

**Republic of Namibia
Ministry of Agriculture, Water and Forestry**

**THE REPUBLIC OF NAMIBIA
NORTHERN CROP AND LIVESTOCK
DEVELOPMENT
MASTER PLAN STUDY**

FINAL REPORT

**VOLUME-II
MAIN REPORT**

June 2017

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

NIPPON KOEI CO., LTD.

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**Republic of Namibia
Ministry of Agriculture, Water and Forestry**

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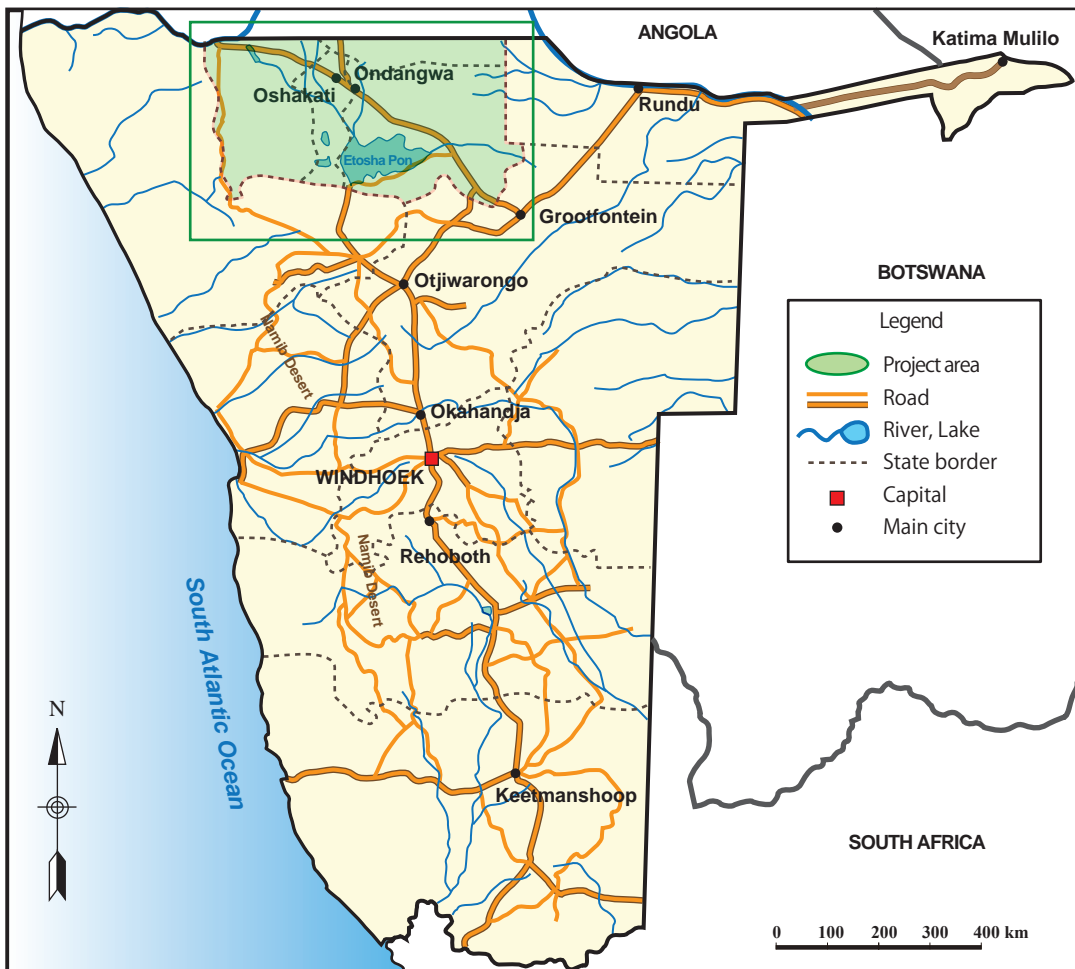
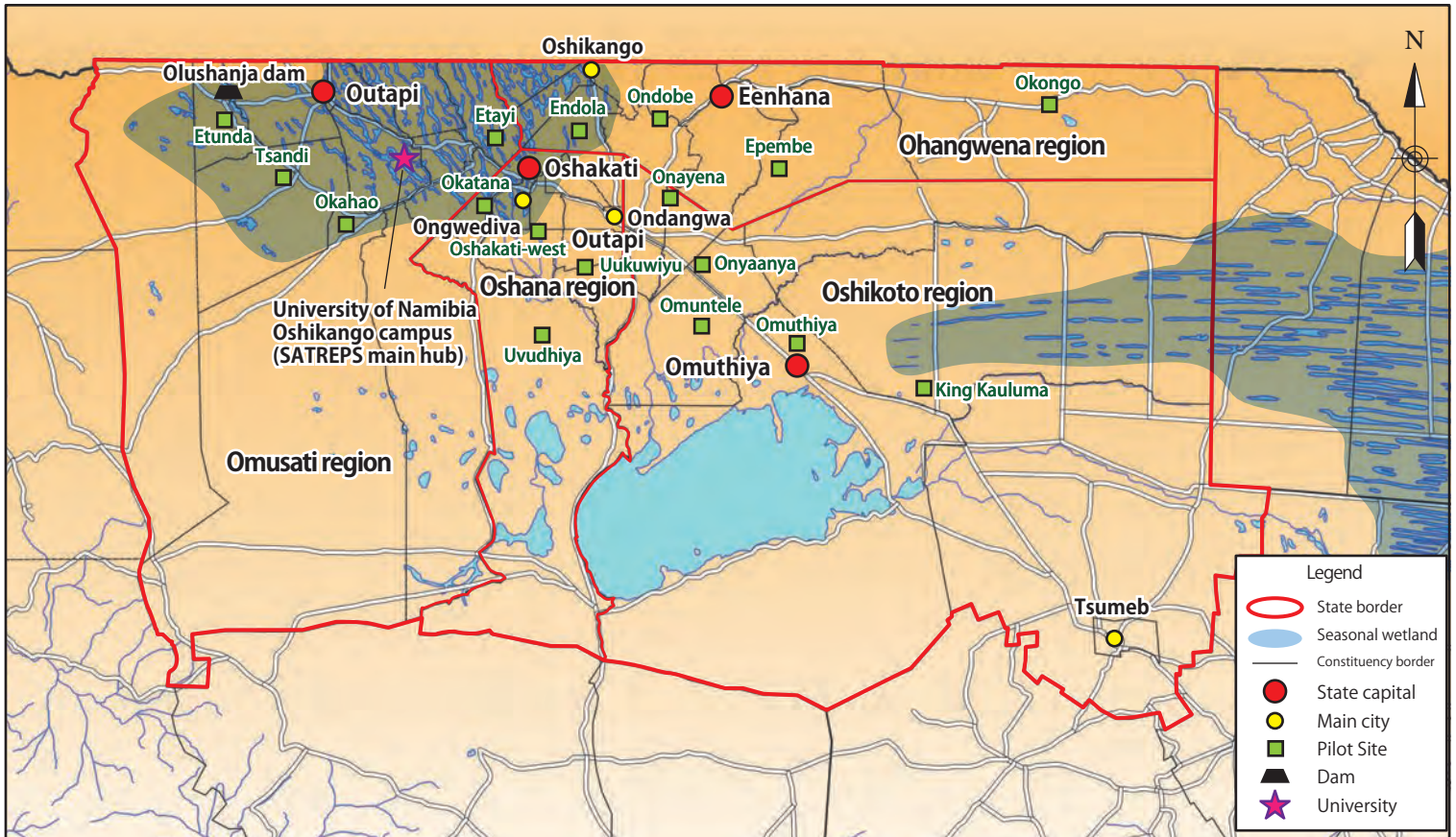
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Northern Crop and Livestock Development Master Plan Study Area Map

No.1 (Phase-1)



The meeting for the 1st Steering Committee was held at Ongwedive on September 22, 2014, inviting the counterparts from the central office of MAWF, Windhoek,.



Ms. Kasheeta, Director of DAPEES, opened the meeting, and Mr. Ohira, JICA South Africa Office gave the remark in the 1st Steering Committee meeting.



Opening remarks by Mr. Imalwa, Deputy Director of the North Central Division at the 1st Divisional Committee meeting on September 30, 2014.



Address by Mr. Nakamura, Chief Representative of JICA Namibia Office at Joint Stakeholder Meeting on February 18, 2015.



Group Work to discuss the dissemination system of Pilot Projects, in the Joint Stakeholder Meeting on February 18 2015.



Participation of MAWF staffs to SHEP Workshop in Pretoria of South Africa on March 2, 2015.

No.2 (Phase-1)

<p>Plough by donkeys, and a boy planting seeds, near Okatyali ADC in Oshana Region on January 24, 2015.</p>	<p>Beans are inter-cropped with Pearl Millet, near Okahao ADC in Omusati Region on January 28, 2015.</p>
<p>Famer is preparing the seedling bed for tomato at Eunda ADC, Omusati Region, on February 07, 2015</p>	<p>Cauliflower, cabbage, etc., in Horticulture Farmer field at Onankali ADC in Oshikoto Region on February 12, 2015.</p>
<p>Demonstration of hand tractor operation by University of Namibia staff at SATREPS field day at a farmer's field in Omusati Region on March 10, 2015.</p>	<p>Millet are ripening in Ondobe ADC in Ohangwena Region on April 28, 2015.</p>

No.3 (Phase-1)



Small poultry raising at Onankali ADC in Oshana Region on February 12, 2015.



Cattle grazing at road-side in Omusati Region, on February 13 2015



Local pig raising at Endola ADC in Omusati Region on February 17, 2015.



Cattle post at Ruacana ADC in Omusati Region on Mach 12, 2015.



Cattle auction held by the Oshikoto Livestock Marketing Cooperative, near Omuntele ADC in Oshikoto Region on March 14, 2015.



Interview to a farmer at the fixed point observation near King Kauluma ADC in Nehale IyaMpingana Constituency on March 11 2015.

No.4 (Phase-2)



The 1st Steering Committee (Phase 2) on July 24 2015 at the PS Board Room, 4th Floor of MAWF, Windhoek.



Mrs. Kasheeta, Deputy Permanent Secretary chaired the 1st Steering Committee.



The Draft Master Plan Workshop on April 12, 2016 at Trade Fair Conference Hall, Ongwediva.



Mr. Hamada, Counselor of Embassy of Japan in Namibia and Mr. Nakamura, Chief Representative of JICA Namibia Office participated in the Draft Master Plan Workshop.



Mrs. Matengu, Chief Agriculture Scientific Officer in Ohangwena Region chaired the Draft Master Plan Workshop.



Presentation of Mr. Otsuka, Team Leader of N-CLIMP Team at the Draft Master Plan Workshop.

No.5 (Phase-2)



3rd training for ATs of Omusati and Oshana Regions on Feb. 2 2016 at at the meeting rooms of AMTA Fresh Produce Hub at Ongwediva.



Market Survey at Omulunga Market by horticulture farmers in Onayena in Oshikoto on Jan. 28 2016.



3rd Training for Farmers Groups at Etayi (Cereal) in Omusati on Feb. 4 2016, training for transplantation of rice plant.



1st Training for Farmers Groups at Etunda (Horticulture) in Omusati on Nov. 6 2015, field investigation for pilot site activities.



3rd Training for Farmers Groups at Okahao (Cattle) in Omusati on Feb. 4 2016, training for dehorning.



Improved chicken house constructed by the support of N-CLIMP at Tsandi (Chicken) in Omusati (Shot at 3rd Training for Farmers Group on Feb. 8 2016)

No.6 (Phase-2)



3rd Training for Farmers Groups at Oshakati-West (Cereal) in Oshana on Feb. 9 2016, explanation of pearl millet growth.



Horticulture production by utilizing existing irrigation kit at Okatana (Horticulture) in Oshana (Shot at 1st Training for Farmers Group on Nov. 18 2015)



3rd Training for Farmers Groups at Uuvudhiya (Cattle) in Oshana on Feb. 9 2016, demonstration of fodder production.



Improved hatching space at demo farmer for chicken production in Uukuwiyu in Oshana (Shot on Feb. 13 2016)



Pearl millet field at demo farmer for cereal production in Omuthiya in Oshikoto (Shot on January during monitoring).



3rd Training for Farmers Groups at Onayena (Horticulture) in Oshikoto on Feb. 12 2016, Operation of tank and drip irrigation kit.

No.7 (Phase-2)



2nd Training for Farmers Groups at Omuntele (Cattle) in Oshikoto on Nov. 25 2015, training for animal fixation method.



4th Training for Farmers Groups at Onankali (Chicken) in Oshikoto on April. 5 2016, demonstration of vaccination for chicken.



2nd Training for Farmers Groups at Ondobe (Cereal) in Ohangwena on Dec. 7 2015, demonstrating of sawing and manuring after Ripper Furrowing.



3rd Training for Farmers Groups at Epembe (Horticulture) in Ohangwena on Feb. 25 2016, crop selection based on market information.



3rd Training for Farmers Groups at Okongo (Cattle) in Ohangwena on Feb. 24 2016, Demonstration of deworming of cattle.



3rd Training for Farmers Groups at Endola (Goat) in Ohangwena on Feb. 25 2016, Demonstration of castration of goat.

No.8 (Phase-3)



March 02nd 2017, the 3rd Training for Agriculture Technicians at AMTA Board Room in Oshana Region, preparation of training agenda for farmers.



March 09th 2017, the 3rd Training for ATs in Ohangwena, presentation by AT on progress of pilot site activities.



March 16th 2017, the 3rd Training for ATs in Oshikoto, preparation of training agenda for farmers.



March 16th 2017, the 3rd Training for ATs in Oshikoto, group photo after closing the training.



March 23 2017, the 3rd Training for ATs in Omusati, presentation by the resource person (drip irrigation) on benefit from group procurement of drip irrigation system.



Feb. 02nd 2017, installation of drip irrigation system at Okatana Constituency in Oshana Region, by replacing with the deteriorated one.

No.9 (Phase-3)



February 02nd 2017, at Okatana, under replacement of roof sheets for roof water harvesting.



Market Survey at Omulunga Market by horticulture farmers in Onayena in Oshikoto on Jan. 28 2016.



March 3rd 2017, site visit to Okau Kamasheshe (Oshakati-west Constituency in Oshana Region), weeding and thinning for mahangu (pearl millet) by demo farmers.



March 23th 2017, site visit to Okau Kamasheshe (Oshakati-west Constituency in Oshana Region), mahangu (pearl millet) well grown under better rainfall started in February 2017




March 14th 2017, site visit at Omuntele (cattle) with JICA mission from South Africa, demo farmer explaining the progress of pilot site activities.



March 14th 2017, site visit at Omuntele (cattle) with JICA mission from South Africa, interview to demo farmer with questions about technical measures.

No.10 (Phase-3)

	
<p>February 07th 2017, monitoring of pilot site activities at Uukwiyu Uushona (chicken) in Oshana Region, poultry house constructed under N-CLIMP.</p>	<p>February 09th 2017, on the Farmers Field Day at the chicken site of Uukwiyu Uushonam, showing hatching nest in the poultry house, made of concrete blocks.</p>
	
<p>February 17th 2017, monitoring at grain site of Okashana in Oshikoto Region, view of the 2nd year fallow plot to examine the effect.</p>	<p>February 17th 2017, monitoring at the grain site of Okashana in Oshikoto Region, view of the 2nd year crop to examine the effect of ripper furrowing applied in the last year.</p>
	
<p>February 14th 2017, site visit at Etunda Irrigation Scheme, maize planted in the plots operated by the Etunda Project Office (under center pivot irrigation).</p>	<p>February 14th 2017, site visit at Etunda Irrigation Scheme, wide area of maize field seriously damaged by army worm.</p>

No.11 (Phase-2)



March 15th 2017, the 3rd training for farmers group at Endola (goat), growing progress of fodder crops planted in demo farm and instructing measures to improve.



March 15th 2017, the 3rd training for farmers group at Endola (goat), group photograph with farmers, AT and N-CLIMP Team after closing the training.



February 23rd 2017, monitoring of pilot site activities at the cattle site of Uuvudhiya Constituency in Oshana Region, interview to the demo farmer on grass growth. ,



February 23rd 2017, at Uuvudhiya (same site as the left), giving instructions for planting fodder crops. Demo farm located in the south western, 100 km from the office.



March 12th 2017, trial planting of mahangu (pearl millet, improved variety of Okashana 2) at the N-CLIMP office in Ongwediva, about 30 days from germination.



March 27th 2017, trial planting of mahangu (pearl millet, same variety) at the N-CLIMP office, heading started at about 45 days from germination

CHAPTER 1 INTRODUCTION

General

1. This is the Main Report of Final Report prepared in accordance with the record of discussion on “Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia” between the Japan International Cooperation Agency and the Ministry of Agriculture, Water and Forestry (MAWF), Republic of Namibia. (I.1)

2. Draft Final Report consists of 4 volumes, as shown below: (1.1)

Volume-I Master Plan for Crop and Livestock Development in the Republic of Namibia

Volume-II Main Report (Result of Draft Master Plan Implementation in Phases-2 and -3)

Volume-III Training Materials

Objective and Approach of N-CLIMP

3. Outline of N-CLIMP is tabulated as follows: (I.3)

Outline of N-CLIMP

Item	Content
Objective of N-CLIMP	<ul style="list-style-type: none"> ◆ Agriculture development master plan is formulated including agriculture and livestock techniques to contribute to the improvement of livelihood of small-scale farmers. ◆ Relevant staff of Counterpart Agency (C/P) is enhanced in planning and implementation in the course of N-CLIMP.
Expected Output	<ul style="list-style-type: none"> ◆ Situation of small-scale farmers in the target area is surveyed and analyzed, and compiled as reliable data. ◆ Technical measures consisting of dry land crop production, livestock and farm management are examined and verified. ◆ Agriculture development M/P is formulated for the target area. ◆ Technology transfer is carried out to relevant staff of C/P in the course of N-CLIMP.
Target Area	<ul style="list-style-type: none"> ◆ Four regions in the North Central Division (NCD), i.e. Oshikoto, Oshana, Ohangwena and Omusati
Study Period	<ul style="list-style-type: none"> ◆ August 2014 to July 2017 (36 months)
Relevant Organizations	<ul style="list-style-type: none"> ◆ Ministry of Agriculture, Water and Forestry (MAWF) ◆ Relevant division and department (Division Extension & Development of Northern Region, Agricultural Development Centers, Veterinary Department of Subdivisions and Agricultural Research Stations)

Source: Prepared by the Study Team

CHAPTER 2 TECHNICAL MEASURES TO BE APPLIED FOR N-CLIMP

Technical Measures Pre-Evaluation

4. Through the discussion with ATs during the series of stakeholder meetings and comprehensive information gathering in Phase-1, technical measures, in total 35 numbers as tabulated below, are proposed for crop production, livestock production and farm management.

Proposed Technical Measures for Crop Production, Livestock Production and Farm Management

Sector	No.	Name of Technical Measures
Crop Production	CR-1	Fertilizer application
	CR-2	Cropping pattern and crop management
	CR-3	Conservation agriculture
	CR-4	Flood- and drought- adaptive cropping system (rice-mahangu mixed cultivation)
	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
	CR-9	Establishment of crop production and marketing cooperatives
Livestock Production	LS-1	Fodder production
	LS-2	Range management
	LS-3	Water harvesting and/or construction of water resource facilities for animals
	LS-4	Nutritious feed supply particularly for pig and chicken
	LS-5	Disease control
	LS-6	Large and small stock fattening
	LS-7	Periodical production
	LS-8	Expansion of quality meat
	LS-9	Bull scheme
	LS-10	Multiplication of Sanga bull
	LS-11	Goat production
	LS-12	Pig production
	LS-13	Chicken production
	LS-14	Promotion and strengthening of auction for both large and small stocks
	LS-15	Development of formal market for small stock
	LS-16	Establishment and strengthening livestock cooperatives
Farm Management	FM-1	Household accounting management
	FM-2	Record keeping (Farm Record)
	FM-3	Post harvest
	FM-4	Business plan
	FM-5	Group formation/ group strengthening
	FM-6	Group accounting management
	FM-7	Formulation of water users association
	FM-8	Collective selling / purchasing
	FM-9	Rural finance accessibility improvement
	FM-10	Market information access improvement

Source: Prepared by the Study Team

5. Master plan for crop and livestock production will be implemented phase-wise, therefore, technical dissemination needs to be strategically carried out. Since 35 numbers of technical measures proposed above are different from various view point such as: (i) necessity of verification, (ii) importance and/or urgency, (iii) technical level, (iv) cost for introduction and so forth, the proposed technical measures are preliminarily evaluated into 3 categories for applying to the fields as follows:

- ◆ **Category 1:** technical measures to be applied for pilot site activities (phase 2 and phase 3)
- ◆ **Category 2:** technical measures to be applied during the master plan period (short-term)
- ◆ **Category 3:** technical measures to be applied during the master plan period (long-term)

Criteria for categorization of technical measures are tabulated as follows: (2.1.1)

Criteria for Categorization of Technical Measures

Criteria	How to evaluate
1. Necessity of verification	(i) necessary or (ii) not necessary (already verified)
2. Period required for verification	Number of years to be required
3. Possibility of dissemination after verification	
3-1 Cost	(i) low, (ii) moderate and (iii) high
3-2 Number of farmers for dissemination	(i) small, (ii) moderate and (iii) large
3-3 Techniques level	(i) basic, (ii) intermediate and (iii) advanced
4. Coordination with other projects and programs	(i) yes and (ii) no and/or organizations for coordination

Source: Prepared by the Study Team

6. Using the criteria above, number of technical measures for each category is shown below. (2.1.2)

Result of Categorization of Technical Measures

Subject	Category						
	1	2	3	1-2	2-3	1,2-3	Total
Crop production	-	-	1	-	-	8	9
Livestock production	8	2	-	1	3	2	16
Farm management	7	2	-	-	-	1	10
Total	15	4	1	1	3	11	35

Note: Category 1-2 are the technical measures necessary to be adopted urgently as fundamental basic items for crop and livestock production. Also, they will require longer time of period for verification.

