necessity tools
- Land preparation
- Sowing
- Transplantation of fodder trees
- Harvesting and preservation
- Collection of seeds and storage

To be assigned by farmer(s)/group(s):

- Training :for farmers/ groups:
- Preparation of necessity tools
- Land preparation
- Sowing
- Transplantation of fodder trees
- Harvesting and preservation
- Collection of seeds and storage

## (2) Investigation of availability of fodder seeds and required amount of seeds

Before the operation, it is necessary to investigate the availability of seeds, seed amount and fodder trees.

Example:

Crops: Millet, sorghum etc.

Grasses: Buffel grass,

Legumes: Alfalfa, cowpea, ground nut, banbara nut, pigeon pea and etc.

Trees: Acacia, prosopis, Dichrostachy, Lucerne and etc.

## (3) Selection of land, demonstration of sowing, monitoring

By farmer(s)/group(s):

- Land preparation
- Sowing
- Monitoring
- Transplantation of fodder trees
- Harvesting and preservation
- Collection of seeds and its storage

Table: Inputs for each site

	Items	Unit	Number	Price	Remarks
Crop seed	Millet or Sorghum	0.5 kg	1		
Peas or nut	Pigeon or Ground or Cow	0.5 kg	1		
Grass seed	Perennial grass	0.1 kg	1		
	Annual grass	0.1 kg	1		
Tree seedlings	Acacia or prosopis or Leucaene or Senna or Faidherbia	1 bag	80		
Fencing					
	Barbed wire roll	120m	1		



		
Land preparation	Pigeon pea	Hay making

#### (4) Training of harvesting and preservation of fodder

Study of feeding with Mentorship system:

After harvesting, farmers /groups would study the way of preservation such as hay and silage to keep it in order to feed them at the end of dry season that most of livestock suffering from lack of fodders. Seed collection is also very important. Perennial grasses keep roots for next rainy season but annual grasses would not re-grow the next year without seeds.

#### (5) Feedback course

By ATs and farmers/groups: Feedback course should discuss concerning advantage and disadvantage of fodder production in cultivated land and the next year plan. For example, such topics as rotation of

cultivated land, introduction of other plants, grasses and/or fodder trees are discussed to derived lessons useful for next cropping season.

\*Since the proper germination and growth of fodder grasses is very difficult due to the lack of rainfall in many regions , transplantation of fodder grasses is also one of techniques to establish seed collection for future.

(6) Further information

- Namibia National Farmers Union (NNFU) Training Manual: Rangeland Management: Chapter 8
- NOLIDEP: Northern Central Division Trial/Demonstration Programme 1996/97

<b>2</b>	<b>Range management :Rotation</b>	
Purpose	To rotate livestock into divided rangeland	
Target area	NCA	
Trainer	ATs had experience and <b>Mentors</b>	
Trainee	Farmers:	
Expected output	Rotation of rangeland utilization and preservation of rangeland from high density of livestock grazing	
Work procedure	(1) Rotation concept (2) Partition of rangeland and its plan of rotation with a fodder production (3) Implementation of rotation and monitoring (4) Feedback course	
Work plan	Group formation and group grazing, if possible to cooperate with fodder production <b>July to Aug.</b> to be assigned by ATs had experience and <b>Mentors</b> : Setting of action plans, preparation of necessity items, study the institutional system to set rotation in specific rangeland, support from Mentorship <b>From Sept.</b> to be assigned by farmer(s)/group(s): Concept of rangeland rotation, agreement to use rangeland rotation, setting of area to rotate and area division, setting the administrative organization of rotation, preparation of necessity tools, if possible sowing of grass seeds(perennial and annual grasses)  <b>Implementation:</b> to be assigned by farmer(s)/group(s): Land preparation and division, monitoring, By ATs: Frequent visit of rangeland and advice By ATs & Farmers: Feedback, plan for next year	
Main monitoring item	➤ Farmers numbers(nos.), numbers of livestock(nos.) ➤ Investigation of degree of vegetation (poor, middle, rich) (ha) ➤ Grazing pressure during rotation ( low, middle, high) (ha)	
Materials and Sample Formats	<b>Necessary materials</b> ➤ Fencing materials ➤ Rotation manual ➤ Map	<b>Formats</b> ➤ FORM xxx ➤ ➤

### (1) Rotation concept

- Insufficient coordination among livestock farmers leads serious rangeland deterioration due to overgrazing
- Farmer group formation and group grazing by the rotation will be able to decrease the grazing pressure on rangeland areas.
- It is very difficult to organize the group of planned rotation.
- Insufficient fodder due to overgrazing in communal rangeland causes chronic insufficiency of feed for livestock

To be assigned by ATs had experience and **Mentors**: Setting of implementation plans, preparation of necessity items, and study of the institutional system to set rotation in specific rangeland, supported through Mentorship system

To be assigned by farmer(s)/group(s): Concept of rangeland rotation, agreement to use rangeland rotation, setting of area to rotate and area division, setting the administrative organization of rotation, preparation of necessity tools, supported through Mentorship system

## (2) Partition of rangeland and its plan of rotation

To be assigned by ATs and farmer(s)/group(s): Mapping of grazing areas, partition of rangeland according to planned rotation

## (3) Implementation of rotation and monitoring

Action operation: By farmer(s)/group(s): Land preparation and division  
Monitoring by ATs: Frequent visit of rangeland and advice

## (4) Feedback course

By ATs , farmers/groups and Mentors: Feedback course should discuss concerning advantage and disadvantage of rangeland rotation and the next year plan.

### Further information

- CBRLM: rangeland rotation manual by GOPA
- Namibia National Farmers Union (NNFU) Training Manual: Rangeland Management:

**Meeting** : Farmers, ATs, Village headmen, Relevant organizations

Discussion: Rotation is needed or not ?

If yes : to continue    If no: to quit

Numbers of participants and cattle:

Area for grazing rotation:

Setting of landmarks or fence:

Management: Number of herdsman, payment for herdsman, number of kaals and camps, water points, rotation method, charge rate of expenditure for rangeland rotation and etc.,

Executing rotation and feedback meeting:

Topic: (for example) introduction of super Sanga bulls, vaccination and de-worming of cattle in kaals, collective sales of cattle(periodical production) , and etc.



<b>3</b>	<b>Water harvesting and /or construction of water resource facilities for animals</b>	
Purpose	To increase watering points in grazing areas	
Target area	NCA	
Trainer	ATs and ( experienced bodies of water harvesting)	
Trainee	Farmers	
Expected output	Construction of enough watering points in grazing area through water	
Work procedure	(1) Concept of water harvesting and construction of watering point (2) Investigation of watering points, numbers of stocks utilized watering point (3) Budget for construction of watering point and water harvesting (4) Making levees at the effective points to stop water flow from wet lands (5)Feedback course	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs: Preparation of necessity tools, land preparation according to the size of water facilities</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Selection of size of watering facilities, preparation of necessity tools, land preparation(digging, making canals to collect rain water)</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s): Land preparation, labor , monitoring, improvement of water utilization, making rule of water utilization</p> <p>By ATs &amp; Farmers: Feedback course , Plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Numbers of watering point(nos.)</li> <li>➤ Available period for watering (months)</li> <li>➤</li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤ Minimum tools :shovels, one wheel barrows,</li> <li>➤ If needs, materials for roof catchment kits</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> <li>➤</li> </ul>

### (1) Concept of water harvesting and construction of watering point

Insufficient numbers and distribution of watering facilities for livestock causes a heavily desertification of area around watering points. Led the lack of watering facilities in remote areas, livestock also cannot reach and utilize grass rich areas even if the areas have nutritious vegetation fully.

ATs and farmers should select the way of water harvesting e.g. roof catchment way, small scale reservoirs of

ponds , deepened reservoirs and ponds, small scale dams to utilize flood and etc.

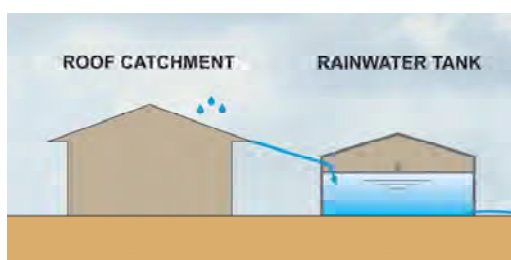
To be assigned by ATs:

- Preparation of necessity tools
- Land preparation according to the size of water facilities

To be assigned by farmer(s)/group(s):

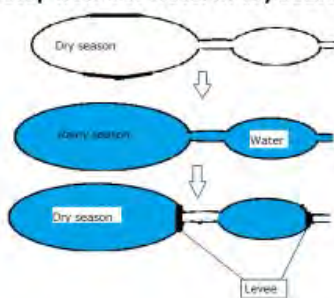
- Selection of areas and size of watering facilities
- Preparation of necessity tools
- Land preparation (digging, canals to collect rain water, bank etc.)

**Figure: Roof catchment**

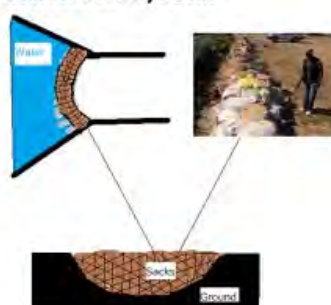


## Water harvesting by levees

To stop flow out water in dry season



To built levees by sacks



**(2) Investigation of watering points, numbers of stocks utilizing watering point**

To be assigned by farmer(s)/group(s):

- Land preparation
- Labor
- Monitoring
- Improvement of water utilization
- Making rule of water utilization

**(3) Budget for construction of watering point and water harvesting**

According to plans for water harvesting, it needs to calculate budgets to prepare necessary tools. It may need to hire machinery power in case of large construction.

#### **(4) Feedback course**

By ATs and farmers/groups: Feedback course should discuss concerning advantage and disadvantage of water harvesting and the next year plan

#### **Further information**

- Rainwater Harvesting for Small-Holder Horticulture in Namibia: Design of Garden Variants and Assessment of Climate Change
- Impacts and Adaptation: Water 2015, 7, 1402-1421; doi:10.3390/w7041402

<b>4</b>	<b>Nutritious feed supply particularly for pig and chicken</b>	
Purpose	To increase nutritious feed supply for pig and chicken	
Target area	NCA	
Trainer	ATs and <b>Mentors</b>	
Trainee	Farmers	
Expected output	Easy purchasing of nutritious food for pig and chicken	
Work procedure	(1) Concept of nutritious food supply for pig and chicken (2) Market research :kind of food , price , availability , factories (3) Possibility to produce nutritious food in rural area (4) Feedback course	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs and <b>Mentors</b>: Preparation of necessity materials, joint to fodder production if needs</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Preparation of necessity materials,</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s): Research of food materials in markets, research of food materials by themselves, study to produce nutritious foods ,</p> <p>By ATs &amp; Farmers: Feedback course , Plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Table of market research for nutritious food materials (places, kinds, price/kg)</li> <li>➤ Available nutritious food in rural area (place, kinds, price/kg)</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Fund to purchase supplement foods</li> <li>➤ Table for research</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> <li>➤</li> <li>➤</li> </ul>

### (1) Concept of nutritious food supply for pig and chicken

This nutritious food for pig and chicken is currently not provided widely. The solution for this challenges can be categorized into three, of purchasing food, of self-sufficiency and of provision of animals with locally available foods.

To be assigned by ATs and Mentors :

- Preparation of necessity materials

To be assigned by farmer(s)/group(s):

- Preparation of necessity materials

According to increasing of chicken numbers, purchased feeds from markets are very expensive and it becomes

main expenditures. Since it minimizes benefits of poultry activities, farmers should make self-made chicken feeds from available food stuffs around their surroundings.

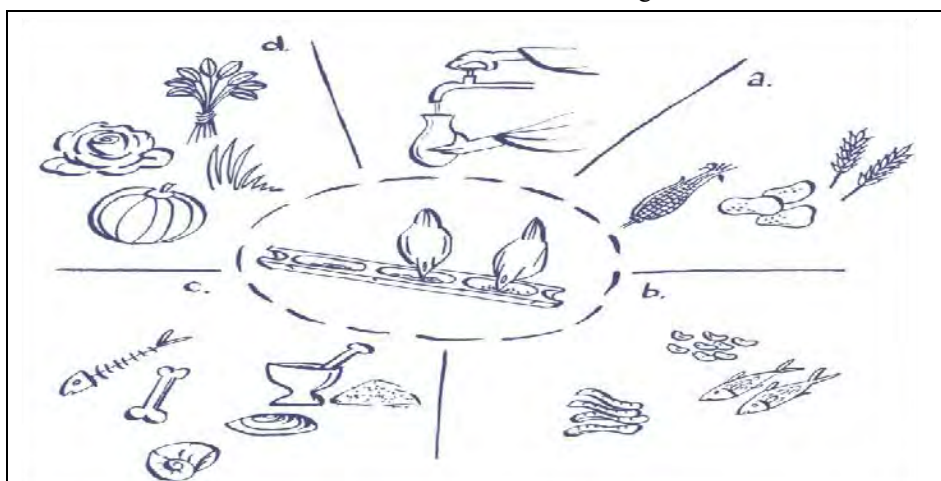


Figure  
Feed stuffs for self-made feeding: a:Grains b:Protein, c:Minerals, d:Vitamins

**(2) Market research :kind of food , price , availability , supplement factories**

To be assigned by farmer(s)/group(s):

- Research of food materials in markets
- Research of food materials by themselves
- Study to produce menu of nutritious foods

**Example Table: Research of supplement feed**

	Address	Name of shop	Items	Price: N\$/kg	Remarks
1	xxx	xxxxx	xxxxxx	xxxxxxx	
2					
3					
4					

**(4) Feedback course**

By ATs, farmers/groups and **Mentors**: Feedback course should discuss concerning economical advantage and disadvantage of nutritious food supply and the next year plan.

**Further information**

- Keeping Village Poultry: A technical manual on small-scale poultry production: Network for Smallholder Poultry Development
- Improving village chicken production: Manual for field workers and trainers: ACIAR
- Indigenous chicken production manual: Kenya Agricultural Research Institute
- Pig farming: Sustainable Livelihoods for Rural Youth Project: Breeding and keeping pigs for income and food in the Solomon Islands
- Farmer's Hand Book on Pig Production (For the small holders at village level): FAO

<b>5</b>	<b>Disease control</b>	
Purpose	To prevent disease outbreak and minimize economical lose from diseases	
Target area	NCA	
Trainer	ATs ,Regional veterinarians and <b>Mentors</b>	
Trainee	Farmers	
Expected output	Increased production ,off-take rate and meat production	
Work procedure	<p>(1) Concept of disease control</p> <p>(2) Increasing of vaccination places during vaccination campaign, increasing of drugs and vaccine at low price</p> <p>(3) animal handling</p> <p>(4) training of medication and treatments</p> <p>(5) Feedback course</p>	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs, ,Regional Veterinarians and <b>Mentors</b>: Study of Mentorship concerning disease control , animal health and animal husbandry, inform the date of vaccine campaign, implementation of disease control, preparation of necessity tools</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Study of Mentorship concerning disease control , animal health and animal husbandry, inform the date of vaccine campaign, mass purchasing of drugs and materials to decrease price, preparation of necessity tools, implementation of disease control</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s): Complete awareness concerning vaccination campaign date and place in the area to increase vaccination percentage, study of Mentorship concerning disease control , animal health and animal husbandry, group activities: dehorning, deworming, branding, drench, spray , etc., mass purchasing of drugs and materials to decrease price , implementation of disease control</p> <p>By ATs &amp; Farmers: Feedback course , Plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ The vaccinated livestock numbers of FMD and CBPP (nos.)</li> <li>➤ The numbers of vaccination points(nos.)</li> <li>➤ The numbers of off-take and loaded heads into abattoir(nos.)</li> <li>➤ The numbers of treated livestock (kind of medication: nos.)</li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤ Mentorship technical manual</li> <li>➤ Treatment tools and drugs</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> <li>➤</li> </ul>

### (1) Concept of disease control

Limited knowledge in farmers off take rate and untimely off-take manner offer low quality meat into market.

High cost of drugs and high cost of drench cause the difficulties to control animal diseases at the levels of farmers.

Farmers would access drugs more frequently if these animal drugs are available at specific points such of livestock cooperatives, assembly points and auction places. Farmer should prepare money to purchase drugs and necessity materials by sales of their livestock in order to control diseases (the cost of prevention of diseases is much cheaper than treatment).

To be assigned by ATs, Regional veterinarians and Mentors :

- Concept of disease control
- The suitable ways to inform the date and place of vaccine campaign
- Study of Mentorship concerning disease control, animal health and animal husbandry
- Implementation of disease control
- (example possibility) Mass purchasing of drugs and materials to decrease price

To be assigned by farmer(s)/group(s):

- Concept of disease control
- The suitable ways to inform the date and place of vaccine campaign
- Study of Mentorship concerning disease control, animal health and animal husbandry
- Mass purchasing of drugs and materials to decrease price, Preparation of necessity tools
- Implementation of disease control

	
Crush pen	Continuous Veterinary injector

**(2) Increasing of vaccination places during vaccination campaign, increasing of drugs and vaccine at low price**

To be assigned by farmer(s)/group(s): During vaccine campaign, some farmers tend to miss free vaccination so it needs to inform the date and place of vaccination.

- Complete awareness concerning vaccination campaign date and place in the area to increase vaccination percentage
- Study of Mentorship concerning disease control, animal health and animal husbandry
- Group activities: dehorning, deworming, branding, drench, spray, etc.
- Study of disease control regularly with Mentorship
- Implementation of disease control

By ATs and farmers/groups have to discuss about the ways of:

- Purchasing drugs and materials at low price to decrease disease control expenditure
- Increasing the sales point of drugs and materials in remote areas to access easily such of livestock cooperatives, assembly points, auction places.

**Table: Inputs for each site for cattle(example)**

	Items	Unit	Number	Price	Remarks
Tools	Continuous Vet injector	1	1		
	Syringe(20ml)	10	1		
	Needle	10	5		
	Cotton	100g	3		
	Bandage	10 roles	2		
	Surgical scalpel	1	1		
	Scalpel blade	20	1		
Drugs	Oxytetracycline	100ml	5		
	Penicillin Long Act	100ml	5		
	Ivermectin	100ml	10		Parasite control
	Vitamin AD <sub>3</sub> E	100ml	10		
	Surgical sprit	500ml	1		Sterilization
Vaccine	Anthrax	100ml	5		
	Black legs	100ml	5		
	Black quarter	100ml	5		

### (3) Feedback course

By ATs, farmers/groups, regional veterinarians and Mentors : Feedback course should discuss concerning advantage and disadvantage of disease control and the next year plan.

### Further information

- Animal husbandry kits: (not disease control but necessity to keep livestock in good condition for better management such of dehorning, castration, straining, hoof trimming and etc.)





Photo : Medicines and Animal husbandry kits

<b>6</b>	<b>Large and small stock fattening</b>	
Purpose	To fatten large and small livestock by feeding of nutritive foods	
Target area	NCA	
Trainer	ATs and <b>Mentors</b>	
Trainee	Farmers	
Expected output	Increasing number of fattening farmers and quality meat production For farmer; income generation	
Work procedure	(1) Concept of fattening (2) Availability of foods and fodders for fattening (3) Utilization of crop residues of grain and beans, fodder production (4)Feedback course	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs: Studies of feeding management and animal husbandry, research of fattening feed materials and supplements ( places, prices), skill up by Mentorship system</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Studies of feeding management and animal husbandry , research of fattening feed materials and supplements ( places, prices), research of livestock markets concerning prices and demands from buyers , skill up by Mentorship system</p> <p><b>Implementation:</b> to be p assigned by farmer(s)/group(s): Studies of feeding management and animal husbandry, research of fattening feed materials and supplements ( places, prices) research of livestock markets concerning prices and demands from buyers , skill up by Mentorship system</p> <p>By ATs &amp; Farmers: Feedback course , Plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Fattening farmers by utilization of special fattening foods (nos.)</li> <li>➤ Selling price after fattening (N\$)</li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤ Foods: purchasing supplements from market, Available crop residues, grains, hay etc.,</li> <li>➤</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> <li>➤</li> <li>➤</li> </ul>

### (1) Concept of fattening

Led by the limited feeding materials, large and small livestock fattening is stagnant. Limited feeding materials is one of main difficulties. Utilization of grains & legume residues with fodders can be the suitable food for fattening.

To be assigned by ATs and Mentors:

- Studies: Feeding management and animal husbandry
- Research of fattening feed materials and supplements (places, prices)
- Skill up by Mentorship system

To be assigned by farmer(s)/group(s):

- Studies of feeding management and animal husbandry
- Research of fattening feed materials and supplements (places, prices)
- Skill up by Mentorship system
- Research of livestock markets concerning prices and demands from buyers

**(2) Availability of foods and fodders for fattening**

Marketing research concerning availability of additive nutritious fodder, supplement, crop residues and so on.

**Example Table: Research of supplement feed**

	Address	Name of shop	Items	Price: N\$/kg	Remarks
1	xxx	xxxxx	xxxxx	xxxxxxx	
2					
3					
4					

**(3) Utilization of crop residues of grain and beans, fodder production**

To be assigned by farmer(s)/group(s):

- Studies of feeding management, animal husbandry and feeding menu composition
- Availability of supplement foods

**Example Table: Research of supplement feed in rural areas**

	Place	Name	Items	Price: N\$/kg	Remarks
1	xxxxxx	xxx	Ground nut hey	xxxxxxx	
2	xx	x x x	Millet grain	xxx	
3					
4					

- Research of livestock markets concerning prices and demands from buyers

**Example Table: Fattening result: Price in market / Auction**

	Market /Auction	Male	Ox	Female	Body weight (kg)	Body condition (Thin, Middle, Fat)			Price\$/kg	Remarks
1	xxx	M	O	F	xxxxx	T	M	F	xxxxxxx	
2		M	O	F		T	M	F		
3		M	O	F		T	M	F		
4		M	O	F		T	M	F		

- Skill up by Mentorship system

#### (4) Feedback course

By ATs, farmers/groups and Mentors: Feedback course should discuss concerning advantage and disadvantage of fattening and the next year plan.

#### Further information

- Livestock producers Forum: Farmers Mentorship: Programme in The NCAs
- Pig farming: Sustainable Livelihoods for Rural Youth Project: Breeding and keeping pigs for income and food in the Solomon Islands
- Farmer's Hand Book on Pig Production (For the small holders at village level: FAO)
- Small stock management: Joint Presidency Committee(NAU and the NNFU)
- FARM-Africa Dairy Goat Production Handbook:

[http://teca.fao.org/sites/default/files/technology\\_files/Farmers%20Dairy%20Goat%20Production%20Handbook](http://teca.fao.org/sites/default/files/technology_files/Farmers%20Dairy%20Goat%20Production%20Handbook)

- Farmers should produce hay and silage in order to keep fodders during dry season through Technical Measure LS-1: Fodder Production
- The members should try to find out the opportunity to assemble certain cattle numbers in order to sell at higher price according market demand although each farmers can sell their cattle individually: Technical measure FM-10: Market Information

<b>7</b>	<b>Periodical production</b>	
Purpose	To bring livestock into auction/ market at the period of highest price	
Target area	NCA	
Trainer	ATs and <b>Mentors</b>	
Trainee	Farmers	
Expected output	Increasing of livestock sales at higher price through periodical production and generate cash income and off take rate	
Work procedure	(1) Concept of periodical production (2) Training of feeding and breeding management (3) Accurate reproductive recording manner with breeding record (4)Feedback course	
Work plan	Breeding management through Mentorship <b>July to Aug.</b> to be assigned by ATs and <b>Mentors</b> : Preparation of necessity tools, study of breeding , feeding , recording , accounting, and marketing research  <b>From Sept.</b> to be assigned by farmer(s)/group(s): Preparation of necessity tools, study of breeding , feeding , recording , accounting, and marketing research <b>Implementation:</b> to be assigned by farmer(s)/group(s): Through Mentorship program :breeding record, feeding skills , monitoring, planning of sales and accounting record, and marketing research By ATs & Farmers: Feedback course , Plan for next year	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Farmers with /without breeding record(nos.)</li> <li>➤ Selling price (N\$)</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Breeding record</li> <li>➤ Fund to purchase supplement feeds</li> <li>➤</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> <li>➤</li> <li>➤</li> </ul>

### (1) Concept of the periodical production

No recording causes no plan for sales at the high price of cattle. Strengthen periodical production is achieved through the support of Mentorship program.

To be assigned by ATs and Mentors:

- Preparation of necessity tools
- Study: breeding, feeding, recording, accounting,

To be assigned by farmer(s)/group(s):

- Training for farmers/ groups
- Preparation of necessity tools
- Study: breeding, feeding, recording, accounting,

## (2) Training of feeding and breeding management

Based on the Mentorship system, farmers study the reproductive cycle of livestock, concerning heat detection and mating, pregnant examination, and delivery and so on. According to the breeding record, farmers make plan for sales of cattle at higher prices

## (3) Accurate reproductive recording manner with breeding record

To be assigned by farmer(s)/group(s): Through Mentorship program:

- Breeding record
- Feeding skills
- Monitoring
- Planning of sales
- Accounting record

**Example Table: Periodical production**

	Market /Auction	Male	Ox	Female	Body weight (kg)	Body condition (Thin, Middle, Fat)			Price\$/kg	Remarks
1	xxx	M	O	F	xxxxxx	T	M	F	xxxxxxx	
2		M	O	F		T	M	F		
3		M	O	F		T	M	F		
4		M	O	F		T	M	F		

## (4) Feedback course

By ATs, farmers/groups and **Mentors**: Feedback course should discuss concerning advantage and disadvantage of periodical production / sales and the next year plan

## (4) Further information

- Livestock producers Forum: Farmers Mentorship: Programme in The NCAs
- Farmer should assemble many numbers of cattle as one unit in order sell at higher price and find out the opportunity of sales at auction or invitation of buyers
- To record reproductive status of all cattle in order to understand the possibility of sales: Technical Measure: FM-2 Record keeping
- To collect the market information and its market tendency : Technical Measure :FM-10 Market Information

<b>LS-8</b>	<b>Expansion of quality meat</b>	
Purpose	To increase quality meat production through early sales of steers at age of ,at least, less than 5 years old	
Target area	NCA	
Trainer	ATs	
Trainee	Farmers	
Expected output	Increasing of farmers' incomes by the sales of quality meat of steers less than 5 years old	
Work procedure	<p>(1) Concept of expansion of quality meat</p> <p>(2) Good feeding management of steers</p> <p>(3) Improvement of rangeland, supplement foods , licks, preparation of feed during dry season or drought</p> <p>(4) Proper animal health in order to erase factors to stagnant growth of steers: perfect vaccination, proper deworming, proper housing and etc.</p> <p>(5)Feedback course</p>	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs: Setting of implementation plans, feeding management; , improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought , study of animal health: perfect vaccination, proper deworming, proper housing and etc.</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Setting of implementation plans, feeding management; , improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought , study of animal health: perfect vaccination, proper deworming, proper housing and etc.</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s): Setting of implementation plans, feeding management; , improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought , study of animal health: perfect vaccination, proper deworming, proper housing and etc.</p> <p>By ATs &amp; Farmers: Feedback course , plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Numbers of steers above Grade C (nos.)</li> <li>➤ Balance sheet of farmers (N\$ from steer sales)</li> <li>➤ Price of cattle sales at markets (N\$ /kg)</li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤ Breeding records</li> <li>➤</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤</li> </ul>

### (1) Concept of expansion of quality meat

Farmers' incomes from cattle sales is very low led by low off-take rate and poor meat qualities derived from old cows, oxen or old bulls. In order to increase farmers' incomes, the best way is based on the sales of young steers within 4 years old to offer quality meat at higher prices.

Currently there are limited off-take rate and sold cattle of off-take are old and /or thin in timely manner. ATs and farmers therefore should discuss to increase off-take rate and good timing of steers sale.

To be assigned by ATs:

- Setting of implementation plans:
- Feeding management; improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought
- Study of animal health: perfect vaccination, proper deworming, proper housing and etc.
- Market research: price(N\$ / body weight ) , number of sales, tendency of price and etc.

To be assigned by farmer(s)/group(s):

To be assigned by ATs:

- Setting of implementation plans,
- Feeding management; improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought
- Study of animal health: perfect vaccination, proper deworming, proper housing and etc.
- Market research: price (N\$ / body weight ) , number of sales, tendency of price and etc.

## **(2) Good feeding management of steers**

Feeding is the base of cattle fattening so ATs and farmers should be keen in order to prepare good feed during fattening.

## **(3) Improvement of rangeland, supplement foods , licks, preparation of feed during dry season or drought**

Since most of fodder for cattle and other small stock is derived from rangeland, ATs and farmers need to observe rangeland to keep it in good condition.

## **(4) Proper animal health in order to erase factors to stagnant growth of steers: perfect vaccination, proper deworming, proper housing and etc.**

Animal health care is also very important to decrease mortality and economic losses from diseases and keep livestock in good condition in order to grow body size rapidly.

By farmer(s)/group(s):

- Setting of implementation plans,
- Feeding management; improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought
- Study of animal health: perfect vaccination, proper deworming, proper housing and etc.
- Market research: price(N\$ / body weight ) , number of sales, tendency of price and etc.

## **(5) Feedback course**

By ATs & Farmers: Feedback course, plan for next year



<b>LS-9</b>	<b>Bull scheme</b>	
Purpose	To improve cattle genetic capacity through introduction of bulls (indigenous and exotic)	
Target area	NCA	
Trainer	ATs	
Trainee	farmers	
Expected output	Improvement of cattle production through genetic improvement	
Work procedure	(1) Concept of bull scheme (2) Study of feeding, breeding, animal health care and etc. (3) Introduction of bulls, recording of mating, recording of productivities of son/daughter cattle and ground son/ daughter cattle (4) Feedback course	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs: Setting of implementation plans, feeding management; improving of rangeland, supplement foods, licks, preparation of feed during dry season or drought, study of animal health: perfect vaccination, proper deworming, proper housing and etc.</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Setting of implementation plans, feeding management; , improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought , study of animal health: perfect vaccination, proper deworming, proper housing and etc.</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s): Setting of implementation plans, feeding management; , improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought , study of animal health: perfect vaccination, proper deworming, proper housing and etc.</p> <p>By ATs &amp; Farmers: Feedback course</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Recording of mating (nos.),</li> <li>➤ The rate of pregnant cows/heifers(nos.) To measure the fertility of bulls</li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤ Mating records</li> <li>➤ Breeding records of cows and heifers</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤</li> </ul>

### (1) Concept of bull scheme

Challenge of bull scheme is insufficient numbers of bull and insufficient knowledge in farmers. Led by insufficient bull numbers, it causes decreased pregnant rate of cows and heifers, low calving rate and calving numbers and finally low off-take rate. It should change above mentioned negative facts by the introduction of proper bulls in numbers. And moreover the price of bulls is expansive so it needs to purchase bulls at reasonable price.

### (2) Study of feeding, breeding, animal health care and etc.

To be assigned by ATs:

- Setting of implementation plans: Introduction method, raising management, mating method and etc.

- Feeding management; improving of rangeland, supplement foods, licks, preparation of feed during dry season or drought
- Study of animal health: perfect vaccination, proper deworming, proper housing and etc.
- Recording of breeding

To be assigned by farmer(s)/group(s):

- Setting of implementation plans
- Feeding management;, improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought ,
- Study of animal health: perfect vaccination, proper deworming, proper housing and etc.
- Recording of breeding

### **(3) Introduction of bulls, recording of mating, recording of productivities of son/daughter cattle and ground son/daughter cattle**

By farmer(s)/group(s):

- Setting of implementation plans
- Feeding management;, improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought ,
- Study of animal health: perfect vaccination, proper deworming, proper housing and etc.
- Recording of breeding

### **(4) Feedback course**

By ATs and farmer(s)/group(s): Recording of reproduction (date of mating, cows / heifers pregnant or not, times of mating for 1 pregnant and etc.), possibility of further introduction of bull if necessity with plan of purchasing fund etc.

<b>LS-10</b>	<b>Multiplication of Sanga bull</b>	
Purpose	To improve cattle genetic capacity through introduction of Sanga bull	
Target area	NCA	
Trainer	ATs	
Trainee	farmers	
Expected output	Improvement of cattle production by the introduction of Sanga bull	
Work procedure	(1) Concept of multiplication of Sanga bull (2) Study of feeding, breeding, animal health care and etc. (3) Introduction of bulls, recording of mating, recording of productivities of son/daughter cattle and ground son/ daughter cattle (4) Feedback course	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs: Setting of implementation plans, feeding management; improving of rangeland, supplement foods, licks, preparation of feed during dry season or drought, study of animal health: perfect vaccination, proper deworming, proper housing and etc.</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Setting of implementation plans, feeding management; , improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought , study of animal health: perfect vaccination, proper deworming, proper housing and etc.</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s): Setting of implementation plans, feeding management; , improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought , study of animal health: perfect vaccination, proper deworming, proper housing and etc.</p> <p>By ATs &amp; Farmers: Feedback course</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Recording of mating (nos.),</li> <li>➤ The rate of pregnant cows/heifers(nos.) To measure the fertility of bulls</li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤ Mating records</li> <li>➤ Breeding records of cows and heifers</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> <li>➤</li> <li>➤</li> </ul>

### (1) Concept of multiplication of Sanga bull

In NCA, it limited grazing pasture and limited production capacity of rangeland. Based on the limited resource for livestock, multiplication of Sanga bull in NCAs is much better than the introduction of exotic bull. Although the exotic bulls are bigger than indigenous Sanga bull, the bigger of body size the bigger demand of foddors. At present, it is much more suitable to introduce Sanga bull to adopt scarce natural resources from current rangeland in NCA.

## **(2) Study of feeding, breeding, animal health care and etc.**

To be assigned by ATs:

- Setting of implementation plans: Introduction method, raising management, mating method and etc.
- Feeding management; improving of rangeland, supplement foods, licks, preparation of feed during dry season or drought
- Study of animal health: perfect vaccination, proper deworming, proper housing and etc.
- Recording of breeding

To be assigned by farmer(s)/group(s):

- Setting of implementation plans
- Feeding management;, improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought ,
- Study of animal health: perfect vaccination, proper deworming, proper housing and etc.
- Recording of breeding

## **(3) Introduction of bulls, recording of mating, recording of productivities of son/daughter cattle and ground son/daughter cattle**

By farmer(s)/group(s):

- Setting of implementation plans
- Feeding management;, improving of rangeland, supplement foods , licks, preparation of feed during dry season or drought ,
- Study of animal health: perfect vaccination, proper deworming, proper housing and etc.
- Recording of breeding

## **(4) Feedback course**

By ATs and farmer(s)/group(s): Recording of reproduction (date of mating, cows / heifers pregnant or not, times of mating for 1 pregnant and etc.), possibility of further introduction of Sanga bull if necessity with plan of purchasing fund etc.

<b>11</b>	<b>Goat production</b>	
Purpose	To increase the number of goat through disease control and breeding	
Target area	NCA	
Trainer	ATs and <b>Mentors</b>	
Trainee	Farmers	
Expected output	Farmers produce goat and bring them in markets , increasing of income by sale of goats	
Work procedure	(1) Concept of goat production (2) Training of feeding ,breeding , disease control and securing of male goats (3) Accountant recording (4) Feedback course	
Work plan	Utilization of the mentorship <b>July to Aug.</b> to be assigned by ATs: Preparation of necessity tools, study of recording, housing ,feeding , breeding , vaccination, parasite control, housing and etc. study of management and accounting through Mentorship  <b>From Sept.</b> to be assigned by farmer(s)/group(s): Preparation of necessity tools, study of recording, housing , feeding , breeding , vaccination, parasite control, housing and etc., preparation of necessity tools through Mentorship  <b>Implementation:</b> to be assigned by farmer(s)/group(s): At the first stage: Housing improvement at present, feeding and food stuff preparation perfectly , breeding and disease control The next stage: Introduction of breeding materials(male , female), selection of superior goats for breeding By ATs, Farmers and <b>Mentors:</b> Feedback course , Plan for next year	
Main monitoring item	➤ Farmers numbers of goat production(nos.) ➤ Total number of breeding goat(nos.) ➤ Balance sheet	
Materials and Sample Formats	<b>Necessary materials</b> ➤ Male goats ➤ Manual of goat management	<b>Formats</b> ➤ FORM xxx ➤

### (1) Concept of goat production

Internal parasites cause heavy economical loss in goat production and limited breeding materials (male and female) limits

Goat breeding program. It needs to awareness campaign for periodical drench highly.

**To be assigned by ATs and Mentors:**

- Preparation of necessity tools Preparation of necessity tools
- Study of recording, housing, feeding, breeding, vaccination, parasite control, housing and etc.
- Study of management and accounting through Mentorship

**To be assigned by farmer(s)/group(s):**

- Preparation of necessity tools
- Study of recording, housing, feeding, breeding, vaccination, parasite control, housing and etc.
- Study of management and accounting through Mentorship

**(2) Training of feeding ,breeding , disease control and securing of male goats**

To be assigned by farmer(s)/group(s):

- Housing improvement at present
- Feeding and food stuff preparation perfectly
- Breeding and disease control
- Introduction of breeding materials (male, female)
- Selection of superior goats for breeding from delivered kids
- Training: awareness campaign for periodical drench, breeding program, milk production system like the mentorship system.

**Example Table: Each reproductive record of female goat**

	Ear Tag Number	Birthday D/M/Y	Mating date	Kidding date	Number of kid	Sex of kid		Ear Tag Number of kid		Remarks
						Male	Female			
1	xxx	xx / x /xx	/ /	/ /	1	M	F	xxxxxxx		
2	xxx	/ /	/ /	/ /	2	M	F	xxx		
3	xx	/ /	/ /	/ /	1	M	F	xxxxx		
		/ /	/ /	/ /		M	F			

**(3) Accountant recording**

Since goat breeding is the business, account record training is required through its operation.

**(4) Monitoring**

By ATs , farmers/groups and Mentors : Feedback course should discuss concerning advantage and disadvantage of goat production and the next year plan.

**Further information**

- Small stock management: Joint Presidency Committee(NAU and the NNFU)
- FARM-Africa Dairy Goat Production Handbook:  
[http://teca.fao.org/sites/default/files/technology\\_files/Farmers%20Dairy%20Goat%20Production%20Handbook](http://teca.fao.org/sites/default/files/technology_files/Farmers%20Dairy%20Goat%20Production%20Handbook)
- Introduction of high quality male goat (buck) into goat herds
- To find out goat markets in order to sell goat at higher price: Technical Measure: FM-10 Market Information

<b>12</b>	<b>Pig production</b>	
Purpose	To increase farmers income through improvement of breeding and management	
Target area	NCA	
Trainer	ATs and <b>Mentors</b>	
Trainee	Farmers	
Expected output	Income generation from pig production	
Work procedure	(1) Concept of pig production (2) Secure boar, training of breeding and feeding (3) Account recording (4) Feedback course	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs: Preparation of necessity tools, study of management and accounting through Mentorship</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Preparation of necessity tools, study of recording, housing ,feeding , breeding , vaccination, parasite control, housing and etc. preparation of necessity tools through Mentorship</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s):  At the first stage: Improvement of present housing, feeding and food stuff preparation perfectly , breeding and disease control actions</p> <p>The next: Introduction of exotic /F1 female pigs, mating with exotic male(if possible), selection of superior pigs for breeding</p> <p>By ATs &amp; Farmers: Feedback course , Plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Farmer number of pig production(nos.)</li> <li>➤ Total pig number(nos.)</li> <li>➤ Breeding record</li> <li>➤ Accounting record</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Exotic boars and exotic and/or F1 female pigs</li> <li>➤ Manual of pig production</li> <li>➤ Fund to purchase materials</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> <li>➤</li> <li>➤</li> </ul>

**(1) Concept of pig production**

The obstacles of pig production are limited breeding materials (male and female) and insufficient facilities. Purchasing of exotic breed (from import or domestic market) and partnership with private farms are necessity in order to increase pig production.

To be assigned by ATs and Mentors:

- Preparation of necessity tools
- Study of recording, housing, feeding, accounting, breeding, disease control, and housing through Mentorship

To be assigned by farmer(s)/group(s):

- Preparation of necessity tools
- Study of recording, housing, feeding, accounting, breeding, disease control, and housing through Mentorship

**(2) Secure boar, training of breeding and feeding**

To be assigned by farmer(s)/group(s):

At the first stage:

- Housing improvement of present housing
- Feeding and food stuff preparation perfectly
- Breeding and disease control actions

The next:

- Introduction of pure exotic or F1 female pigs
- Introduction of exotic boar for mating and pregnant of sows (female pig)
- Selection of superior pigs from delivery sows for breeding
- Study of accounting and breeding record

**Table: Inputs for each pig house site**

	Items	Unit	Number	Price	Remarks
Tools	Continuous Vet injector	1	1		
	Needle	10	5		
	Cotton	100g	3		
	Surgical scalpel	1	1		Castration
	Scalpel blade	20	1		Castration
Drugs	Oxytetracycline	100ml	5		
	Penicillin Long Act	100ml	5		
	Ivermectin	100ml	3		Parasite control
	Vitamin AD <sub>3</sub> E	100ml	3		
	Surgical sprit	500ml	1		Sterilization



	
Pig farm	Local pig farm

### (3) Account recording

On OJT, breeding record would be so important and accounting record becomes the base of pig production business.

### (4) Feedback course

By ATs , farmers/groups and Mentors: Feedback course should discuss concerning advantage and disadvantage of pig production and the next year plan.

### Further information

- Pig farming: Sustainable Livelihoods for Rural Youth Project: Breeding and keeping pigs for income and food in the Solomon Islands
- Farmer's Hand Book on Pig Production (For the small holders at village level: FAO
- Based on possible food supply , farmers improve current pig house although it is difficult to start commercial pig farm at present
- To share cost with members to purchase better male pig (boar) with farmers if a farmer is impossible to introduce boar by himself and to collect charge of mating
- Production of fodders such of beans and grains by themselves because of high price of feed at markets
- Production of self-made feed with millet bran , Lucerne and etc.: Technical Measure: LS-1 Fodder production

<b>13</b>	<b>Chicken production(indigenous)</b>	
Purpose	To promote chicken production and increase income	
Target area	NCA	
Trainer	ATs and <b>Mentors</b>	
Trainee	Farmers	
Expected output	Income generation from chicken production and skill-up from indigenous to modern poultry	
Work procedure	(1) Concept of chicken production (2) Lecture concerning management of housing , feeding , health, breeding and marketing (3) Monitoring , OJT and account recording (4) Feedback course	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs and <b>Mentors</b>: Study of chicken raising, recording, brooding, rearing, vaccination, medication, parasite control, feeding, housing and etc.,preparation of necessity tools with Mentorship</p> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Study of chicken raising, recording, brooding, rearing, vaccination, medication, parasite control, feeding, housing and etc., preparation of necessity tools with Mentorship</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s): Study of chicken raising: recording, brooding, rearing, vaccination, medication, parasite control, feeding, housing and etc., preparation of necessity tools with Mentorship</p> <p><b>By ATs &amp; Farmers:</b> Feedback course , Plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Farmers numbers with chicken and without chicken(nos.)</li> <li>➤ Sales of chicken and eggs, consumed number of chicken and eggs(nos.)</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Chicken raising manual</li> <li>➤ Management record</li> <li>➤ Account record</li> <li>➤ Disease control drugs</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> <li>➤</li> <li>➤</li> </ul>

#### (1) Concept of chicken production

Based on limited breeding materials (insufficient supply agent), insufficient experience in ATs and farmers for brooding and rearing is the obstacles of chicken raising. However, the establishment of chicken supply chain from parent's stock, egg and chick production is too difficult in Namibia at present. Indigenous brooding and rearing techniques therefore will be rather acceptable for farmers.

Modern poultry requires constant supply of pure chicks and food perfectly. In NCA, since it is very difficult to receive such constant supply, farmers and /or groups should start from indigenous poultry. They can shift easily from indigenous poultry to modern poultry if they gain managing skills of indigenous poultry.

To be assigned by ATs and Mentors:

- Study of chicken raising, recording, brooding, rearing, vaccination, medication, parasite control, feeding, housing and etc.
- Preparation of necessity tools with Mentorship

**Table: Inputs for each poultry site**

	Items	Unit	Number	Price	Remarks
Tools	Plastic Syringe(5~10ml)	10	1		
	Needle	10	5		
	Spray 500ml	1			
Drugs	New-castle-disease vaccine	100ml	2		
	Anti-parasite drug	500ml	1		Deworming
	Ivermectin	100ml	1		Deworming

**(2) Lecture concerning management of housing , feeding , health, breeding and marketing**

To be assigned by farmer(s)/group(s):

- Study of chicken raising, recording, brooding, rearing, vaccination, medication, parasite control, feeding, housing and etc.
- Preparation of necessity tools with Mentorship

**(3) Monitoring , OJT and account recording**

To be assigned by farmer(s)/group(s):

- Study of chicken raising, recording, brooding, rearing, vaccination, medication, parasite control, feeding, housing and etc.
- Preparation of necessity tools with Mentorship
- Monitoring: production of eggs and chicks, mortality rate, disease, medication, sold number, feeding and breeding management
- OJT through regular visiting of chicken raising farmers

**(4) Feedback course**

By ATs, farmers/groups and Mentors:

- Feedback course to discuss concerning advantage and disadvantage of indigenous poultry production
- The next year plan

**Further information**

- Keeping Village Poultry: A technical manual on small-scale poultry production: Network for Smallholder Poultry Development
- Improving village chicken production: Manual for field workers and trainers: ACIAR
- Indigenous chicken production manual: Kenya Agricultural Research Institute
- Self-made feeds with legumes such Lucerne as high protein mineral-rich feed : Technical Measure: Fodder Production

<b>LS-14</b>	<b>Promotion and strengthening of Auction for both large and small stocks</b>	
Purpose	To promote auction for cattle and goat in order to increase farmers' income and meat production	
Target area	NCA	
Trainer	ATs (auction) working with livestock cooperatives for auctions	
Trainee	ATs and Farmers	
Expected output	Increasing of farmers' income through auction and increasing of formal meat production through abattoir	
Work procedure	(1) Concept of promotion and strengthening of Auction for both large and small stocks (2) Review of current auction (3) Implementation of large and small stocks auction (4) Feedback course	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs(auction): Setting of auction implementation plans: how to improve auction system by linkage development, how to introduce goat suction system, what is the point to attract participant into auction (distance, frequency of auction, prices, convenience and etc.)</p> <p><b>From Sept.</b> to be assigned by ATs and farmer(s)/group(s): Setting of auction implementation plans :how to improve auction system by linkage development, how to introduce goat suction system, what is the point to attract participant into auction (distance, frequency of auction, prices, convenience and etc.)</p> <p><b>Implementation:</b> to be assigned by ATs and farmer(s)/group(s): Setting of auction implementation plans: how to improve auction system by linkage development, how to introduce goat suction system, what is the point to attract participant into auction (distance, frequency of auction, prices, convenience and etc.)</p> <p>By ATs &amp; Farmers: Feedback course , plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Participant numbers for auction(nos.)</li> <li>➤ Dealt cattle and goat number (nos.)</li> <li>➤ The rate of dealing (% of in auction and out auction: nos.)</li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤ Balance 50kg in each livestock auction places</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤</li> </ul>

**(1) Concept of promotion and strengthening of Auction for both large and small stocks**

In auctions in NCAs, there is an insufficient matching between buyers and sellers and it holds auction just for cattle. It needs to start auction both for cattle and goats and strengthen the activity of auction to attract many

farmers and buyers to join auctions..

## **(2) Review of current auction**

To be assigned by ATs (auction): Setting of auction implementation plans

- How to improve auction system by linkage development
- How to introduce goat suction system
- What is the point to attract participant into auction (distance, frequency of auction, prices, convenience and etc.)
- What is the needs to prepare for small stocks

To be assigned by ATs and farmer(s)/group(s): Setting of auction implementation plans

- How to improve auction system by linkage development
- How to introduce goat suction system
- What is the point to attract participant into auction (distance, frequency of auction, prices, convenience and etc.)
- What is the needs for small stock

## **(3) Implementation of large and small stocks auction**

To be assigned by ATs and farmer(s)/group(s): Setting of auction implementation plans

- Setting of balance for small stocks
- How to improve auction system by linkage development
- How to introduce goat suction system
- What is the point to attract participant into auction (distance, frequency of auction, prices, convenience and etc.)

## **(4) Feedback course**

By ATs (auction), ATs and farmer(s)/group(s): The results of large and small stock auction, the advantage and disadvantage of large and small stock auction, points to be improved, the next years plan

## **Further information**

CBRLM: livestock cooperatives and auction by GOPA

## **Feedback from Pilot Site Activities in Phase-2**

Not to be applied in Phase-2

<b>LS-15</b>	<b>Development of formal market for small stock</b>	
Purpose	To promote market for small stock in order to increase formal market and increase farmers' income and meat production	
Target area	NCA	
Trainer	ATs (auction) and members of livestock cooperatives	
Trainee	ATs and Farmers	
Expected output	Increasing of farmers' income through formal market of small stock and produce formal meat	
Work procedure	(1) Concept of development of formal market for small stock (2) Review of current markets for small stock (3) Implementation of small stock market (4) Feedback course	
Work plan	<p><b>July to Aug.</b> to be assigned by ATs (auction) and members of livestock cooperative: Setting of marketing implementation plans: where is convenient to start formal market of small stock, how to improve formal system, how to introduce market system of small stock, what is the point to attract participant into markets (distance, frequency of auction, prices, convenience and etc.)</p> <p><b>From Sept.</b> to be assigned by ATs and farmer(s)/group(s): Setting of marketing implementation plans: where is convenient to start formal market of small stock, how to improve marketing system, how to introduce market system of small stock, what is the point to attract participant into markets (distance, frequency of auction, prices, convenience and etc.)</p> <p><b>Implementation:</b> to be assigned by ATs and farmer(s)/group(s): Setting of marketing implementation plans: where is convenient to start formal market of small stock, how to improve auction system by linkage development, how to introduce goat suction system, what is the point to attract participant into auction (distance, frequency of auction, prices, convenience and etc.)</p> <p>By ATs &amp; Farmers: Feedback course , plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Established or improved small stock markets (nos.)</li> <li>➤ Participant numbers for markets(nos.)</li> <li>➤ Dealt number of small stock (nos.)</li> <li>➤ The rate of dealing (% of in auction and out auction: nos.)</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Balance 50kg in each livestock market places</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤</li> <li>➤</li> </ul>

**(1) Concept of development of formal market for small stock**

In NCAs, there is an insufficient formal market for small stock so this condition highly prevents farmers to sell their small stock products to formal market. If markets of small stock can offer suitable prices and convenient distance from farmers' households, farmers raise their awareness to sell small stock products in the markets.

## **(2) Review of current markets for small stock**

To be assigned by ATs (auction) and members of livestock cooperatives: Setting of marketing implementation plans

- Where is convenient to start formal market of small stock
- How to introduce formal market system of small stock
- What is the point to attract participant into markets (distance, frequency of auction, prices, convenience and etc.)

To be assigned by ATs and farmer(s)/group(s): Setting of marketing implementation plans

- Where is convenient to start formal market of small stock
- How to introduce formal market system of small stock
- What is the point to attract participant into markets (distance, frequency of auction, prices, convenience and etc.)

## **(3) Implementation of formal marketing of small stocks**

To be assigned by ATs and farmer(s)/group(s): Setting of market implementation plans

- Where is convenient to start formal market of small stock
- How to introduce formal market system of small stock
- What is the point to attract participant into markets (distance, frequency of auction, prices, convenience and etc.)

## **(4) Feedback course**

By ATs (auction), ATs and farmer(s)/group(s): The results of small stock marketing , the advantage and disadvantage of formal small stock marketing , points to be improved, the next years plan

## **Further information**

CBRLM: livestock cooperatives and auction by GOPA

## **Feedback from Pilot Site Activities in Phase-2**

Not to be applied in Phase-2

<h1>16</h1>	<h2>Establishment and strengthening livestock cooperatives</h2>	
Purpose	To accelerate livestock cooperative activities	
Target area	NCA	
Trainer	ATs, Meat Board, regional cooperative and <b>Mentors</b>	
Trainee	Farmer groups ( new group of establishment and /or established cooperative of strengthening)	
Expected output	To activate group activity in many fields not only livestock	
Work procedure	<p>(1) Concept of livestock cooperatives</p> <p>(2) Preparation of establishment, pre-establishment training : account recording, the organization chart,</p> <p>(3) OJT and report of income and expenditure balance</p> <p>(4) Feedback course</p>	
Work plan	<p>Main point is what kind of activities the members require.</p> <p><b>July to Aug.</b> to be assigned by ATs Meat Board, regional cooperative and <b>Mentors</b>:</p> <ul style="list-style-type: none"> <li>-Selection of sites and farmer(s)/group(s) : new or/and established cooperative</li> <li>-Study of organization management and accounting,</li> <li>-Preparation of necessity tools</li> </ul> <p><b>From Sept.</b> to be assigned by farmer(s)/group(s): Role of the cooperative, study of organization management and accounting(through Mentorship), new business to operate in future, preparation of necessity tools</p> <p><b>Implementation:</b> to be assigned by farmer(s)/group(s): Discussion in cooperative concerning activities at present, selection of persons to organize the cooperative (President, Vice-president, Accountant etc.), research of new business :grain trading, livestock breeding and fattening, fodder production and sales, veterinary drug pharmacy, accounting and monitoring</p> <p><b>By ATs, Meat Board, regional cooperative, Mentors &amp; Farmers:</b> Feedback course , plan for next year</p>	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ The number of members (nos.)</li> <li>➤ Income and expenditure balance(N\$)</li> <li>➤ <b>Different trials as the cooperative</b></li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤</li> <li>➤</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤ FORM xxx</li> <li>➤</li> </ul>



*Attachment 2-3*

*Technical Sheet for*

*Farm Management*

*N-CLIMP*

<b>FM-1</b>	<b>Household Accounting Management</b>	
Purpose	To secure farming business by correct fund management	
Target area		
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers	
Expected output	Farmers can manage their funds correctly	
Work procedure	(1) Concept of account management (2) Income and Expense record (3) Cash flow budget (4) Feedback course	
Work plan	This techniques will be applied during master plan period (short term)	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Number of farmers keeping records</li> <li>➤ Number of farmers participating feedback course</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Projector/Laptop Computer: 1</li> <li>➤ Hand-out: 1/person</li> <li>➤ Notepad and pen: 1/person</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤</li> <li>➤</li> <li>➤</li> </ul>

### (1) Concept of account management

The existence of any farming practice is depending on the flow of money or funds, which makes it very important that these funds are managed correctly so that the business is secured for the future. The best possible way for doing this is with a financial management system. True and measurable information is gathered from sound financial management practice, which will give a true reflection of the success of the business. It will also assist the farmer with future planning and problem identification.

The proposed system first of all needs to be effective, simple and easy to implement. The farmer should be able to gather the information during his daily financial activities and record only the basic information into the system. Furthermore the system must assist the farmer to do financial planning on a monthly, quarterly and yearly basis. The farmer thus does an activity plan and commits certain costs and incomes to these activities. The two basic records proposed were the "Income and Expense record" and the "Cash Flow Budget".

### (2) Income and Expense record

Income and expense record is compiled according to each farmer's needs. The record needs to include all individual expenses and incomes occurring every day of the year. The date, the amount and the reason for the expense should be noted. There entries are then added up and put in the cash flow budget under the actual expenses or incomes on a monthly basis.

### **(3) Cash flow budget**

The cash flow budget is drawn up at the beginning of every financial year and is estimated for twelfth months in advance. The budgeted amounts must be as realistic and accurate as possible. The information needed to compile this budget must be taken from the previous year's income and expense records, the taxation return records and the experience of the farmer, as well as the previous year's cash flow budget.

### **(4) Feedback course**

One year later, feedback course will be organized to strengthen the understanding of the farmers. In addition, several semi-commercial farmers will be invited to show their inputs as examples of more practical farmers.

### **Feedback from Pilot Site Activities in Phase-2**

Not to be applied in Phase-2.

### **Feedback from Pilot Site Activities in Phase-3**

Not to be focused in ToT n Phase-3.

However, basic accounting management at household level is discussed within the framework of FM-2: Farm Record. Training materials for ToT also included example of simplified accounting system. Through monitoring, it is observed that there are some farmers who keep accounting issues in their farm records.



**FM-1 Attachent02 Form of Cash Flow Budget**

Cash Flow Budget																								
Name:																			Year:					
Item	April		May		June		July		August		September		October		November		December		January		February		March	
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
Livestock																								
Crop																								
Vegetable																								
Pension																								
<b>Gross income (A)</b>																								
Expense																								
Labor																								
Fuel																								
Supplemantary feed																								
Feedstuff																								
Medication																								
Electricity																								
Licenses																								
Telephone																								
Banking costs																								
Sundries																								
VAT																								
<b>Gross expense (B)</b>																								
A-B (Excess or Loss)																								
Agribank																								
<b>Subtotal EXPENSE (C)</b>																								
A-C (Excess or Loss)																								
Capital																								
New improvements																								
Income Tax																								
<b>Subtotal EXPENSE (D)</b>																								
A-D (Excess or Loss)																								
Interest																								
<b>Subtotal EXPENSE (E)</b>																								
A-E (Excess or Loss)																								
House / Private																								
<b>Subtotal (F)</b>																								
A-F (Excess or Loss)																								

<b>FM-2</b>	<b>Record Keeping (Farm Record)</b>	
Purpose	To impart the knowledge of record keeping for farm record to calculate cost and profit for sound farm management To motivate farmers to the way of crop / livestock production with “business-minded” attitudes	
Target area		
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers	
Expected output	Farmers understand their cost of agricultural input and feedback to next cropping	
Work procedure	(0) Preparation for Record Keeping: Conceptual Notes for ATs (1) Exchange of Experience, Findings and Benefits of Farm Records (2) Basic knowledge for keeping record (3) Analysis of result	
Work plan	Training should be done before cropping season starts.	
Main monitoring item	➤ Number of farmers who keep records ➤ Their ways of record keeping, contents (Please see the monitoring sheet attached)	
Materials and Sample Formats	<b>Necessary Materials</b> ➤ Flip Chart (for demonstrating ways of record keeping) ➤ Notebook and pen: 1/person <b>Additional materials</b> ➤ Hand-out (Example of Farm Record Formats): 1/person	<b>Formats</b> ➤ ➤ ➤

### (0) Preparation for record keeping

In case where farmers are not well accustomed with the record keeping, it is advisable to introduced minimized way of record keeping. There are two concepts for preparation; 1) Dual Comparison (such as In and Out), and 2) Chronological Comparison (along with dates / calendar).

#### 1) Dual Comparison

A note book can be used simply for comparing two aspects such as before & after, cash-in and cash-out, etc.

For example, a notebook for farm record keeping can be used as a simplified account book and records as seen below.

#### 2) Chronological Comparison

A notebook can be used for “memo-taking along dates”. A calendar with wider space can be alternative. In the memo or on calendar, a farmer may write weather, activity or growth of products. A simplified record can be seen below.

**Example of Two-Page Notebook for One Week Activity and Accounting**

*Left: Out*

*Right: In*

Activities and Costs of this week		Cost (N\$)	Sales of this Week		Profit (N\$)
12 Jan	Went to Market (bus fees)	150	12 Jan	Cabbage x 10 Carrots 4 Kg	400 360
14 Jan	Went to Market	150	14 Jan	Cabbage x 6 Peppers 1 Kg	240 200
16 Jan	Paid Water Fee	500	16	Peppers 1 Kg (at home)	160
18 Jan	Net bags for Carrots selling (50)	100			
Total Paid in this week		900	Total Gained in this week		1,360

**Example of Calendar-Like Notebook for Memo-taking on weather, activity and growth**

Date		Weather	Pepper
14 Nov	Mon	Rain	
15 Nov	Tue		about 10 cm
16 Nov	Wed	Rain	
17 Nov	Thu		(fertilizer applied)
18 Nov	Fri		
19 Nov	Sat	Rain	
20 Nov	Sun		
21 Nov	Mon		About 15 cm
22 Nov	Tue		Buds found

**<The needs of observing the current activities by farmers>**

Before conducting training on farm record, ATs are advised to observe the current activities of farmers both at field level and for record keeping.

For example, if a farmer has not done any record keeping, it is better to understand the reasons why they do not keep records. In case that they are illiterate, it is better to understand how they remember the activities in past and how they remember planned activities in future. In case that there is no problem for these things, there is no need to force them to start from alphabetization.

There is no "best" way of record keeping which can be applicable to everybody. It is advised to start with easiest thing or motivating thing.

For example, if crop production is main activity, recording rain fall in a calendar can be a good choice. The recording rain fall is, connecting real situation that is measurable and farmers' action, "record-taking". Raining can remind them the needs of recording. As most cases in North Central Division of Namibia, rain fall is accepted as a good thing. Therefore measuring, recording and keeping records on rain fall can be a good start of their record activities.

If the farmer is interested in marketing, the price and timing of selling need to be added to their simple memo. If a farmer is interested in proper management of cost and benefit, the accounting issues should be included.

## (1) Exchange of Experience, findings and Benefits of Farm Records

For the record keeping, the most important issue can be understanding of benefits by farmers. Therefore prior to the explanation of technical knowledge and skills of record keeping, it is advised that farmers exchange their experience in relation to farm records.

The exchange meeting may be ideally facilitated to the following points:

- Experience of problems faced with the lack of information of farming activities in past
- Experience of use of information of farming activities in past
- Experience of use of records for farming

The last part, discussion on "experience of use of records for farming" is expected to lead to the discussion of benefits of record keeping.

It is recommended that all participants are among discussions rather than a few participants who have already done recording keep talking.

## (2) Basic knowledge for record keeping

Farm records are needed to determine resource use efficiency, which in turn indicates whether the farm business is profitable or not. Farm records give us the idea about our all expenses which occurred during the farm operations. A good farm record system should provide necessary, accurate and updated information.

The following table show the essential commodities which are to be recorded in the worksheet.

List of commodities	
1	Seed
2	Farm Yard Manure
3	Vermicompost
4	Chemical fertiliszer
5	Agro-Chemicals
6	Pump for splay
7	Labour cost
8	Tractor hiring

Cost of all these commodities should be recorded in the worksheet.

The other information to be recorded is:

**1. Seed:** Note the variety, date of sowing, quantity, price etc.

**2 & 3. FYM/Vermicompost:** Rate/kg or q, quantity etc.

**4. Chemical fertilizers:** Price, quantity, how much fertilizer you applied to particular crops and actual cost involved in it etc.

**5. Agro chemicals:** In case of agro chemicals, note the price, quantity and how much time you spent for spray and actual cost of application etc.

**6. Pump for spray:** Actual cost, depreciation and labour cost involved for spray operations etc.

**7. Labour cost:** Note the actual cost of labour used for various operations.

**8. Tractor hiring:** Note the actual hours of ploughing, rate/unit etc.

At the end of the harvesting season the actual cost of production/ cultivation should be calculated.

## (3) Analysis of result

With the help of outcome obtained from cost of cultivation for next season plan can be developed.

Tips: If the results are fruitful then you can proceed for the same agronomic practices and crops, but, if there is some problem or loss then you can think to overcome the problem and decrease the expenses. According to results of your analysis, make necessary changes or adjustments in existing cropping plan or crop rotations to improve the returns or net profit.



Tips: You can change/adjust the sowing time by keeping in mind the time of maximum market prices of each crop.

### Feedback from Pilot Site Activities in Phase-2

This technique was introduced in all 16 sites in Phase-2. The following table summarizes the activities taken through trainings in pilot site activities.

1st Training (Nov. 2015)	- A notebook was given to each target farmers for record keeping. - Explanation was made that whatever they have done for agricultural related activities they have to take note every day. For example, the date and cost for tractor hiring for land preparation, amount and cost for seed purchased for this cropping season, number and unit cost of labor for weeding, etc.
2nd Training (Nov. to Dec. 2015)	- An observation was made that there are big difference of the level of understanding for book keeping. Although few farmers keep record very well, most of them record insufficiently.
3rd Training (Feb. 2015)	- Formats corresponding to each techniques and technical measures were prepared in local language and distributed to make easy for record keeping.
4th Training (Apr. 2015)	- An observation was made that some farmers continue to use black book, while some started recording by use of new formats. There are still certain number of farmers who haven't take note at all.

### Feedback from Pilot Site Activities in Phase-3

#### <ToT implementation on Farm Record>

This technique was re-introduced in the first ToT with the confirmation that ATs need to observe the farmers current implementation of record keeping as noted in (0) Preparation for record keeping. The emphasis was put on the step-by-step approach respecting farmers' initiatives and interests.

As noted above, simplified ways such as Dual Comparison and Chronological Comparison were offered as alternation to solid forms provided in Phase 2.

#### <Monitoring of Farm Record>

In Phase 3, the emphasis was also put on the needs of monitoring. It was also advised that monitoring needs to be the ways of communication for further improvement of farm management, not only record keeping nut as "business-oriented" management of farming.

The forms made for farm record in Phase 2 are shown below.

The monitoring forms proposed in Phase 3 is seen at the end of the farm record forms.

FM-2 Attachment01 Form of Cereal Growth

Farm Record for Cereal Grains		
Name of Farmer _____ ADC, Constituency: _____		
Standard Action	Date / By whom?	Remarks
<b>Basal Fertiliser:</b> 2nd last week November (to be procured and applied by farmer)		Dosage: _____ kg/ha of manure in _____ kg/ha of fertiliser in treatment of plot
<b>Land Preparation:</b> Last week of November (to be arranged by AT, to be conducted by service provider)		Treatment plot: Ripper furrowing Control plot: Usual method
<b>Planting:</b> After rainfall of more than 20 mm in 3 days		Seed volume _____ kg / ha Seed treatment, Pregermination
<b>2nd Planting:</b> (Replanting)		
<b>3rd Planting:</b> (Replanting)		
<b>1st Thinning:</b> 10 days to 2 weeks after germination		Selection of healthy seedlings, removal of weak seedlings. Plant density: 7 to 8 plants / m 3 to 5 plants / m
<b>1st Weeding:</b> 2 to 3 weeks after germination		Depending on weed growth.
<b>Top Dressing:</b>		3 weeks after germination.
<b>2nd Thinning:</b>		Selection of healthy seedlings, removal of weak seedlings.
<b>2nd Weeding:</b> 4 to 6 weeks after germination		Depending on weed growth.

**FM-2 Attachment02 Form of Horticulture Crop Growth**

<b>Farm Record for Horticulture Crops</b>		
Crop type: _____		
Name of Farmer (Group) ADC, Constituency: _____		
<b>Standard Action</b>	<b>Date / By whom?</b>	<b>Remarks</b>
<b><u>Seed Preparation:</u></b>		
<b><u>Seedbed Preparation:</u></b>		Depth of ploughing: _____ Fungicides and pesticides applied before sowing/transplanting: _____
<b><u>Seedlings in nursery:</u></b>		
<b><u>Direct sowing in seedbed:</u></b>		Plant Spacing: _____ Row Spacing: _____
<b><u>Seedlings Transplanting:</u></b>		Plant Spacing: _____ Row Spacing: _____
<b><u>Sunlight Protection:</u></b>		Young plants must be protected, not completely covered
<b><u>Fertiliser application:</u></b>		Type: _____ How much: _____
<b><u>Pest Control:</u></b>		Type: _____ How much: _____
<b><u>Mulching:</u></b>		Mulching in rows between seedlings and between plants
<b><u>1st Weeding:</u></b>		Depending on weed growth.
<b><u>Top Dressing:</u></b>		
<b><u>2nd Thinning:</u></b>		Selection of healthy seedlings, removal of weak seedlings.
<b><u>2nd Weeding:</u></b>		Depending on weed growth.
<b><u>3rd Weeding:</u></b>		Depending on weed growth.
<b><u>Pest Control:</u></b>		

**FM-2 Attachment03 Form of Rainfall**

**Annual Rainfall Records in mm**

Rainfall at: \_\_\_\_\_ (Name of Farmer, ADC, Constituency)

Day	2015			2016								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
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24												
25												
26												
27												
28												
29												
30												
31												
Total:												
<b>Grand Total for year</b>												

**FM-2 Attachment04 Form of Fuel for Pump**

<b>Farm Record for Fuel (Running Pumps)</b>		
Name of Farmer (Group) ADC, Constituency: _____		
<b>Date of Fuel Purchased</b>	<b>By whom</b>	<b>How much?</b>
		_____ litres _____ N\$
		_____ litres _____ N\$
		_____ litres _____ N\$
		_____ litres _____ N\$
		_____ litres _____ N\$
		_____ litres _____ N\$
		_____ litres _____ N\$
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		_____ litres _____ N\$
		_____ litres _____ N\$

**FM-2 Attachment05 Form of Electricity for Pump**

**Farm Record for Electricity**

Name of Farmer (Group)

ADC, Constituency: .....

Date of Electricity Purchase	By whom	How much?
		_____ Units _____ N\$
		_____ Units _____ N\$
		_____ Units _____ N\$
		_____ Units _____ N\$
		_____ Units _____ N\$
		_____ Units _____ N\$
		_____ Units _____ N\$
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		_____ Units _____ N\$
		_____ Units _____ N\$

**FM-2 Attachment06 Form of Tap Water**

<b>Farm Record for Water</b>
------------------------------

Name of Farmer (Group)  
 ADC, Constituency: .....

