

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

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

FINAL REPORT

**VOLUME-I
MASTER PLAN**

June 2017

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

NIPPON KOEI CO., LTD.

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Attachment: Form for Namibian SHEP Approach

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MAIN REPORT

Attachment-1: Minutes of Meeting

Attachment-2: Technical Sheet for Crop Production, Livestock Production and Farm Management

Attachment-3: Verification Results of Technical Measures

Attachment-4: Farmers' Field Day

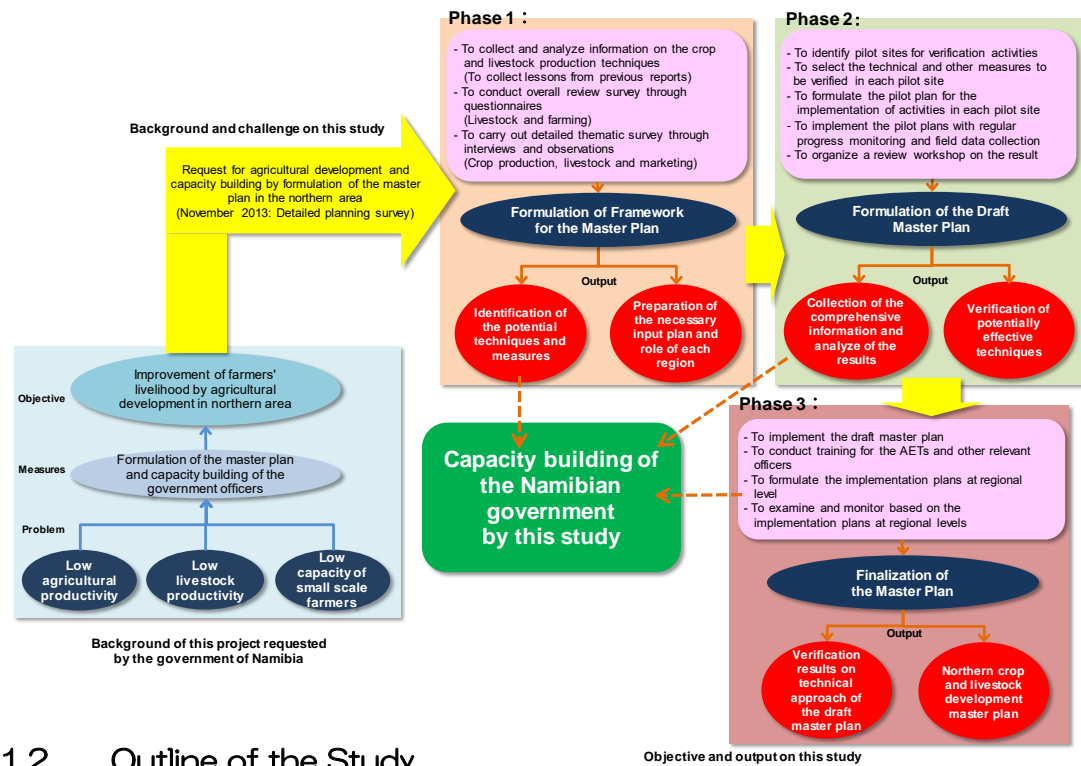
Attachment-5: Results of Questionnaire Survey on Technical Measures in Phase 3

VOLUME-III

TRAINING MATERIALS

1. Background of the Study

1.1 Background, Objective and Output of the Study



1.2 Outline of the Study

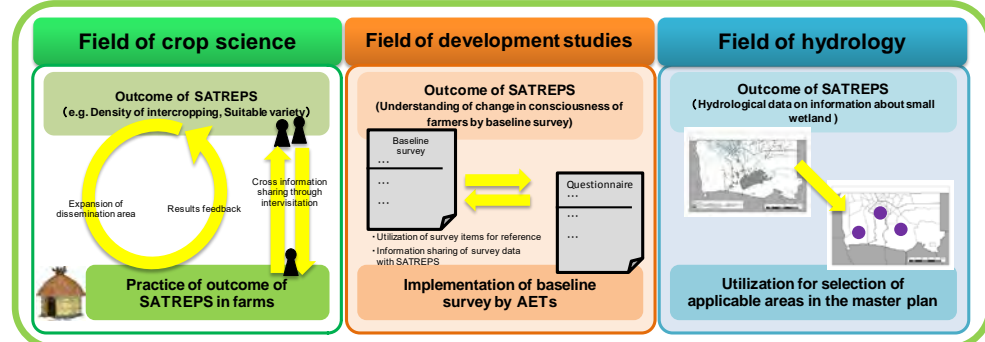
Item	Contents
Objective of the Study	To improve current situation of crop and livestock production of small-scale farmers in northern part of Namibia
Scope of the Study	Situation analysis and identification of potential measures to improve farming practices Examination and verification of technical and other measures to improve farming practices Compilation of the Master Plan
Target Area	Four regions in the North Central Division (NCD) consisting of Oshikoto, Oshana, Ohangwena and Omusati
Relevant Organizations	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)

3. Operational Approach

- Approach 1: Realistic and practical project operation system by MAWF
- Approach 2: Clear role and coordination among relevant organizations
- Approach 3: Study schedule in consistent with farm calendar and budgetary arrangement of GRN
- Approach 4: Coordination and information sharing with SATREPS

Approach-3: Careful consideration in farm calendar and budgetary arrangement procedure of GRN, to prepare overall Study schedule

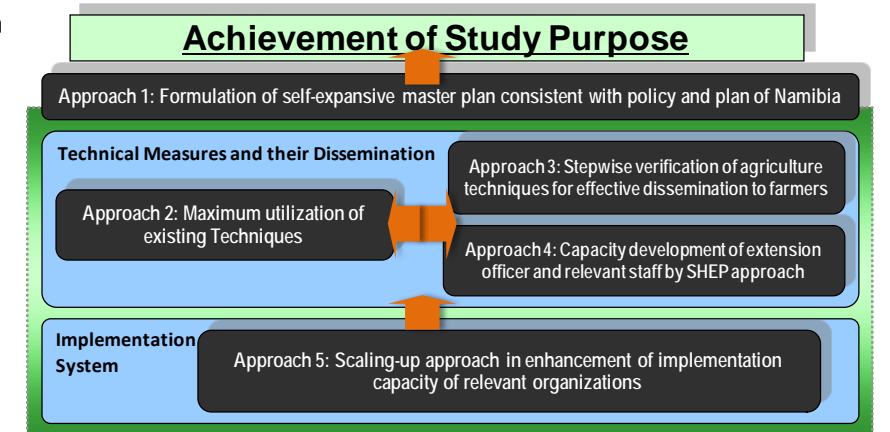
Approach-4:



2. Technical Approach

Approach-1: Formulation of practical master plan consistent with policy and plan of Namibia

- (i) Consistent with relevant policy and plan
 - Period: Target year is set to 2030 same as Vision 2030, therefore, M/P will cover 15 years from 2016 to 2030.
 - Area: North Central Division consisting of: (i) Oshikoto, (ii) Oshana, (iii) Ohangwena and (iv) Omusati.
 - Target: Annual growth of 4%
- (ii) Self-dependent to unconfirmed external financial resources
- (iii) Possible to be materialized by relevant organizations of GRN



Approach-2: Maximum utilization of existing technology

Crop and livestock production system in the target area is categorized by water resources availability.

Crop and livestock production system	Technical measures
(i) Arid area: annum 200~400mm, rainfed only	(i) Water : Water harvesting, pump irrigation, underground storage, water saving cultivation etc.
(ii) Semi arid area: annum 400~600mm, rainfed only	(ii) Crop : Appropriate fertilizer application, crop residual utilization, crop rotation, fallow system, drought-flood adaptation etc.
(iii) Irrigated area: annum 200~600mm, dam and stream	(iii) Livestock : Rotational grazing, community land management, vaccination, auction system, mentorship program etc.
(iv) Seasonal wetland: annum 200~600mm, seasonal wetland	(iv) Farm management : Group formation, rural finance access, book keeping, market information, matching with traders etc.

Approach-3: Stepwise verification of agriculture technology for effective dissemination to farmers

Technical measures are verification stepwise in the course of the study.

Categorization of technical measures: (i) During the Study (3 years), (ii) In M/P period (by 2030), (iii) Others (out of M/P)

Remarks

- (i) Quantification in effect/impact of proposed technical measures : production increase, sales price increase, production cost saving, work burden decrease etc.
- (ii) Dissemination tool: development of tools such as brochure, farmers' action plan, and ATs' activity plan as shown below

Approach-4: Capacity development of extension officer and relevant staff by SHEP approach

- Principle of SHEP approach Encourage...
 - farmers to have business mind in agriculture,
 - farmers to think it possible to increase profit from agriculture by themselves,
 - farmers to increase their motivation by series of training in order to boost retention of knowledge and techniques among them, and
 - ATs to recognize value of their duties resulting in enhancing their motivation
- Namibian Specific SHEP approach
 - Application of SHEP approach to overall study operation
 - Appropriate target for each type of farmers: (i) market promotion for commercial farmers and (ii) household accounts (income and expenditure) improvement for subsistence farmers



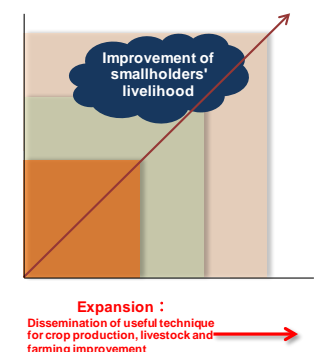
Dissemination tools

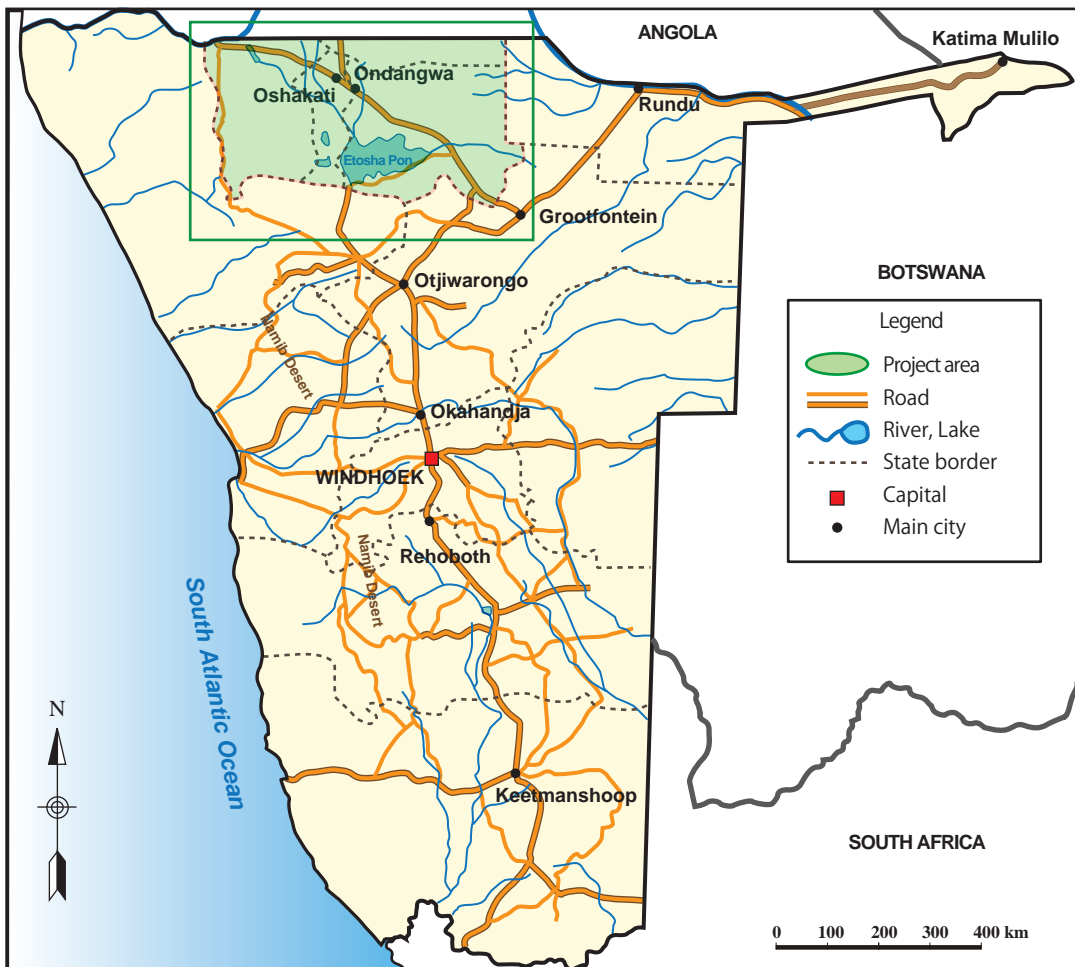
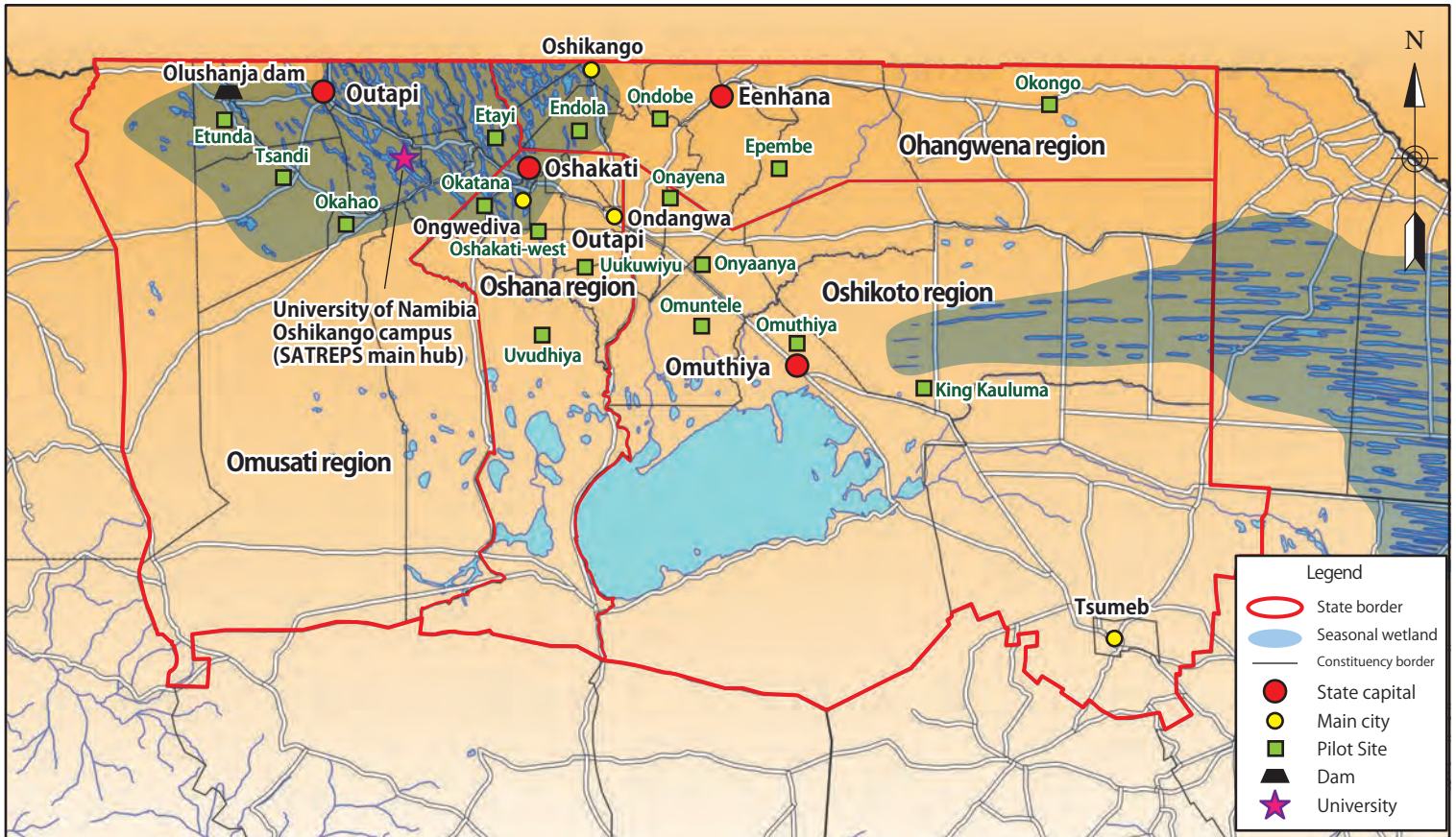
Approach-5: Scaling-up approach in enhancement of implementation capacity of relevant organizations

To ensure materialization and sustainability of M/P, the Study Team in collaboration with MAWF will develop implementation capacity of relevant organizations and staff stepwise:

- (i) Evaluation of implementation capacity,
- (ii) Design realistic work plan,
- (iii) Enhance implementation capacity stepwise, and
- (iv) Increase and expand activities.

Establishment of implementation structure :
• Capacity building of officers
• Ensuring of budget
• Strengthening of organization





Northern Crop and Livestock Development Master Plan Study Area Map

PART-I GENERAL INFORMATION

I-1 INTRODUCTION

General

1. This is the Master Plan for Northern Crop and Livestock Development in the Republic of Namibia prepared in accordance with the record of discussion on “Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia (hereinafter referred to as N-CLIMP)” between the Japan International Cooperation Agency and the Ministry of Agriculture, Water and Forestry (MAWF), Republic of Namibia. **(I-1.1)**

Objective and Approach of N-CLIMP

2. Outline of N-CLIMP is tabulated as follows: **(I-1.3)**

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): Oshikoto, Oshana, Ohangwena and Omusati
Study Period	<ul style="list-style-type: none"> ◆ August 2014 to June 2017 (35 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

Contents of the Master Plan

3. The Master Plan for Northern Crop and Livestock Development in the Republic of Namibia consists of 2 parts: (i) Part-I General Information and (ii) Part-II Master Plan for Northern Crop and Livestock Development. **(I-1.4)**

I-2 NATIONAL AND SECTORAL POLICIES RELATED TO N-CLIMP

National Development Policy

4. The national development policy such as Vision 2030 and Namibia’s Fourth National Development Plan (NDP5) (2017/18 to 2021/22) and Harambee Prosperity Plan (2016/17 – 2019/20) stressed the following issues related with crop and livestock production. **(I-2.1)**

Land and Agriculture Production Sub-sector in Vision 2030

Sub-vision	Strategy
<ul style="list-style-type: none"> ◆ Equitable access to land ◆ Declining rates of land degradation ◆ Appropriate tenure over natural resources ◆ Unpolluted soils and agricultural water run-off ◆ Optimal land-use and livelihood options ◆ Improved economic development options 	<ul style="list-style-type: none"> ◆ Rational land-use planning ◆ Value-added activities ◆ Focus given to food security but not food self-sufficiency ◆ Environment-friendly ◆ Rehabilitation of degraded land and water bodies ◆ Encourage rapid destocking and marketing of livestock during times of drought to reduce pressure on rangelands

Source: Vision 2030 (2004)

Summary of Challenges and Proposed Strategies

Challenge	Key Strategies
<ul style="list-style-type: none"> ◆ High import dependence ◆ Low productivity among small-scale farmers ◆ Climate-related shocks such as persistent drought ◆ Widespread poverty and hunger ◆ Lack of land ownership 	<ul style="list-style-type: none"> ◆ Increase agriculture production for both cereals and horticulture ◆ Develop agro processing industries ◆ Increase smallholder or communal farmers' productivity ◆ Extend the red line/cordon fence to the northern borderlines of Namibia ◆ Enhance preparedness for effective response, recovery and reconstruction ◆ Promote the planting of drought resistance varieties

Source: NDP 5

Pillars and Goals of HPP

Pillars (4 pillars)	Goals (14 goals)	Number of Target (41 targets)	Crop and Livestock Production- directly related Statement
Effective Governance	2 goals ◆ Accountability & Transparency ◆ Improve Performance & Service Delivery	5 targets	-
Economic Advancement	4 goals ◆ Macro-Economic Stability ◆ Economic Transformation ◆ Youth Enterprise Development ◆ Economic Competitiveness	12 targets	◆ Large and small livestock development under industry growth programmes
Social Progression	4 goals ◆ Hunger Poverty ◆ Residential Land Delivery Housing & Sanitation ◆ Infant & Maternal Mortality ◆ Vocational Education Training	9 targets	◆ Humanitarian assistance through ongoing food distribution ◆ Improved agricultural output through subsidized farm implements, expansion of the Green Scheme, Debushing as a strategy for increasing grazing, establishment of fertilizer mixer plants ◆ Introduction of Food Banks that will be run and managed by the unemployed youth in the form of Street Committees, thereby also contributing towards youth employment
Infrastructure Development	4 goals ◆ Energy Infrastructure ◆ Water Infrastructure ◆ Transport Infrastructure ◆ ICT Infrastructure	15 targets	◆ Overcoming of the water challenges by introducing a good mix of available resources (surface water, groundwater, rain water and water re-use)

Source: Harambee Prosperity Plan (2016)

Agriculture Sector Development Policy and Plan

5. There are several agriculture sector development policies and plans related with N-CLIMP, which are: (i) Namibia Agriculture Policy (2015), (ii) MAWF Strategic Plan (2013/14 - 2016/17)¹, (iii), Namibian Agriculture Marketing and Trade Policy and Strategy, (iv) Green Scheme Policy, (v)

¹ Currently, MAWF is compiling the Strategic Plan (2017/18 – 2020/21).

National Rangeland Management Policy and Strategy etc. Among others, MAWF Strategic Plan (2013/14 - 2016/17) shows clearly strategic objectives with the key performance indicators (KPI) in consistent with desired outcome in NDP 5. (I-2.2)

I-3 CROP AND LIVESTOCK DEVELOPMENT PROGRAMS AND PROJECTS

Crop Production, Livestock Production and Others

6. There are several previous and on-going crop and livestock development programs and projects, from which N-CLIMP would be able to get lessons learnt as follows: (I-3.1 to I-3.3)

Previous and On-going Crop and Livestock Production-related Programs and Projects

Subject	Programs and Projects
Crop production	<ul style="list-style-type: none"> ◆ Dry-land Crop Production Program ◆ Integrated Initiative in Support of Urban and Peri-Urban Horticulture Development ◆ Support to Small Scale Horticulture Production ◆ Mahangu Marketing Plan ◆ National Strategic Food Reserve ◆ Comprehensive Conservation Agriculture Programme for Namibia ◆ Research Project CuveWaters ◆ Introduction of Rice Cropping System Harmonized with the Water Environment of Seasonal Wetland in Semi-Arid Region
Livestock production	<ul style="list-style-type: none"> ◆ Community-based Rangeland and Livestock Management Project ◆ Farmers' Mentorship Program (by the Meat Board) ◆ Farmers' Support Program (Mentorship Program by the Agri-Bank) ◆ Livestock Auction System ◆ Livestock Master Plan Implementation by the Meat Board based on the Master Plan for Increased Off Take and Marketing of Cattle and Beef from the Northern Communal Areas of Namibia
Others	<ul style="list-style-type: none"> ◆ Agri-Bank Loan Program ◆ Land-related Law and Act ◆ National Gender Policy ◆ Support Program my Millennium Challenge Account

Source: Prepared by the Study Team

I-4 ASSISTANCE POLICY BY DEVELOPMENT PARTNERS

Development Partners and their Focal Areas

7. Development partners and their focal area in Namibia is summarized as follows: (I-4)

List of Development Partners and their Focal Areas

Organizations	Focal Areas	Relevancy to Crop and Livestock Production/N-CLIMP
International Bank for Reconstruction and Development	◆ Two pillars: (i) Build State Capacity and (ii) Private Sector Development	◆ Under pillar 1, Build State Capacity, there are 2 plans: (i) environment and natural resource management and (ii) statistical capacity. The former includes climate change adaptive measures while latter would be related with data management for agriculture.
African Development Bank	◆ Two pillars: (i) Infrastructure with a focus on transport, energy and water and (ii) Private sector development through skills development and improving the regulatory environment	◆ Pillar 1 consists of 3 categories: (i) transport, (ii) energy and (iii) water and sanitation. Among others, water and sanitation would be related with improvement of rural livelihood in the future.
Food and Agriculture	◆ Four priority areas: (i) Enabling policy, legal and institutional	◆ All the priority areas are related with N-CLIMP. In particular, FAO stresses promotion of

Organizations	Focal Areas	Relevancy to Crop and Livestock Production/N-CLIMP
Organization of the United Nations	environment for food and nutrition security (FNS) and agricultural development; (ii) Sustainable agricultural production, (iii) Linking farmers to markets and (iv) Improved preparedness to agricultural threats and crises	<ul style="list-style-type: none"> conservation agriculture under area 3, accumulated know-how of which is useful for N-CLIMP activities. Some ATs attended training for business-oriented agriculture promotion held in China in 2014 under FAO program.
European Union (EU)	<ul style="list-style-type: none"> Three focal pillars for the assistance: (i) basic enablers (institutional environment, education and skills and public infrastructure, (ii) economic priorities (agriculture and tourism and (iii) cross cutting issues (capacity enhancement, civil society and HIV/Aids prevention) 	<ul style="list-style-type: none"> Under the agriculture subsector, EU focuses on is: "Linking rural primary producers to markets by supporting their sustainable productivity and adaptation to climate change, the development of rural-based value chains and the enhancement of the business environment for rural entrepreneurs." At present, EU is formulating livestock development project covering 7 northern regions.
German International Cooperation	<ul style="list-style-type: none"> Three priority areas: (i) management of natural resources, (ii) transport and (iii) economic development 	<ul style="list-style-type: none"> GIZ is one of the active organizations involved in agriculture sector development in NCD. Under the area of management of natural resources, CBRLM has been implemented to support livestock production and rangeland management in NCD showing remarkable outputs.
Government of Japan	<ul style="list-style-type: none"> Two priority areas: (i) Livelihood Creation Improvement of Basic Human Needs and (ii) Economy Infrastructure Development 	<ul style="list-style-type: none"> N-CLIMP is implemented under priority area 1. In addition, Flood-and Drought-Adaptive Cropping systems to Conserve Water Environments in semi-arid regions and supporting One Region One Initiative Promotion are directly related with improvement of livelihood of NCD.

Source: Prepared by the Study Team

I-5 ORGANIZATIONS RELEVANT TO CROP AND LIVESTOCK DEVELOPMENT

Ministry of Agriculture, Water and Forestry

8. The organization of MAWF at the central and the regional (DAPEES and DVS) levels are summarized as follows: (I-5.1.1 to I-5.1.2)

Departments and Directorates under MAWF

Department	Directorate
Department of Agricultural Development	<ul style="list-style-type: none"> Directorate of Agricultural Production, Extension and Engineering Services (DAPEES) Directorate of Agricultural Research & Development (DARD) Directorate of Veterinary Services (DVS)
Department of Water Affairs & Forestry	<ul style="list-style-type: none"> Directorate of Rural Water Supply & Sanitation Coordination (DRWSSC) Directorate of Water Resources Management (DWRM) Directorate of Forestry (DF)
Department of Planning, Marketing & Administration	<ul style="list-style-type: none"> Directorate of General Services (DGS) Directorate of Planning & Business Development (DPBD)

Source: Prepared by the Study Team

Regions under DAPEES

Divisional Office	Regional Office
North-Central Division: NCD (Oshakati / Ondangwa)	4 Regions of Ohangwena (Eenhana), Omusati (Outapi), Oshana (Oshakati / Ongwediva) and Oshikoto (Onankali)
Central North-Western Division: CNWD (Windhoek)	3 Regions of Khomas, Erongo and Kunene
North-Eastern Division: NED (Rundu)	4 Regions of Otjozondjupa, Kavango West (new), Kavango East and Zambezi

Divisional Office	Regional Office
Southern-Eastern Division: SED (Mariental)	3 Regions of Karas, Hardap and Omaheke

Source: Prepared by the Study Team, based on the information obtained from MAWF, September 2014 to April 2015.

Regions under DVS

Division	Sub-Division	Section (State Veterinary Office)
Animal Disease Control North (Tsumeb)	Sub-division Animal Disease Control: SADC North West (Oshakati)	9 State Veterinary Offices: Ondangwa (Oshana), Oshakati (Oshana), Eenhana (Ohangwena), Okongo (Ohangwena, new), Omuthya (Oshikoto), Outapi (Omusati), Okahao (Omusati), Opuwo (Kunene), Okanguati (Kunene)
	SADC North East (Grootfontein)	5 State Veterinary Offices: Otavi (Otjondjupa), Grootfontein (Otjondjupa), Rundu (Kavange East), Nkurenkuru (Kavango West), Katima Mulio (Zambesi)
Animal Disease Control South (Windhoek)	SADC Central (Windhoek)	7 State Veterinary Offices: Okahanja (Otjondjupa), Otjiwarongo (Otjondjupa), Okakarara (Otjondjupa), Omaruru (Erongo), Walvis Bay (Erongo), Outjo (Kunene), Kamanjab (Kunene)
	SADC South (Mariental)	6 State Veterinary Offices: Keetmanshoop (Karas), Karasburg (new, Karas), Mariental (Hardap), Gobabis (Omaheke), Epukiro (Omaheke) Otjinene (Omaheke)

Source: Prepared by the Study Team

9. Budget and staffing of MAWF is tabulated as follows:

Estimated Budget of MAWF in 2016/17

(unit: N\$'000,000)

	DGS	DVS	DARD	DAPEES	DPBD	DWRM	DRWSSC	DF	Total
Operational	255	175	67	212	102	43	165	93	1,112
Development	62	140	36	416	0	21	384	130	1,189
Total	317	315	103	628	102	64	535	223	2,301

Source: Prepared by the Study Team, based on the Estimates of Revenue, Income and Expenditure, 01 April 2016 to 31 March 2019, Ministry of Finance.

Staff Number of MAWF by Directorate

(unit: persons)

Staffing Status	DGS	DVS	DARD	DAPEES	DPBD	DWRM	DRWSSC	DF	Total	Gov't
Established	373	765	376	1096	36	125	949	590	4,310	139,204
Filled at present	315 84%	733 96%	338 90%	631 58%	28 78%	105 84%	830 87%	498 84%	3,478 81%	100,719 72%
Funded in Budget 2016/17	373 100%	765 100%	376 100%	744 68%	36 100%	125 100%	945 100%	590 100%	3,954 92%	116,510 84%

Source: Prepared by the Study Team, based on the Estimates of Revenue, Income and Expenditure, 01 April 2016 to 31 March 2019, Ministry of Finance.