Category 2-3 are the technical measures comparatively advanced to be disseminated after basic technical measures are extended.

Category 1,2-3 are the technical measures basic and needs to be introduced urgently, however, their dissemination would take longer period than Category 1-2.

Source: Prepared by the Study Team

7. Through the discussion with farmers' group and ATs in the phase-2, the following technical measures are selected for the pilot site activities based on the needs of each site. (2.1.2)

List of Technical Measures adopted in Phase-2

Crop production (8 nos.)	Livestock production (11 nos.)	Farm management (8 nos.)
<p>Grains</p> <ul style="list-style-type: none"> ◆ Fertilizer application (CR-1) ◆ Cropping pattern and crop management (CR-2) ◆ Conservation agriculture (CR-3) ◆ Flood- and drought-Adaptive Cropping System (CR-4) <p>Horticulture crops</p> <ul style="list-style-type: none"> ◆ Water source / water harvesting (CR-5) ◆ Water saving cultivation (CR-6) ◆ Crop selection and Marketing (CR-7) ◆ Cropping plan and horticulture crop management (CR-8) 	<p>Feed supply</p> <ul style="list-style-type: none"> ◆ Fodder production (LS-1) ◆ Range management (LS-2) ◆ Water harvesting and/or construction of water resource facilities for animals (LS-3) ◆ Nutritious feed supply particularly for pig and chicken (LS-4) <p>Production</p> <ul style="list-style-type: none"> ◆ Disease control (LS-5) ◆ Large and small stock fattening (LS-6) ◆ Periodical production (LS-7) ◆ Goat production (LS-11) ◆ Pig production (LS-12) ◆ Chicken production (LS-13) <p>Management</p> <ul style="list-style-type: none"> ◆ Establishment and strengthening livestock cooperatives (LS-16) 	<ul style="list-style-type: none"> ◆ Record keeping (Farm Record) (FM-2) ◆ Post harvest (FM-3) ◆ Group formation/ group strengthening (FM-5) ◆ Group accounting management (FM-6) ◆ Formulation of water users association (FM-7) ◆ Collective selling / purchasing (FM-8) ◆ Rural finance accessibility improvement (FM-9) ◆ Market information access improvement (FM-10)

Source: Prepared by the Study Team

CHAPTER 3 SELECTION OF PILOT SITE ACTIVITIES

General

8. The following meetings were held in each region for selection of pilot site activities. (3.2.1)

Meetings for Selection of Pilot Site Activities

Date	Meeting	Contents
Phase-2 in 2015/16		
1. August 2015	Stakeholder Meeting 1 (SM-1)	◆ Selection of pilot sites (Selection of target ADCs)
2. August to September 2015	Preparatory Training for Farmers' Group	◆ Explanation of SHEP approach ◆ Survey for general farming activities ◆ Gender training ◆ Preparation of farmers' group action plan
3. September 2015	Stakeholder Meeting 2 (SM-2)	◆ Selection criteria for farmers' group ◆ Preparation of supporting plan by ATs
Phase-3 in 2016/17		
4. August 2016	Stakeholder Meeting 1 (SM-1)	◆ Review of pilot site activities in Phase-2 by ATs ◆ Explanation of verification results on technical measures and SHEP Approach ◆ Work schedule in Phase-3 ◆ Selection of pilot sites (Selection of ADCs)
5. August to September 2016	Stakeholder Meeting 2 (SM-2) and Preparatory Training for Farmers' Group	◆ Gender training and FABLIST forum ◆ Survey on farming activities ◆ Preparation of action plan by farmers and support plan by ATs ◆ Work schedule for pilot site activities

Source: Prepared by the Study Team

Selected Site and Activities

9. Through the discussion of SM members during SM-1, principle of the component of pilot site activities were decided as follows:

- ◆ **Number of site:** 4 sites in each region (total 16 sites) in Phase-2, the same 16 site and a new site (King Kauluma ADC in Oshikoto region) in Phase-3;
- ◆ **Activities:** 4 different activities (grains, horticulture, cattle, small stock: chicken and goat) in each region, and
- ◆ **Technical measures:** technical measures are selected according to the farmers' constrains, with necessary farm management technical measures. In addition, water supply improvement measures are to be applied where water is available. (3.2.1)

10. Selection steps and criteria are summarized as follows: (3.2.1)

- ◆ **Step-1 Share of challenges in the region :** based on the information collected through ATs in Phase 1, challenges for crop and livestock production, were reviewed in each region.
- ◆ **Step-2 Criteria for selection of target ADCs :** The following criteria were agreed among SM members for the selection of appropriate ADCs to solve the above mentions challenges

Criteria for Selection of Target ADCs

Criteria	Contents
1. Priority in the region	<ul style="list-style-type: none"> ◆ Technical focus (priority) ◆ Intension of SM members particularly ATs
2. Demonstration effect	◆ Easy physical accessibility in the region so that technical spreading effect will be expected
3. Availability of farmers' group	◆ Utilizing existing farmers group make activities easy and efficient
4. Possibility of technical verification during 1 cropping season	◆ Technical effectiveness can be confirmed to some extent in 1 cropping season
5. Willingness of farmers/ Leadership	◆ Selection of the Groups with high willingness of farmers or with strong leadership (for Ohangwena region)

Source: Prepared by the Study Team

- ◆ **Step-3 Selection of target ADCs** : Based on the criteria agreed in Step-2, the following ADCs were selected in each region.

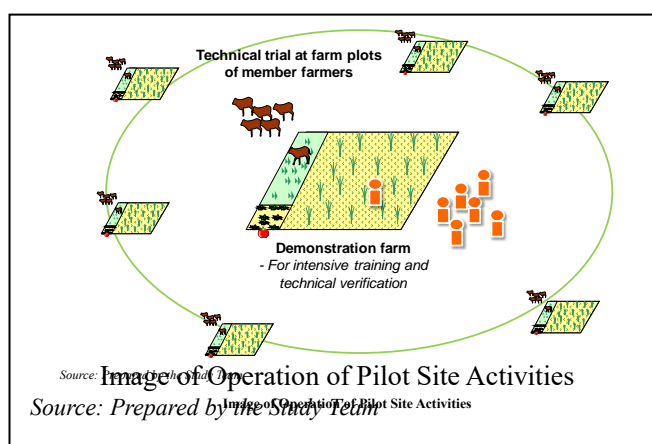
Selected ADCs for Pilot Site Activities

Region	Activity	Crop Production (Cereal/Grains)	Crop Production (Horticulture)	Livestock (Cattle)	Livestock (Small Stocks)
Omusati	Etayi	Etunda	Okahao	Tsandi	
Oshana	Oshakati-west	Okatana	Uuvudhiya	Uukuwiyu	
Oshikoto	Omuthiya	Onayena	Omuntele	Onyaanya. King Kauluma	
Ohangwena	Ondobe	Epembe	Okongo	Endola	

Source: Prepared by the Study Team

11. After the selection of the pilot sites in 4 regions, action plan and supporting plan were formulated by farmer' group and ATs respectively based on the following procedures: (3.2.2 to 3.2.3)

- ◆ Action plan by farmers' group: (i) explanation of outline of N-CLIMP, (ii) explanation of SHEP approach, (iii) survey for general farming activities, (iv) gender training and (v) formulation of farmers' group action plan
- ◆ Supporting plan by ATs: (i) decision of scale of pilot site activities (15 farmers in principle), (ii) discussion on section criteria for target farmers and (iii) formulation of supporting plan



12. As a part of support plan, basic inputs covered by N-CLIMP is tabulated as follows: (3.2.3)

Basic Input covered by N-CLIMP

Items	Notes
Crop production	
Land preparation (Conservation agriculture)	All the target farmers in Phase-2 and Phase-3
Seed, Fertilizer, chemicals	All the target farmers in Phase-2
Fencing material	Demonstration farm only in Phase-2
Drip irrigation kit	All the target farmers in Phase-2 and Phase-3
Water tank for drip irrigation	Demonstration farm only in Phase-2
Roof materials for replacement	Demonstration farm only in Phase-2 and Phase-3

Items	Notes
Livestock production	
Seed (fodder crop)	All the target farmers in Phase-2 and Phase-3
Fencing material for fodder production	Demonstration farm only
Medical kit	2 sets of kit for group
Medicine	Demonstration farm only
Animal husbandry kit	Demonstration farms for cattle and goat
Livestock hut/cage (Chicken)	Demonstration farm only
Water harvesting by sand bag	Provide sand bag and tool

Source: Prepared by the Study Team

CHAPTER 4 IMPLEMENTATION OF PILOT SITE ACTIVITIES

Methodology of Training

13. Training of trainers approach is employed for implementation and monitoring of the pilot site activities in Phase 2 and Phase 3. In this approach, trainings are conducted in two steps for the extension staff as well as farmers. In the 1st step of trainings, N-CLIMP team conducted training for ATs as the training of trainers (TOT) where ATs obtained the technical knowledge and coaching techniques through role plays. In the 2nd step of trainings, ATs conducted the trainings for farmers groups by employing the knowledge and experience obtained in TOT. (4.1.1)

Training for ATs and for Farmers Groups

14. Series of trainings for ATs by the N-CLIMP team and trainings for farmers Groups by ATs were repeatedly conducted as shown below. (4.1.2)

Trainings Conducted for Pilot Site Activities

Month and Year	Trainings
Phase-2 (July 2015 to April 2016)	
November 2015	1st Training for ATs
November 2015	1st Trainings for Farmers Groups by AT
November 2015	2nd Training for ATs
November to December 2015	2nd Training for Farmers Groups by AT
February 2016	3rd Training for ATs
February 2016	3rd Training for Farmers Groups by AT
March 2016	4th Training for ATs
April 2016	4th Training for Farmers Groups by AT
Phase-3 (July 2016 to April 2017)	
October to November 2016	1st Training for ATs
November 2016	1st Trainings for Farmers Groups by ATs
November 2016	2nd Training for ATs
November to December 2016	2nd Training for Farmers Groups by AT
March 2017	3rd Training for ATs
March to April 2017	3rd Training for Farmers Groups by AT

Source: Prepared by the Study Team

Monitoring of the Pilot Site Activities

15. Major features of the pilot site activities at 16 sites are described as the outline of the activities, focusing on location, ATs in charge, target farmers, technical measures applied, inputs and materials provided from N-CLIMP, progress of farm records and other topics, together with the

photographs. (4.2, 4.3, 4.4 and 4.5)

16. The next table summarizes the characteristics of pilot sites in each region.

Summary of Characteristics of Pilot Sites

Region	Cereal Grain	Horticulture	Large Stock	Small Stock
Omusati	<ul style="list-style-type: none"> • Rice-Mahangu Mixed Cropping • Ripper Furrowing • Drought Situations 	<ul style="list-style-type: none"> • Working with Green Scheme Program • SHEP Action Plan based on farmers' initiatives 	<ul style="list-style-type: none"> • Market Oriented Approach by the Demo Farme 	<ul style="list-style-type: none"> • Collective Purchase of Vaccine
Oshana	<ul style="list-style-type: none"> • Effects of Ripper Furrowing Confirmed 	<ul style="list-style-type: none"> • Maximization of Existing Facilities for Horticulture • Market Survey by Farmers 	<ul style="list-style-type: none"> • Fodder Production against Drought 	<ul style="list-style-type: none"> • Collective Purchase of Vaccine as a group • Usage of Local materials and Resources • Farmers' Field Day
Oshikoto	<ul style="list-style-type: none"> • Effects of Ripper Furrowing understood by Farmers 	<ul style="list-style-type: none"> • Introduction of water saving cultivation • Collaboration with an officer in another region • Market Survey by Demo and Key Farmer 	<ul style="list-style-type: none"> • Animal Husbandry made easy by Periodical Production 	<ul style="list-style-type: none"> • Incubation for providing chicks to local markets (Chicken) • Collaboration with a governmental project through technical assistance (Goat)
Ohangwena	<ul style="list-style-type: none"> • Mahangu Intercropping with Bambara nuts and beans • Group Work on Communal Land • Collaboration of ADC and Regional Council 	<ul style="list-style-type: none"> • Communal Irrigation Facility • Delay of Connection to borehole of Rural Water Supply system 	<ul style="list-style-type: none"> • Needs of Fodder Production against Drought understood by Farmers 	<ul style="list-style-type: none"> • Household level Gender Issue • Key farmers' plan for further activities through gaining cash income by selling part of animals

Source: Prepared by the Study Team

CHAPTER 5 VERIFICATION OF TECHNICAL MEASURES AND FARMING MODELS

Verification in General

17. Technical measures are verified based on the results of the pilot site activities through the steps of 1) verification at each site, 2) verification of each technical measures by compiling the results at each site, focusing on the points below: (5.1.1)

- Technical measures for crop and livestock are verified in terms of economic (cost and benefit compared with the conventional methods) and social aspects (perception by farmers).
- Technical measures for farm management are verified in terms of applicability in the process to implement the pilot site activities.

Based on the above, the framework is prepared for verification as shown below;

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.

Verification of Crop Production

18. Verification results are summarized for crop production below: (5.1.2)

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	grain sites
CR-4 Flood- and drought-adaptive cropping (Rice-Mahangu Mixed Cropping System)	Low	Moderate	1 horticulture site, rehabilitation only
CR-5 Water source / water harvesting	High	High	4 horticulture sites
CR-6 Water saving cultivation	Moderate	Moderate	4 horticulture sites
CR-7 Crop selection and marketing	Moderate	High	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"> • Better initial growth brought by basal manure application. • Proper thinning to utilize the limited soil moisture under the drought condition • More improvement expected by better understanding of crop development stages for better
	CR-3 Conservation agriculture	<ul style="list-style-type: none"> • Better growth and harvest through breaking shallow soil pan and increase soil moisture • Limited availability of ripper furrowing

Overall Verification	Technical Measures	Conclusion
	CR-6 Water saving cultivation	<ul style="list-style-type: none"> Higher perception by some of farmers. Essential for horticulture.
Moderate	CR-5 Water source / water harvesting	<ul style="list-style-type: none"> Only 1 site applied for rehabilitation of the existing roof catchment. Effective in back yard garden, but higher cost required Proper maintenance and operation needed
	CR-7 Crop selection and marketing	<ul style="list-style-type: none"> Essential to create the mind set of “agriculture as business”
	CR-8 Cropping plan and horticulture crop management	<ul style="list-style-type: none"> Basic knowledge and techniques required for crop management, particularly pest and insect control.
Low	CR-4 Flood- and drought-adaptive cropping (Rice-Mahangu Mixed Cropping System)	<ul style="list-style-type: none"> Only 1 site to apply Mainly due to unstable stable water condition Economic aspect to be improved under the favorable seasonal wet land

Source: Prepared by the Study Team

Verification of Livestock Production

19. Verification results are summarized for livestock production below: (5.I.3)

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
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

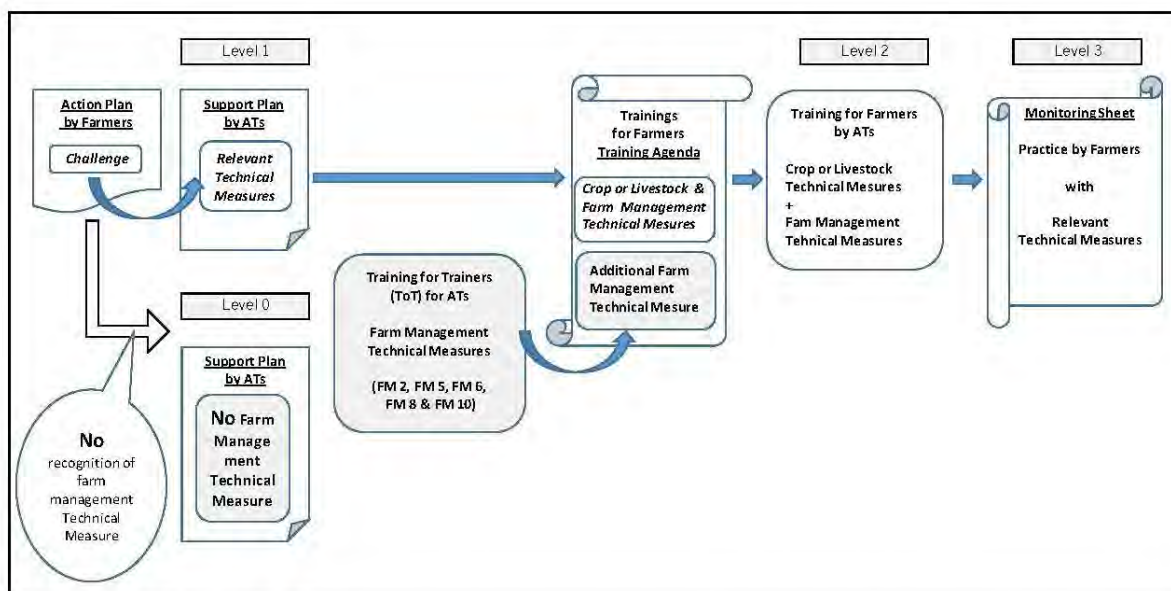
Overall Verification	Technical Measures	Conclusion
High	LS-13 Chicken production	<ul style="list-style-type: none"> High in “economic aspect” in all 3 pilot sites Quick returns by introducing hatching skill Easy raising management with lower investment
Moderate	LS-4 Nutritious feed supply, particularly for pig and chicken	<ul style="list-style-type: none"> Use of feed material locally available in order to improve profitability

Overall Verification	Technical Measures	Conclusion
	LS-5 Disease control	<ul style="list-style-type: none"> Applied and practiced by farmers in all 8 sites. Essential for livestock production Low accessibility to obtain medicines and vaccines
	LS-6 Large and small stock fattening	<ul style="list-style-type: none"> Practiced in 1 site Investment required to purchase materials for fattening
	LS-11 Goat production	<ul style="list-style-type: none"> Quicker return and easy management Less fodder requirement: 1/6 of cattle
Low	LS-1 Fodder production	<ul style="list-style-type: none"> Separate and repeated planting required due to unstable rainfall
	LS-7 Periodical production	<ul style="list-style-type: none"> Only 1 site applied for verification. Low reproductive record keeping of herd reproduction
No rating	LS-2 Range management	<ul style="list-style-type: none"> Mature understanding of importance of planned grazing with rotation against deterioration of pasture. Difficult to solve within the short period of 2 years under N-CLIMP

Source: Prepared by the Study Team

Verification of Farm Management Production

20. 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.: (5.1.3)



Source: Prepared by the Study Team

Process of application of farm management technical measures in pilot sites

21. In short, 4 levels of application of farm management technical measures 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.