Date of Reading	By whom	How much?	Price?
		..... Units	..... N\$
		..... Units	..... N\$
		..... Units	..... N\$
		..... Units	..... N\$
		..... Units	..... N\$
		..... Units	..... N\$
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		..... Units	..... N\$















FM-2 Attachment13 Form of Cow Record

Cow Record Card							
ID (FANMEAT No.)				Name:			
Birth date:				Describe:			
Mother:				Father:			
Date first to bull:				Bull(s):			
	Calving date:	Sex:	FanMeat No:	Wean date:	Wean age:	Wean kg:	Comment
1							
2							
3							
4							
5							
6							
7							
8							
9							



FM-2 Attachment15 Form of Ewe Record

Ewe Record Card							
ID (FANMEAT No.)				Name:			
Birth date:				Describe:			
Mother:				Father:			
Date first to ram:				Ram(s):			
	Lambing date:	Sex:	FanMeat No:	Wean date:	Wean age:	Wean kg:	Comment
1							
2							
3							
4							
5							
6							
7							
8							
9							





FM-2 Attachment17 Form of Chicken Group Record (1/3)

**Poultry Vaccination: (New Castle Disease)**

<b>Before vaccination</b>	<ol style="list-style-type: none"><li>1. To calculate the numbers of chick/chicken for vaccination before Since minimum dose of vaccine is 1000, all member should ask neighbours if total numbers of chick/chicken is less than 1000</li><li>2. To keep all chick/chicken in enclosures, houses, boxes and so on to save time</li><li>3. To select accountant for vaccination activities</li><li>4. To decide the price of vaccination per chick/chicken</li><li>5. To accumulate money for vaccination to buy the next vaccination</li><li>6. To buy cooling boxes 3 or more</li><li>7. To buy syringe and needle</li></ol>
<b>To buy vaccine</b>	Who: Accountant, Leader, Others ? From Where: Pharmacy name? How :By car, taxi, bus or other ?
<b>Expenditure</b>	<ol style="list-style-type: none"><li>1. Transportation: Taxi, bus. Own car ?</li><li>2. Vaccine</li><li>3. Purchasing of cooling boxes (3 or 4), ice</li><li>4. Purchasing of syringe and needle</li></ol>
<b>At the site</b>	<ol style="list-style-type: none"><li>1. Orders for vaccination: divided into 3~4 groups</li><li>2. Numbers of vaccinators</li><li>3. Collect money for vaccination</li><li>4. Give the money to accountant</li><li>5. Keep record of vaccination ,vaccinated number,</li></ol>
<b>Accountant</b>	<ol style="list-style-type: none"><li>1. Make record of vaccination , numbers, money and etc.</li><li>2. Inform the balance to members</li><li>3. Open bank account</li></ol>





**Example Form for Record Keeping Monitoring by ATs**

(Page 1/ 2)

**1. Basic Report on Reporter**

1.1. Reporter (Name)	
1.2. Position	SAT / CAT/ AT
1.3. Date of Visit	

**2. About the Record Holder**

2.1. Region	
2.2. Constituency	
2.3. Record Holder Name	
2.4. Record Holder Mobile	
2.5. Group / Individual	Group / Individual
2.6. If Group, Group Name	

**3. About the Record**

3.1. Type of Record	Notebook (A4/A5/A6) / Paper (Format Provided)	
3.2. Keeping Duration	From (YY/MM/DD)	To (YY/MM/DD)
3.3. Main Activities	Cereal Grain / Horticulture / Cattle / Small Stock (C / G)	
3.4. Record Contents		
3.4.1.	<input type="checkbox"/> Activity Done , <input type="checkbox"/> Sales Made ( <input type="checkbox"/> Price / <input type="checkbox"/> Profit), <input type="checkbox"/> Inputs	
3.4.2.	<input type="checkbox"/> Rain Fall <input type="checkbox"/> Growth <input type="checkbox"/> Application of ( <input type="checkbox"/> Fertilisers / <input type="checkbox"/> Chemicals) <input type="checkbox"/> C/G Format <input type="checkbox"/> Horticulture Format <input type="checkbox"/> Fuel <input type="checkbox"/> Electricity <input type="checkbox"/> Water	
3.4.3.	<input type="checkbox"/> Number of Animals Exist ( <input type="checkbox"/> Number by Categories) <input type="checkbox"/> Addition by Birth <input type="checkbox"/> Addition by Purchasing <input type="checkbox"/> Reducing by Animals Death <input type="checkbox"/> Number of Animals Sold	
3.4.4.	<input type="checkbox"/> Other (Specify: _____ )	
3.5.1. Observation -1: Please select the applicable	<input type="checkbox"/> Well-kept through the above duration in the same styles <input type="checkbox"/> Some fluctuations found in the ways of recording <input type="checkbox"/> Some changes found in the style of recording ( <input type="checkbox"/> improving / <input type="checkbox"/> not improving since _____ )	
3.5.2. Observation 2: Please comment what you analyse		

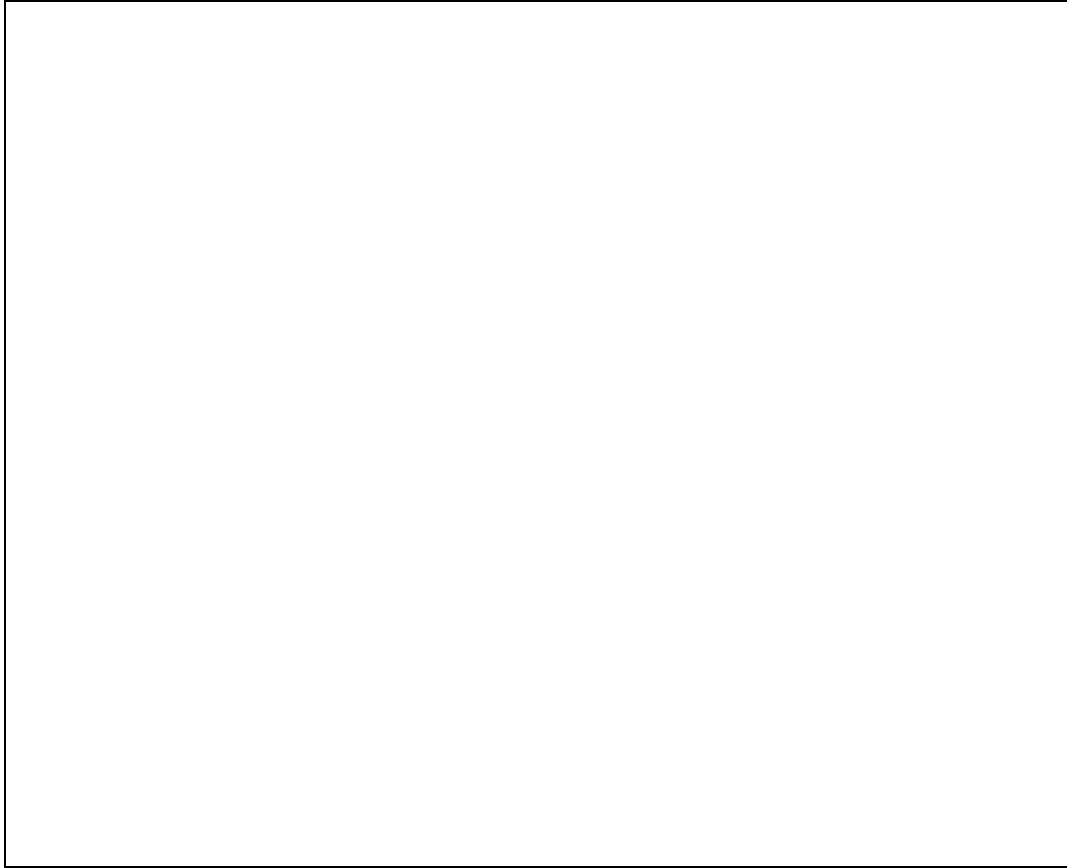
Note:

Example Form for Record Keeping Monitoring by ATs (Continued)

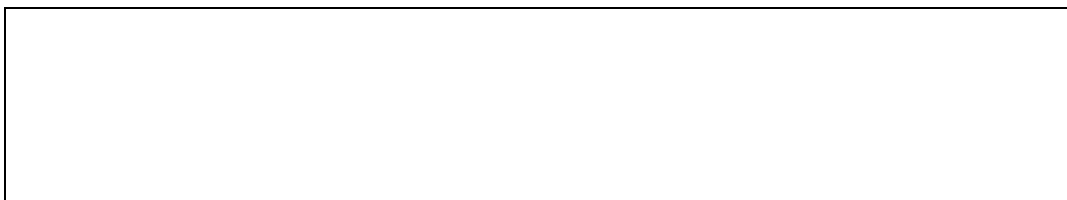
(Page 2/ 2)

**4. The Best Record Page (half of A5 =A6)**

**4.1. Photos taken**

A large, empty rectangular box with a black border, intended for pasting or drawing photos.

**4.2. Typed**

A horizontal, empty rectangular box with a black border, intended for typing text.

**5. Advised Made by ATs to Farmers on Farm Record**

A horizontal, empty rectangular box with a black border, intended for text input.

**The end of Farm Record Monitoring Sheet**

<b>FM-3</b>	<b>Post Harvest</b>	
Purpose	To let farmers understand on time harvest, sorting and grading to earn higher price in the market To impart packing techniques to preserve freshness of vegetables during transportation and to add value to produce	
Target area		
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers	
Expected output	Farmers can earn maximum profit from their products	
Work procedure	(1) Right time harvest of crops (2) Sorting and grading to add value to produce (3) Right procedure for packing and value addition by good package	
Work plan	Theoretical Training will be done before harvesting and OJT will be done at the time of harvest.	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Number of farmers keeping records</li> <li>➤ Number of farmers participating feedback course</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Processing material and equipment (to be identified based on activities)</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤</li> <li>➤</li> <li>➤</li> </ul>

### (1) Right time harvest of crops

The right time harvest includes;

1. Harvest the crop at proper maturity,
2. Harvesting should be done at cooler times of the day to minimize product heat and increase work efficiency of pickers,
3. Carefully harvest in early morning when plants are brittle and prone to damage,
4. Do not harvest during or just after rain as wet conditions favour product spoilage,
5. Carefully harvest produce to minimize physical injury and preserve quality,
6. Avoid pulling fruit to prevent removal of stem end and damage of plant and fruit for subsequent harvest, and
7. Collect vegetable crop in plastic crates, which are more advisable.

### (2) Sorting and grading to add value to produce

1. Under running water, rub fruits and vegetables briskly with your hands to remove dirt and surface microorganisms.
2. In sorting the fruits and vegetables, all the characters that influence their appearance and quality should be considered.
3. Grading is an important practice for successful marketing of fruits and vegetables. The produce is generally sorted out into different grades and attractive forms to fetch a good price from them.
4. Some fruits and vegetables are graded according to their maturity, ripeness and general appearance as well.
5. Sorted produce is classified according to grades or classes based on size and maturity as dictated by markets.

6. Use only the best fruits or vegetables for storage.

### **(3) Right procedure for packing and value addition by good package**

1. Packaging protects produce from damage and serves as an effective handling unit.

Simple packaging materials are:

- Wooden boxes,
- Bamboo baskets,
- Jute bags,
- Earthen pots, and
- Corrugated fibre board boxes and crates

Protective packagings are:

- Use of liners and cushion (newsprint)
- Individual wraps,
- Vents in carton box to minimize heat buildup,
- Strapping

Other protective packaging measures:

- Use clean containers

2. If manual handling, use containers with capacity (e.g. <40 kg) that can be easily handled by an average person

3. Fill package to capacity. Do not under pack (more vibration damage) or over pack (more compression damage)

4. Immobilize produce in the container. Gently shake the container now and then to permit filling up of spaces.

5. Secure the package by proper binding or strapping

6. Pack and stack in a cool place.

7. One of the most critical factors of high product loss is due to result of poor transport conditions, rough handling, and delays.

8. If available, use refrigerated transport (like cold storage) for long transportation.

9. Other measures;

- Immobilize stacks of packages by bracing and/or strapping,
- Careful handling of packages, and
- Air suspension of trucks to reduce road shock and vibration

### **Feedback from Pilot Site Activities in Phase-2 and Phase 3**

Not to be applied in Phase-2 and Phase-3.



<b>FM-4</b>	<b>Business Plan</b>	
Purpose	To let farmers understand what business is Farmers to have idea on what type of business they want to develop	
Target area		
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers	
Expected output	Farmers can manage their funds correctly	
Work procedure	(1) Developing business strategy with possible market (2) Pricing of the products (3) Record keeping in sales management	
Work plan	This techniques will be applied during master plan period (short term)	
Main monitoring item	➤ Number of farmers keeping records	
Materials and Sample Formats	<b>Necessary materials</b> ➤ Projector/Laptop Computer: 1 ➤ Hand-out: 1/person ➤ Notepad and pen: 1/person	<b>Formats</b> ➤ ➤ ➤

### (1) Developing business strategy with possible market

Planning is an important element in small business development. Many small businesses cannot compete with larger businesses in wider markets. Their quality and outlook is not good enough in the initial face. Here they need to understand their strength and weaknesses compared to the opportunities and threats available in the market place.

It will be also good to have their achievement goal in terms of their income/profit. For example, they can mention in their business goal that they will earn N\$. 20,000 per year in three year time. Activities that deal with cultivation and processing are influenced by season and whether. The farmers should be able to plan in consideration of those factors.

Business is different from production for home consumption. For business production, they should have responsibility to produce that meet the cost the consumer pays to the products. Business is highly based on reliability and demands of the consumers. Producers shall not produce what they want to produce but what customers want to buy.

A small producer in a rural village has different markets to link, such as village level market, wholesales, market in towns and cities. At their first market, which could be most likely at village level, customers wants only a good product at an affordable price, where they are not worried about packaging, labeling, or brand name registration etc. But when they move into higher market, requirements of higher quality, attractiveness, and certification etc shall come in. They should be able to segment the markets and assess how to link with each level of markets and what improvements they need to do to meet consumers' demand in each market component. There are also many barriers to entry in each market component and the trainer should be able to give strategies to overcome barriers to entry.

Farmers to run a small enterprise, they should plan in consideration of the necessary investment and expected income. Depending on their business plan and estimated profit, they can decide how much of the profit can be utilized for

re-investment to develop their activity further. It is important to consider to keep some amount aside for reinvestment that is necessary for sustainability and scaling-up of their activities.

## **(2) Pricing of the products**

To price the product, they will add a profit margin that will be operational and development. Operational should be taken on a daily production basis and development should be retained for expansion. The margins on the above two components should be decided taking the market prices on similar products. If the market prices are less than what they would arrive at because in some other places there would be more economics of scale than a small manufacture, then they should add value to their products such as handmade or true products of area etc, which will derive a premium to their products and the buyer will not mind paying for added value. However, the pricing should be kept constant and not vary as is often the case that the regional small producer is so eager to get money into their hands that they would even sell at a loss with the shorter version and will not sustain for a longer period.

The following factors should be considered in pricing;

Cost: Does the price cover all the cost?

Profit: Can it generate income from the production?

Market price: Is the price fair for target customers?

Are people willing to buy with the set price?

Is the price competitive with other similar products?

Sustainability: Does the price cover capital for reinvestment to develop production?

## **(3) Record keeping in sales management**

Apart from the book keeping, it is necessary to keep record of sales of the day. After checking the stock, all the products in the shop/group should be recorded before start sales. Each time the products are sold, record by ticking on the record sheet.

As long as they record the items sold and handle the cash as priced properly, calculation of the earning and remaining balance can be done after closing the shop. The earning should be confirmed with the actual cash in hand and the remaining balance of the items should be confirmed with the actual products in stall before closing the day.

The record should be confirmed by the record keeper of the day and be approved by a responsible person. As long as the record is kept properly confirmed with the actual cash and products in hand, it can be managed by rotating the shop keeper among the group.

## **Feedback from Pilot Site Activities in Phase-2**

Not to be applied in Phase-2

## **Feedback from Pilot Site Activities in Phase-3**

The concept of business plan is discussed for ripper furrow planning in cereal grain, water fee collection, sharing costs, maintenance plan in horticulture pilot sites. These are discussed at stakeholder meeting-2 in August, 2016, and continued at the pilot sites.

Example of cost-benefit analysis through introduction of small-scale irrigation facilities is used for training materials for Farming Model for ToT-3.

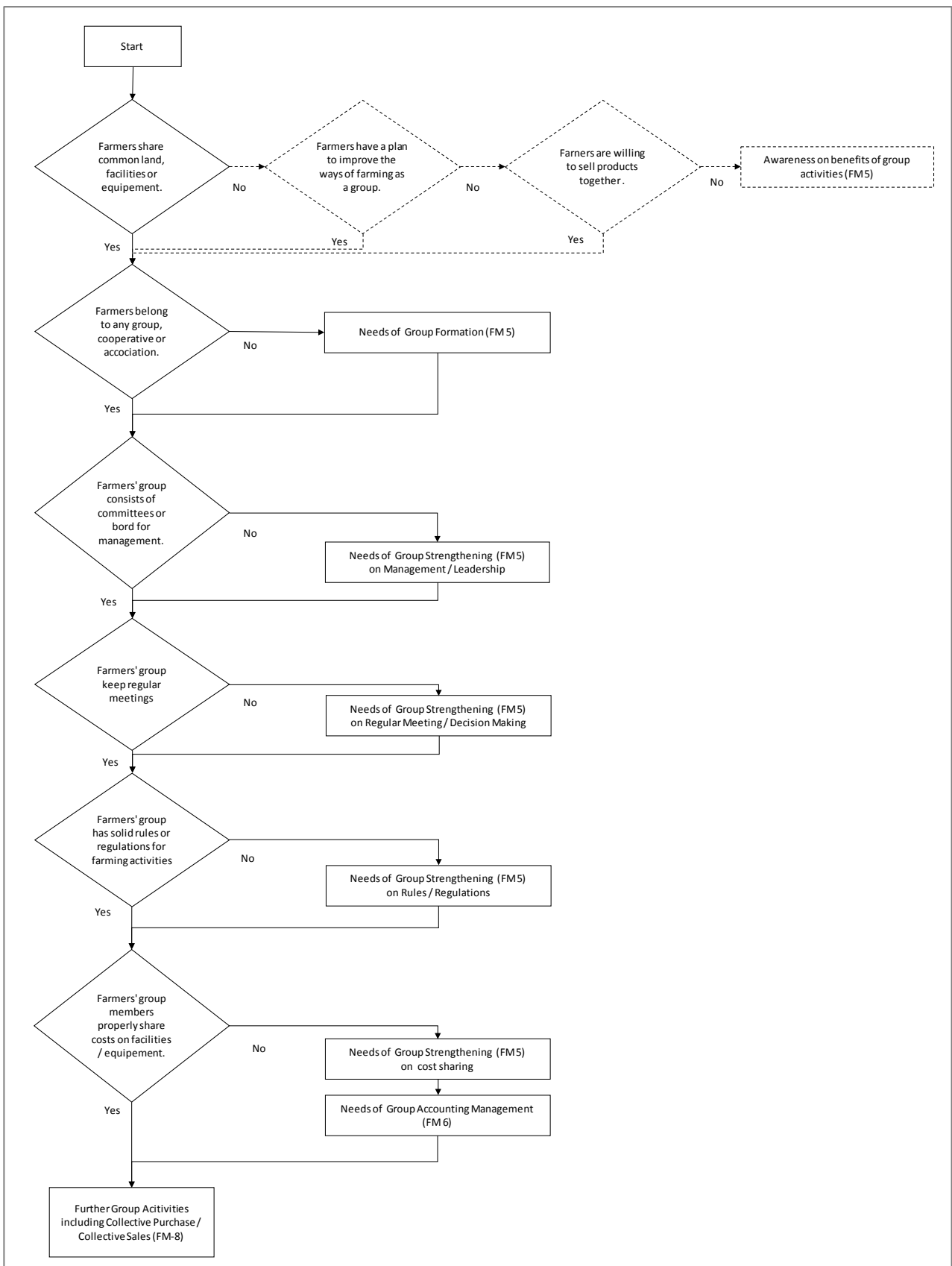


<b>FM-5</b>	<b>Group formation/ Group strengthening</b>	
Purpose	To motivate farmers to work as a group understanding advantage of being a member and benefit of group activity	
Target area		
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers	
Expected output	Farmers groups are established and well managed	
Work procedure	(0) Assistance for Group Activities in Different Stages (1) Formation of group based on the recognition of Benefits of Group Activities (2) Motivating the members (3) Establishment of the basic functions of group	
Work plan	Training should be done before cropping season starts.	
Main monitoring item	➤ Number of groups established	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Flip-charts: 1</li> <li>➤ Markers: 5</li> <li>➤ Masking Tape: 1</li> <li>➤ Hand-out: 1/person</li> <li>➤ Notepad and pen: 1/person</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤</li> <li>➤</li> </ul>

#### (0) Assistance for Group Activities in Different Stages

The ways of assistance for groups may be different according to the situation of the farmers who are to establish or strength the functions of a group. The chart in the next chart show the different aspects of assistance to a group.

In short, there is no unformal way of assistance for group establishment or strengthening. However, there are a series of issues that farmers' group need to fulfill as a functional organization.



**Assistance for Group Activities in Different Stages**

## (1) Formation of group based on the recognition of Benefits of Group Activities

Benefits of working as a group in agricultural activities are to be discussed among farmers.

For example, the following can be noted;

- Procurement as a group,
- Provision of materials,
- Helping in cultivation,
- Processing, packaging, marketing in groups,
- Maximize the utilization of the farm produce, and
- Establishing collective work environment for development of the area.

If farmers decide to form new groups, the following should be considered and facilitated in the formation.

- Respect their own relationships
  - (as they are expected to work with their own initiatives, it will be difficult if the members are not in good relations)
  - (emphasize homogeneous people? or include people from different social background?)
- Let them decide gender composition of the group
  - (consider advantage and disadvantage of women only / mix gender group)
- Consider common interest of the group members

Advantage and disadvantages of different compositions

	Advantage	Disadvantage
Homogeneous group	Easy to work collectively as they can understand their situation each other.	They tend to exclude people from other social background
Mixed with different background	The group can have diversity. Can share benefit with the underprivileged	It can cause disagreement among members and difficult to work in unity
Single gender	Women may feel more comfortable, easily express themselves, and make decision on their activities.	Women may face difficulty in getting support from their husband to participate in the group activities
Mixed gender	Heavy works can be done by men. More access to outside facilities such as wholesale market for which women feel difficult	Women may remain as follower and men tend to take decision. Division of roles may hinder women to expand their capacity.

Issues to be considered in formation

Composition of the group members plays crucial roles in operation of the group. Homogenous group can be preferable to achieve a common objective in one case. Mixed group with people from different background can be more effective in other case. It is better to consider how the group can be arranged in terms of gender balance (mix or exclusive gender composition e.g. women group in which women are more comfortable to work in unity). At the same time, special attention is needed on inclusion of people from different social classes and background to the group.

### Selecting existing groups

If existing groups are supported, it is important to assess their group. Although there may be many existing groups, some have been inactive, or others have been formed for different purposes. By getting information of the existing groups, you can judge the potentials of their activities and can consider what kind of support is necessary.

### **Examples of the information to be collected**

When was the group established?

- Has the group been registered?
- What kind of activities do they have?
- Do they have bank account?
- Are they operating inter-lending?
- Have they applied for bank loan before?
- Do they have any income generation activity?
- What kind of record do they maintain?

### **(2) Motivating the members**

The following discussions are important for motivating the members to work as a group,

A. Discuss problems faced in working alone and how through a common interest group these problems can be solved.

Benefit of working in a group

1. Habit of mutual help.
2. Platform of discussing community and personal problems and taking collective action.
3. Opportunity to start productive activities with lower risk and shared responsibility.
4. Easy access to support schemes
5. Build confidence amongst members
6. More negotiable with middlemen, bigger market

B. Discuss the bottlenecks in benefitting from the respective groups (possible constraints)

C. Discuss the areas in which the group members themselves can contribute for improvement and areas where external help is required.

Motivation for a particular action differs to different people. For example, the motivation for the group activities can be increase income for a person but for another person it can be having social relations with other women in the community. It is important to get idea from the group members what is the benefit or expectation for them to be a group member.

Introducing success stories is one of the ways to motivate people who want to implement the same. If there are several groups in the area, inspiring competitive mind is another way to motivate people, as people in the community feel like competing if others are doing well.

### **(3) Establishment of the basic functions of group**

. Necessary basic group functions include;

- Formation of rules and regulation (by-law),
- Roles and responsibilities of group members,
- How to conduct regular meetings and how to keep meeting minutes, and
- Basic financial management and group management systems.

### **Feedback from Pilot Site Activities in Phase-2**

In Phase-2, three sites for chicken production were targeted for group formation. Those farmers for chicken production group basically work individually in each homestead. However, there are several vaccines and medicines which contains for large number of birds so that buying them individually is not economic. So, in Phase-2 activities, a group was formulated in each site for sharing vaccines and medicines. In addition, group marketing is more profitable than individual sales because of bargaining power. During training, advantage of working as group was repeated and well understood by group members.

For crop production, 3 sites (1 for cereal and 2 for horticulture) were targeted for group strengthening. They are already established group, but the profiles, activities, members' motivation were very different among groups. The key for success of group strengthening is to get confidence of group members and know deeply about them. Once members open their mind and share their problems and challenges, it is important to think together with them how to solve their problems.

### **Feedback from Pilot Site Activities in Phase-3**

In Phase 3, the suitable ways of assistance for group activities according to the stages of group formation or development of organizational functions were recognized. It is also assumed that group strengthening needs to be accompanied with other technical measures such as LS-5: Disease Control, CR-6: Drip Irrigation in order to assist group activities at practical ways. It is also assumed that synergy with other farm management technical measures such as FM-6: Group Account Management, FM-8: Collective Sales / Purchasing and FM-10: Market Information Access Improvement can offer more profitable skills for farmers. The following parts explain the good practices found in Phase 3.

#### **<Working as a group for Crop (Cereal Grain) through sharing communal land >**

Members of a group in Ondobe has high functions as a group. Their meeting including confirmation of communal activity / responsibility sharing, confirmation and adoption of rules, reporting of progress, reviewing of activities, and planning for next cropping season. The responsible AT is there to facilitate the meeting, however, most of activities are conducted by members of groups through their initiative. This group has long history to work together on the communal land. This is a good example that "sharing" is a good engine to promote effective way of group activities.

#### **<Working as a group for Crop(Horticulture) for further market-oriented activities >**

Members of one of horticulture sites recognized the benefits of group activities through the implementation of market survey. After the market survey, farmers in Etunda discussed further activities as a group. The key farmers who are representatives of a cooperative shared recognized benefits of market survey with other members of cooperative. They decided to conduct market survey by themselves for possible collective selling of products.

#### **<Working as a group for Livestock (Chicken) for Disease Control>**

As noted above, farmers in the three chicken production pilot sites have been actively working through group management. In Phase 3, they managed to vaccinate against new castle disease. One out of three groups had basic help by an AT for



accounting and management for vaccination, while two other groups managed to implement most of vaccination activities by themselves, including accounting, collection of vaccination fees.

**<Working for Livestock (Cattle) for collective Periodical Production>**

A demo farmer in one of the cattle pilot sites started to work with other farmers for periodical production. Thanks to the technical assistance by the Project, they are now able to work for periodical production. This means that their calves can be treated together at one time for more effective implementation of animal husbandry activities (such as vaccination, deworming, dehorning, and castration) as the calves had been born almost all in a few months. The demo farmer confirmed the benefits of working as a group as they can assist each other, sharing the limited equipment and facilities for animal husbandry.

<b>FM-6</b>	<b>Group Account Management</b>	
Purpose	To let group members equip basic skill to budget their activities and monitor the cash flow	
Target area		
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers	
Expected output	Group member can understand basic skill for budgeting and group accounting	
Work procedure	(1) Budgeting and Monitoring of group cash flow	
Work plan	Training should be done before cropping season starts (after group formation/ strengthen training)	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Number of members</li> <li>➤ Records</li> </ul>	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Flip Chart with a marker pen</li> <li>➤ Hand-out: 1/person</li> <li>➤ Notepad and pen: 1/person</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤</li> <li>➤</li> <li>➤</li> </ul>

### (1) Budgeting and Monitoring of group cash flow

For a group for farming, for processing, or for any other purpose, simple budgeting can make their activities more fruitful, by planning financial overview of their activities. The following explains more than the group can handle. Therefore, you as Agricultural Technicians (ATs) for extension can have basic ideas and arrange to which extent we can teach groups.

#### Cost analysis

At the beginning, let the farmers to become able to identify all the direct cost of their activity as there are some costs which are somehow forgotten to be taken as a cost.

They will need to consider the following categories;

#### 1. Manufacturing Cost (costs directly assigned to a particular production)

- Direct material
- Direct labour
- Manufacturing overhead (cost for operation of manufacture)

#### 2. Non-manufacturing cost

- General administrative cost
- Sales cost (expenses that is required in the process of the marketing)

#### 3. Any other indirect cost

Example of the costs to be considered;

**Materials** – This includes raw materials, ingredient of the product, seeds, as well as packaging materials. This is the easiest to be identified, though sometimes they purchase in bulk and utilise for several different purpose.

**Equipment** – Utensils, equipment, machinery etc for production process can be identified and to be calculated as a cost.

This is a little more complicate to calculate as a cost as some can last for long and can be utilised for several times, thus need to be calculated the cost per unit of the product.

Labour cost – When the group are operating their activity purely by themselves, labour cost may not be counted as a cost but included in profit. At the stage of self helping purpose, it can be included in their profit. However, it is necessary enough to calculate wage and labour cost even of members if the group step forward to business entity or enterprise.

Other Operational cost – Cost to operate the production activity such as irrigation fee for cultivation, machine operation cost, firewood for cooking for food processing.

Administration cost – such as office stationeries, travelling cost, to keep the group function.

Marketing cost – such as transportation of products, charge of the stall or shop, cost for storage, advertisement, as well as promotion.

### **How to calculate fixed cost**

Fixed cost, which is necessary to be born regardless the amount of the product, should be calculated from the total cost divided by the number of products.

e.g. An utensil for processing, which costs N\$3,000, can serve the purpose for about 1 year, producing 10 kg of the product per month.

Calculate the cost of the utensil per products or a certain amount such as per kg.

$N\$3,000 / (10\text{kg} \times 12 \text{ month}) = N\$25 \text{ per } 1\text{kg} \text{ of the products.}$

### **<<Note>>**

It might be too complicated for the group members to understand non-manufacturing cost and indirect costs. It is better to start with simple budgeting only with manufacturing cost.

### **Monitoring of financial status**

Encourage the group to maintain a cashbook whenever they have transaction of cash (incoming and outgoing). Calculate the actual expenses against their budget, and actual income from their sales.

ATs should be well trained so that they can monitor the records and give advice to the group members.

### **Feedback from Pilot Site Activities in Phase-2**

In Phase-2, one site for horticulture production (Okatana Constituency, Oshana Region) was targeted for group accounting management. Their group has roof catchment system and its sheets need to be replaced regularly so that saving for future replacement is very important. During Phase-2, access to bank account was confirmed and members understood the importance of keeping money in the bank and share of accounting information regularly among members.

### **Feedback from TOTs and Pilot Site Activities in Phase-3**

In Phase-3, implementation of vaccination against New-castle disease of chicken is used as a case in the development of ToT materials on Group Account Management. The group accounting is assumed as effective for collective purchasing of vaccine (that is treated in FM-8).

In the teaching materials for ToT, the study team introduced the ways of calculation of vaccination fee based on the number of chickens treated (please refer the training materials in Vol III).

However, the farmers in chicken pilot sites decided to pay the same amount of money who ever joined the vaccination activities, regardless the number of vaccinated chickens. This way of simplification of account management is suitable for

farmers who have not well accustomed to group accounting. The next stage when the group's accountant can well experienced with the simplified way, detailed ways of management can be introduced.

<b>FM-7</b>	<b>Formulation of WUA</b>	
Purpose	Farmers learn how to form WUA	
Target area	All the area where water source will be constructed by the project	
Trainer	ATs	
Trainee	farmers	
Expected output	WUA is formulated based on the agreement of member farmers.	
Work procedure	(1) Organizational function of O&M of newly constructed water resource (2) Confirmation and agreement among participants in formation of WUA (3) Procedure of WUA formation and registration (4) Support to necessary administrative works on formation	
Work plan	Training should be done since the beginning of planning the construction of water source	
Main monitoring item	➤ Number of groups established	
Materials and Sample Formats	<b>Necessary materials</b> ➤ Flip-charts: 1 ➤ Markers: 5 ➤ Masking Tape: 1 ➤ Projector/Laptop Computer: 1 ➤ Hand-out: 1/person ➤ Notepad and pen: 1/person	<b>Formats</b> ➤

### Organizational Function in irrigation System O&M based on the Ministry's Guideline

It is essential that discussion with the participants to be carried out as follows, through small group discussion and/or plenary discussion:

#### Discussion for Organizational Function of WUA for Irrigation System O&M

No.	Subject	Description
1	Benefits	<ul style="list-style-type: none"> <li>◆ More efficient O&amp;M of water source is established.</li> <li>◆ The group is a platform for conflict management within water users.</li> <li>◆ A group can stand stronger in negotiations with government and private sector.</li> </ul>
2	Expected Inputs from the Members	<ul style="list-style-type: none"> <li>◆ Define and agree on a clear objective and organization structure for the group</li> <li>◆ Commitment to the group and it's objective</li> <li>◆ Contribution in the form of money and/or labor</li> <li>◆ Entrust the management to a small group of representatives</li> </ul>
3	Key Factor of Successful WUA	<ul style="list-style-type: none"> <li>◆ Clear definition of members</li> <li>◆ Clear policies</li> <li>◆ Transparent administration</li> <li>◆ Responsibility and authority</li> <li>◆ Incentives and sanctions</li> <li>◆ Financial and technical audit etc.</li> </ul>

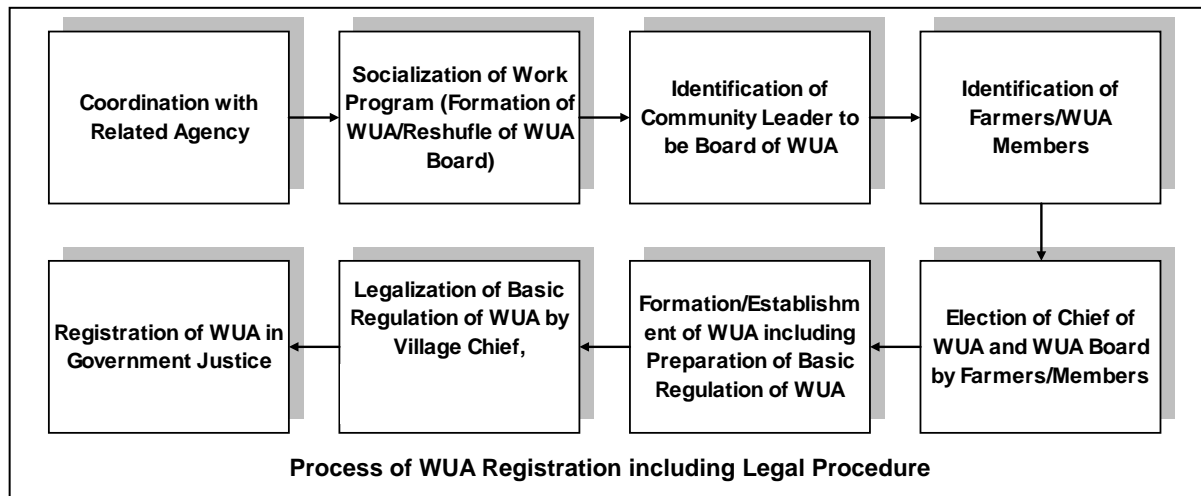
### Confirmation and Agreement among Participants

Formation of WUA needs to be agreed among the participants. Not only the discussion as having been introduced above, but WUA boundary should be clarified using figures. In addition, proposed boundary is to be discussed and agreed among

WUA in the training program.

### Procedure of WUA Formation and Registration

Registration procedure is illustrated as follows, which needs to be explained in the program.



### Advice and Support for Formation of WUA

Prospective issues are exemplified as follows:

- ◆ Duties of relevant organization in formation process
- ◆ Documentation in formation process
- ◆ Defining rules and regulations of WUA

#### Tips

- (1) In the case of new organizational establishment, utilization of existing WUA around the area would be one of the good examples.

### Feedback from Pilot Site Activities in Phase-2 and Phase 3

Not to be applied in Phase-2 and Phase 3.

<b>FM-8</b>	<b>Collective Selling/ Purchasing</b>	
Purpose	To introduce collective selling/purchasing process to the farmers group	
Target area		
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers	
Expected output	Farmers groups getting better income of their products or getting better farm inputs with low prices	
Work procedure	(1) Advantage of Collective selling/ Purchasing (2) Linkage between supplier/buyer and farmer group	
Work plan	Training should be done before cropping season starts.	
Main monitoring item	➤ Number of groups conducting collective selling/ purchasing	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Flip-charts: 1</li> <li>➤ Markers: 5</li> <li>➤ Masking Tape: 1</li> <li>➤ Hand-out: 1/person</li> <li>➤ Notepad and pen: 1/person</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤ FORM</li> <li>➤</li> <li>➤</li> </ul>

### (1) Advantage of Collective selling/ Purchasing

For an individual farmer, volume of his/her products is limited and it is not easy to get uniform quality of products. Instead, if farmers formulate a group and selling their products with bulk, they can have negotiation power to market. They can also add values to their products by sorting or grading to get better price.

Same as collective selling, group of farmers can have a bargaining power for the procurement of farm input. They can negotiate with supplier for better prices, and in addition, they may be able to negotiate mode and timing of payment.

### (2) Linkage between supplier/buyer and farmer group

Making linkage between supplier /buyer and farmer group is essential for the success of collective selling/ purchasing. The role of ATs is the key for making successful linkage. It is important for ATs to prepare list of farming inputs suppliers and agricultural products buyers who will be interested in dealing business with the farmers groups. Trade matching meetings will be organized together with farmers groups and those suppliers and buyers. In the trade matching meetings, both parties will be introduced each other and after that, direct interaction between groups from one side and suppliers/buyers from other side will be made for detailed negotiation of condition of selling/buying.

#### Feedback from Pilot Site Activities in Phase-2

Not to be applied in Phase-2

#### Feedback from ToT and Pilot Site Activities in Phase-3

In Phase-3, FM-8: Collective Purchase is introduced in ToT as a case study with combination with LS-5: Disease Control and FM-6: Group Account Management for vaccination against New Castle Disease in chicken pilot sites.

Farmers in all three chicken pilot sites had conducted the vaccination by themselves with the assistance by ATs. It is reported that farmers in the three sites are now confident to conduct the vaccination through collective purchase.

In comparison with vaccination for chickens, vaccination for cattle and goats was observed not promotive for collective purchase of vaccine. There are mainly three reasons considered through discussion with ATs;

(1) Cost and package of vaccine: Sharing cost

Vaccine for cattle and goats are more affordable than the one for New Castle Disease. On the other hand, usual package for New Castle Disease contain for about 1,000 treatment that a farmer do not need so much while the package for cattle and goats are smaller. This means that farmers are more motivated to purchase vaccine for chickens together for cost sharing compared to cattle and goats.

(2) Availability and perishability of vaccine: Planning the management and operation

In most towns, farmers can find vaccine for cattle and goats at agro-dealers' shops. On the other hand, New castle disease vaccine should be ordered in advance of purchase.

Another fact in relation to availability is perishability of new castle disease vaccine. It should be used within a day under kept temperature. These situations mean that farmers need to plan the vaccination for new castle disease in prior to implmentation. This motivate farmers' groups to manage themselves for collective purchase and plan well for the actual operation at the field levels.

(3) Mobility of livestock: Working together at one place

Different from other animals, chickens are easy to move. At the practical operation of vaccination, farmers planned to collect chickens to a place. After the conduction of vaccination by themselves in Phase 3, farmers' groups had decided to conduct the vaccination together in regular basis.

It was discussed by farmers at a site that this kind of unusual activities seemed to be welcomed by farmers as good place for sharing information not only vaccine.



<b>FM-9</b>	<b>Rural finance accessibility improvement</b>	
Purpose	To let farmers understand kind of rural finance available and how to access to it	
Target area		
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers	
Expected output	Farmers groups are able to utilize rural finance	
Work procedure	(1) Explanation of available rural finance (2) Procedure for the access of rural finance	
Work plan	Training should be done before cropping season starts.	
Main monitoring item	➤ Number of groups access to rural finance	
Materials and Sample Formats	<b>Necessary materials</b> <ul style="list-style-type: none"> <li>➤ Projector/Laptop Computer: 1</li> <li>➤ Hand-out: 1/person</li> <li>➤ Notepad and pen: 1/person</li> </ul>	<b>Formats</b> <ul style="list-style-type: none"> <li>➤</li> <li>➤</li> <li>➤</li> </ul>

### (1) Explanation of available rural finance

Agribank is the most major public organization for agricultural loan. Whereas for communal farmers in North Central Namibia, it is not easy to assess agribank loan because they can't use land as collateral as they don't own land. Agribank also has a scheme to support agricultural association or cooperative.

For farmers in remote area, inter-loaning as a group activity can also be a candidate of loan access.

### (2) Procedure for the access of rural finance

For agribank loan, farmer has to have 100% collateral for the access of loan and it is not easy for small scale communal farmers. On the other hand, Agribank also have a scheme of loan for groups. Formulation of group will be one of method for improvement of access for Agribank loan.

For inter-loaning, rules on inter loaning is one of the important part of the constitution of the group. As the inter-loaning can work only under mutual understanding among group members, clear and accountable rules are crucial to establish successful inter loaning function. The followings are the rules to be discussed among the group members.

#### 1. Savings /contribution

- a. Minimum amount per month
- b. When and for what purpose withdrawal of saving is permitted
- c. Penalty for delay in payment

#### 2. Cash Box

- a. Where and how is the money kept before being deposited in the bank?
- b. Who is responsible for it?

#### 3. Bank Account

a. Who maintains and operates the bank account

#### 4. Loans

- a. Who will get the loan from the group fund
- b. Purpose for which loan will be granted and priority
- c. Interest to be charged
- d. When and how to repay
- e. Handling of default
- f. Utilization of interest income

#### **Consideration in deciding rules on each item**

##### 1. Savings /contribution

\_ Minimum amount of contribution per month:

Amount should be decided in affordable amount for all the members. If there are some members with less economic capability, consider the person not to make the contribution too much burden for her. If the contribution is a burden for some members, the group will exclude economically disadvantaged people.

\_ When and for what purpose withdrawal of saving is permitted

Since the saving is for the whole group, it should be used for the sake of the group. You can leave some room for the group to use for emergency in condition of consensus of all the group members.

\_ Penalty for delay in payment

Penalty can be effective to make people follow their rules. However, if it can disrupt the members' relationships and unity of the group, it does not serve the purpose. Penalty can take different forms apart from monetary penalty, such as additional works or roles.

#### 4. Loans

\_ Who will get the loan from the group fund, purpose of loan

Basically the loan can be used to personal requirement of the members and shall not be strictly limiting the purpose. However, when demand of loan is higher than their available saving, they should prioritize on who to get first. Let them decide how they will prioritize. Will they be entitled in rotation, or judge based on the urgency, or pre-defined priority purpose such as medical and educational purpose.

\_ Interest to be charged

Since the fundamental objective of the inter-lending is mutual support for household of the members, it is not preferable to charge very high rate of interest. At the same time, it can be counted for revenue of the group to be used for running cost of the group activities. If they have enough revenue from their production activities, there is option of not charging any interest. It depends on the members whether they charge interest or not, and how much it should be.

\_ When and how to repay and handling of default

Normally repayment rate of the inter-lending among SHG members are very high due to peer pressure with their social relation and mutual trust. However, it will be wise enough to set a rule on when and how the borrower should pay back, and what will happen if the one does not repay by due.

#### **Feedback from Pilot Site Activities in Phase-2 and Phase 3**

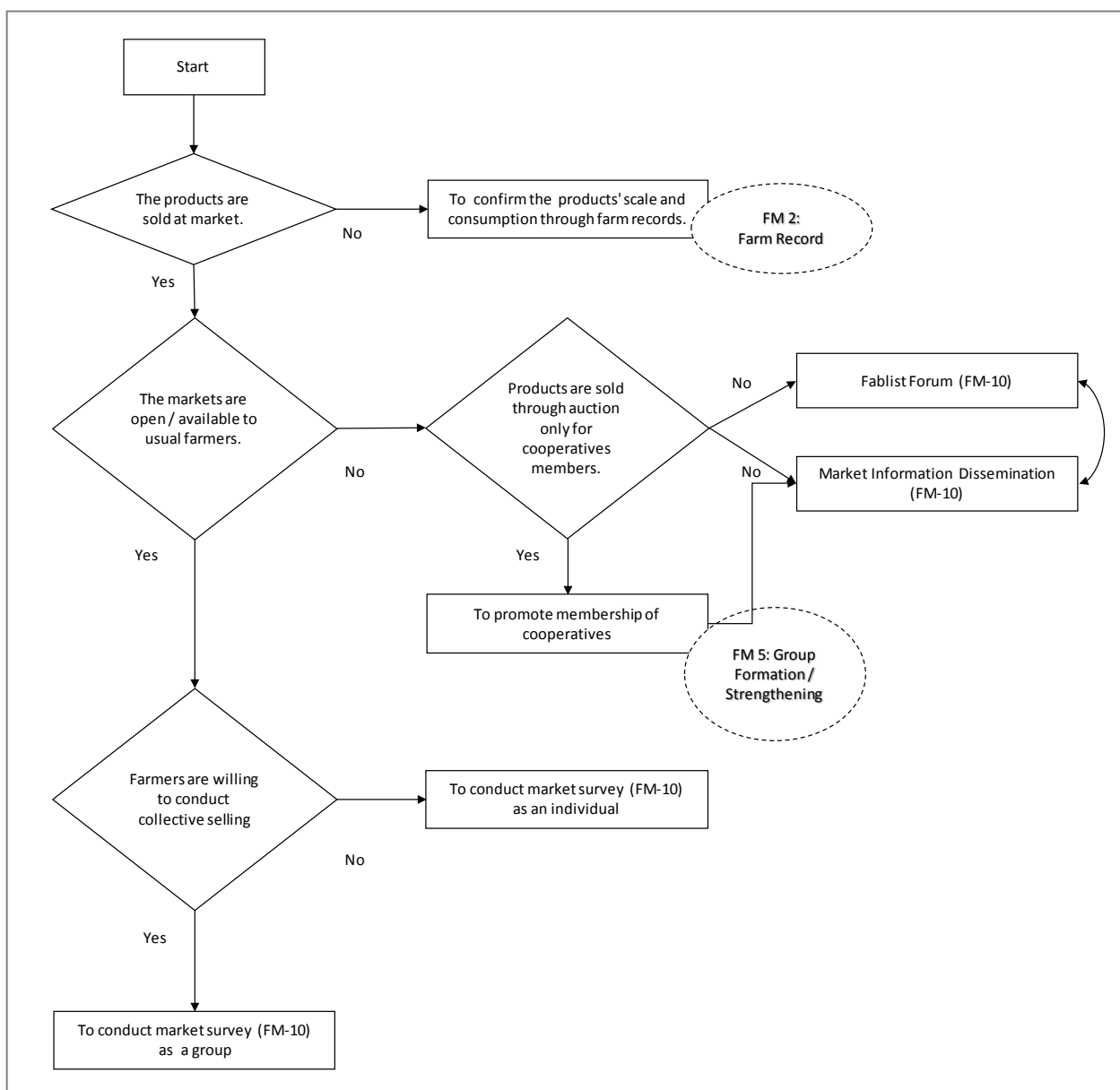
Not to be applied in Phase-2 and Phase 3.

<b>FM-10</b>	<b>Market Information Access Improvement</b>	
Purpose	<p>To share necessity of sharing of information on agricultural (crop and livestock) marketing for farmers</p> <p>To provide agricultural marketing rules and other useful information related to selling of produce</p> <p>To encourage farmers for selection of crop / livestock and planning according to the market information.</p>	
Target area		
Trainer	Agricultural Technicians (ATs)	
Trainee	Target farmers	
Expected output	Farmers can sale their products in higher price	
Work procedure	<p>(0) Preparatory Discussion: Assistance for Marketing Information Access Improvement in Different Situations of Markets</p> <p>(1) Introduction of marketing</p> <p>(2) Marketing channels</p> <p>(3) Tools for market information</p> <p>(4) Market Survey</p>	
Work plan	Training should be done before cropping season starts.	
Main monitoring item	<ul style="list-style-type: none"> <li>➤ Number of farmers checking market information</li> <li>➤ Changes in farmers' ways of crop selection based on the market information (information through stakeholders, media and market survey)</li> </ul>	
Materials and Sample Formats	<p><b>Necessary materials</b></p> <ul style="list-style-type: none"> <li>➤ Matrix : a few sheets /person</li> <li>➤ Note (for information sharing)</li> </ul>	<p><b>Formats</b></p> <ul style="list-style-type: none"> <li>➤ Market Survey Matrix</li> </ul>

### (0) Preparatory Discussion: Assistance for Marketing Information Access Improvement in Different Situations of Markets

Market information can vary. As the same, the needed information for farmers are also different by farmers / groups. The chart in the next page summarized the different way of assistance for market information access improvement.

As seen in the chart below, the assistance of market information access improvement needs adjust firstly to the market situations, then to the needs or interests of farmers.



### Assistance for Marketing Information Access Improvement in Different Situations of Markets

#### (1) Introduction of marketing

Marketing in case of agricultural crops is very challenging; it becomes all the more challenging in the case of vegetables owing to their highly perishable nature. Some of the challenges faced by farmers in marketing of vegetable produce are: limited marketable surplus owing to small land holdings, high volume products hence higher transportation cost, varied produce hence difficult to have standards, seasonality of produce (glut in peak season and high prices during off –season), lack of infrastructural facilities (cold stores, processing facilities etc.), lack of consumer cooperatives, malpractices in regulated markets.

Hence, it becomes very important for a farmer to have a clear answer to all of these questions:

#### 1. Why to produce?

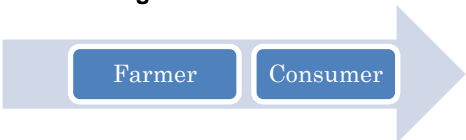

2. What to produce?
3. When to produce?
4. How much to produce?
5. Where to sell his produce?
6. How/Whom to sell his produce?

Once, farmer has a clear understanding about these questions, he is in a better position to plan his production strategy and is assured that he is producing a saleable product.

## (2) Marketing channels

Knowledge of marketing channels is important for the farmers as farmer can devise his marketing strategy based on this information. He has to understand what are the available options with him where he can sell off his produce. Selling off the produce is not the sole criteria; earning maximum profit is the objective of the farmer. Hence, the knowledge of marketing channels is also helpful to him to devise his production strategy. If he wants to sell his produce by himself, his production strategy should ideally be to grow more number of vegetable crops in small quantities and spread his harvesting season over a period of time. However, if he knows he will use an alternative marketing channel wherein he is able to dispose-off his produce to a commission agent, his production strategy will vary in a sense that he focuses on less number of crops but more intensively.

Marketing channels that are available to the farmer along with their benefits and drawbacks is summarized as follows:

Marketing channel	
<p><b>Direct Marketing</b></p> 	
<p><b>Strengths/benefits</b></p> <ul style="list-style-type: none"> <li>• Consumer gets fresh vegetables as farmer is harvesting and directly selling – less time gap</li> <li>• The farmer gets a higher price as middlemen are not involved</li> <li>• Lesser transition cost (transportation over short distance, grading/packing not really needed) – hence relatively cheaper to consumer.</li> <li>• Consumer gets to know the producer and is assured of quality of produce – the source of production is easily traceable.</li> </ul>	<p><b>Drawbacks</b></p> <ul style="list-style-type: none"> <li>• This channel is effective for farmers having immediate access to markets.</li> <li>• Farmer has to spare time for marketing activities</li> <li>• Farmer does not have storage facility and has to sell all his produce the same day – so he has to lower the price to attract the consumers.</li> </ul>
<p><b>Farmer – Retailer – Consumer</b></p> 	
<p><b>Strengths/benefits</b></p> <ul style="list-style-type: none"> <li>• Farmer need not take produce to APMC- thereby saves transportation cost, packing cost – good for farmers who have limited marketable surplus.</li> </ul>	<p><b>Drawbacks</b></p> <ul style="list-style-type: none"> <li>• This activity is seasonal in nature</li> <li>• The retailer negotiates the price with farmer depending upon the quality of produce – if produce</li> </ul>

<ul style="list-style-type: none"> <li>• Farmers can sell produce to retailers at the price prevailing in APMC.</li> <li>• Farmer can sell his produce immediately and can focus on production activities.</li> <li>• Retailer also saves on his transportation cost/time and purchases produce at the shop.</li> </ul>	is good quality and sorted well, the farmer gets price equivalent to APMC
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**Farmer – CA – Retailer – Consumer**



<ul style="list-style-type: none"> <li>• Farmer does not have to pay any fee for selling his produce in the market.</li> <li>• Price of produce is determined either by open auction amongst buyers or through price negotiation.</li> <li>• Big farmers can sell their produce at one place as there are a number of buyers.</li> <li>• The Government has set up market yard/Agriculture Produce Marketing Committees to cater to the needs of this marketing channel. The physical infrastructure has been put in place to enable farmer bring his produce to the market yard and get it auctioned/sold in the presence of a number of buyers so that best prices can be availed.</li> </ul>	<ul style="list-style-type: none"> <li>• Commission agents also import produce from outside to check the prices.</li> <li>• A number of malpractices still prevalent despite control of government.</li> <li>• Poor infrastructure facilities for auction, storage etc.</li> </ul>
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**Farmer – Forwarding Agent – Commission Agent – Retailer – Consumer**



<ul style="list-style-type: none"> <li>• Forwarding agent provides service by insuring the produce and transporting it to the market.</li> <li>• This is helpful especially in those areas where vegetables are grown on a large scale.</li> <li>• These facilities help farmers access markets outside the state – which are not easy if individual farmer has to do it by himself.</li> </ul>	<ul style="list-style-type: none"> <li>• The longer the chain, more the number of middlemen, higher the inefficiencies are there in the marketing channel</li> </ul>
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**(3) Tools for market information**

**Some tools of market information in North Central Namibia:**

- Radio
- Television
- News paper
- Telephone/Mobile
- Internet
- MAWF

**(4) Market Survey**

### Feedback from Pilot Site Activities in Phase-2

This technique was introduced in 2 horticulture sites (Onayena in Oshikoto Region and Epembe in Ohangwena Region) in Phase-2. The following table summarizes the activities taken through trainings in pilot site activities.

1st Training (Nov. 2015)	- Explanation of SHEP approach was made for target farmers to make them understanding about SHEP and to motivate them for marketing of horticulture crops.
2nd Training (Nov. to Dec. 2015)	- Importance of concept of "grow to sell" was repeated during training and explained them for market survey and crop selection. - ATs collect market information for market survey.
3rd Training (Feb. 2015)	-Before training (at the end of January) market survey was conducted. -At training, market information was summarized and farmers (individually in Onayena and as a group in Epembe) made crop selection based on market information, their farming situation and experiences. -Farming schedule was made for each selected crop.
4th Training (Apr. 2015)	- Follow up of progress of farming activities based on farming schedule.

### Feedback from Pilot Site Activities in Phase-3

In phase 3, there are two main activities in relation to FM-10: Market Information Access Improvement: 1) Information Sharing as mini-Fablist forum at Stakeholder meetings and ToTs, and 2) Market Survey.

#### 1) Mini-Fablist forum at Stakeholder meetings and ToTs,

Officers of Agriculture Marketing and Trading Agency (AMTA) and Meat Board have been regular participants for stakeholder meetings and ToTs. All four regions gained more than once of encounters with these officers who share the market information with farmers and ATs.

In Oshana, meetings were held in AMTA premises. This was a benefit both for ATs and for farmers. Farmers who attended to stakeholder meeting (2) in August, 2017 visited the market storage of AMTA. Farmers asked questions to AMTA officers, shop-owner or selling clerks in the market.

#### 2) Market Survey

Market survey was focused in the first ToT in November. Farmers in two horticulture sites, Etunda in Omusati region and Okatana in Oshana Region conducted market survey.

As seen below, the two groups implemented market survey in different ways.

### Markey Survey conducted in Phase 3

Farmer Groups	Markets visited	Informants of the Survey	Ways of Conducting	Outputs
Etunda	Ruacana	Seller of open and community market, owner of restaurant, buyer of super market, cook of school kitchen	<ul style="list-style-type: none"> <li>➤ ATs provided transportation to different premises with the suggestion where to visits</li> <li>➤ Conducted in three groups</li> <li>➤ Sharing the information after the conduction</li> </ul>	Agreement of <b>further conduction of market survey</b> involving all cooperative members with the <b>focus of possible collective selling and selection of crops.</b>
Okatana	Oshakati	Mainly seller and dealers in Open Markets	<ul style="list-style-type: none"> <li>➤ AT explained the ways of market survey prior to the day of farmers' own activity of market survey</li> <li>➤ By farmers groups</li> <li>➤ Conducted Individually</li> <li>➤ Sharing the information after the conduction</li> </ul>	Agreement of <b>selection of crops</b> on communal land in the next season

Etunda's case is a good example how ATs can assist farmers' groups with more intensive intervention. Okatana's case is a good example how an AT can motivate farmers to conduct the market survey by themselves. This case can be applicable to many farmers groups as the intervention of ATs is limited to only once for explaining the methods of market survey.

It is confirmed that both groups have achieved to the purpose of the market survey; the selection of crops based on the discussions after the conduction of market survey.

The manuals and forms made for farm record in Phase 2 are shown below.



## FM-10 Attachment01 Manual for Market Survey

### Objective of Market Survey

Conducting Market Survey is very important to make your planting plan which is orientated by marketing activity. To make a planting plan which is market oriented, you have to know about the situation of the market which you want to target to sell. So, it can be said that your marketing activities is started already before you start planting.

### Key Points of Market Survey

Market Suevey is one of the most important activities of SHEP. There are 3 principles of SHEP's Market Suurvey; by the farmers, from a view point of the farmers, and information that suits the situation of the farmers.

The role of ATs and N-CLIMP staffs is to support farmers, not to go in front during Market Survey

### Procedure of Market Survey

- Determine the markets to be visited (by AT) 1 should be a nearby local market
- Prepare the survey questionnaire (by Project Team)
- Identify market survey team members (by AT with consensus of group members) \*1
- Carry out the survey
- Crop selection based on market survey information (at 3rd training)

### Time schedule

- 9:00 Registration and briefing at ADC \*1
- 10:00 Arrival at 1st Market
- 11:30 Departure from 1st Market
- 12:00 Arrival at 2nd Market
- 13:30 Departure from 2nd Market
- 14:00 Back to ADC

### Conducting Market Survey

During conducting the market survey, please pay your attention to those points listed below to carry out the survey effectively.

- Introduce interviewee about you and purpose of your visit to obtain their cooperation.
- Hold discussion when the interviewee is serving their customers.
- Avoid repetitions to save a time. Remember the interiewee is very busy for their business during the survey
- Use friendly language and express your gratitude at the end of the interview.

Please note that the interviewees are your potential business partners in the future. The market survey also gives you a good opportunity to make a linkage with them.

### Items to be prepared

- Clipboard 5
- Pen 5
- Questionnaire sheet 20

### \*1 Formation of interview team

Among 15 participants, 3 teams will be formulated. Composition of each team should be carefully considered, specially for Oshikoto where farmers work individually (Based on crop, geographical position, gender balance and so on ) preferably a team of 5 farmers per team.

Each team to choose an interviewer and secretary amongst the team members.

## Market Survey Questionnaire

Date:

Name of Market:

Name of Dealer:

Name of team members:

Contact of the Dealer:

Crop & Variety	Product's Quality of Market Requirements	Months of Peak Demand	Quantity (kg) of Supply	Supply Frequency (daily/weekly, etc.)	Place of Production & Distance	Purchasing Unit Price (NAD/kg)	Mode of Payment	Time for Payment	Marketing Challenges	Dealer Willingness to Purchase Production from the Team

## Market Survey Questionnaire

Date: 21 January 2016

Name of Market: Ondangwa town market

Name of Dealer: Joe

Name of team members:

Contact of the Dealer: 080056xxxx

Crop & Variety	Product's Quality of Market Requirements	Months of Peak Demand	Quantity (kg) of Supply	Supply Frequency (daily/weekly, etc.)	Place of Production & Distance	Purchasing Unit Price (NAD/kg)	Mode of Payment	Time for Payment	Marketing Challenges	Dealer Willingness to Purchase Production from the Team
Tomato Roma	Selected good tomato	11,12,4,8	10kg per one time	Twice per week	Etunda	40/kg	Cash	Immediately	Likely to get rotten	I am willing if the group offers good price
Carrot	Long and big	11	100kg each market day	Once a week	Tsumeb	20/kg	Cash	Immediately	Lack of customers	Yes
Onion	Big and fresh	6,7,8	150kg per one time	Weekly	Angola	30/kg	Cash	Immediately	Unstable supply	Yes
Cabbage	Big and heavy	7,8,9,10	300kg per one time	Twice per week	Etunda	10/kg	Cash	Immediately or after trading	Price fluctuation	Yes

FM-10 Attachment03 Sample of Market Survey Questionnaire

## FM-10 Attachment04 Manual for Crop Selection

### Procedure of Crop Selection

Fill up the crop selection sheet according to the results of market survey \*1

- List down the crops covered during the market survey
- Fill each column with accurate information for all candidate crops using: market survey results, crop production experience and other available information
- To fill the column "Month of planting", it is important to consider "month of peak demand" of market survey sheet, to get better income.
- After completing the Sheet, please select 2 priority crops based on your decision by information in the sheet. Crop selected should be easy implement, low technical requirement and affordable. Major production challenge should not be ignored for crop selection.

### Farming Schedule

After selection of 2 preferred crops, please make farming schedule for those selected crops. Farming schedule should be designed to harvest your target period of high demand season, which you identify in the market survey and its analysis. Please make sure farming schedule is practical and try to avoid to ignorance of your condition of farming environment.

### Items to be prepared

- Clipboard 5
- Pen 5
- Crop Selection sheet 20
- Farming schedule sheet 20

### \*1 Crop Selection sheet

A group share communal land and work together with all the group members such as the group in Epembe should prepare 1 sheet as a group, on the other hands, a group where land is allocated individually such as Etunda and Okatana, every member prepare a sheet individually.

## Crop Selection Sheet

Date:

Name:

Crop & Variety	Experience in cultivating the crop	Maturing period	Month of planting	Major production challenges	Main market(s)	Marketing condition	Remarks	Ranking

FM-10 Attachment05 Crop Selection Sheet

## Crop Selection Sheet

Date: 2 February 2016

Name: **Bernadette**

Crop & Variety	Experience in cultivating the crop	Maturing period	Month of planting	Major production challenges	Main market(s)	Marketing condition	Remarks	Ranking
Tomato Roma	Yes	3 months	6,12	Late blight disease	Ongwediva towm market Ongwediva hub	10kg 50kg 1000kg	A need to avoid damage while transportation	1
Carrot	No	3 months	7,8,9	Termite damage	Ongwediva hub	1000kg	A need to spray insecticide	
Onion	Yes	4 months	11,5	None	Ongwediva towm market Ongwediva hub	150kg 300kg 2000kg		2
Cabbage	Yes	3 months	6,12	Pests difficult to get controlled	Ongwediva towm market Ongwediva hub	300kg 500kg 2000kg		
Brinjal (Eggplant)	No	4 months	6,12	None	Ongwediva hub	1000kg	A need to avoid damage while transportation	

## Farming schedule

Date:

Name:

Name of Crop:

Month	February				March				April				May				June				July			
Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1 Purchase of Inputs																								
2 Land Preparation																								
3 Nursery Sowing																								
4 Transplanting																								
5 Top Dressing/ Fertilizer Application																								
6 Pest Disease Control																								
7 Weeding																								
8 Harvesting																								
9 Marketing																								
10																								
11																								
12																								
13																								
14																								
15																								

## Farming schedule

Date: **2 February 2016**

Name: **Bernadette**

Name of Crop: **Tomato**

Month		February				March				April				May				June				July			
Week		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Purchase of Inputs			✓																					
2	Land Preparation			✓																					
3	Nursery Sowing				✓																				
4	Transplanting								✓																
5	Top Dressing/ Fertilizer Application											✓			✓										
6	Pest Disease Control										✓		✓		✓										
7	Weeding										✓		✓		✓										
8	Harvesting																✓		✓				✓		
9	Marketing																✓		✓				✓		
10																									
11																									
12																									
13																									
14																									
15																									



*Attachment 3*

*Verification Results  
of Technical Measures*

*N-CLIMP*

*Attachment 3-1*

*Verification Results by Pilot Site for*

*Crop Production*

*N-CLIMP*

## Attachment 3-1 Verification Results by Pilot Site for Crop Production

### 1. Etayi Constituency

Region / Constituency / ADC	Applied Technical Measures
Omusati Region Etayi Constituency Etayi ADC	CR-2: Cropping Pattern and Crop Management CR-4: Flood- and Drought-Adaptive Cropping System (Rice-Mahangu Mixed Cropping System)

#### 1.1. CR-2: Cropping Pattern and Crop Management

##### Verification Result of Technical Measure of CR-2 in Etayi

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-2: Cropping Pattern and Crop Management		x	-	-	x	-
Work Procedure	1. Crop development stages (crop calendar) of pearl millet, 2. Standard crop management of pearl millet, 3. Modification of cropping calendar (replanting, weeding, thinning, top dressing, etc.)					

Source: Prepared by the Study Team

#### - General Situation

Farmers have long experience of growing pearl millet, and production has been fluctuating mainly due to unstable and low rainfall. Traditional farming practices seem inappropriate like high density of seedlings against soil moisture, transplanting of thinned plants even after vegetative growth, continuous cropping of same plots, and keeping plants without panicles until harvest.

In order to change traditional farming practices to appropriate crop management as well as proper cropping plan, farmers need to understand the crop development stages and prepare proper cropping plan for crop management suitable for unstable rainfall.

Through application of basal fertilizer

#### ➤ Verification in Economic Aspect: Low

Based on the field application results, benefit by cost is assessed in the following manner:

##### Benefit and Cost of Techniques of CR-2 in Etayi

Item	Benefit	Cost	Assessment
Basal Fertilizer for initial vegetative growth	Moderate	Moderate	Moderate
Ploughing (ripper furrow) to increase soil moisture and break soil hard pan	Moderate	Moderate	Moderate
Weeding to avoid nutrient competition	Moderate	Not applied	-
Thinning for appropriate density	Moderate	Not applied	-
Top Dressing with risk due to unstable rain	Not applied	Not applied	-
Replanting for appropriate plant density	Not applied	Not applied	-
Total Benefit and Cost	Moderate	Moderate	Moderate

Remarks "moderate and low" of benefit and cost are derived from comparison with the conventional methods.

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Low

Through the trainings, farmers are gradually understanding the crop development stages, but understand is not enough to change their traditional practices. Accordingly, perception farmers evaluated as "Low".

## 1.2 CR-4: Flood- and Drought-Adaptive Cropping System

Verification Result of Technical Measure of CR-4 in Etayi

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-4: Flood- and Drought-Adaptive Cropping System (Rice-Mahangu Mixed Cropping)			x		x	
Work Procedure	<ol style="list-style-type: none"> <li>1. Introduction of mixed cropping (principles and examples),</li> <li>2. Preparation of cropping pattern (cropping calendar, action plan),</li> <li>3. Land preparation and planting of rice and pearl millet (sorghum),</li> <li>4. Crop management</li> <li>5. Harvesting, threshing, milling and marketing</li> <li>6. Review of result and lesson learnt</li> </ol>					

Source: Prepared by the Study Team

➤ General Situation

Farmers showed interest on the rice cultivation, but they have limited knowledge on growing rice as well as no experience on rice-mahangu mixed cropping system. Through the trainings, farmers have gradually obtained knowledge on mixed cropping at some extent, but rainfall situation did not allow to transplanting in the seasonal wetland without water.

➤ Verification in Economic Aspect: Low

Due to low rainfall and no floods coming from the surrounding area, no water enough to transplant rice seedling in seasonal wetland of the demonstration plot. Sorghum was planted for drought situation in place of pearl millet, and sorghum planting delayed and growth was poor. In this regards verification result is evaluated as "Low" for economic aspect.

➤ Verification in Social Aspect: Medium

In conducting training and trails of cropping rice and sorghum, demonstration farmers gradually understand the mixed cropping and keep their interest. They tried to practice rice cultivation under insufficient rainwater in the seasonal wetland. In this regard, farmers' acceptance is assessed as "Moderate" for social aspect.

### Other Topics

➤ Support by experienced Senior AT from neighboring ADC

Since this is the first experience of rice-mahangu (pearl millet) mixed cropping for AT at Etayi ADC, the Omusati DAPEES Regional Office allocated the experienced Senior AT from Okalongo ADC, experienced staff for support to AT at Etayi.

➤ Workshops by SATREPS for Rice-Mahangu Mixed Cropping

AT at Etayi attended the workshop held under SATREPS for rice-mahangu mixed cropping at the UNAM Ogongo campus on November 22 2015, to take basic information on the mixed cultivation. On December 22, AT at Etayi and Senior AT at Okalongo attended the another workshop under SATREPS at Afoti (Uvudihya Constituency in Oshana Region)

➤ Selection of Seasonal Wetland

At the 1st Training on Nov. 19 2016, seasonal wetlands in the demonstration farm were inspected with farmers for selection of demonstration plot. The largest wetland with the size of approximately 200m x 70 m was selected for demonstration plot taking consideration into account, past situation of water level and duration of water inundation to allow rice growth.

➤ Effect of Ripper Furrowing on Pearl Millet in non-Demonstration Area

In the demonstration farm, ripper furrowing was applied to other plots and good growth were observed compared with the plots not applied. This is the first experience for the demonstration farmer, she understand its effect. During the 4<sup>th</sup> training, key farmers also understand its effect through field observation.

## 2. Ruacana Constituency

Region / Constituency / ADC	Applied Technical Measures
Omusati Region	CR-6: Water Saving Cultivation
Ruacana Constituency	CR-7: Crop Selection and Marketing
Etusnda ADC (Etunda Irrigation Green Scheme)	CR-8: Cropping Plan and Horticulture Crop Management

### 2.1 CR-6: Water Saving Cultivation

#### Verification Result of Technical Measure of CR-6 in Etunda

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-6: Water Saving Cultivation	x			x		
Work Procedure	1. Low pressure drip irrigation system (tank kit, drum kit and bucket kit), 2. Simple drip irrigation system by PET bottles bucket, watering can, and sprinkling can), 3. Drip irrigation system for Etunda Irrigation Green Scheme					

Remarks: “-“ shows no evaluation results are available in this stage.

“(x)” shows the temporary verification result at the moment, not for overall verification.