Agriculture Extension System

10. The primary goal of agricultural extension services by MAWF is to help farmers develop and adopt improved farming technologies and practices organize themselves in cooperatives as well as have access to information (i.e. markets and policies) and infrastructure. In 1997, the Farming System Research and Extension (FSR/E) was officially adopted as an extension strategy. DAPEES currently dispatch total of 62 Agricultural Technicians (ATs) in 4 Regions. One to three ATs are allocated to each ADC. DAPEES headquarters provide ATs with technical trainings in their ADC upon requests from regional chief technician. ATs give training to leader farmers of farmers groups, and the leaders give training to their member farmers. This is the flow of extension to distribute techniques as much number of farmers as possible. (I-5.2.1)
11. Through the interviews and discussions with ATs, many of them mentioned that they have too

much workload for administrative works and they don't have enough time to visit farmer fields regularly. Lack of transportation, breakdown of computers, and limited internet connectivity are the other constraints for extension activities, according to them. There are 3 crop research centers and 2 livestock research centers in the project target regions as described above. Researchers in the centers belong to DARD and they mentioned that linkage between ATs and researchers are very limited, the annual meeting and information day (field day) is the almost only occasion to meet each other. Insufficient number of staffs and lack of budget make them difficult to visit farmer fields to collaborate directly with farmers. (I-5.2.2)

PART-II MASTER PLAN

II-1 COMPREHENSIVE INFORMATION GATHERING AND ANALYSIS RESULT

General

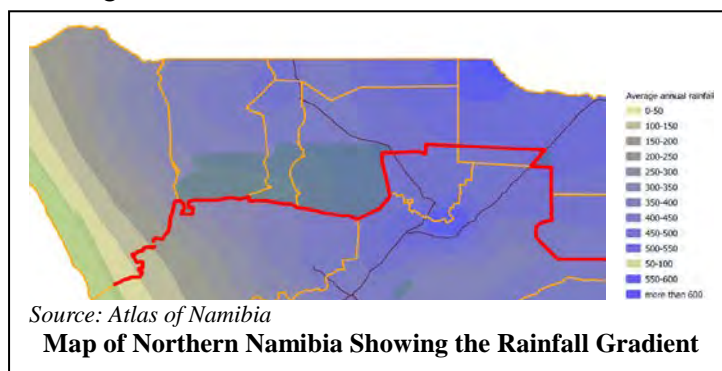
12. As a part of SHEP approach, the situation analysis survey was carried out in collaboration with ATs attached to ADCs in target 4 regions. The purpose of the survey is: (i) to collect agriculture and livestock-related information on each ADC coverage, (ii) to enable ATs to confirm and recognize potential, constraints and challenges for crop and livestock production and (iii) to share awareness amongst ATs in their ADC areas in preparation of the development plan. (II-1.1)

Overall Review Survey

13. A comprehensive questionnaire was designed among ATs in each of the ADCs in the target regions and N-CLIMP Team to collect macro level information. (II-1.2.1)

14. Information suggests that on average there is only one Agricultural Technician for 3,327 farmers. This ratio is too great to ensure that every farmer receives sufficient support. Although the ratio of technical versus support staff seems to be appropriate, too few professional scientific staff exists to provide backstopping and support to ATs. Access to equipment appears to be a constraint. Not every ADC has a vehicle, and only about half of the ADCs have internet connectivity. In terms of farming implements, the situation equally needs to be improved. (II-1.2.2)

15. Rainfall is a meaningful climatic parameter in agriculture, and good rainfall record series and trends can assist with planning and advising farmers. As an overview of rainfall in Namibia, figure below provides the map of northern Namibia including the four target regions, with the average rainfall gradient. What is significant about the data from ATs is the large variation over the years, both in terms of total rainfall received and monthly rainfall figures. This is typical of an arid and semi-arid environment where 4 target regions are located. (II-1.2.3)



16. As for the crop production, millet is the most commonly planted crop in all regions, followed by sorghum, maize, cow pea, pumpkin, water melon, and bambara nuts. The largest area (236,590 ha) is planted with millet, followed by sorghum (74,712 ha), maize (57,475 ha) and cow pea (40,834 ha). Cow peas are the most commonly used for intercropping, followed by sorghum, maize, Bambara nuts, and water melons and pumpkin. The use of manure was the most frequently reported technology by ATs, followed by the use of fertiliser and the use of local seeds. What is however significant is the low frequency that the use of improved seeds was mentioned, and only in Omusati region. **(II-1.2.4)**
17. In terms of livestock production, cattle (486,000 heads by ATs' data, 4 regions total) and goats (598,000 by ATs data, 4 regions total) are the animals most in number followed by poultry and donkeys. Most of the livestock are free ranging, supplemented by mostly crop residues and sometimes bought feeds, especially during droughts. **(II-1.2.5)**
18. Fertilizer application seems to be the activity most commonly provided by ATs to farmers, followed by the selling of seeds and fertiliser, dissemination of agricultural information and supporting the implementation of DCP. Support services in relation to animal health and market were the most mentioned by ATs, followed by animal husbandry related support and support on livestock breeding and management practices in general. Most training provided was on crop production followed by leadership training, livestock production and management, livestock marketing, DAP, animal health and rangeland assessment. Farmers are in most need for training in fertiliser application, crop production, disease and pest control techniques, processing and manufacturing of crop products, soil fertility and marketing of crops. As for the ethnic based group-wise issues and considerations, issues related to the San people are by far the most needed topics to be considered by ATs. Gardening, food processing and modern basket making are amongst the most important extension related activities focusing on women groups. **(II-1.2.8)**
19. The major constraints are transport and vehicle problems, insufficient tractors per ADC, not enough Agricultural Technicians, computers that are not functioning and limited internet connectivity. ATs will continue to train farmers in rangeland and livestock management. Other important future plans include the training of young staff, provision of more transport, location of people in their ADC areas and the provision of internet services. **(II-1.2.9)**

Detailed Thematic Survey

20. As similar to the overall review survey, a comprehensive questionnaire was designed with ATs in each of the ADCs in the target regions. Then, ATs identified one livestock-based, one crop-based and one horticulture-based farmer in their areas to be interviewed. **(II-1.3.1)**
21. Total number of respondents is 62, out of which 52 is full-time farmer. Average years of farming experience varies from 29 years in Oshikoto region to 45 years in Oshana region. Ownership of assets shows that hoe is the most commonly owned by farmers followed by radio. The average size of farm land for crop production is the largest in Oshikoto region (10.21 ha) and the smallest in Oshana region (4.85 ha). In Oshana the average size of grazing land (excluding commonage) is 14.67 ha per household with the smallest size 3.64 ha in Ohangwena region. In Omusati region the average size of orchards is 1.92 ha while in Oshikoto region it is only 0.60 ha. The average

- cattle herd of respondents in Oshikoto region is 39.57, followed by Ohangwena region (35.83 cattle), 30.22 cattle in Oshana region and 17.69 cattle in Omusati region. **(II-1.3.2 to II-1.3.4)**
22. As for the agriculture production, millet is planted on average on 7.65 ha per respondent household in Oshikoto region, followed by 4.06 ha in Ohangwena, 3.64 ha in Omusati and 3.61 ha in Oshana regions. The average area to be planted per respondent under sorghum varies between 1.33 ha in Ohangwena region to 0.57 ha in Oshana region. Very small areas are to be planted with maize varying from 0.36 ha per respondent in Omusati region to on average 0.30 ha in Oshana region. Rice is to be planted on 1.00 ha on average in Oshana region to as little as 0.05 ha on average in Omusati region. Other crops are to be planted on very small areas, with vegetables only to be planted in Omusati region. Average production per hectare of millet varies between 324.03 kg in Ohangwena region to 468.74 kg per hectare in Omusati region, which would be higher than regional average. **(II-1.3.5)**
23. In terms of livestock production and marketing, average numbers of cattle sold or slaughtered differ very little between regions. Except for the Omusati region, respondents indicated that they sold or slaughtered on average more cattle in 2014 than in 2013. The average number of cattle consumed at home varies considerably both between regions and between years. The biggest variation is in the Oshana region where on average 1.5 cattle were consumed at home in 2013 and it went up to 4 on average in 2014. Average number of cattle marketed at the formal market also varied considerably between regions, but not so much between years. In Ohangwena region no cattle were marketed at the formal market, while in Omusati region more animals were formally marketed than in any of the other regions. Average prices received at the formal markets varied between regions and years. In Oshikoto region, prices seem to decline more than in other regions, while in Omusati region the average formal price per animal increased considerably. **(II-1.3.6)**
24. As for the crop and livestock marketing, respondents in all regions have indicated that they do market surveys for both crop and livestock farming, while for horticulture farming no evidence of such activities amongst respondents were recorded. Although the proportion of respondents that are applying these surveys remains low, it is the highest in Oshikoto region for both crops and livestock marketing. In most cases, except Oshana region, market surveys for livestock are more frequently done than for crop production. **(II-1.3.8)**
25. In all regions respondents indicated that they belong to the NNFU, with the highest membership in Oshana region, followed by Ohangwena, Oshikoto and Omusati regions. In the Oshana region a considerable proportion of respondents indicated that they belong to Mahangu groups, while a small proportion of respondents indicated that they belong to livestock marketing cooperatives. **(II-1.3.9)**
26. In terms of agriculture support services, respondents indicated in all regions that they attended training courses in 2013 and 2014, with the highest percentage in Ohangwena region, followed by Oshana and Omusati regions, and Oshikoto region. Although all of them attended some training, the proportion of the respondents that did it, is very low. Pest management amongst crops followed by planting of crops, weeding, and crop management and fertilizer application were the major topics that respondents received training. Some training on soil management and storage

and processing of crops were also received. (II-1.3.10)

27. The major constraints among farmers indicated are limited access to good water followed by a high prevalence of livestock diseases, crop diseases, low producer prices, inadequate grazing and insufficient knowledge on commercial farming. On the other hand, nearly half of the respondents indicated that their future plan is to become a commercial farmer. They however also indicated a high priority to access to tools and equipment to be provided by government, access to more technical advice, and diversification of their enterprises into rice, vegetables, goat and chicken farming. Access to clean and affordable water was also highlighted in their future plans. (II-1.3.11)

II-2 PRELIMINARY ASSESSMENT OF DEVELOPMENT POTENTIAL

General

28. In order to formulate the master plan for crop and livestock development of northern Namibia, it is inevitable to evaluate development potential in the target area. There are various study and research in this subject such as Spotlight on Agriculture by MAWF. Under N-CLIMP, crop and livestock development potential is preliminary assessed by land resources using available electronic files. In particular, comprehensive GIS data is available from Atlas of Namibia, therefore, these resources are utilized for the assessment practices. (II-2.1)

Assessment Result

29. According to the result crop production potential is tabulated as follows by applying following to be proposed: (II-2.3.2)

Crop Production Potential in 4 Regions

Region	Ohangwena	Oshikoto	Oshana	Omusati	Total
Area available for crop production (=1)	61,800	101,800	48,100	141,600	353,300
(Percentage)	(17.5%)	(28.8%)	(13.6%)	(40.1%)	(100.0%)
Yield (kg/ha) (=2)	400	400	400	400	-
Production (ton) (=1x2)	24,700	40,800	19,200	56,600	141,300

Source: Prepared by the Study Team

30. As for the livestock potential, the data of the Atlas of Namibia is utilized. Preliminary assessment result is tabulated below:

Carrying Capacity for in 4 Regions

Region	Ohangwena	Oshikoto	Oshana	Omusati	Total
Area utilized for calculation of livestock production (km²)					
- Entire area (=a1)	10,694	38,669	8,682	26,558	84,603
- Protected area (=a2)	0	11,933	3,590	7,408	22,931
Total (=1=a1 - a2)	10,694	26,736	5,092	19,150	61,672
Carrying capacity (kg/ha)					
Unit					
a. Carrying capacity (=b1)	55	25	15	15	-
Percentage (=b2)	100	87	97	90	-
b. Carrying capacity (=c1)	-	35	45	35	-

Area, Carrying Capacity and Production	Region	Ohangwena	Oshikoto	Oshana	Omusati	Total
Percentage (=c2)		-	13	3	10	-
Accumulated (=2=b1 x b2 +c1 x c2)		55	26	16	17	-
Percentage		100	100	100	100	100
Carrying Capacity (kg) total (=A=1 x 2)		58,817,000	69,513,600	8,147,200	32,555,000	169,032,800
Present Conditions						
Cattle (=1 LU)		212,773	283,088	156,798	332,584	985,243
Goat (=1/6 LU)		64,731	221,531	121,473	255,537	663,272
Sheep (=1/6 LU)		0	3,206	7,412	16,832	27,450
Total LU at present		223,562	320,544	178,279	377,979	1,100,363
Total weight of animals at present (kg) (=B)	450kg	100,602,675	144,244,875	80,225,475	170,090,475	495,163,500
	360kg	80,482,140	115,395,900	64,180,380	136,072,380	396,130,800
	250kg	55,890,375	80,136,042	44,569,708	94,494,708	275,090,833
Comparison between A and B (=A/B)	450kg	58%	48%	10%	19%	34%
	360kg	73%	60%	13%	24%	43%
	250kg	105%	87%	18%	34%	61%

Remarks: The area utilized for calculation of livestock production is obtained from total area of each region deducted by protected area (Etosha national park) in order to ensure consistency with data of carrying capacity from the Atlas of Namibia to calculate total carrying capacity.

Source: Prepared by the Study Team

As a result, even if 250 kg is utilized for cattle weight, satisfaction rate {=carrying capacity total (=A) divided by total weight (=B)} is 61% in total meaning that overgrazing is currently practiced. Among others, Oshana and Omusati regions are comparatively overstocked than other 2 regions. (II-2.3.3)

II-3 TECHNICAL MEASURES TO BE APPLIED FOR N-CLIMP

General

31. Under N-CLIMP, there are 2 pillars for technical measures: (i) crop production and (ii) livestock production. In addition, farm management techniques are related with both crop and livestock production so as to adopt and manage proposed technical measures for both crop and livestock production sub-sectors. In this process, technical measures were studied with members of DC, SM and ATs based on the technical approach-2 of N-CLIMP: *maximum utilization of existing techniques* as MAWF has been accumulating valuable technical know-how through implementing crop and livestock-related development projects in Northern Namibia. (II-3.1)

Crop Production Techniques

32. Technical measures for crop production are proposed based on the two categories: (i) cereal grains traditionally grown and pearl millet as the main crop and (ii) horticulture crops rather newly introduced. Technical measures and expected impact are as follows: (II-3.2)

Technical Measures for Cereal Grains

No.	Technical Measures	Constraints and Challenges	Techniques
CR-1	Fertilizer application	Land degradation (low fertility)	<ul style="list-style-type: none"> - Proper method of fertilizer application to avoid fertilizer burn. - Appropriate dosage of manure and fertilizer, based on the result of soil analysis.

No.	Technical Measures	Constraints and Challenges	Techniques
			- Adjustment of top dressing of fertilizer depending on rainfall
CR-2	Cropping pattern	Unstable rainfall (drought, flood), land degradation (low fertility, continuous cropping)	- Planting in several times from December to February for reduction of drought risk. - Combination of local and improved varieties in cropping pattern. - Improvement of thinning and weeding based on the appropriate plant density.
CR-3	Conservation agriculture	Drought, low fertility, continuous	- Ripper furrow to accelerate percolation of rain water in the root zone. - Crop rotation and mulch to improve soil fertility and structure (soil granule). - Fallowing to increase water holding capacity
CR-4	Flood- and drought-adaptive cropping system (rice mahangu mixed cropping)	Drought, flood	- Mixed cropping of rice and pearl millet in the seasonal wetland
CR-9	Establishment of crop production and marketing cooperatives	Low marketing activities to procure inputs, to sale products, less chance to obtain credit and information.	- Collective procurement of farm inputs - Collective sales of products - Saving and credit - Market information

Source: Prepared by the Study Team

Technical Measures for Horticulture

No.	Technical Measures	Constraints and Challenges	Techniques
CR-5	Water source / water harvesting	Drought, limited water source.	- Utilization of seasonal wetland. - Roof catchment
CR-6	Water saving cultivation	Drought, limited water source.	- Low pressure drip irrigation system - Simple drip irrigation by pet bottle
CR-7	Crop selection and marketing	Short of information on market demand.	- Integration of market information and plant characteristics.
CR-8	Cropping plan and horticulture crop management	Lack of basic cultivation technique on horticulture.	- Basic cultivation technique and knowledge for crop management.
CR-9	Establishment of crop production and marketing cooperatives	Low marketing activities to procure inputs, to sale products, less chance to obtain credit and information.	- Collective procurement of inputs - Collective sales of products - Saving and credit - Market information

Source: Prepared by the Study Team

Livestock Production Techniques

33. Livestock production technical measures are proposed from the view point of: (i) feed supply, (ii) production, (iii) marketing and (iv) management as described below: **(II-3.3)**

Technical Measures for Feed Supply

No.	Technical Measures	Challenges	Strategies
LS-1	Fodder Production	- Lack of planting materials - Insufficient experiences in ATs and farmers	- Cultivated pasture - Cultivated fodder
LS-2	Range Management	- Insufficient coordination among livestock farmers	- Group formation, group grazing
LS-3	Water Harvesting and/or construction of water resource facilities for animals	- Insufficient number and distribution of facilities	- Construct medium & small-scale facilities at potential sites
LS-4	Nutritious Feed Supply particularly for Pig and Chicken	- Currently not provided widely	- Purchase of feed for fattening small stock - Or provide animals with locally available feed - Financial analysis to confirm feasibility

Source: Prepared by the Study Team

Technical Measures for Production

No.	Technical Measures	Challenges	Strategies
LS-5	Disease control	- Limited knowledge in farmers - High cost of drugs - High cost of drench	- Awareness campaign for promoting periodical vaccine and drench
LS-6	Large and small stock fattening	- Limited feeding materials	- Use of grain & legume residue - Fodder production
LS-7	Periodical Production	- No recording	- Strengthen mentorship program
LS-8	Expansion of quality meat	- Limited off-take - Off-take cattle in untimely manner (old cattle)	- Encourage farmers to sell steer in timely manner - Introduction of exotic breed and selection through back fat thickness (pig)
LS-9	Bull Scheme	- Insufficient number of bull - Insufficient knowledge in farmers	- Distribution of bull in reasonable price - Breeding program
LS-10	Multiplication of Sanga bull	- Limited pasture - Limited production capacity	- Increase grazing area - Cultivate pasture
LS-11	Goat production	- Internal parasite - Limited breeding materials	- Awareness campaign for periodical drench - Breeding program - Milk production system
LS-12	Pig production	- Limited breeding materials - Insufficient facilities	- Purchase exotic breed (from import or domestic market) - Construction and management of facilities - Partnership with private farms
LS-13	Chicken production	- Limited breeding materials (insufficient supply agent) - Insufficient experiences in ATs and farmers for brooding and rearing	- Establishment of chicken supply chain from parents stocks, egg and chick production - Brooding and rearing techniques acceptable for farmers

Source: Prepared by the Study Team

Technical Measures for Marketing

No.	Technical Measures	Challenges	Strategies
LS-14	Promotion and strengthening of auction for both large and small stocks	- Insufficient matching between buyers and sellers - Cattle auction only at present	- Improvement of auction system by linkage development - Introduction of goat auction system
LS-15	Development of formal market for small stock	- Insufficient formal market for small stock in NCA	- Awareness raising for farmers to sell product - Attracting private sector (joint production and marketing among meat company and farmers)

Source: Prepared by the Study Team

Technical Measures for Management

No.	Technical Measures	Challenges	Strategies
LS-16	Establishment and strengthening livestock cooperatives	- Group activities currently limited	- Establishment and strengthening the group through providing necessary training and support (group formation and management etc.)

Source: Prepared by the Study Team

Farm Management Techniques

34. Technical measures for farm management are proposed for enhancing capability of either individual or group farmers to appropriately adopt and manage technical measures for crop and livestock production as tabulated below: **(II-3.4)**

List of Technical measures for Farm Management

Target		Technical measures	Relating techniques
Individual	Household financial improvement	【FM-1】 Household accounting management 【FM-2】 Book keeping 【FM-4】 Business plan	- Financial support for procurement agricultural input and equipment: fertilizer, seed, drip irrigation system, feed, medicine, improved breed - Financial support for hiring agricultural machine: ripper
Group	Production improvement	【FM-5】 Group formation / group strengthen 【FM-6】 Group accounting management 【FM-8】 Collective selling / purchasing 【FM-9】 Rural finance accessibility improvement 【FM-10】 Market information access improvement	- Bargaining power for bulk procurement for agricultural input and bulk sales of the products - Supporting efficient group activities: rangeland management, cooperative, marketing
	Efficient water use	【FM-7】 Formulation of water users' association	- Effective use of water for crop production - Effective use of water for livestock
both	Post harvest	【FM-3】 Post harvest	- Post harvest based on market information

Source: Prepared by the Study Team

Technical Measures Pre-Evaluation

35. 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, thirty five proposed technical measures are preliminary evaluated and categorized into 4 as follows:

- ◆ **Category 1:** technical measures to be applied for pilot site activities (phase 2 and phase 3 of N-CLIMP) (short-term)
- ◆ **Category 2:** technical measures to be applied during the master plan period (medium-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: **(II-3.5.1)**

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

36. Using the criteria above, number of technical measures for each category is shown below. **(II-3.5.2)**

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

37. Through the discussion with farmers' group and ATs in the phase-2 and 3, the following technical measures are selected for the pilot site activities based on the needs of each site. (II-3.5.3)

Selected Technical Measures for the Pilot Site Activities based on the Discussion through the Phase-2 and the Phase-3

Crop production (8 nos.)	Livestock production (8nos.)	Farm management (5 nos.)
Grains ◆ Fertilizer application (CR-1) ◆ Cropping pattern (CR-2) ◆ Conservation agriculture (CR-3) ◆ Flood- and drought-Adaptive Cropping System (CR-4) Horticulture crops ◆ 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)	Feed supply ◆ Fodder production (LS-1) ◆ Range management (LS-2) ◆ Nutritious feed supply particularly for pig and chicken (LS-4) Production ◆ Disease control (LS-5) ◆ Large and small stock fattening (LS-6) ◆ Periodical production (LS-7) ◆ Goat production (LS-11) ◆ Chicken production (LS-13)	◆ Book keeping (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

II-4 OUTLINE OF NAMIBIAN SHE APPROACH

General

38. In the course of N-CLIMP since September 2014 through applying SHEP approach, the Namibian SHEP approach is developed as follows: (II-4.1)

Comparison of SHEP Approach between Namibia and Kenya

Step	Kenya SHEP UP	Namibian	
	Farmer's view point	Farmers' view point	Project Implementation
Step-0: Preparatory stage	-		◆ Overall review survey (macro level) ◆ Detailed thematic survey (micro level) ◆ Review and share constraints and potential
Step-1: Selection of targets and sharing vision/goal	◆ Sensitization Workshop ◆ Selection of Target District through Proposal System ◆ Selection of Target Groups by District	◆ Explanatory workshop ◆ Selection of target constituencies (ADCs) based on the set of criteria ◆ Selection of target farmers from selected constituencies by ATs	◆ Set of criteria for the selection of pilot sites
Step-2: Awareness of current situation and	◆ Participatory Baseline Survey ◆ FABLIS Forum ◆ Market Survey after	◆ Preparatory training for farmers' group (baseline survey, gender training and FABLIS forum)	

new information	JEF2G	◆ Coordination with GRN scheme in FABLIS forum	
Step-3: Facilitation of making plan	◆ Crop Selection ◆ Action Plan Making	◆ Formulation of Action Plan by Farmers' Group	◆ Formulation of Support Plan by ATs
Step-4: Provision of technical solutions	◆ In-field trainings after ToT	◆ In-field trainings after ToT	

Note: The activities of each step in Kenya SHEP UP are provided by JICA. Although the activities related with project implementation were carried out for Kenya SHEP UP as well, attention is paid to the activities from farmers' view point for Kenya SHEP UP.

Source: Prepared by the Study Team

39. The measures taken from step-0 to step-4 in Namibian SHEP approach under N-CLIMP are illustrated as follows: (II-4.1)

Step	Activities	Measures taken
Step-0: Preparatory stage	◆ Overall review survey and detailed thematic survey	◆ Opportunity to share development constraints and potential amongst stakeholders
Step-1: Selection of target and sharing the goal	◆ Criteria agreed among stakeholders ◆ Simplification of selection of target area and formulation of action plan	◆ Quick selection procedure of target constituencies (ADCs)
Step-2: Farmers' awareness of current situation and new information	◆ Preparatory training for farmers' group	◆ Providing farmers' group with options of solution ◆ Use of GRN scheme in FABLIS Forum
Step-3: Facilitation of making plan	◆ Formulation of Action Plan by Farmers' Group selected ◆ Formulation of Support Plan by ATs	◆ Strengthening relationship between ATs and farmers' group through planning process
Step-4: Provision of technical solution	◆ In-field training ◆ Periodical monitoring and modification of schedule	◆ Flexible modification of activities based on the realities observed on the ground (weather conditions etc.)

Source: Prepared by the Study Team

Majors taken for each Step in Namibian SHEP Approach

40. Format developed for Namibian SHEP approach are listed as follows: (II-4.1)

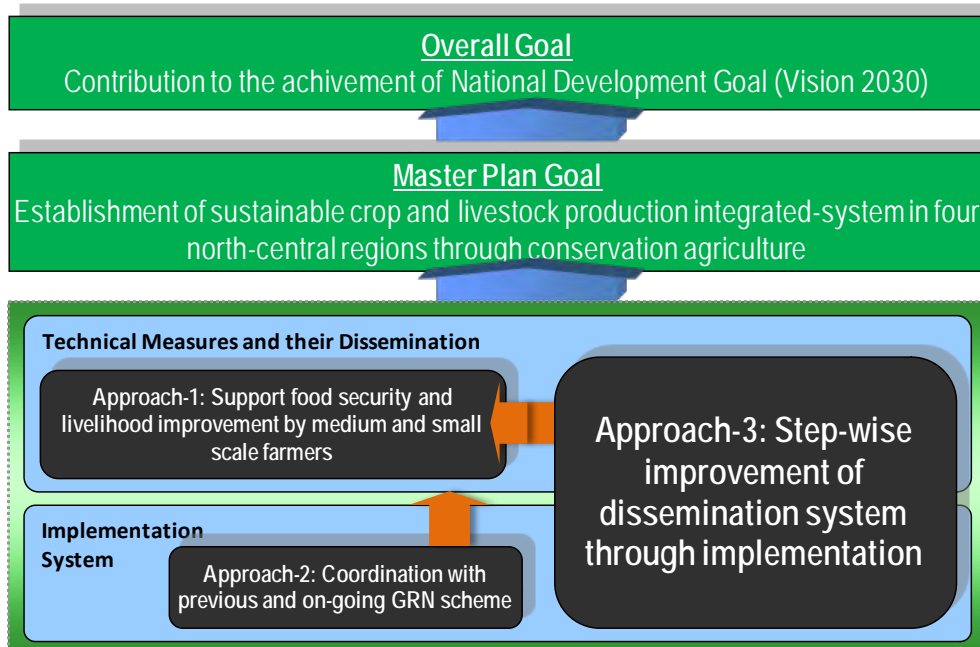
◆ FORM-1:	Questionnaire for Overall Review Survey
◆ FORM-2:	Questionnaire for Detailed Thematic Survey
◆ FORM-3:	Monitoring Form for Fixed Point Observation
◆ FORM-4:	Selection procedure of Pilot Site Activities
◆ FORM-5:	List of Key Farmers
◆ FORM-6:	Baseline survey for farming activities
◆ FORM-7:	Action Plan for Pilot Site Activities
◆ FORM-8:	Support Plan by ATs
◆ FORM-9:	Monitoring Form for Pilot Site Activities of Technical Measures Verification
◆ FORM-10:	Market Survey
◆ FORM-11:	Farming Schedule
◆ FORM-12:	Progress of Technical Dissemination
◆ FORM-13:	Monitoring of Annual Namibian SHEP Implementation (Checklist)
◆ FORM-14:	Review of Technical Measures for ATs and Farmers (1/6-6/6)

Source: Prepared by the Study Team

II-5 MASTER PLAN FOR CROP AND LIVESTOCK DEVELOPMENT

Approach

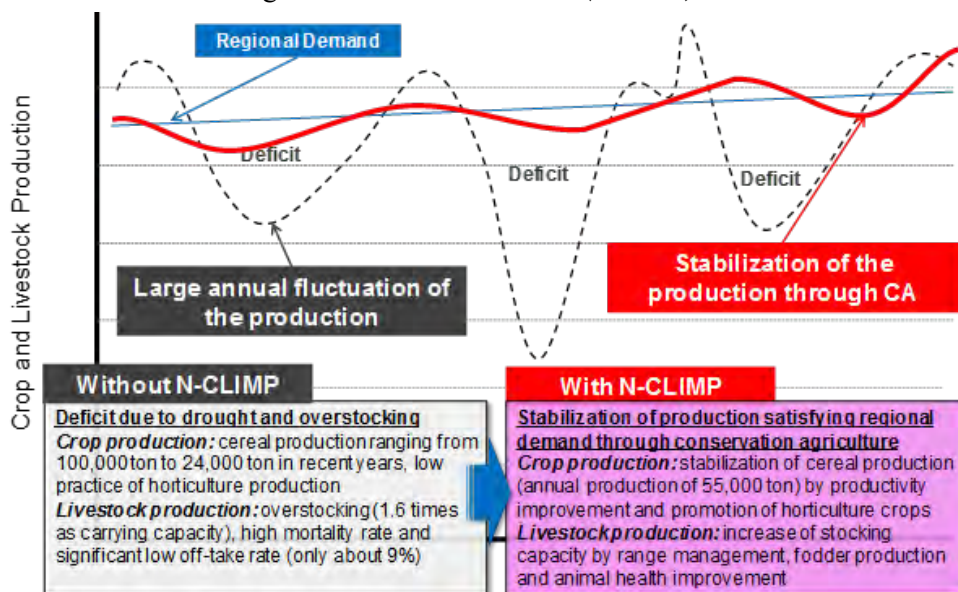
41. Overall goal, master plan goal and the approach of crop and livestock is formulated through the series of meetings as shown in the following table and figure. (II-5.2)



Source: Prepared by the Study Team

Approach for the Master Plan of Northern Crop and Livestock Development

42. Important aspect of the master plan is “**Enhancing Resilience of Crop and Livestock Production.**” The image is illustrated as follows: (II-5.2.2)



Source: Prepared by the Study Team

Enhancement of Resilience of Crop and Livestock Production in Northern Namibia

43. By applying conservation agriculture, enhancement of resilience of crop and livestock production

in Northern is a target for the master plan of N-CLIMP. Without-conditions of the master plan, annual production of cereal grains significantly fluctuate from approximately 100,000 ton to 24,000 ton due to erratic rainfall pattern. In addition, livestock production is not necessarily carried out in sustainable manner due to overstocking, high mortality rate as well as low off-take rate. With-conditions of the master plan, crop production is expected to be stabilized and horticulture crops production is promoted at the potential area. In addition, it is planned that the stocking capacity of livestock is improved by improving range management, fodder production and animal health using proposed technical measures in order to catch up regional demand of crop and livestock products. (II-5.2.2)

Master Plan for Crop and Livestock Development

44. Master plan is prepared by including the following contents: (i) Phase, (ii) phase-wise development scenario, (iii) focal technical measures, (iv) implementation system, (v) implementation structure and (vi) measurable figures of the development target (II-5.3)
45. As discussed above, focal technical measures in each phase are tabulated below: (II-5.3)

Focal Technical Measures in each Phase

No.	Name	Category	Phase	To be applied during N-CLIMP
Crop Production				(8 nos.)
CR-1	Fertilizer application	1,2 to 3	Short, medium to long	+
CR-2	Cropping pattern	1,2 to 3	Short, medium to long	+
CR-3	Conservation agriculture	1,2 to 3	Short, medium to long	+
CR-4	Flood- and drought-adaptive cropping system (Rice-Mahangu mixed cropping)	1,2 to 3	Short, medium to long	+
CR-5	Water source / water harvesting	1,2 to 3	Short, medium to long	+
CR-6	Water saving cultivation	1,2 to 3	Short, medium to long	+
CR-7	Crop selection and marketing	1,2 to 3	Short, medium to long	+
CR-8	Cropping plan and horticulture crop management	1,2 to 3	Short, medium to long	+
CR-9	Establishment of crop production and marketing cooperatives	3	Medium to long	
Livestock Production				(8 nos.)
LS-1	Fodder production	1	Short	+
LS-2	Range management	1,2 to 3	Short, medium to long	+
LS-3	Water harvesting and/or construction of water resource facilities for animals	1	Medium	
LS-4	Nutritious feed supply particularly for pig and chicken	1	Short	+
LS-5	Disease control	1	Short	+
LS-6	Large and small stock fattening	1	Short	+
LS-7	Periodical production	1	Short	+
LS-8	Expansion of quality meat	2 to 3	Medium to long	
LS-9	Bull scheme	2 to 3	Medium to long	
LS-10	Multiplication of Sanga bull	2 to 3	Medium to long	
LS-11	Goat production	1	Short	+
LS-12	Pig production	1 to 2	Medium	
LS-13	Chicken production	1	Short	+
LS-14	Promotion and strengthening of Auction for both large and small stocks	2	Medium	

No.	Name	Category	Phase	To be applied during N-CLIMP
LS-15	Development of formal market for small stock	2	Medium	
LS-16	Establishment and strengthening livestock cooperatives	1, 2 to 3	Medium to long	
Farm Management				(5 nos)
FM-1	Household accounting management	2	Medium	
FM-2	Book keeping (Farm Record)	1	Short	+
FM-3	Post Harvest	1, 2 to 3	Medium to long	
FM-4	Business plan	2	Medium	
FM-5	Group formation/ group strengthening	1	Short	+
FM-6	Group accounting management	1	Short	+
FM-7	Formulation of Water Users Association	1	Medium	
FM-8	Collective Selling / Purchasing	1	Medium	+
FM-9	Rural finance accessibility improvement	1	Medium	
FM-10	Market information access improvement	1	Short	+
Total				21 nos.