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

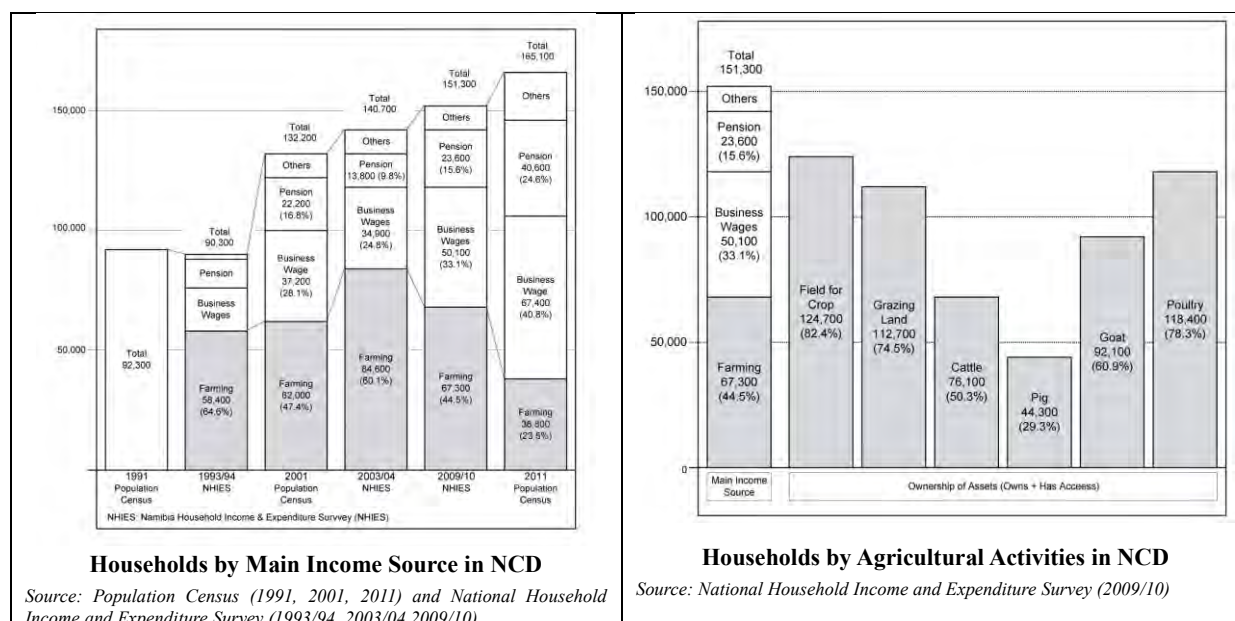
Level 2: Implementation of farmers' training addressing the technical measure

Level 3: Practice by farmers using or applying the technical measure

Source: Prepared by the Study Team

Background on Farming Model based on Verification Results

22. Statistical data in the North Central shows the number of households obtaining the main income from farming has been decreasing rapidly as shown below the left, and this decreasing trend likely continue, caused by shifting of younger generation from farming in the communal lands to urban area. Another data shown below the right indicates households obtaining the main income from other than farming are also engaged in farming activities for home consumption and supplemental income. (5.3.1)
23. Taking into account the above 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. (5.3.1)



Farm Size and Activities

24. Medium and small scale 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. (5.3.2)

Farming Activities by Farm Size

Farming Model	Crop (grains & horticulture)	Livestock (cattle & chicken)
1. Small Scale Farmer Main income: wage and others (off-farm income) Family labor: part time basis	3 ha of grain field 150 m ² 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 ² 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 Tea

Technical Measures applied to Farming Model

25. The following technical measures are applied to each farming models: (5.3.2)

Farming Activities by Farm Size

Farming Model	Crop Production	Livestock Production	Farm Management
1. Small Scale Farmer	CR-1, CR-2, CR-3	LS-1, LS-4, LS-5, LS-6, LS-7 and LS-12	FM-2, FM-5, FM-6, FM-8 and FM-10
2. Medium Scale Farmer	CR-6, CR-7 and CR-8	No technical measures applied	FM-2, FM-5, FM-6, FM-8 and FM-10
3. Small Scale Horticulture Farmer	No technical measures applied	LS-1, LS-2, LS-4, LS-5, LS-6 and LS-7	FM-2, and FM-10
4. Cattle Farming (scale: 114 cattle)	CR-1, CR-2 and CR-3	No technical measures applied	FM-2, FM-5, FM-6, FM-8 and FM-10
5. Grain Farming (scale: 100 ha)	No technical measures applied	LS-1, LS-5 and LS-11	FM-2, FM-5, FM-6, FM-8 and FM-10
6. Goat Farming (1 buck + 20 dose)	No technical measures applied	LS-1, LS-4, LS-5 and LS-12	FM-2, FM-5, FM-6, FM-8 and FM-10
7. Chicken Farming (1 cock +30 hens)	No technical measures applied	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
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		

Source: Prepared by the Study Team

Net Income by Farming Model

26. Through application of technical measures, the net income derived from income-cost balance are estimated for each of farming models, as shown below: (5.3.3)

Net Income by Farming Models

Farming Model	Gross Income		Production Cost		Net Income	
1. Small Scale Farmer 3 ha of grain field 150 m ² 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
	<u>Total</u>	<u>N\$29,100</u>	<u>Total</u>	<u>N\$14,300</u>	<u>Total</u>	<u>N\$14,900</u>
	2. Medium Scale Farmer 6 ha of grain field 150 m ² of garden 30 cattle 1 cock + 10 hen	Pearl Millet	N\$10,200	Pearl Millet	N\$3,800	Pearl Millet
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
<u>Total</u>		<u>N\$61,400</u>	<u>Total</u>	<u>N\$32,200</u>	<u>Total</u>	<u>N\$29,300</u>

Farming Model	Gross Income		Production Cost		Net Income	
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
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

27. Small Scale Farmer obtains N\$14,900 of annual farm income, 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. (5.3.3)
28. Medium Scale Farmer obtains N\$29,300 annually, and this is equivalent to N\$2,400 of monthly income. 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. (5.3.3)
29. Small Scale Horticulture Farmer obtains income generated from horticulture farming, annually 2 crops of vegetables in 3 ha of irrigation plots, conservatively estimated at N\$105,000 annually, equivalent to N\$9,000 of monthly income. (5.3.3)

Net Income by Farming Model

30. For grain production under small scale farmer, net income is compared under the “with technical measures” condition and the “without technical measures” condition: (5.2.3)

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)
Assumption: Small Scale Farmer - 3 ha of pearl millet under rainfed condition	400 kg / ha by (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	200 kg / ha by (1) disc harrow every year, (2) minimum basal manure application, (3) no top dressing of fertilizer, and (4) no thinning
Production and gross income	690 kg x N\$5.4 / kg = N\$3,700	90 kg x N\$5.4 / kg = N\$500
Production cost	N\$1,500	N\$500
Net Income	N\$2,200	N\$0

Source: Prepared by the Study Team

31. Similarly for goat production under small scale farmer, net income is compared under the “with technical measures” condition and the “without technical measures” condition: (5.2.3)

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)
Assumption: Small Scale Farmer - Herd structure 1 buck + 20 does	Off-take rate: 51% (1) pregnant rate: 130% , (2) kid mortality rate: 15%, and (3) adult mortality rate: 2%	Off-take rate: 51%: 42% (1) pregnant rate: 100% , (2) kid mortality rate: 20%, and (3) adult mortality rate: 5%
Production and gross income	22 heads x N\$800 = N\$17,600	15 heads x N\$800 = N\$12,000
Production cost	N\$6,000	N\$4,200
Net Income	N\$11,600	N\$7,800

Source: Prepared by the Study Team

CHAPTER 6 LESSONS LEARNT AND RECOMMENDATION TO MASTER PLAN

Lessons Learnt

32. Lessons learnt from N-CLIMP are summarized as follows: (6.1)

- ◆ **Work load of Agricultural Technicians and senior staff:** (i) work burden and experiences of ATs, (ii) insufficient number of CAT and CASO and (iii) necessity of timely back-support from the headquarters of MAWF,
- ◆ **Timely disbursement of budget and arrangement of equipment:** (i) smooth disbursement of operational budget, (ii) Insufficiency in physical equipment for agricultural extension and (iii) insufficiency in the budget of research station,
- ◆ **Selection of key farmers:** (i) importance of appropriate section of farmers’ group and (ii) necessity of strengthening of farmer to farmer extension system.

Recommendation

33. Recommendation to phase-3 of N-CLIMP is as follows: (6.2)

- ◆ **Budgetary arrangement for Master Plan Implementation:** timely budgetary arrangement to implement activities in the Master Plan.
- ◆ **Selection of pilot sites:** appropriate location and number of pilot sites,
- ◆ **Strengthening of farmer to farmer extension system:** attention to be paid how to facilitate dissemination of proposed technical measures from farmer to farmer,
- ◆ **Strengthening of coordination among relevant organizations and programs:** involvement of stakeholders as well as relevant programs / projects such as DCP, National Strategic Food Reserve, National Comprehensive Conservation Agriculture Program, AgriBusDev, Meat Board etc.

**NORTHERN CROP AND LIVESTOCK DEVELOPMENT MASTER PLAN STUDY
IN
THE REPUBLIC OF NAMIBIA**

**VOLUME-II
MAIN REPORT**

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Abbreviations

[A]	ADC	Agriculture Development Center
	Agri-Bank	Agriculture Bank of Namibia
	AgriBusDev	Agri-business Development Services
	AMTA	Agricultural Marketing and Trade Agency
	ASO	Agricultural Scientific Officer
	AT	Agricultural Technician
[C]	CAN	Conservation Agriculture of Namibia
	CASO	Chief Agricultural Scientific Officer
	CAT	Chief Agricultural Technician
[D]	DAPEES	Directorate of Agricultural Production, Extension and Engineering Services
	DARD	Directorate of Agriculture and Research Development
	DC	Divisional Committee
	DCPP	Dry Land Crop Production Program
	DF	Directorate of Forestry
	DRWSSC	Directorate of Rural Water Supply and Sanitation Coordination
	DVS	Directorate of Veterinary Services
[F]	FR	Final Report
	FSP	Farmers' Support Project
[G]	GDP	Gross Domestic Product
	GNI	Gross National Income
	GOJ	Government of Japan
	GRN	Government of Republic of Namibia
[I]	IcR	Inception Report
[J]	JICA	Japan International Cooperation Agency
[M]	MAWF	Ministry of Agriculture, Water and Forestry
	MeatCo	Meat Corporation of Namibia
	M/P	Master Plan Study
[N]	NAB	National Agronomic Board
	NCD	New Castle Disease
	NCD	North Central Division
	N-CLIMP	Northern Crop and Livestock Development Master Plan Study
	NDP	National Development Plan
	NHIES	National Household Income and Expenditure Survey
	NNFU	Namibia National Farmers Union
[P]	PR	Progress Report
[R]	RDC	Rural Development Center
[S]	SASO	Senior Agricultural Scientific Officer
	SAT	Senior Agricultural Technician
	SATREPS	Science and Technology Research Partnership for Sustainable Development
	SC	Steering Committee
	SHEP	Smallholder Horticulture Empowerment Project
	SM	Stakeholder Meeting
[T]	TOT or ToT	Training of Trainers
[U]	UNAM	University of Namibia

Measurement Units and Currencies

Length

mm	millimeter(s)	km	kilometer(s)
cm	centimeter(s)	in.	inch
m or lin. m	meter(s)	ft.	foot

Area & Volume

m ² or sq. m	square meter(s)	ha	hectare(s)
km ²	square kilometer(s)	acre	acre(s)
L or lit.	liter(s)	MCM	million cubic meter(s)
m ³ or cu. m	cubic meter(s)	ft ³	cubic feet = 0.0283 m ³

Weight

Gr. or gr.	gram(s)	kg	kilogram(s)
ton or t	ton(s) or tonne(s)		

Time & Speed

sec	second(s)	D	day(s)
hr or h	hour(s)	mm/day or mm/d	millimeter per day
L/sec or L/s	liter per second	m ³ /sec or m ³ /s	cubic meter(s) per second

Energy & Temperature

N/m ²	Newton per square m (=Pa)	Pa	Pascal
HP	Horsepower	°C	degrees Celsius

Electricity

kV	kilo Volt	MVA	mega Volt-ampere
MW	mega Watt	GWh	giga Watt-hour(s)

Currency

JPY or ¥	Japanese Yen	USD or US\$	USA Dollar
NAD or N\$	Japanese Yen	ZAR or R	South Africa Rand

Units Conversion

<u>SI Units</u>	<u>FPS Units</u>	<u>SI Units</u>	<u>FPS Units</u>
1.000 m	= 3.281 ft	0.3048 m	= 1.0000 ft
25.4 mm	= 1 inch	1 km	= 0.6214 mile
1.0000 acre	= 4,046.86 m ²	1 ha = 10,000 m ²	= 2.47 acres
1 m ²	= 10.7 ft ²	1 m ³ /s	= 35.3 ft ³ /s
28.3 lit./s	= 1 ft ³ /s	1 tonne	= 0.984 ton
1 kg	= 2.205 lb	1 N = 1 kg.m/s ²	= 0.10197162 kgf
4.88 kg/m ²	= 1 lb/ft ²	9.80665N	= 1 kgf
1 N/mm ²	= 145.03 lb/in ²	16.019 kg/m ³	= 1 lb/ft ³
107.25 kN/m ²	= 1 ton/ft ²	0.745 kW	= 1 HP
g (acceleration of gravity)	= 9.81 m/s ²		

Text

N-CLIMP
Main Report

CHAPTER 1 INTRODUCTION

1.1 General

This is the Main Report of the Final Report prepared in accordance with the record of discussion on the “Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia” (N-CLIMP) between the Japan International Cooperation Agency and the Ministry of Agriculture, Water and Forestry (MAWF), Republic of Namibia.

The Final Report consists of 4 volumes, as shown below:

- Volume-I Master Plan for Crop and Livestock Development in the Republic of Namibia
- Volume-II Main Report (Result of Draft Master Plan Implementation in Phases-2 and -3)
- Volume-III Training Materials

This report contains (1) the result of pilot site activities implemented by the MAWF Agricultural Technicians under the N-CLIMP through applying the Technical Measures to the agricultural extension activities as well as (2) the farming models derived based on the result of pilot site activities.

1.2 Background

(1) Conditions of Agriculture and Rural Area in Northern Namibia

The Republic of Namibia is located on the southern Africa with the area of 820,000 km² surrounded by South Africa, Botswana, Angola and Zambia. The population is approximately 2.2 million in 2011 (Population Census 2011).

Main economic activity of Namibia is mining particularly Uranium, diamond and natural gas. Namibia is a one of the semi-developed countries showing 12.6 billion US dollar of GDP and 5.67 thousand of GNI per capita, the annual economic growth of which has recorded more than 4.5% since 2001. The disparity in wealth, however, still significant, one of the highest countries in the world, with Gini coefficient of 0.636 (as of 2012). Therefore, rural livelihood improvement is put priority in the country.

The Government of Republic of Namibia (GRN) has formulated long term national development policy, “Vision 2030”, a basis of 5-year national development plan. In Vision 2030, maintenance and improvement of land productivity is the main target for agriculture sector in order to increase rural household income and to ensure food security of the country. In particular, in consideration of severe climatic conditions and land environment vulnerability, GRN has been promoting sustainable livelihood improvement and poverty alleviation by environment-friendly agriculture. In addition, Fourth National Development Plan (NDP4: 2012/13 – 2016/17) put enhancement of crop and livestock farming, forestry and fishery as one of four important challenges for economic growth of the country.

Export-oriented fishery and pastoralism has been developed using suitable environment, on the other hand, overall self-sufficiency of grains is still 33.6%, and 95% for millet and sorghum, 44% for maize, 33% for wheat respectively (2007/2008).

Most of the farmers in the northern area engage in subsistent agriculture. The area is extensively covered by sandy soil with the annual rainfall of only 200 to 600mm, therefore, grains such as millet and beans durable to dry conditions are especially planted. Farmers generally practice mixed agriculture by grains farming as mentioned above and feeding cow and goat. Vegetable and fruit cultivation is carried out only at water-accessible areas such as irrigation systems developed under green scheme. In such areas,

market-oriented crops including maize, tomato and onion are cultivated. Northern region of Namibia is prone to climate change where drought due to limited rainfall and flood from Angora plain repeatedly occur giving serious damages to small-scale farmers. Among others, flood damages are more serious such as northern river flood in 2008 and Zambezi river flood in 2010. Therefore, population drain is observed from northern region to capital and other major cities for finding job opportunities.

In order to ensure overall social security of the country and to stabilize agriculture production in the northern region, the strategic, concrete and consistent agriculture development master plan is required to be formulated in natural and social environment-friendly manner. Therefore, MAWF of GRN requested the Government of Japan (GOJ) for technical cooperation to formulate master plan. Based on the minutes of meetings on the Detailed Planning Survey for Northern Crop and Livestock Development Master Plan Study (herein after referred to as “N-CLIMP”) dispatched in November 2013, N-CLIMP is implemented from September 2014.

1.3 Objective of N-CLIMP

Outline of N-CLIMP, on the objective, expected output, target area, study period and relevant organizations, is tabulated below:

Outline of N-CLIMP

Item	Content
Objective of N-CLIMP	<ul style="list-style-type: none"> ✓ Agriculture development master plan is formulated including agriculture and livestock techniques to contribute to the improvement of livelihood of small-scale farmers. ✓ Relevant staff of Counterpart (C/P) Agency is enhanced in planning and implementation in the course of N-CLIMP.
Expected Output	<ul style="list-style-type: none"> ✓ Situation of small-scale farmers in the target area is compiled as reliable data. ✓ Technical measures consisting of crop production, livestock production and farm management. ✓ Agriculture development master plan is formulated for the target area. ✓ Technology transfer is carried out to relevant staff of C/P in the course of N-CLIMP.
Target Area	<ul style="list-style-type: none"> ✓ Four regions in the North Central Division (NCD), i.e. Oshikoto, Oshana, Ohangwena and Omusati,
Study Period and Activities	<ul style="list-style-type: none"> ✓ August 2014 to July 2017 (36 months) consisting of 3 phases, namely ✓ Phase-1: September 2014 to May 2015 Comprehensive information gathering (overall review survey, detailed thematic survey), preliminary assessment of development potential, identification of technical measures, framework of master plan ✓ Phase-2: July 2015 to May 2016 Pilot site activities at 16 sites through training of Agricultural Technicians and farmers’ groups, verification of technical measures, farming model, draft master plan based on the result of pilot site activities ✓ Phase-3: July 2016 to May 2017 ✓ Pilot site activities at 17 sites through training of Agricultural Technicians and farmers’ groups, verification of technical measures, modification of farming models, finalization of master plan based on the result of pilot site activities
Relevant Organizations	<ul style="list-style-type: none"> ✓ Ministry of Agriculture, Water and Forestry (MAWF) ✓ Relevant division and department (Division Extension & Development of Northern Region, Agricultural Development Centers, Veterinary Department of Subdivisions and Agricultural Research Stations)

Source: Prepared by the Study Team

1.4 N-CLIMP Implementation Organization

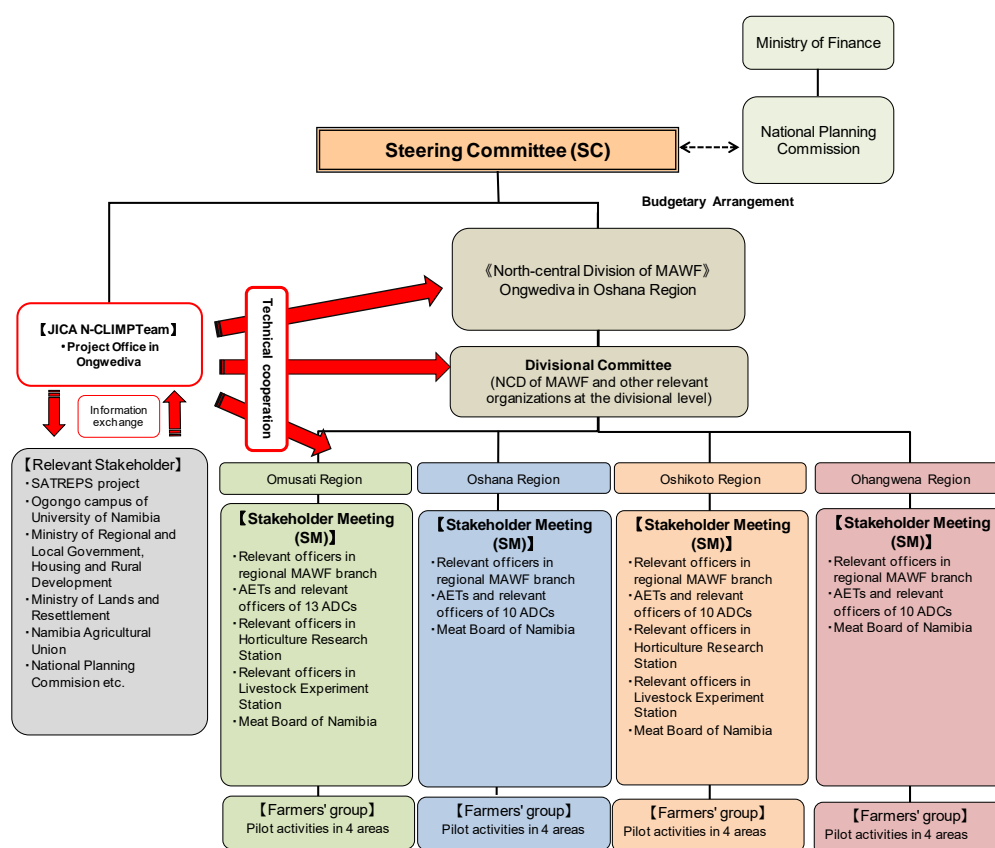
In accordance with the discussion in Steering Committee (SC) and Divisional Committee (DC), members and N-CLIMP implementation organization have been determined as shown below. List of

agriculture development centers (ADCs) and staffs are shown in Table 1.4.1.