Source: Prepared by the Study Team

#### ➤ General Situation

In the Etunda Irrigation Green Scheme, the Etunda Project Office designed a standard drip irrigation system to fit the plot layout of irrigation hydrants and underground pipelines, covering 24 m x 48 m = 1,152 m<sup>2</sup> (48 m x 6 drip lines, 40 cm interval emitters and 4 lit./hr.). Farmers can procure drip irrigation sets according the above standard design through the Etunda project office and install them under the guidance of Etunda project office.

#### ➤ Verification in Economic Aspects: High

It is expected that drip irrigation will save 40% to 60% of the present irrigation water supplied by sprinkler, and enable farmers to produce quality horticulture crops.

High economic performance is already shown in the demonstration plot operated by the Etunda project office.

#### ➤ Verification in Social Aspect: High

Under the pilot site activities, N-CLIMP proposed to provide demonstration farmer and 14 key farmers with drip irrigation sets, and to demand farmers their contribution according to the AgriBusDev policy to encourage the farmers’ ownership. Through discussion with farmers in the 4<sup>th</sup> training, farmers agreed to bear 50% of cost of drip irrigation sets. In this situation, installation of drip irrigation sets has started from the 2<sup>nd</sup> week of April 2016. As of late March 2017, 5 farmers out of 15 farmers participating in the pilot site activity have installed the drip irrigation system, and another 10 farmers have not installed yet, mainly due to the 50% contribution of the procurement cost. Furthermore, 1 farmer installed another 1 sets of drip irrigation by his own expense.

Accordingly, farmers’ perception to introduce the drip irrigation set is verified as “high”,

because farmers seem to have the mind set of “agriculture is business”.

## 2.2 CR-7: Crop Selection and Marketing

### Verification Result of Technical Measure of CR-7 in Etunda

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-7: Crop Selection and Marketing	x	-	-	x	-	-
Work Procedure of CR-7	1. Market Survey 2. Information sharing with stakeholders 3. Crop selection					

Remarks: “-“ shows no evaluation results are available in this stage.

“(x)” shows the temporary verification result at the moment, not for overall verification.

Source: Prepared by the Study Team

#### ➤ Verification in Economic and Social Aspect: High

Drip irrigation sets have been installed in the plots of 5 farmers under the pilot site activities since May 2016 under guidance of the Etunda Project Office. Under this situation, rainings on marketing survey was conducted by the farmers in December 2016 under the 2<sup>nd</sup> training for farmers groups and select vegetables to be grown.

Based on this experience, ATs of Etunda ADC prepared the action plan according to the SHEP format, by involving all the small scale involving all the 73 farmers. In this regard, economic and social aspect is verified as “high”, since ATs are now applying SHEP Approach to the small scale farmers in the Etuda scheme. Hopefully, the Approach will be etended to the small and medium scale horticulture farmers in the Olushandja area.

## 2.3 CR-8: Cropping Plan and Horticulture Crop Management

### Verification Result of Technical Measure of CR-8 in Etunda

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-8: Cropping Plan and Horticulture Crop Management		x		x		
Work Procedure of CR-8	1. Cropping plan, cropping calendar, action plan, 2. Horticulture crop management (crop growing stages of horticulture crops, nursery preparation, seeding & seedling preparation, mulching & shading, thinning, field preparation, seeding or transplanting, weeding, pruning, branch training, lifting, plant protection, harvesting).					

Source: Prepared by the Study Team

#### ➤ Verification in Economic Aspect: Moderate

Drip irrigation sets were installed by 5 farmers and

Out of 15 farmers, 5 farmers installed the drip irrigation system and started to grow vegetables, changing their crop from maize to vegetables. Although trainings to prepare the cropping plan and vegetable growing techniques.

#### ➤ Verification in Social Aspect: High

In the Etunda Irrigation Scheme, the project office has been demonstrating horticulture

cropping under drip irrigation, and farmers seem to have some level of understanding and knowledge on horticulture management since. In this situation, verification result is evaluated as “moderate”.

### Other Topics

➤ Arrangement and coordination between AgriBusDev and MAWF

At the 1st Training for Farmers Group on November 18 2015, the Manager of Etunda Green Scheme explained that the Scheme is operated under AgriBusDev and he requested N-CLIMP Team to obtain acceptance from AgriBusDev. In this situation, pilot site activities were suspended until obtaining the acceptance from AgriBusDev.

N-CLIMP Team had the meetings with AgriBusDev at Windhoek through DAPEES / MAWF on January 21 and February 5 2016, to explain about N-CLIMP and seek acceptance for implementation of the pilot site activities. Based on the discussion AgriBusDev accepted the pilot site activities and issued its letter dated February 8 2016 regarding its concurrence.

➤ Services by Project Office

Etunda Project Office provides support services and inputs to the farmers, and farmers pay their costs. According to the Manager of Etunda Project Office, details of services are shown below.

#### **Services Provided by Etunda Project Office**

Item	Description
Irrigation water supply	<ul style="list-style-type: none"> <li>- Price of water is N\$0.44 / m<sup>3</sup> for small farmers, including electricity for pumps and operation and maintenance of pumps, pipelines and ancillary facilities. Water volume is measured by meters.</li> <li>- Irrigation water used in the scheme is about 400 to 600 mm per month, and</li> </ul>
Tractor services	<ul style="list-style-type: none"> <li>- Cost is N\$22 / liter of fuel (diesel oil), including cost for operator, operation and maintenance. Fuel volume is measured as the difference of filling-up volume between start and end of work.</li> <li>- Tractor services include land preparation and transportation from field to collection yards.</li> </ul>
Tracks	<ul style="list-style-type: none"> <li>- Prices is \$18 / km for 8 to 10 ton of load weight.</li> </ul>
Inputs	<ul style="list-style-type: none"> <li>- Etunda Project Office supplies seeds, seedling, fertilizers, agro-chemicals, planting material, and necessary tools and farm equipment at the substantial prices.</li> </ul>
Marketing of Products Crates (container)	<ul style="list-style-type: none"> <li>- Market support of products for small farmers,</li> <li>- Crate (container) with capacity is 20 kg of products per crate. Under direct operation by the Etunda Project Office, 250 to 300 crates of vegetables can be harvested from a plot of 48 m x 24 m (1,150 m<sup>2</sup>), equivalent to 5 ton to 6 ton</li> </ul>

Source: Prepared by the Study Team



### 3. Oshakati-West Constituency

Region / Constituency / ADC	Applied Technical Measures
Oshana Region	CR-1: Fertilizer Application
Oshakati-west Constituency	CR-2: Cropping Pattern and Crop Management
Okau kamasheshe ADC	CR-3: Conservation Agriculture

#### 3.1 CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management

##### Verification Result of Technical Measure of CR1&2 in Oshakati-West

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management	x				x	
Work Procedure of CR-1	1. Review of the present practice and explanation on fertilizer application method 2. Basal fertilizer application 3. 1 <sup>st</sup> & 2 <sup>nd</sup> top dressing					
Work Procedure of CR-2	1. Crop development stages (cropping calendar) of pearl millet, 2. Standard crop management of pearl millet, 3. Modification of cropping calendar (replanting, weeding, thinning, top dressing, etc.)					

Source: Prepared by the Study Team

#### ➤ General Situation

Farmers have long experience of growing pearl millet, and production has been fluctuating mainly due to unstable and low rainfall. Traditional farming practices seem inappropriate like high density of seedlings against soil moisture, transplanting of thinned plants even after vegetative growth, continuous cropping of same plots, and keeping plants without panicles until harvest.

In order to change traditional farming practices to appropriate crop management as well as proper cropping plan, farmers need to understand the crop development stages and prepare proper cropping plan for crop management suitable for unstable rainfall.

#### ➤ Verification of Economic Aspect: High

Based on the field application results, benefit and cost is assessed as “High” as shown in the following table:

##### Benefit and Cost of Techniques of CR-1 and CR-2 in Oshakati-West

Item	Benefit	Cost	Assessment
Basal fertilizer (manure) for initial vegetative growth	High, manure from home	Low, manure from home	High
Ploughing (ripper furrow) to increase soil moisture	High	Moderate, compared with conventional method	High
Weeding to avoid nutrient competition	Moderate, as same present practice	Moderate, as same present practice	Moderate
Thinning for appropriate density of plants	High or moderate,	Moderate, due to	Moderate

Item	Benefit	Cost	Assessment
		manpower	
Top Dressing with risk due to unstable rain	Not applied	Not applied	-
Replanting for appropriate plant density	High	High	Moderate
Total Benefit and Cost	High	Moderate	High

Remarks "high, moderate. and low of benefit and cost are derived from comparison with the conventional methods.

Source: Prepared by the Study Team

➤ Verification of Social Aspect: Moderate

Through the trainings, farmers are gradually understanding the crop development stages, but understand is not enough to change their traditional practices. Accordingly, perception farmers evaluated as "Moderate".

**Acceptance of Techniques of CR-1 and CR-2 by Farmers in Oshakati-West**

Item	Farmers Acceptance
Crop development stages of pearl millet	✓ Moderate, obtained some level of understanding but not applied to the farming practices.
Basal fertilizer for initial vegetative growth	✓ Normal as the present practice if manure is available.
Ploughing (ripper furrow) to increase soil moisture	✓ High, based on the farmers' observation in each growing stage.
Weeding to avoid nutrient competition	✓ Normal as the present practice,.
Thinning for appropriate density of plants	✓ Moderate, farmers gradually understand theoretical explanation.
Top Dressing with risk due to unstable rain	✓ Not recommended, due to availability and risk of drought.
Replanting for appropriate plant density	✓ Normal as the present practice,.
Total acceptance	✓ Moderate

Source: Prepared by the Study Team

### 3.2 CR-3: Conservation Agriculture

**Verification Result of Technical Measure of CR-3 in Oshakati-West**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-3: Conservation Agriculture	x				x	
Work Procedure	1. Land preparation by deep cultivation (ripper furrowing) , 2. Furrow planting, 3. Mulching on the soil surface, 4. Crop rotation with fallow, 5. Contour furrowing 6. Inter-cropping with legume crops					

Source: Prepared by the Study Team

➤ General

Farmers in this site have some experience on Namibia-specific Conservation Agriculture (ripper furrowing), and they slightly know the effectiveness of ripper furrowing. Under this situation, such traditional farming practices were observed like high density of seedlings, transplanting of thinned plants after vegetative growth, continuous cropping in the same plots, and keeping tillers without panicle.

In order to realize the effect of conservation agriculture, farmers need to understand the crop development stages.

- Verification in Economic Aspect: High  
Based on the field application results, benefits and costs are assessed in the following manner:

**Benefit and Cost of Techniques of CR-3 in Oshakati-West**

Item	Benefit	Cost	Assessment
Land preparation by ripper furrowing	High, under the rainfall in this season	Slightly higher than the conventional method	High, in this season
Furrow planting for maximum utilization of soil moisture	High, under the rainfall situation in this season	Low, same as the conventional method	High, in this season
Mulching to avoid soil moisture loss, weed growing and heat on soil surface	Not applied	Not applied	-
Crop rotation to maintain soil fertility	Not applied	Not applied	-
Contour furrowing in the micro-relief (applied in the part of demonstration plot)	High, under the rainfall in this season	Moderate, same as the conventional method	High in this season
Inter-cropping with legume crops	Not applied	Not applied	-
Total Benefit and Cost	High	Moderate	High

Remarks "high, higher, moderate and low of benefit and cost are derived from comparison with the conventional methods.  
Source: Prepared by the Study Team

- Verification in Social Aspect: Moderate  
Through the trainings under the pilot site activities, farmers have gradually understood the crop development stages of pearl millet, but the level of understanding is not enough to change their traditional practices. Accordingly, perception farmers evaluated as "Moderate".

**Acceptance of Techniques of CR-3 by Farmers in Oshakati-West**

Item	Farmers Acceptance
Land preparation by ripper furrowing	✓ High acceptance based on the result.
Furrow planting	✓ Higher acceptance based on the progress of plant growth.
Mulching to avoid soil moisture loss, weed growing and heat on soil surface	✓ Not applied due short of materials and manpower.
Crop rotation to maintain soil fertility	✓ Not applied.
Contour furrowing in the micro-relief (applied in the part of demonstration plot)	✓ Slightly higher acceptance, but wide variation with micro-relief.
Inter-cropping with legume crops	✓ Not applied
Total acceptance	✓ Moderate

Source: Prepared by the Study Team

#### 4. Okatana Constituency

Region / Constituency / ADC	Applied Technical Measures
Oshana Region Okatana Constituency Uukwangla ADC	CR-5: Water Source / Water Harvesting CR-6: Water Saving Cultivation CR-7: Crop Selection and Marketing CR-8: Cropping Plan and Horticulture Crop Management

#### 4.1 CR-5: Water Source / Water Harvesting

##### Verification Result of Technical Measure or CR-5 in Okatana

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-5: Water Source / Water Harvesting	x	x			x	
Work Procedure	1. Roof catchment 2. Rainwater harvesting 3. Utilization of seasonal wetland					

Source: Prepared by the Study Team

##### ➤ General Situation

At the pilot site, facilities for rainwater harvesting and roof catchment had been installed in 2009 under the research program of CUVE Waters (Germany), and farmers obtained training of vegetable farming.

Rainwater harvesting and roof catchment are seems to be technically effective to collect rainwater, and farmers are utilizing the facilities for vegetable cultivation with supplemental water supply from tap of the Rural Water Supply.

##### ➤ Verification in Economic Aspect: High to Moderate

Cuve Waters suggested that the installation cost is high for the rainwater harvesting facilities, and the roof catchment seems to be lower side. Assuming that farmers can obtain enough sales from vegetables, verification results are “Moderate” for the rainwater harvesting facilities and “High” for the roof catchment, compared with the costs.

One of the present challenges is deteriorated materials like roof sheets and pipes for drip lines, because they are already out of product life and damaged by strong sunlight. Roof sheets were renewed in the Phase-3, and periodical replacement of materials is required through regular fee collection from sales of vegetables.

##### ➤ Verification in Social Aspect: Moderate

Under the present situation, acceptance by farmers seems to be “Moderate” because some group members are utilizing the facilities for vegetable production.

## 4.2 CR-6: Water Saving Cultivation

### Verification Result of Technical Measure of CR-6 in Okatana

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-6: Water Saving Cultivation		x			x	
Work Procedure	1. Low pressure drip irrigation system (tank kit, drum kit, bucket kit, or custom made) 2. Simple drip irrigation system by PET bottles bucket, watering can, and sprinkling can)					

Source: Prepared by the Study Team.

#### ➤ General Situation

Presently drip irrigation system, categorized as the low pressure drip irrigation system, is partially utilized for vegetable cultivation in the garden and green house, and some farmers sell their products to neighboring and markets nearby. However, improvement is required for water management for proper operation and replacement of deteriorated parts.

In addition to the above, deterioration of pipes and drip lines caused difficulties to operate irrigation system to grow vegetables, and limits efficient use of garden and green house.

In order to solve the above issues, layout of drip irrigation was modified and additional valves equipped through renewal of system. The 1<sup>st</sup> cropping under the renewed drip irrigation system is expected to start from April 2017.

#### ➤ Verification in Economic Aspect: Moderate

During the trainings and monitoring activities, garden and green house were not fully utilized for vegetable cropping and majority of plots were not cropped. After replacement of deteriorated parts of drip system and training of group strengthening, it is expected to bring higher benefits. Under this situation, verification result is assessed as “high”.

#### ➤ Verification in Social Aspect: Moderate

Farmers are utilizing drip irrigation system, but not fully, and farmers’ perception is evaluated as “Moderate”.

Deteriorated pipes and drip lines were replaced in the later stage of Phase-3, and farmers are expected to fully utilize the facilities and plot after strengthening of group activities.

## 4.3 CR-7: Crop Selection and Marketing

### Verification Result of Technical Measure of CR-7 in Okatana

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-7: Crop Selection and Marketing		x			x	
Work Procedure of CR-7	1. Market Survey 2. Information sharing with stakeholders 3. Crop selection					

Source: Prepared by the Study Team

#### ➤ Verification in Economic and Social Aspects: Moderate

After the 2<sup>nd</sup> training for farmers groups conducted in December 2016, farmers were

conducted the market survey by visiting the Oshakati Open Market. Based on this visit, farmers selected vegetables to grow. However, cropping of vegetables may start from April 2017 due to delay in renewal of roof catchment and drip irrigation system

#### 4.4 CR-8: Cropping Plan and Horticulture Crop Management

Verification Result of Technical Measure of CR-8 in Okatana

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-8: Cropping Plan and Horticulture Crop Management		x			x	
Work Procedure of CR-8	1. Cropping plan, cropping calendar, action plan, 2. Horticulture crop management (crop growing stages of horticulture crops, nursery preparation, seeding & seedling preparation, mulching & shading, thinning, field preparation, seeding or transplanting, weeding, pruning, branch training, lifting, plant protection, harvesting).					

Remarks: "(x)" shows the verification result at the moment, not for overall verification.

Source: Prepared by the Study Team

➤ Verification in Economic a Aspects: Moderate

Under the CUBE Water implemented during the period from 2009 to November 2014, farmers group obtained techniques and experience of horticulture crop production and they are selling vegetables in small amount. It is expected that farmers can produce and sell more vegetables under the renewed water harvesting facilities and drip irrigation system. In this regard, verification results are evaluated as Moderate.

➤ Verification in Social Aspects: Moderate

Out of 11 group members, some members left the group since they could not wait for renewal of facilities. Presently, the members remaining in the group have better motivation to continue growing vegetables, and the result is assessed as Moderate.

## 5. Omuthiya Constituency

Region / Constituency / ADC	Applied Technical Measures
Oshikoto Region Omuthiya Constituency Okashana ADC	CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management CR-4: Flood- and Drought-Adaptive Cropping System (Rice-Mahangu Mixed Cropping System)

### 5.1 CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management

#### Verification Result of Technical Measure of CR1 and CR-2 in Omuthiya

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management	x				x	
Work Procedure of CR-1	1. Review of the present practice, and explanation on fertilizer application methods. 2. Basal fertilizer application, 3. 1 <sup>st</sup> & 2 <sup>nd</sup> top dressing					
Work Procedure of CR-2	1. Crop development stages (cropping calendar) of pearl millet, 2. Standard crop management of pearl millet, 3. Modification of cropping calendar (replanting, weeding, thinning, top dressing, etc.)					

Source: Prepared by the Study Team

#### ➤ General Situation

Farmers have long experience of growing pearl millet, and production has been fluctuating mainly due to unstable rainfall. Some of traditional farming practices based on their experience can be improved according to crop growing stages, and these practices are high density of seedlings against soil moisture, transplanting of thinned plants even after vegetative growth, continuous cropping of same plots, and keeping plants without panicles until harvest.

In order to change traditional farming practices to appropriate crop management, farmers need to understand the crop development stages and prepare proper cropping plan for crop management.

#### ➤ Verification of Economic Aspect: High

Based on the field application results of techniques under CR-1 and CR-2, benefit and cost are assessed as “high” as shown in the following table:

#### Benefit and Cost of Techniques of CR-1 and CR-2 in Omuthiya

Item	Benefit	Cost	Assessment
Basal fertilizer (manure)	High	Moderate, same as conventional method	High
Ploughing (ripper furrow) to increase soil moisture	High	High, compared with conventional method	Moderate

Item	Benefit	Cost	Assessment
Weeding to avoid nutrient competition	Moderate, as same present practice	Moderate, as same present practice	Moderate
Thinning for appropriate density of plants	High	Moderate, due to manpower	High
Top Dressing with risk due to unstable rain	Not applied	Not applied	-
Replanting for appropriate plant density	Not applied	Not applied	-
Total Benefit and Cost	High	Moderate	High

Remarks "high and moderatet" in benefit and cost are derived from comparison with the conventional methods.

Source: Prepared by the Study Team

According to the rainfall record at the pilot site, frequent dry spells are observed in this season, and totally no rain continued for more than 3 weeks in February. Due to this situation, crops are damaged and growth is not well.

Based on the field application results of techniques under CR-1 and CR-2, benefit and cost ratio are assessed as "Low" as shown in the following table:

#### Benefit and Cost of Techniques of CR-1 and CR-2 in Omuthiya

Item	Benefit	Cost	Assessment
Basal fertilizer (manure)	Low due to unstable rain	Comparatively high, no basal in conventional method	Low
Ploughing (ripper furrow) to increase soil moisture	Low due to unstable rain	High or moderate, compared with conventional method	Low
Weeding to avoid nutrient competition	Low due to unstable rain	Moderate, as same present practice	Low
Thinning for appropriate density of plants	Low due to unstable rain	High or moderate, due to manpower	Low
Top Dressing with risk due to unstable rain	Not applied	Not applied	-
Replanting for appropriate plant density	Low due to unstable rain	High	Low
Total Benefit and Cost	Low	Moderate	Low

Remarks "high, moderate and low" of benefit and cost are derived from comparison with the conventional methods.

Source: Prepared by the Study Team

#### ➤ Verification of Social Aspect: Moderate

Through the trainings, farmers become understanding the crop development stages, but level of understanding is not enough to change their traditional practices. Accordingly, perception farmers evaluated as "Moderate".

#### Acceptance of Techniques of CR-1 and CR-2 by Farmers in Omuthiya

Item	Farmers Acceptance
Crop development stages of pearl millet	✓ Moderate, obtained some level of understanding but not applied to the farming practices.
Basal fertilizer for initial vegetative growth	✓ Normal as the present practice if manure is available.
Ploughing (ripper furrow) to increase soil moisture	✓ High, based on the farmers' observation in each growing stage.
Weeding to avoid nutrient competition	✓ Normal as the present practice,.
Thinning for appropriate density of plants	✓ Moderate, farmers gradually understand theoretical explanation.
Top Dressing with risk due to unstable rain	✓ Not recommended, due to availability and risk of drought.
Replanting for appropriate plant density	✓ Normal as the present practice,.



Item	Farmers Acceptance
Total acceptance	✓ Moderate

Source: Prepared by the Study Team

## 5.2 CR-3: Conservation Agriculture

### Verification Result of Technical Measure of CR-3 in Omuthiya

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-3: Conservation Agriculture	x				x	
Work Procedure	1. Land preparation by deep cultivation (ripper furrowing) , 2. Furrow planting, 3. Mulching on the soil surface, 4. Crop rotation with fallow, 5. Contour furrowing 6. Inter-cropping with legume crops					

Source: Prepared by the Study Team

#### ➤ General

Farmers in this site have some experience on Namibia-specific Conservation Agriculture (ripper furrowing), and they slightly know its effect. Under this situation, farmers conduct such traditional farming practices as described in the above CR-1 and CR-2, and it was found that still some practices can be improved under the conservation agriculture.

In order to realize the effect of conservation agriculture, farmers need to understand the crop development stages and improve their farming practices.

#### ➤ Verification in Economic Aspect: High

Based on the field application results, benefits and costs are assessed as “high” as shown in the following table:

### Benefit and Cost of Techniques of CR-3 in Omuthiya

Item	Benefit	Cost	Assessment
Land preparation by ripper furrowing	High effect continued to the next year	Slightly higher than the conventional method	High,
Furrow planting for maximum utilization of soil moisture	High	Moderate same as the conventional method	High,
Mulching to avoid soil moisture loss, weed growing and heat on soil surface	Not applied	Not applied	-
Crop rotation to maintain soil fertility	Not applied	Not applied	-
Contour furrowing in the micro-relief	Not applied	Not applied	-
Inter-cropping with legume crops	Not applied	Not applied	-
Total Benefit and Cost	High	Moderate	High

Remarks “high, higher and moderate” in benefit and cost are derived from comparison with the conventional methods.

Source: Prepared by the Study Team

#### ➤ Verification in Social Aspect: Moderate

Farmers understood the effect of conservation agriculture, particularly ripper furrowing for land preparation because they observed better progress of crop growth than the conventional one. Accordingly farmers accepted the conservation agriculture and they

have intension to apply to the next season. Accordingly, perception by farmers is evaluated as "Moderate" shown in the table below:

**Acceptance of Techniques of CR-3 by Farmers in Omuthiya**

<b>Item</b>	<b>Farmers Acceptance</b>
Land preparation by ripper furrowing	✓ High acceptance by farmers based on the result.
Furrow planting	✓ High acceptance by farmers based on the progress of plant growth.
Mulching to avoid soil moisture loss, weed growing and heat on soil surface	✓ Not applied due short of materials and manpower.
Crop rotation to maintain soil fertility	✓ Not applied.
Contour furrowing in the micro-relief (applied in the part of demonstration plot)	✓ Slightly accepted by farmers, but wide variation with micro-relief.
Inter-cropping with legume crops	✓ Not applied
Total acceptance	✓ Moderate

Source: Prepared by the Study Team

## 6. Onayena Constituency

Region / Constituency / ADC	Applied Technical Measures
Oshana Region Okatana Constituency Uukwangla ADC	CR-6: Water Saving Cultivation CR-7: Crop Selection and Marketing CR-8: Cropping Plan and Horticulture Crop Management

### 6.1 CR-6: Water Saving Cultivation

#### Verification Result of Technical Measure of CR-6 in Onayena

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-6: Water Saving Cultivation	x				x	
Work Procedure	1. Low pressure drip irrigation system (tank kit, drum kit and bucket kit), 2. Simple drip irrigation system by PET bottles bucket, watering can, and sprinkling can), 3. Drip irrigation system for Etunda Irrigation Green Scheme					

*Remarks: "(x)" shows the temporary verification result at the moment, not for overall verification.*

*Source: Prepared by the Study Team*

#### ➤ General Situation

In the demonstration farm, 1 set of low pressure drip irrigation kit, covering 150 m<sup>2</sup> of horticulture garden, was installed under support from JICA N-CLIMP Team. Drip irrigation kit was connected with tap from water supply through 210 lit tank, and the demonstration farmer is operating it.

For each of 14 key farmers, small size of low pressure drip irrigation kits are distributed, however, no key farmers have installed kits in their garden. This is mainly because that they are not well aware of installation method, even they had guidance for installation at the demonstration farm before.

#### ➤ Verification in Economic Aspects: High

Demonstration farmer started to prepare seedlings of cabbage and green pepper, and transplanted them in the irrigated garden. Growth of vegetables was fair and he sold vegetables in the local market to obtain the economic result of vegetable cropping.

In this regard, water saving cultivation is so far evaluated as "High".

#### ➤ Verification in Social Aspect: Temporarily Moderate.

Although key farmers obtained trainings and understood water saving irrigation at certain level, but some of them were not able to install the kits in their garden. They need to repeat training for installation, operation and maintenance, and this situation is assessed as "Moderate".

## 6.2 CR-7: Crop Selection and Marketing

### Verification Result of Technical Measure of CR7 in Onayena

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-7: Crop Selection and Marketing	x	-	-		x	
Work Procedure of CR-7	1. Market Survey 2. Information sharing with stakeholders 3. Crop selection.					

Remarks: “-“ shows no evaluation results are available in this stage.

“(x)” shows the temporary verification result at the moment, not for overall verification.

Source: Prepared by the Study Team

#### ➤ General Situation

In January 2016, farmers conducted a market survey at the Onayena market under guidance of AT and JICA N-CLIMP Team, and the demo farmer selected cabbage and green pepper for the next crops under drip irrigation. Those crops grown well and were sold to the local markets. In the 4<sup>th</sup> training for farmers group in April 2017, this information was discussed and shared among the key farmers.

#### ➤ Verification in Economic Aspect: High

Based on the above situation, market survey seems to be the fundamental condition for horticulture, and the results of crop selection and marketing is evaluated as “moderate”.

#### ➤ Verification in Social Aspect: Moderate

Perception by the demo farmer and some of key farmers evaluated as “High”, but other farmers have not understood to change their attitude to select vegetables to grow through market survey. In this regard, verification result of this technical measure is evaluated as “Moderate”.

## 6.3 CR-8: Cropping Plan and Horticulture Crop Management

### Verification Result of Technical Measure of CR-8 in Onayena

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-8: Cropping Plan and Horticulture Crop Management		x			x	
Work Procedure of CR-8	1. Cropping plan, cropping calendar, action plan, 2. Horticulture crop management (crop growing stages of horticulture crops, nursery preparation, seeding & seedling preparation, mulching & shading, thinning, field preparation, seeding or transplanting, weeding, pruning, branch training, lifting, plant protection, harvesting).					

Remarks: “-“ shows no evaluation results are available in this stage.

“(x)” shows the temporary verification result at the moment, not for overall verification.

Source: Prepared by the Study Team

#### ➤ Verification in Economic Aspect: Moderate

Demonstration farmer harvested and sold cabbage, tomato and green pepper from the irrigated garden. Growth of vegetables was fair and he sold vegetables in the local market to obtain the economic result of vegetable cropping.

Demonstration farm keeps his records about cropping activities, inputs and their cost and sales of vegetables. His records show the profit seems low due to much cost for labors and assets. Labors are working not only for horticulture but also other work like mahangu cultivation, installation of assets etc., and these costs should be depreciated and allocated properly. In this regards, the economic aspect is evaluated as “Moderate”.

➤ **Verification in Social Aspect: Moderate**

Demonstration farmer prepared the cropping plan based on the market survey and started his cropping of cabbage, tomato and green pepper, and some of key farmers are also planting vegetables. Although not all the key farmers understand and carried out the cropping plan and vegetable crop management, perception by demonstration farmer and some key farmers was obtained. This result is evaluated as “Moderate”.

## 7. Ondobe Constituency

Region / Constituency / ADC	Applied Technical Measures
Omusati Region Etayi Constituency Etayi ADC	CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management CR-4: Flood- and Drought-Adaptive Cropping System (Rice-Mahangu Mixed Cropping System)

### 7.1 CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management

#### Verification Result of Technical Measure of CR-1 and CR-2 in Ondobe

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management		x			x	
Work Procedure of CR-1	1. Review of the present practice, and explanation on fertilizer application methods 2. Basal fertilizer application 3. 1 <sup>st</sup> and 2 <sup>nd</sup> top dressing					
Work Procedure of CR-2	1. Crop development stages (cropping calendar) 2. Standard crop management of pearl millet, 3. Modification of cropping calendar (replanting, weeding, thinning, top dressing, etc.)					

Source: Prepared by the Study Team

#### ➤ General Situation

Like other pilot sites, farmers in this site also have long experience to grow pearl millet under unstable rainfall condition, and such traditional farming practices were observed like high density of seeding, transplanting of thinned plants after vegetative growth, continuous cropping in the same plots, and keeping tillers without panicle.

In order to carry out the appropriate crop management, farmers require to understand the crop development stages.

#### ➤ Verification in Economic Aspect: Moderate

Based on the field application results, benefits and costs are assessed in the following manner:

#### Benefit and Cost of Techniques of CR-1 and CR-2 in Ondobe

Item	Benefit	Cost	Assessment
Basal fertilizer (manure) for initial vegetative growth	Improved, under unstable rain	Higher, compared with the previous practices	Moderate
Ploughing (ripper furrow) to increase soil moisture	Improved, under unstable rain	High or moderate, compared with conventional method	Moderate
Weeding to avoid nutrient competition	Improved, under unstable rain	Moderate, as same present practice	Moderate
Thinning for appropriate density of plants	Improved, under unstable rain	Moderate, as same present practice	Moderate
Top Dressing with risk due to unstable rain	Not applied	Not applied	-

Item	Benefit	Cost	Assessment
Replanting for appropriate plant density	Improved, under unstable rain	Moderate, as same present practice	Moderate
Total Benefit and Cost	Medium	Moderate	Moderate

Remarks "high, moderate and low" of benefit and cost are derived from comparison with the conventional methods.  
Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Through the trainings under the pilot site activities, farmers have gradually understood the crop development stages of pearl millet, but the level of understanding is not enough to change their traditional practices, and trainings need to continue to change farmers attitude. Accordingly, perception farmers evaluated as "Moderate".

**Acceptance of Techniques of CR-1 and CR-2 by Farmers in Ondobe**

Item	Farmers Acceptance
Crop development stages of pearl millet	✓ Moderate, obtained some level of understanding but not applied to the farming practices.
Basal fertilizer for initial vegetative growth	✓ Normal as the present practice if manure is available.
Ploughing (ripper furrow) to increase soil moisture	✓ High, based on the farmers' observation in each growing stage.
Weeding to avoid nutrient competition	✓ Normal as the present practice,.
Thinning for appropriate density of plants	✓ Moderate, farmers gradually understand theoretical explanation.
Top Dressing with risk due to unstable rain	✓ Not recommended, due to low availability with higher price and risk of drought.
Replanting for appropriate plant density	✓ Normal as the present practice,.
Total acceptance	✓ Moderate

Source: Prepared by the Study Team

## 7.2 CR-3: Conservation Agriculture

**Verification Result of Technical Measure of CR-3 in Ondobe**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-3: Conservation Agriculture		x			x	
Work Procedure	1. Land preparation by deep cultivation 2. Furrow planting 3. Mulching on the soil surface 4. Crop rotation with fallow 5. Contour furrowing 6. Inter-cropping with legume crops					

Source: Prepared by the Study Team

➤ General

Farmers in this site have no experience on conservation agriculture before N-CLIMP and this is the first time for them to apply Namibia-specific Conservation Agriculture (ripper furrowing) in their plot.

According to the rainfall record at the pilot site, frequent dry spells are observed, and particularly no rains are recorded over 3 weeks in February 2016. In this situation, harvest of pearl millet was not high in Phase 2, but farmers understand better growth in the demonstration plot compared with the conventional cultivation.

After early February 2017 in Phase 3, better rainfall started and crop growth of pearl millet seemed to be better, comparing with the surrounding fields. Farmer also understand ripper furrowing was bringing better growth than their own fields.

➤ Verification in Economic Aspect: Moderate

Based on the field application results, benefits and costs are assessed as “Low” as shown in the following table:

**Benefit and Cost of Techniques of CR-3 in Ondobe**

Item	Benefit	Cost	Assessment
Land preparation by ripper furrowing	Improved, under unstable rain	Higher, compared with the conventional method	Moderate
Furrow planting for maximum utilization of soil moisture	Improved, under unstable rain	Low, same as the conventional planting	Moderate
Mulching to avoid soil moisture loss, weed growing and heat on soil surface	Not applied	Not applied	-
Crop rotation to maintain soil fertility	Not applied	Not applied	-
Contour furrowing in the micro-relief	Not applied	Not applied	-
Inter-cropping with legume crops	Improved, under unstable rain	Low, same as the conventional planting	Moderate
Total Benefit and Cost	Moderate	Moderate	Moderate

Remarks “moderate and low” of benefit and cost are derived from comparison with the conventional methods.

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Farmers understood the effect of conservation agriculture, particularly ripper furrowing for land preparation because they observed better progress of crop growth than the conventional one. Accordingly farmers accepted the conservation agriculture and they have intension to apply to the next season. Accordingly, perception by farmers is evaluated as ”Moderate” shown in the table below:

**Acceptance of Techniques of CR-3 by Farmers in Ondobe**

Item	Farmers Acceptance
Land preparation by ripper furrowing	✓ High acceptance by farmers based on the result.
Furrow planting	✓ High acceptance by farmers based on the progress of plant growth.
Mulching to avoid soil moisture loss, weed growing and heat on soil surface	✓ Not applied due short of materials and manpower.
Crop rotation to maintain soil fertility	✓ Not applied.
Contour furrowing in the micro-relief (applied in the part of demonstration plot)	✓ Slightly accepted by farmers, but wide variation with micro-relief.
Inter-cropping with legume crops	✓ Not applied
Total acceptance	✓ Moderate

Source: Prepared by the Study Team



## 8. Epembe Constituency

Region / Constituency / ADC	Applied Technical Measures
Ohangwena Region	CR-6: Water Saving Cultivation
Epembe Constituency	CR-7: Crop Selection and Marketing
Epembe ADC	CR-8: Cropping Plan and Horticulture Crop Management

### 8.1 CR-6: Water Saving Cultivation

#### Verification Result of Technical Measure of CR-6 in Epembe

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-6: Water Saving Cultivation		(x)		x		
Work Procedure	1. Low pressure drip irrigation system (tank kit, drum kit and bucket kit), 2. Simple drip irrigation system by PET bottles bucket, watering can, and sprinkling can)					

Remarks: "(x)" shows the temporary verification result at the moment, not for overall verification.

Source: Prepared by the Study Team

➤ **General Situation**

Two sets of low pressure drip irrigation kits (150 m<sup>2</sup> each) were installed together with 500 liter capacity of a tank, however, connection with water source (bore hole: deep well) has not accomplished by the end of N-CLIMP period.

While waiting for connection with bore hole, farmers planted maize and beans in the part of irrigation plot, and they also conducted market survey to select vegetables during Phase-2. In Phase-3, farmers started nursery preparation for tomato and other vegetables in the small ridges by giving water by buckets and watering can.

➤ **Verification in Economic Aspect: temporarily Moderate**

Under the above situation, it is expected to connect the drip irrigation with bore hole in late March 2017. While waiting for connection, farmers were repeatedly encouraged to plant vegetable through the trainings and monitoring activities. Farmers are trying to plant vegetable cropping with watering cans. This is another mode of water saving irrigation..

After connecting drip irrigation kits with bore hole, farmers are expected to use drip irrigation kits and to plant horticulture crops after N-CLIMP period. Under this circumstance, and the economic aspects are temporarily evaluated as "Moderate", mainly because the drip irrigation kits were installed by themselves under guidance of MAWF and N-CLIMP.

➤ **Verification in Social Aspect: High**

Farmers have already obtained experience to install drip irrigation kits under support of MAWF and JICA N-CLIMP Team, and they become understanding for installation and prepare layout of plots. In this situation, perception of farmers is in progress for water saving cultivation and it is evaluated as "High".

## 8.2 CR-7: Crop Selection and Marketing

### Verification Result of Technical Measure of CR-7 in Epembe

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-7: Crop Selection and Marketing	-	x	-	x		
Work Procedure of CR-7	1. Market survey 2. Information sharing with stakeholders 3. Crop selection 4. Cropping plan (farming schedule).					

Remarks: “-“ shows no evaluation results are available in this stage.

“(x)” shows the temporary verification result at the moment, not for overall verification.

Source: Prepared by the Study Team

#### ➤ General Situation

On January 27 2016, farmers conducted a market survey at the Eenhana market under guidance of AT and JICA N-CLIMP Team, and farmers selected cabbage and onion for the next crops under drip irrigation. The selection was made based on market demand. If the cropping calendar is respected, cabbage is expected to sale in high demand season. On the other hand, onion will be sold not in high demand season, but farmers preferred to cultivate it rather than leave land unused.

#### ➤ Verification in Economic Aspect: not applicable

Transportation is the major cost for market survey. After the group sells vegetables at the market, they can accompany with their products to conduct market survey, and the transportation cost will be minimum. In this regard, economic aspect is evaluated as Moderate.

#### ➤ Verification in Social Aspect: Temporary High

Farmers conducted a market survey at Eenhana in January 2016, and selected cabbage and onion for cropping. After the market survey, they anticipated to sell vegetables in the Chinese market at Oshikango in future. In this situation, their motivation is high and they started to prepare seedling bed before connecting drip irrigation kits with water source. In this situation, verification result is judged as High.

## 8.3 CR-8: Cropping Plan and Horticulture Crop Management

### Verification Result of Technical Measure of CR-8 in Epembe

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
CR-8: Cropping Plan and Horticulture Crop Management		x		x		
Work Procedure of CR-8	1. Cropping plan, cropping calendar, action plan, 2. Horticulture crop management (crop growing stages of horticulture crops, nursery preparation, seeding & seedling preparation, mulching & shading, thinning, field preparation, seeding or transplanting, weeding, pruning, branch training, lifting, plant protection, harvesting).					

Remarks: “-“ shows no evaluation results are available in this stage.

“(x)” shows the temporary verification result at the moment, not for overall verification.

Source: Prepared by the Study Team

➤ **Verification in Economic Aspects: Moderate**

Farmers are waiting for connecting drip irrigation with water source to cultivate cabbage and onion, selected based on the market survey. In this situation, horticulture cropping has not started yet, and no verification results are available for economic aspects in the Phase-2.

After connecting drip irrigation kits with water source, trainings for farmers group will resume for cultivation of horticulture crops under the pilot site activities in the Phase-3.

➤ **Verification in Social Aspects: High**

Through the market survey, farmers are well motivated to engage themselves in horticulture cropping, and they prepared the cropping plan. According to the cropping plan, they tried to crop vegetables using watering cans. In this situation, social aspects is evaluated as high, though they need to wait for connecting drip irrigation with water source.

Other Topics

➤ **Farmers Experience of Crop Production**

All of the group members have no experience of crop production for horticulture and grain cereals, and most of the members are younger generation. During preparation of demonstration plot, the group supplied materials like poles and pegs, and many members worked voluntarily. If they can keep their motivation, it is expected that they will obtain proper knowledge and experience without traditional prejudice on crop and farm management separate.

*Attachment 3-2*

*Verification Results of  
each Technical Measures for  
Crop Production*

*N-CLIMP*

## Attachment 3-2 Verification Results of Each Technical Measure for Crop Production

### 1. Overall Verification Result (Crop production and Livestock Production)

#### Summary of Verification Results of Technical Measures for Crop Production

Technical Measure	Economic Aspect	Social Aspect	No. of Sites Applied
CR-1 Fertilizer application	High	Moderate	4 grain sites
CR-2 Cropping pattern and crop management	High	Moderate	3 grain sites
CR-3 Conservation agriculture	High	Moderate	3 grain sites
CR-4 Flood- and drought-adaptive cropping (Rice-Mahangu Mixed Cropping System)	Low	Moderate	1 grain sites
CR-5 Water source / water harvesting	Moderate	Moderate	1 horticulture site, rehabilitation only
CR-6 Water saving cultivation	High	High	4 horticulture sites
CR-7 Crop selection and marketing	Moderate	Moderate	4 horticulture sites
CR-8 Cropping plan and horticulture crop management	Moderate	High	4 horticulture sites

Source: Prepared by the Study Team.

### 2. Crop Production

(1) CR-1: Fertilizer Application (Cereal Grains)

CR-2: Cropping Pattern and Crop Management (Cereal Grains)

Fertilizer application (CR-1) is a part of crop management (CR-2), and CR-1 and CR-2 are combined together to apply to the pilot site activities. Verification results at each site are combined into the overall results, and summarized below:

#### Summary of Verification Results of CR-1 and CR-2

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Etayi	<b><u>Moderate</u></b>	<b><u>Moderate</u></b>	Better crop growth due to unstable rainfall, higher farmers' acceptance but limited members,
Oshana Oshakati-West	High	Moderate	Better crop growth at demonstration farm, higher farmers' acceptance of majority members but still traditional practices
Oshikoto Omuthiya	High	Moderate	Better crop growth at demonstration farm, higher acceptance by majority of members but remain traditional practices
Ohangwena Ondobe	<b><u>Moderate</u></b>	Moderate	Improvement in crop growth under unstable rainfall, higher farmers' acceptance
Overall Verification Results	<b><u>High</u></b>	Moderate	Basal fertilizer of manure recommended, high risk for top dressing of chemical fertilizer due to unstable rainfall. Small amount of chemical fertilizer for basal recommended if readily available and lower price

Source: Prepared by the Study Team.

This technical measure can be applied to the cropped area over the regions, and crop growing stages is the basic knowledge for crop farming. Based on the correct knowledge, farmers can improve the present farming techniques and carry out the proper practices.

Manure is recommended for basal application. Chemical fertilizers are limitedly available at ADCs with subsidized prices and high prices in the markets. Costly chemical fertilizers can be used in the minimum amount to supplement manure, and careful application is required to avoid wasting.

Thinning is another important technique to utilize the limited soil moisture, and to be carried out at proper timing of 2 to 3 weeks after germination. At the ripening stage (grain filling stage), thinning of plants without panicle also seems effective to utilize soil moisture and nutrients, and removed plants can be used for silage to feed livestock.

(2) CR-3: Conservation Agriculture (Cereal Grains)

Verification results at each site are described in the previous section and combined into the overall results, as summarized below:

**Summary of Verification Results of CR-3**

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Oshana Oshakati-West	High	Moderate	Good crop growth by ripper furrowing at demonstration farm, higher farmers' acceptance of majority members on ripper furrowing
Oshikoto Omuthiya	High	Moderate	Good crop growth at demonstration farm but poor crop growth at majority of key farmers, higher acceptance by all members
Ohangwena Ondobe	Low	Moderate	Poor crop growth due to poor rainfall, higher farmers' acceptance
Overall Verification Results	High	Moderate	Good crop growth at majority of farmers, higher acceptance but traditional

*Source: Prepared by the Study Team.*

This technical measure can also be carried out in the entire regions, and Namibia specific Conservation Agriculture, so called as ripper furrowing, is the main techniques to utilize the limited soil moisture, and includes deep ripping, higher ridging and furrow planting is the main technique to utilize limited soil moisture.

From the field observation, growth of pearl millet seemed damaged by high moisture in the plots where the groundwater is higher. This is due to higher soil moisture and low tolerant characteristics of pearl millet. Therefore, application of ripper furrowing needs attention to avoid the lands with higher groundwater level. Other techniques will be combined with the ripper furrowing.

(3) CR-4: Flood- and Drought-Adaptive Cropping System (Cereal Grains)

Rice-Mahangu Mixed Cropping

Verification results at each site are described in the previous section and combined into the overall results, as summarized below:

**Summary of Verification Results of CR-4**

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Etayi	Low	Medium	Poor crop growth due to unstabler rainfall. Higher motivation on rice cultivation by some farmers but low acceptance on rice cultivation techniques due to less repeated of training.

Overall Verification Results	Low	Low	Physical potential area in the northern part of Omusati and Oshana as well as eastern part of Ohangwena.
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Source: Prepared by the Study Team.

This technical measure is applicable only in the seasonal wetland, called Ondonbe and Oshana, where mainly extends over the northern part of Omusati and Oshana Regions and eastern part of Ohangwena. These areas are located on the land units under Kalahari flooded and overflowing valleys, according to the Agro-Ecological Zoning Programme. This is one of the reasons to select only one pilot site for this technical measure.

For farmers and the Agricultural Technician (AT) at the pilot site in Etayi, this is the first experience to engage in the rice cultivation as well as mixed cropping in the wetland. This situation together with poor rainfall resulted in the low verification result, however, motivation of farmers and AT is still high. Together with linkage to the Ogongo Campus where the Rice-Mahangu Project is going-on, repeated trainings for farmers will improve the verification result to “high”.

#### (4) CR-5: Water Source / Water Harvesting (Horticulture)

Verification results at each site are described in the previous section and combined into the overall results, as summarized below:

##### Summary of Verification Results of CR-5

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Oshana Okatana	Moderate	Moderate	Rainwater harvesting facility is high in cost. Roof catchment facility within the cost to compensated by vegetable sales. Better acceptance to use facilities but deteriorated materials not replaced.
Overall Verification Results	Moderate	Moderate	Only applied to the existing harvesting facilities for rehabilitation. No new facilities and structures introduced.

Remarks: “()” shows the temporary verification result at the moment, not for overall verification.

Source: Prepared by the Study Team.

This technical measure can be applied to any place where farmer has strong incentive to obtain water. Facilities equipped at the pilot site in Okatana were originally constructed under the research program of CUVE Waters in 2009.

Challenge of rainwater harvesting facilities is high construction cost, difficult to be compensated by saving water supply charge. For example, 120 m<sup>3</sup> of rainwater can be stored and this is equivalent to about N\$1,400 of water charge as saving of water cost. On the other hand, if this facility is utilized for supplemental irrigation water source, particularly water shortage in the critical period of growing stage, it will be valuable. Roof catchment is rather lower cost, and this should be widely utilized not only for horticulture but also for other purpose like domestic use or livestock.

#### (5) CR-6: Water Saving Cultivation (Horticulture)

Verification results at each site are described in the previous section and combined into the overall results, as summarized below:

**Summary of Verification Results of CR-6**

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Etunda	High	High	Drip irrigation set procured, high acceptance of farmers taking into account 50% contribution of procurement cost.
Oshana Okatana	Moderate	Moderate	Experience to use drip irrigation, moderate acceptance by farmers to improve group management.
Oshikoto Onayena	High	Moderate	Low pressure drip irrigation kit installed in demonstration farm, but remaining not-stalled in key farmers plots, high acceptance by farmers with good motivation, awaiting for training on installation in key farmers plots.
Ohangwena Epembe	(Moderate)	<b>High</b>	Low pressure drip irrigation kits installed but not connected to borehole, high motivation to start cropping.
Overall Verification Results	<b>High</b>	<b>High</b>	Verification of economic aspect not available till crop harvested,

*Source: Prepared by the Study Team.*

The technical measure of water saving cultivation is applicable in the locations where water source is available. Many cases are observed that farmers or house wives are cultivating vegetables and orchards in backyard gardens using tap water, for their home consumption or small income. In this case, low pressure drip irrigation kits are recommendable to save the water supply volume. This is not only for saving water charge of individuals but also for improvement of regional water demand.

Larger scale of drip irrigation system requires more sophisticated water supply system, like Etunda Scheme. In this case, higher investment level is necessary to manage commercial production.

Such larger scale of drip irrigation system can be introduced in the Etunda Irrigation Green Scheme and the area surrounding the Olshandja lake, where enough water source is available. High investment cost is required if the system includes supply from the water source, like pump and main pipelines. One of the serious challenge for this drip irrigation system, limited number of suppliers are available in Namibia, and it take long time to obtain spare parts for maintenance.

(6) CR-7: Crop Selection and Marketing

Verification results at each site are described in the previous section and combined into the overall results, as summarized below:

**Summary of Verification Results of CR-7**

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Etunda	<b>High</b>	<b>High</b>	Marketing survey conducted. Action plan to be expanded to other farmers through the cooperative in Etunda.
Oshana Okatana	Moderate	Moderate	Market survey conducted. Preparation of cropping on-going at the end of N-CLIMP period
Oshikoto Onayena	Moderate	Moderate	Marketing survey conducted, crop selection made, moderate acceptance of farmers but training to be repeatedly required.



Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Ohangwena Epembe	Moderate	Moderate	Marketing survey conducted, crop selection made, moderate acceptance by farmers but repeated training and transportation are required.
Overall Verification Results	Moderate	Moderate	

Source: Prepared by the Study Team.

This technical measure is the important part of SHEP approach, and applicable in the areas under horticulture production, particularly for sales of products. One of the target farmers of this measure is the small farmers of the Etunda Irrigation Scheme, and each of them are cultivating 3 ha of land with underground pipelines of irrigation water supply. These small scale farmers are presently cultivating wheat and maize, and are the potential farmers for horticulture, therefore, pilot site activities in Etunda are expected to expand to other farmers.

Farmers using low pressure drip irrigation kits are also target of this measure, and they are located all over the regions where water is available in their backyard garden and market is nearby.

#### (7) CR-8: Cropping Plan and Horticulture Crop Management (Horticulture)

Verification results at each site are described in the previous section and combined into the overall results, as summarized below:

##### Summary of Verification Results of CR-8

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Etunda	<b><u>Moderate</u></b>	<b><u>High</u></b>	Cropping not started yet, likely high acceptance because of good motivation and training be started.
Oshana Okatana	Moderate	High	Cropping not started yet but existing cropping rather poor, high acceptance with good motivation and training to be commenced.
Oshikoto Onayena	Moderate	Moderate	Cropping started in demonstration farm in good way but key farmers without installation, high acceptance by farmers but frequent trainings required.
Ohangwena Epembe	<b><u>Moderate</u></b>	High	Cropping not started yet, high acceptance by farmers in the training but repeat of trainings required due to no experience of cropping.
Overall Verification Results	Moderate	High	

Source: Prepared by the Study Team.

This is the technical measure essential to horticulture cropping, and needs to be applied where horticulture is cropped.

Level of farmers' knowledge and techniques may widely varies depending on their experience, for example, farmers in the Etunda Irrigation Scheme can observe cropping of green peppers by the project office under drip irrigation system, on the other hand farmers in Epembe have no chance to see cultivation of vegetables nearby their village.

In both cases, the basic knowledge and techniques are essential for horticulture crop, and based on the technical level of farmers training contents should be modified.

*Attachment 3-3*

*Verification Results by Pilot Site for*

*Livestock Production*

*N-CLIMP*

## Attachment 3-3 Verification Results by Pilot Site for Livestock Production

### 1. Okahao Constituency

Region / Constituency / ADC	Applied Technical Measures
Omusati Region Okahao Constituency Okahao ADC	LS-1: Fodder production LS-2: Range Management LS-5: Disease Control LS-6: Large and Small Stock Fattening

#### 1.1 LS-1: Fodder production

##### Verification Result of Technical Measure of LS-1 in Okahao

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-1: Fodder production		X			X	
Work Procedure of LS-1	1. Preparation of land 2. Sowing seeds 3. Hay making 4. Seed collection					

Source: Prepared by the Study Team

#### ➤ Farmers' Understanding

- All farmers have never had this experience to produce fodder grasses because that farmers have never invest any input on grazing pastures as the manners of pastoralist historically. They, however, have noticed the importance of fodder production according to the chronic deficiency of fodder during resent droughts that hit farmers' livestock physically and economically.
- N-CLIMP team has tried to explain the importance of fodder production and the way how to grow nutritive grasses in cultivated area.
- Demo farmer decided demo plot and fenced to protect livestock invasion. Then the farmer prepared land for sowing seeds of Lucerne/ Alfalfa, Bluebuffelgras, Anthephora.

#### ➤ Field application result

- Due to delay poor rainfall in the areas, seeds could not germinate.

#### ➤ Remarks

- Fodder production is very important activity to mitigate continuous grass shortage in grazing area although the activities in Phase-2 and Phase-3 can't get expected result due to poor rainfall.
- Since the timing to give seeds was late and missed sowing chance after even scarce rain, it needs to sow seeds many times like Mahangu in order to select proper moisture in soil in the next season.
- It would be easy to spread this fodder production after establishment of grass fields once and

farmers would not need to buy seeds because of self-collection of seeds from their grass fields.

➤ Verification in Economic Aspect: Moderate

Due to poor rainfall, water/soil moisture was not enough to sow grass seeds in the demonstration plot. Farmers wouldn't need to purchase seeds any more if grasses grow in the plot. Based on the results and its expectation of seed collection possibility in future, it scores "Moderate" of verification result.

**Benefit and Cost of Techniques of LS-1 in Okahao**

Item	Benefit	Cost	Assessment
Preparation of land	Moderate	Moderate	Moderate
Seed purchasing	Moderate	Moderate	Moderate
Sowing seeds	Moderate	Low	High
Hay making	Not applied	Not applied	Not applied
Seed collection	Not applied	Not applied	Not applied
Total Benefit and Cost	High to Moderate	Moderate to Low	High to Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Despite of negative impact of fodder production at the demonstration plot and other key farmers' places, they understand well that the result was due to poor rainfall and improper timing of seed sowing. Demonstration and key farmers tend to sow again in the next rainy season. Farmers know the importance of fodder production, skills to sow and grow grasses. Because that farmers have strong demands to try again fodder production, social aspect is "Moderate"

## 1.2 LS-2: Range Management

**Verification Result of Technical Measure of LS-2 in Okahao**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-2: Range Management	-	-	-	-	-	-
Work Procedure of LS-2	1. Agreement of members to manage grazing area for planned grazing 2. Agreement with traditional authorities to utilize pasture for grazing 3. Fees for range management: payment for herders, fencing materials, water point development and its construction and etc. 4. Allocation of grazing areas for rotation according to plan 5. Fencing and to start planned grazing					

Remarks: "- shows no evaluation results are available in this stage.

Source: Prepared by the Study Team

➤ Farmers' Understanding

- Farmers theoretically understand its importance of Range Management according to the recent degrading of pasture, overgrazing, decreasing perennial grasses, soil erosion and etc.
- It is very difficult to control rangeland properly for grazing. It needs grazing rotation, planned grazing, allocation of grazing areas, group agreement for grazing, charges to employ herders and etc.

➤ Field application result

- Since this trial would take long procedure at least more than 5 years from group agreement of planned grazing to implement proper range management, N-CLIMP just stress its importance and way of rangeland management.
- Remarks
- Since it needs long procedure and cost, N-CLIMP cannot adopt this activity during 3 years period. It however emphasized the concept of range management and its necessity during training for ATs and farmers.

### 1.3 LS-5: Disease Control

**Verification Result of Technical Measure of LS-5 in Okahao**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-5: Disease Control		X			X	
Work Procedure of LS-5	1. Animal husbandry: Dehorning, Castration, Straining, Injection, Oral medication, Pour on and etc. 2. Vaccination, Deworming (parasite control), Medication (injection, oral medication, spraying, pour on etc.)					

*Source: Prepared by the Study Team*

- Farmers' Understanding
  - This is the one of most important challenges for farmers concerning livestock industry in NCA, Namibia. Most of farmers have never taken measures to control animal diseases although these diseases cause great economic loss for livestock farmers.
  - The poor activities of farmers for disease control derived from lack of knowledge for diseases, equipment and instruments to give treatment, medicines and vaccines, individual crush pen and etc.
  - N-CLIMP team prepared Animal Husbandry Tool Kit for husbandry and disease control, and gave lecture how to utilize for disease control and husbandry.
- Field application result
  - Members attended training understood the ways of straining cattle, medication and vaccination, pour on, oral administration, deworming (parasite control), dehorning, castration and etc.
  - Since supplied medicine and vaccine were limited just for demo farmer, other members should prepare such medicine and vaccine by themselves. It is the difficult point to purchase medicines and vaccine by themselves although they understand well the importance of control diseases
  - Some members start dehorning and castration by themselves.
  - Demo farmer gives the suitable advices and help members concerning disease control.
- Verification in Economic Aspect: Moderate
  - Since an accessibility to medicine and vaccine is difficult from lack of money, distance and so on although farmers understand well the importance of disease control and its effects. It gives "Moderate" economic aspect moderate because of the low accessibility.

### Benefit and Cost of Techniques of LS-5 in Okahao

Item	Benefit	Cost	Assessment
Animal husbandry	Moderate	Moderate	Moderate
Vaccination	High	Moderate	Moderate
Deworming (parasite control)	High	Moderate	High
Medication	High	Moderate	High
Total Benefit and Cost	High to Moderate	Moderate	High to Moderate

Source: Prepared by the Study Team

#### ➤ Verification in Social Aspect: Moderate

Due to low accessibility for drugs, vaccine and needed tools, some farmers didn't try to purchase. However some instruments for castration, dehorning and syringe/needle etc. can be utilized for others as sharing kits, key farmers were trying to executing these activities. It therefore concludes that social aspect is "Moderate" from lack of money to buy drugs (negative) and continuous utilization of instruments (positive).

## 1.4 LS-6: Large and Small Stock Fattening

### Verification Result of Technical Measure of LS-6 in Okahao

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-6: Large and Small Stock Fattening		X			X	
Work Procedure of LS-6	1. Stuffs for feeding and supplements: Licks, Minerals, Salt, Vitamins, Concentration feeds, Grass 2. Timing of food and supplements					

Source: Prepared by the Study Team

#### ➤ Farmers' Understanding

- Members understand the necessity to supply salt, licks, phosphate supplements and its utilization according to seasons.
- In NCA, it is always facing chronic deficiency of phosphate. Farmer should memorize its deficiency for fattening.

#### ➤ Field application result

- Demo farmer and some members keep this method continuously.
- Many members are asking appropriate timing of supplements according season so demo farmer and some member offer its utilization and timing.

#### ➤ Verification in Economic Aspect: Moderate

Some farmers give supplements and some is not. Since it also faces low accessibility for such supplements in rural areas in NCA, score of economic aspect is decided as moderate.

### Benefit and Cost of Techniques of LS-6 in Okahao

Item	Benefit	Cost	Assessment
Stuffs for feeding and supplements	Moderate	Moderate	Moderate
Timing of food and supplements	Moderate	Moderate	Moderate
Total Benefit and Cost	Moderate	Moderate	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Not only in Okahao but in other sites, lack of money may be the common excuse for neglecting activities. Some farmers keep fattening with purchasing needed supplements, licks and minerals from their own money. According to good result of fattening, not all but most of key farmers would start improved feeding for fattening.

Well understanding of farmers for fattening and strong support by the demonstration farmer would bring good results for key farmers. It therefore gives social aspect score “Moderate”.

## 2. Tsandi Constituency

Region / Constituency / ADC	Applied Technical Measures
Omusati Region Tsandi Constituency Tsandi ADC	LS-4: Nutritious food supply for chicken LS-5: Disease Control LS-13: Chicken production

### 2.1 LS-4: Nutritious Food Supply for Pig and Chicken

#### Verification Result of Technical Measure of LS-4 in Tsandi

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-4: Nutritious Food Supply for Pig and Chicken		X			X	
Work Procedure of LS-4	1. Stuffs for feeding : Available stuff: Millet, Millet bran, Sorghum ,Maize Bone powder, Maggot, Termite, leftover, Salt, Rubbish, Vegetable, Fresh leaves 2. Feed making 3. Feeding					

Source: Prepared by the Study Team

#### ➤ Farmers' Understanding

- Members know that the nutritious food supply for chicken is important as knowledge only.
- They have never experienced to make self-made foddors by themselves.
- Through training, they get skills to prepare foods from available places.

#### ➤ Field application result

- Some member tries to make some food elements such as maggot and termites.
- There is no complete self-made food till now.
- In Phase-3, Demo farmer changed. Demo farmer feeds food their own and from market although she is very active and has many chickens.

#### ➤ Verification in Economic Aspect: Moderate

Although self-made food is very cheap and economic as below table, some farmers have not tried to make self-made food by themselves and kept their own feeding. Assessment is therefore decided Moderate.

#### Benefit and Cost of Techniques of LS-4 in Tsandi

Item	Benefit	Cost	Assessment
Stuffs for feeding	Moderate	Low	Moderate
Feed making	Moderate	Low	Moderate
Feeding	Moderate	Low	Moderate
Total Benefit and Cost	Moderate	Low	Moderate

Source: Prepared by the Study Team

#### ➤ Verification in Social Aspect: Moderate

Based on members' activities to make self-made foddors with locally available food stuffs, their trials are very slow although they understand well its economically positive impact. To produce self-made fodder production is on the way to complete. It therefore gives the



“Moderate” score for social aspect.

## 2.2 LS-5: Disease Control

### Verification Result of Technical Measure of LS-5 in Tsandi

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-5: Disease Control		X			X	
Work Procedure of LS-5	1. Vaccination: Eye drop New Castle Disease (NCD) 2. Deworming (parasite control: Oral, Spray) 3. Medication (Injection, Oral medication, Spraying, Pour on etc.)					

Source: Prepared by the Study Team

- Farmers' Understanding
  - Farmers have never known concerning viral and bacterial disease except parasite.
  - Farmers understand the important diseases and its control methods.
  - Farmers need to make group for disease control and marketing.
- Field application result
  - Demo farmer and some members are keeping parasite control only.
  - Other members have not done disease control action yet because of lack of money to purchase and availability to pharmacy to supply medicine and vaccines.
  - Vaccination groups gave vaccination against Newcastle Disease (NCD) for 472 chicks, chickens within a day. In phase-3, based on AT in charge let farmer inject NCD vaccine because NCD were spreading in NCA. As a result of vaccination, demo and key farmers didn't lose any chicken from NCD.
  - Frequent contact to AT may need to get suitable treatment although demo farmer have given anti-parasite drugs for respiratory disease.
- Verification in Economic Aspect: Moderate
 

Some members don't try to buy medicines and vaccine due to lack of money. Most farmers has not treated their chickens before and been keeping chickens by traditional system. Despite of important disease control brought great economic loss, they tend to neglect disease control. It is reason to give moderate for Assessment.

### Benefit and Cost of Techniques of LS-5 in Tsandi

Item	Benefit	Cost	Assessment
Vaccination	High	Moderate	Moderate
Deworming	High	Moderate	Moderate
Medication	High	Moderate	Moderate
Total Benefit and Cost	High	Moderate	Moderate

Source: Prepared by the Study Team

- Verification in Social Aspect: Moderate
 

It is based on positive factor such of well understanding of disease control and its importance and getting skills for disease control. On the other hand, follows are negative factors such of a low rate of attending to trainings, lack of money to buy needed materials and so on. It leads the conclusion of “Moderate” for social aspect.

## 2.3 LS-13: Chicken Production (Indigenous)

### Verification Result of Technical Measure of LS-13 in Tsandi

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-13: Chicken production ( Indigenous)	X				X	
Work Procedure of LS-13	1. Feeding and watering 2. Nests setting 3. Laying nests 4. Hatching nests 5. Hatching 6. Housing					

Source: Prepared by the Study Team

#### ➤ Farmers' Understanding

- It becomes clear the definition of layer, broiler and indigenous chicken.
- They understand important points of housing, feeding and watering, hatching, brooding, nests and etc.

#### ➤ Field application result

- Demo farmer is improving poultry management skills and hatched chicks already.
- Demo farmer studied how to prepare laying and hatching nest although she hatched chicks by traditional style.
- It is not sure that the skills of poultry management spread quickly among members like demo farmer.

#### ➤ Remarks

- Chicken production is based on the increasing of number chicken so laying and hatching are very important. Many farmers are raising their chickens at backyards and moreover not set any nests for laying and hatching. Since nests prevent loss of eggs and hatch chicks safely, setting of nests is the meaningful indicators of chicken production.

#### ➤ Verification in Economic Aspect: High

Chicken production activity is not difficult and low input activity. It mentioned just about some important points housing management, setting nests for laying and hatching, feeding management and etc. Farmers would be able to get great benefits when they concentrate such activities by low input. It scores "High".

### Benefit and Cost of Techniques of LS-13 in Tsandi

Item	Benefit	Cost	Assessment
Feeding and watering	Moderate	Moderate	Moderate
Nests setting	High	Moderate	High
Laying nests	High	Low	High
Hatching nests	High	Low	High
Hatching	High	Moderate	High
Housing	Moderate	Moderate	Moderate
Total Benefit and Cost	High	Moderate to Low	High

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Despite great returns from chicken production if they follow to trained skills, some key farmers neglect to put nests and to take care feeding and watering. Expected good result easily and some farmers attitude not to follow are the reason to give score of “Moderate” in social aspect.

### 3. Uuvdhiya Constituency

Region / Constituency / ADC	Applied Technical Measures
Oshana Region	LS-1: Fodder production
Uuvudhuya Constituency	LS-2: Range Management
Ondombe ADC	LS-5: Disease Control

#### 3.1 LS-1: Fodder production

##### Verification Result of Technical Measure of LS-1 in Uuvudhiya

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-1: Fodder production		X			X	
Work Procedure of LS-1	1. Preparation of land 2. Sowing seeds 3. Hay making 4. Seed collection					

Source: Prepared by the Study Team

#### ➤ Farmers' Understanding

- All farmers have never had this experience to produce fodder grasses. They, however, have noticed the importance of fodder production according to the chronic deficiency of fodder during recent droughts that hit farmers' livestock physically and economically.
- N-CLIMP team has tried to explain the importance of fodder production and the way how to grow nutritive grasses in cultivated area.
- Demo farmer decided demo plot and fenced to protect livestock invasion. Then the farmer prepared land for sowing seeds of Lucerne/ Alfalfa, Bluebuffelgras, Anthephora.
  - Field application result
- Due to delay poor rainfall in the areas, seeds could not germinate in Phase-2 and Phase-3.
- N-CLIMP team visited demo farm site in Feb.2017 (Phase-3) and gave seed of lucerne to sow again because that they received good rainfall and soil moisture was enough.

#### ➤ Remarks

- Fodder production is very important activity to mitigate continuous grass shortage in grazing area although the activities in Phase-2 and Phase-3 can't get expected result due to poor rainfall.
- Since the timing to give seeds was late and missed sowing chance after even scarce rain, it needs to sow seeds many times like Mahangu in order to select proper moisture in soil in the next season.
- It would be easy to spread this fodder production after establishment of grass fields once and farmers would not need to buy seeds because of self-collection of seeds from their grass fields.

➤ Verification in Economic Aspect: Moderate

Due to low rainfall, water/soil moisture was not enough to sow grass seeds in the demonstration plot. Farmers would not need to purchase seeds any more if grasses grow in the plot. Based on the results and its expectation of seed collection possibility in future, it scores “Moderate”.

**Benefit and Cost of Techniques of LS-1 in Uuvudhiya**

Item	Benefit	Cost	Assessment
Preparation of land	Moderate	Moderate	Moderate
Seed purchasing	Moderate	Moderate	Moderate
Sowing seeds	Moderate	Low	High
Hay making	Not applied	Not applied	Not applied
Seed collection	Not applied	Not applied	Not applied
Total Benefit and Cost	High to Moderate	Moderate to Low	High to Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Despite of negative impact of fodder production at the demonstration plot and other key farmers’ places, they understand well that the result was due to poor rainfall and improper timing of seed sowing. Demonstration and key farmers tend to sow again in the next rainy season. Moreover since farmers know the importance of fodder production and gained skills to sow and grow grasses. Because the farmers have strong demands to try again fodder production, social aspect is “Moderate”.

### 3.2 LS-2: Range Management

**Verification Result of Technical Measure of LS-2 in Uuvudhiya**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-2: Range Management	-	-	-	-	-	-
Work Procedure of LS-2	1. Agreement of members to manage grazing area for planned grazing 2. Agreement with traditional authorities to utilize pasture for grazing 3. Fees for range management: payment for herders, fencing materials, water point development and its construction and etc. 4. Allocation of grazing areas for rotation according to plan 5. Fencing and to start planned grazing					

Remarks: “-“ shows no evaluation results are available in this stage.

Source: Prepared by the Study Team

➤ Farmers’ Understanding

- Farmers theoretically understand its importance of Range Management according to the recent degrading of pasture, overgrazing, decreasing perennial grasses, soil erosion and etc.
- It is very difficult to control rangeland properly for grazing at Uuvudhiya because of scarce and erratic rainfall, wide grazing pasture and heavy burden of excess grazing cattle numbers, a little tree numbers compared with other constituencies.

➤ Field application result

- Since this trial would take long procedure at least more than 5 years from group agreement of planned grazing to implement proper range management, N-CLIMP just stress its importance and way of rangeland management.

➤ **Remarks**

- Since it needs long procedure and cost, N-CLIMP cannot adopt this activity during 3 years period. It however emphasized the concept of range management and its necessity during training for ATs and farmers.