Source: Prepared by the Study Team

46. Measurable target for crop and livestock production is preliminary determined based on the present conditions, relevant GRN policy and projections of per capita consumption of cereals and so on as tabulated below: (II-5.3.3)

Quantitative Figures of the Development Target (Tentative as of April 2015)

Subject	Indicators	Data Source	Short (2016/17)	Medium (2022/2023)	Long (2029/2030)
Crop Production	Cereal Production				
	Cereal production (millet) (1,000 ton)	◆ Agriculture statistic	54,970	55,370	55,894
	Yield of cereal (millet) (kg/ha)	◆ Survey by ATs	200	300	400
	Yield of horticulture crops				
	Fruit Vegetables				
	Tomato	◆ Agriculture statistic ◆ Survey by ATs	Focal urban and peri-urban area in each region	4 kg/m ²	TBD
	Egg Plant			2.3 kg/m ²	TBD
	Sweet Pepper/Capsicum			2 kg/m ²	TBD
	Cucumber (lifting)			4 kg/m ²	TBD
	Pumpkin			2 kg/m ²	TBD
	Water Melon			2 kg/m ²	TBD
	Melon			1 kg/m ²	TBD
	Root Vegetables				
	Carrot	◆ Agriculture statistic ◆ Survey by ATs	Focal urban and peri-urban area in each region	3 kg/m ²	TBD
	Turnip			3 kg/m ²	TBD
	Onion			2 kg/m ²	TBD
	Sweet Potato			2 kg/m ²	TBD
	Leaf Vegetables				
	Cabbage	◆ Agriculture statistic ◆ Survey by ATs	Focal urban and peri-urban area in each region	2 kg/m ²	TBD
	Chinese Cabbage			1.5 kg/m ²	TBD
	Cauliflower, Broccoli			3 kg/m ²	TBD
	Spinach			2 kg/m ²	TBD
	Conservation agriculture				
	Number of farmers practicing ripper furrow	◆ Agriculture statistic ◆ Survey by ATs	Direct: 4 groups (60 farmers)	Direct: 28 groups (420 farmers)	Direct: 56 (840 farmers)
			Indirect: 900 farmers	Indirect: 6,300 farmers	Indirect: 12,600 farmers
	Horticulture crops production				
	Number of farmers practicing urban and peri-urban horticulture	◆ Agriculture statistic ◆ Survey by ATs	Direct: 4 groups (60 farmers)	Direct: 18 groups (270 farmers)	Direct: 32 groups (480 farmers)

Subject	Indicators	Data Source	Short (2016/17)	Medium (2022/2023)	Long (2029/2030)
	(nos.)		Indirect 900 farmers	Indirect: 4,050 farmers	Indirect: 7,200 farmers
Livestock production	Stocking of cattle (nos.)	◆ Agriculture statistic	578,000 (1LU=250kg)	789,000 (1LU=250kg)	1,000,000 (1LU=250kg)
	Stocking of goat (nos.)	◆ Survey by ATs	389,000 (1/6LU)	544,000 (1/6LU)	700,000 (1/6LU)
	Off-take rate of cattle (%)		12%	20%	30%

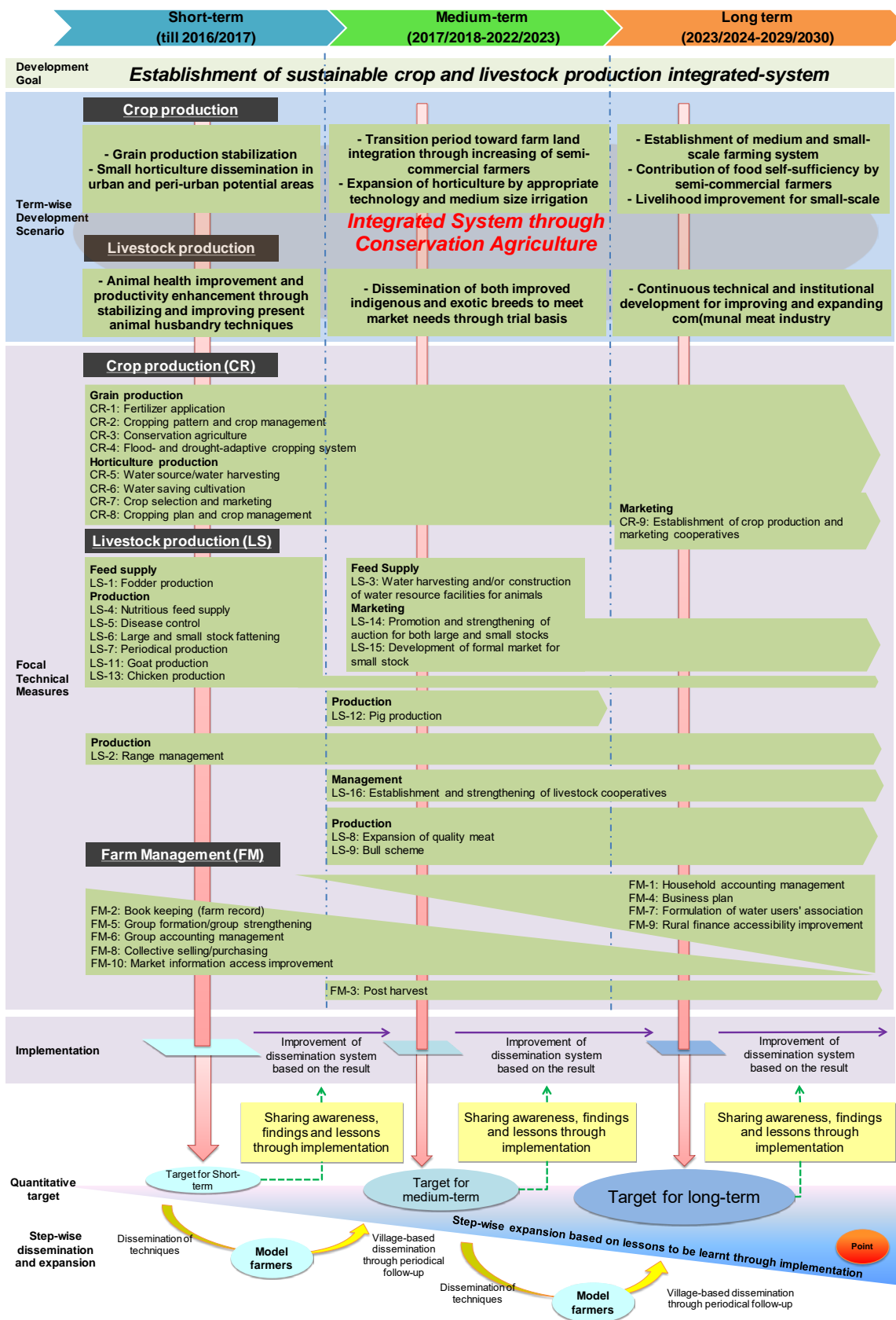
Source: Prepared by the Study Team

47. Based on the discussion above, framework of the master plan for northern crop and livestock development is tabulated and illustrated as follows: (II-5.3.3)

Master Plan for Northern Crop and Livestock Development

Subject	Contents	
Development Target	Establishment of sustainable crop and livestock production integrated system based on conservation agriculture	
Phase	Three phases as follows: ◆ Short-term: At present until 2016/2017 ◆ Medium-term: 2017/18 to 2022/23 ◆ Long-term: 2023/24 to 2029/2030	
Phase-wise Development Scenario	Through the implementation of the master plan, crop and livestock production integrated system is established based on the concept of conservation agriculture. Phase-wise development scenario is as follows based on the current conditions surrounding agriculture that the population is steadily increasing while farm household is decreasing:	
	Phase	Crop production
	Short-term	◆ Development and verification of technical measures for stabilization of cereal production ◆ Promotion of horticulture crops for health improvement and cash income increase at potential areas particularly peri-urban areas
	Medium-term	◆ Increase of semi-commercial farmers through farm integration ◆ Dissemination of improved production system of cereal production to both medium and small-scale farmers ◆ Promotion of horticulture crops through medium scale irrigation development by Green Scheme and dissemination of appropriate technology for drip irrigation system
Long-term	◆ Establishment of medium and small-scale farming system ◆ Contribution of food self-sufficiency by semi-commercial farmers (medium-scale farmers) ◆ Livelihood improvement for small-scale farmers	
	Livestock production	◆ Improvement of animal health and enhancement of livestock productivity particularly using current techniques
		◆ Continuation of animal health improvement and production enhancement programs ◆ Dissemination of both indigenous and exotic breeds to meet market needs through trial basis
		◆ Continuous technical and institutional development for improving and expanding communal meat industry
Focal Technical Measures	Proposed basic, intermediate and advanced technical measures for crop and livestock production and farm management are adopted and disseminated stepwise based on the categorization.	
Implementation Structure	◆ Technical measures are disseminated by crating key model farmers in each village. ◆ Technical measures are disseminated through continuous improvement of dissemination system based on periodical monitoring by NCD and regional offices and ATs of MAWF.	
Quantitative Figures of the Development Target	Development target is established for crop and livestock production-related indicators such as number of farmers and/or agriculture production.	

Source: Prepared by the Study Team

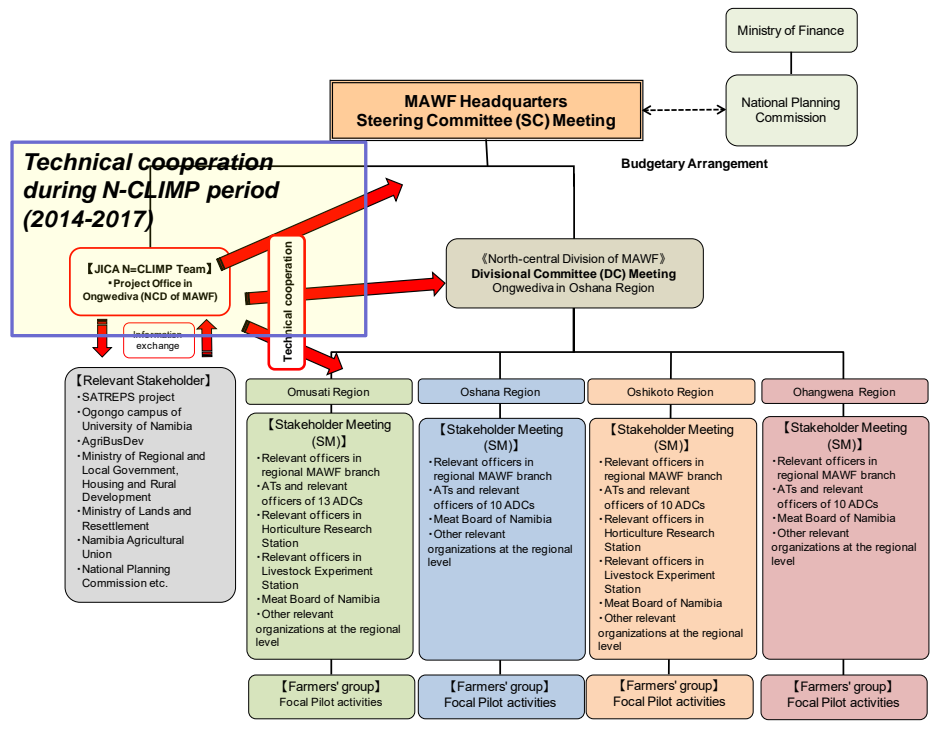


Source: Prepared by the Study Team

Framework of Northern Crop and Livestock Development Master Plan

Implementation System

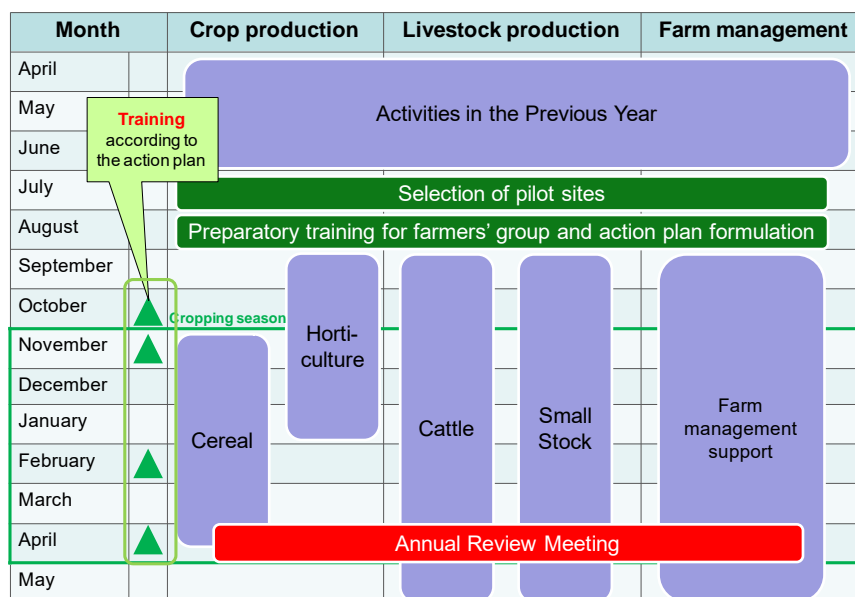
48. The implementing organization of the master plan is proposed as shown below according to the experiences of N-CLIMP. (II-5.4.1)



Source: Prepared by the Study Team

Master Plan Implementation Organization

49. Annual implementation flow of the master plan is summarized below based on the proposed procedure. (II-5.4.2)



Source: Prepared by the Study Team

Summary of Annual Implementation Flow

50. Master plan implementation cost is estimated as follows (II-5.5)

Summary of Cost for the Master Plan

Unit: N\$1,000

No.	Item	Term		
		Short (2016/17)	Medium (2016/17-2022/23)	Long (2023/24-2029/29)
1	Technical Measures Verification and Dissemination (=A)	315	30,390	45,858
2	Monitoring (=B=Ax10%)	31	3,039	4,586
3	Miscellaneous Cost (=C=Ax5%)	16	1,519	2,293
	Total (=A+B+C)	362	34,948	52,737
			Grand Total	88,047
			Annual Average over 15 years	5,870
			First 5 years	23,737

Source: *Prepared by the Study Team*

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

**VOLUME-I
MASTER PLAN**

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Abbreviations

[A]		
	AALS	Affirmative Action Loan Scheme
	ADC	Agriculture Development Center
	Agri-Bank	Agriculture Bank of Namibia
	AgriBusDev	AgriBusiness development Services
	AMTA	Agricultural Marketing and Trade Agency
	ASO	Agricultural Scientific Officer
	AT	Agricultural Technician
[C]		
	CA	Conservation Agriculture
	CAN	Conservation Agriculture of Namibia
	CASO	Chief Agricultural Scientific Officer
	CAT	Chief Agricultural Technician
	CBRLM	Community-based Rangeland and Livestock Management Project
	CLB	Communal Land Board
	CEB	Cuvelai-Etосha Basin
	CLRA	Communal Land Reform Act
	CNWD	Central North-Western Division
	C/P	Counterpart Personnel
	CSP	Country Strategy Paper
[D]		
	DAP	Drought Animal Power
	DAPAP	Drought Animal Power Acceleration Program
	DAPEES	Directorate of Agricultural Production, Extension and Engineering Services
	DAPP	Development Aid People for People
	DARD	Directorate of Agriculture and Research Development
	DC	Divisional Committee
	DCPP	Dry Land Crop Production Program
	DF	Directorate of Forestry
	DFR	Draft Final Report
	DGS	Directorate of General Services
	DO	Desired Outcome
	DPBD	Directorate of Planning and Business Development
	DRFN	Desert Research Foundation of Namibia
	DRWSSC	Directorate of Rural Water Supply and Sanitation Coordination
	DVS	Directorate of Veterinary Services
	DWRM	Directorate of Water Resource Management
[E]		
	EU	European Union
[F]		
	FAO	Food and Agriculture Organization of the United Nations
	FMP	Farmers' Mentorship Program
	FNS	Food and nutrition security
	FR	Final Report
	FSAP	Financial Sector Assessment Program

	FSP	Farmers' Support Project
	FSR/E	Farming Systems Research and Extension
	FU	Farmers' Union
	FURS	Farm Unit Resettlement Scheme
	FY	Fiscal Year
[G]		
	GA	Grazing Area
	GDP	Gross Domestic Product
	GIS	Geographic Information System
	GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
	GMO	Genetically Modified Organism
	GNI	Gross National Income
	GOJ	Government of Japan
	GRN	Government of Republic of Namibia
[H]		
	HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
	HPP	Harambee Prosperity Plan
[I]		
	IcR	Inception Report
	IFAD	International Fund for Agricultural Development
	IFC	International Funding Corporation
	IFPRI	International Food Policy Research Institute
	IWRM	Integrated Water Resources Management
[J]		
	JEF2G Training	Joint Extension Staff & Farmers Dual Gender Training
	JICA	Japan International Cooperation Agency
	JOCV	Japan Overseas Cooperation Volunteers
	JSM	Joint Stakeholder Meeting
	JST	Japan Science and Technology Agency
[K]		
	KPI	Key Performance Indicator
[L]		
	LAN	Limestone Ammonium Nitrate
	LDC	Livestock Development Center
	LMC	Livestock Marketing Cooperative
	LMO	Livestock Modified Organism
[M]		
	MAP	Mono Ammonium Phosphate
	MAWF	Ministry of Agriculture, Water and Forestry
	MAWRD	Ministry of Agriculture, Water and Rural Development
	MCA	Millennium Challenge Account
	MCC	Millennium Challenge Corporation
	MeatCo	Meat Corporation of Namibia
	MET	Ministry of Environment of Tourism
	MFN	Most Favoured Nation
	MGECW	Ministry of Gender Equality and Child Welfare

	MIGA	Multilateral Investment Guarantee Agency
	MLR	Ministry of Lands and Resettlement
	MOE	Ministry of Education
	MOF	Ministry of Finance
	M/P	Master Plan Study
	MRLGHRDC	Ministry of Regional and Local Government, Housing and Rural Development Coordination
	MTI	Ministry of Trade and Industry
[N]		
	NAB	Namibian Agronomic Board
	NACOMA	Namibian Coastal Management
	NamLITS	Namibian Livestock Identification and Traceability System
	NAU	Namibia Agricultural Union
	NCA	Northern Communal Areas
	NCAP	Namibia Conservation Agriculture Project
	NCD	North Central Division
	N-CLIMP	Northern Crop and Livestock Development Master Plan Study
	NDP	National Development Plan
	NECFU	Namibia Emerging Commercial Farmers' Union
	NED	North-Eastern Division
	NGO	Non Government Organization
	NNFU	Namibia National Farmers Union
	NPC	National Planning Commission
	NRMP	National Rangeland Management Policy
	NRMS	National Rangeland Management Strategy
	NSA	Namibia Statistics Agency
	NSFR	National Strategic Food Reserve
[P]		
	PS	Permanent Secretary
	PON	Polytechnic of Namibia
[O]		
	OSBP	One Stop Border Post
	OTC	Outapi Town Council
[P]		
	PC	Personal Computer
	PGCH	Planned Grazing and Combined Herding
	PIF	Project Identification Form
	PPP	Public-Private Partnership
	PR	Progress Report
[R]		
	RDC	Rural Development Center
[S]		
	SADC	Southern African Development Community
	SADC	Sub-division of Animal Disease Control
	SAT	Senior Agriculture Technician
	SATREPS	Science and Technology Research Partnership for Sustainable Development

	SC	Steering Committee
	SED	Southern-Eastern Division
	SHEP	Smallholder Horticulture Empowerment Project
	SHEP UP	Smallholder Horticulture Empowerment & Promotion Unit Project
	SM	Stakeholder Meeting
	SME	Small and Medium Enterprise
	SPS	Sanitary and Phyto-Sanitary
	SSPOS	Small stock pass-on scheme
	SWAPO	South-West Africa People's Organisation
[T]		
	TA	Technical Assistance
	ToR	Terms of Reference
	TVET	Technical, Vocational Education and Training
[U]		
	UN	United Nations
	UNAM	University of Namibia
	UNPFA	United Nations Partnership Framework
[V]		
	VCF	Veterinary Cordon Fence
[W]		
	WATSAN	Water and Sanitation
[Z]		
	ZIZABONA	Zimbabwe-Zambia-Botswana-Namibia interconnector

Measurement Units and Currencies

mm	millimeter(s)
cm	centimeter(s)
m or lin.m	meter(s)
km	kilometer(s)
in.	inch
ft.	foot
m ² or sq.m	square meter(s)
km ²	square kilometer(s)
Ha	hectare(s)
acre	acre(s)
L	liter(s)
m ³ or cu.m	cubic meter(s)
MCM	million cubic meter(s)
ft ³	cubic feet = 0.0283m ³
Gr. or gr.	gram(s)
kg	kilogram(s)
ton or t	ton(s) or tonne(s)
sec	second(s)
hr or h	hour(s)

D	day(s)
N/m ²	Newton per square m (=Pa)
Pa	Pascal
mm/day or mm/d	millimeter per day
L/sec or L/s	liter per second
m/sec or m/s	meter per second
m ³ /sec or m ³ /s	cubic meter(s) per second
kV	kilo Volt
MVA	mega Volt-ampere
MW	mega Watt
GWh	giga Watt-hour(s)
° C	degrees Celsius
HP	Horsepower
JPY	Japanese Yen
USD	USA Dollar

Units Conversion

SI Units

FPS Units

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

PART I

GENERAL INFORMARTION

CHAPTER I-1 INTRODUCTION

I-1.1 General

This is the Master Plan for Northern Crop and Livestock Development 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 Background

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

The Republic of Namibia is located in southern Africa with the area of 820 thousand square meters surrounded by South Africa, Botswana, Angola and Zambia. The population is approximately 2.2 million.

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 dollars 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.

(2) Background of the Study Request

In order to ensure overall social security of the country and to stabilize agriculture production in northern region, strategic, concrete and consistent agriculture development master plan in natural and social environment-friendly manner is required. 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 has been implemented since September 2014.

I-1.3 Objective and Approach of N-CLIMP

(1) Outline of N-CLIMP

Outline of N-CLIMP is tabulated as follows:

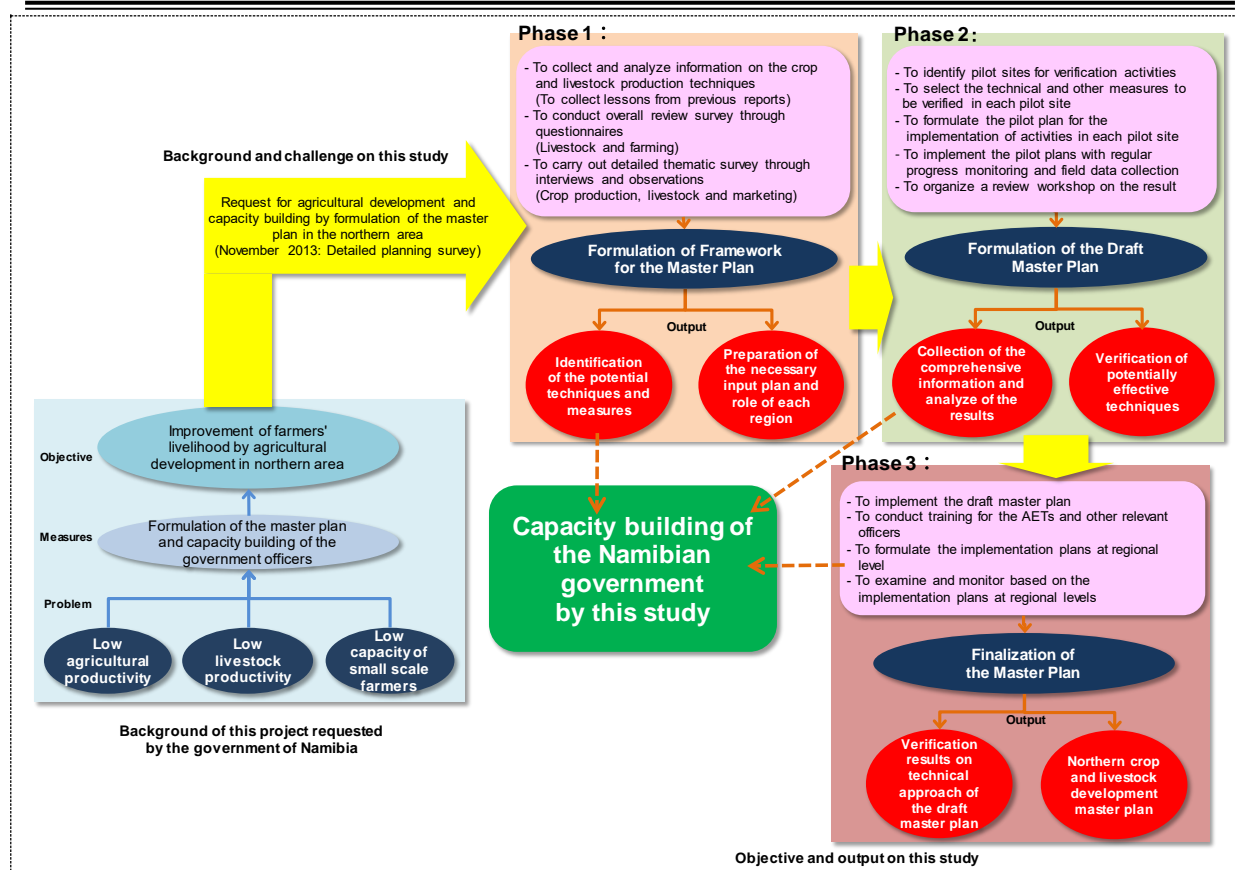
Outline of N-CLIMP

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 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	✓ Four regions in the North Central Division (NCD), i.e. Omusati, Oshana, Oshikoto and Ohangwena
Study Period	✓ August 2014 to June 2017 (35 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

(2) Objective of N-CLIMP

N-CLIMP aims to collect data and information for crop and livestock production and farm management of Northern Region of Namibia to formulate agriculture development master plan appropriate for natural and socio-economic conditions of the target area and to contribute to enhancement of capacities of relevant staff in planning and implementation of master plan. Relationship of background, objective and output of N-CLIMP is illustrated below.



Source: Prepared by the Study Team

Relationship of Background, Objective and Output of N-CLIMP

(3) Approach of N-CLIMP

Technical and operational approaches taken for N-CLIMP are as follows:

Technical Approach

Approach 1:	Formulation of self-expansive master plan consistent with policy and plan of Namibia
Approach 2:	Maximum utilization of existing techniques
Approach 3:	Stepwise verification of agriculture techniques for effective dissemination to farmers
Approach 4:	Capacity enhancement of extension officer and relevant staff by SHEP approach
Approach 5:	Utilization of scale-up approach in enhancement of implementation capacity of relevant organizations

Operational Approach

Approach 1:	Realistic and practical study operation system by MAWF
Approach 2:	Clear role and coordination among relevant organizations
Approach 3:	Study schedule in consistent with farm calendar and budgetary arrangement of GRN
Approach 4:	Coordination and information sharing with SATREPS

I-1.4 Contents of the Master Plan

The master plan for northern crop and livestock development in the republic of Namibia consists of 2 parts: (i) Part-I General Information and (ii) Part-II Master Plan for Northern Crop and Livestock Development.

Part-I: General Information

Part-I consists of 5 chapters.

Chapter I-2 explains national and sectoral policies related to N-CLIMP. Since the master plan is to be consistent with relevant policy and guideline, such policies and summarized in this chapter. Chapter I-3 describes crop and livestock development programs and projects under MAWF and stakeholder organizations. Chapter I-4 deals with assistance policy development partners for agriculture sector particularly crop and livestock development. Chapter I-5 is to explain the organizations relevant to crop and livestock development.

Part-II: Master Plan for Northern Crop and Livestock Development

Based on the general information, Part-II explaining the master plan for northern crop and livestock development consists of 5 chapters.

Chapter II-1 Comprehensive Information gathering consisting of overall review survey and detailed thematic survey explains the overview of the 4 regions, information of which are collected and analyzed together with ATs of 4 regions under MAWF. Since the development direction largely depend upon the development potential, Chapter II-2 describes the result of preliminary assessment of development potential for crop and livestock development. On the basis of current constraints and development potential, Chapter II-3 explains technical measures to be applied for the master plan to improve crop and livestock production in northern Namibia.

As SHEP approach has been applied for N-CLIMP in the course of the project, Chapter II-4 deals with the outline of Namibian SHEP approach based on the experiences of N-CLIMP implementation. On the basis of above discussion, master plan for crop and livestock development is explained in Chapter II-5.

CHAPTER I-2 NATIONAL AND SECTORAL POLICIES RELATED TO N-CLIMP

I-2.1 National Development Policy

I-2.1.1 Vision 2030

Vision 2030 has been prepared by the Office of the President in 2004 in order to describe policy framework for long-term national development of Namibia. The document consists of 6 chapters with appendices as summarized below:

Contents of Vision 2030

Chapter	Contents
Chapter 1	Background to Vision 2030
Chapter 2	An Overview
Chapter 3	Namibia Vision 2030
Chapter 4	People's Quality of Life
Chapter 5	Sustainable Resource Base
Chapter 6	Creating the Enabling Environment
Chapter 7	Appendices

Source: Vision 2030

Development vision, objectives and strategies explained in Vision 2030 are tabulated hereunder. In addition, in relation to crop and livestock production, chapter 5 of the document explains policy framework of sustainable use of natural resources including water, land and forestry. In particular, land and agricultural production section is directly linked with N-CLIMP as follows.