Member of Steering Committee, Divisional Committee and Stakeholder Meeting

Organization	Member
Steering Committee (SC)	<ul style="list-style-type: none"> ◆ Chair: Mrs. Sophia Kasheeta, Deputy Permanent Secretary ◆ Deputy Chair Person: Ms. Johanna F. N. Andowa, Director -DARD ◆ Dr. Albertina Shilongo, Deputy Chief Veterinary Officer, Division of Epidemiology, DVS ◆ Mr. I. P. Mate, Deputy Director, Division of Livestock Research and Production, DARD ◆ Dr. Ben I. Malima, Deputy Director, Division of Crop Research and Production, DARD ◆ Mrs. Paulina Shilunga, Agricultural Scientific Officer, DAPEES
Divisional Committee (DC)	<ul style="list-style-type: none"> ◆ Chair: Mrs. Eddy Namalambo Deputy Director of North Central Division, DAPEES ◆ Vice Chair Person: Dr. K.K.Shoombe, Chief Veterinarian, Division of Animal Disease Control North, DVS ◆ DARD, DF, AMTA, Meat Board, NNFU, AgriBank, DAPEES, DRWSSC, Meat Co., National Agronomic Board(NAB), AgriBusDev
Stakeholder Meeting (SM)	<ul style="list-style-type: none"> ◆ Chair: Chief Agricultural Scientific Office (CASO), DAPEES Region Office ◆ Deputy Chair: Determined by each region ◆ Agricultural Scientific Officer, Chief Agricultural Technicians, Agricultural Technicians, RDC, Veterinary Officer, Animal Health Technicians, Regional Farmers' Union, Meat Board, Meat Co., AMTA, AgriBank, NAB, Ministry of Land and Resettlement (regional level), Regional Council (Directorate of Planning), DRWSSC

Source: Prepared by the Study Team based on the Discussion in SC and DC



Source: Prepared by the Study Team based on the Discussion in SC and DC

N-CLIMP Implementation Organization

1.5 Work Plan

The work flow and work schedule of N-CLIMP are shown on Figure 1.5.1 and Figure 1.5.2 respectively, and the major work items are summarized below:

Major Work Items of N-CLIMP

Phase	Work	Period	Work Item
Proposal of Comprehensive Situation Analysis Survey and Potentially Effective Techniques			
Phase-1	Preparatory Work	Aug. 2014	<ul style="list-style-type: none"> ● Information gathering on the crop and livestock production techniques ● Preparation of the work plan and the Inception Report (1) for Phase-1
	1 st Field Work	From Sept. 2014 to May 2015	<ul style="list-style-type: none"> ● Comprehensive situation analysis survey in the target areas ● Analysis and examination of survey results to identify the technical measures ● Preparation, explanation and discussion on the Progress Report (1)
Verification of Appropriate Measures and Formulation of the Draft Master Plan			
Phase-2	1 st Home Work	June 2015	<ul style="list-style-type: none"> ● Preparation of the Work Plan and the Inception Report (2)
	2 nd Field Work	From July 2015 to May 2016	<ul style="list-style-type: none"> ● Support to MAWF for Budgetary Arrangement for Implementation of Draft Master Plan ● Verification of appropriate measures to improve the crop and livestock production through the pilot site activities ● Preparation of farming models ● Formulation of the draft Master Plan ● Preparation, explanation and discussion on the Progress Report (2)
Initial Implementation of the Draft Master Plan and Revision and Finalization of the Master Plan			
Phase-3	2 nd Home Work	June 2016	<ul style="list-style-type: none"> ● Preparation of the Work Plan and the Inception Report (3)
	3 rd Field Work	From July 2016 to May 2017	<ul style="list-style-type: none"> ● Support to MAWF for budgetary arrangement for sustainable implementation of the Master Plan ● Initial implementation of the draft Master Plan ● Revision and finalization of the Master Plan based on the result of pilot site activities and farming models ● Preparation, explanation and discussion on the draft Final Report (Master Plan, Main Report, Training Materials)
	3 rd Home Work	From May 2017 to June 2017	<ul style="list-style-type: none"> ● Preparation of the Final Report (Master Plan, Main Report, Training Materials, Supporting Data)

Source: Prepared by the Study Team

1.6 Meetings

N-CLIMP has been implemented through the periodical meetings among relevant members for the study. The meetings opened during the study are tabulated in Table 1.6.1 and the minutes of meeting of Steering Committee Meeting and Joint Stakeholder Meetings are shown in Attachment-1.

CHAPTER 2 TECHNICAL MEASURES TO BE APPLIED FOR N-CLIMP

2.1 Technical Measures Pre-Evaluation

2.1.1 Criteria for Evaluating Candidate Technical Measures

Through the discussion with ATs during the series of stakeholder meetings in Phase-1, technical measures, in total 35 numbers as tabulated below, to solve current problems and constraints in 4 target regions are proposed for crop production, livestock production and farm management. For each technical measure, technical sheets for detailed description were prepared in Phase-1, and modified through Phases-2 and -3 based on the pilot site activities, as shown in Attachment-2.

Proposed Technical Measures for Crop Production, Livestock Production and Farm Management

Sector	Name of Technical Measures
Crop Production	CR-1 Fertilizer application
	CR-2 Cropping pattern and crop management
	CR-3 Conservation agriculture
	CR-4 Flood- and drought- adaptive cropping system (rice-mahangu mixed cultivation)
	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
	CR-9 Establishment of crop production and marketing cooperatives
Livestock Production	LS-1 Fodder production
	LS-2 Range management
	LS-3 Water harvesting and/or construction of water resource facilities for animals
	LS-4 Nutritious feed supply particularly for pig and chicken
	LS-5 Disease control
	LS-6 Large and small stock fattening
	LS-7 Periodical production
	LS-8 Expansion of quality meat
	LS-9 Bull scheme
	LS-10 Multiplication of Sanga bull
	LS-11 Goat production
	LS-12 Pig production
	LS-13 Chicken production
	LS-14 Promotion and strengthening of auction for both large and small stocks
	LS-15 Development of formal market for small stock
	LS-16 Establishment and strengthening livestock cooperatives
Farm Management	FM-1 Household accounting management
	FM-2 Record keeping (farm record)
	FM-3 Post harvest
	FM-4 Business plan
	FM-5 Group formation/ group strengthening
	FM-6 Group accounting management
	FM-7 Formulation of water users association
	FM-8 Collective selling / purchasing
	FM-9 Rural finance accessibility improvement
	FM-10 Market information access improvement

Source: Prepared by the Study Team

Master plan for crop and livestock production will be implemented phase-wise, therefore, technical dissemination needs to be strategically carried out. Since they are different from various view point

such as: (i) necessity of verification, (ii) importance and/or urgency, (iii) technical level, (iv) cost for introduction and so forth, thirty five proposed technical measures are preliminary evaluated into three categories as follows:

- ◆ **Category 1:** technical measures to be applied for pilot site activities (phase-2 & -3 of N-CLIMP)
- ◆ **Category 2:** technical measures to be applied during the master plan period (short-term)
- ◆ **Category 3:** technical measures to be applied during the master plan period (long-term)

In order to categorize technical measures into 3, the criteria are tabulated as follows:

Criteria for Categorization of Technical Measures

Criteria	How to evaluate
1. Necessity of verification	(i) necessary or (ii) not necessary (already verified)
2. Period required for verification	Number of years to be required
3. Possibility of dissemination after verification	
3-1 Cost	(i) low, (ii) moderate and (iii) high
3-2 Number of farmers for dissemination	(i) small, (ii) moderate and (iii) large
3-3 Techniques level	(i) basic, (ii) intermediate and (iii) advanced
4. Coordination with other projects and programs	(i) yes and (ii) no and/or organizations for coordination

Source: Prepared by the Study Team

2.1.2 Categorization of Technical Measures

(1) Crop Production

Categorization result for technical measures for crop production is shown in Table 2.1.1 and summarized in the following table.

Discussion on Categorization of Technical Measures for Crop Production

Subject	Categorization result
Crop production	<ul style="list-style-type: none"> ◆ Out of 9 technical measures proposed, most of the measures, say, 8 measures are categorized in 1, 2 to 3 ◆ Because proposed technical measures are integral part of crop production. And they need to be continuously tried and improved at the field and lessons should be shared among farmers depending upon variation of weather conditions and crop varieties etc. ◆ Projects and/or programs required for coordination are: (i) DCP, (ii) CAN, (iii) SATREPS, (iv) Meat Board mentorship program and (v) FSP. ◆ Establishment of crop production and marketing cooperatives would be one of the important next challenges. ◆ Technical measures to be adopted for pilot site activities, therefore, are: CR-1 to CR-8.

Source: Prepared by the Study Team

(2) Livestock Production

As similar to the crop production, sixteen numbers of technical measures categorized in Table 2.1.1 and summarized as follows.

Discussion on Categorization of Technical Measures for Livestock Production

Subject	Categorization result
Livestock production	<ul style="list-style-type: none"> ◆ Out of 16 technical measures proposed, 8 measures are categorized into 1 focusing on improvement of feed supply and animal health improvement. ◆ Range management (LS-2) is also inevitable activities for livestock production. It is categorized in 1,2 to 3 meaning that activities will be conducted continuously since its application and dissemination will take time according to lessons from previous projects/programs. ◆ Also, establishment and strengthening of livestock cooperatives is categorized in 1, 2 to 3 to strengthen the group stepwise.

	<ul style="list-style-type: none"> ◆ Expansion of quality meat (LS-8) supported by Bull scheme (LS-9) and Multiplication of Sanga bull (LS-10) are categorized in 2 to 3, which will be focal development target in medium to long term.
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Source: Prepared by the Study Team

(3) Farm Management

Farm management technical measures to be required for management of crop and livestock production activities are also categorized in Table 2.1.1 and summarized as follows:

Discussion on Categorization of Technical Measures for Farm Management

Subject	Categorization result (draft)
Farm Management	<ul style="list-style-type: none"> ◆ Out of 10 technical measures proposed, 7 measures are categorized into 1 as basic techniques for appropriate management of crop and livestock production. ◆ Basic technical measures will be followed by intermediate measures categorized in 2: (i) Household accounting management (FM-1) and (ii) Business plan (FM-2). ◆ Post harvest (FM-3) for both grain and horticulture crops is categorized in 1,2 to 3 in order to gradually improve and upgrade techniques according to market needs. ◆ Technical measures to be adopted for pilot site activities are: FM-2, FM-3 and FM-5 to FM-10.

Source: Prepared by the Study Team

In essence, using the criteria explained in the preceding section, thirty five proposed technical measures are categorized as follows:

Result of Categorization of Technical Measures

Subject	Category	Category					
	1	2	3	1-2	2-3	1,2-3	Total
Crop production	-	-	1	-	-	8	9
Livestock production	8	2	-	1	3	2	16
Farm management	7	2	-	-	-	1	10
Total	15	4	1	1	3	11	35

Note: Category 1-2 are the technical measures necessary to be adopted urgently as fundamental basic items for crop and livestock production. Also, they will require longer time of period for verification.

Category 2-3 are the technical measures comparatively advanced to be disseminated after basic technical measures are extended.

Category 1,2-3 are the technical measures basic and needs to be introduced urgently, however, their dissemination would take longer period than Category 1-2.

Source: Prepared by the Study Team

(4) Technical Measures to be adopted for Pilot Site Activities in Phase-2

In accordance with the discussion above, the following technical measures, in total 27 numbers, were adopted for verification in phase-2.

List of Technical Measures adopted in Phase-2

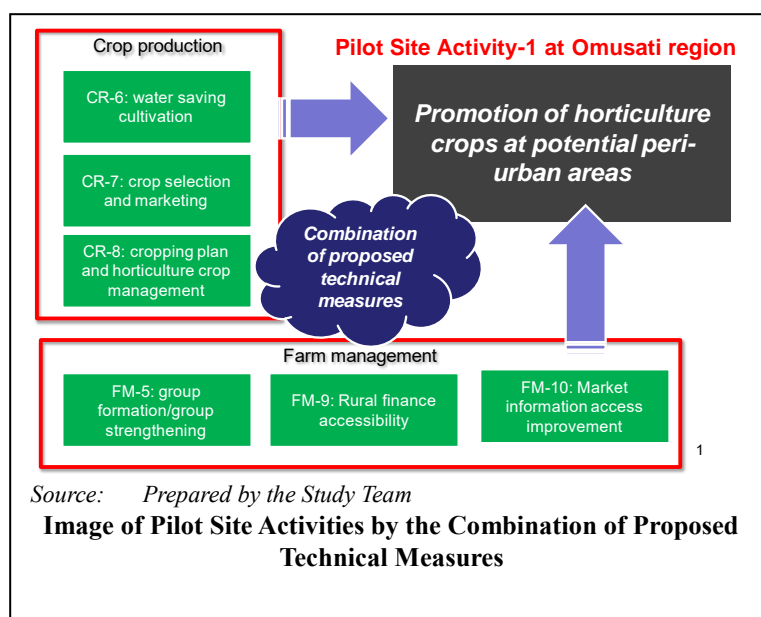
Crop production (8 nos.)	Livestock production (11 nos.)	Farm management (8 nos.)
<p>Grains</p> <ul style="list-style-type: none"> ◆ Fertilizer application (CR-1) ◆ Cropping pattern and crop management (CR-2) ◆ Conservation agriculture (CR-3) ◆ Flood- and drought-Adaptive Cropping System (CR-4) <p>Horticulture crops</p>	<p>Feed supply</p> <ul style="list-style-type: none"> ◆ Fodder production (LS-1) ◆ Range management (LS-2) ◆ Water harvesting and/or construction of water resource facilities for animals (LS-3) ◆ Nutritious feed supply particularly for pig and chicken (LS-4) <p>Production</p> <ul style="list-style-type: none"> ◆ Disease control (LS-5) 	<ul style="list-style-type: none"> ◆ Record keeping (Farm Record) (FM-2) ◆ Post harvest (FM-3) ◆ Group formation/ group strengthening (FM-5) ◆ Group accounting management (FM-6) ◆ Formulation of water users association (FM-7)

Crop production (8 nos.)	Livestock production (11 nos.)	Farm management (8 nos.)
<ul style="list-style-type: none"> ◆ Water source / water harvesting (CR-5) ◆ Water saving cultivation (CR-6) ◆ Crop selection and marketing (CR-7) ◆ Cropping plan and horticulture crop management (CR-8) 	<ul style="list-style-type: none"> ◆ Large and small stock fattening (LS-6) ◆ Periodical production (LS-7) ◆ Goat production (LS-11) ◆ Pig production (LS-12) ◆ Chicken production (LS-13) Management ◆ Establishment and strengthening livestock cooperatives (LS-16) 	<ul style="list-style-type: none"> ◆ Collective selling / purchasing (FM-8) ◆ Rural finance accessibility improvement (FM-9) ◆ Market information access improvement (FM-10)

Source: Prepared by the Study Team

(5) Consideration to Pilot Site Activities for the Verification of Technical Measures to be adopted

The technical sheets are separately prepared for proposed technical measures. They are not independent. Rather they are mutually correlated. Contents of pilot site activities were discussed and determined at the beginning of Phase-2 and Phase-3, however, the pilot site activities were conducted by combining several proposed technical measures, image of which are shown in the right figure.



CHAPTER 3 SELECTION OF PILOT SITE ACTIVITIES

3.1 General

At the beginning of Phase 2 and Phase 3, a series of Stakeholder Meetings (SMs) were held in each region for selection of pilot site activities as well as preparation of the action plan by farmers group and the support plans by ATs in charge, as summarized below.

Schedule and Contents of Meetings for Selection of Pilot Site Activities

Meeting	Date	Contents
Phase-2 (July 2015 to May 2016)		
1. Stakeholder Meeting 1	August 04 2015 at Omusati, August 05 2015 at Oshikoto, August 17 2015 at Oshana, August 25 2015 at Ohangwena	◆ Selection of pilot sites (Selection of target constituencies and ADCs)
2. Preparatory Training for Farmers' Group	August 20 2015 at Omusati, August 24 2015 at Oshikoto, August 27 2015 at Oshana, September 09 2015 at Ohangwena	◆ Explanation of SHEP approach ◆ Survey for general farming activities ◆ Gender training ◆ Preparation of farmers' group action plan
3. Stakeholder Meeting 2	September 02 2015 at Oshana, September 03 2015 at Oshikoto, September 08 2015 at Omusati, September 09 2015 at Ohangwena	◆ Selection criteria for farmers' group ◆ Preparation of supporting plan by ATs
Phase-3 (July 2016 to May 2017)		
4. Stakeholder Meeting 1	August 04 2016 at Omusati, August 05 2016 at Oshikoto, August 17 2016 at Oshana, August 25 2016 at Ohangwena	◆ Review of pilot site activities in Phase-2 ◆ Explanation on verification results ◆ Selection of pilot sites ◆ Explanation of SHEP approach
5. Stakeholder Meeting 2 and Preparatory Training for Farmers' Group	September 02 2016 at Oshana, September 03 2016 at Oshikoto, September 08 2016 at Omusati, September 09 2016 at Ohangwena	◆ Gender training ◆ Preparation of farmers' group action plan ◆ Preparation of supporting plan by ATs

Source: Prepared by the Study Team

3.2 Selected Sites and Activities

3.2.1 Selection of Constituencies (ADCs) for Pilot Site Activities

Through the discussion of SM members during SM-1, the following basic ideas to conduct pilot site activities were explained and agreed by the stakeholders;

- ◆ **Number of site:** basically 4 sites per region (16 sites in total) based on the agreement between JICA and MAWF;
- ◆ **Activities:** 4 different activities (grains, horticulture, cattle, and small stocks) per region, and
- ◆ **Technical measures:** in each site, technical measures of crop or livestock sector will be selected based on the farmers' constrains, together with concerned farm management technical measures. In addition, water supply improvement measures will be applied where there is potential.

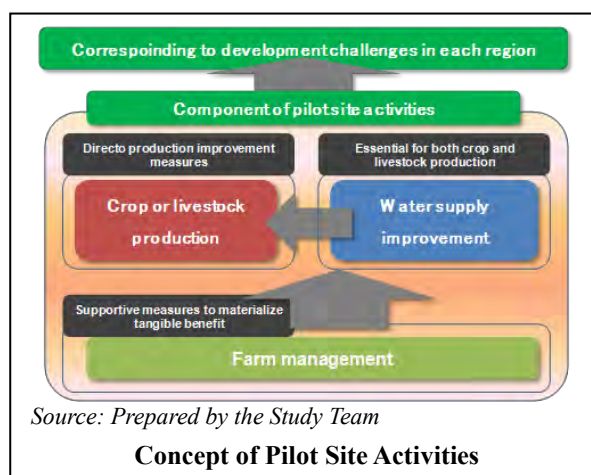
The right figure describes the concepts of pilot site activities.

After confirmation of the basis, pilot sites (target ADCs) were selected by the following 3 steps.

◆ **Step-1 Share of challenges in the region :** Based on the results of the overall review survey and detailed thematic survey conducted in Phase 1, technical challenges for crop and livestock production were summarized for each region.

◆ **Step-2 Criteria for selection of target**

Constituencies (ADCs) : The following criteria were agreed among SM members for the selection of appropriate ADCs to solve the above mentioned challenges.



Criteria for Selection of Target ADCs

No.	Criteria	Contents
1	Priority in the region	<ul style="list-style-type: none"> ◆ Technical focus (priority) ◆ Intension of SM members particularly Ats
2	Demonstration effect	<ul style="list-style-type: none"> ◆ Easy physical accessibility in the region so that technical spreading effect will be expected
3	Availability of farmers' group	<ul style="list-style-type: none"> ◆ Utilizing existing farmers group make activities easy and efficient
4	Possibility of technical verification during 1 cropping season	<ul style="list-style-type: none"> ◆ Technical effectiveness can be confirmed to some extent in 1 cropping season
5	Willingness of farmers/ Leadership	<ul style="list-style-type: none"> ◆ (Ohangwena region) Selection of the Groups with high willingness of farmers or with strong leadership

Source: Prepared by the Study Team

◆ **Step-3 Selection of target Constituencies (ADCs) :** Based on the criteria agreed in Step-2, the following ADCs were selected in each region.

Selected Constituency (ADC) for Pilot Site Activities

	Crop Production (Cereal/Grains)	Crop Production (Horticulture)	Livestock (Cattle)	Livestock (Small Stocks)
Omusati	Etayi	Etunda	Okahao	Tsandi
Oshana	Oshakati-west	Okatana	Uuvudhiya	Uukuwiyu
Oshikoto	Omuthiya	Onayena	Omuntele	Onyaanya King Kauluma*
Ohangwena	Ondobe	Epembe	Okongo	Endola

Note *1: King Kauluma is selected in the Phase-3.

Source: Prepared by the Study Team

3.2.2 Formulation of Action Plan by Farmers' Group

ATs of the target ADCs selected in SM-1 together with 4 farmers in the ADC (basically 2 male and 2 female) were participated in the Preparatory Training for Farmers' Group to formulate farmers' group master plan. The following sessions were conducted during the training.

◆ **Explanation of N-CLIMP:** such N-CLIMP information as objective, location, period, schedule, pilot site activities was explained to the participated farmers for their understanding.

◆ **Explanation of SHEP approach:** basic concept of SHEP approach was explained by showing SHEP explanation movie.