### 3.3 LS-5: Disease Control

**Verification Result of Technical Measure of LS-5 in Uuvudhiya**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-5: Disease Control		X			X	
Work Procedure of LS-5	1. Animal husbandry: Dehorning, Castration, Straining, Injection, Oral medication, Pour on and etc. 2. Vaccination , Deworming(parasite control), Medication ( injection, oral medication, spraying, pour on etc.)					

Source: Prepared by the Study Team

➤ **Farmers' Understanding**

- This is the one of the most important challenges for farmers concerning livestock industry in NCA, Namibia. Most of farmers have never taken measures to control animal diseases although these diseases cause great economic loss for livestock farmers.
- The poor activities of farmers for disease control derived from lack of knowledge for diseases, equipment and instruments to give treatment, medicines and vaccines, individual crush pen and etc.
- N-CLIMP team prepares Animal Husbandry Tool Kit for husbandry and disease control, and gave lecture how to utilize for disease control and husbandry.

➤ **Field application result**

- At the end of Phase-2 period, N-CLIMP team could give practical training for farmers concerning, vaccination, deworming, pour on, dehorning, castration and etc..
- In Phase-3, since disease control in Phase-2 showed very attractive result, AT and farmers have been executing disease control by themselves.
- They let members divide into 2 groups because that members live in wide area and it is very difficult to gather at one place. AT conducts training to two groups according to their circumstances.

➤ **Verification in Economic Aspect: Moderate**

- Since accessibility to medicine and vaccine is difficult from lack of money, distance and so on although farmers understand well the importance of disease control and its effects. Even so , AT and members continue disease control by themselves so it gives economic aspect as “Moderate” because of the low accessibility.

**Benefit and Cost of Techniques of LS-5 in Uuvudhiya**

<b>Item</b>	<b>Benefit</b>	<b>Cost</b>	<b>Assessment</b>
Animal husbandry	Moderate	Moderate	Moderate
Vaccination	High	Moderate	Moderate
Deworming (parasite control)	High	Moderate	High
Medication	High	Moderate	High
Total Benefit and Cost	High to Moderate	Moderate	High to Moderate

*Source: Prepared by the Study Team*

➤ **Verification in Social Aspect: High**

Despite low accessibility for drugs, vaccine and needed tools, many farmers try to execute disease control by themselves. Some instruments for castration, dehorning and syringe/needle etc. can be utilized for other members as sharing kits ,and key farmers are trying to executing these activities. It therefore concludes that social aspect is “Moderate” from arrangement of disease control among them.

#### 4. Uukwiyu Uushona Constituency

Region / Constituency / ADC	Applied Technical Measures
Oshana Region Uukwiyu Uushona Constituency Uukwiyu Uushona ADC	LS-4: Nutritious food supply for chicken LS-5: Disease Control LS-13: Chicken production

#### 4.1 LS-4: Nutritious Food Supply for Pig and Chicken

##### Verification Result of Technical Measure of LS-4 in Uukwiyu

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-4: Nutritious Food Supply for Pig and Chicken	X				X	
Work Procedure of LS-4	1. Stuffs for feeding : Available stuff: Millet, Millet bran, Sorghum ,Maize Bone powder, Maggot, Termite, leftover, Salt, Rubbish, Vegetable, Fresh leaves 2. Feed making 3. Feeding					

Source: Prepared by the Study Team

##### ➤ Farmers' Understanding

- Members know the nutritious food supply for chicken is important as knowledge.
- They have never experienced to make self-made fodders by themselves.
- Through training, they get skills to prepare foods from available places.
- As a result of technical improvement of chicken production such as setting nests, disease control, feeding skills and etc. demo farmer can produce chicks and chickens faster than before N-CLIMP. Led the increasing of chicks and chickens, it increases food consumption is growing. Demand of food supply from markets lets members think deeply the necessity of self-made fodders at low investment.

##### ➤ Field application result

- Some member tries to make some food elements such as maggot and termites.
- There is no complete self-made food till now.

##### ➤ Verification in Economic Aspect: High

Although self-made food is very cheap and economic as below table, some farmers have not tried to make self-made food by themselves and kept their own feeding. In phase-3, most of members understand well purchased foods from markets is more expensive than self-made foods in order to grow net income. Based on the business mind of members, it concludes that economical aspect is "High".



### Benefit and Cost of Techniques of LS-4 in Uukuwiyu

Item	Benefit	Cost	Assessment
Stuffs for feeding	Moderate	Low	Moderate
Feed making	Moderate	Low	Moderate
Feeding	Moderate	Low	Moderate
Total Benefit and Cost	Moderate	Low	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Based on members' activities to make self-made foddors with locally available food stuffs, their trials are very slow although they understand well its economically positive impact. To produce self-made fodder production is on the way to complete. It therefore gives the "Moderate" score for social aspect.

## 4.2 LS-5: Disease Control

### Verification Result of Technical Measure of LS-5 in Uukuwiyu

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-5: Disease Control	X				X	
Work Procedure of LS-5	1. Vaccination: Eye drop New Castle Disease (NCD) 2. Deworming (parasite control: Oral, Spray) 3. Medication (Injection, Oral medication, Spraying, Pour on etc.)					

Source: Prepared by the Study Team

➤ Farmers' Understanding

- Although farmers have never known concerning viral and bacterial disease except parasite, they understand the important diseases and its control methods.
- Farmers need to make group for disease control and marketing and understand the importance of vaccination, deworming and husbandry.

➤ Field application result

- Demo farmer and some members are keeping parasite control only.
- Other member have not done disease control action yet because of lack of money to purchase and availability to pharmacy to supply medicine and vaccines.
- Vaccination groups gave vaccination against New Castle Disease (NCD) for 473 chicken, chicks, doves, and guinea fowl within a day.
- They take care of poultry hygiene and demo poultry houses are being kept so clean.
- Mortality rate becomes very low than before.

➤ Verification in Economic Aspect: High

Based on the improvement of disease control, mortality rate is decreasing and total numbers of hatched chicks is increasing. Good understanding of vaccination importance and matured cooperation with ATs to prepare vaccination among them leads the score of disease control is "High".

### Benefit and Cost of Techniques of LS-5 in Uukuwiyu

Item	Benefit	Cost	Assessment
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Item	Benefit	Cost	Assessment
Vaccination	High	Low	High
Deworming	High	Moderate	Moderate
Medication	High	Moderate	Moderate
Total Benefit and Cost	High	Moderate	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

It is based on positive factor such of well understanding of disease control , its importance and getting skills for disease control. On the other hand, follows are negative factors such of a low rate of attending to trainings, lack of money to buy necessity materials and so on. It leads the conclusion of “Moderate” for social aspect.

### 4.3 LS-13: Chicken Production (Indigenous)

#### Verification Result of Technical Measure of LS-13 in Uukuwiyu

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-13: Chicken production ( Indigenous)	X				X	
Work Procedure of LS-13	1. Feeding and watering 2. Nests setting 3. Laying nests 4. Hatching nests 5. Hatching 6. Housing					

Source: Prepared by the Study Team

➤ Farmers’ Understanding

- They understand important points of housing, feeding and watering, hatching, brooding, nests and etc.
- Preparation of nests for laying and hatching brings high hatching rate and chicks and chicken are increasing.

➤ Field application result

- Demo farmer is improving poultry management skills and hatched chicks already.
- Demo farmer gets hatching skill and hatched more than 100chicks although she used to buy chicks from market in Phase-2.
- Demo farmer doesn’t buy any chicks from market anymore and has hatched more than 130 till Feb. 2017.

➤ Remarks

- Chicken production is based on the increasing of number chicken so laying and hatching are very important. Many farmers are raising their chickens at backyards and moreover not set any nests for laying and hatching. Since nests prevent loss of eggs and can hatch chicks safely, setting of nests is the meaningful indicators of chicken production.

➤ Verification in Economic Aspect: High

Chicken production activity is not difficult and low input activity. It mentioned just about

some important points such of housing management, setting nests for laying and hatching, feeding management and etc. Farmers would be able to get satisfied benefits when they concentrate such activities by low input. It scores “High”.

**Benefit and Cost of Techniques of LS-13 in Uukuwiyu**

<b>Item</b>	<b>Benefit</b>	<b>Cost</b>	<b>Assessment</b>
Feeding and watering	Moderate	Moderate	Moderate
Nests setting	High	Moderate	High
Laying nests	High	Low	High
Hatching nests	High	Low	High
Hatching	High	Moderate	High
Housing	Moderate	Moderate	Moderate
Total Benefit and Cost	High	Moderate to Low	High

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Despite great returns from chicken production if they can digest trained skills, some key farmers neglect to put nests and to take care feeding and watering. Expected good result easily and some farmers’ attitude not to follow are the reason to give score of “Moderate” in social aspect.

## 5. Omuntele Constituency

Region / Constituency / ADC	Applied Technical Measures
Oshikoto Region	LS-1: Fodder production
Omuntele Constituency	LS-2: Range Management
Omuntele ADC	LS-5: Disease Control

### 5.1 LS-1: Fodder production

#### Verification Result of Technical Measure of LS-1 in Omuntele

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-1: Fodder production		X			X	
Work Procedure of LS-1	1. Preparation of land 2. Sowing seeds 3. Hay making 4. Seed collection					

Source: Prepared by the Study Team

#### ➤ Farmers' Understanding

- All farmers have never had this experience to produce fodder grasses because that farmers have never invest any input on grazing pastures as the manners of pastoralist historically. They, however, have noticed the importance of fodder production according to the chronic deficiency of fodder during resent droughts that hit farmers' livestock physically and economically.
- N-CLIMP team has tried to explain the importance of fodder production and the way how to grow nutritive grasses in cultivated area.
- Demo farmer decided demo plot and fenced to protect livestock invasion. Then the farmer prepared land for sowing seeds of Lucerne/ Alfalfa, Bluebuffelgras, Anthephora.

#### ➤ Field application result

- Due to delay poor rainfall in the areas, seeds could not germinate.

#### ➤ Remarks

- Fodder production is very important activity to mitigate continuous grass shortage in grazing area.
- Since the timing to give seeds was late and missed sowing chance after even scarce rain, it needs to sow seeds many times like Mahangu in order to select proper moisture in soil in the nest season.
- It would be easy to spread this fodder production after establishment of grass fields once and farmers would not need to buy seeds because of self-collection of seeds from their grass fields.

#### ➤ Verification in Economic Aspect: Moderate

Due to low rainfall, water/soil moisture was not enough to sow grass seeds in the demonstration plot. Farmers would not need to purchase seeds any more if grasses grow in

the plot. Based on the results and its expectation of seed collection possibility in future, it scores “Moderate”.

**Benefit and Cost of Techniques of LS-1 in each component in Omuntele**

Item	Benefit	Cost	Assessment
Preparation of land	Moderate	Moderate	Moderate
Seed purchasing	Moderate	Moderate	Moderate
Sowing seeds	Moderate	Low	High
Hay making	Not applied	Not applied	Not applied
Seed collection	Not applied	Not applied	Not applied
Total Benefit and Cost	High to Moderate	Moderate to Low	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Despite of negative impact of fodder production in Phase-2 at the demonstration plot and other key farmers’ places, they understand well that the result was due to poor rainfall and improper timing of seed sowing. Demonstration and key farmers tend to sow again in the next rainy season. Moreover since farmers know the importance of fodder production and gained skills to sow and grow grasses. Because the farmers have strong demands to try again fodder production, social aspect is “Moderate”.

## 5.2 LS-2: Range Management

**Verification Result of Technical Measure of LS-2 in Omuntele**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-2: Range Management	-	-	-	-	-	-
Work Procedure of LS-2	1. Agreement of members to manage grazing area for planned grazing 2. Agreement with traditional authorities to utilize pasture for grazing 3. Fees for range management: payment for herders, fencing materials, water point development and its construction and etc. 4. Allocation of grazing areas for rotation according to plan 5. Fencing and to start planned grazing					

Remarks: “-“ shows no evaluation results are available in this stage.

Source: Prepared by the Study Team

➤ Farmers’ Understanding

- Farmers theoretically understand its importance of Range Management according to the resent degrading of pasture, overgrazing, decreasing perennial grasses, soil erosion and etc.- It is very difficult to control rangeland properly for grazing. It needs grazing rotation, planned grazing, allocation of grazing areas, group agreement for grazing, charges to employ herders and etc.

➤ Field application result

- Since this trial would take long procedure at least more than 5 years from group agreement of planned grazing to implement proper range management, N-CLIMP just stress its importance and way of rangeland management.

➤ Remarks

- Since it needs long procedure and cost, N-CLIMP cannot adopt this activity during 3 years

period. It however emphasized the concept of range management and its necessity during training for ATs and farmers.

### 5.3 LS-5: Disease Control

#### Verification Result of Technical Measure of LS-5 in Omuntele

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-5: Disease Control		X			X	
Work Procedure of LS-5	1. Animal husbandry: Dehorning, Castration, Straining, Injection, Oral medication, Pour on and etc. 2. Vaccination , Deworming(parasite control), Medication ( injection, oral medication, spraying, pour on etc.)					

Source: Prepared by the Study Team

- Farmers' Understanding
  - This is the one of most important challenges for farmers concerning livestock industry in NCA, Namibia. Most of farmers have never taken measures to control animal diseases although these diseases cause great economic loss for livestock farmers.
  - The poor activities of farmers for disease control derived from lack of knowledge for diseases, equipment and instruments to give treatment, medicines and vaccines, individual crush pen and etc.
  - N-CLIMP team prepares Animal Husbandry Tool Kit for husbandry and disease control, and gave lecture how to utilize for disease control and husbandry.
- Field application result
  - Members attended training and understood the ways of straining cattle, medication and vaccination, pour on, oral administration, deworming (parasite control), dehorning, castration and etc.
  - Since supplied medicine and vaccine are limited just for demo farmer, other members should prepare such medicine and vaccine by themselves. It is the difficult point to purchase medicines and vaccine by themselves although they understand well the importance of control diseases.
- Verification in Economic Aspect: Moderate
  - Since accessibility to medicine and vaccine is difficult from lack of money, distance and so on although farmers understand well the importance of disease control and its effects. It gives moderate economic aspect moderate because of the low accessibility.

#### Benefit and Cost of Techniques of LS-5 in each component in Omuntele

Item	Benefit	Cost	Assessment
Animal husbandry	Moderate	Moderate	Moderate
Vaccination	High	Moderate	Moderate
Deworming (parasite control)	High	Moderate	High
Medication	High	Moderate	High
Total Benefit and Cost	High to Moderate	Moderate	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Due to low accessibility for drugs, vaccine and needed tools, some farmers didn't try to purchase. However some instruments for castration, dehorning and syringe/needle etc. can be utilized for others as sharing kits, key farmers were trying to executing these acidities. It therefore concludes that social aspect is "Moderate" from lack of money to buy drugs (negative) and continuous utilization of instruments (positive).

## 6. Onankali Constituency

Region / Constituency / ADC	Applied Technical Measures
Oshikoto Region	LS-4: Nutritious food supply for chicken
Onyaanya Constituency	LS-5: Disease Control
Onankali ADC	LS-13: Chicken production

### 6.1 LS-4: Nutritious Food Supply for Pig and Chicken

#### Verification Result of Technical Measure of LS-4 in Onyaanya

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-4: Nutritious Food Supply for Pig and Chicken	X				X	
Work Procedure of LS-4	1. Stuffs for feeding : Available stuff: Millet, Millet bran, Sorghum ,Maize Bone powder, Maggot, Termite, leftover, Salt, Rubbish, Vegetable, Fresh leaves 2. Feed making 3. Feeding					

Source: Prepared by the Study Team

#### ➤ Farmers' Understanding

- Members know the nutritious food supply for chicken is important as knowledge.
- They have never experienced to make self-made foddors by themselves.
- Through training, they get skills to prepare foods from available places.
- Some farmers are trying to add some parts of self-made foddors into purchased feed.

#### ➤ Field application result

- Some member tries to make some food elements such as maggot and termites.
- There is no complete self-made food till now.
- Led the poor production of mahangu caused by continuous draughts, farmers were very difficult to feed mahangu fully to their chickens. In 2017, some farmers are trying to feed as much as self-made foods like mahangu.

#### ➤ Verification in Economic Aspect: High

Farmers are facing serious food shortage led by increasing of hatching numbers of chicks through improving chicken production skills. This increasing of chicks and chicken causes high demand of feed supply from markets which are very expensive and high cost of purchasing foods from markets hits farmers to consider deeply not to purchase from markets but to prepare self-made foods for chicks and chickens in order to gain high net income. Mind change from traditional chicken raising to business-oriented beneficial poultry scores "High".



**Benefit and Cost of Techniques of LS-4 in each component in Onyaanya**

Item	Benefit	Cost	Assessment
Stuffs for feeding	Moderate	Low	Moderate
Feed making	Moderate	Low	Moderate
Feeding	Moderate	Low	Moderate
Total Benefit and Cost	Moderate	Low	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Based on members' activities to make self-made foddors with locally available food stuffs, their trials are very slow although they understand well its economically positive impacts. To produce self-made fodder production is on the way to complete. It therefore gives the "Moderate" score for social aspect.

## 6.2 LS-5: Disease Control

**Verification Result of Technical Measure of LS-5 in Onyaanya**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-5: Disease Control	X				X	
Work Procedure of LS-5	1. Vaccination: Eye drop New Castle Disease (NCD) 2. Deworming (parasite control: Oral, Spray) 3. Medication (Injection, Oral medication, Spraying, Pour on etc.)					

Source: Prepared by the Study Team

➤ Farmers' Understanding

- Farmers have never known concerning viral and bacterial disease except parasite.
- Farmers understand the important diseases and its control methods so they need to make group for disease control and marketing.
- Farmers understand the importance of vaccination, deworming and husbandry.

➤ Field application result

- Demo farmer and some members are keeping parasite control only.
- Other member have not done disease control action yet because of lack of money to purchase and availability to pharmacy to supply medicine and vaccines.
- Vaccination groups gave vaccination against New Castle Disease (NCD) for chicks, chickens, and ducks.

➤ Verification in Economic Aspect: High

Based on the improvement of disease control, mortality rate is decreasing and total numbers of hatched chicks is increasing. Good understanding of vaccination importance and matured cooperation with ATs to prepare vaccination among them leads the score of disease control is "High".

**Benefit and Cost of Techniques of LS-5 in each component in Onyaanya**

Item	Benefit	Cost	Assessment
Vaccination	High	Moderate	Moderate
Deworming	High	Moderate	Moderate
Medication	High	Moderate	Moderate
Total Benefit and Cost	High	Moderate	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

It is based on positive factor such of well understanding of disease control, its importance and getting skills for disease control. On the other hand, follows are negative factors such of a low rate of attending to trainings, lack of money to buy necessity materials and so on. It leads the conclusion of “Moderate”.

**6.3 LS-13: Chicken Production (Indigenous)**

**Verification Result of Technical Measure of LS-13 in Onyaanya**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-13: Chicken production ( Indigenous)	X				X	
Work Procedure of LS-13	1. Feeding and watering 2. Nests setting 3. Laying nests 4. Hatching nests 5. Hatching 6. Housing					

Source: Prepared by the Study Team

➤ Farmers’ Understanding

- They understand important points of housing, feeding and watering, hatching, brooding, nests and etc.
- Preparation of nests for laying and hatching brings high hatching rate and chicks and chicken are increasing.

➤ Field application result

- Demo farmer is improving poultry management skills and hatched chicks already.
- It is not sure that the skills of poultry management spread quickly among members like demo farmer.
- Demo farmer introduced electric hatchery and start hatching as a business .

➤ Remarks

- Chicken production is based on the increasing of number chicken so laying and hatching are very important. Many farmers are raising their chickens at backyards and moreover not set any nests for laying and hatching. Since nests prevent loss of eggs and can hatch chicks safely, setting of nests is the meaningful indicators of chicken production.

➤ Verification in Economic Aspect: High

Chicken production activity is not difficult and low input activity. It mentioned just about some important points such of housing management, setting nests for laying and hatching.

feeding management and etc. Farmers would be able to get satisfied benefits when they concentrate such activities by low input. It scores “High”.

**Benefit and Cost of Techniques of LS-13 in each component in Onyaanya**

Item	Benefit	Cost	Assessment
Feeding and watering	Moderate	Moderate	Moderate
Nests setting	High	Low	High
Laying nests	High	Low	High
Hatching nests	High	Low	High
Hatching	High	Low	High
Housing	Moderate	Moderate	Moderate
Total Benefit and Cost	High	Moderate to Low	High

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Despite great returns from chicken production if they can digest trained skills well , some key farmers neglect to put nests and to take care feeding and watering. Expected good result easily and some farmers’ attitude not to follow are the reason to give score of “Moderate”.

## 7. Okongo Constituency

Region / Constituency / ADC	Applied Technical Measures
Ohangwena Region Okongo Constituency Okongo ADC	CR-2: Cropping Pattern and Crop Management CR-4: Flood- and Drought-Adaptive Cropping System (Rice-Mahangu Mixed Cropping System) LS-1: Fodder production LS-2: Range Management LS-5: Disease Control LS-7: Periodical production

### 7.1 LS-1: Fodder production

#### Verification Result of Technical Measure of LS-1 in Okongo

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-1: Fodder production	X			X		
Work Procedure of LS-1	1. Preparation of land 2. Sowing seeds 3. Hay making 4. Seed collection					

Source: Prepared by the Study Team

#### ➤ Farmers' Understanding

- All farmers have never had this experience to produce fodder grasses because that farmers have never invest any input on grazing pastures as the manners of pastoralist historically. They, however, have noticed the importance of fodder production according to the chronic deficiency of fodder during resent droughts that hit farmers' livestock physically and economically.
- N-CLIMP team has tried to explain the importance of fodder production and the way how to grow nutritive grasses in cultivated area.
- Demo farmer decided demo plot and fenced to protect livestock invasion. Then the farmer prepared land for sowing seeds of Lucerne/ Alfalfa, Bluebuffelgras, Anthephora.

#### ➤ Field application result

- Many member get germination of grasses and grasses are growing.
- Demo farm is lost growing grasses after germination by school children's weeding of plot land in Phase-2. In Phase-3, seeds of given popular wild grass germinated properly and growing. Since lucerne, however, disappeared after germination, N-CLIMP team gave seed of lucerne again in Feb.2017.

#### ➤ Verification in Economic Aspect: High

In Okongo, some farmers got germination of seeds although other 3 regions' plots observed no germination due to poor rainfall. It is thought that rainfall in Okongo is better than other regions and timing of sowing fits at the proper soil moisture. It therefore gives "High" score and can expect activities of hay making and seed collection in near future.

### Benefit and Cost of Techniques of LS-1 in Okongo

Item	Benefit	Cost	Assessment
Preparation of land	Moderate	Low	Moderate
Seed purchasing	Moderate	Moderate	Moderate
Sowing seeds	Moderate	Low	High
Hay making	Not applied	Not applied	Not applied
Seed collection	Not applied	Not applied	Not applied
Total Benefit and Cost	Moderate	Moderate to Low	High

Source: Prepared by the Study Team

➤ Verification in Social Aspect: High

Led its success of germination in demonstration and key farmers, most of member desire to sow again continuously. It continues growth of grasses for long period and grasses spread seeds around roots automatically. Through seed collection, farmers expand the area for fodder production gradually. It therefore gives the score of “High”

In Phase-3, it expects that farmers can make hay through hay making training so they would be able to store hay for long time as reserve for serious drought case. It scores “High” because that hay making is very effective and also a nice **business** to sell especially at the end of drought that most of cattle are hunger.

## 7.2 LS-2: Range Management

### Verification Result of Technical Measure of LS-2 in Okongo

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-2: Range Management	-	-	-	-	-	-
Work Procedure of LS-2	1. Agreement of members to manage grazing area for planned grazing 2. Agreement with traditional authorities to utilize pasture for grazing 3. Fees for range management: payment for herders, fencing materials, water point development and its construction and etc. 4. Allocation of grazing areas for rotation according to plan 5. Fencing and to start planned grazing					

Remarks: “-“ shows no evaluation results are available in this stage.

Source: Prepared by the Study Team

➤ Farmers’ Understanding

- Farmers theoretically understand its importance of Range Management according to the resent degrading of pasture, overgrazing, decreasing perennial grasses, soil erosion and etc.
- It is very difficult to control rangeland properly for grazing. It needs grazing rotation, planned grazing, allocation of grazing areas, group agreement for grazing, charges to employ herders and etc.

➤ Field application result

- Since this trial would take long procedure at least more than 5 years from group agreement of planned grazing to implement proper range management, N-CLIMP just stress its importance and way of rangeland management.

➤ Remarks

- Since it needs long procedure and cost, N-CLIMP cannot adopt this activity during 3 years

period. It however emphasized the concept of range management and its necessity during training for ATs and farmers.

### 7.3 LS-5: Disease Control

#### Verification Result of Technical Measure of LS-5 in Okongo

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-5: Disease Control		X			X	
Work Procedure of LS-5	1. Animal husbandry: Dehorning, Castration, Straining, Injection, Oral medication, Pour on and etc. 2. Vaccination , Deworming(parasite control), Medication ( injection, oral medication, spraying, pour on etc.)					

Source: Prepared by the Study Team

- Farmers' Understanding
  - This is the one of most important challenges for farmers concerning livestock industry in NCA, Namibia. Most of farmers have never taken measures to control animal diseases although these diseases cause great economic loss for livestock farmers.
  - The poor activities of farmers for disease control derived from lack of knowledge for diseases, equipment and instruments to give treatment, medicines and vaccines, individual crush pen and etc.
  - N-CLIMP team prepares Animal Husbandry Tool Kit for husbandry and disease control, and gave lecture how to utilize for disease control and husbandry.
- Field application result
  - Members attended training understood the ways of straining cattle, medication and vaccination, pour on, oral administration, deworming (parasite control) and etc.
  - Since supplied medicine and vaccine are limited just for demo farmer, other members should prepare such medicine and vaccine by themselves. It is the difficult point to purchase medicines and vaccine by themselves although they understand well the importance of control diseases.
  - Farmers are trying to give vaccination, deworming, medication, dehorning, castration and etc. by themselves according to their plan.
- Verification in Economic Aspect: Moderate
  - Since accessibility to medicine and vaccine is difficult from lack of money, distance and so on although farmers understand well the importance of disease control and its effects. It gives economic aspect as "Moderate" because of the low accessibility.

#### Benefit and Cost of Techniques of LS-5 in each component in Okongo

Item	Benefit	Cost	Assessment
Animal husbandry	Moderate	Moderate	Moderate
Vaccination	High	Moderate	Moderate
Deworming (parasite control)	High	Moderate	High
Medication	High	Moderate	High
Total Benefit and Cost	High to Moderate	Moderate	Moderate

Source: Prepared by the Study Team

- Verification in Social Aspect: Moderate
  - All members understood well its importance of disease control and have got enough skills for disease control.
  - Farmers can't make a perfect year-round plan of disease control by themselves according to disease control calendar. They, however, are active to do some important disease control measures.

#### 7.4 LS-7: Periodical Production

**Verification Result of Technical Measure of LS-7 in Okongo**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-7: Periodical Production		X				X
Work Procedure of LS-7	1. Book Keeping 2. Reproductive record 3. Feeding Management					

*Source: Prepared by the Study Team*

- Farmers' Understanding
  - Farmers understood how to manage periodical production.
  - It needs total management skills to gain good results from periodical production.
  - The periodical production is based on cattle reproduction, reproductive record and feeding mainly.
- Field application result
  - Since most of member have never recorded their cattle flock reproduction histories, it is still difficult to record and take proper management for periodical production.
  - Members can't operate periodical production properly because that they face lack of required skills to manage cattle generally.
- Verification in Economic Aspect: Moderate
  - Most of members haven't any record keeping manner and some farmers has tools for animal husbandry. As same as other regions, it is common that most of farmers face many challenges for raising cattle properly. It leads the score for assessment of economic aspect is "Moderate".

**Benefit and Cost of Techniques of LS-7 in Okongo**

Item	Benefit	Cost	Assessment
Book Keeping	High	Low	Moderate
Reproductive record	High	Low	Low
Feeding management	Moderate	Moderate	Moderate
Total Benefit and Cost	High to Moderate	Moderate to Low	Moderate

*Source: Prepared by the Study Team*

- Verification in Social Aspect: Low
 

Periodical production needs detailed reproductive record keeping and strict execution of vaccination, castration, deworming, dehorning, market research and so on according to

planned schedule. Most of members unfortunately have not such experience to record any detailed happenings commonly. Led this fact, the score for social aspect is “Low”.



## 8. Endola Constituency

Region / Constituency / ADC	Applied Technical Measures
Ohangwena Region	LS-1: Fodder production
Endola Constituency	LS-5: Disease Control
Endola ADC	LS-12: Goat production

### 8.1 LS-1: Fodder production

#### Verification Result of Technical Measure of LS-1 in Endola

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-1: Fodder production		X		X		
Work Procedure of LS-1	1. Preparation of land 2. Sowing seeds 3. Hay making 4. Seed collection					

Source: Prepared by the Study Team

#### ➤ Farmers' Understanding

- All farmers have never had this experience to produce fodder grasses because that farmers have never invest any input on grazing pastures as the manners of pastoralist historically. They, however, have noticed the importance of fodder production according to the chronic deficiency of fodder during resent droughts that hit farmers' livestock physically and economically.
- N-CLIMP team has tried to explain the importance of fodder production and the way how to grow nutritive grasses in cultivated area.
- Since demo farmer has lost 8 cattle and 16 goat and 4 donkey are missing from drought till 21<sup>st</sup>. Feb. 2017, demo farmer deeply feels that production of fodder grasses and its storage is the urgent activity in future.
- Demo farmer decided demo plot and fenced to protect livestock invasion. Then the farmer prepared land for sowing seeds of Lucerne/ Alfalfa, Bluebuffelgras, Anthephora.
- Fodder production is very helpful to fatten and to improve health status of goat.

#### ➤ Field application result

- Due to scarce rainfall in the areas, seeds could not germinate. (No rain till the 3<sup>rd</sup> week of Feb. 2017)
- Demo farmer would try to sow grass seeds again in narrow plot at backyard.

#### ➤ Verification in Economic Aspect: Moderate

Due to poor rainfall and improper timing of sowing seeds, seeds could not germinate. Members however can understand the importance of fodder production through recent continuous draughts. It needs minimum investment to do fodder production to buy minimum seeds and materials especially. Many regions farmers stress lack of money to practice or low accessibility of necessary material bring low impact for farmers. Based on these results, it

gives “Moderate” for economic aspect.

**Benefit and Cost of Techniques of LS-1 in each component in Endola**

Item	Benefit	Cost	Assessment
Preparation of land	Moderate	Moderate	Moderate
Seed purchasing	Moderate	Moderate	Moderate
Sowing seeds	Moderate	Low	High
Hay making	Not applied	Not applied	Not applied
Seed collection	Not applied	Not applied	Not applied
Total Benefit and Cost	High to Moderate	Moderate to Low	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Social aspect is very “High” in order to solve chronic fodder deficiency in Endola area although most of farmers are facing fodder deficiency for goat constantly,

**8.2 LS-5: Disease Control**

**Verification Result of Technical Measure of LS-5 in Endola**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-5: Disease Control		X		X		
Work Procedure of LS-5	1. Animal husbandry: Castration, Injection, Oral medication, Pour on and etc. 2. Vaccination, Deworming (parasite control), Medication ( injection, oral medication, spraying, pour on etc.)					

Source: Prepared by the Study Team

➤ Farmers’ Understanding

- This is the one of most important challenges for farmers concerning livestock industry in NCA, Namibia. Most of farmers have never taken measures to control animal diseases although these diseases cause great economic loss for livestock farmers.
- The poor activities of farmers for disease control derived from lack of knowledge for diseases, equipment and instruments to give treatment, medicines and vaccines and etc.
- N-CLIMP team prepares Animal Husbandry Tool Kit for goat husbandry and goat disease control, and gave lecture how to utilize for disease control and husbandry kit.

➤ Field application result

- Members attended training understand the ways of straining goat, medication and vaccination, pour on, oral administration, deworming (parasite control) and etc.
- Since supplied medicine and vaccine are limited just for demo farmer, other members should prepare such medicine and vaccine by themselves. It is the difficult point to purchase medicines and vaccine by themselves although they understand well the importance of control diseases.
- Since demo farmer experienced the effective result of deworming, she is trying to continue deworming based on the disease control calendar.

➤ Verification in Economic Aspect: Moderate

- Because that the accessibility to medicine and vaccine is difficult from lack of money,

distance and so on although farmers understand well the importance of disease control and its effects. It gives moderate economic aspect because of the low accessibility.

**Benefit and Cost of Techniques of LS-5 in each component in Endola**

Item	Benefit	Cost	Assessment
Animal husbandry	Moderate	Moderate	Moderate
Vaccination	High	Moderate	Moderate
Deworming (parasite control)	High	Moderate	Moderate
Medication	High	Moderate	Moderate
Total Benefit and Cost	High to Moderate	Moderate	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: High

Most members understood well its importance of disease control and have studied required enough skills for disease control. Based on the results of disease control, most of farmers understand the well importance of disease control and they are trying to purchase necessity vaccine and medicines by themselves. They moreover understand that the good relationship with AT in charge would improve goat production in order to gain benefit more. It scores “High”

### 8.3 LS-11: Goat Production

**Verification Result of Technical Measure of LS-11 in Endola**

Item	Economic Aspect			Social Aspect		
	High	Moderate	Low	High	Moderate	Low
LS-11: Goat Production		X			X	
Work Procedure of LS-5	1. Feeding : Supplements, licks, vitamins and so on 2. Goat reproduction : Good male goat introduction					

Source: Prepared by the Study Team

➤ Farmers’ Understanding

- It needs periodical medication and husbandry works based on season, reproductive cycle and etc.
- Suitable management of goat production inked to goat reproduction and disease control with fodder production.

➤ Field application result

- It is the difficult point to purchase medicines and vaccine by themselves although they understand well the importance of disease control.
- They don’t have any habit and skills of fodder restoration for dry season historically so it is very difficult to change their mind even if they understand the importance of goat productive actions.

➤ Remarks

- The training is just done at demo farmer and training kit and needed medical materials such of vaccine and medicines are supplied to demo farmer only. Demo farmer understand well according to the results for vaccination and deworming. Since other members don’t have such kit and medicine and vaccine, smooth dissemination of goat production activity is

thought to take time.

- For its reproduction improvement, there is not enough good male goat for reproduction in the area. Members should try to get the male for reproductive improvement in future.

➤ Verification in Economic Aspect: Moderate

Because that the accessibility to medicine and vaccine is difficult from lack of money, distance and so on although farmers understand well the importance of disease control and its effects. It gives “Moderate” economic aspect because of the low accessibility.

**Benefit and Cost of Techniques of LS-11 in each component in Endola**

Item	Benefit	Cost	Assessment
Feeding	Moderate	Moderate	Moderate
Goat reproduction	Moderate	Moderate	Moderate
Total Benefit and Cost	Moderate	Moderate	Moderate

Source: Prepared by the Study Team

➤ Verification in Social Aspect: Moderate

Based on the reproduction cycle, they understand importance of regular vaccination, deworming, and castration and so on to keep the better performance of goat production. It gives score of “Moderate” from their understandings and negative opinion as lack of money and low accessibility of drugs.

*Attachment 3-4*

*Verification Results of  
each Technical Measures for  
Livestock Production*

*N-CLIMP*

## Attachment 3-4 Verification Results of Each Technical Measure for Livestock Production

### 1. Overall Verification Result for Livestock Production

#### Summary of Verification Results of Technical Measures for Livestock Production

Technical Measure	Economic Aspect	Social Aspect	No. of Sites Applied
LS-1 Fodder production	Moderate	Moderate	4 cattle and 1 goat sites,
LS-2 Range management	-	-	4 cattle sites, results not obtained
LS-4 Nutritious feed supply, particularly for pig and chicken	Moderate	Moderate	3 sites chicken
LS-5 Disease control	Moderate	Moderate	8 sites cattle, goat and chicken sites
LS-6 Large and small stock fattening	Moderate	Moderate	1cattle site
LS-7 Periodical production	Moderate	Low	1 cattle site
LS-11 Goat production	Moderate	Moderate	1 goat site
LS-12 Pig production	Not adopted for pilot site		
LS-13 Chicken production	High	Moderate	3 chicken sites

Source: Prepared by the Study Team.

### 2. Verification Results of Each Technical Measure

Verification results are examined for each site as mentioned in the preceding sections, then compiled into the followings.

#### (1) LS-1: Fodder Production

Verification results of LS-1 were combined into the overall results, as summarized below:

#### Summary of Verification Results of LS-1

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Okahao	Moderate	Moderate	Unstable rainfall , improper timing of sowing
Oshana Uuvudhiya	Moderate	Moderate	Unstable rainfall , improper timing of sowing
Oshikoto Omuntele	Moderate	Moderate	Unstable rainfall , improper timing of sowing
Ohangwena Okongo	High	High	Better rainfall, many germination
Ohangwena Endola	Moderate	<b>High</b>	Unstable rainfall, improper timing of sowing
Overall Verification Results	Moderate	Moderate	unstable rainfall and improper timing of sowing seeds

Source: Prepared by the Study Team.

Although total amount of rainfall influence fodder production, it depends on the timing of sowing and minimum soil moisture for germination and growing. Led this fact, farmers would be better to measure rainfall (by rain gauge), separate and repeated sowing according rainfall like mahangu, to sow seeds rather deeper and press cover soil slightly to fix seeds.

#### (2) LS-2: Range management

Verification results of LS-2 were combined into the overall results, as summarized below:

#### Summary of Verification Results of LS-2

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Okahao	Result not obtained yet	Result not obtained yet	- Long procedure to taken to get agreement among concerning organizations - Needed huge investment
Oshana Uuvudhiya			
Oshikoto Omuntele			
Ohangwena Okongo			
Overall Verification Results	-	-	To try to continue at categorization 2 to 3

Source: Prepared by the Study Team.

It is a mature understanding to control grazing according to planned grazing is very important. Grazing pasture is deteriorated by continuous and chronic drought due to poor rainfall, over-grazing, soil erosion, decreasing or disappear of perennial grasses in pasture, poor soil fertility and so on.

Planned grazing with rotation is really effective to save deteriorated pastures and help growth of perennial grasses. This range management however takes long procedure from mutual agreement of farmers, traditional authorities and government. Moreover, it needs certain investments for fencing, secure water points, payment for herders and so on. Since N-CLIMP is impossible to solve these matters within project period for 3 years, it lectures concerning the importance of mange management only.

### (3) LS-4: Nutritious feed supply particularly for pig and chicken

Verification results of LS-4 were combined into the overall results, as summarized below:

#### Summary of Verification Results of LS-4

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Tsandi	Moderate	Moderate	- Complete self-made feeding is not yet - Skills to make feed is low - Kept their own old method - Some farmers try to make food
Oshana Uukwiyu	<b>High</b>	Moderate	
Oshikoto Onyaanya	<b>High</b>	Moderate	
Overall Verification Results	<b>Moderate</b>	Moderate	- This activity needs to increase profits - Farmers should be keen to execute

Source: Prepared by the Study Team.

Poultry as an industry is fully depended on pure race of chicken, feeding, management, disease control and marketing by sophisticated techniques in order to gain maximum profits with minimum investment. In NCA, most of poultry activity is based on indigenous local chicken and its raising method is commonly very primitive and traditional at backyard of farmers.

In this indigenous chicken raising, purchasing of feed from market brings loss of money and never promise any profit. N-CLIMP therefore trying to make chicken food derived from available food stuffs locally. Components of food are:

Protein-rich: leftover, maggots and termites, Carbohydrate-rich: Mahangu, Sorghum and maize grains and its brans, Mineral-rich: burned bone powder and salt, Vitamin-rich: vegetable and leaves of grass and tree.

Acceptance of farmers to make food from above mentioned stuffs is still difficult and some farmers are only trying to make some portion of self-made foddors. It may need time to understand that indigenous poultry is a business.

(4) LS-5: Disease control

Verification results of LS-5 were combined into the overall results, as summarized below:

**Summary of Verification Results of LS-5**

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Okahao	Moderate	Moderate	- Most farmers understand importance of disease control
Omusati Tsandi	Moderate	Moderate	
Oshana Uuvudhiya	Moderate	Moderate	- Lack of money to buy medicine and vaccine although most of key farmers are not poor
Oshana Uukwiyu	<b>High</b>	Moderate	
Oshikoto Omuntele	Moderate	Moderate	- Low accessibility for medicine and vaccine7-Insufficient equipment of key farmers
Oshikoto Onyaanya	<b>High</b>	Moderate	
Ohangwena Okongo	Moderate	Moderate	- No information to get vaccine (chicken)
Ohangwena Endola	Moderate	<b>High</b>	- Grouping of chicken vaccination is good
Overall Verification Results	Moderate	Moderate	- Farmers have to find out money to purchase medicines, vaccines and needed tools - Farmers can sell some livestock such of chickens and goats to get money for purchasing medicine and vaccines

Source: Prepared by the Study Team.

Death by diseases outbreak and parasite infestation are great concerning for farmers through research although infectious diseases such as FMD (Foot and Mouth Disease) also bring huge economic damage for livestock industry. Farmers are worrying about the way how to control disease although they mostly understand the importance of disease control.

Most of farmers have not enough tools for animal husbandry such of dehorning and castration. The understand degree for disease is also low and just some farmers can take vaccination, regular deworming (parasite control) and etc.

On the other hand, the poor accessibility to medicines and vaccines in rural areas makes farmers to neglect to control disease with lack of money to buy drugs. Many countermeasures are required to minimize poor accessibility to drugs in order to stimulate disease control properly. For example, farmers can easily access to drugs and tools if some agents prepare them at auction places.

Through trainings, a few farmers are executing disease control and it may be the first time to practice disease control and animal husbandry for ATs because that government heavily tends to focus crop production and gives insufficient attention for livestock.

(5) LS-6: Large and small stock fattening

Verification results of LS-6 were combined into the overall results, as summarized below:

**Summary of Verification Results of LS-6**

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Okahao	Moderate	Moderate	- Investment : Needed to purchase supplement, Licks, Concentration , Minerals and Vitamins
Overall Verification Results	Moderate	Moderate	- Farmers have to find out money to purchase needed materials - Farmers can sell some livestock such of chickens and goats to get money for purchasing needed materials



Source: Prepared by the Study Team.

Since fattening is based on the feeding, the key point of fattening management is “suitable foods at proper timing”. Trainings focus to the utilization of licks, salt, minerals, supplements and concentrations during rainy and dry seasons. In NCA, Phosphate deficiency in soil is obvious so it stressed to give phosphate-rich supplement.

The poor accessibility to fattening foods and supplements in rural areas is caused by lack of money - farmers stressed strongly- and farmers neglect to feed such supplements. It is however changing of mind for fattening through training gradually.

(6) LS-7: Periodical production

Verification results of LS-7 were combined into the overall results, as summarized below:

**Summary of Verification Results of LS-7**

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Ohangwena Okongo	Moderate	Low	- Low record keeping skills and insufficient knowledge of key farmers
Overall Verification Results	Moderate	Low	- Weak point of farmers is no habit to record anytime

Source: Prepared by the Study Team.

Periodical production is simply based on reproductive record keeping so farmers should record reproductive performance of their herds. But most farmers haven't any habit to record so it may take long time to understand and start recording of herd reproduction.

(7) LS-11: Goat production

Verification results of LS-11 were combined into the overall results, as summarized below:

**Summary of Verification Results of LS-11**

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Ohangwena Endola	Moderate	Moderate	- Quick returns - Easy management
Overall Verification Results	Moderate	Moderate	- Farmers have to find out money to purchase needed materials - Farmers can sell some livestock such of chickens and goats to get money for purchasing needed materials

Source: Prepared by the Study Team.

Goat production is based on the reproduction understanding, disease control, feeding, marketing research and record keeping. Compared with cattle, advantages of goat production are short pregnant period of about 155 days for about 285days of cows, delivery numbers of kid of 1~3 , less requirement of fodder 1/6 of cattle and so on.

Appropriate management of goat can promise good returns for farmers so it should focus on goat production more and more. And an introduction of super male goat would be required in near future to improve reproductive performance of goat herd.

(8) LS-13: Chicken production

Verification results of LS-13 were combined into the overall results, as summarized below:

**Summary of Verification Results of LS-13**

Region and Pilot Site	Economic Aspect	Social Aspect	Main Points for Verification and Remarks
Omusati Tsandi	High	Moderate	- Most key farmers has not poultry house - Quick returns by hatching skill's up - Easy raising management - Low investment
Oshana Uukwiyu	High	Moderate	
Oshikoto Onyaanya	High	Moderate	
Overall Verification Results	High	Moderate	- Farmers have to change their habits to raise chickens by traditional system (extensive) - Key points mainly are housing , setting nests for laying and hatching, and feeding of LS-4

Source: Prepared by the Study Team.

Chicken production is generally based on feeding skills, disease control, marketing research and record keeping. However, setting proper nests for laying hatching is thought most important point to increase laying egg and hatching chicks. In rural areas, laying and hatching are done naturally, traditionally, and not controlled so farmers lose eggs on ground at backyard or bushes closed to houses. Eggs and hatched chicks without guard are attacked by predators such as snakes, hawks, wild cat or dogs easily. This points to set nests for laying and hatching would be the key to proceed from rather extensive traditional raising to semi-intensive raising of indigenous poultry.

(9) Factors for Technical measures

There are many factors to influence for each techniques and technical measures. Those factors are summarized in below table.

**Summary of Factors to Influence each Techniques and Technical Measures**

Technical measure	Main Factors									
	Rainfall	Vegetation	Management	Record keeping	Feeding	Vaccination	Deworming	Dehorning	Castration	Marketing research
LS-1	++	++	++							
	Fodder production is highly influenced by rainfall. Perennial grasses can however grow and spread seeds for long period if grasses take root once.									
LS-2	+	+	+++							
	Range management is influenced moderately by rainfall and vegetation. Range management itself is to control deterioration of pastures' vegetation by planned grazing and recover regrowth of vegetation in grazing areas.									
LS-4			+++		+++					++
	Chicken nutritious food is not depended on rainfall and vegetation. Feeding and management are important.									
LS-5			++			+++	+++			
	Disease control is the management skills of diseases which bring huge economic loss.									
LS-6	+	+			+++					+++
	Fattening means to fatten cattle for sell at market at high price. Most of food for fattening needs to buy from markets.									
LS-7			++	+++		++	++	+	++	+++
	Periodical production is based on reproductive recording . And it is important to manage cattle according to animal husbandry, seasonal treatment such deworming and vaccination and etc.									

Technical measure	Main Factors									
	Rainfall	Vegetation	Management	Record keeping	Feeding	Vaccination	Deworming	Dehorning	Castration	Marketing research
LS-11	++	++	++	++	+	++	++		++	++
	Goat production should operate many kinds of works.									
LS-13			+++		++	++	++			+++
	Chicken production can manage anywhere without any rainfall and vegetation. There is no obstacle to operate chicken production in any places and areas.									

Source: Prepared by the Study Team.

#### (10) Other Observation

The followings are the major points of observation during the trainings for ATs and farmers groups, and these points are the factors causing low training impacts.

➤ Farmer:

- Absence at training: Long distance, No transportation means, No interesting for training

In many case, it has been observed absence of key farmers to training. In remote areas especially, ATs should pick up key farmers and take them to the training venue. It means that many key farmers were not able to attend to the training without obtaining support from ATs. This fact also shows why the training could not start on time.

- No interest in training: Mistake in farmer selection

Since a few farmers were not interested in training, it may be the mistake in selection of key farmers. Farmers should have a will to improve livestock raising in order to improve their lives.

- Scarce leadership: No experience to organize group

Demonstration farmers sometimes work alone and did not try to spread the management skills for key farmers. It may be caused by lack of group organization so may not understand the role of leaders.

- Technical experience, animal husbandry tool kits, husbandry techniques and etc.

Large technical gap between demonstration farmer and key farmers: caused due to input of training materials. Most of farmers have not and a few farmers have tools for castration, dehorning, deworming and etc. Most of farmers have not practiced castration, dehorning, deworming because of lack of opportunity to practice.

Since N-CLIMP basically inputs minimum instruments and training materials for demonstration farmer only so technical transfer from ATs to farmers have executed at demonstration farmers' backyard or some certain places like the place of crush pen. Many farmers know these animal husbandry methods as knowledge but they have not experience to utilize tools practically. It therefore is the time to study such animal husbandry tools in their houses.

- Raising cattle only for increasing numbers but not as business assets:-Historical and traditional manner and lack of business mind (especially among old people)

As a historical and traditional manner, most of farmers try to increase cattle and goat numbers only. And this manner cause overgrazing , overstocking, degradation of pasture,

lack of food , disappear of perennial grasses, land erosion and etc.

Although to change mind at once is very difficult , it however is the time to shift the manner of livestock raising system from traditional increasing to business- oriented raising to keep communal pasture.

- Faced lack money to purchase medicine, vaccines, syringe, needle and etc. Don't want to spend money, Natural manner to ask help to others

Many key farmer state lack of money to purchase tools, vaccines, drugs, foods, licks, supplements and so on. It is really true and not true because that they don't have visible cash in their hands but have alternative resource of money. The alternative resource of money is livestock such goats or chickens so they can purchase needed tools and drugs by sales of these livestock to get cash. These statements indicate the deep dependency of farmers through their life histories. It also shows the lack of business minds. Farmers should notice that livestock raising is business to gain profits in order to improve lives better.

➤ Agricultural Technicians:

- Absence at training: Burden other routine works, No interesting for training, Insufficient transport means

ATs was sometimes absent to training. It may be caused by burden other routine works, no interesting for training and insufficient transport means. The training has purposes to skill up not only farmers but also of ATs in order to transfer these knowledge, techniques, experience and so on to farmers in other areas and other ATs with poor skills and experience of livestock raising.

*Attachment 3-5*

*Verification Results by Pilot Site for*

*Farm Management*

*N-CLIMP*

## Attachment 3-5 Verification Results by Pilot Site for Farm Management

As noted in Chapter 5 in the main report and Attachment 3-5 Verification Results of Each Technical Measure of Farm Management, technical measures for farm management are verified applying different methods from the crop and livestock production.

In the verification, the first focus is put on applicability, whether each technical measure is adopted to support plan by AT (Level 1), implemented at ATs at farmers' training (Level 2), or practiced by farmers (Level 3). In case that there is no adoption of a technical measure into support plan, it is Level 0 in the following tables. The second focus is put on the effectiveness of technical measures. It is verified whether each technical measure is effective for supporting crop or livestock production activities.

### 1. Omusati Region

#### 1.1. Etayi Constituency

##### (1) Application of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Etayi**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Adopted	Implemented	Not Practiced	2
FM 6: Group Account Management	Adopted	Implemented	Not Practiced	2
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Not Practiced	2
FM 10: Market Information Access Improvement	Not Adopted	Not Implemented	Not Practiced	0

*Source: Prepared by the Study Team*

#### <Overview>

- The study team observed that the responsible AT planned the Support Plan with the caution of the relevant projects' intervention, especially DCPD and the DAPEES's own activities.
- The AT also focused on the needs of supports for one technical measures into different activities. For example FM 2 on record keeping was planned to be undertaken for pest control (with CR 2 and CR 4), for purchase of agricultural inputs, and for grain storage (with CR 4 and FM 5). As the same, FM 5 on group strengthening is planned to be undertaken for harvesting and transporting of products to threshing floor, for grain storage, and for harvesting.
- The study team observed that the AT conducted farmers' training on the four technical measures

including the one which was not included in the Support Plan.

< Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Cereal Grain site with Individuals. However, as already noted above, the AT assumed the needs of that group activities and relevant technical measures (FM 5 and FM 6) are also targeted into the support plan.

< Observation of Each Technical Measure >

- The practice by farmers was observed by the study team as limited only to record keeping (FM 2) and other technical measures were not well implemented by farmers. The situation was attributed to i) the situation that farmers work as individuals for cereal production, and ii) the lack of chances for farmers' spontaneous group activities.
- This study team's observation does not match to the one by the answers to the questionnaire made by the responsible AT who marked that all technical measures were covered in the explanation to farmers.
- The study team observed that marketing for *mahangu* and rice was not yet penetrated to AT and farmers.

## (2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Etayi**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Partially confirmed	Rain fall record was reflected to the decision of timing of sowing seeds.
FM 5: Group Formation / Strengthening	suggesting possible effect	There was no significant effect of the usage of technical measures. However, ATs' implementation at
FM 6: Group Account Management	suggesting possible effect	
FM 8: Collective Procurement / Selling	suggesting possible effect	
FM 10: Market Information Access Improvement	suggesting possible effect	

Source: Prepared by the Study Team

- On FM2: The AT trained the model and key farmers for the usage of the rain gauge in combination of record keeping of rain fall. This combination of farmers' own rain fall observation and the crop production technical measures is expected to be effective to let them plan crop calendar. However, the late coming of rainy season in the fiscal year 2016/2017 hazarded to plan the timing of cultivation of rice.
- On FM 5 & 8: Main activities by the model and the key farmers are fully supported by two projects (N-CLIMP and SATREPS). This situation led to the fact that there has been little chances for them to act through group activity. For example, supported by N-CLIMP and

SATREPS, the model and key farmers did not need to work as a group for distribution of seedlings (in relation to FM 5, 6, 8). However, it is reported that neighboring farmers near to key farmers also wanted the seeds / seedlings of rice. In this regards, in the time of master plan implementation, it is expected that farmers need to work for production and sharing of rice seeds / seedlings as group activities. In the expected time, the group member needs to work based on agreement through meetings (FM5) to operate collective purchase of needed inputs (FM 8). From this point of view, the AT's implementation of these technical measures at the farmers' training was rightly focused.

- On FM 6: During the pilot site activities, the SATREPS has not charged any fee for seedlings. However, in the case of the dissemination of rice seeds / seedlings by key farmers as noted above, it is expected that farmers may need to collect fees from those peer farmers who buy seeds / seedlings. In this context, keeping group account book is needed. From this point of view, the AT's implementation of the technical measures at the farmers' training was also respected as in the right track to let farmers to be ready for further group activities.
- On FM 10: Marketing of rice or *mahangu* was not focused neither at Support Plan and farmers' training by AT.



## 1.2. Ruacana Constituency (Etunda ADC, Etunda Irrigation Green Scheme)

### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Ruacana**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced by some	3
FM 5: Group Formation / Strengthening	Adopted	Implemented	Partially Practiced	3
FM 6: Group Account Management	Not Adopted	Implemented	Not Practiced	2
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Willingness confirmed	3
FM 10: Market Information Access Improvement	Adopted	Implemented	Practiced	3

Source: Prepared by the Study Team

#### <Overview>

- In the Support Plan, the two ATs in Ruacana ADC adopted the three technical measures, FM2 on record keeping, FM 5 Group strengthening, and FM 10 Market Information Access Improvement based on the written “challenges” in the Action Plan the farmers’ groups (both plans are at the 2<sup>nd</sup> Stakeholder Meeting on 19 August, 2016).
- The study team observed the responsible ATs well conducted farmers’ trainings covering all five technical measures. This observation completely matches with the two ATs’ answers to the questionnaire at the 3<sup>rd</sup> TOT on 23 March, 2017. The difference between the adoption into ATs’ support plan and the training implementation can be attributed to the deeper understanding by the ATs on the needs of the technical measures through the 1<sup>st</sup> and 2<sup>nd</sup> TOTs.

#### < Classification in terms of group-emphasis and ATs’ coverage of technical measures >

The pilot site is classified as Horticulture with expectation of individual activities. Therefore, the importance of FM 6 and FM 8 were not assumed at the time of the support plan by ATs. However, the two ATs implemented farmers’ training covering all technical measures. This was a good preparation for collective selling. Farmers showed the willingness for collective selling after the group’s implementation of market survey assisted by the ATs.

#### < Observation of Each Technical Measures >

- In relation to FM 2, the model farmer keeps notebook, covering activities done including sales and profit made, and rainfall and water as seen. On the other hand, not all key farmers can keep farm record in the same style. During the observation of market surveys, there are some farmers who did not record by themselves.

Photos of Record kept by Model Farmer in Ruacana (Etunda)

<p>Page on Expenditure as observed on 13 December 2016</p>	<p>Page on sales as observed on 30 January, 2017</p>

Source: the Study Team

- In relation to FM 5 and FM 8, the study team observed that the farmers discussed the way forwards after conducting market survey. The discussion included possible collective selling and eagerness to work together. The discussion showed the high potential of further activities using these technical measures. The two ATs answers on these technical measures assume that they consider that farmers also work through group strengthening.
- In relation to FM 6, both the study team and the ATs confirmed that the AT explained on the group account management. On the other hand, however, both the study team and the ATs deny the practice by farmers.
- In relation to FM 10, the AT successfully assisted market survey within the framework of 2<sup>nd</sup> Farmers Training. One of them is an attendant to the training in South Africa Training on SHEP. The other AT prepared all training materials for training on Market Survey.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

### Effectiveness of Farm Management Technical Measures in Ruacana

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Confirmed	The group leaders use records for confirmation of group activities and decision made, also attendance of members.
FM 5: Group Formation / Strengthening	Partially confirmed	Farmers also understand benefits. But individual responsibility is not yet at good practice.
FM 6: Group Account Management	Not confirmed	The group has not yet started any activity about accounting .
FM 8: Collective Selling / Procurement	Partially confirmed	Farmers have not started collective selling or purchasing. However, the group members are willing collective selling through the market survey and the training by the ATs.
FM 10: Market Information Access Improvement	Confirmed	The market survey led key farmers to consider possible collective selling.

Source: Prepared by the Study Team

- FM 2 on record keeping is effective for activities in Ruacana. It is considered that the technical measures could be utilized in the short term of implementation period by key farmers and other members of cooperatives where the model and key farmers belong to. It is also expected that the model farmer's usage of record on sales and costs is easily applicable to group account management (FM 6).
- Both the study team and the ATs consider FM 5 on group strength is effective to promote further activities as a group. On the other hand, activities on decision making as well as individual responsibilities based on the rules (including payment of water fees) are still questionable.
- The study team considers that the effectiveness of FM 6 on group account management is not well confirmed although farmers' intension to work together will lead to the effective usage of the technical measure. The ATs consider the technical measures as effective.
- The study team considers that teaching of FM 8 on collective selling / purchase at farmers' training was effective to let farmers ready to consider collective selling. This is assumed at the time of discussion after the conducted market survey.
- Both the study team and the ATs consider FM 10 on market survey is effective for activities in Ruacana. Farmers who participated the second farmers' training on market survey discussed on further activities; market survey by themselves and possibility on collective selling. The discussions well showed the farmers' understanding on market-oriented approach. On the other hand, transportation for conducting market survey by farmers themselves was considered as one of the possible
- The natural hazard such as fruit and pumpkin flies and American borers are not yet treated by farmers. All treatment activities such as provision of insecticides reported as the responsibilities of the Green Scheme (with the assistance of AgriBusDeve) and ADC offices. As noted above, there are some farmers are not paying shared fees or contribution (such as water fees). This situation of less responsibility of farmers needs to be well monitored by the MAWF in relation to the sustainability of activities by the ministry and farmers' groups.

### 1.3. Okahao Constituency

(1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Okahao**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Not Adopted	Implemented	Partially Practiced	3
FM 6: Group Account Management	Not Adopted	Not Implemented	Not Practiced	0
FM 8: Collective Procurement / Selling	Not Adopted	Not Implemented	Not Practiced	0
FM 10: Market Information Access Improvement	Adopted	Implemented	Practiced	3

Source: Prepared by the Study Team

<Overview>

- It is observed that the responsible ATs conducted farmers' trainings covering both record keeping (FM 2) and Market Information Access Improvement (FM 10), The AT also explained the needs to work as a group (FM 5).

< Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Large Stock site with Individuals.

< Observation of Each Technical Measure>

- In relation to FM 2 on record keeping, the team observed that the model farmer had kept the notebook covering activity done, number of animals, including addition by birth and reduction by death and selling.

**Farm Record by Model Farmer in Okahao**

Large Stock		Activity Done	Number of Animals				Other	
			Exist	Addition by		Reduction by		
				Birth	Purchase	Death		Sales
Omusati	Okahao	X	X	X		X	X	

Source: The Study Team

- In relation to FM 5 on group strength, AT mentioned the needs to work as a group at training for farmers. The model farmer is keen to disseminate information on the livestock issues towards key farmers and neighboring farmers. However, the attendance rates of key farmers to farmers training have been low it is not yet confirmed that the key farmers plan to work together.
- In relation to FM 10 on market information access improvement, the model farmer understands the benefits and methods of technical measures. He has been in touch with Meat Co. and Meat

Board even before the involvement into N-CLIMP. The model farmer also visits informal, open and local markets for gaining market information. On the other hand, the awareness of other key farmers have just started with the involvement into N-CLIMP.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below. This shows the difference from the recognition by the responsible AT who marked in the questionnaire sheet with all farm management technical measures as effective.

**Effectiveness of Farm Management Technical Measures in Okahao**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Confirmed	Model farmer commented, "Farm record allows me reviewing the production and market activities as well as it works for planning"
FM 5: Group Formation / Strengthening	Partially Confirmed	It is confirmed that working as a group is a good way to transfer the new idea and skills (in case of Okahao, market-oriented approach of livestock management).
FM 6: Group Account Management	N/A	(Not applicable as there was no adoption and implementation)
FM 8: Collective Procurement / Selling	N/A	(Not applicable as there was no adoption and implementation)
FM 10: Market Information Access Improvement	Confirmed	The effectiveness of market-oriented approach (especially selling at early ages) is become accepted by key and neighboring farmers as the successful livestock production (and selling) is assumed by the practiced by the model farmer.

Source: Prepared by the Study Team

- Even before involvement into N-CLIMP, the model farmer was keen to sell cattle at early age stages. He has been gaining market information through ATs and Meat Board through regular communication with them. With N-CLIP, the model farmer gained information and skills through the livestock technical measures, such as range management, fodder production, castellation, and dehorning. These technical measures successfully worked for the decline of mortality rates with the synergy of his keen control of number of animals through selling them at the age of 16 months. During the drought season, those who criticized him for selling "stock", admitted the acceptance of the rightness of the model farmer's market oriented approach.

## 1.4. Tsandi Constituency

### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Tsandi**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced by some	3
FM 5: Group Formation / Strengthening	Not Adopted	Implemented	Practiced	3
FM 6: Group Account Management	Not Adopted	Implemented	Not Practiced	2
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Practiced	3
FM 10: Market Information Access Improvement	Adopted	Implemented	Not Practiced	2

Source: Prepared by the Study Team

#### <Overview>

- The responsible AT adopted only FM 2 and F10 to support plan. After TOT, she conducted farmers' trainings covering all five technical measures.
- This was a good matching with the needs of key farmers who feared the outbreak of Newcastle Disease (NCD). Supported by the facilitation by the AT, key farmers discussed and decided to buy vaccine together (FM 8 based on FM 5).
- Encouraged with the treatment against NCD, key farmers have been discussing the plan to sell chickens together (FM 8).

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as <G-2> site where group activities need to be emphasized.

#### < Observation of Each Technical Measure >

- In relation to FM2, it is observed that model farmer and some farmers keep farm records mainly on limited issues on the number of animals.

**Farm Record by Model Farmer in Tsandi**

Small Stock	Activity Done	Number of Animals				Other	
		Exist	Addition by		Reduction by		
			Birth	Purchase	Death		Sales
Omusati	Tsandi <G-2>	X	X		X		

Source: Prepared by the study team

Note: Observed on 14 February, 2017

- In relation to FM 5 on group strengthening and FM 8 on collective procurement, the procurement of vaccine against Newcastle Disease (NCD) was done as a group. At the 3<sup>rd</sup> farmer trainings on

March 28, 2017, farmers discussed further activities to involve more members into group. During the discussion, it was noted that each key farmer is going to report to the group how many more farmers can joint to the group for further collective procurement of vaccines.

- In relation to FM 6 on group account management, AT taught the needs and theory of group account management. It is followed by her practical helping of the group accounting when the group members were in hurry for vaccination.
- This way of assistance by AT in the process of group development is found as effective in order to gain efficient results of the activities. As the assistance worked well to establish the trust among members, they are now considering to work together for selling (FM 8).
- In relation to FM 10 on market information access improvement, AT explained the needs of collection of market information.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Tsandi**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Confirmed	Number of chickens are also used for confirmation of production and productivity.
FM 5: Group Formation / Strengthening	Confirmed	The vaccination against NCD is smoothly done.
FM 6: Group Account Management	Not Confirmed	The group accounting management is done by the AT.
FM 8: Collective Selling / Procurement	Confirmed	The vaccination against NCD is smoothly done.
FM 10: Market Information Access Improvement	Not Confirmed	Group members are keen to sell chickens, however, the timing and markets are not yet well understood by farmers.

Source: Prepared by the Study Team

## 2. Oshana Region

### 2.1 Oshakati-West Constituency

#### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Oshakati-West**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Not Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Adopted	Not Implemented	Not Practiced	1
FM 6: Group Account Management	Not Adopted	Not Implemented	Not Practiced	0
FM 8: Collective Procurement / Selling	Not Adopted	Not Implemented	Not Practiced	0
FM 9: Rural Finance Accessibility Improvement	Adopted	Not Implemented	Not practiced	1
FM 10: Market Information Access Improvement	Adopted	Not Implemented	Not Practiced	1

Source: Prepared by the Study Team

#### < Overview >

- In the Support Plan, the ATs planned to have FM 5, FM 9 and FM 10 as seen above. At the practical level, however, ATs have not achieved as planned in the support plan.

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Cereal Grain with Individuals.

#### < Observation of Each Technical Measure >

- In relation to FM 2, the responsible AT did not adopt the technical measures into Support Plan. However, at the first TOT, they were suggested by other officers to add the technical measures into the Agenda of farmers' training. They implemented the training for farmers including the record keeping. In February, it was observed that a few farmers kept records well, however, only covering activity and rain fall. On the other hand, it was observed in March 2017 that the model farmer remembered production quantity and profits well in relation to the weather conditions.
- In the support plan, the ATs planned to combine FM 5 on group strengthening and FM 10 on market information strengthening for motivating farmers to organize a marketing group. However, their implementation at farmers training on FM 5 was limited to let more attendance to trainings. In relation to FM 10, there was no market information was involved in the sessions of training for farmers.
- In the support plan, FM 9 on rural finance access improvement was focus as the way of getting



fund for fencing around the demo field as it was raised as one of challenges in the farmers' action plan. However, the ATs did not address this in the farmers' trainings. At the time of the second farmers' training in December, 2016, key farmers demanded actual funds to be given. Responding to them, ATs suggested that the Project pay the self-reliance part of fees for usage of ripper furrow. In relation to this situation, one of ATs explained that the usage of ripper furrow increased from 3 or 4 ha in last season to 49 ha in this season. However, the increase in the area size of the usage could not be a suitable indicator when looking at the background situation as written above.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Oshakati-West**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Partially Confirmed	The production quantity and weather conditions in recent years are well remembered by the model farmer. The needs and benefits of records on notebook is not well confirmed.
FM 5: Group Formation / Strengthening	Not Confirmed	There was no significant effect of the usage of technical measures.
FM 6: Group Account Management	N/A	(Not applicable as there was no adoption and implementation)
FM 8: Collective Selling / Procurement	N/A	(Not applicable as there was no adoption and implementation)
FM 9: Rural Finance Accessibility Improvement	N/A	(Not applicable as there was no adoption and implementation)
FM 10: Market Information Access Improvement	Not Confirmed	There was no significant effect of the usage of technical measures.

Source: Prepared by the Study Team

## 2.2. Okatana Constituency

### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Okatana**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Adopted	Implemented	Practiced	3
FM 6: Group Account Management	Not Adopted	Implemented	Practiced	3
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Not Practiced	2
FM 10: Market Information Access Improvement	Adopted	Implemented	Practiced	3

Source: Prepared by the Study Team

#### < Overview >

- The responsible ATs conducted the three sessions of training for farmers covering all five technical measures.

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Horticulture-Group, <G-1>. This is because the group members share a set of facilities installed with the support of CUVE water and other organizations.

#### < Observation of Each Technical Measure >

- In relation to FM 2, the model and key farmers of Okatana are observed as they are practicing at high standard level. As seen below, the contents in the records that the secretary of the group cover wide range as seen below.

**Record Contents covered by the secretary of Okatana Farmers Groups**

Horticulture		Activity Done	Sales Made	Sales		Rain Fall	Growth
				Price	Profits		
Oshana	Okatana <G-1>	X	X	X	X		

		Inputs	Application of		Consumption of			Other
			Fertilisers	Chemicals	Fuel	Electricity	Water	
Oshana	Okatana <G-1>	X	X	X			X	Rules/ Attendance

Source: Prepared by the study team

Note: observed on 15 December, 2016 and 23 February, 2017

- In relation to FM 5, there have been a series of discussions observed as a process of gaining agreement on membership, regulations and decision making through the two phases. This is considered as there has few activities attractive until the completion of replacement of roof sheets

and installation of drip irrigation parts. After the second farmers' training in November, 2016, the group members decided a series of new rules. The new rules include the imposition of fines and annulment of membership in case of frequent absence from activities or meetings.

- In relation to FM 6, the treasury of the group keeps a an account book. The collection of water fees are recorded and the information is shared among the group members. The group has a bank account and share the responsibilities for the access to the account. One of the reasons why there was change in the membership of management of the group in Phase 2 was related to the accounting issue as noted in the Progress Report 2.
- In relation to FM 8, the group has not yet taken their own action. All materials for installation or rehabilitation of the facilities were supported by the Projects (both CUVE water and N-CLIMP), and farmers were not requested to contribute some parts of the needed fund. This situation did not give a chance for farmers to consider the collective procurement although the AT explained at the farmers training.
- In relation to FM 10 on market survey, within the second farmers' training, the AT managed to explain the purpose and practical methods. Then farmers conducted market survey in Oshakati Open Market by themselves without the presence of the AT. Although it was expected to work as a group, the attendant separated one by one in the market, and then conducted interviews with the traders individually. After the market survey, however, the members shared the information gained through the interview.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Okatana**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Confirmed	The secretary of the group keeps the activities, decision made, rules, attendance of members, and so on. The group record is well used in the discussion at the meeting.
FM 5: Group Formation / Strengthening	Confirmed	It took long process to gain agreement through a series of discussions among members. Supported by the AT, the ways of discussions through regular meetings as well as the way of management in relation to accounting issues have improved.
FM 6: Group Account Management	Confirmed	
FM 8: Collective Selling / Procurement	Not Confirmed	The group did not have chance to practice using the technical measure.
FM 10: Market Information Access Improvement	Confirmed	The attendant to the market survey proved that farmers can conduct market survey by themselves independently.