Development Vision, Objectives and Strategies of Vision 2030

Item	Contents
Development Vision	A prosperous and industrialized Namibia, developed by her human resources, enjoying peace, harmony and political stability
Objectives	<ul style="list-style-type: none"> ◆ Ensure that Namibia is a fair, gender responsive, caring and committed nation, in which all citizens are able to realise their full potential, in a safe and decent living environment; ◆ Create and consolidate a legitimate, effective and democratic political system (under the Constitution), and an equitable, tolerant and free society, that is characterised by sustainable and equitable development and effective institutions, which guarantee peace and political stability; ◆ Develop a diversified, competent and highly productive human resources and institutions, fully utilising human potential, and achieving efficient and effective delivery of customer-focused services which are competitive not only nationally, but also regionally and internationally; ◆ Transform Namibia into an industrialised country of equal opportunities, which is globally competitive, realising its maximum growth potential on a sustainable basis, with improved quality of life for all Namibians; ◆ Ensure a healthy, food-secured and breastfeeding nation, in which all preventable, infectious and parasitic diseases are under secure control, and in which people enjoy a high standard of living, with access to quality education, health and other vital services, in an atmosphere of sustainable population growth and development; ◆ Ensure the development of Namibia's 'natural capital' and its sustainable utilization, for the benefit of the country's social, economic and ecological well-being; ◆ Accomplish the transformation of Namibia into a knowledge-based, highly competitive, industrialized and eco-friendly nation, with sustainable economic growth and a high quality of life; and ◆ Achieve stability, full regional integration and democratised international relations; the transformation from an aid-recipient country to that of a provider of development assistance.
Broad Strategies	<ul style="list-style-type: none"> ◆ Maintaining an economy that is suitable, efficient flexible and competitive; ◆ Operating an dynamic and accessible financial sector; ◆ Achieving full and gaining employment; ◆ Providing excellent, affordable health care for all;

Item	Contents	
	<ul style="list-style-type: none"> ◆ Mainstreaming HIV/AIDS into development policies, plans and programmes; ◆ Creating access to abundant, hygienic and healthy food, based on a policy of food security; ◆ Providing full and appropriate education at all levels; ◆ Leveraging knowledge and technology for the benefit of the people; ◆ Promoting interpersonal harmony among all people; ◆ Operating a morally upright and tolerant society that is proud of its diversity; ◆ Ensuring an atmosphere of peace, security and hope for a better life for all; ◆ Maintaining stable, productive and diverse ecosystems managed for long-term sustainability; ◆ Establishing and sustaining business standards of competence, productivity, ethical behaviour and high trust; ◆ Upholding human rights and ensuring justice, equity and equality in the fullest sense for all, regardless of gender, age, religion, ethnicity, ability or political affiliation; ◆ Maintaining a low level, responsive bureaucracy; ◆ Implementing a land and natural resource policy that distributes wealth fairly, and encourages production, employment and development of wealth in a sustainable economic climate; ◆ Operating a responsive and democratic government that is truly representative of the people, and able to adhere to transparent, accountable systems of governance, proactively; ◆ Achieving collaboration between public, private and Civil Society organisations, in policy formulation, programming and implementation; and ◆ Maintaining sound international policies that ensure effective cooperation, favourable trade relations, peace and security. 	
Land and Agriculture Production	Land is used appropriately and equitably, significantly contributing towards food security at household and national levels, and supporting the sustainable and equitable growth of Namibia's economy, whilst maintaining & improving land capability.	
	Sub-vision	Strategy
	<ul style="list-style-type: none"> ◆ Equitable access to land ◆ Declining rates of land degradation ◆ Appropriate tenure over natural resources ◆ Unpolluted soils and agricultural water run-off ◆ Optimal land-use and livelihood options ◆ Improved economic development options 	<ul style="list-style-type: none"> ◆ Rational land-use planning ◆ Value-added activities ◆ Focus given to food security but not food self-sufficiency ◆ Environment-friendly ◆ Rehabilitation of degraded land and water bodies ◆ Encourage rapid destocking and marketing of livestock during times of drought to reduce pressure on rangelands

Source: Vision 2030 (2004)

I-2.1.2 Namibia's Fifth National Development Plan (NDP 5) (2017/18 - 2021/22)

Fifth National Development Plan (NDP 5) was prepared in order to set out a roadmap for achieving the rapid industrialization while adhering to the four integrated pillars of sustainable development.

- ◆ Economic progression
- ◆ Social transformation
- ◆ Environmental sustainability
- ◆ Good governance

Four pillars and focus area in each are summarized as follows:

Four Pillars and Focus Area in NDP 5

Pillars	Focus Area
Economic progression	<p>Manufacturing sector</p> <ul style="list-style-type: none"> ◆ Agriculture sector and food security ◆ Rural economic development ◆ Blue economy ◆ Fishery ◆ Mining ◆ Tourism

	<p>Expansion and modernization of physical infrastructure</p> <ul style="list-style-type: none"> ◆ Energy ◆ Water ◆ Transport and logistics ◆ Information & communication technology (ICT) <p>Supportive financial infrastructure for greater inclusion</p> <ul style="list-style-type: none"> ◆ Strengthened export capacity and greater regional integration ◆ Research and innovation
Social transformation	<ul style="list-style-type: none"> ◆ Poverty and income inequality ◆ Early childhood development ◆ Education ◆ Higher education: technical, vocational education and training (TVET), university education ◆ Health and nutrition ◆ Gender equality ◆ Housing and land ◆ Sanitation ◆ Youth empowerment (harnessing the demographic dividend – moulding youth to become productive citizens) ◆ Empowering people and communities through sports ◆ Arts and culture ◆ Integrated marginalized communities into mainstream economy
Environmental sustainability	<ul style="list-style-type: none"> ◆ Conservation and sustainable use of natural resources ◆ Environmental management and climate change
Good governance	<ul style="list-style-type: none"> ◆ Peace, security and rule of law ◆ Accountability and transparency ◆ Public service performance and service delivery

Source: NDP 5

As for the target for NDP 5, quantitative figures for desired outcome indicators and targets for agriculture sector and food security are delineated in NDP5 as shown in the following table.

Desired Outcome Indicators and Targets for Agriculture Sector and Food Security

	Baseline	2017/18	2018/19	2019/20	2020/21	2021/22
% decrease in food insecure individuals	25%	23%	20%	17%	15%	12%
% increase in food production	2016 production	3%	6%	10%	15%	20%
Share of value added in livestock farming	14.5%	16.5%	19.0%	22.5%	4.2%	4.0%
Share of value added in crop farming	29.0%	31.0%	34.0%	38.0%	42.0%	45.0%

Source: NDP 5

In addition, table below outlines challenges and strategies described in NDP 5 for agriculture sector.

Summary of Challenges and Proposed Strategies

Challenge	Key Strategies
<ul style="list-style-type: none"> ◆ High import dependence ◆ Low productivity among small-scale farmers ◆ Climate-related shocks such as persistent drought ◆ Widespread poverty and hunger ◆ Lack of land ownership 	<ul style="list-style-type: none"> ◆ Increase agriculture production for both cereals and horticulture ◆ Develop agro processing industries ◆ Increase smallholder or communal farmers' productivity ◆ Extend the red line/cordon fence to the northern borderlines of Namibia ◆ Enhance preparedness for effective response, recovery and reconstruction ◆ Promote the planting of drought resistance varieties

Source: NDP 5

I-2.1.3 Harambee Prosperity Plan (2016/17 – 2019/20)

The Harambee Prosperity Plan (HPP) has been prepared as a targeted Action Plan to accelerate development in clearly defined priority areas, which lay the basis for attaining prosperity in Namibia. The contents of HPP are tabulated as follows:

Contents of Harambee Prosperity Plan

Chapter	Contents
Chapter 1	Rationale of the Harambee Prosperity Plan
Chapter 2	Building of the Legacy
Chapter 3	Effective Governance and Service Delivery <i>Accountability and Transparency</i> <i>Improved Performance and Service Delivery</i>
Chapter 4	Economic Advancement
Chapter 5	Social Progression <i>Hunger Poverty</i> <i>Residential Land Delivery, Housing and Sanitation</i> <i>Infant and Maternal Mortality</i> <i>Vocational Education and Training</i>
Chapter 6	Infrastructure Development <i>Energy Infrastructure</i> <i>Water Infrastructure</i> <i>Transport Infrastructure</i> <i>ICT Infrastructure</i>
Chapter 7	International Relations and Cooperation
Chapter 8	Execution, Monitoring and Reporting
Appendix 1	HPP High Level Action Plan
Appendix 2-5	HPP Detailed Action Plan Per Pillar
Appendix 3	Summary of HPP

Source: Harambee Prosperity Plan (2016)

The document does not replace, but complements the long-term goal of the National Development Plans (NDPs) and Vision 2030. HPP consists of 4 pillars, under which there are 14 goals and 41 targets as follows including crop and livestock production-related statement:

Pillars and Goals of HPP

Pillars (4 pillars)	Goals (14 goals)	Number of Target (41 targets)	Crop and Livestock Production- directly related Statement
Effective Governance	2 goals ◆ Accountability & Transparency ◆ Improve Performance & Service Delivery	5 targets	-
Economic Advancement	4 goals ◆ Macro-Economic Stability ◆ Economic Transformation ◆ Youth Enterprise Development ◆ Economic Competitiveness	12 targets	◆ Large and small livestock development under industry growth programmes
Social Progression	4 goals ◆ Hunger Poverty ◆ Residential Land Delivery Housing & Sanitation ◆ Infant & Maternal Mortality ◆ Vocational Education Training	9 targets	◆ Humanitarian assistance through ongoing food distribution ◆ Improved agricultural output through subsidized farm implements, expansion of the Green Scheme, Debushing as a strategy for increasing grazing, establishment of fertilizer mixer plants ◆ Introduction of Food Banks that will be run

Pillars (4 pillars)	Goals (14 goals)	Number of Target (41 targets)	Crop and Livestock Production- directly related Statement
			and managed by the unemployed youth in the form of Street Committees, thereby also contributing towards youth employment
Infrastructure Development	4 goals <ul style="list-style-type: none"> ◆ Energy Infrastructure ◆ Water Infrastructure ◆ Transport Infrastructure ◆ ICT Infrastructure 	15 targets	◆ Overcoming of the water challenges by introducing a good mix of available resources (surface water, groundwater, rain water and water re-use

Source: Harambee Prosperity Plan (2016)

I-2.2 Agriculture Sector Development Policy and Plan

I-2.2.1 Namibia Agriculture Policy (December 2015)

Latest agriculture sector policy was issued in December 2015 after a review of the 1995 Agricultural Policy. New development policy concept are delineated in this document including the role that agriculture sector is expected to play in the attainment of the Fourth National Development Plan (NDP 4) strategic objectives, as well as Vision 2030 goals of economic growth, sustainability, equity and poverty alleviation as well as the desired for Government to diversify agricultural products and export markets.¹ Policy direction including vision, mission, overall goal and policy objectives are shown in the following table.

Summary of Namibia Agriculture Policy (December 2015)

Item	Contents
Vision	To attain a conducive environment for sustainable agricultural production, marketing and agro-industry development in Namibia
Mission	To promote, regulate, protect the sustainable development of the agriculture sector through stakeholder participation for the purpose of improving the socio-economic situation of the Namibian people
Overall goal	<ul style="list-style-type: none"> ◆ To create a conducive environment for increased and sustained agriculture production and productivity ◆ To accelerate the agriculture sector contribution to National Growth Domestic Product ◆ To promote development of national agriculture sector across the value chain
Policy objectives	<ul style="list-style-type: none"> ◆ Accelerate the agricultural sector's contribution to the National Gross Domestic product (GDP) ◆ Create a conducive environment for increased and sustained agricultural production and productivity which is regionally and internationally competitive ◆ Create a common understanding among national and international stakeholders as well as investors, about the vision of the Government of the Republic of Namibia for the development of Namibia's agriculture sector and its downstream industries ◆ Create a framework that will enable streamlined efforts by all stakeholders in Namibia's agriculture sector and its downstream industries, towards common developmental goals ◆ Promote the development of the national agriculture sector across the value chain ◆ Serve as a basis for drafting new as well as aligning existing legislation

Source: Namibia Agriculture Policy (December 2015)

¹ Since it was issued during the period of NDP 4, the policy explains support to NDP4.

Within the framework of vision, mission, overall goal and policy objectives, specific objectives and policy statement are described for each specific activities: (i) agriculture production (3 areas, crop production, livestock production and plant and animal health), (ii) agriculture marketing and trade (2 areas, domestic marketing and agriculture trade), (iii) agricultural research and development, (iv) international cooperation in agriculture, (v) agriculture training and capacity building, (vi) agriculture management information system, (vii) agro-financing, (viii) co-operative development and (ix) agricultural extension services. Among others, policy statements and strategies for crop and livestock production closely related with N-CLIMP are as follows:

Policy Statements and Strategies of Crop Production in Namibia Agriculture Policy (December 2015)

Policy Statements	Strategies
<ul style="list-style-type: none"> ◆ Actively promote the sustainable utilization of available resources for crop production to realize the country's full crop production potential and ensure food security at national and household levels ◆ Promote self-sufficient in staple crop production ◆ Promote Good Agricultural Practices (GAPs) in crop production to ensure production of safe and quality products ◆ Promote the sustainable existence of Namibia's crop production ◆ Provide different forms of support to eligible crop farmers in the country ◆ Support the development of programmes aimed at improving productivity of arable land ◆ Promote agriculture mechanization and adaptation of appropriate biotechnologies ◆ Promote organic crop production and certification ◆ Regulate the production, importation and use of genetically modified crops in Namibia ◆ Promote combating and eradication of pests with social-economic impact ◆ Promote food safety at production level ◆ Promote crop diversification ◆ Promote agro-forestry ◆ Regulate the use of arable land for non-food crops production ◆ Increase public investment in crop production ◆ Increase investment into human resources development in the area of agriculture specialization ◆ Maintain, improve, broaden agronomic price support mechanisms ◆ Develop and promote the sustainable crop production system ◆ Promote the use of integrated pest management system 	<ul style="list-style-type: none"> ◆ Expand the Green Scheme Programme under which it will develop irrigable land along perennial rivers and large dams and other sustainable water sources ◆ Implement conservation agriculture programme ◆ Implement the Dry Land Crop Production Programme (DCPP) and support farmers through the provision of subsidized fertilizer, improved seeds as well as weeding and ploughing services ◆ Expand extension services and capacitate extension personnel in order to bring services closer to crop farming communities ◆ Implement and support the Horticultural Development Programme ◆ Support research for soil fertility enhancement technologies ◆ Develop ATCs and continue to import and adapt the latest production technologies to Namibian conditions ◆ Promote the adoption of new and appropriate technologies through extension services and encourage farmers to make use of such technologies ◆ Intensify crop production training programme for farmers at the ADCs with special emphasis on GAP in order to ensure production of safe and quality food ◆ Implement pest management programs ◆ Develop instruments to regulate the production and importation of GMO crops and related products ◆ Enforce soil conservation through implementation of the Soil Conservation Legislation ◆ Enforce and ensure utilization of policy instruments at national, regional and multilateral level in order to promote the sustainable existence of Namibia's crop production ◆ Design and implement support programmes for various categories of crop farmers ◆ Implement and continuously improve programs aimed at improving the productivity of arable land ◆ Develop and implement targeted programmes to support organic production and certification ◆ Regulate levels of residues in crops ◆ Encourage farmers to diversify crop production ◆ Identify and introduce new crop varieties ◆ Develop and implement an agro-forestry promotion programme ◆ Develop and implement regulations for use of agricultural land ◆ Protect and promote the conservation of indigenous plants and genetic materials through intellectual property rights ◆ Maintain an environment that is conducive for investment by the private sector in crop production ◆ Promote fodder production

	<ul style="list-style-type: none"> ◆ Promote local fertilizer production ◆ Establish irrigation scheme targeting fodder production
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Source: Namibia Agriculture Policy (December 2015)

Policy Statements and Strategies of Livestock Production in Namibia Agriculture Policy (December 2015)

Policy Statements	Strategies
<ul style="list-style-type: none"> ◆ Actively promote optimal utilization of available resources for livestock production to realize the country's full livestock production potential ◆ Promote the sustainable existence of Namibia's livestock production ◆ Adequately provide veterinary diagnostic services in Namibia ◆ Provide different forms of support to eligible livestock farmers in the country ◆ Develop and promote programmes aimed at improving the productivity of rangeland ◆ Promote the adoption of appropriate technology and adaptation of new technologies ◆ Promote the production of quality livestock ◆ Promote free-range livestock production ◆ Promote combating and eradication of parasites with social-economic impact ◆ Promote the diversification of livestock breeds ◆ Conserve and promote the use of indigenous, hardy and well adapted genetic materials ◆ Regulate the importation and exportation of livestock breeding material ◆ Promote the adaptation of exotic breeding materials ◆ Promote good animal husbandry practices and animal welfare ◆ Promote food safety ◆ Regulate the breeding, importation and use of GMOs, LMOs and products derived thereof ◆ Regulate the use of growth stimulants and growth hormones in livestock production ◆ Regulate the use of fodder and supplements derived from GMOs and LMOs ◆ Promote and conserve diverse livestock genetic pool ◆ Regulate residue levels in livestock products ◆ Promote organic livestock production and certification 	<ul style="list-style-type: none"> ◆ Implement the National Rangeland Management Policy and Strategy ◆ Strengthen the capacity for rangeland/pasture science research and rangeland management monitoring, so as to assist and guide farmers accordingly ◆ Diversify breeding materials through the livestock research stations, livestock development centers and private breeders ◆ Increase the number of famers that benefit from quality breeding materials originating from breeding stations, livestock development centers and private breeders ◆ Strengthen the outreach of programs such as extension and veterinary services in order to support livestock production ◆ Develop and implement appropriate incentives to encourage the application of appropriate production enhancing technologies ◆ Equip and operationalize laboratories in order to detect the presence of LMOs in livestock ◆ Protect and promote the conservation of indigenous breeding materials through appropriate legislation ◆ Promote the development of feedlots in areas where they are economically viable ◆ Promote the use of livestock breeds that can adapt to the local climatic conditions ◆ Encourage the production of fodder within the country ◆ Enforce and ensure utilization of policy instruments at national, regional and multilateral level in order to promote the sustainable existence of Namibia's livestock production ◆ Design and implement support programmes for various categories of livestock farmers ◆ Promote the implementation of Farm Assured Namibia (FAN) Meat Scheme as a national marketing and trade tool ◆ Develop and implement livestock trade regulations ◆ Continue to promote the implementation of good animal husbandry practices ◆ Legislate the exportation and importation of breeding materials ◆ Prohibit the use of growth stimulants and growth hormones in livestock production ◆ Legislate the use of fodder and supplements containing GMOs and LMOs ◆ Establish embryo and sperm banks in order to conserve and preserve our quality indigenous and exotic livestock breeding material ◆ Foster the implementation of the national drought policy and strategy

Source: Namibia Agriculture Policy (December 2015)

I-2.2.2 MAWF Strategic Plan (2013/14 - 2016/17)

MAWF Strategic Plan 2013/14 to 2016/17 has been prepared in line with both NDP 4 and the sectoral execution plans. In addition, based on the strategic plan matrices shown in the document, the activities

including performances of MAWF staff members are monitored and evaluated. The document explains the mandate, the vision and the mission of MAWF based on Namibian constitution, Vision 2030, National Development Plans, SWAPO Party 2009 election manifesto and so forth. In addition, thirteen strategic objectives are set out including objective statement as tabulated below:

Summary of MAWF Strategic Plan (2013/14 - 2016/17)

Item	Contents
Mandate	To promote, manage and utilize the agriculture water and forestry resources sustainably
Vision	To be recognized as the leading contributor to food security, agro-product competitiveness increased and equitable access to or natural resources for improved livelihood, wellbeing and wealth for all
Mission	To promote and manage the sustainable utilization and development of agricultural, water and forestry resources for a prosperous Namibia through stakeholder partnership
Strategic Objectives	Programme 1 Institutional development and support services
	Programme 2 Agriculture planning agro business and cooperative development
	Programme 3 Integrated water resources management
	Programme 4 Management of natural disasters
	Programme 5 Water infrastructure development, maintenance and operation
	Programme 6 Development of WATSAN coordination mechanism among all stakeholders
	Programme 7 Crop and horticulture production
	Programme 8 Livestock production, improvement and animal health services in the NCA
	Programme 9 Maintain and protect animal health status in Namibia
	Programme 10 De-bushing
	Programme 11 Promotion of a forestation and reforestation
	Programme 12 Integrated forest management and forest research
	Programme 13 MAWF capacity building

Source: MAWF (2013), Strategic Plan 2013/14 to 2016/17

In line with NDP 4 and programmes in strategic objectives, MAWF also prepared Directorate-wise development target and annual budget for the implementation of proposed programmes. In relation to crop and livestock production, the following key performance indicators and targets are set out.

Key Performance Indicators and Targets set out in MAWF Strategic Plan (2013/14 - 2016/17)

Strategic Objectives	NDP 4 Desired Outcome (DO) No. and Explanation	Key Performance Indicator	Base line	Target				
				2012/13	2013/14	2014/15	2015/16	2016/17
Increase Household Food Security	By 2017, the population of severely poor individuals has dropped from 15.8 % in 2009/19 to below 10%	% increase in participation of subsidized DCPP beneficiaries	13%	15%	17%	19%	21%	23%
		(1,000) Number of farmers practicing Conservation Agriculture increased	70	140	210	280	350	420
		(1,000) Number of farmers practicing in the integrated support to urban and peri-urban horticulture	50	100	150	200	250	300
		(1,000) Number of support mechanisms designed and operational	6	7	8	9	10	11

Strategic Objectives	NDP 4 Desired Outcome (DO) No. and Explanation	Key Performance Indicator	Base line	Target				
				2012/13	2013/14	2014/15	2015/16	2016/17
Enhance Namibia's Capacity to grow Food	Agriculture experiences average real growth of 4% per annum over the NDP4 period (DOP9)	ha under irrigation increased	10,100	11,000	12,000	13,000	14,000	15,000
		Tons of grain storage capacity increased	14,000	16,000	18,000	20,000	22,000	24,000
	By 2017, adequate ICT infrastructure will be in place to facilitate economic development and competitiveness through innovation, research and development; availability of latest technologies score improves to 6.0 from 5.6 (DO5.5)	Number of infrastructure developed maintained and operational	187	193	198	204	208	210

Source: MAWF (2013), Strategic Plan 2013/14 to 2016/17

Currently, as of the end of March 2017, MAWF is preparing the strategic plan (2017/18 - 2020/21) to commence from coming fiscal year.

I-2.2.3 Namibian Agriculture Marketing and Trade Policy and Strategy

Namibian Agriculture Marketing and Trade Policy and Strategy was developed in 2011 with the aim of contributing to the successful performance of the agriculture sector, as well as to complement other policies and strategies across the value chain of agriculture. The policy and strategy are delineated respectively for domestic and international marketing.

Outline of Agriculture Marketing and Trade Policy and Strategy

Target	Item	Contents
Domestic Marketing	Livestock and meat industry	<ul style="list-style-type: none"> ◆ Utilize its policy space to preserve breeding material and discourage uncontrolled exports of livestock and unrestricted export of breeding material; ◆ Promoted value addition to diversify the product range; ◆ Promote the optimal utilization of the domestic market for Namibian products; ◆ Develop, promote, maintain and improve, where appropriate, sanitary requirements and ensure compliance with standards and quality of livestock and livestock products marketed in Namibia; ◆ Support and ensure that Namibian products meet local standards; ◆ Devise, maintain and improve, where appropriate, the efficient and effective marketing system for livestock and livestock products in order to stimulate production; ◆ Develop domestic livestock and livestock products markets through amongst others promotion of local consumption of locally originating meat and meat products; ◆ Ensure that local standards meet the minimum international standards; ◆ Promote the integration of the informal markets into the mainstream economy; ◆ Promote the development of a competitive agro-industry; and ◆ Ensure equitable distribution of benefits across the value chain.
	Cereals and horticulture industry	<ul style="list-style-type: none"> ◆ Utilize its policy space to preserve plant genetic resources and crop germ plasmas for indigenous plant species (discourage uncontrolled exports); ◆ Promote processing and value addition to diversify the product range; ◆ Promote the optimal utilization of the domestic market for Namibian products; ◆ Develop, promote, maintain and improve, where appropriate, the phyto-sanitary requirements, ensure compliance with standards and quality of cereals and horticulture products marketed in Namibia; ◆ Support and ensure that Namibian products meet the local standards; ◆ Devise, maintain and improve, where appropriate, the efficient and effective domestic marketing system for all crops and crop products in order to stimulate the domestic production of crops; ◆ Develop the domestic market through, amongst others, promotion of local consumption

Target	Item	Contents
		<ul style="list-style-type: none"> of locally originating produce; ◆ Support research and development of the domestic market as well as support efforts by cereal and horticulture producers and other stakeholders to orient agricultural and agro-industrial production towards market demands; and ◆ Promote integration of the informal market into the mainstream economy.
Agriculture Trade	Agriculture imports	<ul style="list-style-type: none"> ◆ Utilize its policy space to preserve a fair share of the domestic market for the Namibia originating agricultural and agro-industrial products; ◆ Promote competitive sourcing of production input, for agricultural and agro-industrial products, and ensure availability of an assortment of high quality and affordable food products in the domestic markets; ◆ Promote the importation of appropriate technology and skills for increased agricultural production and improved value addition to diversify the agro-industrial product range; ◆ Advocate for the maintenance and improvement of the provisions of regional and multilateral trade agreements that grant special and differential treatment to developing countries through adequate regulatory space; ◆ Use regulatory space to reduce the vulnerability of local farmers, the downstream industries and the rural poor to exogenous market factors; ◆ Promote the development of the necessary legal, physical and logistical infrastructure to stimulate and instil competitiveness in the domestic agricultural and agro-industrial sectors and contribute to food security in the country; ◆ Ensure that all imported agricultural and agro-industrial products meet the domestic SPS requirements, technical regulations and quality standards; ◆ Ensure the enforcement of the MFN and National treatment of imported agricultural and agro-industrial products where applicable; ◆ Ensure that all domestic regulations that have a bearing on the importation of agricultural and agro-industrial products originating in other countries are duly and appropriately notified to relevant authorities and institutions; and ◆ Promote, maintain and, where appropriate, improve the high quality, SPS measures and standards for agricultural and agro-industrial products marketed in Namibia.
	Agriculture export	<ul style="list-style-type: none"> ◆ Preserve the existing export markets and develop new markets to maintain a fair share of the international market for Namibian originating agricultural and agro-industrial products; ◆ Advocate for the maintenance and improvement of the provisions of regional and multilateral trade agreements that grant special and differential treatment to developing countries through adequate regulatory space; ◆ Use the regulatory space to reduce the vulnerability of local farmers, the downstream industries and the rural poor to exogenous market factors; ◆ Promote the development of the necessary legal, physical and logistical infrastructure to stimulate the marketing and enhance competitiveness of Namibian originating agricultural and agro-industrial products in the domestic agricultural and agro-industrial sectors and contribute to food security in the country; ◆ Ensure the enforcement of the MFN and National treatment of imported agricultural and agro-industrial products where applicable; ◆ Ensure that all domestic regulations that have a bearing on the importation of agricultural and agro-industrial products originating in other countries are duly and appropriately notified to relevant authorities and institutions; ◆ Promote, maintain and where appropriate improve the high quality, SPS measures and standards for agricultural and agro-industrial products marketed in Namibia; and ◆ Ensure development of the agro-industry to promote export of value added products.

Source: MAWF (2011), *Namibian Agriculture Marketing and Trade Policy and Strategy*

I-2.2.4 Green Scheme Policy

The Green Scheme has commenced since 2002 at potential river basins in the country with the aim to encourage the development of irrigation-based agriculture production in Namibia. Currently, there are 12 numbers of irrigation schemes are under operation, among which Etunda Irrigation scheme only is located in N-CLIMP target area. The outline of the Green Scheme and irrigation projects under Green Scheme are as follows:

Outline of the Green Scheme

Item	Contents
Objectives	<ul style="list-style-type: none"> ◆ To increase agriculture production and sector contribution to GDP; ◆ To promote investment in food production and agro industry; ◆ To mobilize private and public capital for investment in agriculture; ◆ To promote food security at national and household levels; ◆ To diversify agricultural production and products for the domestic and export markets; ◆ To promote research and adaptation of technology to increase productivity; ◆ To promote value addition and job creation; and ◆ To promote skills development and transfer of technology.
Implementation Strategies	<ul style="list-style-type: none"> ◆ Increasing the existing irrigated agricultural areas to full potential; ◆ Identification of potential areas for agricultural irrigation; ◆ Development of agro-projects at identified areas for irrigation; ◆ Development of storage facilities and marketing infrastructure; ◆ Mobilization of public and private capital; ◆ Capacity building to ensure productivity and competitiveness; ◆ Research and development, technology transfer and adaptation; ◆ Implementation of Good Agricultural Practices; ◆ Promotion of the efficient utilisation of agricultural land and water resources; and ◆ Diversification of agricultural crops and export promotion.
Stakeholders	<ul style="list-style-type: none"> ◆ Ministry of Agriculture, Water and Forestry (MAWF) ◆ Ministry of Lands and Resettlement (MLR) ◆ Ministry of Finance (MOF) ◆ Traditional Authorities ◆ Regional Councils ◆ Land Boards ◆ Commercial Financial Institutions ◆ Agricultural Bank ◆ State-Owned Bulk Service Suppliers ◆ Ministry of Education (MOE) and National Educational Institutions

Source: Green Scheme Policy

Irrigation Projects: Location and Area under Green Scheme (As of August 2012)

No	Project	Area (ha)	Region
1.	Orange River Irrigation Project	300 ha	//Karas Region
2.	Tantjieskoppe Irrigation Project	1,000 ha	//Karas Region
3.	Hardap Irrigation Project	130 ha	Hardap Region
4.	Etunda Irrigation Project	1,200 ha	Omusati Region
5.	Shadikongoro Irrigation Project	1,000 ha	Kavango Region
6.	Ndonga Linena Irrigation Project	800 ha	Kavango Region
7.	Mashare Irrigation Project	200 ha	Kavango Region
8.	Uhvungu Vhungu Irrigation Project	600 ha	Kavango Region
9.	Shitemo Irrigation Project	1,000 ha	Kavango Region
10.	Musese Irrigation Project	1,000 ha	Kavango Region
11.	Sikondo Irrigation Project	800 ha	Kavango Region
12.	Kalimbeza Rice Project	229 ha	Caprivi Region

Source: MAWF (2012), Food Security Situation in Namibia (document for Development Dialogue Forum)

According to MAWF, financing and budget allocation for the Green Scheme as well as staffing in financial year 2008 to 2011 are tabulated as follows:

Financing and Budget Allocation for the Green Scheme

Financial Year	Authorized Expenditure (N\$)	Actual Expenditure (N\$)	Variance (N\$)
2008-2009	187,963,000	176,309,308	11,653,692
2009-2010	325,798,500	319,621,607	6,176,893
2010-2011	364,968,000	352,491,932	12,476,068

Source: Green Scheme Programme in MAWF for the Financial Years 2009, 2010 and 2011

Staffing for the Green Scheme

Financial Year	Provision	Filled	Vacancy
2008-2009	749	599	150
2009-2010	748	597	151
2010-2011	749	599	150

Source: Green Scheme Programme in MAWF for the Financial Years 2009, 2010 and 2011

Through implementing green scheme, MAWF is currently trying to increase the areas under irrigation in phases in order to put an area of approximately 27,000 ha over a period of fifteen years countrywide.