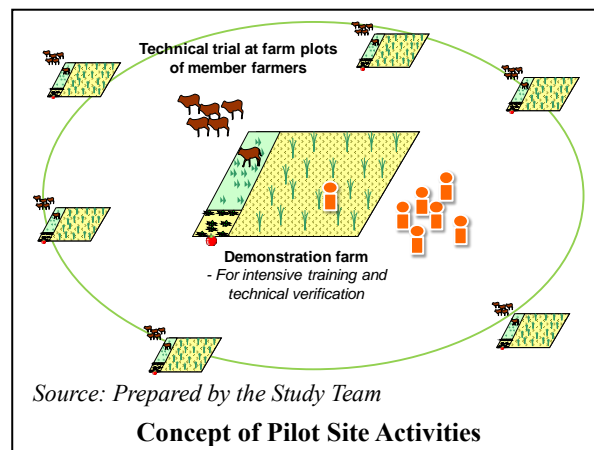
- ◆ **Survey for general farming activities:** To confirm general farming activities of the participant farmers in the particular type of farm production (crop or livestock) and income in the last year, simple questionnaire was distributed and farmers answered. The questionnaire for crop contains such questions on crop varieties, planted area, total production, home consumption, seed for next cropping, sold amount. Livestock one covers the following livestock varieties, total number of animal owned now, for home consumption, sold, and died.
- ◆ **Gender training:** The purposes of this session are to understand the role of men and women in crop and livestock production, to discuss how both men and women work with other group members for the improvement of gender relations in the group, and to discuss how the group interacts and assists vulnerable of the community to improve their livelihood. A Kenyan story for tomato marketing was modified and utilized to think about gender roles.
- ◆ **Formulation of Farmers' Group Action Plan:** Farmers' group action plan was formulated by farmers themselves supported by ATs. Contents of the action plans are: general information (region, constituency, village, ADC, name of AT in charge, relevant organizations), group information (group name, name of representative, number of group members), major activities (type of activity, challenges, action to be taken to solve problem), and work schedule (activity and schedule). Format of Action Plan is shown in Table 3.2.1.

In the Phase-3, the same process was taken place to formulation the Farmers' Group Action Plan.

3.2.3 Formulation of Supporting Plan by ATs

The following topics were discussed during SM-2:

- ◆ **Operation of pilot site activities:** Basically 15 farmers will be selected as the target farmers in each site. Among them, one farmer will be designated as a demonstration farm where pilot activities are implemented. Other 14 farmers, called as key farmers, are requested to replicate the activities by themselves in their homestead which they have learned in the demonstration farm. The right figure describes the image to operate pilot sites activities.



- ◆ **Selection criteria for target farmers:** For the selection of target farmers, the following criteria were discussed and agreed among SM members.

Criteria for selection of target farmers

No.	Criteria	Contents
Target farmers		
1	Number	◆ Maximum 15 farmers
2	Gender consideration	◆ Both male and female farmers are included in target farmers
Demonstration farm		
3	Farming scale	◆ Farmers owning average size of land or average number of animals
4	Location	◆ Geographically located to which member farmers can easily access

Source: Prepared by the Study Team

- ◆ **Formulation of supporting plan by ATs:** Based on the information from farmers' group action plan, technical measures to be adopted corresponding to the challenges identified by farmers' group were selected by ATs. Format of Supporting Plan is shown in Table 3.2.2. Among 27 technical measures categorized to be adopted in Phase-2, in total 21 techniques. In addition, necessary inputs for each technical measure were estimated. The following table shows the basic input covered by N-CLIMP, which were agreed among SM-2 members.

Basic Input covered by N-CLIMP

Items	Notes
Crop production	
Land preparation (Conservation Agriculture, ripper furrowing)	All the target farmers
Seed, Fertilizer, chemicals	All the target farmers
Fencing material	Demonstration farm only
Drip irrigation kit	All the target farmers
Water tank for roof catchment	Demonstration farm only
Fuel for pump	Demonstration farm only
Livestock production	
Seed (fodder crop)	All the target farmers
Fencing material for fodder production	Demonstration farm only
Medical kit	2 sets of kit for group
Medicine	Demonstration farm only
Livestock hut/cage (Chicken)	Demonstration farm only
Water harvesting by sand bag	Provide sand bag and tool
Livestock production	
Black book for record keeping (farm record)	All target farmers

Source: Prepared by the Study Team

In the Phase-3, necessary inputs were basically supplied by MAWF and farmers themselves in each pilot site, except horticulture sites. This is because that installation of drip irrigation kits was delayed and not completed in the Phase-2. This situation brought the situation that no results of technical measures were obtained for horticulture by the end of Phase-2. Therefore, supply of inputs continued during the Phase-3.

CHAPTER 4 IMPLEMENTATION OF PILOT SITE ACTIVITIES

4.1 Methodology of Training

4.1.1 Training of Trainers Approach

(1) Training Approach

Training of trainers (TOT) approach is taken into an account for implementation and monitoring of the pilot site activities in the Phase-2 and Phase-3. In this approach, trainings are conducted in two steps for the extension staff as well as farmers.

In the 1st step of trainings, the Study Team and the resource personnel conducted training for ATs as the (TOT), and ATs obtained the technical knowledge and coaching techniques for farmers through role plays. In the 2nd step of trainings, ATs conducted the trainings for farmers' groups by employing the knowledge and experience obtained in TOT, and the Study Team and resource personnel supported ATs in the 2nd step of training for farmers' groups.

(2) Resource Personnel

Trainings of the technical measures are carried out by the experts of the Study Team as well as the resource personnel in Namibia. In implementing the Master Plan, MAWF or relevant agencies may utilize the resource personnel involved in the trainings under N-CLIMP. List of resource personnel is shown below:

List of Resource Personnel

Subject	Personnel	Organization
<u>Crop Sector</u>		
Crop in General	Mr. Asie Drayer (1 st Training in Phase 2)	SAKATA South Africa (through AQUALAND, Okahandja & Tsumeb)
Flood- and Draught Adaptive Cropping System	Mr. Yoshinori Watanabe, Ph. D. (2 nd Training at Etayi)	SATREPS
Installation of Low Pressure Drip Irrigation (drum kit for 150 m ²)	Mr. Danie Marais (extra demonstration)	AGRA ProVision, Windhoek
Installation of Low Pressure Drip Irrigation (drum kit for 150 m ²),	Mr. Mikka Shilompoka (2 nd to 4 th Trainings for Farmers Groups)	Omahenene Crop Research Station located Omusati Region, under DARD
<u>Livestock</u>		
Cattle and Goat	Mr. Fonnies Bruwe (Vetrinary Dr.)	AGRA ProVision, Windhoek
<u>Farm Management</u>		
Farm Management, Training Coaching,	Mr. Mickael Dege (1 st to 4 th trainings)	AGRA ProVision, Windhoek
Market Information on Vegetables	Mr Peter Matheus (1st and 3rd Training in Phase 3)	Horticulture Officer, Agricultural Marketing and Trade Agency (AMTA)
Market Information on Grain	Mr Stephen Iimbili (3rd Training in Phase 3)	Nasional Strategic Food Reserve, AMTA
Market Information on Cattle	Mr John Utoni, NCA Marketing Officer	Marketing Officer, NCA, Meat Board of Namibia

Source: Prepared by the Study Team

4.1.2 Training Curriculum

(1) Training Sequence and Contents in Phase-2

In the training sequence in the Phase-2, 4 times of trainings were conducted in each site, taking into account the cropping season and livestock rearing. ATs in charge of pilot site activities together with Chief Agricultural Technicians (CATs) and Chief Agricultural Scientific Officer (CASO) of each region were participated for the trainings.

At first training, Action Plan prepared by farmers' group in each site was confirmed as well as the list of techniques and technical measures to be applied in each site. Through the field investigation, trainings and monitoring it was observed that certain techniques and technical measures were not possible to apply with the reasons of geographically inadequate (water harvesting for animals, formulation of water users association), no appropriate facility (roof catchment), level of technique is too high compare to group capacity (establishment of cooperative, collective sales and purchase, rural finance access) etc. Based on these observations, list of techniques and technical measures were modified at 3rd training. In addition, Action Plans were also modified through the progress of field activities.

The following table summarizes contents of the training sequence.

Outline of Training Contents in Phase-2

Training	Main Contents
1 st Training for ATs	Introduction*1, baseline survey, training on the technical measures, setting-up of demonstration plots, explanation on technical manuals (crops, horticulture, cattle, goat), coaching through role play by ATs.
1 st Trainings for Farmers Groups by AT	Introduction*2, explanation of technical measures against constraints and challenges identified by farmers, expectation by farmers, explanation of technical measures and pilot site activities, revision of action plan, questions and answers. Crop sector: monitoring of demonstration plots, its rough delineation, and estimation of necessary materials and inputs.
2 nd Training for ATs	Introduction*1 including review of progress after the 1st trainings, explanation on technical measures by sector, in-house practice of livestock activities, supplemental baseline survey, monitoring activities, coaching through role play by ATs.
2 nd Training for Farmers Groups by AT	Introduction*2, explanation of technical measures, expectation by farmers, explanation and discussion on technical measures and pilot site activities, checking record keeping. Crop sector: monitoring and set up of demonstration plots. Livestock sector: demonstration of dehorning.
3 rd Training for ATs	Introduction*1 including review of progress of the 2 nd trainings and activities at each pilot site, trainings by sectors, coaching through role play by ATs.
3 rd Training for Farmers Groups by AT	Introduction*2, explanation and discussion on the main points of technical measures, confirmation and discussion of progress of pilot site activities, revision of action plan, questions and answers. Crop sector: monitoring of demonstration plots on crop growth and discussion. Livestock sector: practices of livestock activities and discussion.
4 th Training for ATs	Introduction*1 including review of progress of the 3 rd trainings and activities at each pilot site, explanation and discussion on the main points on the 4 th training for farmers, repeat of explanation and discussion on technical measures, coaching through role play by ATs.
4 th Training for Farmers Groups by AT	Introduction*1 including review of farm records and activities discussion on the preliminary result of technical measures. Crop sector: monitoring of demonstration plots and discussion. Livestock sector: practices of livestock activities and discussion.

Remarks *1: Introduction is common to all 4 trainings for AT, and includes such main articles as (1) Outline of the Study, (2) SHEP Approach, (3) Technical Measures, (4) Location of Pilot Sites, (5) Process of Preparation (Stakeholder Meetings (1), Preparatory Training for Farmers, Stakeholder Meeting (2)), (6) Training Process and Pilot Site Activities and (7) confirmation and modification of each training schedule for farmers groups.

*2: Introduction for Farmers Groups is common to all 4 trainings for farmers groups, and includes (1) Opening with Prayer, (2) Welcome Farmers and (3) Introduction of Participants (Registration).

Source: Prepared by the Study Team

(2) Training Sequence and Contents in Phase-3

There are a few changes made for training implementation in Phase 3.

Firstly, between 2nd and 3rd sets of training (ToTs and Farmers Trainings), Farmers Filed Day was organized. Secondly, the 2nd training mainly focused on farm management technical measures. Thirdly, changes are found in the ways of planning of training for farmers' groups. ATs made training agenda by themselves during the ToTs based on their support plans, needs and situations found at the pilot site, and the training contents through explanation on technical measures. The action plans by farmers' groups and support plans by ATs were prepared in the second stakeholder meetings held

The following table summarizes contents of the training sequence in Phase 3.

Outline of Training Contents in Phase-3

Training	Main Contents
1 st Training for ATs	Introduction*1, baseline survey, training on the technical measures, setting-up of demonstration plots, explanation on technical manuals (crops, horticulture, cattle, goat), coaching through role play by ATs.
1 st Trainings for Farmers Groups by AT	Introduction*2, explanation of technical measures against constraints and challenges identified by farmers, expectation by farmers, explanation of technical measures and pilot site activities, revision of action plan, questions and answers.
2 nd Training for ATs	Introduction*1 including review of progress after the 1st trainings, explanation on farm management technical measures, monitoring activities, coaching through role play by ATs.
2 nd Training for Farmers Groups by AT	Introduction*2, explanation of technical measures, expectation by farmers, explanation and discussion on technical measures and pilot site activities, checking record keeping. Crop sector: monitoring and set up of demonstration plots. Livestock sector: demonstration of dehorning.
3 rd Training for ATs	Introduction*1 including review of progress of the previous trainings for farmers' trainings and activities at each pilot site, explanation and discussion on the main, points on the 3rd training for farmers, review of technical measures, coaching
3 rd Training for Farmers Groups by AT	Introduction*1 including review of technical measures. Crop sector: monitoring of demonstration plots and discussion. Livestock sector: practices of livestock, activities and discussion.

*Remarks *1: Introduction is common to all 4 trainings for AT, and includes such main articles as (1) Outline of the Study, (2) SHEP Approach, (3) Technical Measures, (4) Location of Pilot Sites, (5) Process of Preparation (Stakeholder Meetings (1), Preparatory Training for Farmers, Stakeholder Meeting (2)), (6) Training Process and Pilot Site Activities and (7) confirmation and modification of each training schedule for farmers groups.*

**2: Introduction for Farmers Groups is common to all 4 trainings for farmers groups, and includes (1) Opening with Prayer, (2) Welcome Farmers and (3) Introduction of Participants (Registration).*

Source: Prepared by the Study Team

Details of technical training contents for each procedure of techniques and technical measures are shown in Table 4.1.1 for Phase-2 to Table 4.1.2 for Phase-3.

(3) Training Schedule in Phase-2

In September 2015 during the Stakeholder Meetings and Preparatory Training of Farmers, trainings are preliminary scheduled based on the cropping season from November 2015 to April 2016 taking into account annual cycle of livestock activities. Trainings for ATs are conducted at the board rooms of AMTA Fresh Produce Hub at Ongwediva in Oshana Region. Trainings for farmers groups are carried out at the demonstration farm in each site. Schedule and actual date of trainings are listed below:

Training Schedule and Actual Dates in Phase-2

	1 st Training	2 nd Training	3 rd Training	4 th Training
Training for AT				
- Schedule	1 st week of Nov. 2015	1 st week of Dec. 2015	1 st week of Feb. 2016	1 week of Apr. 2016
- Actual	Nov. 3, 4 & 17 2015	Nov. 23, 24 & Dec. 9 2015	Feb. 2 & 3 2016	Mar. 30 & 31 2016
Training for Farmers Groups				
- Schedule	2 nd to 3 rd weeks of Nov. 2015	2 nd to 3 rd weeks of Dec. 2015	2 nd to 3 rd weeks of Feb. 2016	2 nd to 3 rd weeks of Feb. 2016
- Actual	Nov. 6 to 19 2015	Nov. 25 to Dec. 9 2015	Feb. 4 to 18 2016	Apr. 4 to 7 2016

Source: Prepared by the Study Team

For smooth execution of trainings, one of important issues is adjustment of schedule for ATs to attend and conduct the trainings. In case that AT is not able to attend the scheduled trainings, Senior ATs or acting AT nearby ADC are nominated to attend the training for AT and conduct trainings for farmers groups.

(4) Training Schedule in Phase-3

The 1st trainings had fell in the period when regional and ADC officers were very occupied with ministry activities. The regional offices and N-CLIMP faced the difficulties for scheduling of trainings. As a result, the 1st training for ATs in Ohangwena region was postponed and conducted by combining with the 2nd training. As ATs needed to conduct training even before the Training for ATs, N-CLIMP distributed training materials for all relevant officers in the region. The 2nd training for ATs in Oshana region also faced with difficulty to invite all ATs including those of pilot sites. With the arrangement by the regional office, one of the ATs visited the project office to gain explanation on the training subjects.

Training Schedule and Actual Dates in Phase-3

	1 st Training	2 nd Training	3 rd Training
Training for AT (TOT)			
- Schedule	4 th week of Oct. to 1 st week of Nov. 2016	3 rd and 4 th weeks of Nov. 2016	1 st and 2 nd weeks of Mar. 2017
- Actual	Oct. 26, Nov. 1, 3 and 25, 2016	Nov. 15, 17, 24 & 25, 2016	Mar. 2, 9, 16 & 23, 2017
Training for Farmers Groups			
- Schedule	2 nd to 3 rd weeks of Nov. 2016	4 th week of Nov. and 1 st week of Dec. 2016	2 nd to 3 rd weeks of Mar. 2017
- Actual	Nov. 8 to 24 2016	Nov. 28 to Dec. 19 2016	Mar. 13 to Apr. 21 2017

Source: Prepared by the Study Team

4.1.3 Training Materials

In the process to implement the pilot site activities, necessary training materials are prepared as shown in the following tables and compiled into Volume-III Training Materials:

- Handouts, prepared for trainings for Agricultural Technicians and Farmers Groups
- Training Materials to be used by Agricultural Technicians for Training for Farmers Groups in English and Oshiwambo, like “kami-shibai”, record forms

- Technical Manuals (general crops, horticulture, animal husbandry, chicken and goat)

4.1.4 Survey of Dissemination

During Phase 2, in order to evaluate extent of dissemination for techniques and technical measures adopted in each site, survey of dissemination was conducted at 3rd and 4th farmers' training. Farmers answered whether they implemented the techniques in their homestead or not, and in case of no, they also described the reason why they didn't implement.

4.1.5 Technical Measures adopted to Pilot Site Activities

The following 21 technical measures were adopted into pilot site activities in Phase 2 and Phase 3. The adoption took processes of (i) Formulation of Action Plan by farmers' groups, (ii) Formulation of Support Plan by ATs, (iii) Raising issue by ATs at Training for Farmers, and (iv) actual implementation by farmers at pilot sites. These Technical Measures are targeted for verification as noted in Chapter 5.

**Selected Technical Measures for the Pilot Site Activities
through the Discussion and Activities in Phase-2 and Phase-3**

Crop production (8 nos.)	Livestock production (8nos.)	Farm management (5 nos.)
<p>Grains</p> <ul style="list-style-type: none"> ◆ Fertilizer application (CR-1) ◆ Cropping pattern (CR-2) ◆ Conservation agriculture (CR-3) ◆ Flood- and drought-Adaptive Cropping System (CR-4) <p>Horticulture crops</p> <ul style="list-style-type: none"> ◆ Water source / water harvesting (CR-5) ◆ Water saving cultivation (CR-6) ◆ Crop selection and Marketing (CR-7) ◆ Cropping plan and horticulture crop management (CR-8) 	<p>Feed supply</p> <ul style="list-style-type: none"> ◆ Fodder production (LS-1) ◆ Range management (LS-2) ◆ Nutritious feed supply particularly for pig and chicken (LS-4) <p>Production</p> <ul style="list-style-type: none"> ◆ Disease control (LS-5) ◆ Large and small stock fattening (LS-6) ◆ Periodical production (LS-7) ◆ Goat production (LS-11) ◆ Chicken production (LS-13) 	<ul style="list-style-type: none"> ◆ Farm Record (FM-2) ◆ Group formation/ group strengthening (FM-5) ◆ Group accounting management (FM-6) ◆ Collective selling/purchasing (FM-8) ◆ Market information access improvement (FM-10)

Source: *Prepared by the Study Team*

4.2 Outline of Pilot Site Activities

Starting from the next page, outlines of each pilot are summarized. Each site is depicted in a table with the following titles:

- 1) Location of pilot site,
- 2) the responsible ADC with their main ATs who worked for pilot site activities
- 3) Target Farmers with number of Demonstration Farm and Key Farmers,
- 4) Technical Measures that ATs introduced at farmers' trainings,
- 5) Trainings with dates of implementation,
- 6) Inputs and Material Supplied by N-CLIMP, and
- 7) Farm Record activities

For 5) Trainings, 6) Inputs and Material Supplied by N-CLIMP, and 7) Farm Record activities, the description is separated into Phase 2 and 3 except for King Kauluma (in 4.2.3. (5)) that was selected in Phase 3.

About Farm Record, description in Phase 2 mainly focuses on inputs while description in Phase 3 mainly focuses on the results of monitoring (mainly the contents in farmers' notebook).

Summary tables also contain topics that characterize each pilot site's activities. The summary table in the summary of the report is made based on the titles seen in tables of pilot sites.

A series of photographs follow the table for depicting pilot site activities.