Source: Prepared by the Study Team

- With the group's members' activities and long process of discussions through the two phases, it is assumed that the communal note (FM 2) and account management (FM 6) function for better way of group management (FM 5).
- On the other hand, the application of this verification to other areas or groups need to be done

with cations of their capabilities. In Okatana, the newly elected management members of the group are highly literate. This fact has significantly affected the ways of their decision making and regulations.

## 2.3. Uuvudhiya Constituency

### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Uuvudhiya**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Adopted	Implemented	Not Practiced	2
FM 6: Group Account Management	Not Adopted	Implemented	Not Practiced	2
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Not Practiced	2
FM 10: Market Information Access Improvement	Adopted	Implemented	Not Practiced	2

Source: Prepared by the Study Team

#### < Overview >

- In the Support Plan, FM 2, FM 5 and FM 10 were adopted in order to mitigate the challenge written in the action plan by farmers.
- The responsible AT conducted the farmers training covering all farm management technical measures.

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Large Stock site with Individuals.

#### < Observation of Each Technical Measure >

- In relation to FM 2, it is observed that the model and key farmers well keep farm records as seen below. About the Activity Done and Sales, the model farmer added the information in February, 2017, compared to December, 2016.

**Farm Record by Model Farmer in Uuvudhiya**

Large Stock	Activity Done	Number of Animals						Other
		Exist	Addition by		Reduction by			
			Birth	Purchase	Death	Sales		
Oshana	Uuvudhiya	X	X	X		X	X	

Source: Prepared by the study team

Note: observed on 16 December, 2016 and 23 February, 2017

- In relation to FM 5, FM 6 and FM 8, practical activity by farmers was not observed. The distance between residences of farmers are greater in Uuvudhiya compared to other pilot sites. Under this condition, as noted in the LS-5, the group members separated into two places.
- In relation to FM 10, farmers have difficulty to be up-dated with market information as the mobile phone coverage is poor.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Uuvudhiya**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Partially Confirmed	Recording of animals' number by model and key farmers became improved through the AT's trainings. It can be attributed that farmers started to look at the importance of recording.
FM 5: Group Formation / Strengthening	Partially Confirmed	It is confirmed that the group size need to be considered not only the number of members, but also the distances between farmers' residences.
FM 6: Group Account Management	Not Confirmed	Because of the above-noted situation in FM 5 Implementation, it may take more time for farmers to be practice group activities.
FM 8: Collective Selling / Procurement	Not Confirmed	
FM 10: Market Information Access Improvement	Not Confirmed	Although selling at action was encouraged, most farmers consider the prices at auctions are not preferable. Thus, farmers lost animals in draught.

Source: Prepared by the Study Team

- As noted in the table, the situation in Uuvudhiya is not preferable for letting farmers to work as a group, or in market-oriented approach. It may take more time for letting farmers understand well about the benefits of these technical measures.

## 2.3. Uukuwiyu-Uushona

### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Uukuwiyu-uushona**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Adopted	Implemented	Practiced	3
FM 6: Group Account Management	Not Adopted	Implemented	Practiced	3
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Practiced	3
FM 10: Market Information Access Improvement	Adopted	Implemented	Practiced	3

Source: Prepared by the Study Team

#### < Overview >

- In the support plan, the ATs adopted FM 2 on record keeping, FM 5 on group strengthening and FM 10 on market information access improvement. They implemented all farm management technical measures at farmers' trainings.
- Farmers also practiced all farm management technical measures at field level.
- The group is active and spontaneous as can be seen in the additional housing was built by the group members on their own expense.

< Classification in terms of group-emphasis and ATs' coverage of technical measures.

- The pilot site is classified as <G-2> site where group activities need to be emphasized.

< Observation of Each Technical Measure >

- In relation to FM 2, the secretary of the group keeps a notebook recording the following issues.

**Farm Record kept by Secretary of the Group in Uukuwiyu**

Small Stock	Activity Done	Number of Animals					Other
		Exist	Addition by		Reduction by		
			Birth	Purchase	Death	Sales	
Oshana	Uukuwiyu	<G-2>	X	X		X	X

Source: Prepared by the study team

Note: Observed on 7 February, 2017

- In relation to FM 5 and FM 8, there are two main issues. Firstly, the group has done vaccination against Newcastle Disease (NCD) as group activities. For doing so, they decided the date and practical methods including the responsible in sub-groups and ways of collection of fees. Secondly the group has built an additional housing by their own initiatives.

- In relation to FM 6, the group keeps account book. For the vaccination against NCD, members simply shared the cost divided by number of members, not by heads of vaccinated chickens. In this way, the calculation and ways of collecting fees became simple. As of March, 2017, the group has not yet share the profits made from the sales of chickens. The profits are planned to be used for further investment (feeding, vitamins and chemicals, etc..).
- In relation to FM 10, the group has plan to sell more. Without transporting to markets, the group sells chickens at the site as customers know the site and visit them.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Uukuwiyu**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Confirmed	Number of chickens (in both group and individual records) are also used for accounting.
FM 5: Group Formation / Strengthening	Confirmed	The vaccination against NCD is smoothly done. The members share the vision for further group activities.
FM 6: Group Account Management	Confirmed	The group accounting management is effectively done for the practical activities such as vaccination and group hatching.
FM 8: Collective Selling / Procurement	Confirmed	The vaccination against NCD is smoothly done.
FM 10: Market Information Access Improvement	Partially Confirmed	Group members are keen to sell chickens. But the information on buyers may be still limited as buyers come to the site.

*Source: Prepared by the Study Team*



### 3. Oshikoto Region

#### 3.1. Omuthiya Constituency

##### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Omuthiya**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Not Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Not Adopted	Implemented	Not Practiced	2
FM 6: Group Account Management	Not Adopted	Not Implemented	Not Practiced	0
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Not Practiced	2
FM 10: Market Information Access Improvement	Not Adopted	Implemented	Partially Practiced	3

Source: Prepared by the Study Team

##### < Overview >

- In the support plan, the responsible AT did not adopt any technical measures.
- However, at the time of farmers' training, the four technical measures were covered.
- At the field level, farmers' practice in relation to farm management technical measures is limited.

##### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Cereal Grain site with Individuals.

##### < Observation of Each Technical Measure >

- In relation to FM 2, the model farmer's record keeps only the activities and rain fall.

Farm Record by Model Farmer in Omuthiya

Cereal Grain		Activity Done	Sales Made	Sales		Rain Fall	Growth	Inputs
				Price	Profits			
Oshikoto	Omuthiya	X				X		

Source: Prepared by the Study Team

Note: Observed on 20 December, 2016 and 1 February, 2017

- In relation to FM 5, FM 6 and FM 8, farmers did not practice any activities.
- In relation to FM 10, the key farmers who are also members of an association in the constituency have advantages to have semi-regular and unofficial access to market information. However, the members of association basically sell the products as individual basis.

##### (2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Omuthiya**

<b>Technical Measures</b>	<b>Effectiveness</b>	<b>Note</b>
FM 2: Record Keeping	Not Confirmed	The using the information written in the record is not observed.
FM 5: Group Formation / Strengthening	Not Confirmed	No group activities or discussions were observed.
FM 6: Group Account Management	N/A	(Not applicable as there was no adoption and implementation)
FM 8: Collective Selling / Procurement	Not Confirmed	No significant activities or discussions that can be considered as the reflection were observed.
FM 10: Market Information Access Improvement	Not Confirmed	There was no significant effect of the usage of technical measures.

*Source: Prepared by the Study Team*

### 3.2. Onayena Constituency

#### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Onayena**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Not Adopted	Not Implemented	Not Practiced	0
FM 6: Group Account Management	Not Adopted	Not Implemented	Not Practiced	0
FM 8: Collective Procurement / Selling	Not Adopted	Not Implemented	Not Practiced	0
FM 10: Market Information Access Improvement	Not Adopted	Implemented	Practiced	3

Source: Prepared by the Study Team

#### < Overview >

- In the support plan, only FM 2 was adopted. At the farmers' training, FM 2 and FM 10 were implemented.
- The same technical measures were also practiced by farmers.

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Horticulture as Individuals.

#### < Observation of Each Technical Measure >

- In relation to FM 2, the model farmer has kept leadership to key farmers, and through farmers' training, he had shared his own knowledge and skills on the ways of record keeping.

**Farm Record by Model Farmer in Onayena**

Horticulture		Activity Done	Sales Made	Sales		Rain Fall	Growth
				Price	Profits		
Oshikoto	Onayena	X	X	X	X	X	

Horticulture		Inputs	Application of		Consumption of			Other
			Fertilisers	Chemicals	Fuel	Electricity	Water	
Oshikoto	Onayena						X	

Source: Prepared by the Study Team

Note: Observed on 9 February, 2017

- In relation to FM 5 FM 6 and FM 8, there is no practice observed at the field level except gathering for farmers training.
- In relation to FM 10, the model and key farmers implemented market survey in January, 2016. Since then, the model farmer keep similar activities in informal ways on regular basis. He also

demonstrates a good example of crop selection to key farmers.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in**

<b>Technical Measures</b>	<b>Effectiveness</b>	<b>Note</b>
FM 2: Record Keeping	Confirmed	Farm records are used for the planning of crop production as reference of the previous seasons activities and outputs, as well as with accounting.
FM 5: Group Formation / Strengthening	N/A	(Not applicable as there was no adoption and implementation)
FM 6: Group Account Management	N/A	(Not applicable as there was no adoption and implementation)
FM 8: Collective Selling / Procurement	N/A	(Not applicable as there was no adoption and implementation)
FM 10: Market Information Access Improvement	Confirmed	Crop selection is done based on the results of market survey.

*Source: Prepared by the Study Team*

### 3.3. Omuntele Constituency

(1) Applicability of Farm Management Technical Measures

Verification of Applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Omuntele**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Not Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Not Adopted	Implemented	Practiced	3
FM 6: Group Account Management	Not Adopted	Not Implemented	Not Practiced	0
FM 8: Collective Procurement / Selling	Adopted	Implemented	Willingness showed	3
FM 10: Market Information Access Improvement	Adopted	Implemented	Practiced	3

Source: Prepared by the Study Team

< Overview >

- In the support plan, the ATs planned help farmers for procurement of medicine through collective purchase (FM 8) and for improvement of market information (FM 10).
- The ATs conducted the farmers' training covering these technical measures as well as record keeping (FM 2) and group strengthening (FM 5).
- With the support of N-CLIMP with the livestock technical measures, model farmer's market oriented approach (FM 10) gained synergistic effects and the better ways of collaboration with other farmers (FM 5) as seen below.

< Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Large Stock site with Individuals, although there have been a series of initiatives showed by the model and key farmers as noted in the next part.

< Observation of Each Technical Measure >

- In relation to FM 2, the model farmer and key farmers keep the records. The model farmer especially keep a good series of records covering not only he number of animals also the sales records.

**Farm Record by Model Farmer in Omuntele**

Large Stock	Activity Done	Number of Animals						Other
		Exist	Addition by		Reduction by			
			Birth	Purchase	Death	Sales		
Oshikoto	Omuntele	X	X	X		X	X	

Source: Prepared by the Study Team

Note: Observed on 19 December, and 22 February, 2017

- In relation to FM 5 and FM 10, a synergy is found with livestock technical measures. Firstly, these animal husbandry training as well as the information on the timing of selling and buying reduced the death. Secondly, with using animal husbandry calendar and controlling of insemination timing, new-born calves of group members are almost within two months' difference at birth dates. In this condition, as the timing of vaccination, castration, and dehorning are shared by other farmers in accordance with the livestock production calendar, it is easy to collaborate with other farmers.
- In relation to FM 8, farmers are now discussing possible collective procurement of medicine for disease controls.
- The model farmer is now planning to buy crush pen so he can do dehorning, castration and vaccination in his household. This clearly shows that he considers livestock management as business.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Omuntele**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Confirmed	Records on number of animals and sales make a good reference for coming season of livestock calendar.
FM 5: Group Formation / Strengthening	Confirmed	Group working gained synergistic effects with animal husbandry technical measures as noted above.
FM 6: Group Account Management	N/A	(Not applicable as there was no adoption and implementation)
FM 8: Collective Selling / Procurement	Partially Yes; Confirmed	Farmers are now discussing the collective procurement of medicine.
FM 10: Market Information Access Improvement	Confirmed	The effectiveness of market-oriented approach (especially selling at early ages) is become accepted by key and neighboring farmers as the successful livestock production (and selling) is assumed by the practiced by the model farmer.

*Source: Prepared by the Study Team*

### 3.4. Onyaanya Constituency

#### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Onyaanya**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Adopted	Implemented	Practiced	3
FM 6: Group Account Management	Not Adopted	Implemented	Practiced	3
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Practiced	3
FM 10: Market Information Access Improvement	Adopted	Implemented	Not Practiced	2

Source: Prepared by the Study Team

#### < Overview >

- In the support plan, the responsible ATs planned to assist farmers with technical measures of FM 2, FM 5 and FM 10.
- At farmers training sessions, ATs implemented all five farm management technical measures.
- Farmers also practiced almost all technical measures, except marketing is done as individual basis.

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as <G-2> site where group activities need to be emphasized.

#### < Observation of Each Technical Measure >

- In relation to FM 2, the secretary of the group keeps a notebook recording the following issues.

**Farm Record kept by Secretary of the Group in Onyaanya**

Small Stock	Activity Done	Number of Animals						Other
		Exist	Addition by		Reduction by			
			Birth	Purchase	Death	Sales		
Oshikoto	Onyaanya <G-2>	X	X	X		X	X	

Source: Prepared by the study team

Note: Observed on 22 February, 2017

- In relation to FM 5 and FM 8, the group has done vaccination against Newcastle Disease (NCD) as group activities. For doing so, they decided the date and practical methods including the responsible in sub-groups and ways of collection of fees.
- On the other hand, Attendance rates of key farmers to trainings have been low and the AT re-organized the second training (3 on 30 November, and 5 on 7 December, 2017). This implies

that group strengthening was not well plasticized at the time. However, at the third training (on 29 March, 2017), farmers discussed the way forward and confirmed the activities to work as a group.

- As there is an incubator at the model farmer’s site, group members also use the system by paying fees for incubator. The model farmer also buy eggs from other farmers for hutching.
- In relation to FM 6, the group keeps account book. They also opened a group account at Nam-Post. For the vaccination against NCD, members simply shared the cost divided by number of members.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Onyaanya**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Confirmed	Number of chickens are used for planning of further activities.
FM 5: Group Formation / Strengthening	Confirmed	The vaccination against NCD is smoothly done. The members share the vision for further group activities.
FM 6: Group Account Management	Confirmed	The group keeps account book.
FM 8: Collective Selling / Procurement	Confirmed	The vaccination against NCD is smoothly done.
FM 10: Market Information Access Improvement	Partially Confirmed	Group members are keen to sell chickens. But the information on buyers may be still limited as buyers come to the site.

*Source: Prepared by the Study Team*



### 3.5. King Kauluma Constituency

#### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Edola**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	N/A	Implemented	Not Practiced	2
FM 5: Group Formation / Strengthening		Not Implemented	Not Practiced	0
FM 6: Group Account Management		Not Implemented	Not Practiced	0
FM 8: Collective Procurement / Selling		Not Implemented	Not Practiced	0
FM 10: Market Information Access Improvement		Implemented	Not Practiced	2

Source: Prepared by the Study Team

#### < Overview >

- The site was added as the fifth pilot site in Oshikoto Region after other pilot sites had decided the support plan. This is why there is no support plan for the activities in the pilot site.
- The AT started farmers training for key farmers in late December when other pilot sites had completed the second farmers training.
- The arrival of goats delayed. The farmers' training in December 2016 mainly focused on livestock technical measures. At the 2<sup>nd</sup> training on 30 March, 2017, the AT focused on FM 2 and FM 10. .

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Small Stock with Individuals.

#### (2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Endola**

<b>Technical Measures</b>	<b>Effectiveness</b>	<b>Note</b>
FM 2: Record Keeping	N/A	(Not applicable as there was no adoption and implementation)
FM 5: Group Formation / Strengthening	N/A	(Not applicable as there was no adoption and implementation)
FM 6: Group Account Management	N/A	(Not applicable as there was no adoption and implementation)
FM 8: Collective Selling / Procurement	N/A	(Not applicable as there was no adoption and implementation)
FM 10: Market Information Access Improvement	N/A	(Not applicable as there was no adoption and implementation)

*Source: Prepared by the Study Team*

- As noted above, the verification did not take place in the pilot site.

## 4. Ohangwena Region

### 4.1. Ondobe Constituency

#### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Ondobe**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Adopted	Implemented	Practiced	3
FM 6: Group Account Management	Not Adopted	Implemented	Practiced	3
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Practiced	3
FM 10: Market Information Access Improvement	Not Adopted	Implemented	Practiced	3

Source: Prepared by the Study Team

#### < Overview >

- In the support plan, the AT focused only on FM 2 and FM 5. However, at the farmers' trainings, the AT implemented four farm management technical measures.
- At the first TOT, the AT managed all participants to comment challenges that they feel, then categorized whether the issues can be treated by human factors or not. After categorization of crop production technical measures, the AT led to the discussion into the needs to focus on farm management technical measures.
- It is also observed that the intervention of regional council is effective to work with the AT and suggested the public funding system for ripper furrow and other subsidies to be used for the communal land of *mahangu*.
- Farmers practiced at the filed level covering all five technical measures.

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as <G-2> site where group activities need to be emphasized.

#### < Observation of Each Technical Measure >

- In relation to FM 2, the secretary and the treasury of the group keep a notebook which is also used as an account book.

**Farm Record kept by Secretary of the Group in Ondobe**

Cereal Grain		Activity Done	Sales Made	Sales		Rain Fall	Growth
				Price	Profits		
Ohangwena	Ondobe <G-1>	X	X	X	X	X	

Cereal Grain			Inputs	Application of		Consumption of			Other
				Fertilisers	Chemicals	Fuel	Electricity	Water	
Ohangwena	Ondobe	<G-1>							

Source: Prepared by the Study Team

Note: Observed on 21 December, 2016 and 3 February, 2017

- In relation to FM 5 and FM 8, the group's management is observed as at high level. The rules for attending to the group activities as well as the decision making of collective selling were all discussed with the members. This can be attributed to the group's long term experience to share common land and work.
- In relation to FM 6, an account book is well kept. More importantly, the sales, quantity and profits from the the products are all reported at a farmers meeting (that fell into the 1<sup>st</sup> farmers' training). Participants are also active to examine the correctness of the account management.
- In relation to FM 8, the group management members are responsible for collective selling and procurement. As noted above, high level of group account management (FM 6) supports the smooth implementation by the farmers on their own.
- In relation to FM 10, the AT worked as the information source, where and how to sell the communal products.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Confirmed	Records of group activities are well kept and reported at the meetings.
FM 5: Group Formation / Strengthening	Confirmed	Discussions for practical reasons (for example, ways to guaranteeing equal levels of responsibilities at farm land) show the good management as a group and leadership of management team of the group.
FM 6: Group Account Management	Confirmed	The reporting followed by the discussion with group members shows that FM 6 are important for guaranteeing FM 8.
FM 8: Collective Selling / Procurement	Confirmed	The management team has the clear idea on how to deal with collective selling and procurement.
FM 10: Market Information Access Improvement	Confirmed	With enough market information, the group managed to sell the products harvested from the previous season.

Source: Prepared by the Study Team

## 4.2. Epembe Constituency

### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Epembe**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Adopted	Implemented	Practiced	3
FM 6: Group Account Management	Not Adopted	Implemented	Practiced	3
FM 8: Collective Procurement / Selling	Not Adopted	Implemented	Practiced	3
FM 9: Rural Finance Access Improvement	Adopted	Implemented	Practiced	3
FM 10: Market Information Access Improvement	Adopted	Implemented	Practiced	3

Source: Prepared by the Study Team

#### < Overview >

- The position as AT in the constituency has been vacant through Phase 3. The Ohangwena Region was not able to assign an officer to work for the pilot site up to the time of the 3<sup>rd</sup> ToT.
- On the other hand, the farmers' group has been mainly active although the younger generation started to be

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as <G-2> site where group activities need to be emphasized.

#### < Observation of Each Technical Measure >

- In relation to FM 2, the group secretary keep a notebook at high standard. The notebook is also used as an account book (FM 6).

**Farm Record kept by Secretary of the Group in**

Cereal Grain		Activity Done	Sales Made	Sales		Rain Fall	Growth
				Price	Profits		
Ohangwena	Ondobe <G-1>	X	X	X	X	X	

Cereal Grain		Inputs	Application of		Consumption of			Other
			Fertilisers	Chemicals	Fuel	Electricity	Water	
Ohangwena	Ondobe <G-1>							

Source: Prepared by the Study Team

Note: Observed on 21 December, 2016 and 3 February, 2017

- In relation to FM 5, the groups had been observed as dormant. Through the intervention, the group members learned what a group can do. For example, subsidy application and collective production. However, during the time of waiting for the installation of drip irrigation facilities and connection to

water supply, some members had dropped off from the group. For facilitating the connection to water supply, it was advised by an engineer that the group members also become water users committee. However,

- In relation to FM 6, the management team of the farmers' groups keep the account book.
- In relation to FM 8 and FM 10, the group does not start official production on the communal land as the proper facilities were not yet installed,

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Epembe**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Partially Confirmed	Although the records is kept, the farmers cannot plan according to the activities in the records.
FM 5: Group Formation / Strengthening	Partially Confirmed	The dropping-off of members show that the effectiveness is low in the pilot site.
FM 6: Group Account Management	Confirmed	An account book is kept at high standard.
FM 8: Collective Selling / Procurement	Not Confirmed	Collective selling has not officially done. Collective procurement has not done as all materials are provided by external sources without letting farmers sharing costs.
FM 10: Market Information Access Improvement	Not Confirmed	The farmers group have not used the results of the market survey held in Enahha, mainly due to the fact that the group has not produced since then.

*Source: Prepared by the Study Team*

### 4.3. Okongo Constituency

#### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Okongo**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Not Adopted	Not Implemented	Willingness showed	2
FM 6: Group Account Management	Not Adopted	Not Implemented	Not Practiced	0
FM 8: Collective Procurement / Selling	Not Adopted	Not Implemented	Not Practiced	0
FM 10: Market Information Access Improvement	Adopted	Implemented	Partially Practiced	2

Source: Prepared by the Study Team

#### < Overview >

- In the support plan, only FM 2 and FM 10 were adopted by ATs. The same technical measures are also implemented at the farmers' training.
- Farmers' practice the technical measures facilitated by the ATs.

#### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Large Stock – Individuals.

#### < Observation of Each Technical Measure >

- In relation to FM 2, the next table shows the coverage of records kept by the model farmer.

**Farm Record by Model Farmer in Okongo**

Large Stock		Activity Done	Number of Animals				Other	
			Exist	Addition by		Reduction by		
				Birth	Purchase	Death		Sales
Ohangwena	Okongo	X	X	X		X		

Source: Prepared by the Study Team

Note: Observed on 16 February, 2017

- In relation to FM 5, farmers' group discussed over the ways of usage of animal husbandry kit. Although other activities are done as individual basis, at the occasion of farmers' training, key farmers make a small group for practicing livestock techniques (LS 5 Disease Control and LS 7 Periodical Production).
- In relation to FM 6 and FM 8, no activity was observed in the pilot site. Vaccination animal husbandry and other activities are all at individual basis.
- In relation to FM 10, farmers are encouraged to sell animals based on the records. However, as

the above-noted record does not show sale, the practice is observed as limited.

(2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Okongo**

Technical Measures	Effectiveness	Note
FM 2: Record Keeping	Partially Confirmed	The records are kept. However, it is not yet fully used for the planning of livestock production.
FM 5: Group Formation / Strengthening	Partially Confirmed	The farmers are willing to share the tools (animal husbandry kit) with the fee charges.
FM 6: Group Account Management	N/A	(Not applicable as there was no adoption and implementation)
FM 8: Collective Selling / Procurement	N/A	(Not applicable as there was no adoption and implementation)
FM 10: Market Information Access Improvement	Partially Confirmed	Farmers were encouraged to sell. However, foot and mouth disease hazarded auctions. In the group, unlike Okahao or Omuntele, there has not been a leader who can show a good model of market-oriented livestock production.

Source: Prepared by the Study Team

- At farmers' training on vaccination (LS 5), dehorning and castellation (LS 7), farmers are trained to practice with peer farmers.



#### 4.4. Endola Constituency

##### (1) Applicability of Farm Management Technical Measures

Verification of applicability is summarized as seen in the table below.

**Farm Management Technical Measures Implementation in Endola**

Technical Measures	Observation by Study Team			Conclusion
	Adoption into Support Plan by AT	Implementation at Farmers' Training	Practice by Farmers	Level
FM 2: Record Keeping	Adopted	Implemented	Practiced	3
FM 5: Group Formation / Strengthening	Not Adopted	Not Implemented	Not Practiced	0
FM 6: Group Account Management	Not Adopted	Not Implemented	Not Practiced	0
FM 8: Collective Procurement / Selling	Not Adopted	Not Implemented	Not Practiced	0
FM 10: Market Information Access Improvement	Adopted	Implemented	Partially Practiced	3

Source: Prepared by the Study Team

##### < Overview >

- In the support plan, the responsible AT planned to adopt only FM 2 and FM5. These technical measures were implemented at the farmers' trainings.
- Farmers activities in relation to these technical measures were observed.

##### < Classification in terms of group-emphasis and ATs' coverage of technical measures >

- The pilot site is classified as Small Stock with Individuals.

##### < Observation of Each Technical Measure >

- In relation to FM 2, it is observed that the model farmer keep records covering the following issues.

**Farm Record kept by Secretary of the Group in Endola**

Small Stock	Activity Done	Number of Animals				Other	
		Exist	Addition by		Reduction by		
			Birth	Purchase	Death		Sales
Ohangwena	Endola	X	X		X		

Source: Prepared by the study team

Note: Observed on 14 December, and 21 February, 2017

- In relation to FM 10 and other livestock technical measures, there was a household level gender issue observed as affecting the activity. Even when female key farmers were trained for medication, selling or market issues, their husbands did not allow their wives (i.e. key farmers who have more knowledge on goats).

##### (2) Effectiveness of Farm Management Technical Measures

The study team observed effectiveness of farm management technical measures as seen in the table below.

**Effectiveness of Farm Management Technical Measures in Endola**

<b>Technical Measures</b>	<b>Effectiveness</b>	<b>Note</b>
FM 2: Record Keeping	Partially Confirmed	The records are kept. However, it is not yet fully used for the planning of livestock production.
FM 5: Group Formation / Strengthening	N/A	(Not applicable as there was no adoption and implementation)
FM 6: Group Account Management	N/A	(Not applicable as there was no adoption and implementation)
FM 8: Collective Selling / Procurement	N/A	(Not applicable as there was no adoption and implementation)
FM 10: Market Information Access Improvement	Partially Confirmed	For letting key farmers active in relation to goats, gender issues need to be addressed.

*Source: Prepared by the Study Team*

- As noted above, the gender issue is only applicable for goat production and not for chickens.

*Attachment 3-6*

*Verification Results of  
each Technical Measures for  
Farm Management*

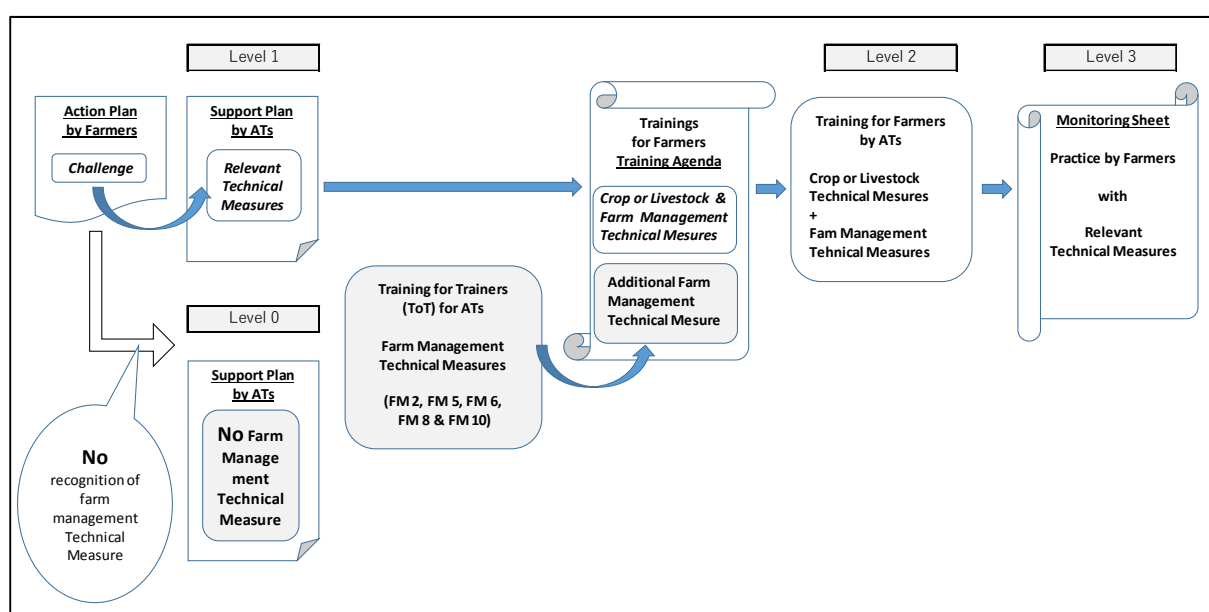
*N-CLIMP*

## Attachment 3-6 Verification Results of Each Technical Measure for Farm Management

### 1. Overall Verification for Farm Management Technical Measures

#### 1.1. Process of application of farm management technical measures in pilot sites

In consideration of farmers' application of each farm management technical measure, there are a few steps before achieving farmers' practice. The process is summarized with the assumption that ATs and farmers need to take some actions for passing through to the next step. The standing point of after taking a kind of action is presented as a level. The next chart shows the process with the recognition of the levels.



Source: The Study Team

#### Process of application of farm management technical measures in pilot sites

In short, the four levels of application of a farm management technical measure are summarized below.

- Level 0: No mention of the technical measure in the support plan prepared by ATs
- Level 1: Adoption of the technical measure in the support plan prepared by ATs
- Level 2: Implementation of farmers' training addressing the technical measure
- Level 3: Practice by farmers using or applying the technical measure

#### 1.2. Levels of Application for Each Technical Measures

The simplified result of application of farm management technical measures is presented in the next table.

## Application Levels of Farm Management Technical Measures

Technical Measure	Number of Sites by Levels				Observation
	Level 0	Level 1	Level 2	Level 3	
FM-2 Record Keeping (Farm Record)	0	0	1	16	Farmers in all sites except King Kauluma keep farm records.
FM-5 Group Formation / Strengthening	3	1	4	9	Farmers in more than half of pilots sites are assumed that they work together for crop or livestock production related activities.
FM-6 Group Accounting Management	0	8	4	5	Farmers in about one third of pilot sites work using group account. ATs in the almost the same number of pilot sites explained but farmers do not practice.
FM-8 Collective Selling / Purchasing	6	0	4	7	Farmers in about 40 % of pilot sites work through collective selling or purchasing, or discussed on the collective activities.
FM-10 Market Information Access Improvement	1	0	5	11	Farmers in more than 60 % of sites practice any activities related to market information access improvement.

Source: The Study Team

Note: Level 0: No mention of the technical measure in the support plan prepared by ATs

Level 1: Adoption of the technical measure in the support plan prepared by ATs

Level 2: Implementation of farmers' training addressing the technical measure

Level 3: Practice by farmers using or applying the technical measure

However, the table above does not well present significance of application levels in FM 5, FM 6, and FM8. Then the relationship between the application levels and types of crop or livestock production is focused in the next table.

## Application Levels of Farm Management Technical Measures

Technical Measure	Types of production	Number of Sites by Levels				Observation
		Level 0	Level 1	Level 2	Level 3	
FM-2 Record Keeping (Farm Record)	grain	0	0	0	4	There is no difference between types of crops or livestock.
	horticulture	0	0	0	4	
	cattle	0	0	0	4	
	chicken	0	0	0	3	
	goat	0	0	1	1	
FM-5 Group Formation / Strengthening	grain	0	1	2	1	There seems to be significance in higher levels in horticulture and chicken production.
	horticulture	1	0	0	3	
	cattle	0	0	2	2	
	chicken	0	0	0	3	
	goat	2	0	0	0	
FM-6 Group Accounting Management	grain	2	0	1	1	Cattle and goat sites mark lower levels. For crop production types, there are division in higher and low levels.
	horticulture	1	0	1	2	
	cattle	3	0	1	0	
	chicken	0	0	1	2	
	goat	2	0	0	0	
FM-8 Collective Selling / Purchasing	grain	1	0	2	1	Chicken sites mark full. Other types are divided into higher and lower levels' groups.
	horticulture	1	0	1	2	
	cattle	2	0	1	1	
	chicken	0	0	0	3	
	goat	2	0	0	0	
FM-10 Market Information Access Improvement	grain	1	1	0	2	Mainly almost all are in level 2 and level 3.
	horticulture	0	0	0	4	
	cattle	0	0	2	2	
	chicken	0	0	2	1	
	goat	0	0	1	1	

Source: The Study Team

Note: Level 0: No mention of the technical measure in the support plan prepared by ATs

Level 1: Adoption of the technical measure in the support plan prepared by ATs

Level 2: Implementation of farmers' training addressing the technical measure

Level 3: Practice by farmers using or applying the technical measure

In the above table, the boxes in grey show the higher presences in the same level by the types of production. There is some tendency read between the application level and types of crop or livestock production. However, there is not yet explicit explanation for FM 5, FM 6, and FM 8 where divisions of presence of sites between Level 0 and Level 2 and 3. This situation led to the next analysis with the focus on the feature of pilot sites with group activities.

### 1.3. Recognition of Group-oriented and Group-expected sites in Verification

The analysis focuses on the groups where group activities are identified as effectual. There are following two types of groups.

<G-1>: Group-oriented pilot sites identified at the start of Phase 2 as farmers share communal land and facilities. One of them is cereal grain, and other two are horticulture sites.

<G-2>: Group-expected pilot sites identified as group activities are expected through implementation in Phase 2 and 3. These are all chicken sites.

The next table shows the categorization of pilot sites with <G-1> Group-oriented, <G-2> Group-expected and individual sites.

**Group-oriented <G-1> and Group-expected <G-2> Pilot Sites with the Name of Constituencies**

Grouping	Cereal Grain	Horticulture	Large Stock	Small Stock	
				Chicken	Goats
<G -1> Group-oriented sites	Ondobe	Okatana Epembe	-	-	-
<G-2> Group-expected sites	-	-	-	Tsandi Uukwiyu Onyaanya	-
Individual sites	Etaiye Oshakati-West Omuthiya	Ruacana Onayena	Okahao Uuvudhiya Omuntele Okongo	-	King-Kauluma Endola

Source: The Study Team

Verification results of application of each farm management technical measures are summarized below. In this table, the average of levels, not number of sites, is chosen to present the results. Therefore, the highest is all ways 3.0, meaning all sites in the category mark Level 3 (farmers' practice). Lowest is 0, which means all sites in the category mark Level 0 (no adoption in the support plan by ATs).

### Summary of Verification Results of Application Level of Technical Measures for Farm Management

Technical Measure	Average Levels of Application						
	grain		horticulture		cattle	chicken	goat
Group Categorization	Individual	G-1	Individual	G-1	Individual	G-2	Individual
Number of sites in the categorization	3	1	2	2	4	3	2
FM-2 Record Keeping (Farm Record)	3.0	<b>3.0</b>	3.0	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	2.5
FM-5 Group Formation / Group Strengthening	1.7	<b>3.0</b>	1.5	<b>3.0</b>	2.5	<b>3.0</b>	0
FM-6 Group Accounting Management	0.6	<b>3.0</b>	1.0	<b>3.0</b>	0	<b>2.7</b>	0
FM-8 Collective Selling / Purchasing	1.3	<b>3.0</b>	1.5	<b>3.0</b>	1.3	2.0	0
FM-10 Market Information Access Improvement	2.0	<b>3.0</b>	3.0	<b>3.0</b>	2.5	2.3	2.5

*Source: Prepared by the Study Team.*

*Note: Group Categorization: G-1: Group activities are expected as farmers share communal land and facilities, G-2: Group activities are focused for smooth implementation of vaccination.*

*Average Levels of Application is calculated through sum of levels divided by number of sites in the same category.*

*Application Level 1: Adopted in Support Plan by AT, Level 2: Implemented in Farmer Training by ATs, and Level 3: Practiced by farmers*

For FM 5, FM 6, and FM 8, <G-1> <G-2> groups achieve to higher levels than individual groups. There are more significant differences between individual and group categorizations rather than types of crop or livestock.

Based on the result of this analysis there are a question may be asked whether ATs do not need to adopt group-related technical measures (FM 5, FM 6, and FM 8) in case that the pilot sites are designated to let farmers work individually. The answer is No. The following two sections will explain the reasons.

#### 1.4. Applicability Enhancement through TOTs

There are clear results that show how TOTs by ATs function to let farmers to recognize a few types of technical measures.

In the next table, the enhancement of applicability of technical measures through the TOTs are summarized. In the table, the number of sites where AT achieved to implement farmers' training (Level 2) and farmers practice (Level 3) where there was no adoption of technical measure in support plan (Level 0).

#### Number of Sites with Enhancement of Applicability through TOTs

Technical Measure	From Level 0 to	Cereal Grain	Horticulture	Cattle	Chicken <G-2>	Goat	Number of Site Enhanced	Enhanced	
								By Level	Total
Number of sites		4	4	4	3	2	17	(%)	
FM-2 Record Keeping	Level 2	-	-	-	1	1	-	0	29
	Level 3	3	-	2	-	-	5	29	
FM-5 Group	Level 2	1	-	1	-	-	2	12	41

Technical Measure	From Level 0 to	Cereal Grain	Horticulture	Cattle	Chicken <G-2>	Goat	Number of Site Enhanced	Enhanced	
								By Level	Total
Formation / Strengthening	Level 3	-	1	2	2	-	5	29	
FM-6 Group Accounting Management	Level 2	-	1	3	1	-	5	29	65
	Level 3	1	3	-	2	-	6	35	
FM-8 Collective Selling / Purchasing	Level 2	2	2	2	-	-	6	35	71
	Level 3	1	2	-	3	-	6	35	
FM-10 Market Information Access Improvement	Level 2	-	-	-	-	1	1	6	24
	Level 3	2	1	-	-	-	3	18	

Source: The Study Team

Note: <G-1> refers Group-Oriented pilot sites identified at the start of Phase 2. <G-2> refers pilot sites identified as group activities are need to be emphasized through Phase 2 and 3 implementation .

Note: Applicability Level 1: Adopted in Support Plan by AT, Level 2: Implemented in Farmer Training by AT, and Level 3: Practiced by farmers

The table clearly shows the effect of TOT on the raising levels of application. The most significantly influenced technical measures are observed as FM 6 group accounting and FM 8 collective selling / purchasing.

### 1.5. Effectiveness of farm management technical measures

For those pilot sites of farmers' practice (Level 3), ATs' explanation (Level 2) and ATs' adoption in their support plan (Level 1), effectiveness of the technical measure is verified. The next table summarizes effectiveness of farm management technical measures.

#### Summary of Verification Results of Effectiveness of Technical Measures for Farm Management

Technical Measure	Not Confirmed	Partially Confirmed	Confirmed	Observation
FM-2 Record Keeping (Farm Record)	1	6	9	The effectiveness is confirmed with more than half sites. This means that farmers use the records for activities of production.
FM-5 Group Formation / Strengthening	3	5	6	In some individual activity sites, the effects are not yet confirmed. On the hand, there are a few individual sites where farmers are willing to work together.
FM-6 Group Accounting Management	4	0	5	There are some sites accounting is not well managed by farmers. This technical measure need to be combined with FM 5 and FM 8.
FM-8 Collective Selling / Purchasing	5	2	4	As already noted in the above section, the chicken sites are significantly good to show the effects of FM 8. In some individual activity sites, the effects are not yet confirmed. On the hand, there are a few individual sites where farmers are willing to work together.



Technical Measure	Not Confirmed	Partially Confirmed	Confirmed	Observation
FM-10 Market Information Access Improvement	6	4	6	The market survey effects are well found in horticulture sites. It is also significant that two of cattle sites where model farmers are active with market-oriented approach, their production become better with the combination with livestock technical measures.

Source: Prepared by the Study Team.

In combination of the observation with the table above, applicability enhancement by TOTs, this table implies the needs of ATs' focus on the expected achievement where they would like to lead farmers, not only the recognized challenges. As noted in the observation for FM 5, FM 8 and FM 10, there are some sites where farmers have not yet taken actions, but have willingness for working using technical measures.

These technical measures in relation to group activities effective when they are presented as a series or with other activities for production. Ruacana (horticulture site in Omusati Region) and Omuntele (cattle site in (Oshikoto Region) present examples of good stories.

**Effects of Market Survey in Ruacana (Etunda), Omusati**

Ruacana farmers conducted market survey assisted by the ATs as part of the 2<sup>nd</sup> farmers' training. Before the market survey, one of the ATs explained that the team of ATs would like farmers to be "business" people in agriculture sector.

The key farmers are divided into three groups and visited local Ruacana open market, informal village shops, a super market, a school kitchen, a lodge, and a restaurant. After the market survey, farmers presented the results and share the information.

In the presentation and discussions, farmers found that certain bulk quantity of the same quality products are needed. They started to discuss the possible collective selling.



*Village shop  
Open market  
Restaurant*

*In Ruacana on 9 November, 2017*

**“Group work Made Easy by Livestock Technical Measures”**

**A talk by Model Farmer in Omuntele**

The model farmers has been keen to control number of animals even before the involvement into N-CLIMP. With N-CLIMP, he gained new animal husbandry techniques such as usage of livestock calendar and controlling insemination timing.

These techniques lead the model farmer and neighboring farmers to work together much easily as calves are born almost within two months' age difference. For example, dehorning, castellation and vaccination to calves can be done together with neighboring farmers.

The model farmer and his peer farmers are now considering to procure vaccine together.

## 2. Verification of Each Technical Measure

### 2.1. FM-2: Record Keeping (Farm Record)

This technical measure was adopted to support plan and farmers' training in most of pilot sites except Omuthiya in Oshikoto Region. In all pilot sites, farmers practice (indicated with "Level 3" in the column of Adoption and Implementation in the Summary Table).

#### (1) Cereal Grain Pilot Sites

**Summary of Verification Results of FM 2 in Cereal Grain Pilot Sites**

Region and Pilot Site		Application	Effectiveness	Main Points for Verification and Remarks
OmUSati	Etayi	Level 3	Partially Confirmed	Both model and key farmers recorded rain fall and activities.
Oshana	Oshakati-West	Level 3	Partially Confirmed	Usage of records for crop production may take more time to be confirmed.
Oshikoto	Omuthiya	Level 3	Not Confirmed	The effectiveness can be high when the records include sales as seen in case of Ondobe.
Ohangwena	Ondobe <G-1>	Level 3	Confirmed	
Overall Verification Results		Level 3	Confirmed	

Source: Prepared by the Study Team

The table shows the contents kept in the farm records by farmers in these pilot sites.

Cereal Grain		Activity Done	Sales Made	Sales		Rain Fall	Growth	Inputs	Application of			Consumption of		Other
				Price	Profits				Fertilisers	Chemicals	Fuel	Electricity	Water	
OmUSati	Etayi	X				X			X					
Oshana	Oshakati-West	X				X								
Oshikoto	Omuthiya	X				X								
Ohangwena	Ondobe <G-1>	X	X	X	X	X								

Source: The Study Team

Note: Prepared based on monitoring from December 2016 to February, 2017.

#### (2) Horticulture Pilot Sites

**Summary of Verification Results FM 2 in Horticulture Pilot Sites**

Region and Pilot Site		Application	Effectiveness	Main Points for Verification and Remarks
OmUSati	Etunda	Level 3	Confirmed	Both model and key farmers recorded activities including chemical / fertilizer application and sales. Some of them kept costs, too. Model farmers (or leaders) in Okatana keep group notebook that can probably applicable to group account book.
Oshana	Okatana <G-1>	Level 3	Confirmed	
Oshikoto	Onayena	Level 3	Confirmed	
Ohangwena	Epembe <G-1>	Level 3	Partially Confirmed	
Overall Verification Results		Level 3	Confirmed	

Source: Prepared by the Study Team

The table shows the contents kept in the farm records by farmers in these pilot sites.

Horticulture		Activity Done	Sales Made	Sales		Rain Fall	Growth	Inputs	Application of			Consumption of		Other
				Price	Profits				Fertilisers	Chemicals	Fuel	Electricity	Water	
OmUSati	Etunda <G-3>	X	X		X		X						X	
Oshana	Okatana <G-1>	X	X	X	X			X	X	X			X	
Oshikoto	Onayena	X	X	X	X	X							X	
Ohangwena	Epembe <G-1>						(not yet started the actual activities at site)							

Source: The Study Team

Note: Prepared based on monitoring from December 2016 to February, 2017.

### (3) Large Stock Pilot Sites

**Summary of Verification Results of FM 2 in Large Stock Pilot Sites**

Region and Pilot Site		Application	Effectiveness	Main Points for Verification and Remarks
Omusati	Okahao	Level 3	Confirmed	Both model and key farmers keep records on animal numbers (including death and birth). A few model farmers keep records also on sales and other activities and then plan the livestock management based on the records.
Oshana	Uuvudhiya	Level 3	Partially confirmed	
Oshikoto	Omuntele	Level 3	Confirmed	
Ohangwena	Okongo	Level 3	Partially Confirmed	
Overall Verification Results		Level 3	Confirmed	

Source: Prepared by the Study Team

The table shows the contents kept in the farm records by farmers in these pilot sites.

Large Stock		Activity Done	Rain Fall	Growth	Water	Number of Animals				Other	
						Exist	Addition by		Reduction by		
							Birth	Purchase	Death		Sales
Omusati	Okahao	X				X	X	X	X		
Oshana	Uuvudhiya	X				X	X	X	X		
Oshikoto	Omuntele	X				X	X	X	X		
Ohangwena	Okongo	X				X	X	X			

Source: The Study Team

Note: Prepared based on monitoring from December 2016 to February, 2017.

### (4) Small Stock Pilot Sites

**Summary of Verification Results of FM 2 in Small Stock Pilot Sites**

Region and Pilot Site			Application	Effectiveness	Main Points for Verification and Remarks
Omusati	Tsandi	<G-2>	Level 3	Confirmed	Model farmers (or group secretary) keep the records on chicken, egg and chick numbers as well as activities of the vaccination and sales. The groups mainly share the information. The group note can be soon turned out into group account book.
Oshana	Uukwiyu	<G-2>	Level 3	Confirmed	
Oshikoto	Onyaanya	<G-2>	Level 3	Confirmed	
Oshikoto	King-Kauluma		Level 2	N/A	The monitoring is in the progress.
Ohangwena	Endola		Level 3	Partially Confirmed	
Overall Verification Results			Level 3	Confirmed	

Source: Prepared by the Study Team

Note: King Kauluma in Oshikoto Region is added at the beginning of Phase 3. Therefore farmers practice are not well confirmed.

The table shows the contents kept in the farm records by farmers in these pilot sites.

Small Stock			Activity Done	Rain Fall	Growth	Water	Number of Animals				Other	
							Exist	Addition by		Reduction by		
								Birth	Purchase	Death		Sales
Omusati	Tsandi	<G-2>				X	X	X	X			
Oshana	Uukwiyu	<G-2>				X	X	X	X			
Oshikoto	Onyaanya	<G-2>	X			X	X	X	X			
Oshikoto	King-Kauluma		(Not applicable as farmers have not yet received goats at the time of monitoring in December, 2016 to February, 2017)									
Ohangwena	Endola					X	X	X				

Source: The Study Team

Note: Prepared based on monitoring from December 2016 to February, 2017.

## 2.2. FM-5: Group Formation / Group Strengthening

Apart from the categorization based on the crop or livestock types, the study team recognized that there are three the beginning of the study. Those pilot sites are marked with <G-1> in the following tables. Apart from these pilot sites, chicken sites are recognized that group activities are effective. The sites are marked with <G-2>. After the four types of crop and livestock production, <G-1> groups are re-cited to look at whether they have any common features in application and effectiveness.

### (1) Cereal Grain Pilot Sites

**Summary of Verification Results of FM 5 in Cereal Grain Pilot Sites**

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Etayi	Level 2	Not Confirmed	Most of cereal grain pilot sites did not gain FM 5 on group strengthening. Exception is found in Ondobe where farmers organize a group for cultivation of <i>mahangu</i> on communal land.
Oshana Oshakati-West	Level 1	Not Confirmed	
Oshikoto Omuthiya	Level 2	Not Confirmed	
Ohangwena Ondobe <G-1>	Level 3	Confirmed	
Overall Verification Results	(Level 1 to 3)	(Not Confirmed)	

Source: Prepared by the Study Team

Note: Mark <G-1> refers Group-Oriented pilot sites identified at the start of Phase 2.

### (2) Horticulture Pilot Sites

**Summary of Verification Results FM 5 in Horticulture Pilot Sites**

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Etunda	Level 3	Partially Confirmed	Except Onayena where AT did not adopted FM 5 to support plan, neither implemented at farmers training, farmers in other three sites practiced group activities that are considered as effective or partially effective.
Oshana Okatana <G-1>	Level 3	Confirmed	
Oshikoto Onayena	Level 0	N/A	
Ohangwena Epembe <G-1>	Level 3	Partially Confirmed	
Overall Verification Results	Level 3 with exception	Confirmed	

Source: Prepared by the Study Team

Note: Mark <G-1> refers Group-Oriented pilot sites identified at the start of Phase 2.

### (3) Large Stock Pilot Sites

**Summary of Verification Results of FM 5 in Large Stock Pilot Sites**

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Okahao	Level 3	Partially Confirmed	For large stock pilot sites, FM 5 is at least implemented at farmers' training or practiced by farmers. Effects are also recognized.
Oshana Uuvudhiya	Level 2	Partially confirmed	
Oshikoto Omuntele	Level 3	Confirmed	
Ohangwena Okongo	Level 2	Partially Confirmed	
Overall Verification Results	Level 2 & 3		

Source: Prepared by the Study Team

#### (4) Small Stock Pilot Sites

##### Summary of Verification Results of FM 5 in Small Stock Pilot Sites

Region and Pilot Site			Application	Effectiveness	Main Points for Verification and Remarks
Omusati	Tsandi	<G-2>	Level 3	Confirmed	The group of farmers in the three chicken raising pilot sites were planned to be emphasize the needs of group activities. Without exception, farmers archived to work together for vaccination against Newcastle Disease (NCD) showing effectiveness of group activities.
Oshana	Uukwiyu	<G-2>	Level 3	Confirmed	
Oshikoto	Onyaanya	<G-2>	Level 3	Confirmed	
Oshikoto	King-Kauluma		Level 0	N/A	In these two sites, monitoring is still in progress and cannot conclude at the time of the report drafting.
Ohangwena	Endola		Level 0	N/A	
Overall Verification Results <G-2>			Level 3	Confirmed	

Source: Prepared by the Study Team

Note: King Kaulma in Oshikoto Region is added at the beginning of Phase 3.

Mark <G-2> refers pilot sites identified as group activities are needs to be emphasized through Phase 2 and 3 implementation

#### (5) Re-citing Group-Oriented Pilot Sites

When focusing on the pilot sites where Group-Oriented activities are identified (with the mark of <G-1>), it is assumed that farmers' activities are supported with the group management with the better ways of decision making and discussions.

##### Re-cited Summary of Verification Results FM 5 in Group-Oriented Pilot Sites (categorized as <G-1> )

Region and Pilot Site			Application	Effectiveness	Main Points for Verification and Remarks
Oshana	Okatana	<G-1>	Level 3	Confirmed	All three groups of farmers have done group activities. However, there is a few difference> Ondobe has good ways of management on group records and accounting as the group has long history work on the communal land.
Ohangwena	Ondobe	<G-1>	Level 3	Confirmed	
Ohangwena	Epembe	<G-1>	Level 3	Partially Confirmed	
Overall Verification Results			Level 3	Confirmed	

Source: Prepared by the Study Team

Note: Mark <G-1> refers Group-Oriented pilot sites identified at the start of Phase 2.

### 2.3. FM-6: Group Account Management

It is verified that FM 6 works with FM 5 on group strengthening and FM 8 collective procurement / selling. For this particular farm management technical measure, there are significant differences of adoption and implementation, and effectiveness among the types of crop or livestock production.

#### (1) Cereal Grain Pilot Sites

##### Summary of Verification Results of FM 6 in Cereal Grain Pilot Sites

Region and Pilot Site			Application	Effectiveness	Main Points for Verification and Remarks
Omusati	Etayi		Level 2	Not Confirmed	Over all verification is not applicable to sum up this type of crop production. Only Ondobe where farmers work on communal land for long time show the farmers activities are benefited by the FM 6.
Oshana	Oshakati-West		Level 0	N/A	
Oshikoto	Omuthiya		Level 0	N/A	
Ohangwena	Ondobe	<G-1>	Level 3	Confirmed	
Overall Verification Results			N/A	N/A	

Source: Prepared by the Study Team

## (2) Horticulture Pilot Sites

### Summary of Verification Results FM 6 in Horticulture Pilot Sites

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Etunda	Level 2	Not Confirmed	Okatana and Epembe where Group activities were emphasized (<G-1>), the effectiveness is confirmed.
Oshana Okatana <G-1>	Level 3	Confirmed	
Oshikoto Onayena	Level 0	N/A	
Ohangwena Epembe <G-1>	Level 3	Confirmed	
Overall Verification Results	N/A	N/A	

Source: Prepared by the Study Team

## (3) Large Stock Pilot Sites

### Summary of Verification Results of FM 6 in Large Stock Pilot Sites

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Okahao	Level 0	N/A	Although there are a few sites where farmers are interested in group activities (FM 5) with possible collective selling or procurement (FM8), at the moment, there was no good example to show that group account management is working for large stock production. This is a great difference with the following small stock (especially chicken) sites.
Oshana Uuvudhiya	Level 2	Not Confirmed	
Oshikoto Omuntele	Level 0	N/A	
Ohangwena Okongo	Level 0	N/A	
Overall Verification Results	N/A	N/A	

Source: Prepared by the Study Team

## (4) Small Stock Pilot Sites

### Summary of Verification Results of FM 6 in Small Stock Pilot Sites

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Tsandi <G-2>	Level 2	Not Confirmed	For the collective procurement of vaccines against New Castle Disease, the three groups (with the mark of <G-2>) worked for FM 8. In the process, Uukwiyu and Onyaanya farmers have done the account management by themselves. In Tsandi, the AT had worked as an account.
Oshana Uukwiyu <G-2>	Level 3	Confirmed	
Oshikoto Onyaanya <G-2>	Level 3	Confirmed	
Oshikoto King-Kauluma	Level 0	N/A	The data are not enough to verify based on these two sites' activities.
Ohangwena Endola	Level 0	N/A	
Overall Verification Results	N/A	N/A	

Source: Prepared by the Study Team

King Kauluma in Oshikoto Region started the farmers training in December, 2016. Therefore, farmers practice is not well confirmed.

## (5) Re-citing Group-Oriented Pilot Sites

It is assumed that farmers in the group-emphasized pilot sites manage group account very well.

**Re-cited Summary of Verification Results FM 6 in Group-Oriented Pilot Sites (categorized as <G-1> )**

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Oshana Okatana <G-1>	Level 3	Confirmed	In these group-emphasized pilot sites, management teams keep group account book, bank account. They have bank account and reporting is also done in meetings.
Ohangwena Ondobe <G-1>	Level 3	Confirmed	
Ohangwena Epembe <G-1>	Level 3	Confirmed	
Overall Verification Results	Level 3	Confirmed	

Source: Prepared by the Study Team

## 2.4. FM-8: Collective Selling / Purchasing

Collective selling or purchasing is added from the beginning of Phase 3. This is because FM 8 collective purchasing can be combined with FM 5 group strengthening, FM 6 Group Account Management, and LS 5 Disease control.

### (1) Cereal Grain Pilot Sites

**Summary of Verification Results of FM 8 in Cereal Grain Pilot Sites**

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Etayi	Level 2	Not Confirmed	As similar to FM 6, effectiveness of collective selling or procurement was not confirmed except Ondobe where farmers work as a group on communal land.
Oshana Oshakati-West	Level 0	N/A	
Oshikoto Omuthiya	Level 2	Not Confirmed	
Ohangwena Ondobe <G-1>	Level 3	Confirmed	
Overall Verification Results	Level 2 to 3	N/A	

Source: Prepared by the Study Team

### (2) Horticulture Pilot Sites

**Summary of Verification Results FM 8 in Horticulture Pilot Sites**

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Etunda	Level 3	Partially Confirmed	Etunda is marked with “partially confirmed” because of their discussion on the way forward of collective selling. With other horticulture production even including those of group-emphasized pilot sites, collective procurement or selling did not archive to the level of effectiveness confirmation. In other words, farmers did not have a good chance to procure materials by themselves for the needed facilities on their own land or communal land. This situation should be well analyzed from the point of view of “competence” what the SHEP approach focuses on.
Oshana Okatana <G-1>	Level 2	Not Confirmed	
Oshikoto Onayena	Level 0	N/A	
Ohangwena Epembe <G-1>	Level 3	Not Confirmed	
Overall Verification Results	N/A	N/A	

Source: Prepared by the Study Team

### (3) Large Stock Pilot Sites

**Summary of Verification Results of FM 8 in Large Stock Pilot Sites**

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Okahao	Level 0	N/A	Farmers in Omuntele are now considering collective purchase of medicine is now discussed. Other pilot sites have not reach to any
Oshana Uuvudhiya	Level 2	Not Confirmed	
Oshikoto Omuntele	Level 3	Partially	

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
		Confirmed	action or discussions for collective procurement or selling.
Ohangwena Okongo	Level 0	N/A	
Overall Verification Results	N/A	N/A	

Source: Prepared by the Study Team

#### (4) Small Stock Pilot Sites

##### Summary of Verification Results of FM 8 in Small Stock Pilot Sites

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Tsandi <G-2>	Level 3	Confirmed	Procurement of vaccine against Newcastle Disease is done.
Oshana Uukwiyu <G-2>	Level 3	Confirmed	
Oshikoto Onyaanya <G-2>	Level 3	Confirmed	
Oshikoto King-Kauluma	Level 0	N/A	
Ohangwena Endola	Level 0	N/A	
Overall Verification Results			

Source: Prepared by the Study Team

King Kaulma in Oshikoto Region started the farmers training in December, 2016. Therefore, farmers' practice is not well confirmed.

#### (5) Re-citing Group-Oriented Pilot Sites

##### Re-cited Summary of Verification Results FM 8 in Group-Oriented Pilot Sites (categorized as <G-1> )

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Oshana Okatana <G-1>	Level 2	Not Confirmed	Farmers in Ondobe have experience to collective selling of <i>mahangu</i> . For farmers in Okatana and Epembe, collective selling is not yet at practical level for discussion. Materials for facilities (roof materials or drip irrigation) on the communal land did not need to be procured by farmers.
Ohangwena Ondobe <G-1>	Level 3	Confirmed	
Ohangwena Epembe <G-1>	Level 3	Not Confirmed	
Overall Verification Results	Level 2 and 3		

Source: Prepared by the Study Team

## 2.5. FM-10: Market Information Access Improvement

The degree of farmers' involvement to FM 10 on market information access improvement differ by types of crops. During the implementation of Phase 2 and Phase 3, there have been great improvement of receiving of market information by farmers.

#### (1) Cereal Grain Pilot Sites

##### Summary of Verification Results of FM 10 in Cereal Grain Pilot Sites

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Etayi	Level 2	Not Confirmed	In Ondobe, group leaders (management team) are functional for collective selling and procurement. They do practical operation and then report to other farmers at meetings. For other sites, the information on the better ways of marketing is not well transferred to farmers except the time of stakeholder meeting with invitees from AMTA.
Oshana Oshakati-West	Level 1	Not Confirmed	
Oshikoto Omuthiya	Level 3	Not Confirmed	
Ohangwena Ondobe <G-1>	Level 3	Confirmed	
Overall Verification Results	Level 1 to 3	Not well Confirmed	

Source: Prepared by the Study Team



## (2) Horticulture Pilot Sites

### Summary of Verification Results FM 10 in Horticulture Pilot Sites

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Etunda	Level 3	Confirmed	With the assistance and guidance of ATs, all four horticulture sites experienced the market survey; Onayena and Epembe in Phase 2 and Etunda and Okatana in Phase 3. Since then, the model farmer of Onayena have been conducting unofficial market survey at regular basis. He reflects the results into his crop production planning.
Oshana Okatana <G-1>	Level 3	Confirmed	
Oshikoto Onayena	Level 3	Confirmed	
Ohangwena Epembe <G-1>	Level 3	Not Confirmed	
Overall Verification Results	Level 3	Mainly Confirmed	

Source: Prepared by the Study Team

## (3) Large Stock Pilot Sites

### Summary of Verification Results of FM 10 in Large Stock Pilot Sites

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Okahao	Level 3	Confirmed	The model farmers in Okahao and Omuntele have been keen to gain market information by themselves. They often attend to auctions. They use the records that contain the number of animals and sales. The auctions are not only for selling, but also buying young animals. They plan the livestock numbers for keeping based on the records based on the knowledge of livestock calendar.
Oshana Uuvudhiya	Level 2	Not Confirmed	
Oshikoto Omuntele	Level 3	Confirmed	
Ohangwena Okongo	Level 2	Partially Confirmed	
Overall Verification Results	Level 2 & 3	N/A	

Source: Prepared by the Study Team

## (4) Small Stock Pilot Sites

### Summary of Verification Results of FM 10 in Small Stock Pilot Sites

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Omusati Tsandi <G-2>	Level 2	Not Confirmed	As the same with the large stick types, farmers are supposed to sell chickens or chicks (in case of Onyaaya). However, gaining market information is limited. They usually sell within the site or near the site, without travelling.
Oshana Uukwiyu <G-2>	Level 3	Partially Confirmed	
Oshikoto Onyaanya <G-2>	Level 2	Partially Confirmed	
Oshikoto King-Kauluma	Level 2	N/A	
Ohangwena Endola	Level 3	Partially Confirmed	
Overall Verification Results			

Source: Prepared by the Study Team

Note: King Kaulma in Oshikoto Region started the farmers training in December, 2016. Therefore, farmers' practice is not well confirmed.

## (5) Re-citing Group-Oriented Pilot Sites

### Re-cited Summary of Verification Results FM 10 in Group-Oriented Pilot Sites (categorized as <G-1> )

Region and Pilot Site	Application	Effectiveness	Main Points for Verification and Remarks
Oshana Okatana <G-1>	Level 3	Confirmed	As farmers in Ondobe work through collective selling of mahangu, marketing is their concerns discussed group meeting. They gain information
Ohangwena Ondobe <G-1>	Level 3	Confirmed	
Ohangwena Epembe <G-1>	Level 3	Not	

<b>Region and Pilot Site</b>	<b>Application</b>	<b>Effectiveness</b>	<b>Main Points for Verification and Remarks</b>
		Confirmed	from informal network as well as official, i.e. ATs. In Epembe, the result of market survey is not well reflected to the production. This is mainly because they have not started the production with new facilities of irrigation.
Overall Verification Results	Level 2 and 3		

*Source: Prepared by the Study Team*

*Attachment 4*

*Farmers' Field Day*

*N-CLIMP*

## N-CLIMP : Northern Crop and Livestock Development Master Plan Study January to February 2017

### 1. N-CLIMP

- (1) Area: Four regions in the North Central Division (NCD) consisting of Oshikoto, Oshana, Ohangwena and Omusati in the Republic of Namibia
- (2) Objectives: (i) Data collection and analysis on small-scale farmers in the target areas through situation analysis  
(ii) Examination and verification of technical and other measures to improve farming practice by way of pilot site activities  
(iii) Formulation of crop and livestock development master plan based on abovementioned practices
- (3) Counterpart Organization:  
Ministry of Agriculture, Water and Forestry (MAWF)
- (4) Study Period: August 2014 to June 2017 (35 months)  
Phase 1: August 2014 to May 2015: Formulation of framework for the master plan  
Phase 2: June 2015 to May 2016: Formulation of the draft master plan based through implementation of pilot site activities  
**Phase 3: June 2016 to June 2017: Draft master plan implementation by MAWF and finalization of the master plan**
- (5) Major activities from January to February 2017 are tabulated as follows:

#### Major Works from January to February 2017

No.	Stage	Period	Major works
1.	First stage work in Namibia	January 2017 to February 2017 (1 months)	(1) Monitoring of pilot site activities in phase-3 (Draft Master Plan Implementation by MAWF) (2) Farmers' Field Day at Ukuwiyu Ushona in Oshana Region

### 2. Farmers' Field Day at Ukuwiyu Ushona in Oshana Region

#### (1) Outline

Outline of Farmers' Field Day is as follows:

<b>Date</b>
◆ February 9 <sup>th</sup> 2017 8:30 to 13:30
<b>Site</b>
◆ Uukuwiyu Ushona in Oshana Region
<b>Purpose</b>
◆ Sharing information among stakeholders for chicken farming techniques and experiences at Uukuwiyu Ushona in Oshana Region
◆ Dissemination of techniques and technical measures and experiences to surrounding farmers in the community
◆ Sharing information with other chicken farming sites in Tsandi in Omusati region and Onankali in Oshikoto Region
◆ Extraction of lessons for revising techniques and technical measures and finalizing master plan

## (2) Participants

### Participants of Farmers' Field Day

Organization	Participants
<b>MAWF</b>	
ATs from Oshana Region	6
MAWF (NORTH-OSHANA)	17
ATs responsible for Oshana pilot Sites(Chicken)	3
<b>Local Authority</b>	
Uukwiyu Uushona	3
<b>Farmers</b>	
Uukwiyu Uushona	15
Onankali	15
Tsandi	15
Community of Uukwiyu ushona	29
<b>Others</b>	
UNAM (OGONGO)	1
<b>JICA</b>	
JICA (SATREPS)	2
JICA Namibia Office	1
JICA Team (Ongwediva)	8
<b>TOTAL</b>	<b>115</b>

Source: Prepared by the Study Team

## (3) Agenda

Agenda of Farmers' Field Day is as follows:

Time	Subject	Presenter / Facilitator/ Responsible
08:30-09:30	Arrival of guests and registration	◆ Ms. Aini Amukoto and Mr. Benjamin Shikesho N-CLIMP
09:30-09:40	Opening remarks and welcoming of invited guests and prayer by Kuku Rauha Nangula	◆ Chairperson: Chief of DAPEES of Oshana Region and Honorable Councilor Andreas M Amundjindi
09:40-09:50	◆ Confirmation of agenda and Farmer's Field day output	◆ Ms. Bernadette Erago
09:50-10:00	◆ Entertainment	
10:00-11:50	Sharing of Information and Experience from Farmers and ATs from Pilot Sites. ◆ Ls4: Nutritious Feed Supply (growing maggots, termites, preparing bone meal) ◆ Ls5: Disease Control (disease control, vaccination programme) ◆ Ls13: Chicken production (housing, feeding, laying and hatching nests) ◆ Fm1: Booking keeping (record in black books) ◆ Fm5: Group Formation and Strengthening ◆ Field Visit by all the participants, invited Guests ◆ Feedback from Farmers and ATs	Facilitated by: ◆ Mr. Daniel I. (N-CLIMP TEAM)
11:50-12:00	◆ Entertainment	
12:00-12:25	◆ Closing remarks	◆ Key farmer of Ukuwiyu Ushona site: Uusiku Waholongo ◆ Representative of poultry farmers: Mrs. Johanna Hango ◆ Deputy Director of DAPEES cum chief of NCD: Ms. Enny Namalambo
12:25-13:05	◆ Refreshment and snacks	◆ Mrs. Johanna Ekandjo

#### (4) Discussion

Major presentation and discussion made by farmers of chicken farming sites (Oshana, Oshikoto and Omusati Regions) are as follows.

**Challenges** faced by farmers before pilot site activities are:

- ◆ Low number of laying eggs and no skill of hatching
- ◆ High mortality rate of chicks and chickens by diseases and predators
- ◆ Insufficient availability of chicken feed
- ◆ Insufficient technical management of poultry
- ◆ Low profitability from poultry raising
- ◆ Poor market access

In order to overcome those challenges, techniques and technical measures tried at chicken farming sites are:

- ◆ LS-3 Nutritious feed supply to chicken
- ◆ LS-5 Disease control
- ◆ LS-13 Chicken production
- ◆ FM-2 Record keeping
- ◆ FM-5 Group formation/ Strengthening

**Positive outcomes** from the activities are:

The cycle that the farmers have purchased chicks from market

and sold chickens, hens and eggs are established as a model. The farmers have not any skills for hatching and brooding. At present, they have already prepared nest for laying and hatching so the numbers of chicks increasing. Since the space for chicks from hatching is not enough, she has constructed special house for chicks by herself.

- ◆ Facilities for chicken raising: housing, laying nests, hatching nests,
- ◆ Disease control: vaccination and parasite control to decrease any loss from disease
- ◆ Feeding improvement: purchasing and self-made feeds
- ◆ Group formation: group purchase for vaccination, fund raising for medication, bank account open and management
- ◆ Record keeping: for recording any activities and sharing with others

Comments from individuals are listed below:

##### Farmers' from Tsandi in Omusati Region

- ◆ Chicken farming in Ukuwiyu Ushona would be more advanced than those in our site. The farmers of Tsandi continue communicating with farmers of Ukuwiyu Ushona to develop our activities.