I-2.2.5 National Rangeland Management Policy and Strategy

(1) National Rangeland Management Policy

National Rangeland Management Policy and Strategy is the document prepared by MAWF in 2012, in the long run, in order to contribute towards improving the livelihoods of people in Namibia, particularly those directly or indirectly dependent on rangeland and rangeland resources and, in the short-term, to empower rangeland managers and users to utilize their rangeland resources in such a way that animal production per ha is sustainably improved, that vulnerability of users to a highly variable resource base is decreased and that biodiversity is improved and maintained.

Essence of National Rangeland Management Policy

Achievement Target	Contents
Optimizing Sustainable Production per ha	<ul style="list-style-type: none"> ◆ Improving the nutrient cycle by (i) promoting diversity a diversity of plants with diverse root systems to allow for maximum upward movement of nutrients from as deep and wide as possible, (ii) promoting an effective way of getting excess plant material (litter) back on the soil surface as well as into the top soil, (iii) creating a healthy soil surface with active biological activity to speed up the process of putting minerals back into the soil for reuse, and (iv) improving the structure (crumbing) of the soil to prevent unnecessary leaching of minerals beyond the root zone and to improve the aeration of the soil; and ◆ Improving the water cycle by (i) promoting the creation of a good soil cover, (ii) promoting the creation of sufficient organic matter (live plants and litter) in and on the soil surface, (iii) promoting good aeration of the top soil, (iv) reducing the competition for soil moisture between undesirable bushes and preferred grasses, and (v) restoring base levels at important control points in the landscape where erosion had previously resulted in rapid loss of water from sloping rangelands after significant rainfall events.
Reduced Vulnerability of Users to a variable Resource base	<ul style="list-style-type: none"> ◆ Timely and flexible adjustment of animal numbers to available fodder source by (i) developing easy and reliable methods to determine fodder availability, (ii) promoting the use of these methods by as many as possible rangeland users and managers, (iii) considering incentives to enhance the timely adjustment of livestock on an annual basis, and (iv) promoting flexible livestock system; and ◆ Timely provision for disaster drought situations through (i) the development of a timely and proactive marketing incentive scheme during disaster droughts, making provision for tax waivers where applicable, (ii) the creation of a special drought fund, (iii) the promotion of diversification inside and outside agriculture, and (iv) the promotion of planted pastures and other forms of fodder preservation.

Achievement Target	Contents
Improvement and Maintenance of Biodiversity	<ul style="list-style-type: none"> ◆ Correct utilization of key plants (intensity of utilization); ◆ Adequate recovery of utilized plants (frequency of utilization); ◆ Reclamation of denuded rangelands; ◆ Strategic erosion control; ◆ Use of biodiversity-friendly parasite control rather than chemical control; and ◆ Managing rangelands for heterogeneity rather than homogeneity.

Source: National Rangeland Management Policy

(2) National Rangeland Management Strategy

On the basis of the National Rangeland Management Policy (NRMP), the National Rangeland Management Strategy (NRMS) is prepared as more practical action-oriented document, outline of which is as follows:

Outline of National Rangeland Management Strategy

Item	Contents
Objective	<p>Objective 1: The importance of Namibia's rangelands is raised at local, national and international levels.</p> <p>Objective 2: The understanding of the national rangeland management principles among all stakeholders is improved.</p> <p>Objective 3: Best practices and lessons learnt regarding sound rangeland management are identified, documented and widely shared.</p> <p>Objective 4: Sufficient support structures to implement the NRMS are in place and functional.</p> <p>Objective 5: The policy environment is conducive to the implementation of the NRMS.</p> <p>Objective 6: The adverse effects of bush encroachment are reversed.</p> <p>Objective 7: The implementation of the NRMS on commercial and resettled farms, in communal areas and in national protected areas is supported.</p>
Strategies to mitigate the Effects of Climate Change	<ul style="list-style-type: none"> ◆ Grazing capacity determination and monitoring through rangeland condition assessment; ◆ Soil conservation unit and application of the soil conservation act; ◆ Responsible redistribution of land; ◆ Training of land evaluators; ◆ Setting a clear understanding of what constitutes an economically viable sized farm unit ◆ Debushing; ◆ Establishing drought-resistant fodder crops; ◆ Planning for drought; and ◆ Improving the rangeland research capacity of MAWF.
Enhancing incentives for farmers to improve rangelands	<ul style="list-style-type: none"> ◆ Direct financial interventions consisting of: (i) subsidizing interest rates related to bank loans for bush thinning, (ii) subsidizing labor intensive bush clearing methods, (iii) subsidizing the purchasing of herbicides or cheaper import of active ingredients, (iv) soft loans for small-scale entrepreneurs, and (v) food/cash for work; ◆ Utilization of wood from problem bushes ◆ Property rights and political assurances; ◆ Capacity building and training programmes; ◆ Combating bush as a drought-mitigating strategy; ◆ Need for research; ◆ Maintaining information management systems; ◆ Ensuring cross-sectoral implementation capacity at national and local levels; ◆ Agro-economic value of farm lands; and ◆ Land reform and socio-economic considerations.

Source: National Rangeland Management Strategy

CHAPTER I-3 CROP AND LIVESTOCK DEVELOPMENT PROGRAMS AND PROJECTS

I-3.1 Crop Production

I-3.1.1 Dry-land Crop Production Program

Dry-land Crop Production Program (DCPP) has been implemented from the 2009/10 crop season to support the communal farmers in the Northern Communal Area with the following objectives:

- ◆ To provide subsidized farm inputs and services to farmers in the crop growing regions,
- ◆ To increase the use of improved seeds,
- ◆ To enhance knowledge on appropriate farming techniques,
- ◆ To increase dry-land crop production per unit of land through appropriate intervention measures,
- ◆ To increase household food security levels,
- ◆ To reduce Namibia's dependence on imported food,
- ◆ To support income generation through the production of marketable surplus as well as of cash crops grown in crop rotation, and
- ◆ To contribute to the reduction of poverty and income inequality through agricultural activities in communal area to provide employment opportunity and sustain livelihood.

Target groups are the rural households in the communal area of 7 Regions of Caprivi (now Zambezi), Kavango (Now Kavango East and Kavango West), Ohangwena, Oshikoto, Omusati, Oshana and Kunene. Specific attention is paid to the elderly, to single-parent and child-headed household.

DCPP provides (i) ploughing services by government tractors or private tractors, (ii) improved seeds at the subsidized prices, (iii) provision of fertilizer at the subsidized prices, and (iv) provision of weeding services employing rural youth, as shown in Table I-3.1.1.

While the Drought Animal Power Acceleration Program had been separately implemented, this is merged into the ploughing services under DCPP from 2014/15 cropping season. The DCPP components are integrating the other government schemes and programs involving the "Youth Employment Scheme" for weeding services. Fertilizers provided to farmers are mainly LAN (limestone ammonium nitrate), MAP (mono ammonium phosphate), ammonium sulphate, or urea depending on the soil property.

Since farmers are facing the challenges and constraints of low yield, poor farming practices, labor shortage, limited access to finance, etc. Particularly low yield and poor farming practices have been caused by mono-cropping, improper tillage practices such as plough pan. Therefore, farmers' demand for DCPP is increasing in order to overcome the constraints.

I-3.1.2 Integrated Initiative in Support of Urban and Peri-Urban Horticulture Development and Support to Small Scale Horticulture Production

(1) Integrated Initiative in Support of Urban and Peri-Urban Horticulture Development

In order to contribute to the livelihood of such people in and around the towns and cities as unemployed or underemployed, MAWF, through DAPEES, launched a project entitled “Integrated Initiative in Support of Urban and Peri-Urban Horticulture Development”, with the following missions and objectives:

Mission and Objective of Integrated Initiative in Support of Urban and Peri-Urban Horticulture Development

Mission	Objective
<ul style="list-style-type: none"> - To contribute to food security by improving access to fresh horticulture produce at household level all year round, and - To promote employment and income for the less endowed population in the urban and peri-urban environment. 	<ul style="list-style-type: none"> - To secure access to natural resources (land, water, climate), - To secure quality and safe horticulture produce, - To secure sustainable development of urban and peri-urban horticulture, and

Source: Prepared by the Study Team

The primary project beneficiaries are urban slum dwellers, landless, marginal farmers and disadvantaged groups. Technologies used in the project include (i) integrated production and protection management techniques, (ii) micro-garden system at the scale of 30 m² or more within the house yards, (iii) micro-irrigation techniques like low pressured drip irrigation system, (iv) cultivation of improved and adapted varieties. Advantages of urban horticulture production from the micro-garden system are (i) efficient water usage less insects and disease, (ii) requirement of little physical effort available for weak / old and young persons, and (iii) requirement of limited space within the home.

(2) Support of Small Scale Horticulture Production

Meanwhile, MAWF prepared the program for Small Scale Horticulture Production for the period from 2014/15 to 2016/17 in order to provide subsidized farm input and services to horticulture producers with the following objectives;

- ◆ To increase the use of improved seeds,
- ◆ To increase horticultural crop production per unit of land through appropriate intervention measures,
- ◆ To increase national and household food security levels,
- ◆ To reduce dependence on imported horticulture produce,
- ◆ To Support income generation through the production of marketable surpluses,
- ◆ To ensure that horticulture activities provide employment and sustainable livelihoods,
- ◆ To contribute eventually to the reduction of poverty and income inequality, and
- ◆ To avail machinery and equipment to horticultural producers.

Target groups are small scale and emerging horticultural producers using irrigation. The beneficiaries shall have access to land up to a maximum thirty (30) ha. The program consists of four components to provide (i) mechanization services through providing soft loans and subsidies, (ii) subsidized improved seeds, (iii) subsidized fertilizers, and (iv) such subsidized agro-chemicals as herbicides, pesticides and fungicides. In order to promote the small scale commercial farmers, a part of this program can be incorporated in N-CLINP.

I-3.1.3 Mahangu Marketing Plan and National Strategic Food Reserve

Before the Mahangu Marketing Plan was introduced, farmers could sell their surplus of pearl millet through only the channels to millers or local markets. MAWF had implemented the Mahangu Marketing Plan through the Namibia Agronomic Board (NAB) during the period from 2010 to 2013, in order to procure surplus of pearl millet from farmers. By this plan, farmers were able to sell their surplus to NAB through Agricultural Development Centers (ADC). NAB set the price calculated according to import prices.

At the same time, MAWF started the National Strategic Food Reserve to store the grains procured in the above plan, with the objectives to ensure national food security, to stabilize food prices in the domestic market, to stimulate food production through procurement and marketing, to encourage the national and international food safety and quality standards in food storage of grains and related crops, and to promote development of the private sector agro-dealer network.

For storing grains, grain silos were constructed with capacity of 18,900 ton in the Northern Communal Area (NCA). In 4 regions of NCD, 3 silos are located for the capacity of 4,000 ton at Omuthiya in Oshikoto Region, 3,000 ton at Tsandi in Omusati Region, and 500 ton at Okongo in Ohangwena Region. NAB originally procured the grains under the above plan, and then the procurement role of grains and operation of silos were transferred to AMTA in 2014/15.

I-3.1.4 Comprehensive Conservation Agriculture Programme for Namibia

Comprehensive Conservation Agriculture Programme for Namibia is currently implemented by MAWF from 2015 to 2019. The description of the program is as follows:

Description of Comprehensive Conservation Agriculture Programme for Namibia

Items	Contents
Program Overall Goal	Contribute to the reversal of land degradation and climate change adaptation through the adoption of CA as a basis for sustainable crop production and improved food security at national and farm level increased, efficient and sustainable management in the farming systems of Namibia.
Program Objectives	Increase crop productivity and production through the adoption of CA by at least 2,000 smallholder farmers.
Output	<ul style="list-style-type: none"> ◆ Increase awareness and knowledge of CA among stakeholders, including farmers, extension workers, researchers and policy- and decision makers. ◆ Increase farmers' and extension workers' skills of practicing CA. ◆ Conduct farmer-focused research to develop appropriate CA technologies and packages for the farming systems. ◆ Establish institutional arrangements for harmonized and coordinated implementation of the CA programme. ◆ Ensure farmers have sustained access to CA equipment, input, markets and services ◆ Develop standards, then monitor and evaluate adoption and impact of CA.

Source: Comprehensive Conservation Agriculture Programme for Namibia

I-3.1.5 Research Project CuveWaters

The research project CuveWaters was implemented from 2004 to 2015 in the Cuvelai-Etoshia Basin (CEB) as part of activities of Integrated Water Resources Management (IWRM) with the aim of strengthening the potential of the region. The outline of the project is summarized as follows:

Description of the Research Project CuveWaters

Items	Contents
Project Overall Goal	To strengthen the potential of the regions' water resources by developing and adapting innovative technologies for water supply and sanitation as pilot and demonstration plants
Applied technologies	Rain water harvesting <ul style="list-style-type: none"> ◆ Tank: 30m³, gutters and downpipes ◆ Ground catchment, underground tank 120m³, shade net covered pond 80m³, gutters, down pipes ◆ Garden (90m²) drip irrigation system ◆ Garden 750m², greenhouse (160m²), drip irrigation system
	Flood water harvesting <ul style="list-style-type: none"> ◆ Underground tank (130m³) ◆ Shade net covered pond (135m³) ◆ Corrugated iron covered pond (135m³) ◆ Garden (1,000m³) including drip irrigation ◆ Greenhouse (176m²) including drip irrigation
	Groundwater desalination <ul style="list-style-type: none"> ◆ Desalination plant using solar energy
	Salinization and water reuse <ul style="list-style-type: none"> ◆ Wastewater management with water reuse, fertilizer recovery, energy generation
Pilot sites	<ul style="list-style-type: none"> ◆ 6 sites in Omusati and Oshana region
Relevant organizations	<ul style="list-style-type: none"> ◆ Ministry of Agriculture, Water and Forestry (MAWF) ◆ Outapi Town Council (OTC) ◆ University of Namibia (UNAM) ◆ Polytechnic of Namibia (PON) ◆ Dessert Research Foundation of Namibia (DRFN) ◆ Development Aid People for People (DAPP) ◆ Africa AHEAD, South Africa ◆ One World Consultants, Kenya ◆ Federal Institute for Geosciences and Natural Resources (BGR) ◆ Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Source: Comprehensive Conservation Agriculture Programme for Namibia

I-3.1.6 Introduction of Rice Cropping System Harmonized with the Water Environment of Seasonal Wetland in Semi-Arid Region

Introduction of Rice Cropping System Harmonized with the Water Environment of Seasonal Wetland in Semi-Arid Region have been implemented by the University of Namibia with the assistance of JICA and Japan Science and Technology Agency (JST) for 2012 to 2017. The project is implemented through the Science and Technology Research Partnership for Sustainable Development (SATREPS), one of the assistance projects under the Government of Japan. The description of the project is as follows:

Descriptions of Introduction of Rice Cropping System Harmonized with the Water Environment of Seasonal Wetland in Semi-Arid Region

Items	Contents
Program Overall Goal	<ul style="list-style-type: none"> ◆ “Flood- and Drought- Adaptive Cropping Systems” are disseminated in north-central Namibia to contribute to the food security and cash income of local farmers. ◆ “Flood- and Drought- Adaptive Cropping Systems” are considered in the northeastern area of Namibia of high rainfall as well as in neighboring countries.
Program Purpose	<ul style="list-style-type: none"> ◆ “Flood- and Drought- Adaptive Cropping System” are developed which can sustainably preserve the water environment of semi-arid region.
Output	<ol style="list-style-type: none"> (1) The rice-pearl millet mixed cropping system, which is adaptable to the yearly fluctuation of flooding and drought as well as water-saving, is proposed. (2) The methods to understand the change of attitudes and perception by farmers and socio-economic impacts on farmers through introduction of the rice-pearl millet mixed cropping system are established. (3) The possible area of mixed-cropping field that does not modify the water environment of seasonal wetlands is estimated based on the water budget/water source analysis. (4) The cropping systems proposed by the project are integrated through field activities.

Source: Detailed Planning Survey Report for Introduction of Rice Cropping System Harmonized with The Water Environment of Seasonal Wetland in Semi-Arid Region in The Republic of Namibia

I-3.2 Livestock Production

I-3.2.1 Community-based Rangeland and Livestock Management Project

The Community-based Rangeland and Livestock Management (CBRLM) Project, funded by the Millennium Challenge Corporation (MCC), worked in 58 grazing areas (GA) with 1290 communal farmers to enhance the productivity and sustainability of the livestock sector in NCA through improved rangeland resource and livestock management. The Project was launched in March 2010 and ended in July 2014 and set 5 components for implementation through a series of training sessions as well as continuous on-the-ground facilitation. The summary of the Project results in each component are described below.

Summary of CBRLM Project Result

Components	Implementation	Outcomes	Challenges
Rangeland Management	<ul style="list-style-type: none"> ◆ Planned grazing and combined herding (PGCH) ◆ Adjustment of livestock numbers 	<ul style="list-style-type: none"> ◆ Improvement of water use and control ◆ Farmers understand the root causes of rangeland degradation and grapple with solutions ◆ To instill the need for a sense of ownership over an area ◆ No evidence on significant adjustment of animal numbers in relation to fodder availability 	<ul style="list-style-type: none"> ◆ Inability of farmers to enforce grazing plan ◆ Uncontrolled fire ◆ Lack of trained and dedicated herders and farm managers in the communal area ◆ Water provision
Water Infrastructure Development	<ul style="list-style-type: none"> ◆ Selection of type of water infrastructure improvement and installation 	<ul style="list-style-type: none"> ◆ In total, 70 sites received new installations or upgrades (29 in new water installation, 22 new boreholes, 1 new earth dam, 8 equipped solar or trash pump) 	<ul style="list-style-type: none"> ◆ Limited budget allocation ◆ Procurement of materials and supplies were hampered and delayed ◆ Do not meet the daily water demand due to water source limitation
Community	<ul style="list-style-type: none"> ◆ Pre-mobilisation in 	<ul style="list-style-type: none"> ◆ Although some GAs had strong 	<ul style="list-style-type: none"> ◆ Further training needs for

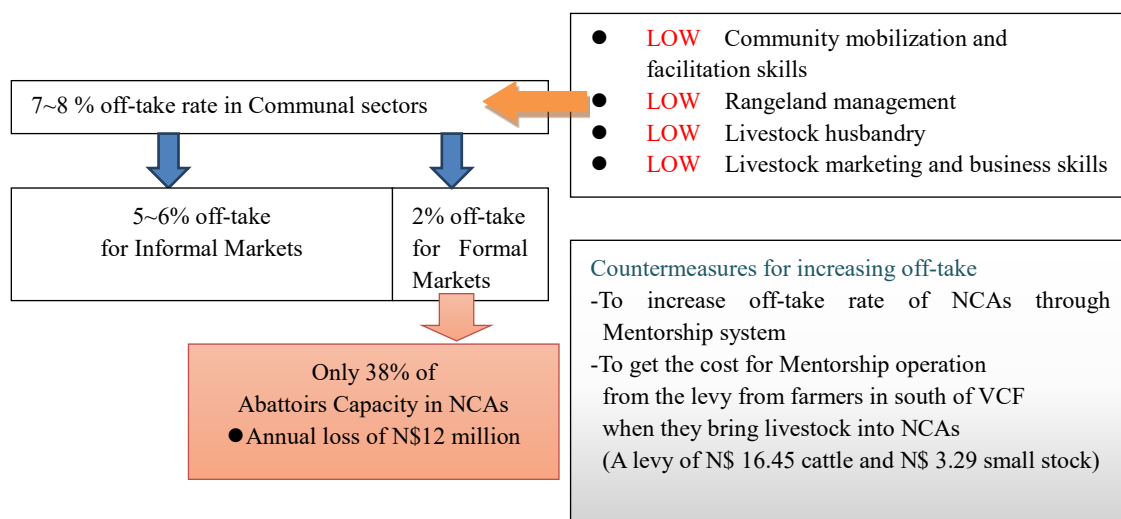
Components	Implementation	Outcomes	Challenges
Development	<ul style="list-style-type: none"> ◆ wider rangeland intervention areas ◆ GA level mobilisation ◆ Formation of GA committees 	<ul style="list-style-type: none"> ◆ and dedicated mobilisation, many of the GAs became inactive or were not able to demonstrate consistent commitment ◆ Formation of GA on average 6.9 members, in which performance and perception varied strongly 	<ul style="list-style-type: none"> ◆ committee members to know their responsibility ◆ Committee members need a clear mandate from livestock owners ◆ Empowerment of committee to enforce grazing rules
Livestock Management	<ul style="list-style-type: none"> ◆ Herd (re-)structuring, bull scheme and livestock management plan ◆ Small stock pass-on scheme (SSPOS) ◆ Livestock handling infrastructure 	<ul style="list-style-type: none"> ◆ Significant change in calving percentages by receiving bulls ◆ Revolving fund has made it possible for the project to procure more bulls ◆ SSPOS has been tried and understood in some extent ◆ The mobile infrastructure made handling of livestock extremely convenient 	<ul style="list-style-type: none"> ◆ Difficulty for some GAs to understand and implement livestock management plan ◆ Adjustment of animal numbers to fodder availability were implemented only marginally
Marketing	<ul style="list-style-type: none"> ◆ To increase the commercial livestock off-take at GAs ◆ Institutionalization of six regional Livestock Marketing Cooperatives (LMC) ◆ Capacity building for LMCs ◆ Exploration of foreign livestock markets 	<ul style="list-style-type: none"> ◆ Six LMC were established and registered, had functioning office, developed a business plan and received training on major cooperative issues. ◆ A cooperative forum consisting of the six LMC chairpersons was also established ◆ About 20.8 tonnes of chilled beef export to Zimbabwe 	<ul style="list-style-type: none"> ◆ Marketing at GA level was only sporadic ◆ Necessity of establishment of viable markets for the grade C bone in beef that abounds in the NCAs including processing to sausages, biltong, salamis and tinned meats.
Recommendation	<ul style="list-style-type: none"> ◆ Continuation of support to grazing area communities is required ◆ Legislation to enable the enforcement of grazing rules is required ◆ Necessity to invest substantially in the upgrading of water supply ◆ Future interventions should recognize and work with the mixed farming agricultural conditions ◆ The established agricultural cooperatives in the NCA need further support ◆ Further establishment of fire breaks is effective in stopping fires 		

Source: CBRLM Sub-Activity Final Report (2014)

I-3.2.2 Farmers' Mentorship Program (by the Meat Board)

Despite availability of huge natural resources and large number of livestock, marketable meat output from NCA is extremely low. Cattle off-take level in NCA is approximately 7.5% while it is estimated around 25% in commercial sector. Of the low cattle off-take in the communal sector, only 2% is marketed through the formal market outlets. It is to reverse the current subsistence level of livestock producers that the Livestock Producers Forum through Meat Board of Namibia has initiated the NCA - Farmers' Mentorship Program (NCA-FMP) in 2009.

The following figure described the background of NCA-FMP.



Source: Prepared by the Study Team

Background of Northern Communal Areas- Farmers' Mentorship Program

The outline of NCA-FMP is summarized below.

Outline of Northern Communal Areas- Farmers' Mentorship Program

Item	Contents
Program Goal	<ul style="list-style-type: none"> ◆ Long-Term Goal: Transform traditional livestock keepers in the NCAs to market or commercially-oriented livestock producers capable of producing premium quality beef for export markets. ◆ Medium Term Goal: Encourage or support selected number of livestock farmers in the NCAs to plan, produce and supply cattle for export abattoir in the NCAs.
Program Outputs	<ul style="list-style-type: none"> ◆ Increased quantity and improved quality of cattle marketed by livestock producers in the NCAs to MeatCo's export abattoirs at Oshakati and Katima Muliko; and ◆ Increased knowledge in commercially-oriented livestock production and marketing practices among communal farmers in the NCAs.
Strategies	<ul style="list-style-type: none"> ◆ Formal theoretical training of farmers on simplified and basic principles of livestock production and marketing practices; ◆ Mentoring of livestock producers on a regular basis by highly experienced professional livestock experts on the application of good livestock production practices; ◆ Practical demonstrations of basic animal health care, animal husbandry, feeding practices etc.; ◆ Plan and implement, with the assistance of mentors, good/proven livestock husbandry and management and marketing practices; and ◆ Organize exposure visits for participating farmers to commercial farms, Livestock Development Centers of research stations where livestock production activities are routinely practiced.
Criteria for Selection of Participating Farmers	<ul style="list-style-type: none"> ◆ Must possess Directorate of Veterinary Service's (DVS) stock brand and stock card. ◆ Must be a resident in the area or must be a farm manager with fully delegation of authority by the farm owner to adopt new technologies. ◆ The farm must have a minimum herd size of 20 heads of cattle, exclusive of cattle on loan or that belong to extended family relations. ◆ The farmer must have had good records of participation in community initiated activities. ◆ Keenly interested to participate in the Program and willingness to sign contract with Meatco or other abattoir to supply specified minimum number of cattle annually for the next three years from the date of signature of cattle sale contract; ◆ Participating livestock producers should have access to abundant and reliable grazing and water sources; ◆ Farmers' willingness to share knowledge and experiences in livestock management and marketing with other farmers in the community they farm in ◆ Must be hard working with entrepreneurial inclination and interest in adopting new livestock technologies; ◆ Must be financially able and willing to invest on his/her farm to achieve planned targets; ◆ Must be registered member of farmers' union/association/cooperative in the region and active in

Item	Contents
	community-initiated activities; ◆ Must have leadership skills widely acknowledged by farmers’ organizations and the community where he /she owns and manages own farm; ◆ Illiterate farmers who may have been selected to participate in the Program must designate literate member his/her family to maintain farm records and instructions given by the mentor; and ◆ Participant of Program must be willing and able to sell agreed number of cattle to Meatco or other abattoir annually.

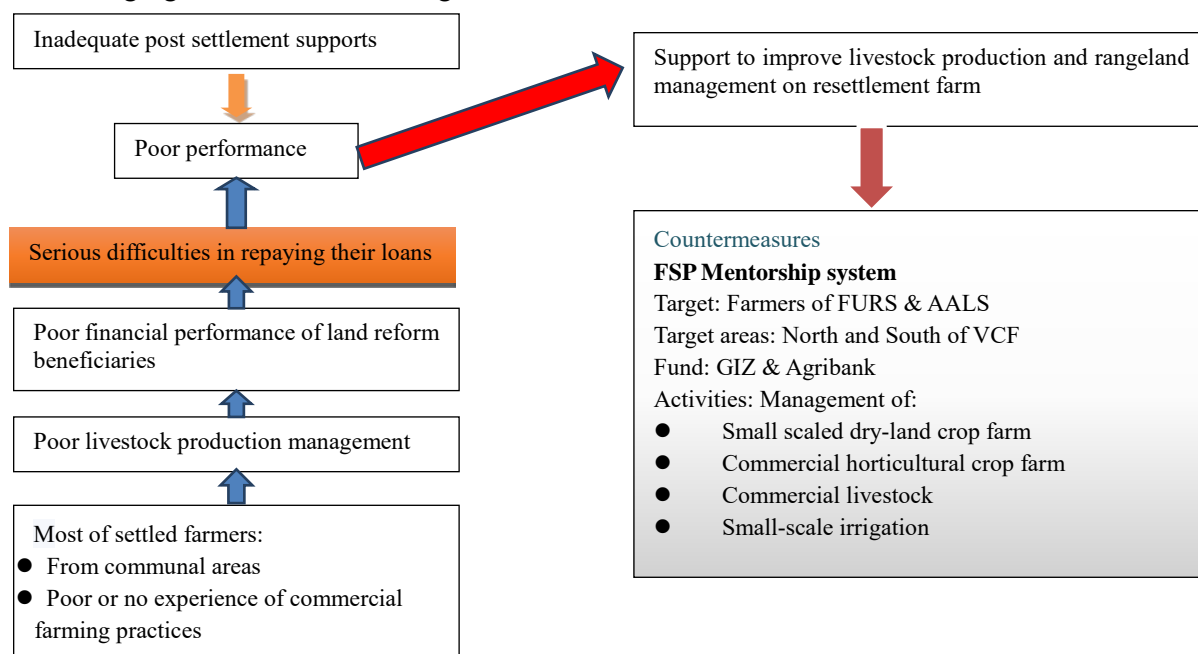
Source: Meat Board of Namibia (2009), Market-Driven Livestock Production Initiative

Through a consultative process and based on criteria collectively developed, seven Regional Steering Committees screened close to 600 candidate farmers in short-listed and 403 livestock producers who are eligible to participate in the program in 2010.

I-3.2.3 Farmers’ Support Program (Mentorship Program by the Agri-Bank)

The Farmers’ Support Project (FSP) was initially a project under GRN through the Ministry of Lands and Resettlement (MLR) with financial and technical support provided by the Government of the Federal Republic of Germany through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and co-funded by the Agricultural Bank of Namibia (Agri-bank). Since January 2010 Agri-bank took over the implementation of the FSP in partnership with the Namibia Agricultural Union (NAU), the Namibia National Farmers’ Union (NNFU) and the Namibia Emerging Commercial Farmers’ Union (NECFU). The funding from Germany had ended in June 2014 and Agri-bank own funding, which is available since November 2010, continues to funds for the expansion of project activities.

The following figure describes the background of FSP.



Source: Prepared by the Study Team

Background of Farmers’ Support Project

The outline of the FSP is as follows:

Outline of Farmers' Support Program

Item	Contents
Purposes	<ul style="list-style-type: none"> ◆ To enhance the competencies (knowledge, skills and attitude) of farmers; ◆ To support farmers to improve their farming practices; and ◆ To enhance the interface between farmers and service providers in the Agriculture Industry.
Activities	<ul style="list-style-type: none"> ◆ Mentors are contracted on a yearly basis as Consultants in all thirteen (13) regions as livestock, horticulture or dry-land production experts to provide mentoring inclusive of theory and practical through farmer information days excursions and short courses such as sustainable rangeland management, testing for venereal diseases amongst bulls and rams and testing for their fertility, determining of carrying capacity and the accompanied timely destocking or restocking, and direct marketing to abattoirs; ◆ Hosting of regional stakeholders meetings which allows for farmer groups at regional level to regularly link up with public and private sector service providers whereby farmers identify challenges they are faced with at regional and at local level and with the participation of service providers joint solutions are developed and implemented; ◆ Farmers to keep production records of their farming business with guidance and advice provided by the mentor in order to measure a change in production & reproduction (meat production/ha, crop yield/ha, kg sold to markets, etc.); and ◆ Farmers to keep financial records of their farming business with guidance and advice provided by the mentor in order to measure increased income.