4.2.1 Outline of Pilot Site Activities in Omusati Region

(1) Etayi Constituency: Etayi ADC

Location	The pilot site is located in the village of Onuumba, at about 30 km north-west of the N-CLIMP office at Ongwediva, about 20 minutes driving along the road. Coordination: 17.542948S, 15.508093E				
ADC	Etayi ADC, Ms. Miriam Fikunawa (AT), under the support by Okalongo ADC, Ms. Kaunapawa Shapenga (Senior AT)				
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Ms. Ehregardis Efraim in Onuumba 14 key farmers consisting of 12 females and 2 males, coming from 9 villages of Onuumba, Omutaku, Onelombo, Olyavahenge, Okanwa, Onhelewiwa, Okahenge, Okafifi, and Otindi				
Technical Measures Crop: Cereal Grain	CR-2: Cropping Pattern and Crop Management CR-4: Flood- and Drought-Adaptive Cropping System (Rice-Mahangu Mixed Cropping System) FM-2: Farm Record FM-5: Group Formation/ Strengthening, FM-6: Group Account Management FM-8: Collective Purchase/ Selling.				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 19, 2015	Dec. 01, 2015	Feb. 04, 2016	Apr. 04 2016
	Male	2	0	0	0
	Female	11	5	12	7
	Total	13	5	12	7
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
	Date	Nov. 11, 2016	Dec. 1, 2016	Apr.03, 2017	
	Male	2	0	0	
	Female	11	5	5	
	Total	13	5	5	
Inputs and Material Supplied in Phase 2	<ul style="list-style-type: none"> Ploughing services by ripper furrowing for 1 ha of demonstration farm as well as 1 ha each for 8 key famers Fencing material for 30 m x 30 m plot: (fencing net: 50 m x 3 roles, 4 poles: 1.8 m x 75-100 mm dia.) Rice seedlings from JICA SATREPS Team at UNAM Ogongo Campus 1 rain gauge for demonstration farm 				
Inputs and Material Supplied in Phase 3	<ul style="list-style-type: none"> Ploughing services by ripper furrowing for 1 ha under DCP Improved seeds under DCP 				
Farm Record in Phase 2	<ul style="list-style-type: none"> Black books (A5 size notebook) for each member Daily Rainfall Record in mm Farm Record for Cereal Grains 				
Farm Record in Phase 3	<ul style="list-style-type: none"> Well Kept: Rain fall record is reflected to decide timing of sawing. 				
Rice-Mahangu Mixed Cropping	<ul style="list-style-type: none"> This site's activities were done through the collaboration with a JICA Science and Technology Research Partnership for Sustainable Development (SATREPS) project. The SATREPS project's office was located in the Okongo Campus of University of Namibia (UNAM) near from the pilot site. Seeds of rice were provided by the SATREPS project. According to the responsible in UNAM, even after the completion of the SATREPS project, UNAM is to provide rice seeds. 				
Ripper Furrowing	<ul style="list-style-type: none"> For land preparation for Rice-Mahangu Mixed Cropping, ripper furrowing was applied before rain started. The demo farmer well understand the effect of ripper furrowing for mahangu and sorghum crops, and she applied ripper furrowing to her own field other than the demo plots by her own expense. 				
Drought Situations	<ul style="list-style-type: none"> In Phase 2, severe drought caused and no flood were observed. Therefore, transplanting was delayed and rice seedlings were transplanted in March in a small area of limited number of demo and key farmers. In the 4th training, it was observed poor growth and no harvest rice and pearl millet. In this regard, farmers could not obtain experience to grow rice and mixed cropping. In Phase 3, rainfall started in middle of February 2017, and rice seedlings were transplanted in February 21 2017 at demo farm, and other 2 key farmers obtained rice seedling. After late February 2017, demo farm was not accessible due to inundated road access.in confirmed. 				

Source: Prepared by the Study Team

Photographs

<p>Jan. 18, 2016, the demonstration field ploughed by ripper furrowing for land preparation. Only small rain available, not enough to transplant rice seedlings.</p>	<p>Jan. 18 2016, rice seedling delivered in late Dec. 2015. Water condition in the demo farm not allow to transplant, and rice seedlings were over growing.</p>
<p>April 05 2017, 4th Training in Phase 2 to review the activities.</p>	<p>April 05 2016, rice seedlings were transplanted after inundation of water in the demonstration plot, but seedlings were two old, over 3 month from germination.</p>
<p>Rain gauge installed in the demonstration farm. Demo farmer keeping record of rainfall.</p>	<p>Feb. 24, 2017, rice seedlings were delivered on Feb. 18 and transplanted on Feb. 21.</p>

(2) Ruacana Constituency: Etunda ADC, Etunda Irrigation Green Scheme

Location	The pilot site is located at the Etunda Irrigation Green Scheme, about 150 km west of the N-CLIMP office at Ongwediva, about 1 hour 30 minutes driving along the road. Coordination: 17.419556S, 14.528852 E				
ADC	Etunda ADC: Ms. Lucia Nyango (Senior AT), Mr. Lucas Moongela (AT, from Apr. 2016), Mr. Toivo Shivute (Agri. Sci. Officer, till Mar. 2016)				
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Mr. Kalenga Johannes (Plot No.C-12) in the Etunda Green Scheme. 14 key farmers consisting of 8 females and 6 males, coming from the villages of Etunda.				
Technical Measures Crop: Horticulture	CR-6: Water Saving Cultivation CR-7: Crop Selection and Marketing CR-8: Cropping Plan and Horticulture Crop FM-2: Farm Record FM-5: Group Formation / Group Strengthening FM-6: Group Account Management FM-8: Collective Procurement / Selling FM-10 Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training Nov. 06, 2015	2 nd Training (suspended)	3 rd Training (suspended)	4 th Training Apr. 04, 2016
	Male	5	-	-	5
	Female	6	-	-	6
	Total	11	-	-	11
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training Nov. 08, 2016	2 nd Training Dec. 02, 2016	3 rd Training Mar. 30, 2017	
	Male	7	5	8	
	Female	6	4	6	
	Total	13	9	14	
Inputs and Material Supplied in Phase 2 and 3 (July, 2015 to April, 2017)	<ul style="list-style-type: none"> 15 sets of drip irrigation systems covering 24 m x 48 m (1,150 m²), with 50% contribution by farmers (farmers' contribution: N\$1,625, equivalent to 50% of procurement cost.) In the farmers' fields, pressured pipes have been installed with density of 15 m x 15 m. 				
Farm Record in Phase 2	<ul style="list-style-type: none"> Black books (A5 size notebook) distributed for each member No farm record forms were distributed. 				
Farm Record in Phase 3	<ul style="list-style-type: none"> Well done by demo farmer who keeps sales and profits made, rain fall and water used. On the other hand, there are some key farmers who are not well literate. 				
SHEP Action Plan based on farmers' initiatives	<ul style="list-style-type: none"> In Phase 3, market survey was conducted by key farmers in the framework of the 1st training for farmers groups on November 9th 2016. One of ATs, Etunda ADC participated the SHEP seminar in South Africa in February 2016. She emphasized the importance of business mind for market-oriented approach. The details of the market survey is depicted in a box titled as "Effects of Market Survey in Ruacana (Etunda), Omusati" in Attachment 3-6. During the review of the market survey farmers discussed further actions such as market survey with other members of cooperatives, and collective selling of products. With the assistance by the ATs, the key farmers who are also management members of the cooperatives took initiatives to prepare Action Plan for SHEP in Okatana. The rough plan was once presented by ATs in the 3rd Training for ATs in Omusati Region on March 23, 2017, and also by one of the key farmers at Joint Stakeholder Meeting on April 5, 2017. The Action Plan takes account 3 out of 4 steps of SHEP Approach; namely 1. Selection for targets and sharing vision / goal, 2. Farmers' awareness of current situation and new information and 3. Decision making, except 4. Provision of technical solutions. 				
Other Topics	<ul style="list-style-type: none"> Monitoring is done on Oct. 27 2015 before starting trainings and activities. Discussion with the Manager of Etunda Scheme on Nov. 10 and 20, 2015. Trainings for farmers group was suspended until obtaining of understanding of ARIBUSDEV. In Feb. 2016, the concurrence from AGRIBUSDEV was obtained and training was resumed. Collection of quotations and purchase orders from the Etunda Scheme on Mar. 23, 2016. In April 2016, contribution by farmers was agreed at 50% of procurement cost of drip irrigation system through the 4th training for farmers groups (Phase 2). 				

Source: Prepared by the Study Team

Photographs



Omusati 3rd Staff Meeting on October 16th 2014 at Etunda ADC, opening by Mr. Martin, CASO Omusati.



(date, activities, etc.)



(date, activities, etc.)



(date, activities, etc.)



(date, activities, etc.)



(date, activities, etc.)

(3) Okahao Constituency: Okahao ADC

Location	The pilot site is located at about 10 km from Okahao about 15 minutes driving. Coordination: 17.893435S, 15.066070E																													
ADC	Okahao ADC: Ms. Rachel Anghuwo:AT and Ms.Juria Shigwedha :AT																													
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Okahama: Mr.Kristian Hango 14 key farmers consisting of 5 females and 9 males coming from 14villages of Okahama(1), Ombanza(1), Oshikwa(1), Uukwandongo(1), Ombonde Yahango (1), Otamanzi(1), Omkondo(2), Uukwalumbe(1), Okalale(1), Ingululu(1), Uukwalumbe(1), Onaminga(1), Onakaheke(1)																													
Technical Measures Large Stock: Cattle	LS-1: Fodder production LS-2: Range Management LS-5: Disease Control LS-6: Large and Small Stock Fattening LS-7: Periodical Production FM-2: Farm Record FM-5: Group Formation/ Strengthening FM-10: Market Information Access Improvement																													
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training Nov. 06, 2015	2 nd Training Nov. 26, 2015	3 rd Training Feb. 04, 2016	4 th Training Apr. 06, 2016																									
	Male	8	3	10	2																									
	Female	5	5	3	3																									
	Total	13	8	13	5																									
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training Nov. 14, 2016	2 nd Training Dec. 28, 2016	3 rd Training Mar. 27, 2017																										
	Male	1	0	1																										
	Female	0	2	2																										
	Total	1	2	3																										
Inputs and Material Supplied in Phase-2	<p>LS-1:Fodder production - Wire Mesh net 50m, Rain gage, Seeds (Lucerne/Alfalfa, Bluebuffelgras, Anthephora)</p> <p>LS-5:Disease Control:</p> <table border="1"> <tr> <td>CASTRATOR BURDIZZO 19' 48CM AB)</td> <td>DEBUDDER GAS CADAC</td> </tr> <tr> <td>NOZZLE DEHORNER GAS</td> <td>SYRINGE ROUX 30ML REV LUER LOCK</td> </tr> <tr> <td>NEEDLE LUER 12X16GX19MM</td> <td>GLASS SYR ROUX RP 30ML 3030000070</td> </tr> <tr> <td>WASHER SET ROUX 30/50ML R/P 3030500099</td> <td>DRENCHER AUTO PHIL 30ML</td> </tr> <tr> <td>SYRINGE DISPOSAL 20ML</td> <td>NEEDLE DISP 1X18GX38MM PINK</td> </tr> <tr> <td>GLOVES LATEX MEDIUM/SHORT 100S</td> <td>GLOVES PL GENIA -ARMLENGTH</td> </tr> <tr> <td>WEIGHT BAND</td> <td>TERRA.WOUND SPRAY 150ML</td> </tr> <tr> <td>SYRINGE DISPOSAL 50ML</td> <td>TRUNK STEEL TOOLKIT</td> </tr> <tr> <td>DEHORNER BARNES 13'</td> <td>NEEDLE DISP 1X18GXX38MM PINK</td> </tr> <tr> <td>BULL NOSE HOLDER (AM0</td> <td>VANGRIEM NYLON 16MM S/E (ROPE)</td> </tr> <tr> <td>COOLER BOX 6 PACK</td> <td>NEEDLE LUER 12X16GX15MM</td> </tr> <tr> <td>WACCINE: Supavax</td> <td>DECTOMAX INJECT 500ML</td> </tr> <tr> <td>DRASTIC DEADLINE 5LTR ACKPACK</td> <td>GAS CYLINDER 9KG</td> </tr> </table>				CASTRATOR BURDIZZO 19' 48CM AB)	DEBUDDER GAS CADAC	NOZZLE DEHORNER GAS	SYRINGE ROUX 30ML REV LUER LOCK	NEEDLE LUER 12X16GX19MM	GLASS SYR ROUX RP 30ML 3030000070	WASHER SET ROUX 30/50ML R/P 3030500099	DRENCHER AUTO PHIL 30ML	SYRINGE DISPOSAL 20ML	NEEDLE DISP 1X18GX38MM PINK	GLOVES LATEX MEDIUM/SHORT 100S	GLOVES PL GENIA -ARMLENGTH	WEIGHT BAND	TERRA.WOUND SPRAY 150ML	SYRINGE DISPOSAL 50ML	TRUNK STEEL TOOLKIT	DEHORNER BARNES 13'	NEEDLE DISP 1X18GXX38MM PINK	BULL NOSE HOLDER (AM0	VANGRIEM NYLON 16MM S/E (ROPE)	COOLER BOX 6 PACK	NEEDLE LUER 12X16GX15MM	WACCINE: Supavax	DECTOMAX INJECT 500ML	DRASTIC DEADLINE 5LTR ACKPACK	GAS CYLINDER 9KG
CASTRATOR BURDIZZO 19' 48CM AB)	DEBUDDER GAS CADAC																													
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WACCINE: Supavax	DECTOMAX INJECT 500ML																													
DRASTIC DEADLINE 5LTR ACKPACK	GAS CYLINDER 9KG																													
Inputs and Material Supplied in Phase-3	<ul style="list-style-type: none"> Fodder grass seeds: Bluebuffelgras, Lucerne, Anthephora 																													
Farm Record in Phase 2	<ul style="list-style-type: none"> Black books (A5 size notebook), Fodder production record, Disease control record, Fattening record, Reproductive record 																													
Farm Record in Phase 3	<ul style="list-style-type: none"> Well Kept: Activities, Numbers of cattle, Numbers of calving, Mortality, Numbers of sales, Prices of purchase and selling of animals. 																													
Market Oriented Approach by the Demo Farmer	<ul style="list-style-type: none"> The demo farmer has been active for market-oriented approach. Against the traditional ways of livestock keeping that usually keeps animal as longer as possible as "stock", he is keen to sell at the best time at the market. He keeps prices of selling and purchasing of cattle and reflects into his planning for periodical production. 																													

Source: Prepared by the Study Team

Photographs



Phase-2.¹ Farmer Training



Phase-2.¹ Farmer Training



Phase-2. Farmer practical training at crush pen



Phase-2. Training of injection



Phase-2. Study of reproductive cycle of cattle









Phase-2. Tool kits

(4) Tsandi Constituency: Tsandi ADC

Location	The pilot site is located at about 3 km from Tsandi Coordination: 17.740829S, 14.892171E				
ADC	Tsandi ADC: Ms. Monika Moses:AT and Ms. Lydia Ekandjo				
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Tsandi: Mr. Frans Shikulo 14 key farmers consisting of 10 females and 4 males coming from 10 villages of Ampole (3), Oshinesi (1), Elamba (3), Ondukuta (2), Omaanda (1), Olukma (1), Ondongwadhya (1), Uukwanampembe (1), Omushapi (1)				
Technical Measures Small Stocks: Chicken	LS-4: Nutritious Food Supply for Pig and Chicken LS-5: Disease Control LS-13: Chicken Production (Indigenous) FM-2: Farm Record FM-5: Group Formation / Group Strengthening FM-6: Group Account Management FM-8: Collective Purchase/ Selling FM-10: Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training Nov. 19, 2015	2 nd Training Nov. 26, 2015	3 rd Training Feb. 08, 2016	4 th Training Apr. 06, 2016
	Male	4	3	2	2
	Female	11	10	2	8
	Total	15	13	4	10
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training Nov. 08, 2015	2 nd Training Dec. 01, 2015	3 rd Training Mar. 27, 2016	
	Male	0	1	0	
	Female	11	6	7	
	Total	11	7	7	
Inputs and Material Supplied in Phase-2	LS-5: Disease Control				
	SYRINGE DISPOSAL 20ML		NEEDLE DISP 1X18GX38MM PINK		
	GLOVES PL GENIA		GLOVES LATEX MEDIUM/SHORT 100S		
	TERRA.WOUND SPRAY 150ML		SYRINGE DISPOSAL 50ML		
	BAYTICOL 1 LTR		PEPERAZINE ADIPATE 1005 500G		
	AVISOL 100ML		LaSota NCD VACCINE		
	SPRAY		SYRINGE 1ML		
	PLASTIC CONTAINER 20 ML				
LS-13: Chicken Production (Indigenous) – Housing material (poles and cement, wire mesh net 50m, corrugated zinc sheets, concrete bricks)					
Inputs and Material Supplied in Phase-3	<ul style="list-style-type: none"> Lucerne seed Moringa tree (from Mr. Michel Dege, resource person from AGRA) 				
Farm Record in Phase-2	<ul style="list-style-type: none"> Black books (A5 size notebook), Poultry recording, Disease control record, Nutritious food record, Fodder production record, Vaccinator record, Balance sheet of group, Vaccination record and vaccinator record 				
Farm Record in Phase-3	<ul style="list-style-type: none"> Well Kept: Numbers of chickens, Hatching, Mortality 				
Collective Purchase of Vaccine	<ul style="list-style-type: none"> New Castle Disease vaccination was done through grouping of farmers, collective purchase of vaccine in Phase 2 and Phase 3. As noted above, vaccine was provided by N-CLIMP in Phase 2. Farmers understood the effects of vaccination through the fact that the rate of mortality significantly dropped after the vaccination. In Phase 3, farmers decided to buy vaccine with their own money. This initiative was supported by ATs through training for farmers that focused on Group Strengthening (FM-5), Group Account Management (FM-6), Collective Purchase/ Selling(FM-8). Encouraged with the success of vaccination, farmers are now discussing collective selling as a group. 				
Other Topics	<ul style="list-style-type: none"> In Phase-2, Demo farmer was changed. 				

Source: Prepared by the Study Team

Photographs

	
<p>Phase-2. Training of chicken management</p>	<p>Phase-2. Constructed poultry house</p>
	
<p>Phase-2. Laying nest and eggs in poultry house</p>	<p>Phase-2. Poultry house and chickens</p>
	
<p>Phase-2. Training of NCD vaccination</p>	<p>Phase-3. Chickens at new Demo farm</p>

4.2.2 Outline of Pilot Site Activities in Oshana Region

(1) Oshakati-West Constituency: Okau kamasheshe ADC

Location	The pilot site is located in the village of Okaukamasheshe at about 20 km south of Oshakati, about 35 minutes driving. Coordination: 17.388971S, 15.560597E			
ADC	Okaukamasheshe ADC, Mr. Agasty Amon (Senior AT)			
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Ms. Telefina Angolo 14 key farmers consisting of 9 females and 5 males, coming from 7 villages of Okaukamasheshe, Unthilindindi, Oshitowa, Okau, Oshuule, Oshikolomgondjo, and Okamule			
Technical Measures Crop: Cereal Grain	CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management CR-3: Conservation Agriculture FM-1: Farm Record			
Trainings in Phase-2 (July 2015 – April 2016)	1 st Training	2 nd Training	3 rd Training	4 th Training
	Nov. 18, 2015	Dec. 09, 2015	Feb. 09, 2016	Apr. 5, 2016
	Male	4	5	5
	Female	10	10	9
Total	14	15	14	14
Trainings in Phase-3 (July 2016 – April 2017)	1 st Training	2 nd Training	3 rd Training	
	Nov. 18, 2016	Dec. 9, 2016	Mar. 27, 2017	
	Male	5	5	4
	Female	9	7	8
Total	14	12	12	
Inputs and Material Supplied in Phase 2	<ul style="list-style-type: none"> Ploughing services by ripper furrowing for 1 ha of demonstration plot, 1 ha each for 14 key farmers Fencing net (100 m: 50 m x 2 roles) Rain gauge: 1 piece for demonstration farm, 14 pieces for 14 key farmers 			
Inputs and Material Supplied in Phase 3	<ul style="list-style-type: none"> Ploughing services by ripper furrowing for 1 ha of demonstration plot, 1 ha each for 14 key farmers (N\$250 from DCP, other cost of N\$140 by N-CLIMP) 			
Farm Record in Phase 2	<ul style="list-style-type: none"> Black books (A5 size notebook) Daily Rainfall Record in mm (daily record) Farm Record for Cereal Grains 			
Farm Record in Phase 3	<ul style="list-style-type: none"> A few farmers (demo and key farmers) keep records only on activity and rain fall. On the other hand, it is often observed that farmers keep good remembering in mind on crop production activities and weather. 			
Effects of Ripper Furrowing Confirmed	<ul style="list-style-type: none"> In Phase-2, ripper furrowing (CR-3 Conservation Agriculture) was arranged in late November 2015. A tractor with ripper was in stand-by at the demo farm while waiting for adequate rain to loose soil for easier ripping of deeper for about 10 days. Results of mahangu (pearl millet) in Phase-2 showed the likely better production than the control plot (no treatment with disc harrow). However, wide variation was observed in different growing progress, probably depending on the moisture and nutrient conditions of the spots. During weeding conducted in middle of February 2017, the demo farmer carried out thinning of mahangu plants to reduce number of plants in one hill to 4-5 plants, since she understood the proper plant density under the rain-fed condition. 			

Source: Prepared by the Study Team

Photographs



October 2015, the 1st site visit in Phase-2, explanation to demo farmers to set pilot site before rain start.



January 2016, site inspection with ATs. Measuring of growth of pearl millet, affected by drought.



January 2016, site inspection with ATs. Discussion with demo farmer and AT.