##### Farmers' from Onankali in Oshikoto Region

- ◆ Since the project has commenced from 2015 together with ATs and JICA N-CLIMP team, the farmers have learnt various techniques and technical measures for chicken farming including chicken house construction, chicken feed preparation and balance nutritious feed supply.
- ◆ In particular, feed preparation was really useful for the group in order to carry out cost effective chicken farming.



**Joint field visit by the participants of Farmers' Field Day**

- ◆ Also, disease control by timely vaccination has contributed to reduce mortality rate of chicken.
- ◆ Since then, many farmers have opened their bank account at Nampost to save money for chicken farming.
- ◆ In addition, linkage with community members are strengthened through exchanging information about chicken farming. Many farmers visited pilot sites to learn how to carry out chicken farming.

#### Farmers' from Ukuwiyu Ushona

- ◆ As seen in our site, chicken farming has contributed to income generation of community members. Although chickens are attacked by predators such as snakes, number of chickens sold to the market have increased.
- ◆ In addition, the community have received assistance from constituency for fencing. Therefore, farmers continues promoting chicken farming as well as other farming activities to develop integrated farming model.
- ◆ Currently, the number of chicken has increased, therefore, effective feed preparation would be next challenges for the community.

#### Representative from Oshikoto Farmers' Union

- ◆ Although member farmers in our Union are facing insufficient resources to purchase materials for chicken farming, we would like to gradually disseminate techniques and technical measures tried at Ukuwiyu Ushona site to our farmers to start chicken farming.
- ◆ As a representative from the Union, we would like to work with MAWF to support out member farmers to start chicken farming.

#### Mrs. Enny Namalambo

- ◆ In order to alleviate poverty reduction in the rural communities, sustainable agriculture development including appropriate chicken farming is one of the options. Therefore, MAWF continues supporting communities by the use of techniques and technical measures as proposed by N-CLIMP.

Attachment:                   Materials/handout  
   Photographs of Farmers' Field Day at Ukuwiyu Ushona in Oshana Region 3 sheets

***Prepared by JICA Study Team for N-CLIMP***

# N-CLIMP

Okumuna Eendjuxwa dho Shiwambo

## Indigenous Chicken Production

Efiku LyaanaFaalama Po Uukwiyu Uushona

Farmers Field Day at Uukwiyu Uushona on 09  
February 2017

**FM 5:** Group formation  
(Etungepo Lo Ngudu)  
Group strengthening –  
Chicken  
(Okukoleka Ongudu)









Feed types split into sources of energy (a), protein (b), minerals (c) and vitamins (d). Remember always to give free access to water.  
 likulya yina litungitholutu- Dhimbulukwa okugandja omeya aluhe

## Disease control schedule – chicken omulandu Faneko Woku keelela Omikifi- Eendjuxwa

	Omwedhi	1	2	3	4	5	6	7	8	9	10	11	12
okugwayeka	VECTOCID	o		o		o		o		o		o	
mokana	PROMECTINE		o		o		o		o		o		o
okutuntula	Lasota (* n1)			o						o			
okuwenda	KELAMECTIN	o			o				o			o	
	*n1:yuuhuwena watendulwa miiwike iyali (2 weeks)												
	Oodhila/oondjuhwa ahihe mu Sept. & March												
	VECTOCID: gwedhamo ishewe petameko												

Before: No laying and hatching nest  
Petameko : kapali pena oshikuku sho  
kutendulila no sho ku tekulila Omayi

After : Housing for hatching and chick raising  
Paife : opena oshikuku sho ku tendulila, neumbo  
lokutekulila Uuyuxwena



Before : Floor only  
Petameko : opwali pena ashike Evi

After : Hatching nests  
Paife : opena ukololo wokulangela noku tendulilwa



Before: Direct sun light  
Etango tali xwike Laukilila

After : New construction yard for chicks only  
Paife : opwa tungwa okakuku kuu yuuxwena okape



Farmers' Field Day at Ukuwiyu Ushona, chicken farming site (9<sup>th</sup> of February 2017)

	
<p>Registration by the participants</p>	<p>Participants of the Farmers' Field Day</p>
	
<p>Ms. Vicky Ipinge, chief agricultural extension officer of Oshana Region, chairperson of Farmers' Field Day delivering opening remarks</p>	<p>Mr. Andreas M. Amundjindi, Regional and Honorable Councilor expressing the appreciation to MAWF and JICA for the support of chicken farming for Ukuwiyu Ushona pilot site</p>
	
<p>Farmer of Ukuwiyu Ushona site explaining the activities with holding skin of predator caught at her chicken house</p>	<p>Farmer of Onankali in Oshikoto region sharing her experiences of chicken farming at her site</p>

Photo-1

Farmers' Field Day at Ukuwiyu Ushona, chicken farming site (9<sup>th</sup> of February 2017)

	
<p>Representative farmer from Tsandi in Omusati Region explaining her activities of chicken farming under her pilot site</p>	<p>Representative of Oshikoto Farmers' Union showing his interest to disseminate chicken farming techniques to his member farmers</p>
	
<p>Performance by children dance team in Ukuwiyu Ushona community</p>	<p>Participants attending the Farmers' Field Day</p>
	
<p>Closing remarks by Ms. Enny Namalambo, the Deputy Director of DAPEES cum chief of NCD expressing the future continuation of activities by ATs and farmers</p>	<p>Interview to the project staff by Namibian Broadcasting Corporation</p>

Farmers' Field Day at Ukuwiyu Ushona, chicken farming site (9<sup>th</sup> of February 2017)



Joint field visting by the participants (1)



Joint field visting by the participants (2)



Planting for chicken feed under the shade of the house



Hatchery and poultry house constructed with technical support by ATs and JICA N-CLIMP Team



Feed and water supply to chicken



Nursery for onion for chicken and vegetable integrated farming

*Attachment 5*

*Questionnaire Survey  
on Dissemination in Phase 3*

*N-CLIMP*



*Attachment 5-1*

*Questionnaire Form for  
Agricultural Technicians*

*N-CLIMP*

## Review of Technical Measures (Crops) for TOT

\_\_\_\_\_ Region, Organization: \_\_\_\_\_,

ADC: \_\_\_\_\_, Name: \_\_\_\_\_

CR-1: Fertilizer Application (grains) CR-2 Cropping Pattern & Crop Management (grains)	Remark <u>Fertilizer Application and Thinning according to the Crop Growing Stage</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know about “fertilizer application and thinning” of mahangu according to the crop growing stages?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>_____</del>
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you practice fertilizer application and thinning of mahangu according to the stages?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>_____</del>
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain “fertilizer application and thinning” according to the crops to farmers?	<del>_____</del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers practice fertilizer application and thinning” according to the crops?	<del>_____</del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did mahangu grow better?	<del>_____</del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-3 Conservation Agriculture (grains)	Remark <u>Reason of Ripper Furrowing</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know how ripper furrowing functions?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>_____</del>
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you practice ripper furrowing in your mahangu field?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>_____</del>
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how ripper furrow functions?	<del>_____</del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers apply ripper furrowing to their mahangu fields?	<del>_____</del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did mahangu grow better?	<del>_____</del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-4 Rice-Mahangu Mixed Cropping System (grains)	Remark <u>Water level required for Transplanting Rice Seedlings</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know how deep the water must be to transplant rice seedlings?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>_____</del>
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you transplant rice seedlings?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>_____</del>
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how to transplant rice seedlings?	<del>_____</del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers transplant rice seedlings?	<del>_____</del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmers harvest rice?	<del>_____</del>	<input type="checkbox"/> Yes <input type="checkbox"/> No

### Review of Technical Measures (Crops) for TOT

CR-5 Water Source / Water Harvesting (horticulture)	Remark <u>Water Volume harvested by Roof Catchment</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Can you estimate water volume to be harvested from 100 m <sup>2</sup> of roof?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Do you have water harvesting system of roof catchment at your house?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how to estimate water volume by roof catchment?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers install the roof catchment?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmers utilize the water from roof catchment?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-6 Water Saving Cultivation (horticulture)	Remark <u>Drip Irrigation System</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know what is drip irrigation system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you install and use drip irrigation system in your field (including ADC)?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain the drip irrigation system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmer install the drip irrigation system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmer grow vegetables using the drip irrigation system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-7 Crop Selection (horticulture)	Remark <u>Selection of Vegetables to Grow</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Do you know how to select vegetables to grow?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you select vegetables according to the market survey?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how to select vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers conduct market survey?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmers select vegetables according to the market survey?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-8 Cropping Plan & Crop Management (horticulture)	Remark <u>Cropping Plan of Vegetables</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know how to prepare a cropping plan for vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you prepare a cropping plan for vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how to prepare a cropping plan for vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers prepare cropping plan for vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmers grow vegetables according to the cropping plan?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

**Review of Technical Measures (Livestock) AT**

Region: \_\_\_\_\_, ADC: \_\_\_\_\_, AT: \_\_\_\_\_

<b>LS-1 Fodder Production</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know fodder production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you produce fodder before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach how to produce fodder to farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers produce fodders through your technical transfer?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did farmer produce fodder by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>LS-2 Range management</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know range management before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you have experience of range management?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach farmer how to manage rangeland? : rotation, gathered grazing etc.,	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers try to manage rangeland by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmer group keep rangeland according to range management?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>LS-4 Nutritious food supply for chicken</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know nutritious foods for chicken before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you produce nutritious food for chicken before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you give explanation concerning nutritious food for farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers produce nutritious food according to your technical transfer?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmer produce nutritious food by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>LS-5 Disease Control</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know the importance of disease control of cattle before?  ① Vaccination. Parasite control, Powder On, Injection, etc.  ② Dehorning , Castration, Hoof trimming , Way to fix , etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach how to control disease for farmers practically?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers control diseases by themselves through your training?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers control disease by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

**Review of Technical Measures (Livestock) AT**

<b>LS-6 Large and small stock fattening</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know what elements are needed for fattening? (Vitamins, minerals, licks, supplements etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you give such elements to cattle before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach the importance of such elements and the way of administration for farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers give such elements by themselves through your training?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers practice fattening by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>LS-7 Periodical production</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know the periodical production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you know the reproductive cycle and seasonal cares of cattle?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you explain the importance of reproductive records for farmers and teach them how to note reproductive records?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did you teach farmers how to write reproductive records and how to access market information at high price period?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers keep reproductive records by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>LS-11 Goat production</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know goat production and reproductive cycle before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you experience treatment and husbandry for goat before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach what points were important in order to increase goat production for farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers get enough skills to increase goat production by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers operate techniques for goat production by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>LS-13 Chicken production (indigenous)</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know what was important for chicken production before? : Nests for laying and hatching, disease control, vaccination, de-worming, feeding, kind of chicken (layer, broiler, dual purpose, indigenous)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you have experience of indigenous chicken raising before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach how to manage chicken raising to farmers before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers follow your training of chicken production correctly?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers manage their poultry houses according to your technical transfer?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

### Review of Technical Measures (Livestock) AT

<b>LS-5 Disease Control (Goat)</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know the importance of disease control of goat before? ① Vaccination. Parasite control, Powder On, Injection, etc. ② Castration, Hoof trimming, Way to fix, etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach how to control disease for farmers practically?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers control diseases by themselves through your training?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers control disease by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>LS-5 Disease Control (Chicken)</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know the importance of disease control of chicken before? : Vaccination. Parasite control, Powder On, Injection, Spray, kind of medicine etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach how to control disease for farmers practically?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers control diseases by themselves through your training?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers control disease by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

## Review of Technical Measures (Farm Management)

Region: \_\_\_\_\_, ADC: \_\_\_\_\_, AT: \_\_\_\_\_

FM-2 Record Keeping	Remark: Farm Record for Planning	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of Record Keeping?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you use records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers on the use of records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers use records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that the use of records for planning of farming gain better ways of farming by farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-5 Group Formation / Group Strengthening	Remark: Regular meeting, agreement on rules	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of Group Strengthening?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work with other farmers / people through agreement go rules?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers the ways of agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers work for agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that farmers gained better ways of farming through agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-6 Group Account Management	Remark: Transparency & Accountability	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of needs of Group Account Management	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you use account book for planning and reporting to other farmers and people?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers on the use an account book for planning and reporting to farmers for collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers use an account book for planning and reporting for collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that the use of an account book for planning and reporting to other farmers make transparency and accountability?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Farm Management)

FM-8 Collective Selling / Purchasing	Remark:	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work with other farmers / people through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers the ways of agreement on rules through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers work through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that farmers gained better ways of farming through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-10 Market Information Access Improvement	Remark: Market Survey, Grading, and Auction System	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefit of market surveys or other ways of improvement of market information access?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers the ways of using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers work through using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that farmers gained better ways of farming using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No



*Attachment 5-2*

*Results of Questionnaire Survey for  
Agricultural Technicians*

*N-CLIMP*

**Attachment 5-2-1 Summary Table: Respondents of Questionnaire Survey (Officers)**

Region	Omusati	Oshana	Oshikoto	Ohangwena	Sub-Total by Category
AT in Charge	4	4	5	3	16
AT not in Charge	8	5	1	4	18
Senior Officers	4	4	3	4	15
DAPEES in Total	16	13	9	11	49
Other Stakeholders	0	4	0	0	4
Sub-Total by Region	16	17	9	11	53

*Source: The Study Team*

*Note: The used questionnaire sheets can be found in Attachment 5-1.*

**Attachment 5-2-2 Results of Questionnaire Survey for ATs: Summary Table by Region**

**Attachment 5-2-2-1 Table of Results of Questionnaire Survey for ATs in Omusati Region**

**(1) Crop Production Technical Measures**

		Omusati Region ATs in Charge (n=4)						Omusati Region ATs not in Charge (n=8)						Omusati Region Senior: CASO, ASO, 2 CATs (n=4)						Omusati Region Total (n=16)						Omusati Valid Response		Omusati Region Total (n=16)					
		Before			After			Before			After			Before			After			Before			After			Before	After	Before			After		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A
																											%	%	%	%	%	%	%
CR-1/2 Grains Fertilizer App.	1	3	1	0			8	0	0			4	0	0				15	1	0				100.0		93.8	6.3	0.0					
	2	4	0	0			8	0	0			3	0	1				15	0	1				93.8		93.8	0.0	6.3					
	3			4	0	0				7	1	0			3	0	1				14	2	0		100.0				87.5	12.5	0.0		
	4			4	0	0				7	1	0			1	2	1				12	2	2		87.5				75.0	12.5	12.5		
	5			3	1	0				5	3	0			3	0	1				11	5	0		100.0				11.0	5.0	0.0		
CR-3 Grains Consavation Agr.	1	4	0	0			6	2	0			4	0	0				14	2	0				100.0		87.5	12.5	0.0					
	2	3	1	0			5	3	0			2	2	0				10	6	0				100.0		62.5	37.5	0.0					
	3			2	2	0				7	1	0			3	0	1				12	4	0		100.0				75.0	25.0	0.0		
	4			2	2	0				7	1	0			2	1	1				11	4	1		93.8				68.8	25.0	6.3		
	5			2	2	0				6	2	0			2	1	1				10	5	1		93.8				11.0	5.0	0.0		
CR-4 Grains Rice-Mahangu	1	0	4	0			3	5	0			1	3	0				4	12	0				100.0		25.0	75.0	0.0					
	2	1	3	0			4	4	0			1	3	0				6	10	0				100.0		37.5	62.5	0.0					
	3			2	2	0				4	4	0			1	2	1				7	7	2		87.5				43.8	43.8	12.5		
	4			2	2	0				5	3	0			1	2	1				8	6	2		87.5				50.0	37.5	12.5		
	5			1	3	0				4	4	0			1	2	1				6	8	2		87.5				11.0	5.0	0.0		
CR-5 Horticulture Water Harvesting	1	0	4	0			0	8	0			0	4	0				0	16	0				100.0		0.0	100.0	0.0					
	2	2	2	0			2	6	0			1	3	0				5	11	0				100.0		31.3	68.8	0.0					
	3			0	4	0				0	8	0			0	3	1				0	13	3		81.3				0.0	81.3	18.8		
	4			1	3	0				3	5	0			0	3	1				4	9	3		81.3				25.0	56.3	18.8		
	5			1	3	0				6	2	0			0	3	1				7	6	3		81.3				11.0	5.0	0.0		
CR-6 Horticulture Drip Irrigation	1	4	0	0			8	0	0			4	0	0				16	0	0				100.0		100.0	0.0	0.0					
	2	2	2	0			3	5	0			3	1	0				8	8	0				100.0		50.0	50.0	0.0					
	3			3	0	1				5	3	0			3	0	1				11	4	1		93.8				68.8	25.0	6.3		
	4			3	1	0				2	6	0			1	2	1				6	8	2		87.5				37.5	50.0	12.5		
	5			3	0	1				4	4	0			2	1	1				9	5	2		87.5				11.0	5.0	0.0		
CR-7 Horticulture Crop Selection	1	4	0	0			7	1	0			3	0	1				14	1	1				93.8		87.5	6.3	6.3					
	2	2	2	0			3	5	0			2	1	1				7	8	1				93.8		43.8	50.0	6.3					
	3			4	0	0				4	4	0			3	0	1				11	5	0		100.0				68.8	31.3	0.0		
	4			4	0	0				0	8	0			2	1	1				6	9	1		93.8				37.5	56.3	6.3		
	5			3	1	0				1	7	0			2	1	1				6	9	1		93.8				11.0	5.0	0.0		
CR-8 Horticulture Cropping Plan Crop Management	1	4	0	0			4	3	1			3	0	1				11	3	2				87.5		68.8	18.8	12.5					
	2	3	1	0			4	3	1			3	0	1				10	4	2				87.5		62.5	25.0	12.5					
	3			4	0	0				4	3	1			2	1	1				10	4	2		87.5				62.5	25.0	12.5		
	4			4	0	0				2	5	1			2	1	1				8	6	2		87.5				50.0	37.5	12.5		
	5			4	0	0				3	4	1			1	2	1				8	5	3		81.3				11.0	5.0	0.0		

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-1.



**(3) Farm Management Technical Measures**

		Omusati Region						Omusati Region						Omusati Region						Omusati		Omusati Region											
		ATs in Charge (n=4)						ATs not in Charge (n=8)						Senior: CASO, ASO, 2 CATs (n=4)						Total (n=16)						Valid Response	Total (n=16)						
		Before			After			Before			After			Before			After			Before			After			Before	Before			After			
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	%	Yes	No	N/A	Yes	No
FM-2 Record Keeping	1	4	0	0	4	0	0	8	0	0	0	7	0	4	0	0	3	0	1	16	0	0	7	7	2	100.0	87.5	100.0	0.0	0.0	43.8	43.8	12.5
	2	2	2	0	4	0	0	5	3	0	5	3	0	3	1	0	2	1	1	10	6	0	11	4	1	100.0	93.8	62.5	37.5	0.0	68.8	25.0	6.3
	3	2	2	0	4	0	0	7	1	0	7	1	0	4	0	0	2	1	1	13	3	0	13	2	1	100.0	93.8	81.3	18.8	0.0	81.3	12.5	6.3
	4	0	2	2	2	0	2	0	8	0	5	3	0	0	3	1	1	2	1	0	13	3	8	5	3	81.3	81.3	0.0	81.3	18.8	50.0	31.3	18.8
	5	2	2	0	4	0	0	7	1	0	8	0	0	3	0	1	3	0	1	12	3	1	15	0	1	93.8	93.8	75.0	18.8	6.3	93.8	0.0	6.3
FM-5 Group Formation Group Strengthening	1	2	2	0	4	0	0	7	1	0	8	0	0	4	0	0	3	0	1	13	3	0	15	0	1	100.0	93.8	81.3	18.8	0.0	93.8	0.0	6.3
	2	2	2	0	4	0	0	5	3	0	5	3	0	3	0	1	2	0	2	10	5	1	11	3	2	93.8	87.5	62.5	31.3	6.3	68.8	18.8	12.5
	3	1	3	0	4	0	0	5	3	0	6	2	0	3	0	1	2	0	2	9	6	1	12	2	2	93.8	87.5	56.3	37.5	6.3	75.0	12.5	12.5
	4	1	3	0	4	0	0	3	5	0	6	2	0	3	0	1	3	0	1	7	8	1	13	2	1	93.8	93.8	43.8	50.0	6.3	81.3	12.5	6.3
	5	1	3	0	4	0	0	5	3	0	7	1	0	2	1	1	3	0	1	8	7	1	14	1	1	93.8	93.8	50.0	43.8	6.3	87.5	6.3	6.3
FM-6 Group Acct.	1	2	2	0	3	0	1	5	3	0	6	2	0	2	1	1	2	1	1	9	6	1	11	3	2	93.8	87.5	56.3	37.5	6.3	68.8	18.8	12.5
	2	1	3	0	4	0	0	2	6	0	3	5	0	1	2	1	1	1	2	4	11	1	8	6	2	93.8	87.5	25.0	68.8	6.3	50.0	37.5	12.5
	3	1	3	0	4	0	0	1	7	0	3	5	0	2	1	1	3	0	1	4	11	1	10	5	1	93.8	93.8	25.0	68.8	6.3	62.5	31.3	6.3
	4	1	3	0	2	1	1	1	7	0	2	6	0	0	3	1	2	1	1	2	13	1	6	8	2	93.8	87.5	12.5	81.3	6.3	37.5	50.0	12.5
	5	2	2	0	4	0	0	5	3	0	6	2	0	2	1	1	3	0	1	9	6	1	13	2	1	93.8	93.8	56.3	37.5	6.3	81.3	12.5	6.3
FM-8 Collective Sales Collective Purchasing	1	1	3	0	4	0	0	5	3	0	6	2	0	0	4	0	3	0	1	6	10	0	13	2	1	100.0	93.8	37.5	62.5	0.0	81.3	12.5	6.3
	2	1	3	0	3	1	0	5	3	0	5	3	0	0	4	0	2	1	1	6	10	0	10	5	1	100.0	93.8	37.5	62.5	0.0	62.5	31.3	6.3
	3	1	3	0	4	0	0	3	5	0	5	3	0	1	3	0	2	1	1	5	11	0	11	4	1	100.0	93.8	31.3	68.8	0.0	68.8	25.0	6.3
	4	3	1	0	4	0	0	2	6	0	3	5	0	1	2	1	3	0	1	6	9	1	10	5	1	93.8	93.8	37.5	56.3	6.3	62.5	31.3	6.3
	5	1	2	1	4	0	0	2	6	0	7	1	0	2	1	1	3	0	1	5	9	2	14	1	1	87.5	93.8	31.3	56.3	12.5	87.5	6.3	6.3
FM-10 Market Info. Access Im	1	2	2	0	4	0	0	2	6	0	6	1	1	3	1	0	3	0	1	7	9	0	13	1	2	100.0	87.5	43.8	56.3	0.0	81.3	6.3	12.5
	2	2	2	0	4	0	0	2	6	0	3	5	0	1	3	0	2	1	1	5	11	0	9	6	1	100.0	93.8	31.3	68.8	0.0	56.3	37.5	6.3
	3	2	2	0	4	0	0	3	5	0	4	4	0	1	3	0	3	0	1	6	10	0	11	4	1	100.0	93.8	37.5	62.5	0.0	68.8	25.0	6.3
	4	1	3	0	4	0	0	2	6	0	3	5	0	2	2	0	2	1	1	5	11	0	9	6	1	100.0	93.8	31.3	68.8	0.0	56.3	37.5	6.3
	5	1	3	0	4	0	0	3	5	0	6	2	0	2	2	0	3	0	1	6	10	0	13	2	1	100.0	93.8	37.5	62.5	0.0	81.3	12.5	6.3

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-1.

**Attachment 5-2-2-2 Table of Results of Questionnaire Survey for ATs in Oshana Region**

**(1) Crop Production Technical Measures (Part 1: Officers)**

		Oshana Region ATs in Charge (n=4)						Oshana Region ATs not in Charge (n=8)						Oshana Region Senior: CASO, 2ASO, CAT (n=4)						Oshana Region DAPEES Total (n=13)						Omusati Valid Response		Oshana Region DAPEES Total (n=13)																											
		Before			After			Before			After			Before			After			Before			After			Before	After	Before			After																								
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	%	%	%	%															
CR-1/2 Grains Fertilizer App.	1	3	0	1				5	0	0				4	0	0				12	0	1				92.3		92.3				92.3	0.0	7.7				92.3	0.0	7.7															
	2	3	0	1				5	0	0				4	0	0				12	0	1				92.3		92.3				92.3	0.0	7.7				92.3	0.0	7.7															
	3				3	0	1				3	0	2				3	0	1				9	0	4	69.2						69.2			69.2	0.0	30.8																		
	4				3	0	1				3	0	2				3	0	1				9	0	4	69.2						69.2			69.2	0.0	30.8																		
	5				3	0	1				3	0	2				3	0	1				9	0	4	69.2						69.2			69.2	0.0	30.8																		
CR-3 Grains Consavation Agr.	1	3	0	1				5	0	0				4	0	0				12	0	1				92.3		92.3				92.3	0.0	7.7				92.3	0.0	7.7															
	2	2	2	0				5	0	0				3	1	0				10	3	0				100.0		100.0				100.0	76.9	23.1	0.0			100.0	76.9	23.1	0.0														
	3				3	0	1				3	0	2				3	0	1				9	0	4	69.2						69.2			69.2	0.0	30.8																		
	4				3	0	1				3	0	2				3	0	1				9	0	4	69.2						69.2			69.2	0.0	30.8																		
	5				3	0	1				2	0	3				3	0	1				8	0	5	61.5						61.5			61.5	0.0	38.5																		
CR-4 Grains Rice-Mahangu	1	2	1	1				2	2	1				1	2	1				5	5	3				76.9		76.9				38.5	38.5	23.1				38.5	38.5	23.1															
	2	2	2	0				2	3	0				0	3	1				4	8	1				92.3		92.3				30.8	61.5	7.7				30.8	61.5	7.7															
	3				2	1	1				1	1	3				2	2	0				5	4	4	69.2						69.2			69.2	30.8	30.8																		
	4				2	1	1				1	2	2				3	0	1				6	3	4	69.2						69.2			69.2	46.2	23.1																		
	5				1	1	2				1	2	2				3	0	1				5	3	5	61.5						61.5			61.5	38.5	23.1																		
CR-5 Horticulture Water Harvesting	1	0	3	1				1	2	2				1	3	0				2	8	3				76.9		76.9				15.4	61.5	23.1				15.4	61.5	23.1															
	2	3	0	1				1	2	2				3	1	0				7	3	3				76.9		76.9				53.8	23.1	23.1				53.8	23.1	23.1															
	3				0	4	0				1	4	0				0	4	0				1	12	0	100.0		100.0				100.0		100.0		7.7	92.3					0.0													
	4				1	3	0				2	0	3				1	2	1				4	5	4	69.2		69.2				69.2		69.2		30.8	38.5					30.8													
	5				2	2	0				2	0	3				3	0	1				7	2	4	69.2		69.2				69.2		69.2		53.8	15.4					30.8													
CR-6 Horticulture Drip Irrigation	1	4	0	0				5	0	0				3	1	0				12	1	0				100.0		100.0				92.3		92.3				92.3	15.4	76.9	7.7			92.3	15.4	76.9	7.7								
	2	0	4	0				1	3	1				1	3	0				2	10	1				92.3		92.3				92.3		92.3				92.3		92.3															
	3				2	1	1				1	1	3				3	0	1				6	2	5	61.5		61.5				61.5		61.5		46.2	15.4					38.5													
	4				2	1	1				1	1	3				3	0	1				6	2	5	61.5		61.5				61.5		61.5		46.2	15.4					38.5													
	5				1	2	1				1	1	3				3	0	1				5	3	5	61.5		61.5				61.5		61.5		38.5	23.1					38.5													
CR-7 Horticulture Crop Selection	1	4	0	0				5	0	0				4	0	0				13	0	0				100.0		100.0				100.0		100.0				100.0	0.0	0.0				100.0	0.0	0.0									
	2	0	4	0				2	2	1				3	1	0				5	7	1				92.3		92.3				92.3	38.5	53.8	7.7			92.3	38.5	53.8	7.7														
	3				2	1	1				3	0	2				3	1	0				8	2	3	76.9		76.9				76.9		76.9		61.5	15.4					23.1													
	4				1	2	1				3	2	0				3	1	0				7	5	1	92.3		92.3				92.3		92.3		53.8	38.5					7.7													
	5				1	2	1				3	1	1				3	1	0				7	4	2	84.6		84.6				84.6		84.6		53.8	30.8					15.4													
CR-8 Horticulture Cropping Plan Crop Management	1	2	2	0				5	0	0				2	1	1				9	3	1				92.3		92.3				92.3	69.2	23.1	7.7			92.3	69.2	23.1	7.7														
	2	2	2	0				4	1	0				1	3	0				7	6	0				100.0		100.0				100.0	53.8	46.2	0.0			100.0	53.8	46.2	0.0														
	3				2	1	1				2	1	2				3	1	0				7	3	3	76.9		76.9				76.9		76.9		53.8	23.1					23.1													
	4				1	2	1				3	0	2				3	1	0				7	3	3	76.9		76.9				76.9		76.9		53.8	23.1					23.1													
	5				1	2	1				3	0	2				2	1	1				6	3	4	69.2		69.2				69.2		69.2		46.2	23.1					30.8													

Source: The Study Team

Note: Note: The used questionnaire sheets can be found in Attachment 5-1.

In Oshana Region, there are four persons who are not in the DAPEES structure, such as Meat Board and AMTA,

**(1) Crop Production Technical Measures (Part 2: Other Stakeholders and Total)**

		Oshana Region						Oshana Region						Oshana		Oshana Region					
		Other Stakeholders (n=4)						Total (n=17)						Valid Response		Total (n=17)					
		Before			After			Before			After			Before	After	Before			After		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A
CR-1/2 Grains Fertilizer App.	1	1	2	1			13	2	2				88.2		76.5	11.8	11.8				
	2	1	2	1			13	2	2				88.2		76.5	11.8	11.8				
	3				0	3	1			9	3	5		70.6				52.9	17.6	29.4	
	4				0	2	2			9	2	6		64.7				52.9	11.8	35.3	
	5				0	2	2			9	2	6		64.7				52.9	11.8	35.3	
CR-3 Grains Consavation Agr.	1	3	0	1			15	0	2				88.2		88.2	0.0	11.8				
	2	1	2	1			11	5	1				94.1		64.7	29.4	5.9				
	3				1	2	1			10	2	5		70.6				58.8	11.8	29.4	
	4				0	3	1			9	3	5		70.6				52.9	17.6	29.4	
	5				1	1	2			9	1	7		58.8				52.9	5.9	41.2	
CR-4 Grains Rice-Mahangu	1	0	2	2			5	7	5				70.6		29.4	41.2	29.4				
	2	0	2	2			4	10	3				82.4		23.5	58.8	17.6				
	3				0	2	2			5	6	6		64.7				29.4	35.3	35.3	
	4				0	2	2			6	5	6		64.7				35.3	29.4	35.3	
	5				0	2	2			5	5	7		58.8				29.4	29.4	41.2	
CR-5 Horticulture Water Harvesting	1	0	3	1			2	11	4				76.5		11.8	64.7	23.5				
	2	0	3	1			7	6	4				76.5		41.2	35.3	23.5				
	3				0	3	1			1	15	1		94.1				5.9	88.2	5.9	
	4				0	3	1			4	8	5		70.6				23.5	47.1	29.4	
	5				0	3	1			7	5	5		70.6				41.2	29.4	29.4	
CR-6 Horticulture Drip Irrigation	1	2	1	1			14	2	1				94.1		82.4	11.8	5.9				
	2	1	1	2			3	11	3				82.4		17.6	64.7	17.6				
	3				1	1	2			7	3	7		58.8				41.2	17.6	41.2	
	4				1	2	1			7	4	6		64.7				41.2	23.5	35.3	
	5				1	2	1			6	5	6		64.7				35.3	29.4	35.3	
CR-7 Horticulture Crop Selection	1	2	1	1			15	1	1				94.1		88.2	5.9	5.9				
	2	1	1	2			6	8	3				82.4		35.3	47.1	17.6				
	3				1	2	1			9	4	4		76.5				52.9	23.5	23.5	
	4				1	1	2			8	6	3		82.4				47.1	35.3	17.6	
	5				1	1	2			8	5	4		76.5				47.1	29.4	23.5	
CR-8 Horticulture Cropping Plan Crop Management	1	1	1	2			10	4	3				82.4		58.8	23.5	17.6				
	2	1	1	2			8	7	2				88.2		47.1	41.2	11.8				
	3				1	1	2			8	4	5		70.6				47.1	23.5	29.4	
	4				1	2	1			8	5	4		76.5				47.1	29.4	23.5	
	5				1	2	1			7	5	5		70.6				41.2	29.4	29.4	

Source: The Study Team

Note: Note: The used questionnaire sheets can be found in Attachment 5-1.

In Oshana Region, there are four persons who are not in the DAPEES structure, such as Meat Board and AMTA,

**(2) Livestock Production Technical Measures (Part 1: Officers)**

		Oshana Region						Oshana Region						Oshana Region						Omusati		Oshana Region											
		ATs in Charge (n=4)						ATs not in Charge (n=8)						Senior: CASO, 2ASO, CAT (n=4)						DAPEES Total (n=13)						Valid Response		DAPEES Total (n=13)					
		Before			After			Before			After			Before			After			Before			After			Before	After	Before			After		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	%	%	%	%	%	%
LS-1	1	4	0	0				5	0	0				4	0	0				13	0	0				100.0		100.0	0.0	0.0			
Fodder Production	2	2	2	0				4	1	0				1	3	0				7	6	0				100.0		53.8	46.2	0.0			
	3				2	1	1				3	0	2				1	2	1				6	3	4						46.2	23.1	30.8
	4				1	2	1				3	1	1				2	1	1				6	4	3						46.2	30.8	23.1
	5				1	2	1				3	0	2				3	0	1				7	2	4						53.8	15.4	30.8
LS-2	1	4	0	0				5	0	0				4	0	0				10	2	1				92.3		76.9	15.4	7.7			
Range Management	2	4	0	0				3	0	2				4	0	0				8	2	3				76.9		61.5	15.4	23.1			
	3				2	0	2				2	0	3				3	0	1				5	1	7						38.5	7.7	53.8
	4				1	1	2				2	2	1				3	0	1				3	5	5						23.1	38.5	38.5
	5				1	1	2				1	2	2				1	3	0				3	4	6						23.1	30.8	46.2
LS-4	1	2	2	0				3	1	1				0	3	1				6	4	3				76.9		46.2	30.8	23.1			
Nutritious Feed Suppl	2	1	3	0				3	1	1				0	3	1				5	5	3				76.9		38.5	38.5	23.1			
	3				1	1	2				3	2	0				4	0	0				5	4	4						38.5	30.8	30.8
	4				2	1	1				4	1	0				4	0	0				7	3	3						53.8	23.1	23.1
	5				3	0	1				4	1	0				4	0	0				8	2	3						61.5	15.4	23.1
LS-5	1	4	0	0				5	0	0				2	1	1				10	1	2				84.6		76.9	7.7	15.4			
Disease Control Cattle	2	4	0	0				3	0	2				2	2	0				8	2	3				76.9		61.5	15.4	23.1			
	3				2	0	2				4	0	1				3	0	1				7	1	5						53.8	7.7	38.5
	4				2	0	2				4	1	0				3	0	1				7	2	4						69.2	15.4	30.8
	5				2	0	2				4	1	0				3	0	1				7	2	4						69.2	15.4	30.8
LS-6	1	2	1	1				3	0	2				1	3	0				6	2	5				61.5		46.2	15.4	38.5			
Fattening	2	3	1	0				4	0	1				1	3	0				8	2	3				76.9		61.5	15.4	23.1			
	3				2	0	2				3	0	2				3	1	0				6	1	6						53.8	7.7	46.2
	4				2	0	2				3	1	1				3	1	0				6	2	5						61.5	15.4	38.5
	5				2	0	2				3	1	1				3	1	0				6	2	5						61.5	15.4	38.5
LS-7	1	3	1	0				5	0	0				4	0	0				9	2	2				84.6		69.2	15.4	15.4			
Periodical Production	2	4	0	0				5	0	0				3	1	0				10	1	2				84.6		76.9	7.7	15.4			
	3				1	1	2				3	1	1				3	0	1				5	3	5						61.5	23.1	38.5
	4				1	1	2				3	0	2				3	0	1				5	2	6						53.8	15.4	46.2
	5				0	1	3				3	2	0				3	0	1				3	4	6						53.8	30.8	46.2
LS-11	1	4	0	0				4	1	0				3	1	0				9	2	2				84.6		69.2	15.4	15.4			
Goat Production	2	4	0	0				5	0	0				3	1	0				10	1	2				84.6		76.9	7.7	15.4			
	3				2	0	2				3	1	1				2	1	1				6	2	5						61.5	46.2	38.5
	4				2	1	1				1	3	1				3	0	1				4	5	4						69.2	30.8	38.5
	5				2	0	2				1	3	1				3	0	1				4	4	5						61.5	30.8	38.5
LS-13	1	3	1	0				4	0	1				4	0	0				8	2	3				76.9		61.5	15.4	23.1			
Chiken Production	2	3	1	0				5	0	0				4	0	0				9	2	2				84.6		69.2	15.4	15.4			
	3				2	1	1				4	1	0				3	0	1				7	3	3						76.9	53.8	23.1
	4				1	1	2				4	1	0				3	0	1				6	3	4						69.2	46.2	30.8
	5				2	1	1				4	1	0				3	0	1				7	3	3						76.9	53.8	23.1
LS-5	1	4	0	0				4	0	1				4	0	0				8	1	4				69.2		61.5	7.7	30.8			
Disease Control Goat	2	4	0	0				4	0	1				3	1	0				8	1	4				69.2		61.5	7.7	30.8			
	3				2	0	2				3	1	1				3	0	1				6	2	5						61.5	46.2	38.5
	4				2	0	2				3	1	1				2	0	2				6	2	5						61.5	46.2	38.5
	5				2	0	2				3	1	1				3	0	1				6	2	5						61.5	46.2	38.5
LS-5	1	2	2	0				5	0	0				3	1	0				7	3	3				76.9		53.8	23.1	23.1			
Disease Control Chicken	2	2	2	0				3	1	1				1	3	0				5	4	4				69.2		38.5	30.8	30.8			
	3				1	1	2				3	2	0				3	0	1				5	4	4						69.2	38.5	30.8
	4				1	1	2				4	1	0				3	0	1				6	3	4						69.2	46.2	30.8
	5				2	0	2				4	1	0				3	0	1				7	2	4						69.2	53.8	30.8

Source: The Study Team

Note: Note: The used questionnaire sheets can be found in Attachment 5-1.

In Oshana Region, there are four persons who are not in the DAPEES structure, such as Meat Board and AMTA,



**(2) Livestock Production Technical Measures (Part 2: Other Stakeholders and Total)**

		Oshana Region Other Stakeholders (n=4)						Oshana Region Total (n=17)						Oshana Valid Response		Oshana Region Total (n=17)								
		Before			After			Before			After			Before	After	Before			After					
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	%	%	%	%					
LS-1 Fodder Production	1	0	2	2			13	2	2				88.2		76.5	11.8	11.8							
	2	0	2	2			7	8	2				88.2		41.2	47.1	11.8							
	3				1	2	1			7	5	5		70.6				41.2	29.4	29.4				
	4				1	2	1			7	6	4		76.5				41.2	35.3	23.5				
	5				1	1	2			8	3	6		64.7				47.1	17.6	35.3				
LS-2 Range Management	1	1	1	2			11	3	3				82.4		64.7	17.6	17.6							
	2	1	1	2			9	3	5				70.6		52.9	17.6	29.4							
	3				0	3	1			5	4	8		52.9				29.4	23.5	47.1				
	4				0	2	2			3	7	7		58.8				17.6	41.2	41.2				
	5				0	3	1			3	7	7		58.8				17.6	41.2	41.2				
LS-4 Nutritious Feed Suppl	1	0	3	1			6	7	4				76.5		35.3	41.2	23.5							
	2	0	3	1			5	8	4				76.5		29.4	47.1	23.5							
	3				1	2	1			6	6	5		70.6				35.3	35.3	29.4				
	4				1	2	1			8	5	4		76.5				47.1	29.4	23.5				
	5				1	2	1			9	4	4		76.5				52.9	23.5	23.5				
LS-5 Disease Control Cattle	1	0	2	2			10	3	4				76.5		58.8	17.6	23.5							
	2	0	2	2			8	4	5				70.6		47.1	23.5	29.4							
	3				1	2	1			8	3	6		64.7				47.1	17.6	35.3				
	4				0	3	1			7	5	5		70.6				41.2	29.4	29.4				
	5				0	3	1			7	5	5		70.6				41.2	29.4	29.4				
LS-6 Fattening	1	0	3	1			6	5	6				64.7		35.3	29.4	35.3							
	2	1	2	1			9	4	4				76.5		52.9	23.5	23.5							
	3				0	3	1			6	4	7		58.8				35.3	23.5	41.2				
	4				1	2	1			7	4	6		64.7				41.2	23.5	35.3				
	5				0	3	1			6	5	6		64.7				35.3	29.4	35.3				
LS-7 Periodical Production	1	0	3	1			9	5	3				82.4		52.9	29.4	17.6							
	2	0	3	1			10	4	3				82.4		58.8	23.5	17.6							
	3				1	2	1			6	5	6		64.7				35.3	29.4	35.3				
	4				1	2	1			6	4	7		58.8				35.3	23.5	41.2				
	5				1	1	2			4	5	8		52.9				23.5	29.4	47.1				
LS-11 Goat Production	1	0	3	1			9	5	3				82.4		52.9	29.4	17.6							
	2	0	3	1			10	4	3				82.4		58.8	23.5	17.6							
	3				1	2	1			7	4	6		64.7				41.2	23.5	35.3				
	4				0	3	1			4	8	5		70.6				23.5	47.1	29.4				
	5				0	3	1			4	7	6		64.7				23.5	41.2	35.3				
LS-13 Chicken Production	1	0	3	1			8	5	4				76.5		47.1	29.4	23.5							
	2	0	3	1			9	5	3				82.4		52.9	29.4	17.6							
	3				1	2	1			8	5	4		76.5				47.1	29.4	23.5				
	4				0	2	2			6	5	6		64.7				35.3	29.4	35.3				
	5				0	2	2			7	5	5		70.6				41.2	29.4	29.4				
LS-5 Disease Control Goat	1	1	1	2			9	2	6				64.7		52.9	11.8	35.3							
	2	0	2	2			8	3	6				64.7		47.1	17.6	35.3							
	3				1	1	2			7	3	7		58.8				41.2	17.6	41.2				
	4				1	1	2			7	3	7		58.8				41.2	17.6	41.2				
	5				1	1	2			7	3	7		58.8				41.2	17.6	41.2				
LS-5 Disease Control Chicken	1	0	2	2			7	5	5				70.6		41.2	29.4	29.4							
	2	1	1	2			6	5	6				64.7		35.3	29.4	35.3							
	3				1	1	2			6	5	6		64.7				35.3	29.4	35.3				
	4				1	1	2			7	4	6		64.7				41.2	23.5	35.3				
	5				1	1	2			8	3	6		64.7				47.1	17.6	35.3				

Source: The Study Team

Note: Note: The used questionnaire sheets can be found in Attachment 5-1.

In Oshana Region, there are four persons who are not in the DAPEES structure, such as Meat Board and AMTA,

**(3) Farm Management Technical Measures (Part 1: Officers)**

		Oshana Region						Oshana Region						Oshana Region						Oshana Region						Omusati		Oshana Region					
		ATs in Charge (n=4)						ATs not in Charge (n=8)						Senior: CASO, 2ASO, CAT (n=4)						DAPEES Total (n=13)						Valid Response		DAPEES Total (n=13)					
		Before			After			Before			After			Before			After			Before			After			Before	After	Before			After		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A
FM-2 Record Keeping	1	3	1	0	3	0	1	4	0	1	3	0	2	3	1	0	3	0	1	9	2	2	7	1	5	84.6	61.5	69.2	15.4	15.4	53.8	7.7	38.5
	2	3	1	0	3	0	1	4	0	1	3	0	2	4	0	0	3	0	1	9	2	2	7	1	5	84.6	61.5	69.2	15.4	15.4	53.8	7.7	38.5
	3	3	1	0	3	0	1	4	0	1	3	0	2	4	0	0	3	0	1	9	1	3	8	0	5	76.9	61.5	69.2	7.7	23.1	61.5	0.0	38.5
	4	1	3	0	3	1	0	2	0	3	4	1	0	3	1	0	3	0	1	5	3	5	9	2	2	61.5	84.6	38.5	23.1	38.5	69.2	15.4	15.4
	5	4	0	0	3	0	1	2	0	3	4	1	0	4	0	0	3	0	1	8	0	5	9	1	3	61.5	76.9	61.5	0.0	38.5	69.2	7.7	23.1
FM-5 Group Formation Group Strengthening	1	3	1	0	3	0	1	3	0	2	4	0	1	3	1	0	3	0	1	8	1	4	9	0	4	69.2	69.2	61.5	7.7	30.8	69.2	0.0	30.8
	2	1	3	0	2	1	1	3	0	2	2	1	2	3	1	0	2	1	1	6	3	4	6	2	5	69.2	61.5	46.2	23.1	30.8	46.2	15.4	38.5
	3	1	3	0	3	0	1	4	0	1	3	1	1	3	1	0	2	1	1	7	3	3	8	1	4	76.9	69.2	53.8	23.1	23.1	61.5	7.7	30.8
	4	1	3	0	3	0	1	2	1	2	2	1	2	3	1	0	2	1	1	5	4	4	7	1	5	69.2	61.5	38.5	30.8	30.8	53.8	7.7	38.5
	5	1	3	0	2	0	2	4	0	1	3	1	1	3	1	0	3	0	1	7	3	3	7	1	5	76.9	61.5	53.8	23.1	23.1	53.8	7.7	38.5
FM-6 Group Acct.	1	2	2	0	3	0	1	2	1	2	2	2	1	3	1	0	3	0	1	5	4	4	6	3	4	69.2	69.2	38.5	30.8	30.8	46.2	23.1	30.8
	2	1	3	0	3	0	1	1	3	1	2	2	1	3	1	0	2	1	1	3	7	3	6	3	4	76.9	69.2	23.1	53.8	23.1	46.2	23.1	30.8
	3	1	3	0	3	0	1	3	1	1	3	2	0	3	1	0	2	1	1	5	5	3	7	3	3	76.9	76.9	38.5	38.5	23.1	53.8	23.1	23.1
	4	1	3	0	2	1	1	2	1	2	4	1	0	2	2	0	2	1	1	4	5	4	7	3	3	69.2	76.9	30.8	38.5	30.8	53.8	23.1	23.1
	5	1	3	0	3	0	1	4	1	0	2	1	2	3	1	0	3	0	1	6	5	2	6	2	5	84.6	61.5	46.2	38.5	15.4	46.2	15.4	38.5
FM-8 Collective Sales Collective Purchasing	1	2	2	0	3	1	0	3	2	0	2	1	2	2	2	0	3	0	1	6	5	2	6	3	4	84.6	69.2	46.2	38.5	15.4	46.2	23.1	30.8
	2	1	3	0	3	1	0	3	1	1	3	2	0	2	2	0	2	1	1	5	5	3	7	4	2	76.9	84.6	38.5	38.5	23.1	53.8	30.8	15.4
	3	1	3	0	2	1	1	2	1	2	3	2	0	3	1	0	2	1	1	3	5	5	6	4	3	61.5	76.9	23.1	38.5	38.5	46.2	30.8	23.1
	4	0	4	0	2	1	1	2	1	2	3	2	0	2	2	0	2	1	1	2	6	5	6	4	3	61.5	76.9	15.4	46.2	38.5	46.2	30.8	23.1
	5	2	2	0	3	0	1	2	1	2	2	3	0	3	1	0	3	0	1	4	4	5	6	4	3	61.5	76.9	30.8	30.8	38.5	46.2	30.8	23.1
FM-10 Market Info. Access Im	1	3	1	0	2	0	2	1	2	2	3	1	1	2	2	0	3	0	1	5	4	4	7	1	5	69.2	61.5	38.5	30.8	30.8	53.8	7.7	38.5
	2	1	3	0	2	0	2	1	2	2	2	2	1	1	3	0	2	1	1	3	6	4	5	3	5	69.2	61.5	23.1	46.2	30.8	38.5	23.1	38.5
	3	1	2	1	2	1	1	0	3	2	3	2	0	1	3	0	2	1	1	2	6	5	6	4	3	61.5	76.9	15.4	46.2	38.5	46.2	30.8	23.1
	4	0	3	1	4	0	0	2	0	3	3	1	1	1	3	0	2	1	1	3	4	6	8	2	3	53.8	76.9	23.1	30.8	46.2	61.5	15.4	23.1
	5	0	3	1	4	0	0	3	0	2	4	1	0	1	3	0	3	0	1	4	4	5	9	2	2	61.5	84.6	30.8	30.8	38.5	69.2	15.4	15.4

Source: The Study Team

Note: Note: The used questionnaire sheets can be found in Attachment 5-1.

In Oshana Region, there are four persons who are not in the DAPEES structure, such as Meat Board and AMTA,

**(3) Farm Management Technical Measures (Part 2: Other Stakeholders and Total)**

		Oshana Region						Oshana Region						Oshana		Oshana Region					
		Other Stakeholders (n=4)						Total (n=17)						Valid Response		Total (n=17)					
		Before			After			Before			After			Before	After	Before			After		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A			Yes	No	N/A	Yes	No	N/A
													%	%	%	%	%	%	%	%	
FM-2 Record Keeping	1	2	1	1	2	1	1	11	3	3	9	2	6	82.4	64.7	64.7	17.6	17.6	52.9	11.8	35.3
	2	2	1	1	2	1	1	11	3	3	9	2	6	82.4	64.7	64.7	17.6	17.6	52.9	11.8	35.3
	3	1	1	2	1	1	2	10	2	5	9	1	7	70.6	58.8	58.8	11.8	29.4	52.9	5.9	41.2
	4	1	1	2	1	1	2	6	4	7	10	3	4	58.8	76.5	35.3	23.5	41.2	58.8	17.6	23.5
	5	1	1	2	1	1	2	9	1	7	10	2	5	58.8	70.6	52.9	5.9	41.2	58.8	11.8	29.4
FM-5 Group Formation Group Strengthening	1	1	1	2	1	1	2	9	2	6	10	1	6	64.7	64.7	52.9	11.8	35.3	58.8	5.9	35.3
	2	1	1	2	1	1	2	7	4	6	7	3	7	64.7	58.8	41.2	23.5	35.3	41.2	17.6	41.2
	3	1	1	2	1	1	2	8	4	5	9	2	6	70.6	64.7	47.1	23.5	29.4	52.9	11.8	35.3
	4	0	2	2	0	2	2	5	6	6	7	3	7	64.7	58.8	29.4	35.3	35.3	41.2	17.6	41.2
	5	0	2	2	0	2	2	7	5	5	7	3	7	70.6	58.8	41.2	29.4	29.4	41.2	17.6	41.2
FM-6 Group Acct.	1	0	3	1	1	2	1	5	7	5	7	5	5	70.6	70.6	29.4	41.2	29.4	41.2	29.4	29.4
	2	0	3	1	1	2	1	3	10	4	7	5	5	76.5	70.6	17.6	58.8	23.5	41.2	29.4	29.4
	3	0	3	1	1	2	1	5	8	4	8	5	4	76.5	76.5	29.4	47.1	23.5	47.1	29.4	23.5
	4	0	3	1	1	2	1	4	8	5	8	5	4	70.6	76.5	23.5	47.1	29.4	47.1	29.4	23.5
	5	0	3	1	0	3	1	6	8	3	6	5	6	82.4	64.7	35.3	47.1	17.6	35.3	29.4	35.3
FM-8 Collective Sales Collective Purchasing	1	1	2	1	0	3	1	7	7	3	6	6	5	82.4	70.6	41.2	41.2	17.6	35.3	35.3	29.4
	2	0	3	1	1	2	1	5	8	4	8	6	3	76.5	82.4	29.4	47.1	23.5	47.1	35.3	17.6
	3	1	1	2	1	1	2	4	6	7	7	5	5	58.8	70.6	23.5	35.3	41.2	41.2	29.4	29.4
	4	2	1	1	1	2	1	4	7	6	7	6	4	64.7	76.5	23.5	41.2	35.3	41.2	35.3	23.5
	5	2	1	1	1	2	1	6	5	6	7	6	4	64.7	76.5	35.3	29.4	35.3	41.2	35.3	23.5
FM-10 Market Info. Access Im	1	1	2	1	1	1	2	6	6	5	8	2	7	70.6	58.8	35.3	35.3	29.4	47.1	11.8	41.2
	2	1	2	1	1	2	1	4	8	5	6	5	6	70.6	64.7	23.5	47.1	29.4	35.3	29.4	35.3
	3	1	2	1	1	2	1	3	8	6	7	6	4	64.7	76.5	17.6	47.1	35.3	41.2	35.3	23.5
	4	1	2	1	1	2	1	4	6	7	9	4	4	58.8	76.5	23.5	35.3	41.2	52.9	23.5	23.5
	5	1	2	1	1	2	1	5	6	6	10	4	3	64.7	82.4	29.4	35.3	35.3	58.8	23.5	17.6

Source: The Study Team

Note: Note: The used questionnaire sheets can be found in Attachment 5-1.

In Oshana Region, there are four persons who are not in the DAPEES structure, such as Meat Board and AMTA,

**Attachment 5-2-2-3 Table of Results of Questionnaire Survey for ATs in Oshikoto Region**

**(1) Crop Production Technical Measures**

	Oshikoto Region ATs in Charge (n=5)							Oshikoto Region ATs not in Charge (n=8)							Oshikoto Region Senior: ASO, 2 CATs (n=3)							Oshikoto Region Total (n=9)							Oshikoto Valid Response		Oshikoto Region Total (n=9)								
	Before			After				Before			After				Before			After				Before			After				Before	After	Before			After					
	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A	%	%	%				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8					
CR-1/2 Grains Fertilizer App.	4	0	1												2	0	1				7	0	2			77.8		77.8	0.0	22.2									
	4	0	1							1	0	0			2	0	1				7	0	2			77.8		77.8	0.0	22.2									
				3	1	1							0	1	0										5	2	2					55.6	22.2	22.2					
				3	1	1							0	1	0										5	2	2					55.6	22.2	22.2					
				3	1	1							0	1	0										5	2	2					11.0	5.0	0.0					
CR-3 Grains Consavation Agr.	4	0	1							1	0	0			2	0	1				7	0	2			77.8		77.8	0.0	22.2									
	3	1	1							1	0	0			1	1	1				5	2	2			77.8		77.8	55.6	22.2	22.2								
				3	1	1							0	1	0										5	2	2					55.6	22.2	22.2					
				3	1	1							0	1	0										5	2	2					55.6	22.2	22.2					
				3	1	1							0	1	0										5	2	2					11.0	5.0	0.0					
CR-4 Grains Rice-Mahangu	0	4	1							0	1	0			0	2	1				0	7	2			77.8		77.8	0.0	77.8	22.2								
	1	3	1							0	1	0			0	2	1				1	6	2			77.8		77.8	11.1	66.7	22.2								
				1	3	1							0	1	0										2	5	2					22.2	55.6	22.2					
				1	3	1							0	1	0										2	5	2					22.2	55.6	22.2					
				1	3	1							0	1	0										2	5	2					11.0	5.0	0.0					
CR-5 Horticulture Water Harvesting	1	3	1							0	1	0			0	2	1				1	6	2			77.8		77.8	11.1	66.7	22.2								
	1	3	1							1	0	0			0	2	1				2	5	2			77.8		77.8	22.2	55.6	22.2								
				2	2	1							0	1	0										2	5	2					22.2	55.6	22.2					
				2	1	2							0	1	0										2	4	3					22.2	44.4	33.3					
				2	2	1							0	1	0										2	5	2					11.0	5.0	0.0					
CR-6 Horticulture Drip Irrigation	3	1	1							1	0	0			2	0	1				6	1	2			77.8		77.8	66.7	11.1	22.2								
	1	3	1							0	1	0			0	2	1				1	6	2			77.8		77.8	11.1	66.7	22.2								
				2	2	1							0	1	0										3	4	2					33.3	44.4	22.2					
				2	2	1							0	1	0										3	4	2					33.3	44.4	22.2					
				2	2	1							0	1	0										2	4	3					11.0	5.0	0.0					
CR-7 Horticulture Crop Selection	3	1	1							1	0	0			2	0	1				6	1	2			77.8		77.8	66.7	11.1	22.2								
	1	3	1							1	0	0			1	1	1				3	4	2			77.8		77.8	33.3	44.4	22.2								
				2	2	1							0	1	0										3	4	2					33.3	44.4	22.2					
				2	2	1							0	1	0										3	4	2					33.3	44.4	22.2					
				2	2	1							0	1	0										3	4	2					11.0	5.0	0.0					
CR-8 Horticulture Cropping Plan Crop Management	2	2	1							1	0	0			1	1	1				4	3	2			77.8		77.8	44.4	33.3	22.2								
	2	1	2							1	0	0			1	1	1				4	2	3			66.7		66.7	44.4	22.2	33.3								
				2	1	2							0	1	0										3	3	3					33.3	33.3	33.3					
				2	2	1							0	1	0										3	4	2					33.3	44.4	22.2					
				2	2	1							0	1	0										3	4	2					11.0	5.0	0.0					

Source: The Study Team

Note: Note: The used questionnaire sheets can be found in Attachment 5-1.



**(3) Farm Management Technical Measures**

		Oshikoto Region						Oshikoto Region						Oshikoto Region						Oshikoto		Oshikoto Region											
		ATs in Charge (n=5)						ATs not in Charge (n=8)						Senior: ASO, 2 CATs (n=3)						Total (n=9)						Valid Response	Total (n=9)						
		Before			After			Before			After			Before			After			Before			After			Before	Before			After			
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	%	%	%	%		
FM-2 Record Keeping	1	4	1	0	5	0	0	1	0	0	1	0	0	3	0	0	3	0	0	8	1	0	9	0	0	100.0	100.0	88.9	11.1	0.0	100.0	0.0	0.0
	2	3	2	0	5	0	0	1	0	0	1	0	0	2	1	0	2	1	0	6	3	0	8	1	0	100.0	100.0	66.7	33.3	0.0	88.9	11.1	0.0
	3	4	0	1	4	0	1	1	0	0	1	0	0	2	1	0	3	0	0	7	1	1	8	0	1	88.9	88.9	77.8	11.1	11.1	88.9	0.0	11.1
	4	1	4	0	3	1	1	0	1	0	0	1	0	0	3	0	3	0	0	1	8	0	6	2	1	100.0	88.9	11.1	88.9	0.0	66.7	22.2	11.1
	5	3	1	1	4	0	1	1	0	0	1	0	0	3	0	0	3	0	0	7	1	1	8	0	1	88.9	88.9	77.8	11.1	11.1	88.9	0.0	11.1
FM-5 Group Formation Group Strengthening	1	2	1	2	2	1	2	1	0	0	1	0	0	2	1	0	3	0	0	5	2	2	6	1	2	77.8	77.8	55.6	22.2	22.2	66.7	11.1	22.2
	2	2	1	2	3	0	2	1	0	0	1	0	0	3	0	0	3	0	0	6	1	2	7	0	2	77.8	77.8	66.7	11.1	22.2	77.8	0.0	22.2
	3	2	1	2	3	0	2	1	0	0	1	0	0	2	1	0	3	0	0	5	2	2	7	0	2	77.8	77.8	55.6	22.2	22.2	77.8	0.0	22.2
	4	2	1	2	2	1	2	1	0	0	1	0	0	1	2	0	1	1	1	4	3	2	4	2	3	77.8	66.7	44.4	33.3	22.2	44.4	22.2	33.3
	5	2	1	2	2	1	2	1	0	0	1	0	0	2	1	0	3	0	0	5	2	2	6	1	2	77.8	77.8	55.6	22.2	22.2	66.7	11.1	22.2
FM-6 Group Acct.	1	3	1	1	4	0	1	0	1	0	1	0	0	1	1	1	3	0	0	4	3	2	8	0	1	77.8	88.9	44.4	33.3	22.2	88.9	0.0	11.1
	2	0	4	1	2	2	1	0	1	0	1	0	0	0	3	0	2	1	0	0	8	1	5	3	1	88.9	88.9	0.0	88.9	11.1	55.6	33.3	11.1
	3	2	2	1	2	2	1	0	1	0	1	0	0	0	3	0	2	1	0	2	6	1	5	3	1	88.9	88.9	22.2	66.7	11.1	55.6	33.3	11.1
	4	1	3	1	2	2	1	0	1	0	0	1	0	0	3	0	2	1	0	1	7	1	4	4	1	88.9	88.9	11.1	77.8	11.1	44.4	44.4	11.1
	5	2	2	1	4	0	1	0	1	0	1	0	0	2	1	0	3	0	0	4	4	1	8	0	1	88.9	88.9	44.4	44.4	11.1	88.9	0.0	11.1
FM-8 Collective Sales Collective Purchasing	1	3	1	1	4	0	1	0	1	0	0	0	1	1	2	0	3	0	0	4	4	1	7	0	2	88.9	77.8	44.4	44.4	11.1	77.8	0.0	22.2
	2	3	2	0	3	2	0	0	1	0	0	1	0	0	3	0	0	3	0	3	6	0	3	6	0	100.0	100.0	33.3	66.7	0.0	33.3	66.7	0.0
	3	1	3	1	3	1	1	0	1	0	0	1	0	0	1	2	1	1	1	1	5	3	4	3	2	66.7	77.8	11.1	55.6	33.3	44.4	33.3	22.2
	4	2	2	1	2	2	1	0	1	0	0	1	0	0	3	0	1	1	1	2	6	1	3	4	2	88.9	77.8	22.2	66.7	11.1	33.3	44.4	22.2
	5	3	1	1	4	1	0	0	1	0	1	0	0	0	2	1	2	0	1	3	4	2	7	1	1	77.8	88.9	33.3	44.4	22.2	77.8	11.1	11.1
FM-10 Market Info. Access Im	1	3	1	1	3	1	1	1	0	0	1	0	0	2	0	1	2	0	1	6	1	2	6	1	2	77.8	77.8	66.7	11.1	22.2	66.7	11.1	22.2
	2	4	1	0	3	1	1	0	1	0	1	0	0	1	1	1	2	0	1	5	3	1	6	1	2	88.9	77.8	55.6	33.3	11.1	66.7	11.1	22.2
	3	4	1	0	4	0	1	0	1	0	1	0	0	1	1	1	2	0	1	5	3	1	7	0	2	88.9	77.8	55.6	33.3	11.1	77.8	0.0	22.2
	4	4	1	0	5	0	0	0	1	0	0	1	0	1	1	1	1	1	1	5	3	1	6	2	1	88.9	88.9	55.6	33.3	11.1	66.7	22.2	11.1
	5	3	2	0	5	0	0	0	1	0	0	1	0	1	1	1	2	0	1	4	4	1	7	1	1	88.9	88.9	44.4	44.4	11.1	77.8	11.1	11.1

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-1.

**Attachment 5-2-2-4 Table of Results of Questionnaire Survey for ATs in Ohangwena Region**

**(1) Crop Production Technical Measures**

		Ohangwena Region ATs in Charge (n=3)						Ohangwena Region ATs not in Charge (n=8)						Ohangwena Region Senior: SASO, ASO, CATs (n=4)						Ohangwena Region Total (n=11)						Ohangwena Valid Response		Ohangwena Region Total (n=16)					
		Before			After			Before			After			Before			After			Before	After	Before			After								
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A					
CR-1/2 Grains Fertilizer App.	1	3	0	0			4	0	0			4	0	0			11	0	0			100.0		100.0	0.0	0.0							
	2	3	0	0			4	0	0			4	0	0			11	0	0			100.0		100.0	0.0	0.0							
	3				2	1	0			4	0	0			4	0	0			10	1	0		100.0			90.9	9.1	0.0				
	4				2	1	0			4	0	0			4	0	0			10	1	0		100.0			90.9	9.1	0.0				
	5				2	1	0			4	0	0			4	0	0			10	1	0		100.0			11.0	5.0	0.0				
CR-3 Grains Consavation Agr.	1	3	0	0			4	0	0			4	0	0			11	0	0			100.0		100.0	0.0	0.0							
	2	3	0	0			4	0	0			4	0	0			11	0	0			100.0		100.0	0.0	0.0							
	3				2	0	1			4	0	0			4	0	0			10	0	1		90.9			90.9	0.0	9.1				
	4				2	0	1			4	0	0			4	0	0			10	0	1		90.9			90.9	0.0	9.1				
	5				2	0	1			4	0	0			4	0	0			10	0	1		90.9			11.0	5.0	0.0				
CR-4 Grains Rice-Mahangu	1	1	2	0			1	2	1			3	1	0			5	5	1			90.9		45.5	45.5	9.1							
	2	1	2	0			1	3	0			2	2	0			4	7	0			100.0		36.4	63.6	0.0							
	3				1	2	0			1	3	0			2	2	0			4	7	0		100.0			36.4	63.6	0.0				
	4				1	2	0			1	3	0			2	2	0			4	7	0		100.0			36.4	63.6	0.0				
	5				1	2	0			1	3	0			2	2	0			4	7	0		100.0			11.0	5.0	0.0				
CR-5 Horticulture Water Harvesting	1	0	3	0			1	3	0			2	2	0			3	8	0			100.0		27.3	72.7	0.0							
	2	2	1	0			3	1	0			2	2	0			2	4	0			100.0		63.6	36.4	0.0							
	3				0	3	0			2	2	0			0	4	0			2	9	0		100.0			18.2	81.8	0.0				
	4				0	3	0			3	1	0			0	4	0			3	8	0		100.0			27.3	72.7	0.0				
	5				0	2	1			3	1	0			1	3	0			4	6	1		90.9			11.0	5.0	0.0				
CR-6 Horticulture Drip Irrigation	1	3	0	0			4	0	0			4	0	0			11	0	0			100.0		100.0	0.0	0.0							
	2	0	3	0			2	2	0			1	3	0			3	8	0			100.0		27.3	72.7	0.0							
	3				1	0	2			3	1	0			3	1	0			7	2	2		81.8			63.6	18.2	18.2				
	4				0	1	2			3	1	0			2	2	0			5	4	2		81.8			45.5	36.4	18.2				
	5				0	1	2			3	1	0			2	2	0			5	4	2		81.8			11.0	5.0	0.0				
CR-7 Horticulture Crop Selection	1	3	0	0			4	0	0			4	0	0			11	0	0			100.0		100.0	0.0	0.0							
	2	1	2	0			2	1	1			3	1	0			6	4	1			90.9		54.5	36.4	9.1							
	3				2	0	1			3	0	1			3	1	0			8	1	2		81.8			72.7	9.1	18.2				
	4				2	1	0			2	1	1			2	2	0			6	4	1		90.9			54.5	36.4	9.1				
	5				2	1	0			2	1	1			2	2	0			6	4	1		90.9			11.0	5.0	0.0				
CR-8 Horticulture Cropping Plan Crop Management	1	3	0	0			4	0	0			4	0	0			11	0	0			100.0		100.0	0.0	0.0							
	2	2	1	0			4	0	0			4	0	0			10	1	0			100.0		90.9	9.1	0.0							
	3				1	2	0			2	1	1			3	1	0			6	4	1		90.9			54.5	36.4	9.1				
	4				0	3	0			2	1	1			2	2	0			4	6	1		90.9			36.4	54.5	9.1				
	5				0	3	0			2	1	1			2	2	0			4	6	1		90.9			11.0	5.0	0.0				

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-1.