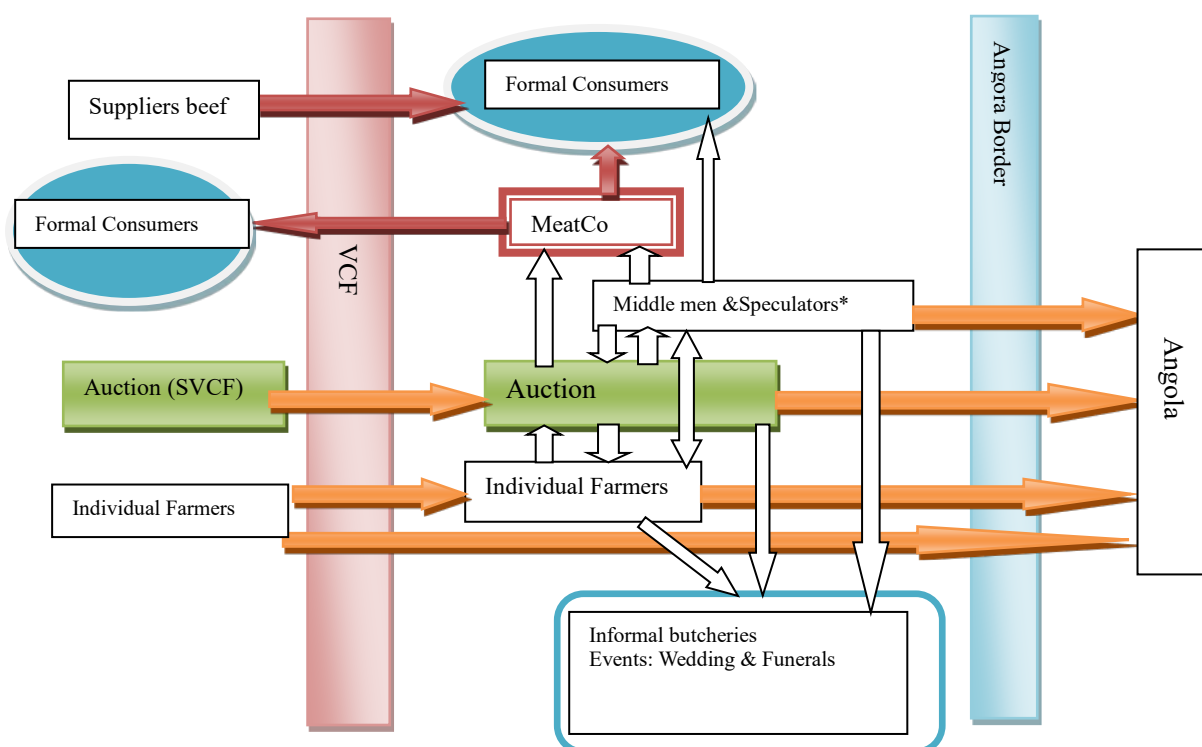
Source: <http://www.thevillager.com.na/articles/4632/FSP--Agribank-injects-N-10m--to-empower-local-farmers/>

I-3.2.4 Livestock Auction System

The livestock sector contributes 76% to the agricultural GDP. Although a large number of livestock is found in the NCAs, because of low productivity and marketability in the NCAs, only 6 % of this 76 % comes from the NCAs while the remaining 70 % is derived from the commercial areas. The reasons of low marketing rate of livestock are attributed that (i) production goals of NCA livestock tend to focus on status through the accumulation of livestock, self-consumption (weddings, funerals and other ceremonies), cultural symbolism, draft power and milk rather than commercially oriented, (ii) increased number of livestock (2.5 times higher than 1990) have led to severe rangeland degradation resulting poor quality of livestock presented for marketing, (iii) lack of functioning local livestock marketing institutions and infrastructure, and (iv) lack of diversity of livestock product marketing outlets.

The following figure describes the general image of livestock marketing in NCAs.

Livestock marketing is one of the five components of CBRLM Project. According to the initial terms of reference (ToR) of the project, this component was to develop marketing plans and increase off-take at the community level. However, just assisting the GA communities to market their cattle would not address the core problem of marketing in the NCAs, which is the lack of functioning marketing institution in the agricultural sector. Based on the observation, in the course of the project, the following two activities are incorporated; (i) institutionalization of six regional Livestock Marketing Cooperatives (LMC) in the target regions with the core business of organizing formalized auction and to receive a commission, and (ii) capacity building for LMCs in a broad spectrum of business support with final objective to not only to develop and sustain livestock marketing but also to train farmers on rangeland and livestock development activities beyond the support of development partners.



Remark*: Speculators are informal traders that move around and buy livestock according to their individual needs. They usually represent feedlots in South Africa, or have own butcheries. Some of these people don't make use of a scale and animal weights are only estimated and prices are then based on an average weight for a group of animals. Animals are bought at farm gate and no transport costs for the farmer are involved. Payment also takes place at sale and ownership changes immediately at the point of sale.

Source: Prepared by the Study Team

General Image of Livestock Marketing in NCAs

The following tables show the summary of cooperative auction activities in 2013 and average price and % sold at cooperative auction from August 2012 to March 2014.

Summary of Cooperative Auction Activities in 2013

Region Cooperative	No. of Auctions organized	No. of Cattle sold	Average No. of Cattle sold	Total Turnover (N\$)	Commissions earned (N\$)	Average Price (N\$)
Kunene	10	600	60	1,552,459.20	92,707.00	2,587.43
Oshikoto	7	333	48	1,158,206.25	62,140.41	3,478.10
Omusati	9	244	27	926,684.00	57,257.00	3,797.89
Ohangwena	4	92	23	385,320.00	21,089.00	4,188.26
Kavango	6	81	14	258,790.00	12,122.00	3,190.94
Oshana	3	32	11	112,050.00	6,723.00	3,501.56
Total	39	1382	35	4,393,509.45	252,040.41	3,179.01

Source: CBRLM Progress Report for Quarter 14, June-August 2014

Average price and % sold at cooperative auction from August 2012 to March 2014

Region Cooperative	No. of Cattle registered	No. of Cattle sold	% sold	Average Price (N\$ /head)	Av. N\$ withdrawn	Av. N\$/kg	Av. N\$/kg withdrawn
Kavango	379	230	61	3,318	1,156	9.5	9.9
Kunene	1,121	869	78	2,855	1,520	8.6	7.9
Ohangwena	164	100	61	4,359	3,605	13.7	NA
Omusati	1,275	707	55	4,999	3,172	12.5	12.4
Oshana	68	30	44	4,140	2,743	16.0	10.4
Oshikoto	662	437	66	3,979	3,243	12.7	11.1
Total	3,669	2,373	65	3,825	2,686	10.7	11.2

Source: CBRLM Sub-Activity Final Report (2014)

Cattle valued at over 9 million N\$ were sold at these auctions cover a period of 20 months. To date all cooperatives are organizing regular auctions following an auction calendar developed by the secretariat. All the set up of the cooperatives and the organization of regular auctions in the NCAs is a big achievement of the CBRLM project, especially Kunene, Oshikoto and Omusati cooperatives are doing well, while the other 3 are lagging behind and are yet far to gain a sustainable income from this business. It is still dominant of informal transactions of livestock in NCAs and the number of participant farmers in auctions is low. In remote areas in NCAs, since the difficult accessibility (e.g. in a flood period or insufficient water points from household to livestock markets on hooves,) to auction places exists, farmers tend to sale their livestock in convenient market such as open market, to speculators or individual buyers. Although the advantages of auction are, known price, known costs, competition between buyers resulted in better prices, regularly organized and money immediately available, on other hand, disadvantages are: (i) low livestock numbers results in few buyers, (ii) farmers are hesitant to commission, (iii) risk of unsold animals, and (iv) buyers can make agreements on forehand. It needs to improve accessibility for auctions during years and to attract livestock owners to sale livestock at satisfied prices.

I-3.2.5 Livestock Master Plan Implementation by the Meat Board based on the Master Plan for Increased Off Take and Marketing of Cattle and Beef from the Northern Communal Areas of Namibia

In relation to livestock subsector development in northern regions, the Study on the “Master plan for increased off take and marketing of cattle and beef from the northern communal areas of Namibia” was implemented from 2012 to 2016 for NCA (Ohangwena, Oshikoto, Kunene, Oshana, Kavango, Omusati, Caprivi and Otjozondjupa).

This master plan provides information regarding the goals, objectives, strategies, and major actions to be carried out to increase off-take and marketing of cattle and beef from the NCA, the outline of which is as follows:

Outline of Master Plan for Increased Off Take and Marketing of Cattle and Beef from The Northern Communal Areas of Namibia

Items	Contents
Goals	<p>Long term goal: The livelihoods of people in the northern communal areas of Namibia have been significantly improved through increased income from cattle sales.</p> <p>Medium term goal: Cattle farmers in the northern communal areas of Namibia are marketing high quality cattle and cattle produce at local and international markets at best (acceptable) possible prices on a continuous basis.</p>
Objectives & Strategies	<p><u>Objective 1. Inputs (soft-and hardware) are demand driven and of high quality.</u></p> <p>Strategy 1.1. Provide effective livestock oriented agricultural extension services.</p> <p>Strategy 1.2. Improve access of farmers to feeds, licks and veterinary medicines and services.</p> <p>Strategy 1.3. Improve access of farmers to superior breeding material.</p> <p>Strategy 1.4. Support farmers' associations to become more functional and involved in marketing activities.</p> <p><u>Objective 2. The effectiveness and efficiency of cattle production is increased.</u></p> <p>Strategy 2.1. Improve rangeland condition and productivity.</p> <p>Strategy 2.2. Improve herd efficiency.</p> <p>Strategy 2.3. Strengthen individual land tenure in the NCA (e.g. SSCF</p>

Items	Contents
	<p>model of MLR).</p> <p><u>Objective 3. Marketing (locally and internationally) is enhanced.</u></p> <p>Strategy 3.1. Increase capacity of Meatco abattoirs.</p> <p>Strategy 3.2. Improve efficiency and use of other existing smaller abattoirs (e.g. Katima, Rundu, Oshakati, etc.).</p> <p>Strategy 3.3. Upgrade Eenhana and Outapi abattoirs and support the processing of meat products at the Ongwediva Fresh Produce hub.</p> <p>Strategy 3.4. Assess the Meatco strategy of providing incentives for bigger carcasses.</p> <p>Strategy 3.5. Enlarge the marketing “window” of cattle.</p> <p>Strategy 3.6. Promote the supply of younger animals to abattoirs.</p> <p>Strategy 3.7. Promote big and small auctions.</p> <p>Strategy 3.8. Improve marketing infra-structure.</p> <p>Strategy 3.9. Improve management in quarantine facilities (in Caprivi).</p> <p>Strategy 3.10. Continue to develop the Commodity Based Trade approach.</p> <p><u>Objective 4. Trans-boundary disease status in NCAs enhanced and maintained.</u></p> <p>Strategy 4.1. Develop and implement animal disease management and eradication strategies focused on GMD and CBBP.</p> <p><u>Objective 5. Proper monitoring evaluation and adjustment are done.</u></p> <p>Strategy 5.1. Coordinate the implementation of the master plan through the National Livestock Marketing Consultative Forum.</p> <p>Strategy 5.2. Coordinate impact monitoring</p> <p><u>Objective 6. Policy environment for increased off-take of cattle and cattle produce is enhanced.</u></p> <p>Strategy 6.1. Review current policies and legislation regarding cattle production in the NCA.</p>

Source: Master plan for increased off take and marketing of cattle and beef from the northern communal areas of Namibia

Currently, the Meat Board commenced field-level implementation of activities based on formulated plan under the supervision by MAWF.

I-3.3 Others

I-3.3.1 Agri-Bank Loan Program

There are number of institutions providing microfinance in Namibia such as commercial banks, non-bank financial institutions, public financial corporations, savings and credit cooperatives, NGOs and the informal sector. According to a survey conducted by the Bank of Namibia in 2002, there were about 125 institutions which provide financial services to the poor in Namibia. The main clients of microfinance were defined as individuals with full time jobs, government officials and those that do not have access to commercial bank loan. The majority of these clients (61%) were located in urban area. Interest charged was on average 19 percent monthly.

The Agricultural Bank of Namibia (Agri-Bank) is a state-owned financial institution with the mandate to advance money to persons or financial intermediary for the development of agriculture and activities related to agriculture. Unlike agricultural loans of commercial banks which targets on commercial farmers with high interest rates, Agri-bank offers several loan programs for communal farmers with low interest rates. The following describes loans and interests rate of Agri-Bank Services.

Loans and Interest Rates of Agri-Bank Services

Loan		Period	Interest Rates for Farmers	
			Commercial	Communal
Short Term	Ekwatho Meatco Scheme	1-2 years	7.50%	N/A
	Production inputs / Crop production / Seasonal Loans (revolving basis)	1-2 years	7.50%	4.00%
Medium Term	Loans for the purchase of male breeding stock and tollies	5 years	7.50%	4.00%
	Loans for the purchasing of light delivery vans, veld vehicles and small trucks	5 years	8.25%	7.00%
	Loans for the purchasing of used tractors and agricultural implements	5 years	7.50%	7.00%
	Loans for the purchasing of Draught animals and implements	5 years	N/A	4.00%
	Loans for the purchasing of irrigation equipment, etc.	5 years	7.50%	4.00%
	Loans for the purchasing of breeding birds (ostrich farming), Poultry	5 years	7.50%	4.00%
	Bush encroachment: Labour	10 years	8.00%	7.00%
	Aerial spraying and other methods	10 years	8.00%	7.00%
	Infrastructure and Improvement loans	10 years	8.25%	7.00%
	Loans for the purchasing of large stock	10 years	8.25%	4.00%
	Loans for the purchasing of small stock	8 years	8.25%	4.00%
	Loans for the purchasing of new tractors and agricultural implements	10 years	8.25%	7.00%
Long Term	Loans for the purchase of Land for beginners	25 years	8.00%	N/A
	Loans for the purchase of additional land for expansion	20 years	8.00%	N/A
	Loans for the construction of dwellings and other permanent farm buildings	15 years	8.00%	N/A
	Loans for the construction of Labourers Housing	15 years	4.00%	N/A
	Loans for water provision, fencing and other improvements	15 years	8.00%	7.00%
	Loans for Taking over of debts	15 years	8.00%	N/A
	Loans for loan consolidation	10-25 years	Weighted	Weighted
	Bush encroachment: Labour	15 years	8.00%	7.00%
Aerial spraying and other methods	15 years	8.00%	7.00%	

Source: <http://www.agribank.com.na/>

There are 23 loan services, out of which 17 services can be applied by communal farmers with the interest rates of them are set 1.00-3.50% lower than those for commercial farmers. In addition, there is a service named loans for purchasing of Draught animals and implements especially for communal farmer.

Lack of collateral is known as the biggest challenge for communal farmers to access loans. Although some of institutions provide the service without request any security, because of reasons such as high interest rate or difficulty of access, it is not easy for rural farmers to use these services. Agri-bank once had offered a group application service without the need for collateral but the service has stopped because of high default rates. Recently Agri-bank is preparing new service of loan application through cooperative, which will be alternative way of group application.

I-3.3.2 Land-related Law and Act

Land in Namibia is broadly divided into two tenure categories, i. e., state land and freehold commercial land. The state land includes the communal land, protected areas like the national parks and reserves, as well as mines. Specific condition and area of each category are shown below:

Outline of Land Category

Land Category	Specific Conditions
State Land	<p>Protected Area: 107,000 km² (13% of the national land) Protected areas like the national parks, game reserves, mines are administrated under the laws by the ministries in charge. In North Central Division (NCD), the Etosha National Park (22,270 km²) extends on the southern parts of Omusati, Oshana and Oshikoto regions.</p>
	<p>Communal Land: 354,000 km² (43%) Communal land is regulated and administered by the Communal Land Boards with the support of Ministry of Land and Resettlement under the Communal Land Reform Act (ACT No. 5 of 2002). The majority of NCD is the communal land, except the Etosha National Park and the commercial land below.</p>
Freehold Commercial Land	<p>363,000 km² (44%) Freehold commercial land is regulated under the Agriculture (Commercial) Land Reform Act (Act No. 6 of 1995) In NCD, commercial farms are located in the southern part of Oshikoto region, so called as the Mangetti farms.</p>

Source: Prepared by the Study Team, based on "Who should own the land? Analysis and Views on Land Reform and the Land Question in Namibia and Southern Africa, edited by Justine Hunter, Monrad-Adenauwer-Stiftung, Namibia Institute for Democracy, February 2004.

Communal farmers are traditionally residing and conducting farming in the communal land, by obtaining verbal permission from the traditional authorities through village headman. This verbal permission is not legal title and its land title is no capital value. This has been bringing about such troubles as boundary disputes and duplicated permission, and the communal famers have the risk of losing traditional usage right. In order to avoid such disputes and troubles as well as the risk, registration system of land rights are stipulated in the Communal Land Reform Act (CLRA) (Act No. 5, 2002). Under CLRA, three kinds of land categories are described in the Act, namely, commonage, land under customary land right and land under right of leasehold. Purposes and conditions of each land category are described in the table below:

Purpose and Conditions of Land Category

Category	Commonage	Land under Customary Land Right	Land under Right of Leasehold
Purpose and Utilization	Common grazing area for livestock of the members of traditional communities	Farming unit Residential unit	Specific commercial purpose on the "designated area"
Maximum Size	-	Maximum size of 20 ha (Regulation 3)	Maximum size of 50 ha (Regulation 13), Maximum lease period of 99 years (Regulation 34)
Others	Limitation of grazing not more than 300 large stock or more than 1800 small stock at one time, No cultivation as well as no building and structure are permitted (Regulation 10)	Fencing is prohibited, unless permission is granted or existing is allowed to remain.	PTO: Permission to Occupy in the old act is phased out and converted to Right of Leasehold

Source: Prepared by the Study Team, based on Guide to the Communal Land reform Act, 2002 (No.5 of 2002) 2nd Edition, Land, Environment and Development Project, Leagal Assistance Centre and the Advocacy Unit Namibia National farmers Union, 2009

Communal farmers principally apply the customary land right for their homestead and crop field to the Communal Land Board (CLB). CLB processes the application under the support of the Ministry of Land and Resettlement (MLR). After measurement of plot and approval by CLB, certification of land right is issued to the farmer.

MLR has been taking an effort to accelerate the registration of customary land right for the communal farmers and introduced the Namibian Land Administration System as an improved means of storing digital data and aerial photographs on communal land rights in 2008. In 4 regions of NCD, about 135,000 of land right were applied, however, process to certificate has been delayed mainly due to difficult confirmation of boundaries in the field.

I-3.3.3 National Gender Policy

The First National gender Policy was adopted in 1997 in order to create a society in which women and men enjoy equal rights and access to basic services. When a review of the first gender policy was carried out, it emerged that progress in the advancement of gender equality was made in the economic, political, legal and education spheres. Despite the progress made, many challenges remain in programming for gender equality. Based on the review, Ministry of Gender Equality and Child Welfare (MGECW) designed National Gender Policy (2010-2020) in March 2010. The outline of the national gender policy in as follow:

Outline of the National Gender Policy

Item	Contents
Goal	To achieve gender equality and the empowerment of women in the socio-economic cultural and political development of Namibia
Purposes	<ul style="list-style-type: none"> ◆ To provide mechanism and guidelines for all sectors and other stakeholders for planning, implementing and monitoring gender equality strategies and programmes in order to ensure effective strategies for gender equality and women's empowerment; ◆ To create an enabling environment for the empowerment of women in order to ensure their full participation in socio-economic and decision-making processes in al sectors and at all levels; ◆ To define mechanisms and structures for institutional frameworks that can coordinate and guide implementation of gender equality programmes amongst partners and in the society, and to monitor and evaluate gender programming; ◆ While the policy aims to address gender equality, it is important to note that due to continuing inequality affecting women more than men in access to opportunities in decision-making, access to resources and unequal gender relations, the Policy will highlight women's needs in order to close the inequality gaps; and ◆ Provide guidelines for the implementation, monitoring and evaluation of regional and international instruments.
Key Programme Areas	<ul style="list-style-type: none"> ◆ Poverty and Rural Development; ◆ Education and Training, Health; ◆ Health, Reproductive Health and HIV and AIDS; ◆ Gender Based Violence; ◆ Trade and Economic Empowerment,; ◆ Governance and Decision-Making; ◆ Media, Information and Communication; ◆ Environment; ◆ Issues of the Girl-Child; ◆ Peace-Building and Conflict Resolution, and Natural Disaster-Management; ◆ Legal Affairs and Human Rights; and ◆ Gender Equality in the Family Context.

Source: MGECW (2010), National Gender Policy (2010-2020)

I-3.3.3 Support Program by Millennium Challenge Account

MCC was established in November 2002 as a US government body to implement and fund the Millennium Challenge Account (MCA) projects to support sustainable and transformative economic growth in developing countries. In September 2006, GRN presented a Compact proposal to MCC with the objective to reduce poverty through economic growth and to create an environment for

transformational development activities.

After the development of MCA Namibia Compact by MCC and MCA Namibia For implementation of projects, in July 2008 GRN signed the agreement on grant funding of US\$304.5 million for 5 years implementation of the Compact. After preparation of the Strategic Environmental Assessment completed in November 2008, the projects were finalized and implemented in September 2009, then all the projects were finally completed in September 2014.

MCA Namibia Program consists of three projects: namely, (1) Education Project, (2) Tourism Project, and (3) Agricultural Projects with the following objectives.

Objectives of Millennium Challenge Account Namibia

Project	Objectives
Education Project	To alleviate workforce quality constraints to private sector-led growth by enhancing the equity and effectiveness of basic, vocational, and tertiary education.
Tourism Project	To grow the Namibian tourism industry by improving tourism management and increasing awareness of Namibia as a tourist destination.
Agriculture Project	To improve rural livelihoods by enhancing the sustainable use of resources (the rangeland, livestock, and indigenous natural products)

Source: Prepared by the Study Team, based on "MCA-N: 3 Years In and Making Good on Its Promises, September 2012, Millennium Challenge Account Namibia.

Most of the MCA Program interventions were concentrated in NCA covering 6 administrative regions of Kunene, Oshana, Ohangwena, Omusati, Oshikoto, Kavango and Caprivi (in 2013, Kavango was split into Kavango West and Kavango East, Caprivi was renamed as Zambezi).

Agriculture Project was composed of three major activities, namely (1) Land Access and Management, (2) Livestock Support, and (3) Indigenous Natural Products, as shown in the Table I-3.3.1. Each activity consists of sub-activities and components, and those related to N-CLIMP are shown below:

- ◆ Community-Based Rangeland and Livestock Management (CBRLM), as mentioned in I-3.2.1,
- ◆ Construction of the new State Veterinary Offices at Eenhana, Outapi and Omuthya,
- ◆ Provision of tools for monitoring and management through expansion of service area of Namibian Livestock Identification and Traceability System (NamLITS) to the north of Veterinary Cordon Fence (VCF), and
- ◆ Livestock Market Efficiency Fund to conduct various studies and activities by grant basis including the Baseline Survey of Animal Nutrition in the NCA.

CHAPTER I-4 ASSISTANCE POLICY BY DEVELOPMENT PARTNERS

I-4.1 International Bank for Reconstruction and Development

The first Country Partnership Strategy was prepared for Namibia by the World Bank in 2013 aiming to move the engagement a step forward. Major focus for the assistance consisting of 2 pillars is tabulated as follows:

Country Partnership Strategy by the World Bank

Pillar	Plans	Activities	Desired Outcome
Pillar 1: Build State Capacity	Economic management	<ul style="list-style-type: none"> ◆ Ministry of Finance TA ◆ Reserve Asset Advisory ◆ Knowledge-Sharing with Parliamentarians ◆ Municipal Public Finance 	<ul style="list-style-type: none"> ◆ Building the public sector's capacity through improved organizational structures, and through the adoption and routine application of standard tools, practices, guidelines etc. that enable better management of the economy
	Environment and natural resource management	<ul style="list-style-type: none"> ◆ NACOMA (Namibian Coastal Management) project ◆ Climate change ◆ Trans-boundary cooperation 	<ul style="list-style-type: none"> ◆ Resulting in implementation of the new coastal management and other environmental policies, ◆ Expanded adoption of environmentally sensitive tourism practices, and in increased jobs and incomes from sustainable use of Namibia's environment
	Statistical capacity	<ul style="list-style-type: none"> ◆ Monitoring and evaluation TA ◆ NSA (Namibian Statistics Agency) capacity building TA ◆ Natural capital accounting ◆ Road traffic safety surveillance 	<ul style="list-style-type: none"> ◆ Increasing the frequency, quality and dissemination of official statistics and policy analysis ◆ Developing, implementing, monitoring and evaluating public policies
	Health and nutrition	<ul style="list-style-type: none"> ◆ Support implementation of the National Nutrition Strategic Plan 2011-2015 	<ul style="list-style-type: none"> ◆ Transforming the various expressions of interest into a coherent program of technical cooperation with the government ◆ Mobilization of funding to sustain relevant programs
Pillar 2: Private Sector Development	Regulatory framework to support a competitive and resilient private sector	<ul style="list-style-type: none"> ◆ Central securities depository TA ◆ Insolvency and creditors rights review ◆ FSAP (Financial sector assessment program) 	<ul style="list-style-type: none"> ◆ Introducing reforms that reduce transaction costs and increase the resilience of markets, especially financial services and capital markets, and that reduce the costs that firms face in complying with business regulations
	Support for private investments in production and infrastructure	<ul style="list-style-type: none"> ◆ Support for investments through IFC debt and equity investments in Namibian firms, MIGA credit enhancement and risk insurance products, PPP transaction support etc. 	<ul style="list-style-type: none"> ◆ Increasing private investment

Source: International Bank for Reconstruction and Development (2013), Country Partnership Strategy

I-4.2 African Development Bank

In consistent with NDP 4, the assistance policy of African Development Bank to Namibia is described in the Country Strategy Paper (CSP) especially focusing on 2 pillars: (i) infrastructure with a focus on transport, energy and water and (ii) private sector development through skills development and improving the regulatory environment as summarized below:

Assistance Strategy by African Development Bank

Pillar	Category	Major Focus	Project
Pillar I: Infrastructure with a focus on transport, energy and water	Transport	<ul style="list-style-type: none"> ◆ Support the upgrading, rehabilitation and maintenance of Namibia's road networks and the development of an efficient and sustainable urban transport system in Windhoek ◆ Support upgrading and rehabilitating Namibia's rail system in order to make rail transport competitive 	On-going <ul style="list-style-type: none"> ◆ Strategic expansion of the Walvis Bay Container Terminal Project ◆ Capacity building for Walvis Bay-Ndola-Lubumbashi Corridor Management Committee Pipeline <ul style="list-style-type: none"> ◆ Rail project ◆ Windhoek Urban Transit Project
	Energy	<ul style="list-style-type: none"> ◆ Support and contribute to ensuring the availability of uninterrupted, adequate and environmentally friendly energy 	Pipeline <ul style="list-style-type: none"> ◆ Kudu gas power project ◆ Zimbabwe-Zambia-Botswana-Namibia interconnector (ZIZABONA) ◆ Training and capacity building
	Water and sanitation	<ul style="list-style-type: none"> ◆ Contribute to increasing access to water supply for human consumption and industrial use 	Pipeline <ul style="list-style-type: none"> ◆ Water supply & sanitation project
Pillar II: Private sector development through skills development and improving the regulatory environment	-	<ul style="list-style-type: none"> ◆ Facilitation of policy and regulatory reforms ◆ Support measures geared towards enhancing the legal, regulatory and institutional framework for PPPs ◆ Support the development of skills to meet the demands of the public and private sectors by strengthening technical and vocational education and training to address the problem of skills shortages especially middle level skills 	Pipeline <ul style="list-style-type: none"> ◆ Policy-based operation ◆ Capacity building for PPP Unit ◆ Line of Credit to SME Bank (will include a training/capacity building component)

Source: African Development Bank (2014), Country Strategy Paper 2014-2018

I-4.3 Food and Agriculture Organization of the United Nations

Food and Agriculture Organization (FAO) of the United Nations (UN) assistance strategy to Namibia is elaborated in the document, FAO Country Programming Framework for Namibia 2014-2018 which is on the basis of Partnership Framework (UNPAF) 2014-2018. During 2014-2018, FAO is focusing on the following four priority areas:

Priority Areas by FAO

Area	Contents
Enabling policy, legal and institutional environment for food and nutrition security (FNS) and agricultural development:	<ul style="list-style-type: none"> ◆ Support reviewing of dated policy and legal frameworks, development of new policy and legal frameworks and preparation of policy implementation plans ◆ Provide support in monitoring the impact of agriculture policies and programs through capacity development in appraisal, monitoring and evaluation of agricultural policies and programs
Sustainable agricultural production	<ul style="list-style-type: none"> ◆ Enhancing the productive capacity of medium- and small-scale producers in the crop, horticulture, aquaculture and livestock sub-sectors

Area	Contents
	◆ Support implementing comprehensive program on conservation agriculture, strengthening the national seed production system, promoting the up-scale of small-scale horticulture production, strengthening animal breeding programs and livestock disease surveillance at local and district level etc.
Linking farmers to markets	◆ Support the increase of farmers' access to local and international markets by strengthening capacity in processing, value addition, marketing, safety standards etc.
Improved preparedness to agricultural threats and crises	◆ Strengthening government capacity in delivering regular information on potential threats through the establishment of an integrated early warning system, housed in the directorate of disaster risk management etc.

Source: FAO (2013), FAO Country Programming Framework for Namibia 2014-2018

According to the estimate by FAO, the total resource/financial requirements for the implementation of abovementioned activities is US\$3,288,000, out of which FAO is expected to provide US\$ 1,118,000 (34%) through the technical cooperation, global, regional and sub-regional projects.

I-4.4 European Union

The EU is one of Namibia's main trade partners amounting roughly 1,500 million euro (29% of total Namibian exports). Namibia's products have enjoyed duty and quota free entry into the EU market under the unilaterally awarded Market Access Regulation. When it comes to the development cooperation, it is also a crucial element of the EU's activity in Namibia. There are 3 focal pillars for the assistance:

- ◆ Basic enablers: (i) Institutional Environment, (ii) Education and Skills and (iii) Public Infrastructure
- ◆ Economic Priorities: (i) Agriculture and (ii) Tourism
- ◆ Cross Cutting Issues: (i) Capacity Enhancement, (ii) Civil Society and (iii) HIV/Aids Prevention

According to the Joint EU Response Strategy for Namibia 2014-16/17, EU and member countries' budget allocation to support of NDP4 is as follows:

Indicative Sector Allocations in Support of NDP4 in Million Euro

	EU	Germany	Finland	France	Portugal	Spain	UK	Total
Basic Enablers								
Institutional Environment		46						46.0
Education and Skills	36.0	22.6			0.9	0.8	0.2	60.5
Public Infrastructure		61.0						61.0
Economic Priorities								
Agriculture	20.0	17.0						37.0
Tourism		12.0					0.1	12.1
Cross Cutting Issue								
Capacity Enhancement	6	4.0	6.0					16.0
Civil Society	6		6.0					12.0
HIV/Aids Prevention		3						3.0
Total	68.0	165.6	12.0	0.0	0.9	0.8	0.3	247.6

Source: Joint EU Response Strategy for Namibia 2014-16/17

Under the economic priorities, N-CLIMP related item, agriculture EU focuses on is: "Linking rural primary producers to markets by supporting their sustainable productivity and adaptation to climate change, the development of rural-based value chains and the enhancement of the business environment for rural entrepreneurs.