April 2016, joint inspection of demo farm with key farmers in the 4th Training for Farmers Group



Early February 2017, site inspection with JICA Namibia representative, farmers conducting weeding & thinning



Late February 2017, pearl millet well grown owing to better rainfall

(2) Okatana Constituency Uukwangla ADC

Location	The pilot site is located in the village of Epyeshona, at about 7 km west of the N-CLIMP office in Ongwediva, about 15 minutes driving along the road. Coordination: 17.732111S, 15.690986E																				
ADC	Uukwangla ADC, Ms. PrucheriaMwanyangapo (Senior AT), Ms. Ndilimeke T. Hango (AT, transferred to the other ADC in January 2016)																				
Target Farmers: Key Farmers	Demonstration farm: rain water catchment, roof water catchment, drip irrigation systems established by CUVE Water (Germany) in 2009 at Epyeshona village 15 key farmers consisting of 11 females and 4 males, staying in the villages of Epyeshona																				
Technical Measures Crop: Horticulture	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 FM-2: Farm Record FM-5:Group Formation / Group Strengthening FM-6:Group Account Management FM-8: Collective Purchase/ Selling FM-10:Market Information Access Improvement																				
Trainings in Phase-2 (July 2015 – April 2016)	<table border="1"> <thead> <tr> <th></th> <th>1st Training Nov. 18 2015</th> <th>2nd Training Dec. 019 2015</th> <th>3rd Training Feb. 10, 2016</th> <th>4th Training Apr. 05 2016</th> </tr> </thead> <tbody> <tr> <td>Male</td> <td>2</td> <td>2</td> <td>3</td> <td>3</td> </tr> <tr> <td>Female</td> <td>6</td> <td>5</td> <td>8</td> <td>5</td> </tr> <tr> <td>Total</td> <td>8</td> <td>7</td> <td>11</td> <td>8</td> </tr> </tbody> </table>		1 st Training Nov. 18 2015	2 nd Training Dec. 019 2015	3 rd Training Feb. 10, 2016	4 th Training Apr. 05 2016	Male	2	2	3	3	Female	6	5	8	5	Total	8	7	11	8
	1 st Training Nov. 18 2015	2 nd Training Dec. 019 2015	3 rd Training Feb. 10, 2016	4 th Training Apr. 05 2016																	
Male	2	2	3	3																	
Female	6	5	8	5																	
Total	8	7	11	8																	
Trainings in Phase-3 (July 2016 – April 2017)	<table border="1"> <thead> <tr> <th></th> <th>1st Training Nov. 14, 2018</th> <th>2nd Training Nov. 28, 2016</th> <th>3rd Training Mar. 27, 2016</th> </tr> </thead> <tbody> <tr> <td>Male</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>Female</td> <td>5</td> <td>3</td> <td>8</td> </tr> <tr> <td>Total</td> <td>5</td> <td>4</td> <td>9</td> </tr> </tbody> </table>		1 st Training Nov. 14, 2018	2 nd Training Nov. 28, 2016	3 rd Training Mar. 27, 2016	Male	0	1	1	Female	5	3	8	Total	5	4	9				
	1 st Training Nov. 14, 2018	2 nd Training Nov. 28, 2016	3 rd Training Mar. 27, 2016																		
Male	0	1	1																		
Female	5	3	8																		
Total	5	4	9																		
Inputs and Materials Supplied in Phase 2	<ul style="list-style-type: none"> No inputs and materials have been supplied before group strengthening. 																				
Inputs and Materials Supplied in Phase 3	<ul style="list-style-type: none"> Roof sheets (measurement required) and drip irrigation equipment were supplied during the period from Oct. 2016 to Feb. 2017. Drip irrigation was installed in Jan. to Feb.2017. Roof sheets are under installation as of March 2017. Weighing Scale for product (1) 																				
Farm Record in Phase 2	<ul style="list-style-type: none"> Black books (A5 size notebook) for each member Record of group meetings 																				
Farm Record in Phase 3	<ul style="list-style-type: none"> Well kept as a group record, including activities, rules and decision made at any meetings. 																				
Maximization of Existing Facilities for Horticulture	<ul style="list-style-type: none"> The following facilities are handed-over to community of users on Nov. 23 2015 from CUVE Water. <ul style="list-style-type: none"> Rainwater harvesting facilities installed under Cuve Waters are concrete floor (640 m²) for rainfall collection, underground tank (120 m³). Roof catchment installed under Cuve Waters are roof (260 m²) of green house and pond (80 m³). Drip irrigation systems cover 1,000 m² of open garden and 160 m² under green (shade) house In Phase 3, N-CLIMP has assisted to rehabilitate the facilities with the inputs as noted above. This encouraged farmers to consider further actions as noted in the box below. 																				
Market Survey by Farmers	<ul style="list-style-type: none"> The responsible AT explained ways of market survey at training for key farmers. Key farmers conducted market survey in Oshakai Open Market on their own. This means that farmers understood well the methods of market survey. The participants decided and to conduct the survey individually. Everybody has gained valuable information on demands of vegetables. This confirms that a farmer can implement market survey independently. After sharing their own experience of market survey, farmers started to plan the communal production of vegetables as a group. 																				

Source: Prepared by the Study Team

Photographs



March 2016, site visit. Roof sheets for rain water harvesting



April 2016, 4th Training for Farmers Group



February 2017, installation of drip irrigation



March 2017, under renewal of roof sheets



March 2017, nursery preparation inside net house



March 2017, 3rd training for farmers group

(3) Uuvudhiya Constituency: Uuvudhiya ADC

Location	The pilot site is located at about 10 km from Uuvudhiya ADC 15 minutes driving				
ADC	Uuvudhiya ADC: Ms. Taimi Nambabi :SAT				
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Ondulu: Mr. Eino Amupolo 14 key farmers consisting of 6 females and 8 males coming from 6 villages of Ondulu (1), Engonbe (4), Uuvudhiya (1), Oponona (5), Ondulu (1), Oluthalwegolo (3)				
Technical Measures Large stock: Cattle	LS-1:Fodder production LS-2:Range Management LS-5:Disease Control LS-7: Periodical Production FM-2: Farm Record FM-5: Group Formation/ Strengthening FM-6: Group Account Management FM-8: Collective Purchase/ Selling FM-10: Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 18 2015	Dec. 09 2015	Feb. 9, 2016	Apr. 04, 2016
	Male	4	5	5	3
	Female	4	3	3	2
	Total	8	8	8	5
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
	Date	Nov. 14, 2018	Dec 14, 2016	Apr 29, 2016	
	Male	3	3	3	
	Female	3	4	4	
	Total	6	7	7	
Inputs and Material Supplied in Phase 2	LS-1:Fodder production - Wire Mesh net 50m, Rain gage, Seeds (Lucerne/Alfalfa, Bluebuffelgras, Anthephora)				
	LS-5:Disease Control:				
	CASTRATOR BURDIZZO 19' 48CM AB)	DEBUDDER GAS CADAC			
	NOZZLE DEHORNER GAS	SYRINGE ROUX 30ML REV LUER LOCK			
	NEEDLE LUER 12X16GX19MM	GLASS SYR ROUX RP 30ML 3030000070			
	WASHER SET ROUX 30/50ML R/P 3030500099	DRENCHER AUTO PHIL 30ML			
	SYRINGE DISPOSAL 20ML	NEEDLE DISP 1X18GX38MM PINK			
	GLOVES LATEX MEDIUM/SHORT 100S	GLOVES PL GENIA -ARMLENGTH			
	WEIGHT BAND	TERRA.WOUND SPRAY 150ML			
	SYRINGE DISPOSAL 50ML	TRUNK STEEL TOOLKIT			
	DEHORNER BARNES 13'	NEEDLE DISP 1X18GXX38MM PINK			
	BULL NOSE HOLDER (AM0)	VANGRIEM NYLON 16MM S/E (ROPE)			
	COOLER BOX 6 PACK	NEEDLE LUER 12X16GX15MM			
	WACCINE: Supavax	DECTOMAX INJECT 500ML			
DRASTIC DEADLINE 5LTR ACKPACK	GAS CYLINDER 9KG				
Inputs and Material supplied in Phase 3	• Fodder grass seeds: Bluebuffelgras, Lucerne, Anthephora				
Farm Record in Phase 2	• Black books (A5 size notebook), Fodder production record, Disease control record				
Farm Record in Phase 3	• Well Kept: Activities, Numbers of cattle, Numbers of calving, Mortality, Sales				
Fodder Production against Drought	• In Phase 2 period, the drought in the area was severe. Demo farmer gets 2 calves only by influence of drought • In Phase 3, the responsible AT explained the needs of periodical production as one of the technical measures against drought situation.				

Source: Prepared by the Study Team

Photographs



Phase-2. Training at the demo farmer



Phase-2. Farmer training



Phase-2. Explanation of tools



Phase-2. AT of the practical training at crush pen



Phase-2. Pour On treatment for external parasites



Phase-2. Practices for dehorning by farmers in the training

(4) Uukuwiyu Constituency: Uukwiyu Uushona ADC

Location	The pilot site is located at about 20 km from Ondangwa about 25 minutes driving. Coordination: 18.023130S, 15.933382E				
ADC	Uukwiyu-Uushona ADC, Ms. Kaarina Nghilwamo :SAT				
Target Farmers: Demonstration Farm and Key Farmers	Okahongo: Ms. Fredricha N. Ntinda 17 key farmers consisting of (12) females and (5)males coming from 10 villages of Okahongo (3), Oshaadha (1), Okatale (1), Onankulo (2), Onambango (2), Onekaku (1), Osholuyu (2),Ethiya (3), Eheke (1), Oshoopala(1)				
Technical Measures Small Stocks: Chicken	LS-4: Nutritious Food Supply for Pig and Chicken LS-5: Disease Control LS-13: Chicken Production (Indigenous) FM-2: Farm Record FM-5: Group Formation / Group Strengthening FM-6: Group Account Management FM-8: Collective Purchase/ Selling FM-10: Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 18 2015	Dec. 09 2015	Feb. 10 2016	Apr. 04, 2016
	Male	2	1	1	2
	Female	7	8	4	8
	Total	9	9	5	10
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
		Cancelled	Nov. 30, 2016	Mar. 22, 2017	
	Male		1	1	
	Female		5	5	
	Total		6	6	
Inputs and Material Supplied in Phase 2	LS-5: Disease Control				
	SYRINGE DISPOSAL 20ML		NEEDLE DISP 1X18GX38MM PINK		
	GLOVES PL GENIA		GLOVES LATEX MEDIUM/SHORT 100S		
	TERRA.WOUND SPRAY 150ML		SYRINGE DISPOSAL 50ML		
	BAYTICOL 1 LTR		PEPERAZINE ADIPATE 1005 500G		
	AVISOL 100ML		LaSota NCD VACCINE		
	SPRAY		SYRINGE 1ML		
	PLASTIC CONTAINER 20 ML				
LS-13: Chicken Production (Indigenous) – Housing material (poles and cement, wire mesh net 50m, corrugated zinc sheets, concrete brocks)					
Inputs and Material Supplied in Phase 3	Lucerne seed, Moringa seedling				
Farm Record in Phase 2	<ul style="list-style-type: none"> Black books (A5 size notebook), Poultry recording, Disease control record, Nutritious food record, Fodder production record, Vaccinator record, Balance sheet of group, Vaccination record and vaccinator record 				
Farm Record in Phase 3	<ul style="list-style-type: none"> Well Kept as a group record and account book: Numbers of chickens, hatching, Mortality, and Sales. 				
Collective Purchase of Vaccine as a group	<ul style="list-style-type: none"> New Castle Disease vaccination was done through grouping of farmers and collective purchase of vaccine. The significance of Uukuwiyu group is that farmers conducted collection of money and accounting. They also invited neighbors for vaccination to gain more chickens for vaccination. 				
Usage of Local materials and Resources	<ul style="list-style-type: none"> For assisting housing improvement for hatchery, N-CLIMP used locally available materials as noted above. Following the found effects of hatchery in the chicken coop supported by N-CLIMP, the local government also supported the group for the second coop. 				
Farmers' Field Day	<ul style="list-style-type: none"> The pilot site was selected for Farmers' Filed Day. The demo and key farmers well explained their experience to invitees. 				

Source: Prepared by the Study Team

Photographs



Phase-2. The first farmer training



Phase-2. Poultry house by N-CLIMP



Phase-2 . Laying nests and eggs



Phase-2. Chicken in Hatching



Phase-2. Hatched chicks



Phase-3. Starting of horticulture

4.2.3. Outline of Pilot Site Activities in Oshikoto Region

(1) Omuthiya Constituency: Okashana ADC

Location	The pilot site is located in the village of Ekulo near the Okashana ADC and the Crop Research Station, at about 120 km south-east of the N-CLIMP office at Ongwediva, about 1 hour 30 minutes driving along the road. Coordination: 18.383114S, 16.606794E				
ADC	Okashana ADC, Mr. Wilhelm Kashimba (AT)				
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Ms. Ester Ndeutapo in Ekuno village 14 key farmers consisting of 7 females and 7 males, coming from 12 villages of Ekulo, Ongaka, Ehafo, Onameya, Okaale, Othema, Othemayemanya, Onamulele, Oniiyagaya, Ombolo, Okapuku Ehafo, and Omalindi				
Technical Measures Crop: Cereal Grain	CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management CR-3: Conservation Agriculture FM-2: Farm Record FM-5: Group Formation/ Strengthening FM-8: Collective Purchase/ Selling FM-10: Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 12, 2015	Nov. 26, 2015	Feb. 11, 2016	Apr. 6, 2016
	Male	5	6	1	4
	Female	7	6	7	7
	Total	12	12	8	11
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
	Date	Nov. 24, 2016	Dec. 07, 2016	Mar. 28 2017	
	Male	8	8	1	
	Female	7	9	6	
	Total	15	17	7	
Inputs and Material Supplied in Phase 2	<ul style="list-style-type: none"> • Ploughing services by ripper furrowing for 1 ha of demonstration plot as well as 1 ha each for 14 key farmers • Fencing 150 m: wire 50 m x 3 roles and 6 poles: 1.8 n x (75 – 100 mm dia.) for demonstration farm • Composite fertilizer: 50 kg x 3 bags for demonstration farm • Rain gauge 				
Inputs and Material supplied in Phase-3	<ul style="list-style-type: none"> • Ploughing services of 1 ha by ripper furrowing for each of demonstration and 14 key farmers, except the government subsidy • Other services, inputs and materials supplied by farmers 				
Farm Record in Phase 2	<ul style="list-style-type: none"> • Black books (A5 size notebook) • Annual Rainfall Record in mm (daily record) • Farm Record for Cereal Grains 				
Farm Record in Phase 3	<ul style="list-style-type: none"> • Recording is limited to activities and rain fall. 				
Effects of Ripper Furrowing understood by Farmers	<ul style="list-style-type: none"> • In the Phase-2, ripper furrowing (CR-3 Conservation Agriculture) was applied, however, depth of ripper and height furrow were not enough. Even under this condition, farmers understand the effect of ripper furrowing (breaking shallow pan and increase of water holding capacity), then, some farmers applied ripper furrowing to their field by their own expenses. • In the Phase-3, ripper furrowing could not be arranged due to short of ripper furrowing services, and the usual method of disc harrow was applied for ploughing. On the other hand, field applied ripper furrow in the Phase-2 showed the well grown mahangu (pearl millet). This indicates that ripper furrowing is effective for the next year crop. 				

Source: Prepared by the Study Team

Photographs



April 2016, 4th training for farmers group to review the activities and Technical Measures



April 2016, 4th training for farmers group, better harvest by ripper furrowing and basal fertilizer



February 2017, site visit



February 2017, site visit



April 2016, fallow plot



February 2017, site visit, fallow plot

(2) Onayena Constituency: Onayena ADC

Location	The pilot site is located in the village of Omandongo, at about 60 km west of the N-CLIMP office at Ongwediva, about 40 minutes driving along the road. Coordination: 17.990101S, 16.206062E				
ADC	Onayena ADC, Ms. Ester Namuhunga (AT), Mr. Hosea Salmon (AT)				
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Mr. John Amapandi at Omandongo village 14 key farmers consisting of 10 females and 4 males, coming from 9 villages of Omandongo, Ompugulu, Uuyoka, Onayenge, Elombe, Oniihwa, Onimwandi, Uukete, Ethindi				
Technical Measures Crop: Horticulture	CR-6: Water Saving Cultivation CR-7: Crop Selection and Marketing CR-8: Cropping Plan and Horticulture Crop Management FM-2: Farm Record FM-5: Group Formation / Group Strengthening FM-10: Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 12, 2015	Dec. 25, 2015	Feb. 12 2016	Apr. 06, 2016
	Male	1	3	3	3
	Female	6	9	4	9
	Total	7	12	7	10
Trainings in Phase-3 (July 2016 – April 2017)		1 st & 2 nd Training		3 rd Training	
		Nov. 30, 2015		Mar. 29, 2017	
	Male	1		1	
	Female	3		6	
	Total	4		7	
Inputs and Material Supplied in Phase 2	<ul style="list-style-type: none"> Low pressure drip irrigation kit (150 m²) x 1 set, tank (210 lit.), poles (1.8 m x 4 pieces), binding wire, nail bags (100 g) for demonstration farm Fencing net: 150 m: 50 m x 3 roles) for demonstration farm Low pressure drip irrigation kit (30 m²) x 14 sets and buckets x 14 pieces for key farmers Rain gauge by farmer 				
Inputs and Material Supplied in Phase 3	<ul style="list-style-type: none"> Weighing Scale for products (1) 				
Farm Record in Phase 2	<ul style="list-style-type: none"> Black books (A5 size notebook) distributed for each member Demo and key farmers kept the following <ul style="list-style-type: none"> Annual Rainfall Record in mm (daily record) Farm Record for Water Farm Record for Horticulture Crops 				
Farm Record in Phase 3	<ul style="list-style-type: none"> Confirmed that the demo farmer well kept the farm records covering the above noted as well as the following: <ul style="list-style-type: none"> Activity done, Sales made, prices and profits On the other hand, not all key farmers keep farm records. 				
Introduction of Small-Scale Irrigation	<ul style="list-style-type: none"> Training for installation of drip irrigation kits were additionally conducted in 3 times during the period from February to September 2016. Out of 14 key farmers, who received drip irrigation kits, some farmers could not install the kit because of short of technical knowledge. In the demo plot, water supply stopped in late December 2016 due to break of the main supply pipe, and resumed to supply water late January 2017. Thanks to water supply in this period, all the vegetable crops are heavily damaged. 				
Collaboration with an officer in another region	<ul style="list-style-type: none"> For designing and installing small-scale irrigation facilities for demo and key farmers, an officer from Omahenene Crop Research Station (out of the four regions) worked well collaborating with N-CLIMP. 				
Market Survey by Demo and Key Farmer	<ul style="list-style-type: none"> The demo farmer regularly visits local markets for deciding the selection of crop and timing of selling. 				

Source: Prepared by the Study Team

Photographs



March 2016



April 2016



April 2016



July 2016



July 2016



July 2016

(3) Omuntele Constituency: Omuntele ADC

Location	The pilot site is located at about 15 km from Omuntele ADC about 25 minutes driving. Coordination: 18.276870S 16.177461E				
ADC	Omuntele ADC: Mr. George Haufiku:AT				
Target Farmers: Demonstration Farm and Key Farmers	Demo farm: Omuntemo: Mr. Petrus Ngwena 14 key farmers consisting of (2) females and (12) males coming from 4 villages of Omuntemo(3), Epeke(4), Oshilunga(4) Okuluwa(3)				
Technical Measures Largestock: Cattle	LS-1: Fodder production LS-2: Range Management LS-5: Disease Control LS-7: Periodical Production FM-2: Farm Record FM-5: Group Formation/ Strengthening FM-8: Collective Purchase/ Selling FM-10: Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 12, 2015	Nov. 25, 2015	Feb. 10, 2016	Apr. 05, 2016
	Male	10	13	11	6
	Female	3	2	2	3
	Total	13	15	13	9
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
		Nov. 11, 2016	Nov. 28, 2015	Mar. 28, 2017	
	Male	11	8	4	
	Female	4	4	9	
	Total	15	12	13	
Inputs and Material Supplied in Phase 2	LS-1:Fodder production - Wire Mesh net 50m, Rain gage, Seeds (Lucerne/Alfalfa, Bluebuffelgras, Anthephora)				
	LS-5:Disease Control:				
	CASTRATOR BURDIZZO 19' 48CM AB)	DEBUDDER GAS CADAC			
	NOZZLE DEHORNER GAS	SYRINGE ROUX 30ML REV LUER LOCK			
	NEEDLE LUER 12X16GX19MM	GLASS SYR ROUX RP 30ML 3030000070			
	WASHER SET ROUX 30/50ML R/P 3030500099	DRENCHER AUTO PHIL 30ML			
	SYRINGE DISPOSAL 20ML	NEEDLE DISP 1X18GX38MM PINK			
	GLOVES LATEX MEDIUM/SHORT 100S	GLOVES PL GENIA -ARMLENGTH			
	WEIGHT BAND	TERRA.WOUND SPRAY 150ML			
	SYRINGE DISPOSAL 50ML	TRUNK STEEL TOOLKIT			
	DEHORNER BARNES 13'	NEEDLE DISP 1X18GXX38MM PINK			
	BULL NOSE HOLDER (AM0	VANGRIEM NYLON 16MM S/E (ROPE)			
	COOLER BOX 6 PACK	NEEDLE LUER 12X16GX15MM			
	WACCINE: Supavax	DECTOMAX INJECT 500ML			
DRASTIC DEADLINE 5LTR ACKPACK	GAS CYLINDER 9KG				
Inputs and Material Supplied in Phase 3	• Fodder grass seeds: Bluebuffelgras, Lucerne, Anthephora				
Farm Record in Phase 2	• Black books (A5 size notebook), Fodder production record, Disease control record				
Farm Record in Phase 3	• Well kept: Activities, Numbers of cattle, Calving numbers, Mortality, Number of sales				
Animal Husbandry made easy by Periodical Production	• The Demo farmer promoted the animal husbandry technical measures to neighbors and key farmers. This was enabled as the technical measure on periodical production limits the timing of calving within a few months. This allows farmers to work together for dehorning, hoof trimming and castration.				