**(2) Livestock Production Technical Measures**

		Ohangwena Region						Ohangwena Region						Ohangwena Region						Ohangwena Region						Ohangwena		Ohangwena Region					
		ATs in Charge (n=3)						ATs not in Charge (n=8)						Senior: SASO, ASO, CATs (n=4)						Total (n=11)						Valid Response		Total (n=16)					
		Before			After			Before			After			Before			After			Before			After			Before	After	Before			After		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	%	%	%	%		
LS-1 Fodder Production	1	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	2	3	0	0				4	0	0				3	1	0				10	1	0				100.0		90.9	9.1	0.0			
	3				3	0	0				4	0	0				2	2	0				9	2	0	100.0				81.8	18.2	0.0	
	4				2	1	0				4	0	0				1	3	0				7	4	0	100.0				63.6	36.4	0.0	
	5				1	2	0				3	1	0				1	3	0				5	6	0	100.0				11.0	5.0	0.0	
LS-2 Range Management	1	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	2	3	0	0				4	0	0				3	1	0				10	1	0				100.0		90.9	9.1	0.0			
	3				3	0	0				2	2	0				3	1	0				8	3	0	100.0				72.7	27.3	0.0	
	4				3	0	0				3	1	0				4	0	0				10	1	0	100.0				90.9	9.1	0.0	
	5				3	0	0				2	2	0				1	2	1				6	4	1	90.9				11.0	5.0	0.0	
LS-4 Nutritious Feed Suppl	1	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	2	3	0	0				3	1	0				2	2	0				8	3	0				100.0		72.7	27.3	0.0			
	3				3	0	0				3	1	0				4	0	0				10	1	0	100.0				90.9	9.1	0.0	
	4				2	1	0				3	1	0				4	0	0				9	2	0	100.0				81.8	18.2	0.0	
	5				3	0	0				4	0	0				3	1	0				10	1	0	100.0				11.0	5.0	0.0	
LS-5 Disease Control Cattle	1	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	2	2	0	1				3	1	0				4	0	0				9	1	1				90.9		81.8	9.1	9.1			
	3				3	0	0				4	0	0				3	1	0				10	1	0	100.0				90.9	9.1	0.0	
	4				2	1	0				4	0	0				3	0	1				9	1	1	90.9				81.8	9.1	9.1	
	5				3	0	0				4	0	0				4	0	0				11	0	0	100.0				11.0	5.0	0.0	
LS-6 Fattening	1	1	1	1				4	0	0				4	0	0				9	1	1				90.9		81.8	9.1	9.1			
	2	2	1	0				2	1	1				3	1	0				7	3	1				90.9		63.6	27.3	9.1			
	3				3	0	0				4	0	0				4	0	0				11	0	0	100.0				100.0	0.0	0.0	
	4				2	1	0				4	0	0				4	0	0				10	1	0	100.0				90.9	9.1	0.0	
	5				3	0	0				4	0	0				2	1	1				9	1	1	90.9				11.0	5.0	0.0	
LS-7 Periodical Production	1	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	2	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	3				2	1	0				4	0	0				4	0	0				10	1	0	100.0				90.9	9.1	0.0	
	4				3	0	0				2	1	1				4	0	0				9	1	1	90.9				81.8	9.1	9.1	
	5				2	0	1				3	1	0				2	1	1				7	2	2	81.8				11.0	5.0	0.0	
LS-11 Goat Production	1	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	2	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	3				3	0	0				4	0	0				4	0	0				11	0	0	100.0				100.0	0.0	0.0	
	4				2	1	0				3	1	0				3	1	0				8	3	0	100.0				72.7	27.3	0.0	
	5				1	2	0				3	1	0				4	0	0				8	3	0	100.0				11.0	5.0	0.0	
LS-13 Chiken Production	1	2	1	0				4	0	0				4	0	0				10	1	0				100.0		90.9	9.1	0.0			
	2	2	1	0				4	0	0				4	0	0				10	1	0				100.0		90.9	9.1	0.0			
	3				2	0	1				3	1	0				3	1	0				8	2	1	90.9				72.7	18.2	9.1	
	4				3	0	0				2	2	0				2	2	0				7	4	0	100.0				63.6	36.4	0.0	
	5				3	0	0				3	1	0				3	1	0				9	2	0	100.0				11.0	5.0	0.0	
LS-5 Disease Control Goat	1	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	2	3	0	0				4	0	0				4	0	0				11	0	0				100.0		100.0	0.0	0.0			
	3				3	0	0				4	0	0				4	0	0				11	0	0	100.0				100.0	0.0	0.0	
	4				2	0	1				4	0	0				4	0	0				10	0	1	90.9				90.9	0.0	9.1	
	5				3	0	0				4	0	0				4	0	0				11	0	0	100.0				11.0	5.0	0.0	
LS-5 Disease Control Chicken	1	2	1	0				4	0	0				4	0	0				10	1	0				100.0		90.9	9.1	0.0			
	2	2	1	0				3	1	0				4	0	0				9	2	0				100.0		81.8	18.2	0.0			
	3				2	0	1				3	0	1				3	1	0				8	1	2	81.8				72.7	9.1	18.2	
	4				1	0	2				3	0	1				3	1	0				7	1	3	72.7				63.6	9.1	27.3	
	5				2	1	0				3	0	1				4	0	0				9	1	1	90.9				11.0	5.0	0.0	

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-1.



### (3) Farm Management Technical Measures

		Ohangwena Region						Ohangwena Region						Ohangwena Region						Ohangwena		Ohangwena Region											
		ATs in Charge (n=3)						ATs not in Charge (n=8)						Senior: SASO, ASO, CATs (n=4)						Total (n=11)						Valid Response		Total (n=16)					
		Before			After			Before			After			Before			After			Before			After			Before	After	Before			After		
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A
FM-2 Record Keeping	1	3	0	0	3	0	0	4	0	0	4	0	0	4	0	0	11	0	0	11	0	0	100.0	100.0	100.0	0.0	0.0	100.0	0.0	0.0			
	2	3	0	0	3	0	0	4	0	0	4	0	0	3	1	0	4	0	0	10	1	0	11	0	0	100.0	100.0	90.9	9.1	0.0	100.0	0.0	0.0
	3	3	0	0	3	0	0	4	0	0	4	0	0	3	1	0	4	0	0	10	1	0	11	0	0	100.0	100.0	90.9	9.1	0.0	100.0	0.0	0.0
	4	0	3	0	3	0	0	3	1	0	3	1	0	1	3	0	2	1	1	4	7	0	8	2	1	100.0	90.9	36.4	63.6	0.0	72.7	18.2	9.1
	5	2	1	0	3	0	0	3	1	0	3	0	1	3	0	1	3	1	0	8	2	1	9	1	1	90.9	90.9	72.7	18.2	9.1	81.8	9.1	9.1
FM-5 Group Formation Group Strengthening	1	3	0	0	3	0	0	2	2	0	4	0	0	3	1	0	4	0	0	8	3	0	11	0	0	100.0	100.0	72.7	27.3	0.0	100.0	0.0	0.0
	2	1	2	0	2	1	0	2	1	1	2	1	1	4	0	0	4	0	0	7	3	1	8	2	1	90.9	90.9	63.6	27.3	9.1	72.7	18.2	9.1
	3	1	2	0	1	2	0	3	1	0	4	0	0	2	2	0	4	0	0	6	5	0	9	2	0	100.0	100.0	54.5	45.5	0.0	81.8	18.2	0.0
	4	1	2	0	2	1	0	3	1	0	4	0	0	2	2	0	4	0	0	6	5	0	10	1	0	100.0	100.0	54.5	45.5	0.0	90.9	9.1	0.0
	5	2	1	0	2	1	0	3	1	0	4	0	0	2	2	0	3	1	0	7	4	0	9	2	0	100.0	100.0	63.6	36.4	0.0	81.8	18.2	0.0
FM-6 Group Acct.	1	3	0	0	3	0	0	4	0	0	4	0	0	4	0	0	4	0	0	11	0	0	7	0	4	100.0	63.6	100.0	0.0	0.0	63.6	0.0	36.4
	2	1	2	0	2	1	0	1	3	0	3	1	0	0	4	0	3	1	0	2	9	0	8	3	0	100.0	100.0	18.2	81.8	0.0	72.7	27.3	0.0
	3	3	0	0	3	0	0	2	2	0	4	0	0	3	1	0	4	0	0	8	3	0	11	0	0	100.0	100.0	72.7	27.3	0.0	100.0	0.0	0.0
	4	0	3	0	3	0	0	2	2	0	4	0	0	0	2	2	1	1	2	2	7	2	8	1	2	81.8	81.8	18.2	63.6	18.2	72.7	9.1	18.2
	5	2	1	0	3	0	0	3	1	0	4	0	0	2	1	1	2	1	1	7	3	1	9	1	1	90.9	90.9	63.6	27.3	9.1	81.8	9.1	9.1
FM-8 Collective Sales Collective Purchasing	1	2	1	0	3	0	0	3	1	0	4	0	0	3	1	0	4	0	0	8	3	0	11	0	0	100.0	100.0	72.7	27.3	0.0	100.0	0.0	0.0
	2	2	1	0	2	1	0	2	2	0	4	0	0	0	4	0	2	2	0	4	7	0	8	3	0	100.0	100.0	36.4	63.6	0.0	72.7	27.3	0.0
	3	1	2	0	3	0	0	1	3	0	4	0	0	1	3	0	3	1	0	3	8	0	10	1	0	100.0	100.0	27.3	72.7	0.0	90.9	9.1	0.0
	4	0	3	0	2	1	0	2	2	0	4	0	0	1	3	0	3	1	0	3	8	0	9	2	0	100.0	100.0	27.3	72.7	0.0	81.8	18.2	0.0
	5	3	0	0	3	0	0	1	3	0	4	0	0	2	2	0	3	1	0	6	5	0	10	1	0	100.0	100.0	54.5	45.5	0.0	90.9	9.1	0.0
FM-10 Market Info. Access Im	1	3	0	0	2	1	0	4	0	0	4	0	0	4	0	0	4	0	0	11	0	0	10	1	0	100.0	100.0	100.0	0.0	0.0	90.9	9.1	0.0
	2	1	2	0	3	0	0	2	1	1	3	0	1	3	1	0	4	0	0	6	4	1	10	0	1	90.9	90.9	54.5	36.4	9.1	90.9	0.0	9.1
	3	0	3	0	1	2	0	3	1	0	3	1	0	3	1	0	4	0	0	6	5	0	8	3	0	100.0	100.0	54.5	45.5	0.0	72.7	27.3	0.0
	4	2	1	0	3	0	0	3	1	0	4	0	0	1	3	0	3	1	0	6	5	0	10	1	0	100.0	100.0	54.5	45.5	0.0	90.9	9.1	0.0
	5	1	2	0	3	0	0	3	1	0	3	1	0	4	0	0	4	0	0	5	6	0	10	1	0	100.0	100.0	45.5	54.5	0.0	90.9	9.1	0.0

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-1.

**Attachment 5-2-3: Results of Questionnaire Survey for ATs: Summary Table in Total**

**(1) Crop Production Technical Measures**

		All 4 Regions						All 4 Region						Valid Response		Oshana Region						All 4 Regions						Valid Response		All 4 Region					
		DAPEES Total (n=49)						DAPEES Total (n=49)						Total		Other Stakeholders (n=4)						All Respondents (n=53)						Total		Total (n=16)					
		Before			After			Before			After			Before	After	Before			After			Before	After	Before			After								
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A					
CR-1/2	1	45	1	3					91.8	2.0	6.1			80.9			1	2	1				46	3	4			92.5		86.8	5.7	7.5			
Grains	2	45	0	4					91.8	0.0	8.2			77.1			1	2	1				46	2	5			90.6		86.8	3.8	9.4			
Fertilizer App.	3				38	5	6					77.6	10.2	12.2	69.3					0	3	1			38	8	7	86.8			71.7	15.1	13.2		
	4				36	5	8					73.5	10.2	16.3	61.6					0	2	2			36	7	10	81.1			67.9	13.2	18.9		
	5				35	8	6					71.4	16.3	12.2	69.3					0	2	2			35	10	8	84.9			66.0	18.9	15.1		
CR-3	1	44	2	3					89.8	4.1	6.1			80.9			3	0	1				47	2	4			92.5		88.7	3.8	7.5			
Grains	2	36	11	2					73.5	22.4	4.1			84.8			1	2	1				37	13	3			94.3		69.8	24.5	5.7			
Consavation Agr.	3				36	6	7					73.5	12.2	14.3	65.5					1	2	1			37	8	8	84.9			69.8	15.1	15.1		
	4				35	6	8					71.4	12.2	16.3	61.6					0	3	1			35	9	9	83.0			66.0	17.0	17.0		
	5				33	7	9					67.3	14.3	18.4	57.8					1	1	2			34	8	11	79.2			64.2	15.1	20.8		
CR-4	1	14	29	6					28.6	59.2	12.2			69.3			0	2	2				14	31	8			84.9		26.4	58.5	15.1			
Grains	2	15	31	3					30.6	63.3	6.1			80.9			0	2	2				15	33	5			90.6		28.3	62.3	9.4			
Rice-Mahangu	3				18	23	8					36.7	46.9	16.3	61.6					0	2	2			18	25	10	81.1			34.0	47.2	18.9		
	4				20	21	8					40.8	42.9	16.3	61.6					0	2	2			20	23	10	81.1			37.7	43.4	18.9		
	5				17	23	9					34.7	46.9	18.4	57.8					0	2	2			17	25	11	79.2			32.1	47.2	20.8		
CR-5	1	6	38	5					12.2	77.6	10.2			73.2			0	3	1				6	41	6			88.7		11.3	77.4	11.3			
Horticulture	2	21	23	5					42.9	46.9	10.2			73.2			0	3	1				21	26	6			88.7		39.6	49.1	11.3			
Water Harvesting	3				5	39	5					10.2	79.6	10.2	73.2					0	3	1			5	42	6	88.7			9.4	79.2	11.3		
	4				13	26	10					26.5	53.1	20.4	53.9					0	3	1			13	29	11	79.2			24.5	54.7	20.8		
	5				20	19	10					40.8	38.8	20.4	53.9					0	3	1			20	22	11	79.2			37.7	41.5	20.8		
CR-6	1	45	2	2					91.8	4.1	4.1			84.8			2	1	1				47	3	3			94.3		88.7	5.7	5.7			
Horticulture	2	14	32	3					28.6	65.3	6.1			80.9			1	1	2				15	33	5			90.6		28.3	62.3	9.4			
Drip Irrigation	3				27	12	10					55.1	24.5	20.4	53.9					1	1	2			28	13	12	77.4			52.8	24.5	22.6		
	4				20	18	11					40.8	36.7	22.4	50.1					1	2	1			21	20	12	77.4			39.6	37.7	22.6		
	5				21	16	12					42.9	32.7	24.5	46.2					1	2	1			22	18	13	75.5			41.5	34.0	24.5		
CR-7	1	44	2	3					89.8	4.1	6.1			80.9			2	1	1				46	3	4			56.5		86.8	5.7	7.5			
Horticulture	2	21	23	5					42.9	46.9	10.2			73.2			1	1	2				22	24	7			86.8		41.5	45.3	13.2			
Crop Selection	3				30	12	7					61.2	24.5	14.3	65.5					1	2	1			31	14	8	84.9			58.5	26.4	15.1		
	4				22	22	5					44.9	44.9	10.2	73.2					1	1	2			23	23	7	86.8			43.4	43.4	13.2		
	5				22	21	6					44.9	42.9	12.2	69.3					1	1	2			23	22	8	84.9			43.4	41.5	15.1		
CR-8	1	35	9	5					71.4	18.4	10.2			73.2			1	1	2				36	10	7			86.8		67.9	18.9	13.2			
Horticulture	2	31	13	5					63.3	26.5	10.2			73.2			1	1	2				32	14	7			86.8		60.4	26.4	13.2			
Cropping Plan	3				26	14	9					53.1	28.6	18.4	57.8					1	1	2			27	15	11	79.2			50.9	28.3	20.8		
Crop Management	4				22	19	8					44.9	38.8	16.3	61.6					1	2	1			23	21	9	83.0			43.4	39.6	17.0		
	5				21	18	10					42.9	36.7	20.4	53.9					1	2	1			22	20	11	79.2			41.5	37.7	20.8		

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-1.

This table is made based on the results of the separated tables in "Attachment 5-2-2 Results of Questionnaire Survey for ATs: Summary Table by Region".

## (2) Livestock Production Technical Measures

		All 4 Regions DAPEES Total (n=49)						All 4 Region DAPEES Total (n=49)						Valid Response Total		Oshana Region Other Stakeholders (n=4)						All 4 Regions All Respondents(n=53)						Valid Response Total		All 4 Region Total (n=16)					
		Before			After			Before			After			Before	After	Before			After			Before	After	Before			After								
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A			
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%			
LS-1 Fodder Production	1	45	1	3			91.8	2.0	6.1				80.9		0	2	2				45	3	5	90.6		84.9	5.7	9.4							
	2	23	23	3			46.9	46.9	6.1				80.9		0	2	2				23	25	5	90.6		43.4	47.2	9.4							
	3				27	13				55.1	26.5	18.4		57.8				1	2	1			28	15	10				52.8	28.3	18.9				
	4				19	22				38.8	44.9	16.3		61.6				1	2	1			20	24	9				37.7	45.3	17.0				
	5				20	21				40.8	42.9	16.3		61.6				1	1	2			21	22	10				39.6	41.5	18.9				
LS-2 Range Management	1	41	5	3			83.7	10.2	6.1				80.9		1	1	2				42	6	5	90.6		79.2	11.3	9.4							
	2	35	8	6			71.4	16.3	12.2				69.3		1	1	2				36	9	8	84.9		67.9	17.0	15.1							
	3				30	9				61.2	18.4	20.4		53.9				0	3	1			30	12	11				56.6	22.6	20.8				
	4				21	20				42.9	40.6	16.3		61.6				0	2	2			21	22	10				39.6	41.5	18.9				
	5				17	21				34.7	42.9	22.4		50.1				0	3	1			17	24	12				32.1	45.3	22.6				
LS-4 Nutritious Feed Suppl	1	33	10	6			67.3	20.4	12.2				69.3		0	3	1				33	13	7	86.8		62.3	24.5	13.2							
	2	24	20	5			49.0	40.8	10.2				73.2		0	3	1				24	23	6	88.7		45.3	43.4	11.3							
	3				25	18				51.0	36.7	12.2		69.3				1	2	1			26	20	7				49.1	37.7	13.2				
	4				26	17				53.1	34.7	12.2		69.3				1	2	1			27	19	7				50.9	35.8	13.2				
	5				32	12				65.3	24.5	10.2		73.2				1	2	1			33	14	6				62.3	26.4	11.3				
LS-5 Disease Control Cattle	1	43	2	4			87.8	4.1	8.2				77.1		0	2	2				43	4	6	88.7		81.1	7.5	11.3							
	2	38	5	6			77.6	10.2	12.2				69.3		0	2	2				38	7	8	84.9		71.7	13.2	15.1							
	3				32	10				65.3	20.4	14.3		65.5				1	2	1			33	12	8				62.3	22.6	15.1				
	4				31	11				63.3	22.4	14.3		65.5				0	3	1			31	14	8				58.5	26.4	15.1				
	5				35	8				71.4	16.3	12.2		69.3				0	3	1			35	11	7				66.0	20.8	13.2				
LS-6 Fattening	1	33	8	8			67.3	16.3	16.3				61.6		0	3	1				33	11	9	83.0		62.3	20.8	17.0							
	2	28	15	6			57.1	30.6	12.2				69.3		1	2	1				29	17	7	86.8		54.7	32.1	13.2							
	3				31	9				63.3	18.4	18.4		57.8				0	3	1			31	12	10				58.5	22.6	18.9				
	4				28	13				57.1	26.5	16.3		61.6				1	2	1			29	15	9				54.7	28.3	17.0				
	5				26	15				53.1	30.6	16.3		61.6				0	3	1			26	18	9				49.1	34.0	17.0				
LS-7 Periodical Production	1	34	11	4			69.4	22.4	8.2				77.1		0	3	1				34	14	5	90.6		64.2	26.4	9.4							
	2	38	7	4			77.6	14.3	8.2				77.1		0	3	1				38	10	5	90.6		71.7	18.9	9.4							
	3				33	9				67.3	18.4	14.3		65.5				1	2	1			34	11	8				64.2	20.8	15.1				
	4				28	12				57.1	24.5	18.4		57.8				1	2	1			29	14	10				54.7	26.4	18.9				
	5				26	13				53.1	26.5	20.4		53.9				1	1	2			27	14	12				50.9	26.4	22.6				
LS-11 Goat Production	1	38	7	4			77.6	14.3	8.2				77.1		0	3	1				38	10	5	90.6		71.7	18.9	9.4							
	2	40	5	4			81.6	10.2	8.2				77.1		0	3	1				40	8	5	90.6		75.5	15.1	9.4							
	3				26	15				53.1	30.6	16.3		61.6				1	2	1			27	17	9				50.9	32.1	17.0				
	4				21	21				42.9	42.9	14.3		65.5				0	3	1			21	24	8				39.6	45.3	15.1				
	5				25	16				51.0	32.7	16.3		61.6				0	3	1			25	19	9				47.2	35.8	17.0				
LS-13 Chicken Production	1	37	7	5			75.5	14.3	10.2				73.2		0	3	1				37	10	6	88.7		69.8	18.9	11.3							
	2	40	5	4			81.6	10.2	8.2				77.1		0	3	1				40	8	5	90.6		75.5	15.1	9.4							
	3				28	14				57.1	28.6	14.3		65.5				1	2	1			29	16	8				54.7	30.2	15.1				
	4				24	18				49.0	36.7	14.3		65.5				0	2	2			24	20	9				45.3	37.7	17.0				
	5				27	16				55.1	32.7	12.2		69.3				0	2	2			27	18	8				50.9	34.0	15.1				
LS-5 Disease Control Goat	1	40	3	6			81.6	6.1	12.2				69.3		1	1	2				41	4	8	84.9		77.4	7.5	15.1							
	2	38	4	7			77.6	8.2	14.3				65.5		0	2	2				38	6	9	83.0		71.7	11.3	17.0							
	3				30	12				61.2	24.5	14.3		65.5				1	1	2			31	13	9				58.5	24.5	17.0				
	4				27	14				55.1	28.6	16.3		61.6				1	1	2			28	15	10				52.8	28.3	18.9				
	5				31	10				63.3	20.4	16.3		61.6				1	1	2			32	11	10				60.4	20.8	18.9				
LS-5 Disease Control Chicken	1	37	7	5			75.5	14.3	10.2				73.2		0	2	2				37	9	7	86.8		69.8	17.0	13.2							
	2	30	12	7			61.2	24.5	14.3				65.5		1	1	2				31	13	9	83.0		58.5	24.5	17.0							
	3				27	14				55.1	28.6	16.3		61.6				1	1	2			28	15	10				52.8	28.3	18.9				
	4				25	14				51.0	28.6	20.4		53.9				1	1	2			26	15	12				49.1	28.3	22.6				
	5				32	9				65.3	18.4	16.3		61.6				1	1	2			33	10	10				62.3	18.9	18.9				

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-1.

This table is made based on the results of the separated tables in "Attachment 5-2-2 Results of Questionnaire Survey for ATs: Summary Table by Region".

**(3) Farm Management Technical Measures**

		All 4 Regions						All 4 Region						Valid Response		Oshana Region						All 4 Regions						Valid Response		All 4 Region											
		DAPEES Total (n=49)						DAPEES Total (n=49)						Total		Other Stakeholders (n=4)						All Respondents(n=53)						Total		Total (n=16)											
		Before			After			Before			After			Before	After	Before			After			Before	After	Before			After			Before	After	Before			After						
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	%	%	Yes	No	N/A	Yes	No	N/A						
FM-2	1	44	3	2	34	8	7							89.8	6.1	4.1	69.4	16.3	14.3	92.3	73.0	2	1	1	2	1	1	46	4	3	36	9	8	94.3	84.9	86.8	7.5	5.7	67.9	17.0	13.2
Record Keeping	2	35	12	2	37	6	6							71.4	24.5	4.1	75.5	12.2	12.2	92.3	76.9	2	1	1	2	1	1	37	13	3	39	7	7	94.3	86.8	69.8	24.5	5.7	73.6	13.2	13.2
	3	39	6	4	40	2	7							79.6	12.2	8.2	81.6	4.1	14.3	84.6	73.0	1	1	2	1	1	2	40	7	6	41	3	9	88.7	83.0	75.5	13.2	11.3	77.4	5.7	17.0
	4	10	31	8	31	11	7							20.4	63.3	16.3	63.3	22.4	14.3	69.2	73.0	1	1	2	1	1	2	11	32	10	32	12	9	81.1	83.0	20.8	60.4	18.9	60.4	22.6	17.0
	5	35	6	8	41	2	6							71.4	12.2	16.3	83.7	4.1	12.2	69.2	76.9	1	1	2	1	1	2	36	7	10	42	3	8	81.1	84.9	67.9	13.2	18.9	79.2	5.7	15.1
FM-5	1	34	9	6	41	1	7							69.4	18.4	12.2	83.7	2.0	14.3	76.9	73.0	1	1	2	1	1	2	35	10	8	42	2	9	84.9	83.0	66.0	18.9	15.1	79.2	3.8	17.0
Group Formation	2	29	12	8	32	7	10							59.2	24.5	16.3	65.3	14.3	20.4	69.2	61.5	1	1	2	1	1	2	30	13	10	33	8	12	81.1	77.4	56.6	24.5	18.9	62.3	15.1	22.6
Group Strengthening	3	27	16	6	36	5	8							55.1	32.7	12.2	73.5	10.2	16.3	76.9	69.2	1	1	2	1	1	2	28	17	8	37	6	10	84.9	81.1	52.8	32.1	15.1	69.8	11.3	18.9
	4	22	20	7	34	6	9							44.9	40.8	14.3	69.4	12.2	18.4	73.0	65.3	0	2	2	0	2	2	22	22	9	34	8	11	83.0	79.2	41.5	41.5	17.0	64.2	15.1	20.8
	5	27	16	6	36	5	8							55.1	32.7	12.2	73.5	10.2	16.3	76.9	69.2	0	2	2	0	2	2	27	18	8	36	7	10	84.9	81.1	50.9	34.0	15.1	67.9	13.2	18.9
FM-6	1	29	13	7	32	6	11							59.2	26.5	14.3	65.3	12.2	22.4	73.0	57.6	0	3	1	1	2	1	29	16	8	33	8	12	84.9	77.4	54.7	30.2	15.1	62.3	15.1	22.6
Group Acct.	2	9	35	5	27	15	7							18.4	71.4	10.2	55.1	30.6	14.3	80.7	73.0	0	3	1	1	2	1	9	38	6	28	17	8	88.7	84.9	17.0	71.7	11.3	52.8	32.1	15.1
	3	19	25	5	33	11	5							38.8	51.0	10.2	67.3	22.4	10.2	80.7	80.7	0	3	1	1	2	1	19	28	6	34	13	6	88.7	88.7	35.8	52.8	11.3	64.2	24.5	11.3
	4	9	32	8	25	16	8							18.4	65.3	16.3	51.0	32.7	16.3	69.2	69.2	0	3	1	1	2	1	9	35	9	26	18	9	83.0	83.0	17.0	66.0	17.0	49.1	34.0	17.0
	5	26	18	5	36	5	8							53.1	36.7	10.2	73.5	10.2	16.3	80.7	69.2	0	3	1	0	3	1	26	21	6	36	8	9	88.7	83.0	49.1	39.6	11.3	67.9	15.1	17.0
FM-8	1	24	22	3	37	5	7							49.0	44.9	6.1	75.5	10.2	14.3	88.4	73.0	1	2	1	0	3	1	25	24	4	37	8	8	92.5	84.9	47.2	45.3	7.5	69.8	15.1	15.1
Collective Sales	2	18	28	3	28	18	3							36.7	57.1	6.1	57.1	36.7	6.1	88.4	88.4	0	3	1	1	2	1	18	31	4	29	20	4	92.5	92.5	34.0	58.5	7.5	54.7	37.7	7.5
Collective Purchasing	3	12	29	8	31	12	6							24.5	59.2	16.3	63.3	24.5	12.2	69.2	76.9	1	1	2	1	1	2	13	30	10	32	13	8	81.1	84.9	24.5	56.6	18.9	60.4	24.5	15.1
	4	13	29	7	28	15	6							26.5	59.2	14.3	57.1	30.6	12.2	73.0	76.9	2	1	1	1	2	1	15	30	8	29	17	7	84.9	86.8	28.3	56.6	15.1	54.7	32.1	13.2
	5	18	22	9	37	7	5							36.7	44.9	18.4	75.5	14.3	10.2	65.3	80.7	2	1	1	1	2	1	20	23	10	38	9	6	81.1	88.7	37.7	43.4	18.9	71.7	17.0	11.3
FM-10	1	29	14	6	36	4	9							59.2	28.6	12.2	73.5	8.2	18.4	76.9	65.3	1	2	1	1	1	2	30	16	7	37	5	11	86.8	79.2	56.6	30.2	13.2	69.8	9.4	20.8
Market Info. Access Im	2	19	24	6	30	10	9							38.8	49.0	12.2	61.2	20.4	18.4	76.9	65.3	1	2	1	1	2	1	20	26	7	31	12	10	86.8	81.1	37.7	49.1	13.2	58.5	22.6	18.9
	3	19	24	6	32	11	6							38.8	49.0	12.2	65.3	22.4	12.2	76.9	76.9	1	2	1	1	2	1	20	26	7	33	13	7	86.8	86.8	37.7	49.1	13.2	62.3	24.5	13.2
	4	19	23	7	33	11	5							38.8	46.9	14.3	67.3	22.4	10.2	73.0	80.7	1	2	1	1	2	1	20	25	8	34	13	6	84.9	88.7	37.7	47.2	15.1	64.2	24.5	11.3
	5	19	24	6	39	6	4							38.8	49.0	12.2	79.6	12.2	8.2	76.9	84.6	1	2	1	1	2	1	20	26	7	40	8	5	86.8	90.6	37.7	49.1	13.2	75.5	15.1	9.4

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-1.

This table is made based on the results of the separated tables in "Attachment 5-2-2 Results of Questionnaire Survey for ATIs: Summary Table by Region".

*Attachment 5-3*

*Questionnaire Form for*

*Farmers*

*N-CLIMP*

## Review of Technical Measures (Crops for Famers)

\_\_\_\_\_ Region, Constituency: \_\_\_\_\_,

Village: \_\_\_\_\_, Farmers' Name: \_\_\_\_\_

CR-1: Fertilizer Application (grains) CR-2 Cropping Pattern & Crop Management (grains)	Remark (Okau k., Ondobe, Omuthiya, Etayi) <u>Fertilizer Application &amp; Thinning</u> <u>according to the Crop Growing Stage</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP, before and after N-CLIMP Training	Did you know "fertilizer application & thinning" of mahangu according to the crop growing stages?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes / <input type="checkbox"/> No
2. Practice of TM by Farmer before N-CLIMP,	Did you practice fertilizer application and thinning of mahangu according to the stage?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you find any improvement in "fertilizer application and thinning"?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	After N-CLIMP, are you practicing the TM?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform and explain to other farmers about TM?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-3 Conservation Agriculture (grains)	Remark (Okau k., Ondobe, Omuthiya, Etayi) <u>Reason of Ripper Furrowing</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP, before and after N-CLIMP Training	Did you know how ripper furrowing functions?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes / <input type="checkbox"/> No
2. Practice of TM by Farmer before N-CLIMP	Did you practice ripper furrowing in your mahangu field?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Do you understand how ripper furrow functions?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	After N-CLIMP, are you going to continue to practice TM?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform other farmers of TM?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-4 Rice-Mahangu Mixed Cropping System (grains)	Remark (Etayi only) <u>Water level required for</u> <u>Transplanting Rice Seedlings</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Did you know how much depth of water is required for transplanting rice seedlings?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes / <input type="checkbox"/> No
2. Practice of TM by Farmer before N-CLIMP	Did you transplant rice seedlings?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to transplant rice seedlings?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	Are you practicing TM?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform other farmers of TM?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No

## Review of Technical Measures (Crops for Famers)

\_\_\_\_\_ Region, Constituency: \_\_\_\_\_,

Village: \_\_\_\_\_, Farmers' Name: \_\_\_\_\_

CR-5 Water Source / Water Harvesting (horticulture)	Remark (Okanata only) <u>Water Harvesting</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Can you estimate water harvesting from roof?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
2. Practice of TM by Farmer before N-CLIMP.	Do you have water harvesting system of roof catchment in your house?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to estimate water volume by roof catchment?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	Are you practicing "water harvesting from roof"?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform and explain to any other farmers about this TM ?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-6 Water Saving Cultivation (horticulture)	Remark (Epembe, Onayena, Etunda) <u>Drip Irrigation System</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Did you know what is drip irrigation system?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
2. Practice of TM by Farmer before N-CLIMP.	Did you install and use drip irrigation system in your field?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to use drip irrigation system?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	Did you grow vegetables using drip irrigation?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform and explain to other farmers about drip irrigation?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-7 Crop Selection (horticulture)	Remark (Epembe, Onayena, Etunda) <u>Selection of Vegetables to Grow</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Do you know how to select vegetables to grow?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
2. Practice of TM by Farmer	Did you select vegetables according to market survey?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to select vegetables?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	Did you selection crops to grow through market survey?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform and explained to other farmers about crop selection through market survey?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-8 Cropping Plan & Crop Management (horticulture)	Remark (Epembe, Onayena, Etunda) <u>Cropping Plan of Vegetables</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Did you know how to prepare cropping plan of vegetables?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
2. Practice of TM by Farmer before N-CLIMP	Did you prepare cropping plan of vegetables?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<del>-</del>
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to prepare cropping plan of vegetables?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers after N-CLIMP	Are you going to continue to practice TM?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform other farmers about preparation of cropping plan and conduct crop management?	<del>-</del>	<input type="checkbox"/> Yes / <input type="checkbox"/> No

TM: Technical Measures.

## Review of Technical Measures (Livestock)Farmer

Region: \_\_\_\_\_, ADC: \_\_\_\_\_, AT: \_\_\_\_\_

LS-1 Fodder Production	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know fodder production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>                    </del>
2. Having Experience of TM.	Did you produce fodder before TM training?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>                    </del>
3. Understanding of TM training by AT	Did you understand well concerning fodder production?	<del>                    </del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice fodder production by yourself?	<del>                    </del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is fodder production spreading to other farmers?	<del>                    </del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-2 Range management	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know range management before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>                    </del>
2. Having Experience of TM.	Did you have experience of range management?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>                    </del>
3. Understanding of TM training by AT	Did you understand well concerning Range management? : rotation, gathered grazing etc.,	<del>                    </del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice range management by yourself?	<del>                    </del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is range management spreading among other farmers?	<del>                    </del>	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-4 Nutritious food supply for chicken	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know nutritious foods for chicken before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you produce nutritious food for chicken before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Understanding of TM training by AT	Did you understand well concerning nutritious food for chicken?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you produce nutritious food for chicken by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is nutritious chicken food spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-5 Disease Control (Cattle)	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the importance of disease control of cattle before?  ① Vaccination. Parasite control, Powder On, Injection, etc.  ② Dehorning , Castration, Hoof trimming , Way to fix , etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>                    </del>
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<del>                    </del>
3. Understanding of TM training by AT	Did you understand well concerning disease control?	<del>                    </del>	<input type="checkbox"/> Yes <input type="checkbox"/> No



### Review of Technical Measures (Livestock)Farmer

4. Practice of TM by Farmers	Can you practice disease control by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is disease control spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-6 Large and small stock fattening	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know what elements needed for fattening? (Vitamins, minerals, licks, supplements etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you give such elements for cattle before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Understanding of TM training by AT	Did you understand well concerning large stock fattening?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice large stock fattening by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is large stock fattening spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-7 Periodical production	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the periodical production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you know how the reproductive cycle and seasonal cares of cattle is?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Understanding of TM training by AT	Did you understand well concerning periodical production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice periodical production by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is periodical production spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-11 Goat production	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know goat production and reproductive cycle before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you experience treatment and husbandry for goat before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Understanding of TM training by AT	Did you understand well concerning goat production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice goat production by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is goat production spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-13 Chicken production (indigenous)	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know what was important for chicken production before? : Nests for laying and hatching, disease control , vaccination , de-worming , feeding , kind of chicken(layer, broiler, dual purpose,	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

**Review of Technical Measures (Livestock)Farmer**

	indigenous ),,		
2. Having Experience of TM.	Did you have experience of indigenous chicken raising before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Understanding of TM training by AT	Did you understand well concerning chicken production?		<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice chicken production by yourself?		<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is chicken production spreading to other farmers?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>LS-5 Disease Control (Goat)</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know the importance of disease control of GOAT before? ① Vaccination. Parasite control, Powder On, Injection, etc. ② Castration, Hoof trimming , Way to fix , etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Understanding of TM training by AT	Did you understand well concerning disease control?		<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice disease control by yourself?		<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is disease control spreading to other farmers?		<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>LS-5 Disease Control (Chicken)</b>	<b>Remark</b>	<b>Before N-CLIMP</b>	<b>With N-CLIMP</b>
1. Already Aware of TM	Did you know the importance of disease control of chicken before? : Vaccination. Parasite control, Powder On, Injection, Spray , kind of medicine etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Understanding of TM training by AT	Did you understand well concerning disease control?		<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice disease control by yourself?		<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is disease control spreading to other farmers?		<input type="checkbox"/> Yes <input type="checkbox"/> No

## Review of Technical Measures (Farm Management)

Region: \_\_\_\_\_, ADC: \_\_\_\_\_, Farmers: \_\_\_\_\_

FM-2 Record Keeping	Remark: Farm Record for Planning	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of Record Keeping?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you use records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers on the use of records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers use records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that the use of records for planning of farming gain better ways of farming by other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-5 Group Formation / Group Strengthening	Remark: Regular meeting, agreement on rules	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of Group Strengthening?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work with other farmers / people through agreement go rules?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers the ways of agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers work for agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that other farmers gained better ways of farming through agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-6 Group Account Management	Remark: Transparency & Accountability	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of needs of Group Account Management?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you use account book for planning and reporting to other farmers and people?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers on the use an account book for planning and reporting to farmers for collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers use an account book for planning and reporting for collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that the use of an account book for planning and reporting to other farmers make transparency and accountability?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Farm Management)

FM-8 Collective Selling / Purchasing	Remark:	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work with other farmers / people through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers the ways of agreement on rules through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers work through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that other farmers gained better ways of farming through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-10 Market Information Access Improvement	Remark: Market Survey, Grading, and Auction System	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefit of market surveys or other ways of improvement of market information access?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers the ways of using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers work through using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that other farmers gained better ways of farming using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

*Attachment 5-4*

*Results of Questionnaire Survey for*

*Farmers*

*N-CLIMP*

**Attachment 5-4-1 Summary Table: Respondents of Questionnaire Survey (Farmers)**

**Attachment 5-4-1-1 Summary Table: Respondents of Questionnaire Survey by Category of Pilot Sites and by Region**

Region	Omusati	Oshana	Oshikoto	Ohangwena	Sub-Total by Category
Cereal Grain	5	12	6	19	42
Horticulture	13	9	7	9	38
Large Stock (Cattle)	3	6	12	12	33
Small Stock (Chicken)	8	6	5	N/A	19
Small Stock (Goat)	N/A	N/A	N/A	12	12
Sub-Total by Region	29	33	30	52	144

*Source: The Study Team*

*Note: The used questionnaire sheets can be found in Attachment 5-3.*

**Attachment 5-4-1-2 Summary Table: Respondents of Questionnaire Survey by Category of Pilot Sites for each Question**

**(1) Cereal Grain Pilot Sites**

Region	Omusati	Oshana	Oshikoto	Ohangwena	Sub-Total
Cereal Grain Pilot Site Sub-Total	5	12	6	19	42
CR-1/2: Grain Fertilizer Application	5	12	6	19	42
CR-3: Conservation Agriculture Culture	5	12	6	19	42
CR-4: Grain Rice-Mahangu	5				5
FM-2: Farm Record	5	12	6	19	42
FM-5: Group Formation / Strengthening	5	12	6	19	42
FM-6: Group Account Management	5			19	24
FM-8: Collective Selling /Purchasing	5	12		19	36
FM-10: Market Information Access Improvement	5	12		19	36

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

**(2) Horticulture Pilot Sites**

Region	Omusati	Oshana	Oshikoto	Ohangwena	Sub-Total
Horticulture Pilot Site Sub-Total	13	9	7	9	38
CR-5: Water Harvesting		9		9	18
CR-6: Drip Irrigation	13	9	7	9	38
CR-7: Crop Selection	13	9	7	9	38
CR-8: Cropping Plan/ Crop Management	13	9	7	9	38
FM-2: Farm Record	13	9	7	9	38
FM-5: Group Formation / Strengthening	13	9		9	31
FM-6: Group Account Management	13	9		9	31
FM-8: Collective Selling /Purchasing	13	9		9	31
FM-10: Market Information Access Improvement	13	9	7	9	38

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

### (3) Large Stock (Cattle) Pilot Sites

Region	Omusati	Oshana	Oshikoto	Ohangwena	Sub-Total
Large Stock (Cattle) Pilot Site Sub-Total	3	6	12	12	33
LS-1: Fodder Production	3	6	12	12	33
LS-2: Range Management	3	6	12	12	33
LS-5: Disease Control (Cattle)	3	6	12	12	33
LS-6: Fattening	3		12		15
LS-7: Periodical Production	3		12		15
FM-2: Farm Record	3	6	12	12	33
FM-5: Group Formation / Strengthening	3	6		12	21
FM-10: Market Information Access Improvement	3	6		12	21

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

There was no pilot site where farmers answered questions on FM 6: Group Account Management and FM 8: Collective Selling / Purchasing.

### (4) Small Stock (Chicken) Pilot Sites

Region	Omusati	Oshana	Oshikoto	Ohangwena	Sub-Total
Small Stock (Chicken) Pilot Site Sub-Total	8	6	5	N/A	19
LS-4: Nutritious Feed Supply	8	6	5		19
LS-13: Chiken Production	8	6	5		19
LS-5: Disease Control (Chicken)		6	5		11
FM-2: Farm Record	8	6	5		19
FM-5: Group Formation / Strengthening	8	6	5		19
FM-6: Group Account Management			5		5
FM-8: Collective Selling /Purchasing	8		5		13
FM-10: Market Information Access Improvement		6			6

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.



**(5) Small Stock (Goat) Pilot Sites**

Region	Omusati	Oshana	Oshikoto	Ohangwena	Sub-Total
Large Stock (Cattle) Pilot Site Sub-Total	N/A	N/A	17	12	29
LS-1: Fodder Production			17	12	29
LS-5: Disease Control (Goat)			17		17
LS-11: Goat Production				12	12
FM-2: Farm Record				12	12
FM-10: Market Information Access Improvement				12	12

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

There was no pilot site where farmers answered questions on FM 5: Group Formation/ Strengthening, FM 6: Group Account Management and FM 8: Collective Selling / Purchasing.

**Attachment 5-4-1-3 Summary Table: Respondents of Questionnaire Survey by Category of Pilot Sites for Farm Management Questions**

Region	Cereal Grain	Horticulture	Cattle	Chicken	Goat	Total
Total Number of Respondents	42	38	33	19	29	161
FM-2: Farm Record	42	38	33	19	12	144
FM-5: Group Formation / Strengthening	42	31	21	19	0	113
FM-6: Group Account Management	24	31	0	5	0	60
FM-8: Collective Selling /Purchasing	36	31	0	13	0	80
FM-10: Market Information Access Improvement	36	38	21	6	12	113

*Source: The Study Team*

*Note: The used questionnaire sheets can be found in Attachment 5-3.*

**Attachment 5-4-2 Results of Questionnaire Survey for Farmers: Summary Table by Category of Pilot Sites**

**Attachment 5-4-2-1 Table of Results of Questionnaire Survey for Farmers in Cereal Grain Pilot Sites**

**(1) Crop Production Technical Measures**

	Elayi (Omusati Region) Total						Okau-K (Oshana Region) Total						Omuthiya (Oshikoto Region) Total						Ondobe (Ohangwena Region) Total						Grain (All 4 Regions) Total						Valid Response			All 4 Regions					
	Grain n= 5						Grain n= 12						Grain n= 6						Grain n= 19						Grain n= 42						Total			Percentage against Valid Responses					
	Before			After			Before			After			Before			After			Before			After			Number	Percentage		Before			After								
	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A		Yes	No	N/A	Yes	No	N/A								
CR-1/2	1	4	1	0	5	0	0	11	0	1	10	0	2	3	3	0	4	1	1	10	6	3	12	4	3	28	10	4	31	5	6	42	90.5	66.7	23.8	9.5			
Grains	2	4	1	0				11	1	0				4	2	0				10	4	5				29	8	5				42	88.1	69.0	19.0	11.9			
Fertilizer App.	3				5	0	0				12	0	0				6	0	0				14	2	3				37	2	3	42		92.9			88.1	4.8	7.1
	4				4	1	0				12	0	0				6	0	0				14	2	3				36	3	3	42		92.9			85.7	7.1	7.1
	5				5	0	0				12	0	0				6	0	0				13	3	3				36	3	3	42		92.9			85.7	7.1	7.1
CR-3	1	3	2	0	5	0	0	5	6	1	11	1	0	1	5	0	5	0	1	6	10	3	13	2	4	15	23	4	34	3	5	42	90.5	35.7	54.8	9.5			
Grains	2	5	0	0				7	4	1				2	4	0				7	7	5				21	15	6				42	85.7	50.0	35.7	14.3			
Consavation Agr.	3				5	0	0				12	0	0				5	1	0				10	6	3				32	7	3	42		92.9			76.2	16.7	7.1
	4				5	0	0				12	0	0				6	0	0				12	4	3				35	4	3	42		92.9			83.3	9.5	7.1
	5				5	0	0				12	0	0				4	2	0				11	5	3				32	7	3	42		92.9			76.2	16.7	7.1
CR-4	1	0	5	0	5	0	0																			0	5	0	5	0	0	5	100.0	0.0	100.0	0.0			
Grains	2	5	0	0																						5	0	0				5	100.0	100.0	0.0	0.0			
Rice-Mahangu	3				5	0	0																						5	0	0	5	100.0				100.0	0.0	0.0
	4				5	0	0																						5	0	0	5	100.0				100.0	0.0	0.0
	5				5	0	0																						5	0	0	5	100.0				100.0	0.0	0.0

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

**(2) Farm Management Technical Measures**

		Etayi (Omusati Region) Total						Okau-K (Oshana Region) Total						Omuthiya (Oshikoto Region) Total						Ondobe (Ohangwena Region) Total						Grain (All 4 Regions) Total						Valid Response			All 4 Regions						
		Grain n= 5						Grain n= 12						Grain n= 6						Grain n= 19						Grain n= 42						Total			Percentage against Valid Responses						
		Before			After			Before			After			Before			After			Before			After			Number	Percentage		Before			After									
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A		Yes	No	N/A	Yes	No	N/A									
FM-2	1	1	4	0	5	0	0	5	7	0	10	1	1	0	6	0	4	2	0	6	10	3	14	2	3	12	27	3	33	5	4	42	92.9	90.5	28.6	64.3	7.1	78.6	11.9	9.5	
Record Keeping	2	2	3	0	5	0	0	4	8	0	11	0	1	1	4	1	5	0	1	6	10	3	15	1	3	13	25	4	36	1	5	42	90.5	88.1	31.0	59.5	9.5	85.7	2.4	11.9	
	3	1	4	0	5	0	0	5	7	0	11	1	0	1	5	0	5	1	0	7	9	3	16	0	3	14	25	3	37	2	3	42	92.9	92.9	33.3	59.5	7.1	88.1	4.8	7.1	
	4	1	4	0	5	0	0	5	7	0	11	0	1	0	6	0	2	4	0	8	8	3	16	0	3	14	25	3	34	4	4	42	92.9	90.5	33.3	59.5	7.1	81.0	9.5	9.5	
	5	2	3	0	5	0	0	5	6	1	11	0	1	1	2	4	0	4	1	1	8	8	3	16	0	3	17	21	4	36	1	5	42	90.5	88.1	40.5	50.0	9.5	85.7	2.4	11.9
FM-5	1	5	0	0	5	0	0	4	6	2	10	0	2	1	5	0	4	2	0	8	8	3	16	0	3	18	19	5	35	2	5	42	88.1	88.1	42.9	45.2	11.9	83.3	4.8	11.9	
Group Formation	2	5	0	0	5	0	0	2	8	2	9	0	3	2	4	0	4	2	0	8	8	3	16	0	3	17	20	5	34	2	6	42	88.1	85.7	40.5	47.6	11.9	81.0	4.8	14.3	
Group Strengthening	3	5	0	0	5	0	0	2	8	2	10	0	2	0	6	0	4	2	0	7	9	3	16	0	3	14	23	5	35	2	5	42	88.1	88.1	33.3	54.8	11.9	83.3	4.8	11.9	
	4	5	0	0	5	0	0	4	6	2	9	0	3	3	3	0	6	0	0	7	9	3	16	0	3	19	18	5	36	0	6	42	88.1	85.7	45.2	42.9	11.9	85.7	0.0	14.3	
	5	5	0	0	5	0	0	4	5	3	9	0	3	2	4	0	6	0	0	7	9	3	16	0	3	18	18	6	36	0	6	42	85.7	85.7	42.9	42.9	14.3	85.7	0.0	14.3	
FM-6	1	5	0	0	5	0	0													7	9	3	16	0	3	12	9	3	21	0	3	24	92.9	92.9	50.0	37.5	12.5	87.5	0.0	12.5	
Group Acct.	2	5	0	0	5	0	0													7	9	3	16	0	3	12	9	3	21	0	3	24	92.9	92.9	50.0	37.5	12.5	87.5	0.0	12.5	
	3	5	0	0	5	0	0													7	9	3	16	0	3	12	9	3	21	0	3	24	92.9	92.9	50.0	37.5	12.5	87.5	0.0	12.5	
	4	5	0	0	5	0	0													7	9	3	16	0	3	12	9	3	21	0	3	24	92.9	92.9	50.0	37.5	12.5	87.5	0.0	12.5	
	5	5	0	0	5	0	0													7	9	3	16	0	3	12	9	3	21	0	3	24	92.9	92.9	50.0	37.5	12.5	87.5	0.0	12.5	
FM-8	1	5	0	0	5	0	0	6	5	1	10	0	2							7	9	3	16	0	3	18	14	4	31	0	5	36	90.5	88.1	50.0	38.9	11.1	86.1	0.0	13.9	
Collective Sales	2	5	0	0	5	0	0	6	5	1	10	0	2							7	9	3	16	0	3	18	14	4	31	0	5	36	90.5	88.1	50.0	38.9	11.1	86.1	0.0	13.9	
Collective Purchasing	3	5	0	0	5	0	0	4	6	2	10	0	2							7	9	3	16	0	3	16	15	5	31	0	5	36	88.1	88.1	44.4	41.7	13.9	86.1	0.0	13.9	
	4	5	0	0	5	0	0	6	4	2	10	0	2							7	9	3	16	0	3	18	13	5	31	0	5	36	88.1	88.1	50.0	36.1	13.9	86.1	0.0	13.9	
	5	5	0	0	5	0	0	6	4	2	10	0	2							7	9	3	16	0	3	18	13	5	31	0	5	36	88.1	88.1	50.0	36.1	13.9	86.1	0.0	13.9	
FM-10	1	4	1	0	4	1	0	9	3	0	10	1	1							7	9	3	16	0	3	20	13	3	30	2	4	36	92.9	90.5	55.6	36.1	8.3	83.3	5.6	11.1	
Market Info. Access Im	2	5	0	0	5	0	0	8	4	0	10	2	0							7	9	3	16	0	3	20	13	3	31	2	3	36	92.9	92.9	55.6	36.1	8.3	86.1	5.6	8.3	
	3	5	0	0	5	0	0	8	4	0	11	1	0							7	9	3	16	0	3	20	13	3	32	1	3	36	92.9	92.9	55.6	36.1	8.3	88.9	2.8	8.3	
	4	5	0	0	5	0	0	7	5	0	11	1	0							7	9	3	16	0	3	19	14	3	32	1	3	36	92.9	92.9	52.8	38.9	8.3	88.9	2.8	8.3	
	5	5	0	0	5	0	0	7	5	0	11	1	0							7	9	3	16	0	3	19	14	3	32	1	3	36	92.9	92.9	52.8	38.9	8.3	88.9	2.8	8.3	

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

**Attachment 5-4-2-2 Table of Results of Questionnaire Survey for Farmers in Horticulture pilot sites**

**(1) Crop Production Technical Measures**

	Elunda (Omusati Region) Total						Okatana (Oshana Region) Total						Onyena (Oshikoto Region) Total						Epenbe (Ohangwena Region) Total						Horticulture (All 4 Regions) Total						Valid Response			All 4 Regions						
	Horticulture n= 13						Horticulture n= 9						Horticulture n= 7						Horticulture n= 9						Horticulture n= 38						Horticulture Total			Percentage against Valid Responses						
	Before			After			Before			After			Before			After			Before			After			Number	Percentage		Before			After									
	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A		%	%	%	%	%	%									
CR-5	1						8	1	0									7	1	1					15	2	1			18	97.4		83.3	11.1	5.6					
Horticulture	2						8	1	0									5	2	2					13	3	2			18	94.7		72.2	16.7	11.1					
Water Harvesting	3									8	1	0									7	1	1			15	2	1			18	97.4					83.3	11.1	5.6	
	4									8	1	0									6	2	1				14	3	1			18	97.4					77.8	16.7	5.6
	5									8	1	0									5	3	1				13	4	1			18	97.4					72.2	22.2	5.6
CR-6	1	3	9	1			6	3	0				0	7	0			9	0	0					18	19	1			38	97.4		47.4	50.0	2.6					
Horticulture	2	2	11	0			0	9	0				0	7	0			5	4	0					7	31	0			38	100.0		18.4	81.6	0.0					
Drip Irrigation	3				12	1	0			5	4	0			7	0	0				8	1	0			32	6	0			38	100.0					84.2	15.8	0.0	
	4				9	4	0			5	4	0			7	0	0				7	2	0			28	10	0			38	100.0					73.7	26.3	0.0	
	5				11	2	0			6	3	0			7	0	0				5	4	0			29	9	0			38	100.0					76.3	23.7	0.0	
CR-7	1	10	3	0			9	0	0				0	7	0			8	0	1					27	10	1			38	97.4		71.1	26.3	2.6					
Horticulture	2	7	6	0			8	0	1				0	7	0			6	2	1					21	15	2			38	94.7		55.3	39.5	5.3					
Crop Selection	3				12	1	0			9	0	0			7	0	0				9	0	0				37	1	0			38	100.0					97.4	2.6	0.0
	4				12	1	0			9	0	0			7	0	0				9	0	0				37	1	0			38	100.0					97.4	2.6	0.0
	5				11	1	1			9	0	0			7	0	0				6	3	0				33	4	1			38	97.4					86.8	10.5	2.6
CR-8	1	10	2	1			8	1	0				0	7	0			0	9	0					18	19	1			38	97.4		47.4	50.0	2.6					
Horticulture	2	11	1	1			9	0	0				0	7	0			9	0	0					29	8	1			38	97.4		76.3	21.1	2.6					
Cropping Plan	3				10	1	2			9	0	0			7	0	0				9	0	0				35	1	2			38	94.7					92.1	2.6	5.3
Crop Management	4				10	1	2			9	0	0			7	0	0				9	0	0				35	1	2			38	94.7					92.1	2.6	5.3
	5				9	1	3			7	2	0			7	0	0				6	3	0				29	6	3			38	92.1					76.3	15.8	7.9

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

**(2) Farm Management Technical Measures**

	Etunda (Omusati Region) Total						Okatana (Oshana Region) Total						Onyena (Oshikoto Region) Total						Eperembe (Oshana Region) Total						Horticulture (All 4 Regions) Total						Valid Response			All 4 Regions						
	Horticulture n= 13						Horticulture n= 9						Horticulture n= 7						Horticulture n= 9						Horticulture n= 38						Horticulture Total			Percentage against Valid Responses						
	Before			After			Before			After			Before			After			Before			After			Number	Percentage		Before			After									
	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	%		%	Yes	No	N/A	Yes	No	N/A								
FM-2	1	12	1	0	13	0	0	6	2	1	4	5	0	1	6	0	6	0	1	4	2	3	8	1	0	23	11	4	31	6	1	38	89.5	97.4	60.5	28.9	10.5	81.6	15.8	2.6
Record Keeping	2	10	3	0	13	0	0	7	2	0	4	5	0	1	6	0	6	0	1	6	3	0	8	0	1	24	14	0	31	5	2	38	100.0	94.7	63.2	36.8	0.0	81.6	13.2	5.3
	3	10	3	0	13	0	0	6	2	1	8	1	0	1	6	0	6	0	1	2	4	3	7	2	0	19	15	4	34	3	1	38	89.5	97.4	50.0	39.5	10.5	89.5	7.9	2.6
	4	11	2	0	13	0	0	5	3	1	8	1	0	3	4	0	6	0	1	0	6	3	6	3	0	19	15	4	33	4	1	38	89.5	97.4	50.0	39.5	10.5	86.8	10.5	2.6
	5	12	1	0	13	0	0	8	1	0	8	1	0	3	4	0	6	0	1	4	3	2	8	0	1	27	9	2	35	1	2	38	94.7	94.7	71.1	23.7	5.3	92.1	2.6	5.3
FM-5	1	12	1	0	13	0	0	8	0	1	7	2	0							5	3	1	7	0	2	25	4	2	27	2	2	31	94.7	94.7	80.6	12.9	6.5	87.1	6.5	6.5
Group Formation	2	12	1	0	13	0	0	7	1	1	6	3	0							4	2	3	7	0	2	23	4	4	26	3	2	31	89.5	94.7	74.2	12.9	12.9	83.9	9.7	6.5
Group Strengthening	3	12	1	0	13	0	0	7	1	1	5	4	0							4	2	3	9	0	0	23	4	4	27	4	0	31	89.5	100.0	74.2	12.9	12.9	87.1	12.9	0.0
	4	12	1	0	13	0	0	6	2	1	7	2	0							6	1	2	8	0	1	24	4	3	28	2	1	31	92.1	97.4	77.4	12.9	9.7	90.3	6.5	3.2
	5	12	1	0	13	0	0	6	2	1	8	1	0							5	2	2	8	0	1	23	5	3	29	1	1	31	92.1	97.4	74.2	16.1	9.7	93.5	3.2	3.2
FM-6	1	12	1	0	13	0	0	6	3	0	5	4	0							5	2	2	7	0	2	23	6	2	25	4	2	31	94.7	94.7	74.2	19.4	6.5	80.6	12.9	6.5
Group Acct.	2	11	2	0	12	1	0	5	4	0	6	3	0							2	3	4	8	1	0	18	9	4	26	5	0	31	89.5	100.0	58.1	29.0	12.9	83.9	16.1	0.0
	3	11	2	0	12	1	0	6	3	0	8	1	0							2	5	2	5	2	2	19	10	2	25	4	2	31	94.7	94.7	61.3	32.3	6.5	80.6	12.9	6.5
	4	11	2	0	12	1	0	6	2	1	7	2	0							3	4	2	5	1	3	20	8	3	24	4	3	31	92.1	92.1	64.5	25.8	9.7	77.4	12.9	9.7
	5	12	1	0	13	0	0	7	2	0	8	1	0							4	3	2	7	0	2	23	6	2	28	1	2	31	94.7	94.7	74.2	19.4	6.5	90.3	3.2	6.5
FM-8	1	12	1	0	13	0	0	8	1	0	6	3	0							5	2	2	6	0	3	25	4	2	25	3	3	31	94.7	92.1	80.6	12.9	6.5	80.6	9.7	9.7
Collective Sales	2	12	1	0	13	0	0	8	1	0	7	2	0							2	3	4	7	1	1	22	5	4	27	3	1	31	89.5	97.4	71.0	16.1	12.9	87.1	9.7	3.2
Collective Purchasing	3	12	1	0	13	0	0	8	1	0	6	3	0							3	3	3	7	1	1	23	5	3	26	4	1	31	92.1	97.4	74.2	16.1	9.7	83.9	12.9	3.2
	4	11	2	0	12	1	0	8	1	0	7	2	0							4	3	2	7	0	2	23	6	2	26	3	2	31	94.7	94.7	74.2	19.4	6.5	83.9	9.7	6.5
	5	12	1	0	13	0	0	8	1	0	6	3	0							4	3	2	7	0	2	24	5	2	26	3	2	31	94.7	94.7	77.4	16.1	6.5	83.9	9.7	6.5
FM-10	1	12	1	0	13	0	0	7	2	0	7	1	1	3	4	0	7	0	0	3	3	3	8	0	1	25	10	3	35	1	2	38	92.1	94.7	65.8	26.3	7.9	92.1	2.6	5.3
Market Info. Access Im	2	11	2	0	12	1	0	5	4	0	5	4	0	2	5	0	7	0	0	5	2	2	7	0	2	23	13	2	31	5	2	38	94.7	94.7	60.5	34.2	5.3	81.6	13.2	5.3
	3	12	1	0	13	0	0	6	3	0	6	3	0	3	4	0	6	1	0	3	2	4	6	0	3	24	10	4	31	4	3	38	89.5	92.1	63.2	26.3	10.5	81.6	10.5	7.9
	4	12	1	0	13	0	0	7	2	0	7	2	0	1	6	0	7	0	0	4	3	2	6	0	3	24	12	2	33	2	3	38	94.7	92.1	63.2	31.6	5.3	86.8	5.3	7.9
	5	12	1	0	13	0	0	6	3	0	8	1	0	1	6	0	6	1	0	4	3	2	6	0	3	23	13	2	33	2	3	38	94.7	92.1	60.5	34.2	5.3	86.8	5.3	7.9

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

**Attachment 5-4-2-3 Table of Results of Questionnaire Survey for Farmers in Large Stock (Cattle) pilot sites**

**(1) Livestock Production Technical Measures**

		Okahao (Orrusati Region) Total						Okahao (Oshana Region) Total						Orruntele (Oshikoto Region) Total						Okongo (Changwenya Region) Total						Cattle (All 4 Regions) Total						Valid Response			All 4 Region					
		Cattle n= 3						Cattle n= 6						Cattle n= 12						Cattle n= 12						Total n= 33						Cattle Total			Percentage against Valid Responses					
		Before			After			Before			After			Before			After			Before			After			Number	Percentage		Before			After								
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A		Before	After	%	%	Yes	No	N/A	Yes	No	N/A				
LS-1 Fodder Production	1	2	1	0			0	4	2			6	6	0			0	12	0			8	23	2			33	93.9		24.2	69.7	6.1								
	2	0	3	0			0	4	2			5	7	0			0	12	0			5	26	2			33	93.9		15.2	78.8	6.1								
	3				3	0	0				4	0	2				9	3	0				12	0	0	33		93.9				84.8	9.1	6.1						
	4				1	2	0				4	0	2				12	0	0				12	0	0	33		93.9				87.9	6.1	6.1						
	5				0	3	0				4	0	2				10	1	1				11	0	1	33		87.9				75.8	12.1	12.1						
LS-2 Range Management	1	2	1	0			0	4	2			10	1	1			2	9	1			14	15	4			33	87.9		42.4	45.5	12.1								
	2	1	2	0			0	4	2			10	2	0			2	9	1			13	17	3			33	90.9		39.4	51.5	9.1								
	3				3	0	0				4	0	2				11	1	0				12	0	0	33		93.9				90.9	3.0	6.1						
	4				2	1	0				4	0	2				10	2	0				12	0	0	33		93.9				84.8	9.1	6.1						
	5				1	1	1				4	0	2				8	2	2				11	0	1	33		81.8				72.7	9.1	18.2						
LS-5 Disease Control Cattle	1	0	2	1			1	1	4			5	6	1			2	10	0			8	19	6			33	81.8		24.2	57.6	18.2								
	2	0	2	1			1	1	4			5	7	0			0	10	2			6	20	7			33	78.8		18.2	60.6	21.2								
	3				2	0	1				2	0	4				11	0	1				12	0	0	33		81.8				81.8	0.0	18.2						
	4				2	0	1				2	0	4				12	0	0				12	0	0	33		84.8				84.8	0.0	15.2						
	5				2	0	1				2	0	4				10	2	0				12	0	0	33		84.8				78.8	6.1	15.2						
LS-6 Fattening	1	1	2	0								6	6	0								7	8	0			15	100.0		46.7	53.3	0.0								
	2	1	2	0								4	8	0								5	10	0			15	100.0		33.3	66.7	0.0								
	3				3	0	0									12	0	0							15		100.0				100.0	0.0	0.0							
	4				3	0	0									11	1	0							15		100.0				93.3	6.7	0.0							
	5				3	0	0									9	1	2							15		93.9				80.0	6.7	13.3							
LS-7 Periodical Production	1	2	1	0								7	4	1								9	5	1			15	97.0		60.0	33.3	6.7								
	2	0	2	1								4	7	1								4	9	2			15	93.9		26.7	60.0	13.3								
	3				3	0	0									11	1	0							15		100.0				93.3	6.7	0.0							
	4				2	0	1									11	1	0							15		97.0				86.7	6.7	6.7							
	5				0	2	1									10	2	0							15		97.0				66.7	26.7	6.7							

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

## (2) Farm Management Technical Measures

		Okahao (Omusati Region) Total						Okahao (Oshana Region) Total						Oruntele (Oshikoto Region) Total						Okongo (Changwena Region) Total						Cattle (All 4 Regions) Total						Valid Response			All 4 Region					
		Cattle n= 3						Cattle n= 6						Cattle n= 12						Cattle n= 12						Total n= 33						Cattle Total			Percentage against Valid Responses					
		Before			After			Before			After			Before			After			Before			After			Number	Percentage		Before			After								
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A		Before	After	%	%	%	%	%	%	%	%				
FM-2 Record Keeping	1	0	3	0	3	0	0	0	6	0	5	0	1	3	0	9	3	0	9	1	8	3	10	0	2	4	17	12	21	0	12	33	63.6	63.6	12.1	51.5	36.4	63.6	0.0	36.4
	2	0	3	0	3	0	0	2	4	0	5	0	1	3	0	9	3	0	9	0	10	2	10	0	2	5	17	11	21	0	12	33	66.7	63.6	15.2	51.5	33.3	63.6	0.0	36.4
	3	0	3	0	1	2	0	4	2	0	5	0	1	2	1	9	2	1	9	0	10	2	10	0	2	6	16	11	18	3	12	33	66.7	63.6	18.2	48.5	33.3	54.5	9.1	36.4
	4	0	3	0	2	1	0	3	2	1	5	0	1	1	1	10	3	0	9	0	10	2	10	0	2	4	16	13	20	1	12	33	60.6	63.6	12.1	48.5	39.4	60.6	3.0	36.4
	5	1	2	0	3	0	0	3	2	1	3	0	3	1	1	10	3	0	9	0	10	2	10	0	2	5	15	13	19	0	14	33	60.6	57.6	15.2	45.5	39.4	57.6	0.0	42.4
FM-5 Group Formation Group Strengthening	1	1	2	0	3	0	0	4	2	0	5	0	1							3	7	2	10	0	2	8	11	2	18	0	3	21	93.9	90.9	38.1	52.4	9.5	85.7	0.0	14.3
	2	1	2	0	3	0	0	4	2	0	5	0	1							0	10	2	10	0	2	5	14	2	18	0	3	21	93.9	90.9	23.8	66.7	9.5	85.7	0.0	14.3
	3	1	2	0	3	0	0	4	2	0	5	0	1							1	9	2	10	0	2	6	13	2	18	0	3	21	93.9	90.9	28.6	61.9	9.5	85.7	0.0	14.3
	4	1	2	0	3	0	0	3	3	0	6	0	0													4	5	0	9	0	0	9	100.0	100.0	44.4	55.6	0.0	100.0	0.0	0.0
	5	1	1	1	3	0	0	2	2	2	5	0	1													3	3	3	8	0	1	9	90.9	97.0	33.3	33.3	33.3	88.9	0.0	11.1
FM-10 Market Info. Access Im	1	1	0	2	1	0	2	1	3	2	4	0	2							0	12	0	12	0	0	2	15	4	17	0	4	21	87.9	87.9	9.5	71.4	19.0	81.0	0.0	19.0
	2	1	0	2	1	0	2	1	3	2	4	0	2							1	11	0	11	0	1	3	14	4	16	0	5	21	87.9	84.8	14.3	66.7	19.0	76.2	0.0	23.8
	3	1	0	2	1	0	2	1	3	2	4	0	2							0	12	0	11	0	1	2	15	4	16	0	5	21	87.9	84.8	9.5	71.4	19.0	76.2	0.0	23.8
	4	0	1	2	0	1	2	1	3	2	4	0	2													1	4	4	4	1	4	9	87.9	87.9	11.1	44.4	44.4	44.4	11.1	44.4
	5	1	0	2	1	0	2	1	3	2	4	0	2													2	3	4	5	0	4	9	87.9	87.9	22.2	33.3	44.4	55.6	0.0	44.4

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

There was no pilot site where farmers answered questions on FM 6: Group Account Management and FM 8: Collective Selling / Purchasing.