I-4.5 German International Cooperation

Based on policy dialogue between the German and Namibian Governments, GIZ activities focus on the following priority areas:

- ◆ Management of natural resources
- ◆ Transport
- ◆ Economic development

In addition to the programmes and projects being implemented in these priority areas, GIZ are providing projects and advices in the field of basic education and health (HIV/AIDS).

Under the management of natural resources sub-sector, in relation to N-CLIMP, GIZ has been working with MAWF and MLR natural resources management in NCD of Namibia such as Support to De-bushing and Support to Land Reform aiming at improving productivity and effective utilization of land resources as follows:

Title: Support to De-bushing

Commissioned by: German Federal Ministry for Economic Cooperation and Development (BMZ)

Country: Namibia

Lead executing agency: Ministry of Agriculture, Water and Forestry (MAWF)

Overall term: 2014 to 2017

Context

Namibia is affected by bush encroachment on a massive scale. The phenomenon currently affects some 26 to 30 million hectares of farmland in eight of the country's 13 regions. That amounts to roughly 30 per cent of Namibia's land area. Bush encroachment severely reduces biodiversity and the formation of groundwater. It lowers the productivity and livestock capacity of pasture land by up to two thirds. This in turn causes economic losses of over EUR 100 million every year due to reduced meat production.

Meanwhile, the bush encroachment process has developed into a huge biomass resource, estimated at about 200 million tonnes. Measures to repel bush encroachment, known in Namibia as 'de-bushing', are creating new opportunities for the Namibian economy through the use of this resource for electricity generation and value chain development in other sectors. The de-bushing process therefore offers the potential to increase agricultural productivity, economic growth, employment and the energy supply, without competing with food production.

Objective

Namibia has established a national de-bushing programme which supports the large-scale expansion of effective activities to fight bush encroachment. The programme is supported by public- and private-sector stakeholders.

Approach

In order to use the bush biomass in economically viable and environmentally sustainable ways, it is important to identify and develop opportunities for adding value to the biomass. Programme activities will focus on support measures, and on efforts to create an enabling environment. Key approaches at the programme level include:

- ◆ developing strategies for the profitable use of biomass for electricity generation as well as in agricultural and industrial value chains
- ◆ enhancing know-how and institutional capacities for the successful development of the national de-bushing programme
- ◆ improving the legal and institutional framework for large-scale bush clearance programmes.

The scale of bush encroachment in Namibia calls for extensive and expandable exploitation strategies. There is extensive, diverse demand for biomass on both domestic and international markets, with interest shown by, among others:

- ◆ the agricultural sector, which can use biomass as feed for cattle or wild animals, or as fertiliser for crop production
- ◆ the construction industry, where biomass is used to produce sustainable building materials, such as chipboard or wood panels
- ◆ the energy sector, whose especially large demand is sufficient to trigger large scale bush clearance programmes. Bush material can be used to substitute firewood in private households, and fossil fuels such as coal or oil in industrial boilers and power plants.

Source: <http://www.giz.de/en/worldwide/28648.html>

I-4.6 Government of Japan

Basic policy of the assistance by the Government of Japan toward Namibia is “Realizing of Sustainable Development and Correction of Economic Disparity.” On this basis, there are 2 priority areas: (i) livelihood creation improvement of basic human needs and (ii) economic infrastructure development. Under these priority areas, cooperation programme and project name are summarized as follows:

Development Assistance Plan by the Government of Japan

Priority Area 1	Contribution to Improvement of Living Standard and Reduction of Poverty in Rural Area		
Development Assignments:	Cooperation Programme	Summary	Project Name
Livelihood Creation Improvement of Basic Human Needs	Rural promotion programme	The Government of Japan aims to implement assistance for acquisition of livelihood for poor populations including women and improvement of living standard through the introduction of The One Region One Initiative in Namibia which the Ministry of Rural Government is proceeding with.	Training for Rural Promotion Sector in Japan ("One Region One Initiative", "Tourism Development" and etc.)
			Capacity Building for Rural Development Practitioners
			Adviser of One Region One Initiative Promotion
			JOCV in Rural Promotion Sector (Infrastructure, Engineering and Architecture in Poverty Area)
	Agricultural development program to adaptive climate change	Assistance of establishment of sustainable agriculture which can adjust unstable precipitation by climate change in the poverty areas of northern part of Namibia.	Flood-and Drought-Adaptive Cropping systems to Conserve Water Environments in semi-arid regions
			Northern Crop and Livestock Development Master Plan Study
			SHEP (Smallholder Horticulture Empowerment and Promotion)
			Training in agriculture development sector to adaptive climate change ("Agribusiness", "Improvement of a species" and etc.) in Japan
			JOCV in agriculture development sector to adaptive climate change (Rice culture)
	Regional common priority program(Health and education)	The Government of Japan aims to implement assistance for improvement of the life of poor population including women and of the living standard such as education and health, and supports to solve problems by using knowledge and resources in the southern African region on the basis of South-South Cooperation	Strengthening monitoring evaluation and capacity building of HIV/AIDS response program
			Training in health/education sector in Japan
			JOCV in health/education sector
Improvement of living standard (Grass-roots Grant program)			
Priority Area 2	Economic and Industrial Infrastructure Development		
Development Assignments:	Cooperation Programme	Summary	Project Name
Economy Infrastructure Development	Wide area infrastructure development	Implementation of capacity building for staple, large area infrastructure improvement, one stop border post and development of budget	The project for the establishment of the OSBP between Botswana and Namibian at Mamuno/Trans Kalahari Border Post
			The project on the capacity development of public budget management

		process adjustment in order to contribute to the economic growth of Namibia and the southern African region through the regional economic integration.	Project on Master Plan for Development of an International Logistics Hub for SADC Countries in the Republic of Namibia Training in infrastructure development sector in Japan
	Others (Industrial development sector)	To contribute to diversification of industries and human resource rising including through improvement of various systems and measures MTI has for fostering SMEs.	ABE Initiative (African Business Education Initiative for Youth) Training in industrial development sector (SME promotion, water for industry, recycle for waste water, fisheries and etc) JOCV in industrial development sector (Dressing, Aquaculture, Electricity device and etc.)

Source: Government of Japan (2014), *Development Assistance Plan in the Republic of Namibia by the Government of Japan*

CHAPTER I-5 ORGANIZATIONS RELEVANT TO CROP AND LIVESTOCK DEVELOPMENT

I-5.1 Ministry of Agriculture, Water and Forestry

I-5.1.1 Central Level

MAWF was originally established as Ministry of Agriculture, Water and Rural Development (MAWRD) after the independence in 1990. In 2004, MAWRD was reorganized to MAWF, by merging the Directorate of Forest from the Ministry of Environment of Tourism (MET) as well as transferring the Directorate of Rural Development to the Ministry of Regional and Local Government, Housing and Rural Development Coordination (MRLGHRDC).

MAWF is the main government body to support the agriculture sector through implementation of the policies and programs, with the mission to realize the potential of the agricultural, water resource and forestry sectors towards the promotion of an efficient and sustainable socio-economic development. In order to implement the policies and programs, MAWF has eight Directorates under the three Departments.

Departments and Directorates under MAWF

Department	Directorate
Department of Agricultural Development	<ul style="list-style-type: none"> - Directorate of Agricultural Production, Extension and Engineering Services (DAPEES) - Directorate of Agricultural Research & Development (DARD) - Directorate of Veterinary Services (DVS)
Department of Water Affairs & Forestry	<ul style="list-style-type: none"> - Directorate of Rural Water Supply & Sanitation Coordination (DRWSSC) - Directorate of Water Resources Management (DWRM) - Directorate of Forestry (DF)
Department of Planning, Marketing & Administration	<ul style="list-style-type: none"> - Directorate of General Services (DGS) - Directorate of Planning & Business Development (DPBD)

Source: Prepared by the Study Team

Each Directorate consists of Divisions Sub-divisions, Sections and Sub-Sections. DAPEES as well as DARD and DVS are the counterpart agency of N-CLIMP, and their organization are illustrated in Figures I-5.1.1.

I-5.1.2 Regional Level

Each Directorate has wings and arms to extend their services in the local level. Under DAPEES, agricultural extension activities cover the whole country through four Divisions, namely North- Eastern Division, Central North-Western Division, North-Central Division, and South-Eastern Division. Under Divisional Office, Regional Offices of DAPEES is established in each region, as shown below;

Regions under DAPEES

Divisional Office	Regional Office
North-Central Division: NCD (Oshakati / Ondangwa)	4 Regions of Ohangwena (Eenhana), Omusati (Outapi), Oshana (Oshakati / Ongwediva) and Oshikoto (Onankali)
Central North-Western Division: CNWD (Windhoek)	3 Regions of Khomas, Erongo and Kunene
North-Eastern Division: NED (Rundu)	4 Regions of Otjozondjupa, Kavango West (new), Kavango East and

Divisional Office	Regional Office
	Zambesi
Southern-Eastern Division: SED (Mariental)	3 Regions of Karas, Hardap and Omaheke

Source: Prepared by the Study Team, based on the information obtained from MAWF, September 2014 to April 2015.

Under the DAPEES Regional Office, Agriculture Development Centers (ADC) are located at the Constituency level. In the N-CLIMP target area, 49 ADCs are established in 4 regions.

Under DVS, the country is divided into two areas of the north and south areas, and Divisions of Animal Disease Control are placed in each area. Divisions are sub-divided into four Sub-divisions of Animal Disease Control (SADC) in each area of the North West, North East, Central and South areas. In total 27 State Veterinary Offices have been established under SADC offices. In the N-CLIMP target area of 4 regions, 7 State Veterinary Offices are working under SADC North West located at Oshakati (Ongwediva), as shown below:

Regions under DVS

Division	Sub-Division	Section (State Veterinary Office)
Animal Disease Control North (Tsumeb)	Sub-division Animal Disease Control: SADC North West (Oshakati)	9 State Veterinary Offices: Ondangwa (Oshana), Oshakati (Oshana), Eenhana (Ohangwena), Okongo (Ohangwena, new), Omuthya (Oshikoto), Outapi (Omusati), Okahao (Omusati), Opuwo (Kunene), Okanguati (Kunene)
	SADC North East (Grootfontein)	5 State Veterinary Offices: Otavi (Otjozondjupa), Grootfontein (Otjozondjupa), Rundu (Kavango East), Nkurenkuru (Kavango West), Katima Mulio (Zambesi)
Animal Disease Control South (Windhoek)	SADC Central (Windhoek)	7 State Veterinary Offices: Okahanja (Otjozondjupa), Otjiwarongo (Otjozondjupa), Okakarara (Otjozondjupa), Omaruru (Erongo), Walvis Bay (Erongo), Outjo (Kunene), Kamanjab (Kunene)
	SADC South (Mariental)	6 State Veterinary Offices: Keetmanshoop (Karas), Karasburg (new, Karas), Mariental (Hardap), Gobabis (Omaheke), Epukiro (Omaheke) Otjinene (Omaheke)

Source: Prepared by the Study Team

Under DARD, Crop Research Sub-division is located at Ongwediva in Oshakati and coordination the crop research in five stations in the northern Namibia, of which three stations are located in NCD, namely Okashana, Mannheim and Omahenene. For livestock, Oshaamboero Livestock Development Center (LDC) and Okapya LDC are located in NCD under Large Stock Research Sub-division.

I-5.1.3 Budget and Staffing

The estimated budget of MAWF for 2016/17 is N\$2,301 million, corresponding to 4.0% of the national budget of N\$57,200 million. The budget consists of the operational and development budget, and the operational budget is N\$1,112 million (48% of total budget) and the development budget is N\$1,189 million (42%) as summarized below:

Estimated Budget of MAWF in 2016/17

(unit: N\$'000,000)

	DGS	DVS	DARD	DAPEES	DPBD	DWRM	DRWSSC	DF	Total
Operational	255	175	67	212	102	43	165	93	1,112
Development	62	140	36	416	0	21	384	130	1,189
Total	317	315	103	628	102	64	535	223	2,301

Source: Prepared by the Study Team, based on the Estimates of Revenue, Income and Expenditure, 01 April 2016 to 31 March 2019, Ministry of Finance.

The largest expenditure is allocated to DAPEES, particularly N\$628 million for the total budget. Operational expenditure is mainly allocated to agricultural extension and development expenditure is to agricultural engineering. The 2nd largest expenditure is allocated to DWRSSC, composed of N\$165 million for operational and N\$384 million for development expenditure, probably to develop and maintain the water supply facilities.

The main portion of the operational expenditure seems to be personnel cost and other costs associated with personnel. In the table below, staff number of MAWF by each directorate are shown as well as the total government staff.

Staff Number of MAWF by Directorate

(unit: persons)

Staffing Status	DGS	DVS	DARD	DAPEES	DPBD	DWRM	DRWSSC	DF	Total	Gov't
Established	373	765	376	1096	36	125	949	590	4,310	139,204
Filled at present	315 84%	733 96%	338 90%	631 58%	28 78%	105 84%	830 87%	498 84%	3,478 81%	100,719 72%
Funded in Budget 2016/17	373 100%	765 100%	376 100%	744 68%	36 100%	125 100%	945 100%	590 100%	3,954 92%	116,510 84%

Source: Prepared by the Study Team, based on the Estimates of Revenue, Income and Expenditure, 01 April 2016 to 31 March 2019, Ministry of Finance.

Total number of staffing filled at present in MAWD is 3,478 persons or 81% against the total staffing established of 4,310. This proportion of 81% is higher than the national average of 72% (100,719 of staffing filled against the staffing established of 139,204). If the staff is recruited according to the budget, 92% of establishment will be filled at the end of the fiscal year 2016/17.

In July 2014, new organization of MAWF was approved to increase staffs as well as the facilities such as ADCs. It will take several years to construct new facilities and fill the staffing established under the new organization. In this regards, a short term plans will be formulated based on the present staff, however, a long term plans will be designed according to the new organization.

I-5.2 Agriculture Extension System

I-5.2.1 Current Extension System

The bulk of agriculture extension services are managed by the public sector, represented by the government through MAWF in Namibia. The primary goal of Namibia agricultural extension services is to help farmers develop and adopt improved farming technologies and practices organize themselves in cooperatives as well as have access to information (i.e. markets and policies) and infrastructure. In 1997, the Farming System Research and Extension (FSR/E) was officially adopted as a development strategy.

FSR/E is a multi-disciplinary, participatory methodology for technology development that merges research and extension efforts. FSR/E I a means of integrating farmers with researchers and extensionists in a systematic procedure for identifying and solving problems associated with attempts to achieve diversified and sustainable agricultural development. FSR/E field teams identify problems and constraints of farmers and farmers participate in a search for and testing of options. Because of continued farmer participation, and because research and extension activities are combined rather than separated, communication problems are reduced and the lag from problem identification to technology adoption is

minimized.

I-5.2.2 Relation among Research, Extension and Farmers

As mentioned above, FSR/E is the official strategic approach for agricultural extension and DAPEES is in charge for providing agricultural extension services to farmers, agro-based industries and other stakeholders in the form of information communication, advisory and training services. DAPEES dispatch total of 62 ATs in 4 Regions. One to three ATs are dispatched in each ADC.

DAPEES headquarter give technical trainings to ATs in their ADC upon requests from regional chief technician. ATs give training to leader farmers of farmers groups, and the leaders give training to their member farmers. This is the flow of extension to distribute techniques as much number of farmers as possible.

Through the interviews and discussions with ATs, many of them mentioned that they have too much workload for administration works and they don't have enough time to visit farmer fields regularly. Lack of transportation, breakdown of computers, and limited internet connectivity are the other constraints for extension activities, according to them.

There are 3 crop research centers and 2 LDCs in the project target regions as described above. Researchers in the centers belong to DARD and they mentioned that linkage between ATs and researchers are very limited, the annual meeting and information day (field day) is the almost only occasion to meet each others. Insufficient number of staffs and lack of budget make them difficult to visit farmer fields to collaborate directly with farmers.

The insufficient collaboration between researchers, extension officers and farmers are also pointed out by Dr. Kumba, a researcher of UNAM. He pointed out that impression on participation of farmers in agricultural programs is quite different between agricultural professionals (extension works and researchers) and farmers. Agricultural professional think farmers participation is high enough, but farmers are dissatisfied of the performance of other agricultural professionals (Farmer participation in agricultural research and extension service in Namibia, in *Journal of International Agricultural and Extension Education*, in 2003).

International Food Policy Research Institute (IFPRI) has also pointed out two challenges for agricultural extension in Namibia. One is that the government of Namibia attempted to implement a policy of decentralization aiming at bringing services closer to the farmers but it has encountered a series of difficulties since in many remote areas extension offices are the only government offices the people can go to. Many farmers live and farm far away from the ADC making it difficult to be reached by extension agents or for farmers themselves to travel to the ADC for assistance with agricultural advice and services. Another challenge is that research and extension activities are under two separate directorates, DAPEES and DARD, which making the research-extension linkage less evident and coordination of programs more difficult (*Extension and Advisory Services in Namibia*, by IFPRI).

As a conclusion, linkage between researchers, extension workers and farmers has many challenges to be improved. N-CLIMP can support for the linkage between them thorough the implementation of pilot project by inviting not only extension workers but also agricultural researchers to the farmer fields for implementation and monitoring.

PART II

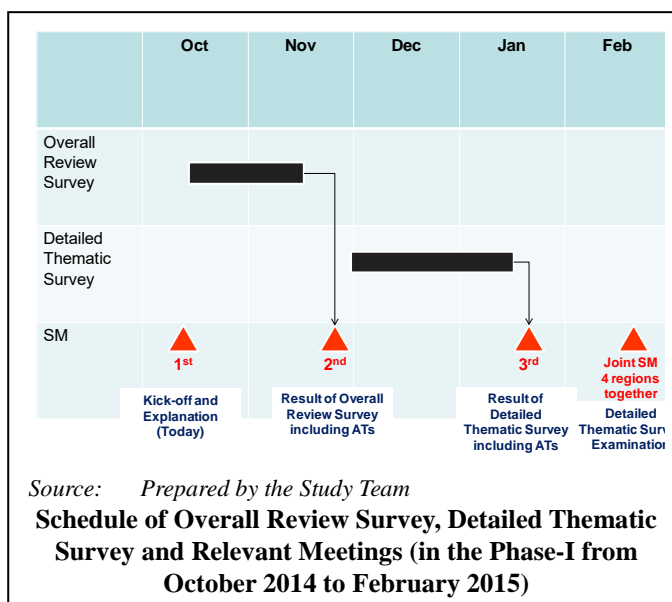
MASTER PLAN

CHAPTER II-1 COMPREHENSIVE INFORMATION GATHERING AND ANALYSIS RESULT

II-1.1 General

As a part of SHEP approach, the situation analysis survey was carried out in collaboration with ATs attached to ADCs in target 4 regions, the work schedule of which is illustrated in the right figure.

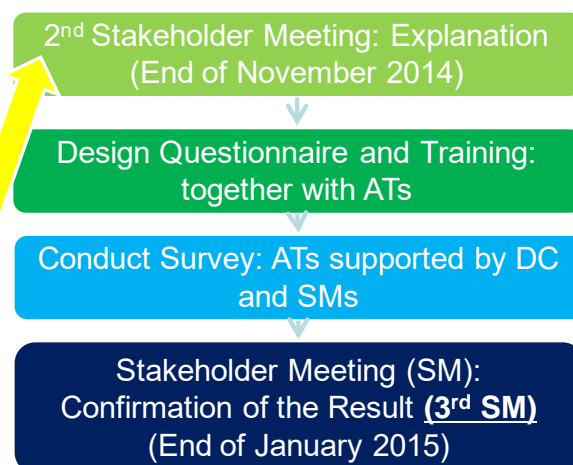
The purpose of the survey is: (i) to collect agriculture and livestock-related information on each ADC coverage, (ii) to enable ATs to confirm and recognize potential, constraints and challenges for crop and livestock production and (iii) to share awareness amongst ATs in their ADC areas in preparation of the development plan. This chapter hereunder describes the result of overall review survey and detailed thematic survey.



Overall Review Survey: Macro Level



Detailed Thematic Survey: Micro Level (select 3 typical model farmers from each ADC)



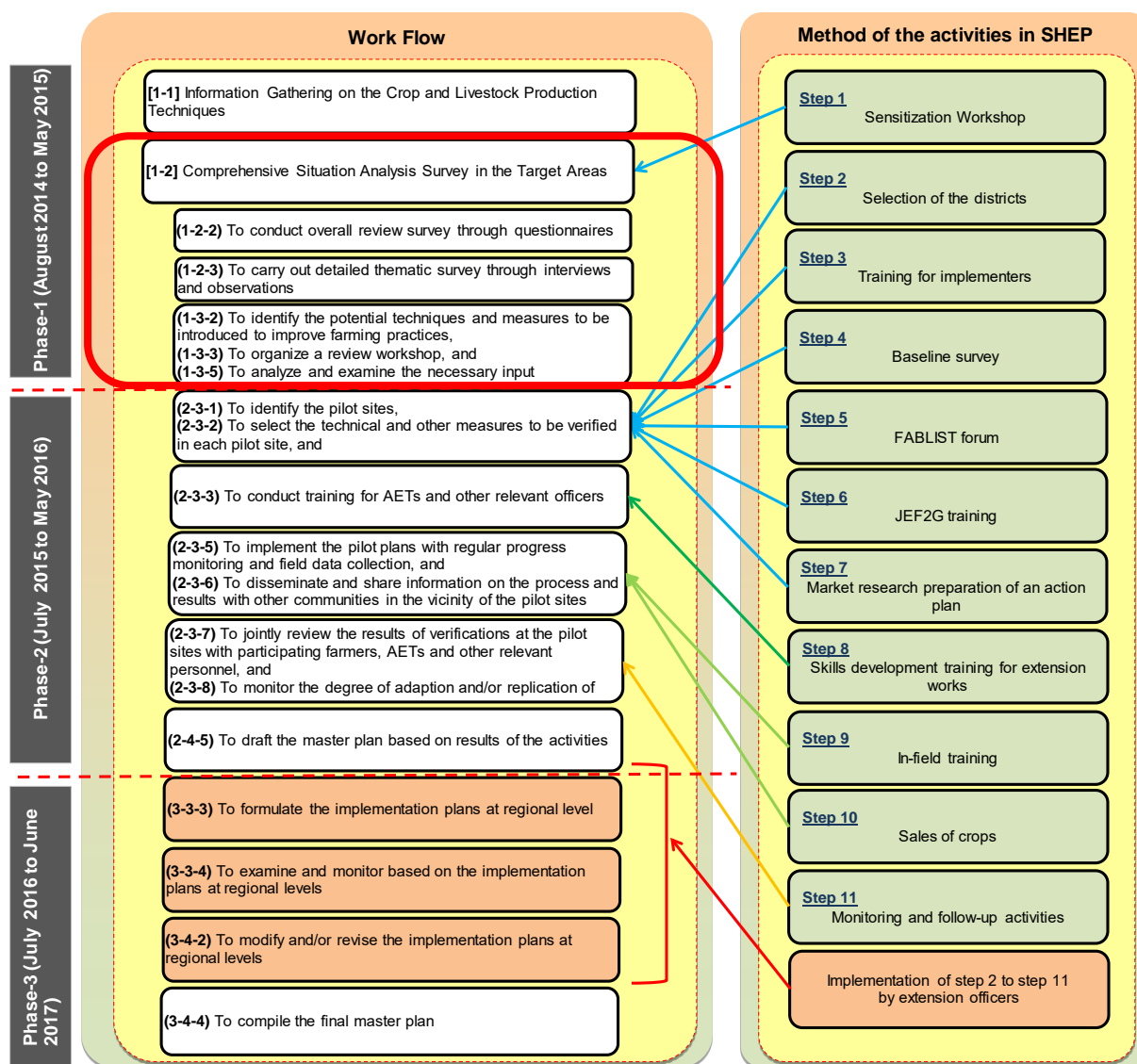
Source: Prepared by the Study Team

General Flow of Comprehensive Information Gathering and Analysis

The survey consists of 2 steps: (i) step-1, Overall Review Survey and (ii) step-2, Detailed Thematic Survey.

- ◆ Step-1 Overall Review Survey: macro-level survey at each ADC coverage by collecting and compiling crop and livestock production-related statistical data at each ADC
- ◆ Step-2 Detailed Thematic Survey: micro-level survey by selecting and interviewing typical model farmers in each ADC area (crop production-based farmers, livestock production-based farmers and horticulture farmers)

After the survey, ATs made presentation of findings and shared awareness among N-CLIMP members in the Stakeholder Meetings.



Source: Prepared by the Study Team

Overall Implementation and Management and Comprehensive Information Gathering by SHEP Approach

N-CLIMP has been carried out entirely based on SHEP approach. Comprehensive information gathering and analysis through the situation analysis survey corresponds to the Step-1 of SHEP approach!

II-1.2 Overall Review Survey

II-1.2.1 Methodology

A comprehensive questionnaire was designed among ATs in each of the ADCs in the target regions and N-CLIMP Team. The questionnaire consisted of 8 sections:

- ◆ **Section A:** general information on location of the ADC, staff profiles and access to farming related equipment;
- ◆ **Section B:** focused on the natural environment and climatic conditions in the ADC area regarding rainfall, temperature, occurrence of natural disasters and mitigation measures taken by farmers;
- ◆ **Section C:** focused on crop production topics like different crops and varieties planted, areas under cultivation, inputs technologies used by farmers and crop production techniques implemented;
- ◆ **Section D:** covered information on livestock production including livestock species and livestock numbers, feeding regimes for livestock and production techniques used;
- ◆ **Section E:** focused on crop and livestock marketing providing information on market locations and marketing methods used;
- ◆ **Section F:** explored group activities in the ADC area;
- ◆ **Section G:** covered agricultural support services, including extension services, provided to farmers; and
- ◆ **Section H:** asked about major constraints experienced and future plans of staff in each ADC. (See Annexure A for detailed questionnaire).

Table below presents an overview of the ADCs that responded to the questionnaire per region and constituency.

ADCs that Responded to the Questionnaire per Region and Constituency

Region	Constituency	Name of ADC
Ohangwena	Epembe	Epembe
	Endola	Endola
	Omundaungilo	Omundaungilo
	Omulonga	Ongulayanetanga
	Ongenga	Ongenga
Oshikoto	Onyaanya	Onankali
	Onayena	Onayena
	Okankolo	Onyuulaye
	Oiiipa	Oshigambo
	Omuntele	Omuntele
	Omuthiya	Okashana
	Olunkonda	Olunkonda
	Eengodi	Onamishu
Oshana	Okatana - Emono	Uukwangula
	Oshakati West	Okakuaukamsheshe
	Uuvudhiya	Engombe
	Ompundja	Enguwantale
	Ongwediva	Ongwediva
	Okaku	Okaku
	Okatyali	Okatyali
	Ondangwa	Ondangwa
Omusati	Outapi	Outapi
	Okahao	Okahao
	Tsandi	Tsandi
	Onesi	Onesi

Region	Constituency	Name of ADC
		Eunda
	Oshikuku	Oshikuku
	Elim	Onaanda
	Okalongo	Okalongo
	Ruacana	Oshifo

Source: Prepared by the Study Team

II-1.2.2 General Information

Table below presents the number of staff recorded per region by the responding ADC's.

Technical and Other Staff per Region

Staff category	Total	Ohangwena	Oshikoto	Oshana	Omusati
Agricultural Technician	41	11	8	8	14
Others					
Labourer	31	4	4	12	11
Water Supply	1	1	0	0	0
Crops & Livestock Specialist	3	1	1	0	1
Implement Operator Driver	1	0	1	0	0
Administration Officer	5	0	1	2	2
Cleaner	1	0	0	0	1
General	1	0	0	0	1
Technician	1	0	0	0	1
Clerk Assistant	1	0	0	0	1
Assistant Administrative Officer	1	1	0	0	0
Livestock & Business Management	1	1	0	0	0
Total	88	19	15	22	32

Source: Prepared by the Study Team based on Collected Data from ATs

From the above table, it is evident that 46.5% of the personnel at ADCs are Agricultural Technicians. In three of the four regions (Oshana excluded) at least 1 crop and livestock specialist is available for professional inputs and back-up to ATs. It should be noted that the table above only reflects data from the 61.2% of ADCs responding. Table below reflects the number of farmers serviced by the responding ADCs in each of the regions, and the resulting farmer to AT ratio per region.

Number of Farmers and Farmer: AT Ratio per Region¹

Farmer category	Total	Ohangwena	Oshikoto	Oshana	Omusati
Total farmers	136 410	17 467	53 781	2 897	62 265
- Commercial farmers	0	0	0	0	0
- Subsistence farmers	136 410	17 467	53 781	2 897	62 265
Farmer: AT ratio	3 327	1 588	6 723	362	4 448

Source: Prepared by the Study Team based on Collected Data from ATs

These numbers do not represent the final figures, since not all ADCs responded to the questionnaires. The number of farmers in Oshana and Ohangwena regions is believed to be far below the real figure. On average there is 1 AT available for 3,327 farmers in all four regions. It varies however significantly between regions with 1 AT for 6,723 farmers in Oshikoto region and only 362 farmers for 1 AT in Oshana region. Although there are no commercial farmers registered, it can be expected that there are many commercially oriented farmers that produce more than what they consume at home. The possible reason for not mentioning any commercial farmers is that all farmers reported farming in the communal areas. It may be necessary to define commercial farming more clearly.

Table below provides a summary of the access of staff to different general equipment and services per region.

¹ It is expected that the number of farmers for Oshana and Ohangwena regions is too low

Access to General Equipment and Services per Region (Average Number per ADC)

Equipment type	Total	Ohangwena	Oshikoto	Oshana	Omusati
Personal Computer	34 (1.13)	7 (1.40)	11 (1.38)	5 (0.63)	11 (1.22)
Vehicles	22 (0.73)	3 (0.60)	5 (0.63)	8 (1.00)	6 (0.67)
Tractors	26 (0.87)	5 (1.00)	7 (0.88)	6 (0.75)	8 (0.89)
Internet Connection	16 (0.53)	4 (0.80)	4 (0.50)	5 (0.63)	3 (0.33)

Source: Prepared by the Study Team based on Collected Data from ATs

The above table reflects the number of various equipment types per region recorded as being available as well as the ratio of a specific equipment type per ADC in that region. Overall for all regions there are 1.13 PCs, 0.73 vehicles, 0.87 tractors and 0.53 internet connections available per ADC. Significant differences however occur between regions. In terms of access to PCs Oshana region seems to be the worst off, while in all regions (except Oshana) there is less than one vehicle per ADC available. In Ohangwena region there is 1 tractor available per ADC, whilst in all other regions there is less than one tractor available per ADC. Overall for all regions only about one half of all ADCs have access to internet connections.

Table below reflects access to specific crop and livestock tools per region.

Access to Crop and Livestock Specific Tools per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Ripper Plough	4	2	1	1	0
Hand Hoe	22	8	14	0	0
Cultivator	50	4	34	0	12
Planter	9	3	3	2	1
Hallow Disc	5	4	0	1	0
GPS	6	1	1	0	4
Scale Crops (30 Kg)	1	1	0	0	0
Walking Tractor	2	2	0	0	0
Livestock tool kit	2	0	2	0	0
Animal Health Kit	2	0	0	0	2

Source: Prepared by the Study Team based on Collected Data from ATs

Access to specific crop and livestock tools is not only inadequate, but highly skewed between different regions. Of the 50 cultivators available in all regions combined, 34 of them are reported to be in Oshikoto region while nothing is available in the Oshana region. In total there are only 2 walking tractors available for all regions, with both in Ohangwena region.