Source: Prepared by the Study Team

Photographs



Phase-2. Farmers training



Phase-2. Training of dehorning



Phase-2. Tool kits and medicines



Phase-2. Practical training of vaccination and parasite control



Phase-2. Explanation of tool kits



Phase-2. Measuring of body weight

(4) Onayaanya Constituency: Onankali ADC

Location	The pilot site is located at about 5 km from Onankali ADC about 5 minutes driving				
ADC	Onankali ADC: Ms. Hambeleleni Sheleka: SAT				
Target Farmers: Demonstration Farm and Key Farmers	Demo Farm Okatundu :Ms. Verena Niiye 14 key farmers consisting of 11 females and 3 males coming from 11 villages of Okatunda (1), Onyati (2), Ositi (1), Omulilo (1), Ondjokwe (1), Ombundu (1), Uukwanambwa (2), Onalukula (1), Onembege (3), Oshiyashomatope (1)				
Technical Measures Small Stocks: Chicken	LS-4: Nutritious Food Supply for Pig and Chicken LS-5: Disease Control LS-13: Chicken Production (Indigenous) FM-2: Farm Record FM-5: Group Formation / Group Strengthening FM-6: Group Account Management FM-8: Collective Purchase/ Selling FM10: Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 12, 2015	Dec. 09 2015	Feb. 11, 2016	Apr. 5, 2016
	Male	0	2	2	1
	Female	6	8	10	9
	Total	6	10	12	10
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
	Date	Nov. 9, 2016	Dec. 7, 2016	Mar. 29, 2017	
	Male	0	0	0	
	Female	7	4	5	
	Total	7	4	5	
Inputs and Material Supplied in Phase 2	LS-5: Disease Control				
	SYRINGE DISPOSAL 20ML		NEEDLE DISP 1X18GX38MM PINK		
	GLOVES PL GENIA		GLOVES LATEX MEDIUM/SHORT 100S		
	TERRA.WOUND SPRAY 150ML		SYRINGE DISPOSAL 50ML		
	BAYTICOL 1 LTR		PEPERAZINE ADIPATE 1005 500G		
	AVISOL 100ML		LaSota NCD VACCINE		
	SPRAY		SYRINGE 1ML		
	PLASTIC CONTAINER 20 ML				
LS-13: Chicken Production (Indigenous) – Housing material (poles and cement, wire mesh net 50m, corrugated zinc sheets, concrete bricks)					
Inputs and Material Supplied in Phase 3	None				
Farm Record in Phase 2	<ul style="list-style-type: none"> Black books (A5 size notebook), Poultry recording, Disease control record, Nutritious food record, Fodder production record, Vaccinator record, Balance sheet of group, Vaccination record and vaccinator record 				
Farm Record in Phase 3	<ul style="list-style-type: none"> Well kept: Activity, Numbers of chickens, Hatching, Sales of chickens, Mortality 				
Incubation for providing chicks to local markets	<ul style="list-style-type: none"> Demo farmer gained an incubator. The system is used by key farmers for hatchery paying some money to demo farmer. Demo farmer buys eggs from neighbors and selling chicks to other farmers or to local markets. 				

Source: Prepared by the Study Team

Photographs



Phase-2. Farmer training



Phase-2. Chickens in cage



Phase-2. Farmer training concerning disease control



Phase-2. Modification of poultry house



Phase-2. NCD vaccine and its usage



Phase-3. Chicks from hatchery

(5) Nehale ly Mpingana Constituency: King Kauluma ADC

Location	The constituency is located south-east of Outhiya north-west of Tsuebu, , and north of Etosha Pan.												
ADC	King Kauluma ADC: Mr. Kanyagela Sergious:AT												
Target Farmers	Beneficiaries of the governmental project “Small Stock Distribution and Development in Communal Areas”.												
Technical Measures Small Stocks: Goat	LS-5: Disease Control FM-2: Farm Record FM10: Market Information Access Improvement												
Trainings in Phase-2 (July 2015 – April 2016)	Not Applicable as the site was selected in the beginning of Phase 3. Please see the note below in details.												
Trainings in Phase-3 (July 2016 – April 2017)	<table border="1"> <thead> <tr> <th></th> <th>1st & 2^d Training Nov 23 2016</th> <th>3rd Training April 2017</th> </tr> </thead> <tbody> <tr> <td>Male</td> <td>14</td> <td>11</td> </tr> <tr> <td>Female</td> <td>28</td> <td>12</td> </tr> <tr> <td>Total</td> <td>42</td> <td>23</td> </tr> </tbody> </table>		1 st & 2 ^d Training Nov 23 2016	3 rd Training April 2017	Male	14	11	Female	28	12	Total	42	23
	1 st & 2 ^d Training Nov 23 2016	3 rd Training April 2017											
Male	14	11											
Female	28	12											
Total	42	23											
Inputs and Material Supplied in Phase 3	Not Applicable (Please see below).												
Farm Record in Phase 2	Not Applicable (Please see below).												
Farm Record in Phase 3	<ul style="list-style-type: none"> Benefits of Farm Record are one of the topics that the responsible ATs raised at the trainings with key farmers. 												
Collaboration with a governmental project through technical assistance	<ul style="list-style-type: none"> This pilot site was selected in the beginning of Phase 3 as the fifth site in the region. N-CLIMP was expected to collaborate with the governmental project “Small Stock Distribution and Development in Communal Areas”. It was agreed with the regional office that any tangible inputs were provided by the government through the regional and ADC offices. The intervention by N-CLIMP was expected only for technical matters for the implementation of training for ATs and Farmers. The actual activities in King Kauluma had been postponed according to the delay of provision of goats by the government. However, the responsible AT took initiative and conducted the two times of training for farmers. The above-noted technical measures are among the issues that the AT explained and facilitated discussions at the training for farmers. 												

Source: Prepared by the Study Team

Photographs



Farmers met for the first time at the joint (1st and 2nd) Training held by the AT on 23 November.



AT explaining the disease control in the 3rd training of Phase 3 held on 30 March, 2017



Farmers discussing the ways of farm records on 30 March, 2017.



Young children also listening to AT's explanation on marketing at the 3rd training on 30 March, 2017.

4.2.4 Outline of Pilot Site Activities in Ohangwena Region

(1) Ondobe Constituency: Ondobe ADC

Location	The pilot site is located in the village of Eegonyo, at about 80 km north-east of the N-CLIMP office at Ongwediva, about 1 hour 20 minutes driving along the road. Coordination: 17.444344S, 16.268496E				
ADC	Ondobe ADC, Mr. Henry Shilmba (AT, transferred to Ongha ADC in April 2016) in Phase-2 and Mr. Festus Nembia (AT, from April 2016) in Phase-3				
Target Farmers: 15 Key Farmers	Demonstration farm: Customary land for the group (51 members) in the village of Eegonyo. 15 key farmers consisting of 11 females and 4 males, coming from 5 villages of Eegonyo, Onaikosha, Oheti, Ondaanda, Ohandimba				
Technical Measures Crop: Cereal Grain	CR-1: Fertilizer Application CR-2: Cropping Pattern and Crop Management CR-3: Conservation Agriculture FM-2: Farm Record FM-5: Group Formation/ Strengthening FM-6: Group Account Management FM-8: Collective Purchase/ Selling FM-10: Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 10, 2015	Dec. 7, 2015	Feb. 18 2016	Apr. 07, 2016
	Male	5	4	2	1
	Female	16	16	26	21
	Total	21	20	28	22
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
	Date	Nov. 10, 2016	Dec. 15, 2016	Mar. 22, 2017	
	Male	4	4	6	
	Female	34	33	35	
	Total	38	37	41	
Inputs and Material Supplied in Phase 2	<ul style="list-style-type: none"> • Ploughing services by ripper furrowing for 1 ha of demonstration plot • Fencing net: wire net 65 m: 50 m x 2 roles, barbed wire 850 m x 1 role • Rain gauge: 1 piece 				
Inputs and Material Supplied in Phase 3	<ul style="list-style-type: none"> • Ploughing services by ripper furrowing for 1 ha of demonstration plot, 1 ha each for 14 key farmers (N\$250 from DCP, other cost of N\$140 by N-CLIMP) 				
Farm Record in Phase 2	<ul style="list-style-type: none"> • Black books (A5 size notebook) • Annual Rainfall Record in mm (daily record) • Farm Record for Cereal Grains 				
Farm Records in Phase 3	<ul style="list-style-type: none"> • Well Kept as a Group Record: Activity Done, Sales Made (with prices and profits) Rain Fall. Also the group's activity plans (schedules, inputs) and rules 				
Mahangu Intercropping with Bambara nuts and beans	<ul style="list-style-type: none"> • Mahangu (pearl millet) was planted in January, intercropping with bambara nuts and beans. Under the dry condition during the January, the crop growth showed not so bad and fields were under weeding. • On Mar. 22, 2017, the 3rd training for farmers groups was conducted at the site, and crop growth of Mahangu, bambara nuts and beans showed the well grown situation under enough rainfall in late February to March 2017. 				
Group Work on Communal Land	<ul style="list-style-type: none"> • The group has been active for long time to work on the communal land. The attendance of members is always in high rates. • The board of the group has been keeping the management very well. At general assembly, they report activities of the previous crop season and accounting issues. Then they discuss plan of activities for the next season. 				
Collaboration of ADC and Regional Council	<ul style="list-style-type: none"> • The AT has been well managing the ways of assisting the group. He combines N-CLIMP's farmers' training with other official work with the group. • The regional council shows presence in farmers' training, and often gives advice or guidance on the ways of the usage of the council's resource, such as subsidy. • These situations suggest high potential of the government's sustainable assistance to the group. 				

Source: Prepared by the Study Team

Photographs



October 2015, 1st Training for Farmers Groups



October 2015, 1st Training for Farmers Groupss



April 2016



April 2016



February 2017, site visit



February 2017, site visit

(2) Epembe Constituency: Epembe ADC

Location	The pilot site is located in the village of Epumba Lyondjabe at about 170 km north-east of the N-CLIMP office at Ongwediva, about 2 hour driving along the road. Coordination: 17.628927S, 16.806101E				
ADC	Epembe ADC, Mr. Bruce Kasaona (Agricultural Technician) Mr. Immanuel Eelu, Chief of ATs as acting after Mr Kasaona's transfer.				
Target Farmers: 15 Key Farmers	Demonstration farm: Customary land in the village of Epumba Lyondjabe 15 key farmers consisting of 9 females and 6 males in the village of Epumba Lyondjabe				
Technical Measures Crop: Horticulture	CR-6: Water Saving Cultivation CR-7: Crop Selection and Marketing CR-8: Cropping Plan and Horticulture Crop Management FM-2: Farm Record FM-5: Group Formation / Group Strengthening FM-6: Group Account Management FM-8: Collective Purchase/ Selling FM-10: Marketing Information across Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 10 2015	Dec. 07 2015	Feb. 17 2016	Apr. 07, 2016
	Male	5	4	2	6
	Female	7	8	10	17
	Total	12	12	12	23
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
				Mar 22, 2016	
	Male	Not Applicable for conducting		5	
	Female	training. Please refer the note		3	
	Total	below.		8	
Inputs and Material Supplied in Phase 2	<ul style="list-style-type: none"> Low pressure drip irrigation kit (150 m²) x 2 sets, tank (500 lit.), poles (3 m x 6 pieces) for demonstration farm Fencing: wire net 120 m: 50 m x 3 roles, poles from farmers 				
Inputs and Material Supplied in Phase 3	<ul style="list-style-type: none"> Watering can (10 lit.) x 5 Shade net 3 m x 50 m x 1 role Connection parts for borehole (T-connector, ball valve, neppel, galve pipe, elbows etc. 				
Farm Record	<ul style="list-style-type: none"> Black books (A5 size notebook) distributed for each member Farm Record for Water (water charge) Farm Record for Fuel (running pump) Farm Record for Horticulture Crops 				
Communal Irrigation Facility	<ul style="list-style-type: none"> Members of groups are about 50 persons, forming HIV support group In late January 2017, nursery beds were prepared for tomato, pepper and spinach under the Guidance by Mr. Shilompoka (resource personnel for drip irrigation and horticulture, Senior Agricultural Technician from Omahenene Crop Research Station). On February 15 2017, the site was visited for monitoring site activities, and it was observed that vegetable seedlings went well. 				
Delay of Connection to borehole of Rural Water Supply system	<ul style="list-style-type: none"> Drip irrigation systems have not connected with borehole yet since February 2016, due to delay in approval by the Rural Water Services. As the responsible AT in charge of Epembe was transferred to other Region, discussion with Rural Water Supply was held off. In the 3rd Training for AT conducted on March 9th (Thu) 2017, this matter was discussed and Mr. Immanuel Eelu, Chief AT was appointed by regional office as an acting AT for Epembe. In middle of March, Mr. Eelu visited the pilot site with the personnel from the Rural Water Services, and identified necessary parts and pipes to connect with the borehole. N-CLIMP supplied the parts and materials at the 3rd training for farmers groups on March 22, 2017. 				

Source: Prepared by the Study Team

Photographs



October 2015



April 2016



April 2016



April 2016



April 2016, guidance of nursery bed preparation under the 4th training for farmers groups.



Feb. 15 (Wed) 2017, nursery bed prepared in late Jan. 2017.

(3) Okongo Constituency

Location	The pilot site is located at about 10 km from Okongo about 15 minutes driving.				
ADC	Okongo ADC: Mr.Paulus Mbaile : SAT				
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Oluhapa: Ms. Nghiishidimbwa Lucia 14 key farmers consisting of 6 females and 8 males coming from 2villages of Oluhapa(10), and Ekangolomuve(4)				
Technical Measures Large stock: Cattle	LS-1: Fodder production LS-2: Range Management LS-5: Disease Control LS-7: Periodical Production FM-2: Farm Record FM-10: Market Information Access Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 10 2015	Dec. 07 2015	Feb. 24 2016	Apr. 07, 2016
	Male	5	5	4	7
	Female	6	5	7	6
	Total	11	10	11	13
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
		Nov. 21, 2016	Dec. 5, 2016	Mar. 31, 2017	
	Male	3	4	5	
	Female	2	4	7	
Total	5	8	12		
Inputs and Material Supplied in Phase 2	LS-1:Fodder production - Wire Mesh net 50m, Rain gage, Seeds (Lucerne/Alfalfa, Bluebuffelgras, Anthephora)				
	LS-5:Disease Control:				
	CASTRATOR BURDIZZO 19' 48CM AB)	DEBUDDER GAS CADAC			
	NOZZLE DEHORNER GAS	SYRINGE ROUX 30ML REV LUER LOCK			
	NEEDLE LUER 12X16GX19MM	GLASS SYR ROUX RP 30ML 3030000070			
	WASHER SET ROUX 30/50ML R/P 3030500099	DRENCHER AUTO PHIL 30ML			
	SYRINGE DISPOSAL 20ML	NEEDLE DISP 1X18GX38MM PINK			
	GLOVES LATEX MEDIUM/SHORT 100S	GLOVES PL GENIA -ARMLENGTH			
	WEIGHT BAND	TERRA.WOUND SPRAY 150ML			
	SYRINGE DISPOSAL 50ML	TRUNK STEEL TOOLKIT			
	DEHORNER BARNES 13'	NEEDLE DISP 1X18GXX38MM PINK			
	BULL NOSE HOLDER (AM0	VANGRIEM NYLON 16MM S/E (ROPE)			
	COOLER BOX 6 PACK	NEEDLE LUER 12X16GX15MM			
	WACCINE: Supavax	DECTOMAX INJECT 500ML			
DRASTIC DEADLINE 5LTR ACKPACK	GAS CYLINDER 9KG				
Inputs and Material Supplied in Phase 3	• Fodder grass seeds: Bluebuffelgras, Lucerne, Anthephora				
Farm Record in Phase 2	• Black books (A5 size notebook), Fodder production record, Disease control record, Fattening record, Reproductive record				
Farm Record in Phase 3	• Well Kept: Activities, Numbers of cattle, Numbers of calving, and mortality				
Needs of Fodder confirmed in drought season	• In December, 2016, it was observed that demo farmer gained 12 calves. However, 2 calves did not survive. Demo farmer thinks one of the reasons is lack of grass and fodder due to drought.				
Other topics	• To plan vaccination of Supervax and deworming drugs				

Source: Prepared by the Study Team

Photographs



Phase-2. Farmer training concerning general management



Phase-2. Practical training



Phase-2. Training of injection



Phase-2. Pour on to control external parasites



Phase-2. Distribution of fencing material



Phase-3. Fodder grass production

(4) Endola Constituency

Location	The pilot site is located at about 10 km from Endola about 15 minutes driving.				
ADC	Endola ADC: Mr. Nockolaus Enjala :AT				
Target Farmers: Demonstration Farm and Key Farmers	Demonstration farm: Ms. Tuesnerde Hamukoto 14 key farmers consisting of 10 females and 4 males coming from 4 villages of Oshali(4), Omakango(5), Oshipumbu(2), Omutunda(3)				
Technical Measures Small Stock :Goat	LS-1: Fodder production LS-5: Disease Control LS-7: Periodical Production LS-11: Goat production FM-2: Farm Record FM-5: Group Formation / Group Strengthening FM-10: Market Access Information Improvement				
Trainings in Phase-2 (July 2015 – April 2016)		1 st Training	2 nd Training	3 rd Training	4 th Training
	Date	Nov. 10, 2015	Dec. 07, 2015	Feb. 24, 2016	Apr. 07, 2016
	Male	2	2	2	1
	Female	8	8	9	8
	Total	10	10	11	9
Trainings in Phase-3 (July 2016 – April 2017)		1 st Training	2 nd Training	3 rd Training	
	Date	Nov. 16, 2015	Dec. 08, 2015	Mar 15, 2016	
	Male	1	0	0	
	Female	11	6	12	
	Total	12	6	12	
Inputs and Material Supplied in Phase 2	LS-1:Fodder production - Wire Mesh net 50m, Rain gage, Seeds (Lucerne/Alfalfa, Bluebuffelgras, Anthephora)				
	LS-5:Disease Control				
	APPLICATOR CAS/RING SAV	CASTRATOR RING 500 KSTREK			
	SYRINGE ROUX 30ML REV LUER LOCK	NEEDLE LUER 12X16GX19MM			
	GLASS SYR ROUX RP 30ML 3030000070	WASHER SET ROUX 30/50ML R/P 3030500099			
	DRENCHER AUTO PHIL 30ML	SYRINGE DISPOSAL 20ML			
	NEEDLE DISP 1X18GX38MM PINK	GLOVES PL GENIA			
	GLOVES LATEX MEDIUM/SHORT 100S	TERRA.WOUND SPRAY 150ML			
	SYRINGE DISPOSAL 50ML	TRUNK STEEL TOOLBOX			
MULTIVAX P PLUS VACCINE 250ML	DECTOMAX INJECT 200ML				
Inputs and Material Supplied in Phase 3	<ul style="list-style-type: none"> Fodder grass seeds: Bluebuffelgras, Lucerne, Anthephora Fencing material 				
Farm Record in Phase 2	<ul style="list-style-type: none"> Black books (A5 size notebook), Fodder production record , Farm record, Disease control record, Goat record 				
Farm Record in Phase 3	<ul style="list-style-type: none"> Well Kept: numbers of goat, numbers of birth, mortality 				
Household level Gender Issue	<ul style="list-style-type: none"> Majority of key farmers are women. They study well on medication, selling, marketing through farmers' training. However, when they back to their house, they cannot implement as they studies at training. This is because the decision making is kept at hands of husband in many households. This is a great difference from chicken keeping sites where women are generally free to do any kind of activities on their own decision making. 				
Key farmers' plan for further activities through gaining cash income by selling part of animals	<ul style="list-style-type: none"> Farmer plan to introduce ram for gaining better lams. For a ram, it is estimated to cost about NAD 1,500. For doing so, they will sell goats. Farmers understood the needs of deworming. As cash money is required, they may sell some goats. This is also a good combination with 				

Source: Prepared by the Study Team

Photographs



Phase-2. Farmer training concerning general management



Phase-3. Training of reproduction and disease control



Phase-2. Distribution of fencing materials



Phase-2. Training of injection



Phase-2. Castration practice



Phase-3. Farmer Training