**Attachment 5-4-2-4 Table of Results of Questionnaire Survey for Farmers in Small Stock (Chicken) pilot sites**

**(1) Livestock Production Technical Measures**

		Tsandi (Omusati Region) Total						Uukwiyu (Oshana Region) Total						Onyaanya (Oshikoto Region) Total						Chicken (3 Regions) Total						Valid Response			3 Regions								
		Chicken n= 8						Chicken n= 6						Chicken n= 5						Chicken n= 19						Chicken Total			Percentage against Valid Responses								
		Before			After			Before			After			Before			After			Before			After			Before			After								
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A
LS-4	1	0	6	2				4	2	0				0	4	1				4	12	3				19	84.2		21.1	63.2	15.8						
Nutritious Feed Suppl	2	0	6	2				4	2	0				0	4	1				4	12	3				19	84.2		21.1	63.2	15.8						
	3				8	0	0				4	0	2				4	0	1				16	0	3	19		84.2				84.2	0.0	15.8			
	4				8	0	0										5	0	0				13	0	0	13		100.0				100.0	0.0	0.0			
	5				8	0	0										3	1	1				11	1	1	13		94.7				84.6	7.7	7.7			
LS-13	1	7	1	0				4	1	1				3	2	0				14	4	1				19	94.7		73.7	21.1	5.3						
Chiken Production	2	2	6	0				5	0	1				1	4	0				8	10	1				19	94.7		42.1	52.6	5.3						
	3				7	1	0				5	0	1				5	0	0				17	1	1	19		94.7				89.5	5.3	5.3			
	4				7	1	0				5	0	1				5	0	0				17	1	1	19		94.7				89.5	5.3	5.3			
	5				6	1	1				4	0	2				0	0	5				10	1	8	19		57.9				52.6	5.3	42.1			
LS-5	1							5	1	0				0	5	0				5	6	0				11	100.0		45.5	54.5	0.0						
Disease Control	2							5	1	0				0	5	0				5	6	0				11	100.0		45.5	54.5	0.0						
Chicken	3										6	0	0				5	0	0				11	0	0	11		100.0				100.0	0.0	0.0			
	4										6	0	0				5	0	0				11	0	0	11		100.0				100.0	0.0	0.0			
	5							6	0	0				5	0	0				11	0	0				11		100.0				100.0	0.0	0.0			

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

## (2) Farm Management Technical Measures

	Tsandi (Omusati Region) Total							Uukwiyu (Oshana Region) Total							Onyaanya (Oshikoto Region) Total							Chicken (3 Regions) Total							Valid Response			3 Regions						
	Chicken n= 8							Chicken n= 6							Chicken n= 5							Chicken n= 19							Chicken Total			Percentage against Valid Responses						
	Before			After				Before			After				Before			After				Before			After				Before			After						
	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Number	Percentage		Yes	No	N/A	Yes	No	N/A		
																												Before	After	%	%	%	%	%	%			
FM-2	1	1	6	1	8	0	0	6	0	0	5	0	1	0	5	0	5	0	0	7	11	1	18	0	1	19	94.7	94.7	36.8	57.9	5.3	94.7	0.0	5.3				
Record Keeping	2	1	7	0	7	0	1	6	0	0	6	0	0	1	4	0	5	0	0	8	11	0	18	0	1	19	100.0	94.7	42.1	57.9	0.0	94.7	0.0	5.3				
	3	3	5	0	7	0	1	4	1	1	5	0	1	3	2	0	5	0	0	10	8	1	17	0	2	19	94.7	89.5	52.6	42.1	5.3	89.5	0.0	10.5				
	4	1	7	0	6	1	1	5	0	1	5	0	1	1	4	0	5	0	0	7	11	1	16	1	2	19	94.7	89.5	36.8	57.9	5.3	84.2	5.3	10.5				
	5	1	7	0	6	1	1	5	0	1	5	0	1	3	2	0	5	0	0	9	9	1	16	1	2	19	94.7	89.5	47.4	47.4	5.3	84.2	5.3	10.5				
FM-5	1	2	6	0	6	1	1	2	4	0	4	1	1	0	5	0	4	1	0	4	15	0	14	3	2	19	100.0	89.5	21.1	78.9	0.0	73.7	15.8	10.5				
Group Formation	2	3	5	0	6	1	1	4	2	0	4	1	1	1	4	0	5	0	0	8	11	0	15	2	2	19	100.0	89.5	42.1	57.9	0.0	78.9	10.5	10.5				
Group Strengthening	3	1	6	1	6	0	2	3	3	0	5	0	1	1	4	0	4	1	0	5	13	1	15	1	3	19	94.7	84.2	26.3	68.4	5.3	78.9	5.3	15.8				
	4	1	6	1	7	0	1											4	1	0	5	0	0	5	7	1	12	0	1	13	94.7	94.7	38.5	53.8	7.7	92.3	0.0	7.7
	5	2	5	1	7	0	1											3	2	0	5	0	0	5	7	1	12	0	1	13	94.7	94.7	38.5	53.8	7.7	92.3	0.0	7.7
FM-6	1																	1	4	0	5	0	0	1	4	0	5	0	0	5	100.0	100.0	20.0	80.0	0.0	100.0	0.0	0.0
Group Acct.	2																	1	4	0	3	2	0	1	4	0	3	2	0	5	100.0	100.0	20.0	80.0	0.0	60.0	40.0	0.0
	3																	2	3	0	4	1	0	2	3	0	4	1	0	5	100.0	100.0	40.0	60.0	0.0	80.0	20.0	0.0
	4																	3	2	0	4	1	0	3	2	0	4	1	0	5	100.0	100.0	60.0	40.0	0.0	80.0	20.0	0.0
	5																	3	2	0	5	0	0	3	2	0	5	0	0	5	100.0	100.0	60.0	40.0	0.0	100.0	0.0	0.0
FM-8	1	0	5	3	4	0	4										3	2	0	5	0	0	3	7	3	9	0	4	13	84.2	78.9	23.1	53.8	23.1	69.2	0.0	30.8	
Collective Sales	2	1	5	2	5	0	3										2	3	0	5	0	0	3	8	2	10	0	3	13	89.5	84.2	23.1	61.5	15.4	76.9	0.0	23.1	
Collective Purchasing	3	1	5	2	5	0	3										1	4	0	3	2	0	2	9	2	8	2	3	13	89.5	84.2	15.4	69.2	15.4	61.5	15.4	23.1	
	4	1	5	2	5	0	3										1	4	0	4	1	0	2	9	2	9	1	3	13	89.5	84.2	15.4	69.2	15.4	69.2	7.7	23.1	
	5	1	5	2	5	1	2										2	3	0	5	0	0	3	8	2	10	1	2	13	89.5	89.5	23.1	61.5	15.4	76.9	7.7	15.4	
FM-10	1							4	1	1	5	0	1							4	1	1	5	0	1	6	94.7	94.7	66.7	16.7	16.7	83.3	0.0	16.7				
Market Info. Access Im	2							5	0	1	5	0	1							5	0	1	5	0	1	6	94.7	94.7	83.3	0.0	16.7	83.3	0.0	16.7				
	3							5	0	1	5	0	1							5	0	1	5	0	1	6	94.7	94.7	83.3	0.0	16.7	83.3	0.0	16.7				
	4							4	0	2	4	0	2							4	0	2	4	0	2	6	89.5	89.5	66.7	0.0	33.3	66.7	0.0	33.3				
	5							4	0	2	4	0	2							4	0	2	4	0	2	6	89.5	89.5	66.7	0.0	33.3	66.7	0.0	33.3				

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

**Attachment 5-4-2-5 Table of Results of Questionnaire Survey for Farmers in Small Stock (Goat) pilot sites**

		King K (Oshikoto Region) Total						Endola (Oshanaana Region) Total						Goat (2 Regions) Total						Valid Response			2 Regions								
		Goat N= 17						Goat n= 12						Total n= 29						Goat Total			Percentage against Valid Responses								
		Before			After			Before			After			Before			After			Number	Percentage		Before			After					
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A		
																								%	%	%	%	%	%	%	%
LS-1 Fodder Production	1	9	6	2				7	5	0				16	11	2				29	93.1		55.2	37.9	6.9						
	2	5	9	3				7	5	0				12	14	3				29	89.7		41.4	48.3	10.3						
	3				8	7	2				7	5	0				15	12	2	29		93.1				51.7	41.4	6.9			
	4				10	5	2				11	0	1				21	5	3	29		89.7				72.4	17.2	10.3			
	5				11	5	1				12	0	0				23	5	1	29		96.6				79.3	17.2	3.4			
LS-5 Disease Control Goat	1	9	8	0										9	8	0				17	100.0		52.9	47.1	0.0						
	2	7	10	0										7	10	0				17	100.0		41.2	58.8	0.0						
	3				10	7	0										10	7	0	17		100.0				58.8	41.2	0.0			
	4				10	5	2										10	5	2	17		93.1				58.8	29.4	11.8			
	5				10	7	0										10	7	0	17		100.0				58.8	41.2	0.0			
LS-11 Goat Production	1							7	5	0				7	5	0				12	100.0		58.3	41.7	0.0						
	2							3	9	0				3	9	0				12	100.0		25.0	75.0	0.0						
	3										12	0	0				12	0	0	12		100.0				100.0	0.0	0.0			
	4										12	0	0				12	0	0	12		100.0				100.0	0.0	0.0			
	5										12	0	0				12	0	0	12		100.0				100.0	0.0	0.0			
FM-2 Record Keeping	1							2	9	1	10	0	2	2	9	1	10	0	2	12	96.6	93.1	16.7	75.0	8.3	83.3	0.0	16.7			
	2							2	8	2	10	1	1	2	8	2	10	1	1	12	93.1	96.6	16.7	66.7	16.7	83.3	8.3	8.3			
	3							2	8	2	9	1	2	2	8	2	9	1	2	12	93.1	93.1	16.7	66.7	16.7	75.0	8.3	16.7			
	4							1	10	1	10	0	2	1	10	1	10	0	2	12	96.6	93.1	8.3	83.3	8.3	83.3	0.0	16.7			
	5							1	10	1	9	0	3	1	10	1	9	0	3	12	96.6	89.7	8.3	83.3	8.3	75.0	0.0	25.0			
FM-10 Market Info. Access Im	1							1	9	2	10	0	2	1	9	2	10	0	2	12	93.1	93.1	8.3	75.0	16.7	83.3	0.0	16.7			
	2							0	9	3	9	0	3	0	9	3	9	0	3	12	89.7	89.7	0.0	75.0	25.0	75.0	0.0	25.0			
	3							1	10	1	10	0	2	1	10	1	10	0	2	12	96.6	93.1	8.3	83.3	8.3	83.3	0.0	16.7			
	4							2	9	1	10	0	2	2	9	1	10	0	2	12	96.6	93.1	16.7	75.0	8.3	83.3	0.0	16.7			
	5							2	9	1	8	1	3	2	9	1	8	1	3	12	96.6	89.7	16.7	75.0	8.3	66.7	8.3	25.0			

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

### Attachment 5-4-3 Results of Questionnaire Survey for Farmers: Summary Table on Farm Management Technical Measures

		Grain (All 4 Regions) Total						Horticulture (All 4 Regions) Total						Cattle (All 4 Regions) Total						Chicken (3 Regions) Total						Goat (2 Regions) Total						Farm Management Total						Valid Response			4 Regions					
		Grain n= 42						Horticulture n= 38						Total n= 33						Chicken n= 19						Total n= 29						Total n= 161						Chicken Total			Percentage against Valid Responses					
		Before			After			Before			After			Before			After			Before			After			Before			After			Before			After											
		Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A	Yes	No	N/A
FM-2 Record Keeping	1	12	27	3	33	5	4	23	11	4	31	6	1	4	17	12	21	0	12	7	11	1	18	0	1	2	9	1	10	0	2	48	75	21	113	11	20	144	87.0	87.6	33.3	52.1	14.6	78.5	7.6	13.9
	2	13	25	4	36	1	5	24	14	0	31	5	2	5	17	11	21	0	12	8	11	0	18	0	1	2	8	2	10	1	1	52	75	17	116	7	21	144	89.4	87.0	36.1	52.1	11.8	80.6	4.9	14.6
	3	14	25	3	37	2	3	19	15	4	34	3	1	6	16	11	18	3	12	10	8	1	17	0	2	2	8	2	9	1	2	51	72	21	115	9	20	144	87.0	87.6	35.4	50.0	14.6	79.9	6.3	13.9
	4	14	25	3	34	4	4	19	15	4	33	4	1	4	16	13	20	1	12	7	11	1	16	1	2	1	10	1	10	0	2	45	77	22	113	10	21	144	86.3	87.0	31.3	53.5	15.3	78.5	6.9	14.6
	5	17	21	4	36	1	5	27	9	2	35	1	2	5	15	13	19	0	14	9	9	1	16	1	2	1	10	1	9	0	3	59	64	21	115	3	26	144	87.0	83.9	41.0	44.4	14.6	79.9	2.1	18.1
FM-5 Group Formation Group Strengthening	1	18	19	5	35	2	5	25	4	2	27	2	2	8	11	2	18	0	3	4	15	0	14	3	2							55	49	9	94	7	12	113	94.4	92.5	48.7	43.4	8.0	83.2	6.2	10.6
	2	17	20	5	34	2	6	23	4	4	26	3	2	5	14	2	18	0	3	8	11	0	15	2	2							53	49	11	93	7	13	113	93.2	91.9	46.9	43.4	9.7	82.3	6.2	11.5
	3	14	23	5	35	2	5	23	4	4	27	4	0	6	13	2	18	0	3	5	13	1	15	1	3							48	53	12	95	7	11	113	92.5	93.2	42.5	46.9	10.6	84.1	6.2	9.7
	4	19	18	5	36	0	6	24	4	3	28	2	1	4	5	0	9	0	0	5	7	1	12	0	1							52	34	9	85	2	8	95	94.4	95.0	54.7	35.8	9.5	89.5	2.1	8.4
	5	18	18	6	36	0	6	23	5	3	29	1	1	3	3	3	8	0	1	5	7	1	12	0	1							49	33	13	85	1	9	95	91.9	94.4	51.6	34.7	13.7	89.5	1.1	9.5
FM-6 Group Acct.	1	12	9	3	21	0	3	23	6	2	25	4	2							1	4	0	5	0	0							36	19	5	51	4	5	60	96.9	96.9	60.0	31.7	8.3	85.0	6.7	8.3
	2	12	9	3	21	0	3	18	9	4	26	5	0							1	4	0	3	2	0							31	22	7	50	7	3	60	95.7	98.1	51.7	36.7	11.7	83.3	11.7	5.0
	3	12	9	3	21	0	3	19	10	2	25	4	2							2	3	0	4	1	0							60	96.9	96.9	55.0	36.7	8.3	83.3	8.3	8.3						
	4	12	9	3	21	0	3	20	8	3	24	4	3							3	2	0	4	1	0							35	19	6	49	5	6	60	96.3	96.3	58.3	31.7	10.0	81.7	8.3	10.0
	5	12	9	3	21	0	3	23	6	2	28	1	2							3	2	0	5	0	0							38	17	5	54	1	5	60	96.9	96.9	63.3	28.3	8.3	90.0	1.7	8.3
FM-8 Collective Sales Collective Purchasing	1	18	14	4	31	0	5	25	4	2	25	3	3							3	7	3	9	0	4							46	25	9	65	3	12	80	94.4	92.5	57.5	31.3	11.3	81.3	3.8	15.0
	2	18	14	4	31	0	5	22	5	4	27	3	1							3	8	2	10	0	3							43	27	10	68	3	9	80	93.8	94.4	53.8	33.8	12.5	85.0	3.8	11.3
	3	16	15	5	31	0	5	23	5	3	26	4	1							2	9	2	8	2	3							41	29	10	65	6	9	80	93.8	94.4	51.3	36.3	12.5	81.3	7.5	11.3
	4	18	13	5	31	0	5	23	6	2	26	3	2							2	9	2	9	1	3							43	28	9	66	4	10	80	94.4	93.8	53.8	35.0	11.3	82.5	5.0	12.5
	5	18	13	5	31	0	5	24	5	2	26	3	2							3	8	2	10	1	2							45	26	9	67	4	9	80	94.4	94.4	56.3	32.5	11.3	83.8	5.0	11.3
FM-10 Market Info. Access Im	1	20	13	3	30	2	4	25	10	3	35	1	2	2	15	4	17	0	4	4	1	1	5	0	1	1	9	2	10	0	2	52	48	13	97	3	13	113	91.9	91.9	46.0	42.5	11.5	85.8	2.7	11.5
	2	20	13	3	31	2	3	23	13	2	31	5	2	3	14	4	16	0	5	5	0	1	5	0	1	0	9	3	9	0	3	51	49	13	92	7	14	113	91.9	91.3	45.1	43.4	11.5	81.4	6.2	12.4
	3	20	13	3	32	1	3	24	10	4	31	4	3	2	15	4	16	0	5	5	0	1	5	0	1	1	10	1	10	0	2	52	48	13	94	5	14	113	91.9	91.3	46.0	42.5	11.5	83.2	4.4	12.4
	4	19	14	3	32	1	3	24	12	2	33	2	3	1	4	4	4	1	4	4	0	2	4	0	2	2	9	1	10	0	2	50	39	12	83	4	14	101	92.5	91.3	49.5	38.6	11.9	82.2	4.0	13.9
	5	19	14	3	32	1	3	23	13	2	33	2	3	2	3	4	5	0	4	4	0	2	4	0	2	2	9	1	8	1	3	50	39	12	82	4	15	101	92.5	90.7	49.5	38.6	11.9	81.2	4.0	14.9

Source: The Study Team

Note: The used questionnaire sheets can be found in Attachment 5-3.

This table is made based on the results of the separated tables in "Attachment 5-4-2 Results of Questionnaire Survey for Farmers: Summary Table by Category of Pilot Sites".

*Attachment 5-5*

*Analysis and Discussions on  
Results of Questionnaire Survey*

*N-CLIMP*

## Attachment 5-5: Analysis and Discussion on Results of Questionnaire Survey in Phase-3

### 1. Framework of the Questionnaire Survey in Phase 3

#### 1.1. Summary of the Questionnaire Survey

The next table summarizes the questionnaire survey in terms of targets, timing, and used questionnaire sheets.

**Summary of the Questionnaire Survey on Technical Measures**

Target	Timing	Used Questionnaire	Obtained Data	The way of Response
Officers: C/P mainly ATs including CASO, ASO, CAT etc..	The 3rd TOT in each region; Omusati: March 23, 2017 Oshana: March 2, 2017 Oshikoto: March 16, 2017 Ohangwena: March 9, 2017	Attachment 5-1  Printed in English	Attachment 5-2  (Data by Region)	Each Person answered to <b>all</b> technical measures
Farmers in Pilot Sites	The 3rd farmers' training in each pilot sites; Omusati: From March 27 to April 3, 2017 Oshana: From March 13 to April 20, 2017 Oshikoto: From March 20 to March 30, 2017 Ohangwena: March 15 to March 27, 2017	Attachment 5-3  Printed in Oshwambo and English	Attachment 5-4  (Data by Types of Pilot Sites)	Farmers answered <b>only the technical measures that were introduced</b> into their pilot sites

Source: The Study Team

#### 1.2. Structure of Questionnaire Sheets

Questionnaire Sheets can be found in Attachment 5-1 for officers and Attachment 5-3 for farmers.

In the questionnaire, each technical measure is evaluated by officers or by farmers from the five points of view; 1) Awareness, 2) Experience, 3) Explanation, 4) Practice and 5) Effects.

**Structure of Questionnaire Sheets**

View Points	Questions	Time Span of Questions	
		Crop / Livestock Production	Farm Management
1: Awareness	Did/ Do you know the technical measure? Did / Do you know the needs of the technical measure?	Before N-CLIMP	Before + After N-CLIMP
2. Experience	Did / Do you have experience of using the technical measure?	Before N-CLIMP	Before + After N-CLIMP
3: Explanation	Did / Do you explain the technical measure to farmers?	With N-CLIMP	Before + After N-CLIMP
4: Practice	Did / Do farmers practice the technical measure?	With N-CLIMP	Before + After N-CLIMP
5: Effects)	Did / Do you find effects of the technical measure?	With N-CLIMP	Before + After N-CLIMP

Source: The Study Team

For technical measures on crop production and livestock, the time framework for 1) Awareness and 2) Experience is “before N-CLIMP” while other three points, 3) Explanation, 4) Practice and 5) Effects are

addressed as “during N-CLIMP” or “after N-CLIMP”. In other words, it could be easily understood that there is time flow from 1) Awareness to 5) Effects in questions in these two fields of crop and livestock production.

On the other hand, for technical measures on farm management, both “before N-CLIMP” and “after N-CLIMP” are asked for each point of view. In other words, the time flow is observed in each points of view in the questionnaire sheets for farm management technical measures.

### 1.3. Respondents by Category

The numbers of respondents for the survey can be summarized in the next table.

**Summary of the Respondents of Questionnaire Survey**

Target	Total Number	Composition of Respondents	
		Category	Number by Category
Officers: C/P mainly ATs including CASO, ASO, CAT etc..	53	1) Region	Omusati: 16, Oshana: 17, Oshikoto: 9 and Ohangwena: 11
		2) Responsibilities:	AT in Charge: 16, AT not in Charge: 18, Senior Officers: 15, and Other Stakeholders (not in DAPEES although within MAWF Framework; I.e, Meat Board, AMTA): 4
Farmers in Pilot Sites	144	1) Region	Omusati: 29, Oshana: 33, Oshikoto: 30 and Ohangwena: 52
		3) Types of Pilot Sites	Cereal Grain: 42, Horticulture: 38, Large Stock (Cattle): 33, Small Stock (Chicken): 19, and Small Stock (Goat): 12

Source: The Study Team

The categorization of respondents differs between officers and farmers because of the ways of the responding. While officers answered to all technical measures, farmers answered only the relevant technical measures that were introduced to their pilot sites.

The detailed numbers of respondents and the compositions are found in 6-2-1: Summary Table : Respondents of Questionnaire Survey (Officers) in Attachment 5-2: Results of Questionnaire Survey for Agricultural Technicians in Phase-3, and 6-4-1: Summary Table: Respondents of Questionnaire Survey (Farmers) and the following tables in Attachment 5-4: Results of Questionnaire Survey for Farmers in Phase-3.

### 1.4. Validities of Responses

Almost all points of view of all technical measures are answered properly with the rates of validities at least about 70 % up to 100 %. In other words, it could be said that there are not applicable answers or not responded questions with the rate of 30 % or less.

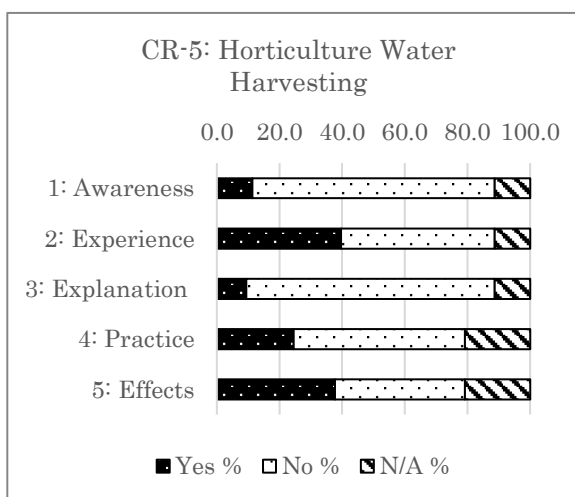
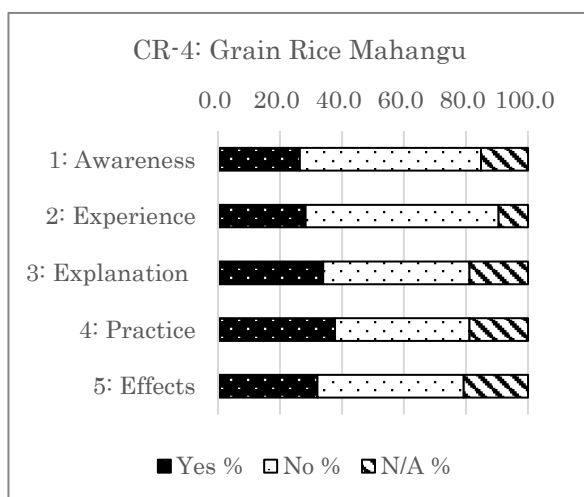
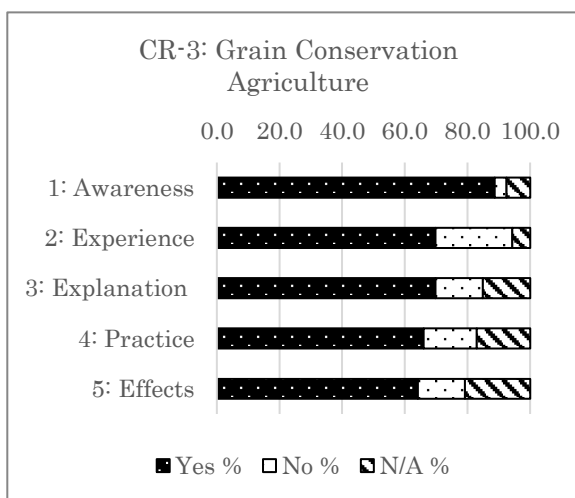
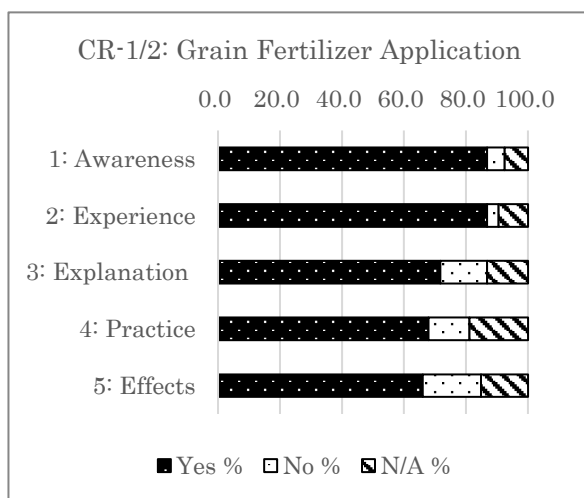
In details, please refer the column of “valid response” in each sheet in Attachment 5-2 and Attachment 5-4.

## 2. Analysis and Discussions of Results of the Questionnaire Survey

### 2.1. Crop Production Technical Measures

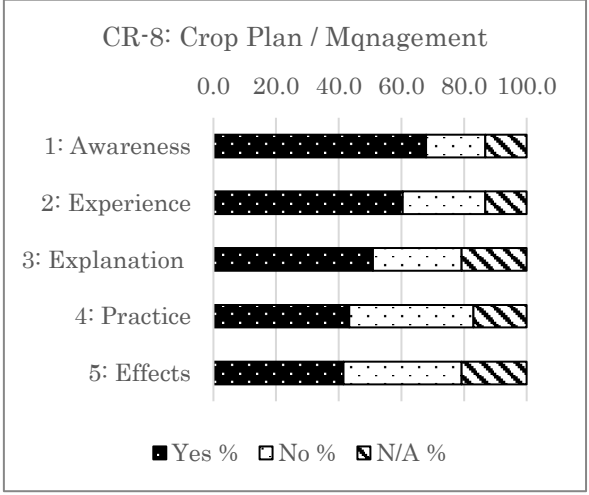
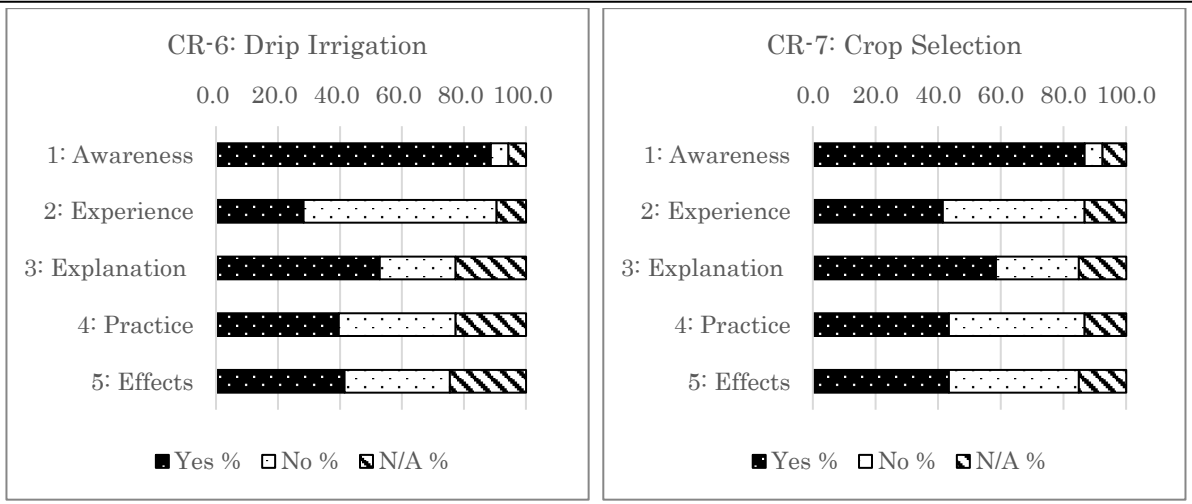
#### (1) Results of Questionnaire Survey with ATs

The following graphs summarize the results of the questionnaire survey with ATs on crop production technical measures. These graphs are based on the data sheets comprised as Attachment 5-2-3: Results of Questionnaire Survey for ATs: Summary Table in Total.



#### Results of Questionnaire Survey with ATs (Crop Production-Part 1)





**Results of Questionnaire Survey with ATs (Crop Production-Part 2)**

The above-noted series of graphs can be analyzed in the following points; i) differences in awareness by technical measures, ii) difference in awareness and experience and iii) possible improvement through the intervention for a few technical measures that were relatively highly aware of. The data cited in the following parts are based on the relevant parts of the Attachment 5-2-3.

**i) The difference in awareness by technical measures**

The awareness of technical measures such as CR-1/2: Grain Fertilizer Application, CR-3: Grain Conservation Agriculture, CR-6: Horticulture Drip Irrigation and CR-7: Crop Selection, is high exceeding 80 %.

On the other hand, the awareness of CR4: Grain Rice-Mahangu Mix Cropping and CR-5: Horticulture Water Harvesting is low, marking about 26 % and 11 % respectively. It could be said that these two technical measures are newly introduced by the Project.

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## **ii) The difference in awareness and experience**

There is difference between awareness, experience, and explanation for those technical measures that ATs are well aware of. The typical cases are found in CR-6: Horticulture Drip Irrigation and CR-7: Crop Selection.

About 89 % of ATs answered that they were aware of CR-6: Horticulture Drip Irrigation before the Project. However, only 28 % of them had experience to do on their own. As the same, 87 % of ATs were aware of CR-7: Crop Selection while only 42 % had experience before the Project.

## **iii) Implication of improvement through the Project's intervention**

For these two technical measures that the difference between awareness and experience is great, there is another point to be recognized.

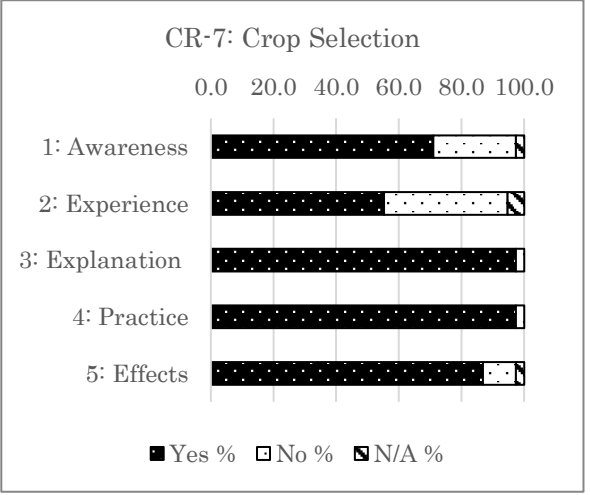
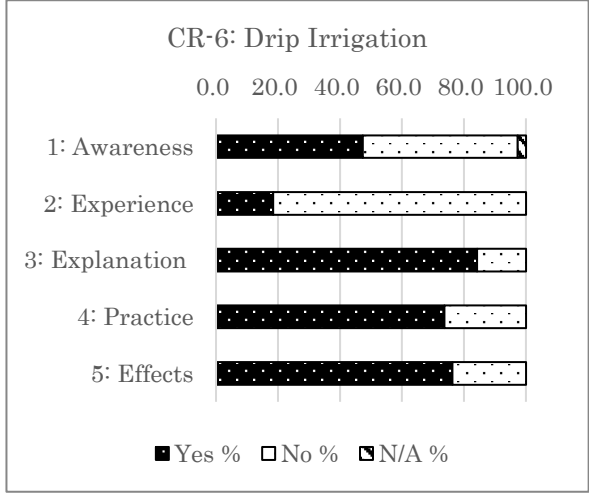
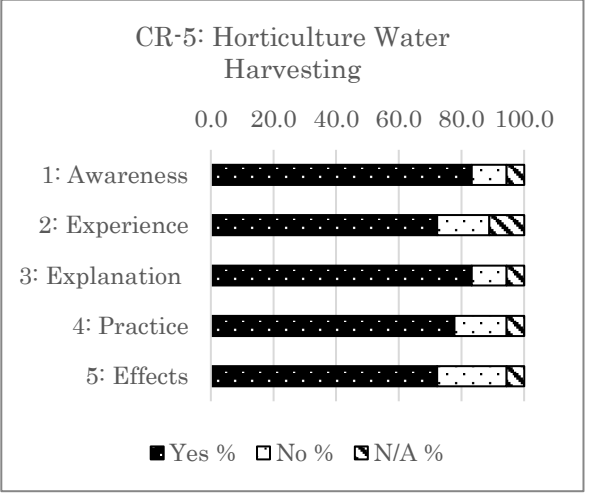
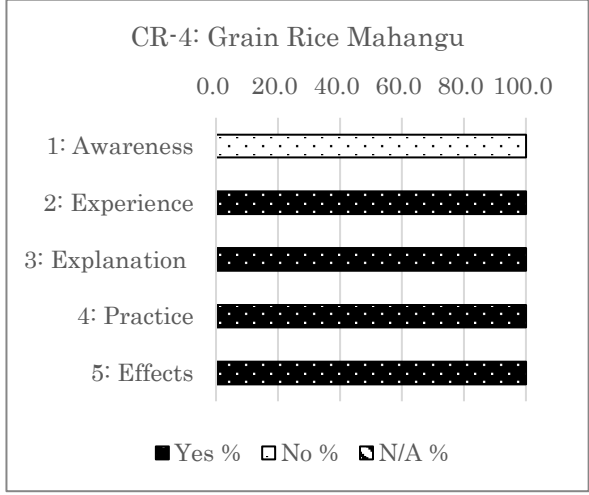
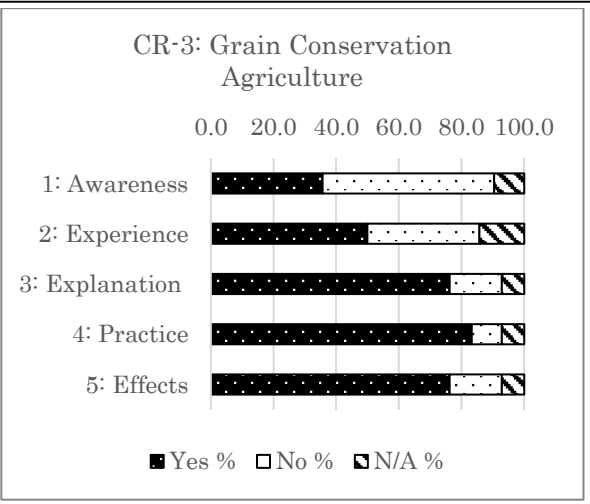
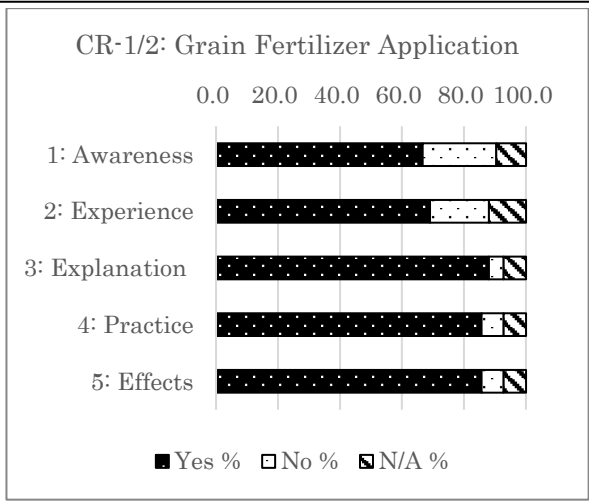
While only 28 % of ATs had experience in relation to CR-6: Horticulture Drip Irrigation. During the Project, however, about 53 % of them had achieved to explain to farmers. As the same, only 42 % had experience in relation to CR-7: Crop Selection before the Project, however, about 59 % of ATs answered that they explained to farmers during the Project.

This situation is typical to these two technical measures that ATs answered as “high awareness with low experience”. In contrast, those technical measures with “high awareness with high experience” such as CR-1/2: Grain Fertilizer Application, CR-3: Grain Conservation Agriculture, and CR-8: Crop Plan/Management, do not share the situation. The rate of explanation to farmers do not jump against the lower rate of experience.

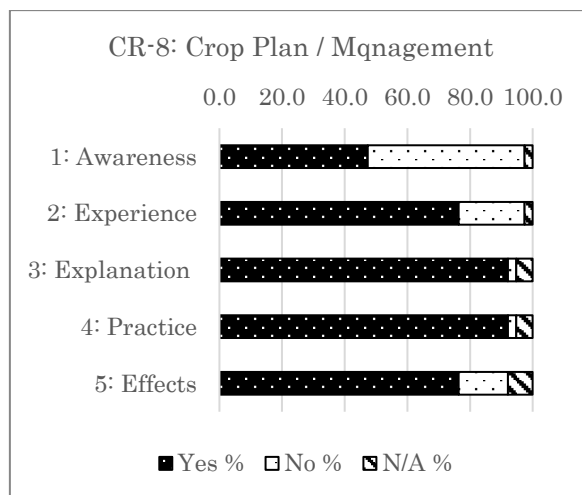
The situation of higher rate of explanation of CR-6: Horticulture Drip Irrigation and CR-7: Crop Selection could be considered as the effects that ATs have recognized their improvement made through the intervention of the Project.

## **(2) Results of Questionnaire Survey with Farmers**

The following graphs summarize the results of the questionnaire survey with farmers on crop production technical measures. These graphs are based on the data sheets comprised as Attachment 5-4-2: Results of Questionnaire Survey for Farmers: Summary Table in Total.



**Results of Questionnaire Survey with Farmers (Crop Production-Part 1)**



### Results of Questionnaire Survey with Farmers (Crop Production-Part 2)

Focusing on CR-6: Drip Irrigation and CR-7: Crop Selection, the change in the recognition by farmers is analyzed. There are following three points;

- (1) About half of farmers did not know or were not aware of importance of drip irrigation before the Project. Only one out of five farmers had experience to use drip irrigation before the Project.
- (2) For both the technical measures (CR-6 and CR-7), affirmative response rates for experience (2: Experience) is lower than those of awareness or prior knowledge (1: Awareness). In other words, those who recognized the necessity (or had knowledge) of these technical measures did not actually have field-level experience before the project was implemented.
- (3) Higher rates of affirmative answer were obtained for 3: Explanation, 4: Practice and their 5: Effects.

The situation of (3) can be commonly seen with other technical measures.

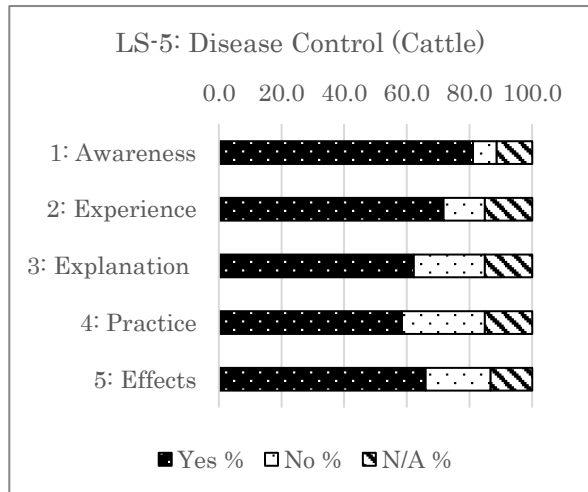
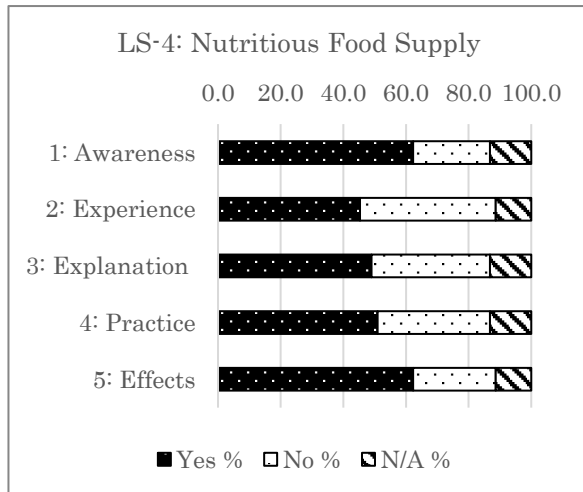
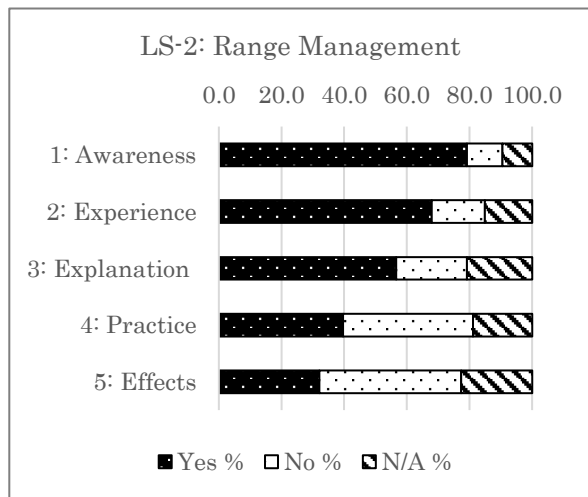
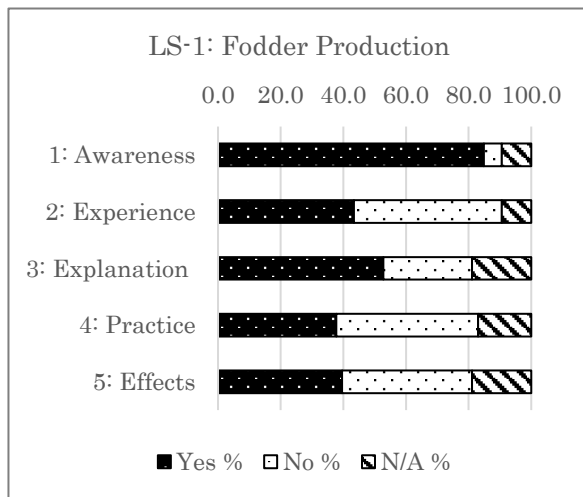
As the composition of respondents are different between ATs and farmers, the results of the survey with farmers could not be simply compared with the results with ATs, saying that farmers more likely consider that they have explained to other farmers, they observe more practices by other farmers and they recognize more effects of the technical measures.

However, these graphs clearly suggest that farmers have explained the technical measures to other farmers, observing practices by other farmers and they recognize effects of the technical measures. In short, the results of the questionnaire survey clearly suggest that farmer to farmer extension has successfully achieved.

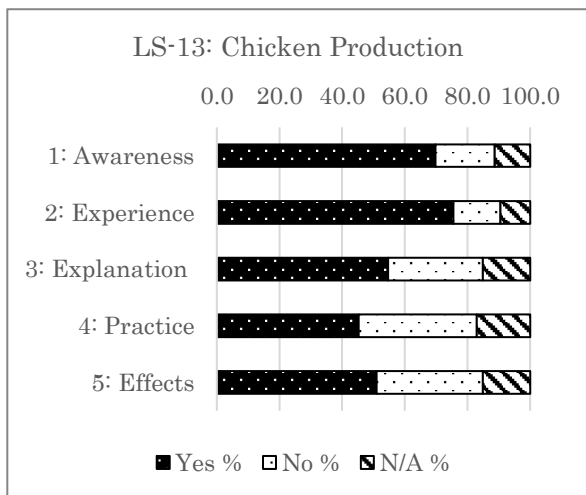
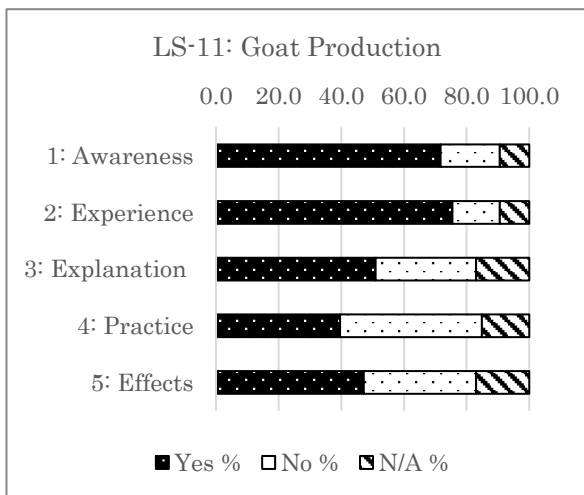
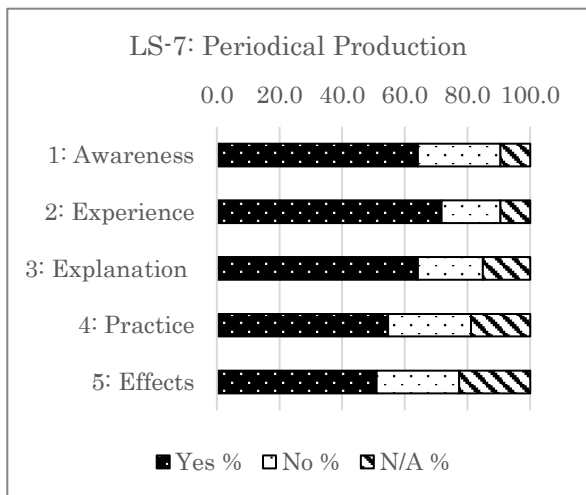
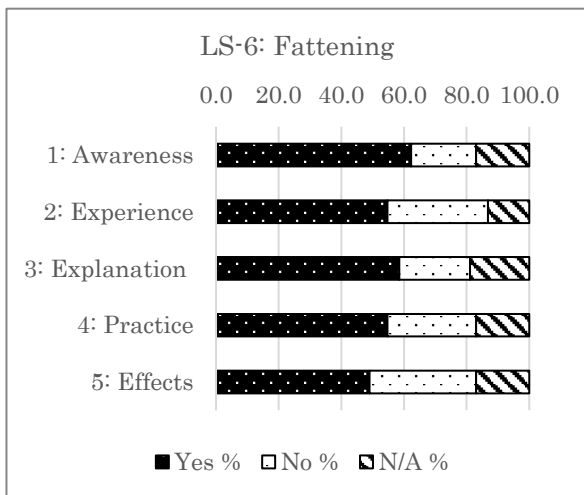
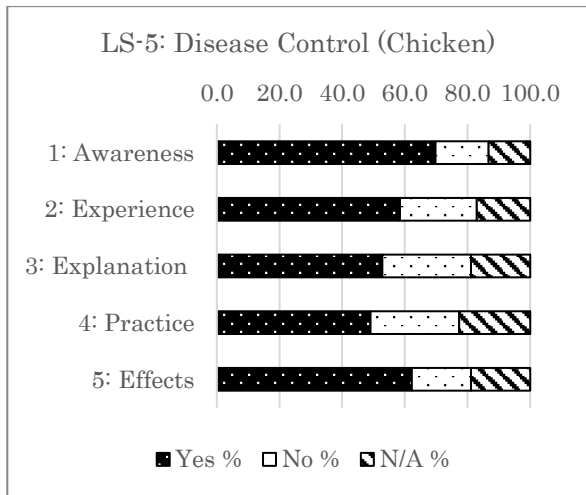
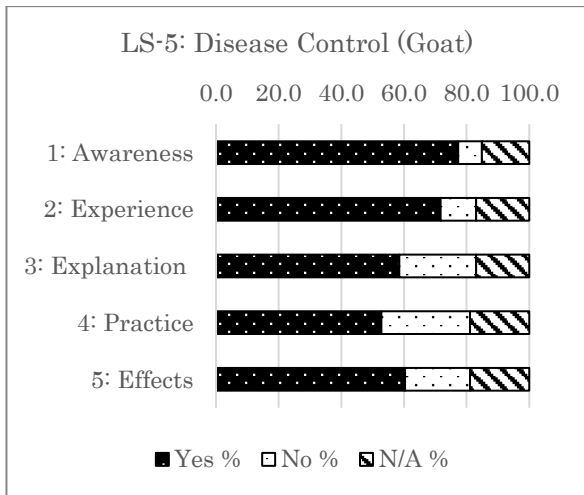
## 2.2. Livestock Production Technical Measures

### (1) Results of Questionnaire Survey with ATs

The following graphs summarize the results of the questionnaire survey with ATs on livestock production technical measures. These graphs are based on the data sheets comprised as Attachment 5-2-3: Results of Questionnaire Survey for ATs: Summary Table in Total.



### Results of Questionnaire Survey with ATs (Livestock Production-Part 1)



**Results of Questionnaire Survey with ATs (Livestock Production-Part 2)**

The above-noted series of graphs can be analyzed in the following points; i) relatively high awareness or knowledge and experience, ii) relatively lower explanation and recognition of farmers practice, and iii) two patterns recognition of effects.

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**i) Relatively high awareness or knowledge and experience**

All livestock production technical measures gained higher points for awareness, clearly marking above 60%. This can be interpreted that ATs consider that they “knew” or “were aware of the importance of the technical measures” even before of the Project.

About experience, all the livestock production technical measures except LS-1:Fodder production, LS-4: Nutritious Feed Supply (for Chicken) and LS-6: Fattening mark above 60 %.

These situations show that ATs consider that they have been familiar with most of technical measures in livestock section even before the introduction through the Project.

**ii) relatively lower explanation and recognition of farmers practice**

Compared to the above-noted two aspects, awareness and experience, explanation to farmers and practice (here, ATs’ recognition of farmers practice) mark lower. About 50 to 60 % half of ATs explained the livestock production technical measures to farmers. The ATs’ recognition of farmers’ practice appears relatively lower than their own explanation, marking about 40 % for most of technical measures.

When it is limited to ATs in charge of pilot sites (including for those of crop production), both the rates of their explanation to farmers and their recognition of farmers’ practice mark higher. The rates of recognition of farmers practice for LS-5: Disease Control (Cattle) and LS-7: Periodical Production mark above 60 %.

These situations can be interpreted that those ATs who worked closely with the Project gained the confidence to explain to farmers on livestock production (as they were involved in the Project activities, including ToTs and pilot site activities). This leads them to observe that farmers practice the technical measures that they explain to farmers. More importantly, even when they were working for crop production, it seems that they gained some clues to explain to farmers.

**iii) two patterns of recognition of effects.**

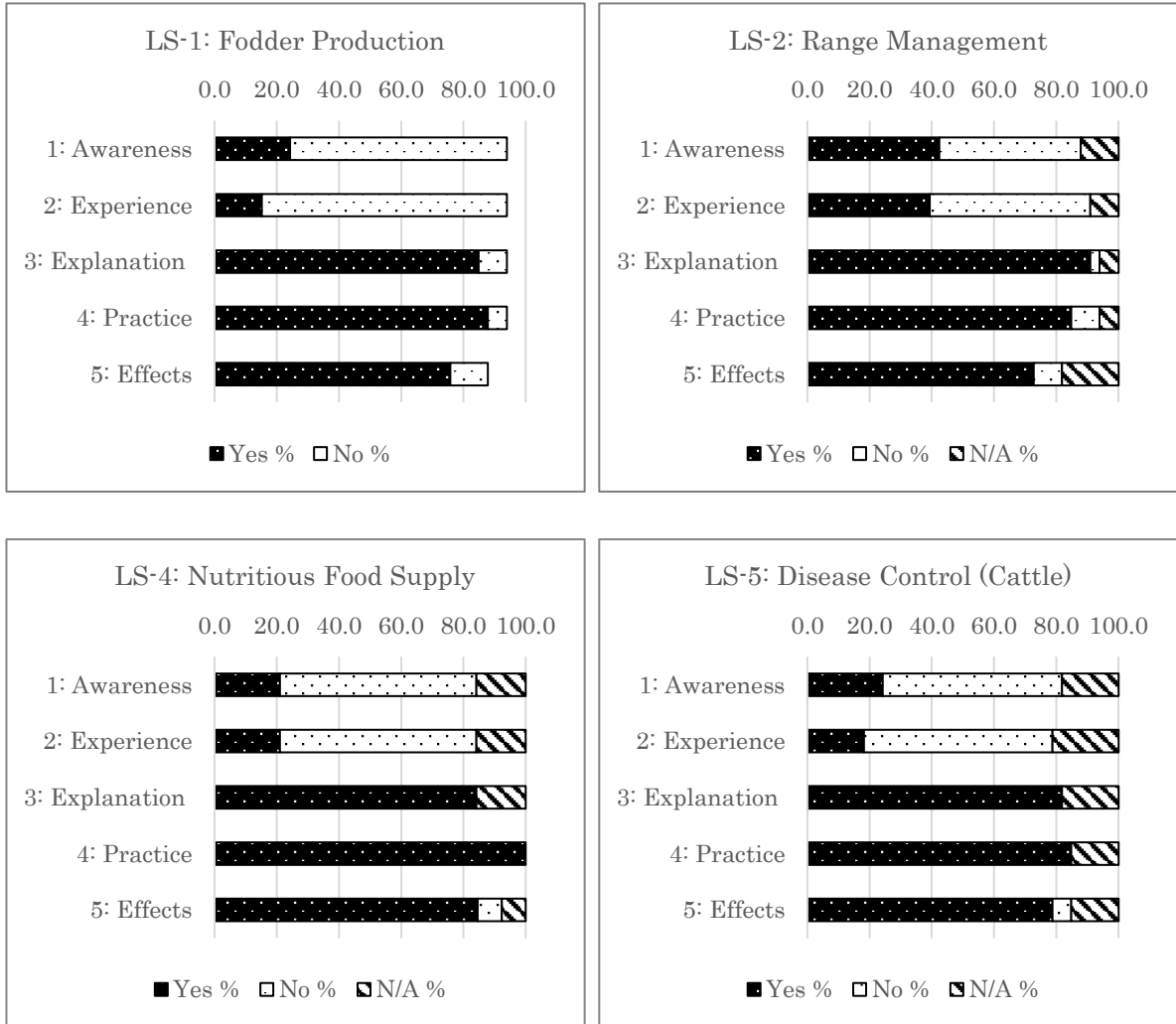
There are two patterns observed in relation to effects of the technical measures of livestock. The first pattern as majority is related to the above-noted “higher awareness and experience and lower explanation and practice”. In this case, the ATs’ recognition of effects of the technical measures is also low.

However, there is another pattern observed. When ATs answer that their observation of practice by farmers are not so high, they recognize the effects with higher rates. This is observed for LS 4: Nutritious Feed Supply and LS- 5: Disease Control (Cattle, Goat, and Chicken).

This can be interpreted that ATs who understood the needs of these technical measures consider or expect the effects of technical measures with higher rates.

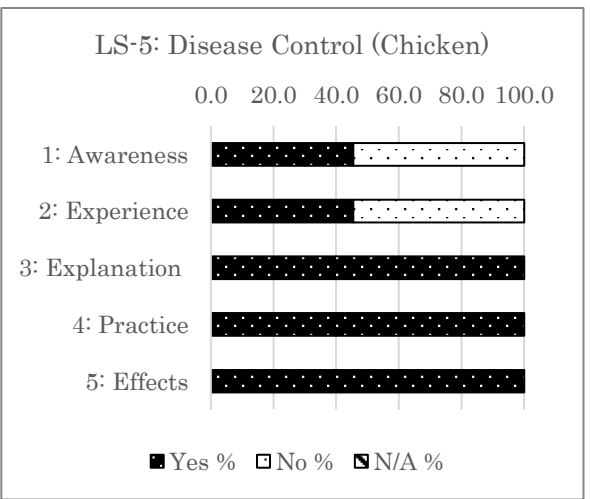
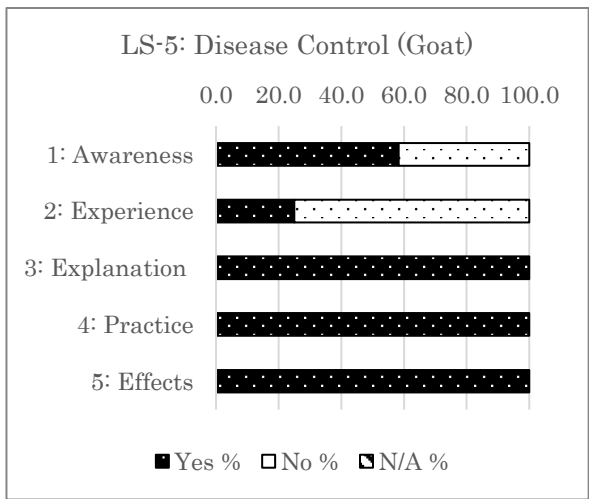
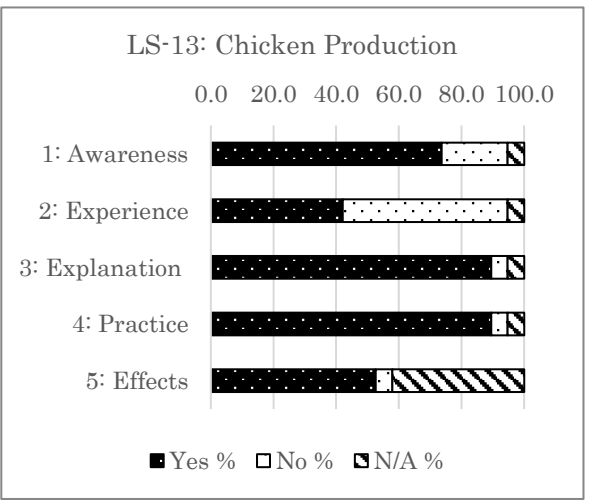
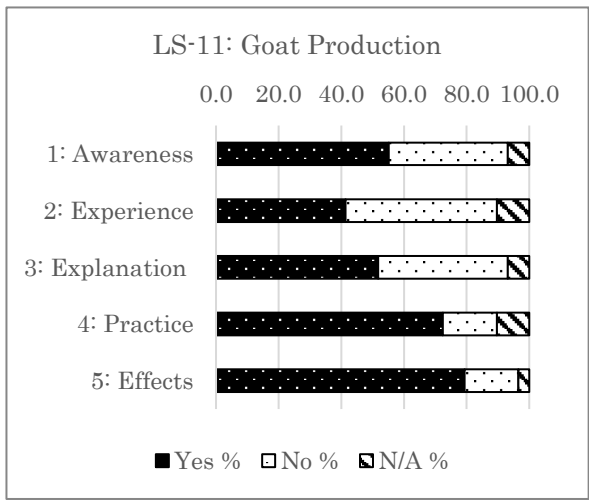
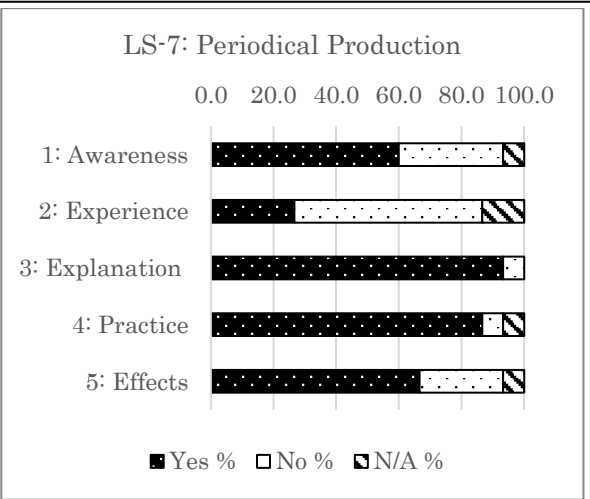
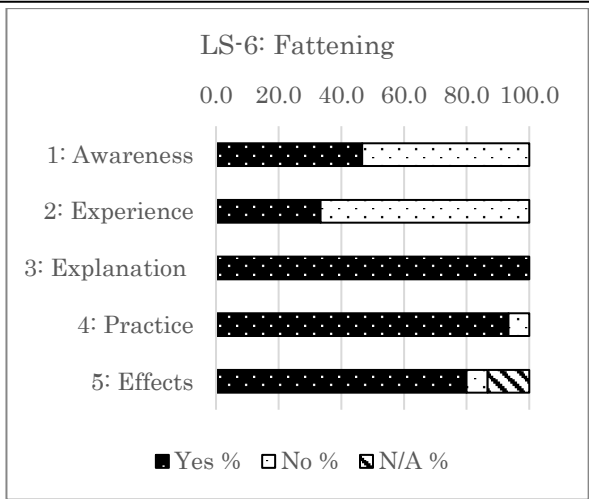
**(2) Results of Questionnaire Survey with Farmers**

The following graphs summarize the results of the questionnaire survey with farmers on livestock production technical measures. These graphs are based on the data sheets comprised as Attachment 5-4-2: Results of Questionnaire Survey for Farmers: Summary Table in Total.



**Results of Questionnaire Survey with Farmers (Livestock Production-Part 1)**





**Results of Questionnaire Survey with Farmers (Livestock Production)**

As noted in the previous section on the results of the survey with ATs, the three points; i) relatively high

awareness or knowledge and experience, ii) relatively lower explanation and recognition of farmers practice, and iii) two patterns recognition of effects are also observed here.

However, as the same with crop production technical measures, the comparison of the rates of affirmative response between the results of the survey with ATs and farmers does not mean logical analysis due to the difference in composition of respondents.

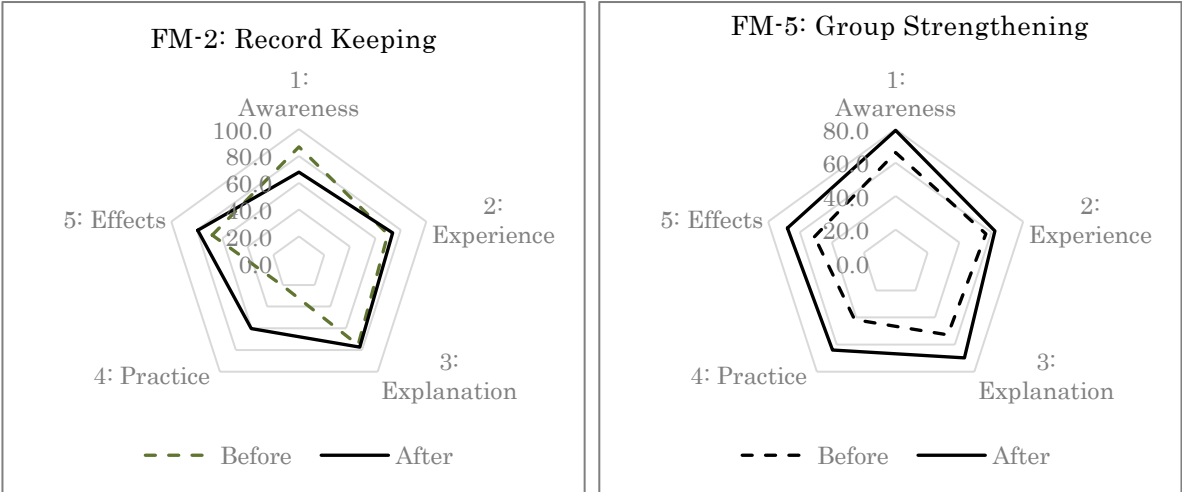
What can be confirmed here is the fact that farmers have done explanation to other farmers, assuming practice by those farmers as well as the effects recognized. In short, farmer-to-famer extension successfully took place for dissemination of the technical measures during the Project.

**2.3. Farm Management Technical Measures**

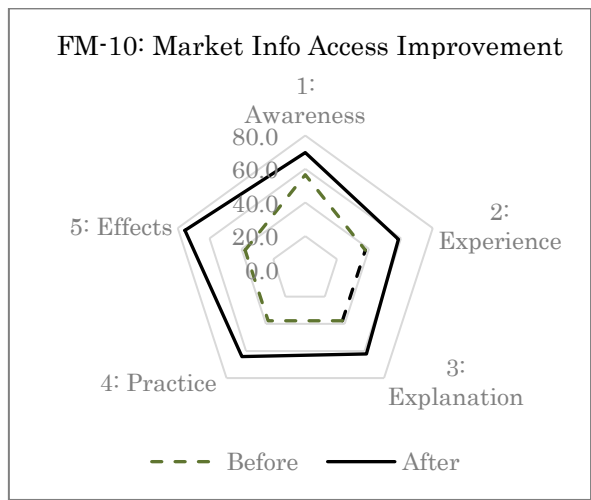
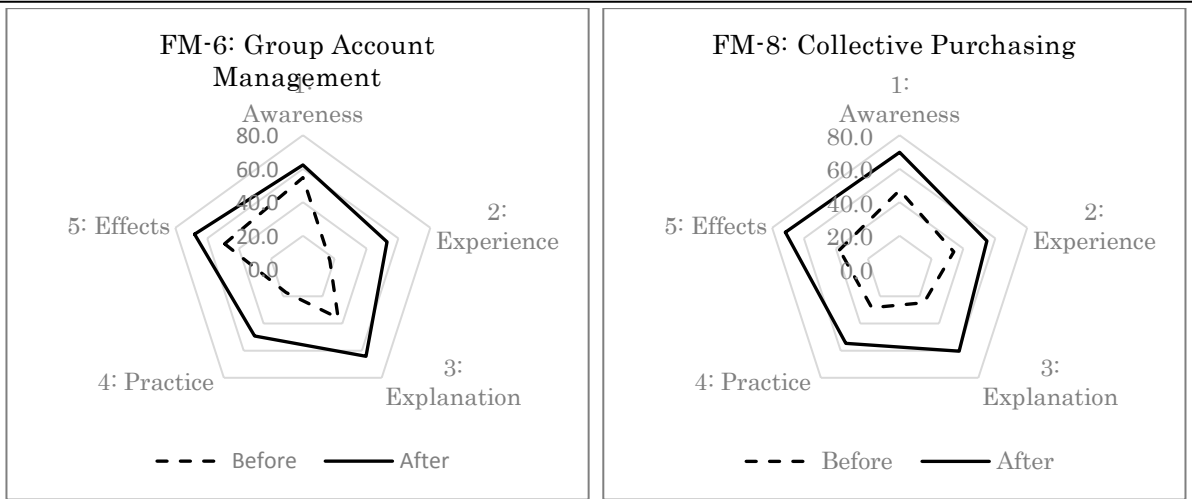
**(1) Results of Questionnaire Survey with ATs**

The following graphs summarize the results of the questionnaire survey with ATs on farm management technical measures. These graphs are based on the data sheets comprised as Attachment 5-2-3: Results of Questionnaire Survey for ATs: Summary Table in Total.

As noted above (in 1.2 Structure of Questionnaire Sheet), for each aspect of awareness, experience, explanation, practice and effects of both before and after the Project is asked for all farm management technical measures. Therefore, the graphs are to focus on the comparison between before and after the Project. The following graphs gained data only from the answers with “yes” for each aspect.



**Results of Questionnaire Survey with ATs (Farm Management -Part 1)**



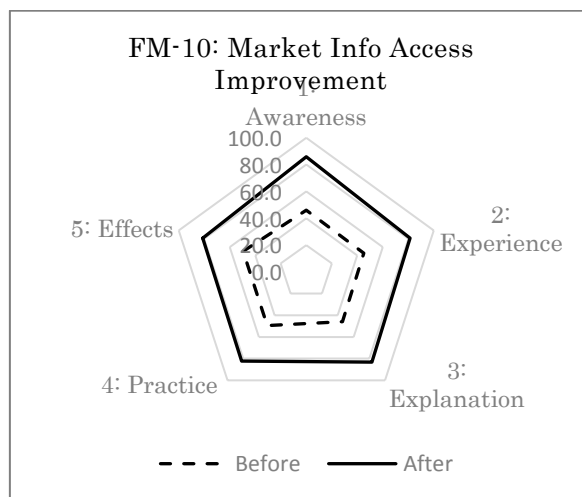
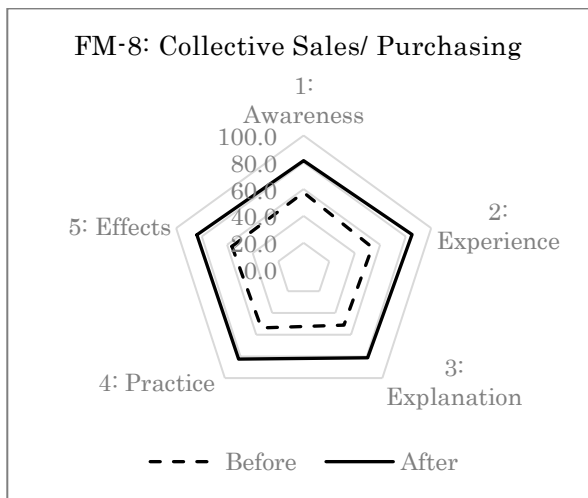
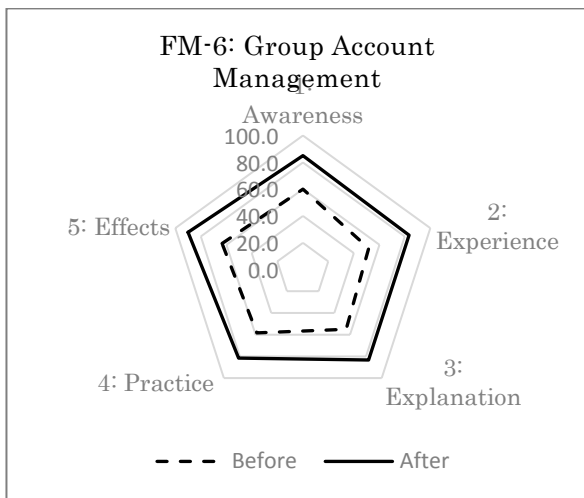
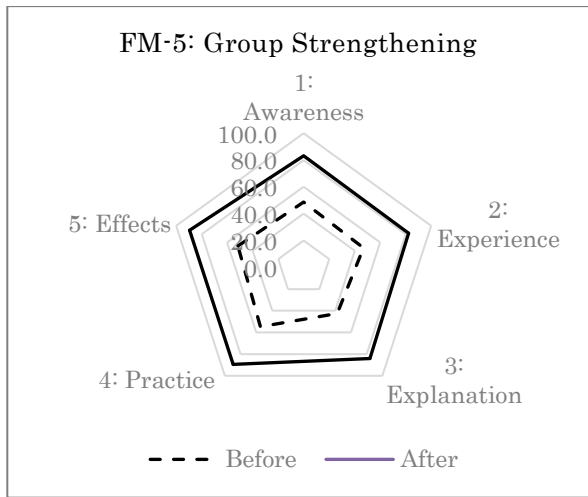
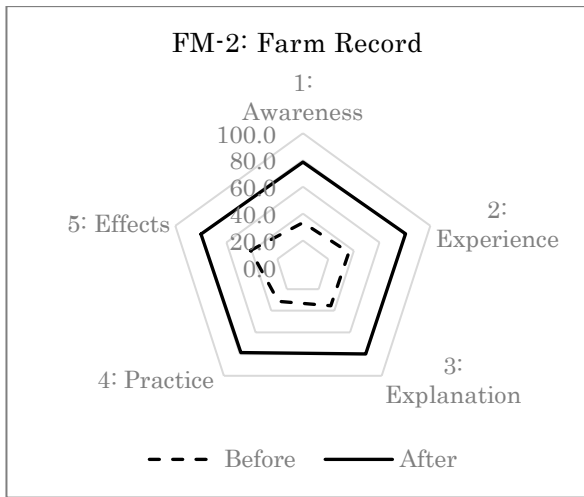
**Results of Questionnaire Survey with ATs (Farm Management -Part 2)**

These graphs are based on the data sheet comprised as Attachment 5-2-3: Results of Questionnaire Survey for ATs: Summary Table for Total. The data cited in the following parts use the figures in the relevant part of the Attachment 5-2-3.

The above-noted series of graphs can be summarized as there has been a significant improvement through the Project. For almost all aspects of the farm management technical measures treated in the Project, ATs answer with more “yes” during or after the Project compared to before the Project.

**(2) Results of Questionnaire Survey with Farmers**

The following graphs summarize the results of the questionnaire survey with farmers on farm management technical measures. These graphs are based on the data sheets comprised as Attachment 5-4-2: Results of Questionnaire Survey for Farmers: Summary Table in Total.



**Results of Questionnaire Survey with Farmers (Farm Management)**

The above-noted series of graphs show the recognition of farmers of improvement through the Project. All of aspects (awareness, experience, explanation to other farmers, practice of other farmers, and effects) for all five technical measures show the higher marks during / after the N-CLIMP without

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exception. As the same with above-noted crop and livestock production technical measures, it is also assumed that famer-to-famer extension was successfully implemented.

The recognized significant improvement in the extension can be attributed to the fact that most of farm management technical measures were new to ATs and farmers. Therefore the improvement through the Project's intervention to their own activities can be freshly recognized by them.