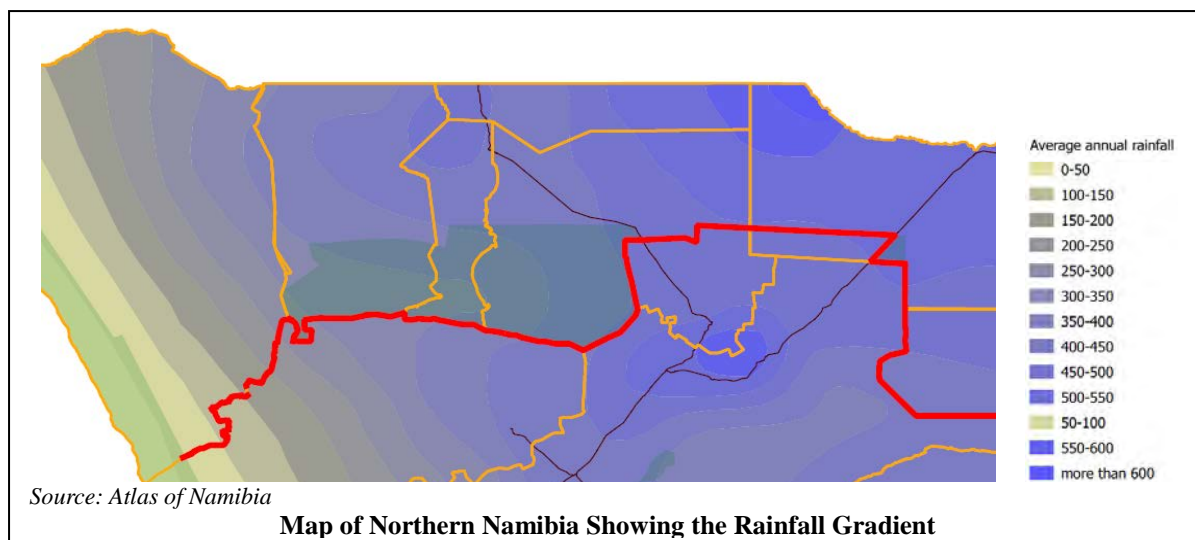
The number of ATs per region is inadequate for the number of farmers to be reached, except in the Oshana region. The ratio of technical versus support staff seems to be appropriate. Too few professional scientific staff exists to provide backstopping and support to ATs.

Access to PCs per ADC seems to be adequate, except in the Oshana region. Only in Oshana region at least 1 vehicle is available per ADC, which is likely to be seriously hampering the activities of the ATs in the other regions. Internet connections are only available in half of the ADCs, which is totally inadequate. The number of tractors available per ADC is totally inadequate.

II-1.2.3 Natural Environment and Climatic Conditions

(1) Rainfall

Rainfall is a meaningful climatic parameter in agriculture, and good rainfall record series and trends can assist with planning and advising farmers. As an overview of rainfall in Namibia, figure below provides the map of northern Namibia including the four target regions, with the average rainfall gradient.

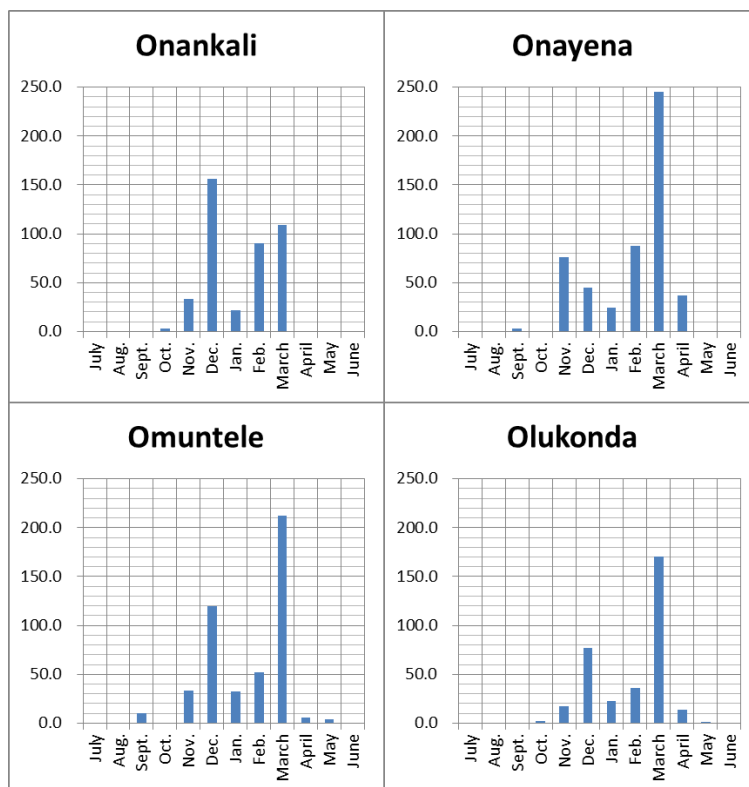


Tables and figures below provide the monthly and/or yearly rainfall records in the target regions except Oshana region.

Rainfall Records for ADCs in Oshikoto Region for 2013/14

Season ADC	2013						2014						Total
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	
Onankali	0.0	0.0	0.0	3.0	33.0	156.0	22.1	90.1	108.6	0.0	0.0	0.0	412.8
Onayena	0.0	0.0	3.0	0.0	76.1	44.6	24.6	87.6	245.2	37.0	0.0	0.0	518.1
Omuntele	0.0	0.0	10.1	0.0	33.2	120.0	32.2	52.1	212.6	5.5	4.0	0.0	469.7
Olukonda	0.0	0.0	0.0	2.0	17.0	77.0	22.6	36.4	170.1	13.4	1.0	0.0	339.5
Average	0.0	0.0	3.3	1.3	39.8	99.4	25.4	66.6	184.1	14.0	1.3	0.0	435.0

Source: Prepared by the Study Team based on Collected Data from ATs



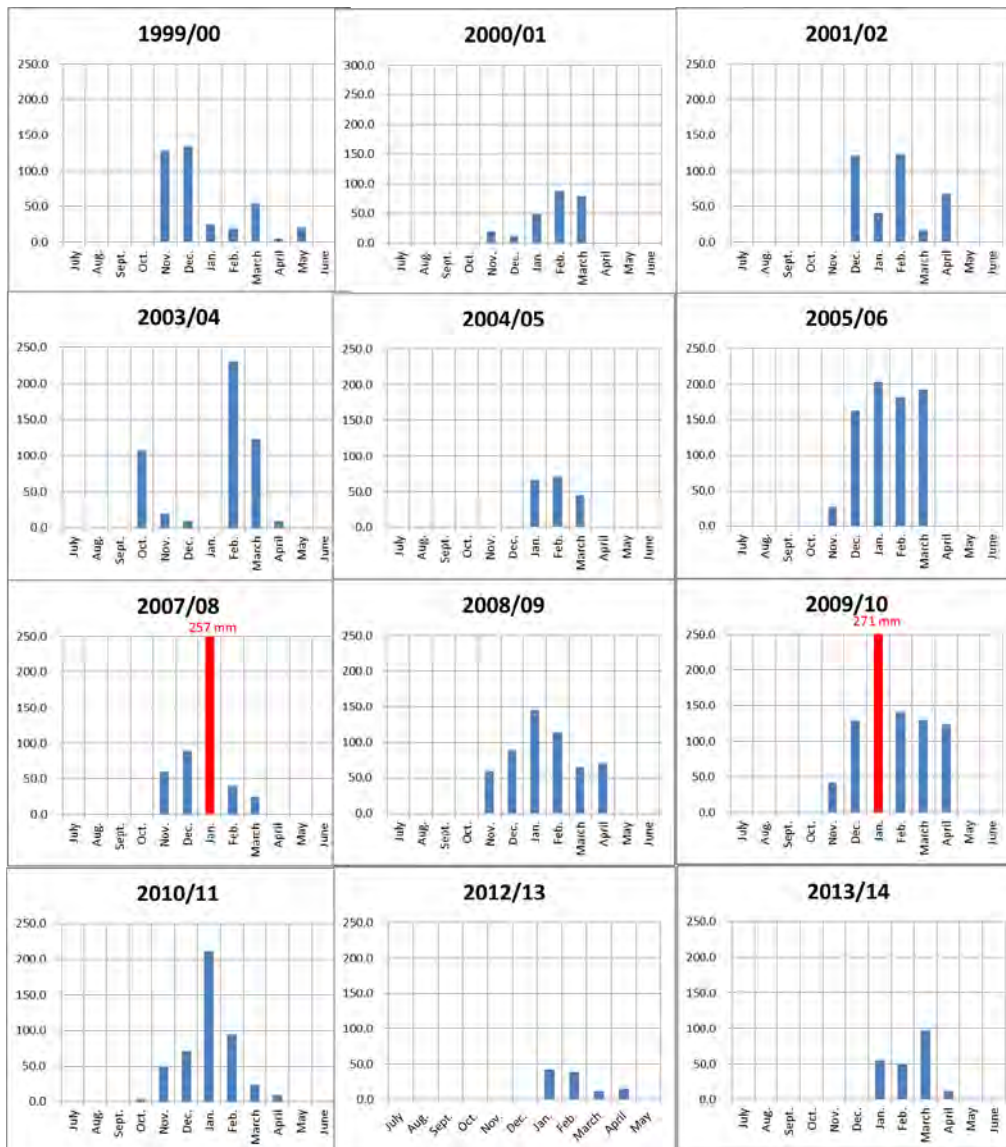
Source: Prepared by the Study Team based on Collected Data from ATs

Monthly Rainfall Distribution (mm) for ADCs in Oshikoto Region for 2013/14

Monthly Rainfall (mm) at Tsandi ADC in the Omusati Region from 1999/00 to 2013/14

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	Total
1999/00	0.0	0.0	0.0	0.0	127.6	134.0	24.3	19.0	54.0	5.0	20.0	0.0	383.9
2000/01	0.0	0.0	0.0	0.0	20.0	12.7	48.5	87.8	79.0	0.0	0.0	0.0	248.0
2001/02	0.0	0.0	0.0	0.0	0.0	120.2	40.3	123.5	16.7	68.4	0.0	0.0	369.1
2002/03													354.0
2003/04	0.0	0.0	0.0	108.0	20.0	10.0	0.0	230.0	124.0	10.0	0.0	0.0	502.0
2004/05	0.0	0.0	0.0	0.0	0.0	0.0	66.5	71.0	45.0	0.0	0.0	0.0	182.5
2005/06	0.0	0.0	0.0	0.0	28.4	162.0	203.0	181.0	192.0	0.0	0.0	0.0	766.4
2006/07													491.5
2007/08	0.0	0.0	0.0	0.0	60.0	89.0	256.5	40.0	24.5	0.0	0.0	0.0	470.0
2008/09	0.0	0.0	0.0	0.0	60.0	89.0	145.0	114.5	65.1	71.0	0.0	0.0	544.6
2009/10	0.0	0.0	0.0	0.0	41.0	129.0	271.1	140.0	129.2	123.0	0.0	0.0	833.3
2010/11	0.0	0.0	0.0	3.5	49.5	71.3	212.5	94.5	24.0	9.5	0.0	0.0	464.8
2011/12													
2012/13	0.0	0.0	0.0	0.0	0.0	0.0	42.5	38.6	10.9	15.5	0.0	0.0	107.5
2013/14	0.0	0.0	0.0	0.0	0.0	0.0	55.0	49.0	96.6	11.0	0.0	0.0	211.6
Average	0.0	0.0	0.0	9.3	33.9	68.1	113.8	99.1	71.8	26.1	1.7	0.0	423.6

Source: Prepared by the Study Team based on Collected Data from ATs



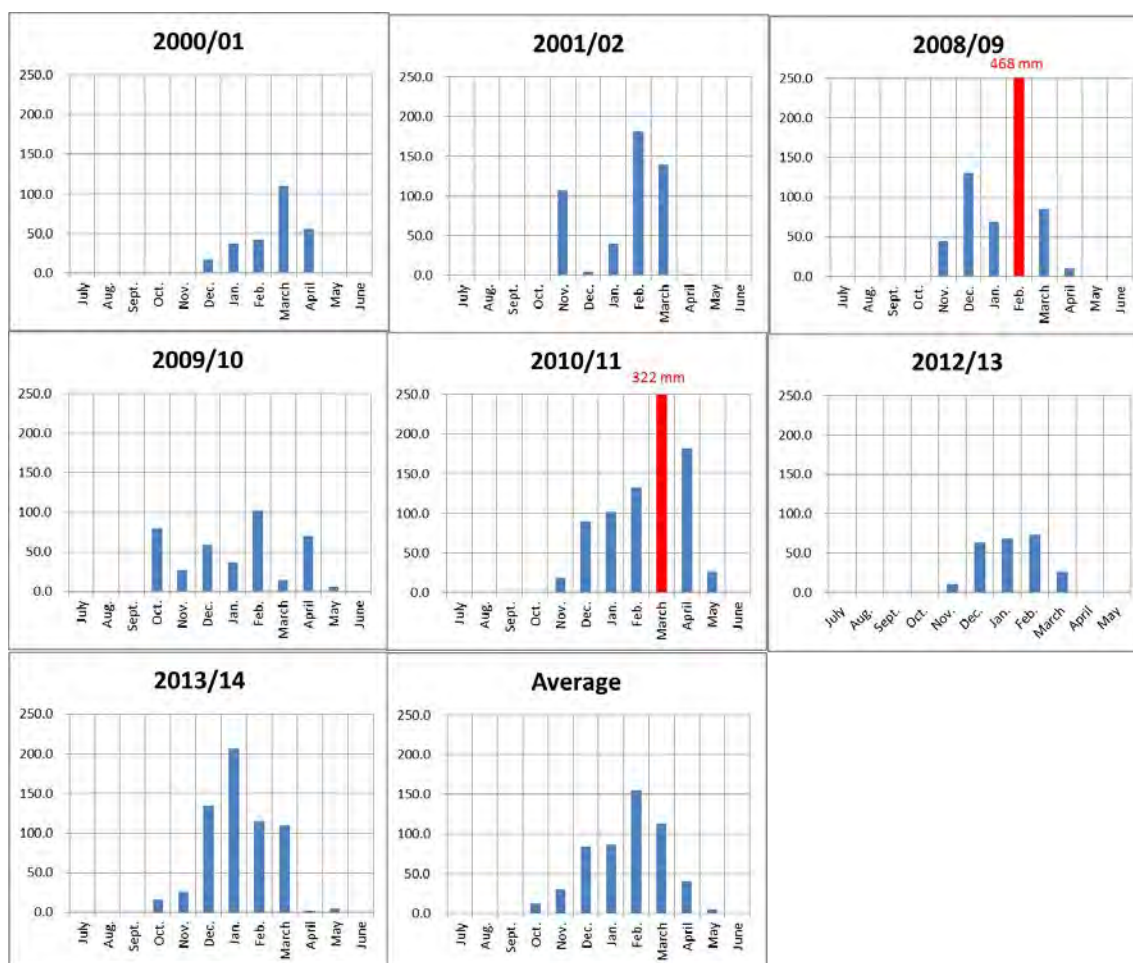
Source: Prepared by the Study Team based on Collected Data from ATs

Monthly Rainfall Distribution (mm) at Tsandi ADC in Omusati Region

Rainfall Records (mm) at Onesi ADC in Omusati Region from 2000/01 to 2013/14

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	Total
2000/01	0.0	0.0	0.0	0.0	0.0	17.0	36.5	42.0	109.5	56.0	0.0	0.0	261.0
2001/02	0.0	0.0	0.0	0.0	107.0	4.0	39.5	181.5	139.0	1.0	0.0	0.0	472.0
2008/09	0.0	0.0	0.0	0.0	45.0	130.0	69.0	468.0	85.0	10.0	0.0	0.0	807.0
2009/10	0.0	0.0	0.0	80.0	27.0	59.5	36.5	103.0	15.0	70.0	7.0	0.0	398.0
2010/11	0.0	0.0	0.0	0.0	18.0	89.0	102.0	132.0	321.5	182.0	26.0	0.0	870.5
2011/12	0.0	0.0	0.0	0.0	8.0	174.0	132.0	124.0	103.4	0.0	0.0	0.0	541.4
2012/13	0.0	0.0	0.0	0.0	10.0	63.0	69.0	73.0	26.0	0.0	0.0	0.0	241.0
2013/14	0.0	0.0	0.0	16.0	26.0	134.6	207.0	115.5	109.5	2.5	5.0	0.0	616.1
Average	0.0	0.0	0.0	12.0	30.1	83.9	86.4	154.9	113.6	40.2	4.8	0.0	525.9

Source: Prepared by the Study Team based on Collected Data from ATs



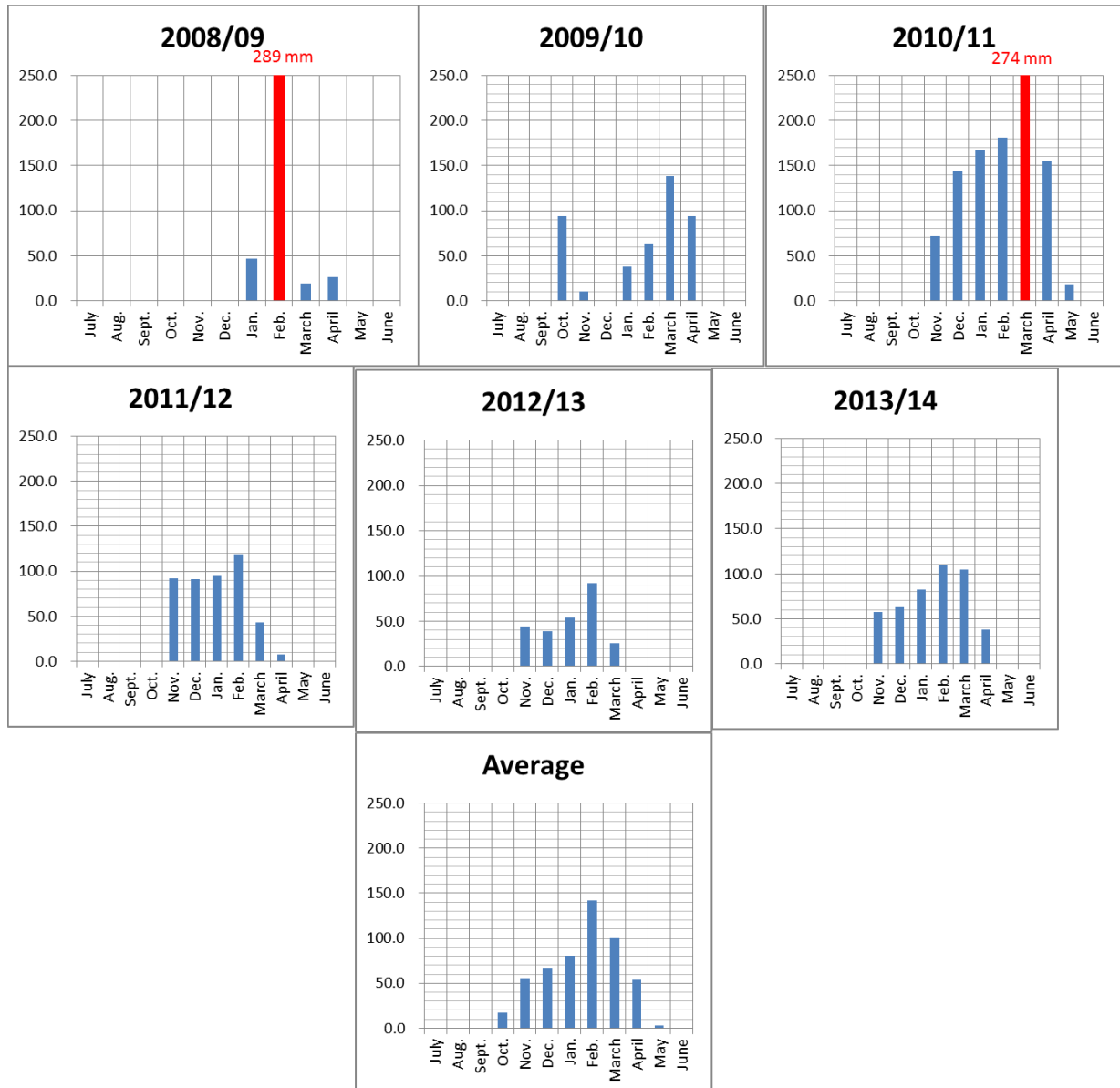
Source: Prepared by the Study Team based on Collected Data from ATs

Monthly Rainfall Distribution (mm) at Onesi ADC in Omusati Region

Rainfall Records (mm) at Oshifo ADC in Omusati Region between 2008/09 and 20013/14

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	Total
2008/09							47.0	289.3	19.0	26.0	0.0	0.0	
2009/10	0.0	0.0	0.0	93.7	10.5	0.0	37.8	63.2	138.0	94.0	0.0	0.0	437.2
2010/11	0.0	0.0	0.0	0.0	72.0	144.0	167.5	181.1	273.8	155.5	18.5	0.0	1 012.4
2011/12	0.0	0.0	0.0	0.0	92.0	91.2	94.5	118.1	43.2	7.9	0.0	0.0	446.9
2012/13	0.0	0.0	0.0	0.0	44.7	39.2	53.9	92.0	25.7	0.0	0.0	0.0	255.5
2013/14	0.0	0.0	0.0	0.0	57.1	62.4	82.0	109.8	104.9	38.0	0.0	0.0	454.2
Average	0.0	0.0	0.0	17.1	55.3	67.4	80.5	142.3	100.8	53.6	3.1	0.0	519.8

Source: Prepared by the Study Team based on Collected Data from ATs



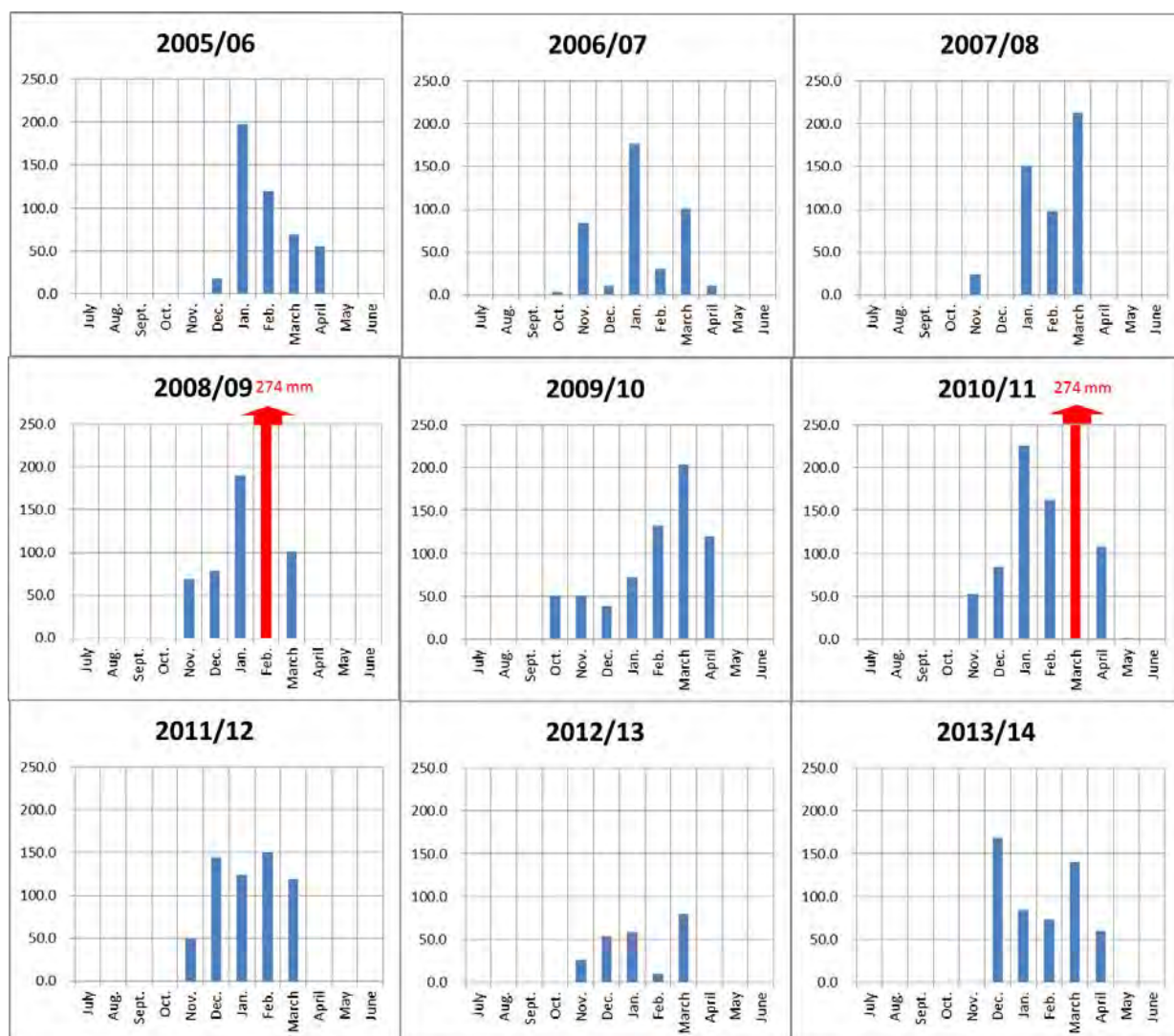
Source: Prepared by the Study Team based on Collected Data from ATs

Rainfall Distribution (mm) at Oshifo ADC in Omusati Region

Rainfall Records (mm) at Elim ADC in Omusati Region between 2005/06 and 2013/14

	July	Aug	Sept	Oct.	Nov	Dec.	Jan.	Feb.	March	April	May	June	Total
2005/06	0.0	0.0	0.0	0.0	0.0	17.0	197.5	120.0	69.0	56.0	0.0	0.0	459.5
2006/07	0.0	0.0	0.0	4.0	84.0	11.0	177.0	31.0	101.0	11.0	0.0	0.0	419.0
2007/08	0.0	0.0	0.0	0.0	24.0	0.0	151.0	97.0	213.0	0.0	0.0	0.0	485.0
2008/09	0.0	0.0	0.0	0.0	69.0	79.0	190.0	256.0	101.0	0.0	0.0	0.0	695.0
2009/10	0.0	0.0	0.0	50.5	50.5	38.5	72.0	132.5	203.5	119.5	0.0	0.0	667.0
2010/11	0.0	0.0	0.0	0.0	53.0	84.0	225.5	162.0	399.0	108.5	1.1	0.0	1 033.1
2011/12	0.0	0.0	0.0	0.0	50.0	145.0	124.0	151.0	120.0	0.0	0.0	0.0	590.0
2012/13	0.0	0.0	0.0	0.0	26.0	54.0	58.0	9.0	79.5	0.0	0.0	0.0	226.5
2013/14	0.0	0.0	0.0	0.0	0.0	169.0	84.5	73.5	140.5	59.0	0.0	0.0	526.5

Source: Prepared by the Study Team based on Collected Data from ATs



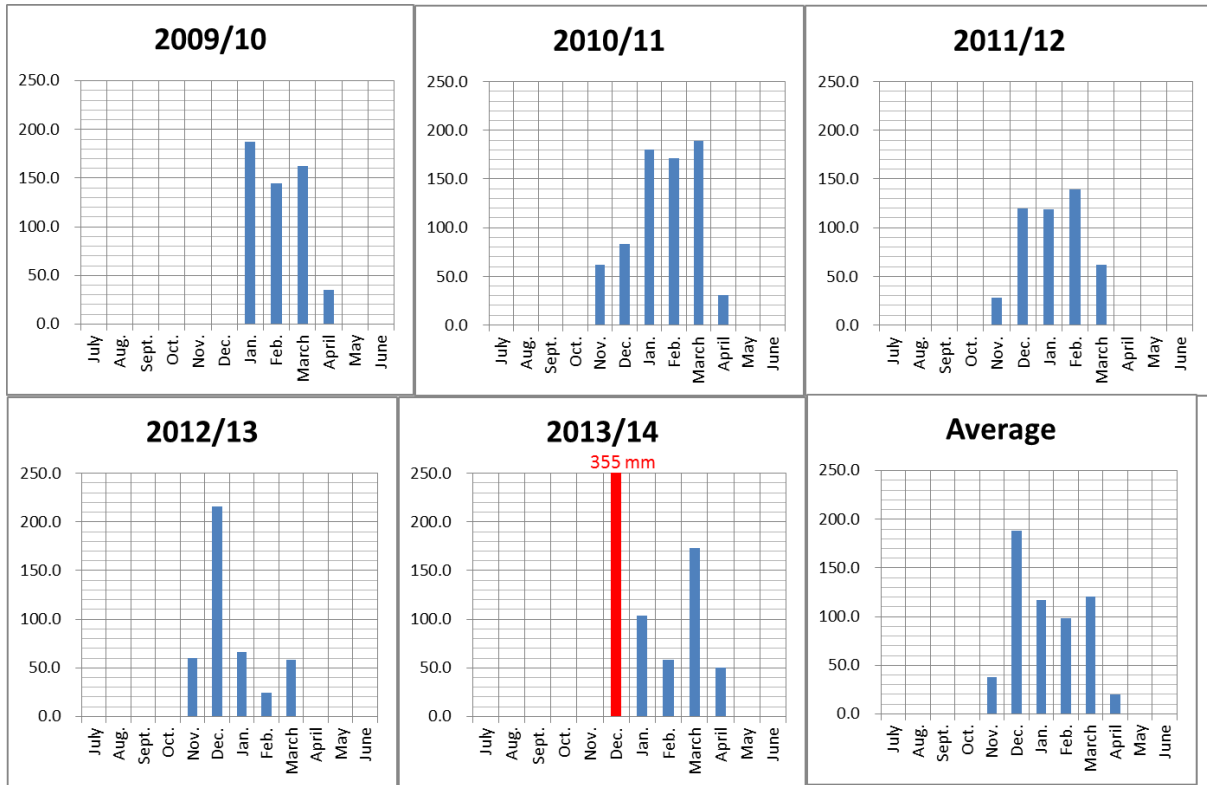
Source: Prepared by the Study Team based on Collected Data from ATs

Monthly Rainfall Distribution (mm) at Elim ADC in Omusati Region

Rainfall (mm) at Omuundangilo ADC Ohangwena Region between 2009/10 and 2013/14

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	Total
2009/10	-	-	-	-	-	-	187.0	145.0	162.0	35.0	0.0	0.0	529.0
2010/11	0.0	0.0	0.0	0.0	62.0	83.0	180.0	171.0	189.0	31.0	0.0	0.0	716.0
2011/12	0.0	0.0	0.0	0.0	28.0	120.0	119.0	139.0	62.0	0.0	0.0	0.0	468.0
2012/13	0.0	0.0	0.0	0.0	60.0	216.0	66.0	24.0	58.0	0.0	0.0	0.0	424.0
2013/14	0.0	0.0	0.0	0.0	0.0	335.0	104.0	58.0	173.0	50.5	0.0	0.0	720.5
Average	0.0	0.0	0.0	0.0	37.5	188.5	117.3	98.0	120.5	20.4	0.0	0.0	582.1

Source: Prepared by the Study Team based on Collected Data from ATs



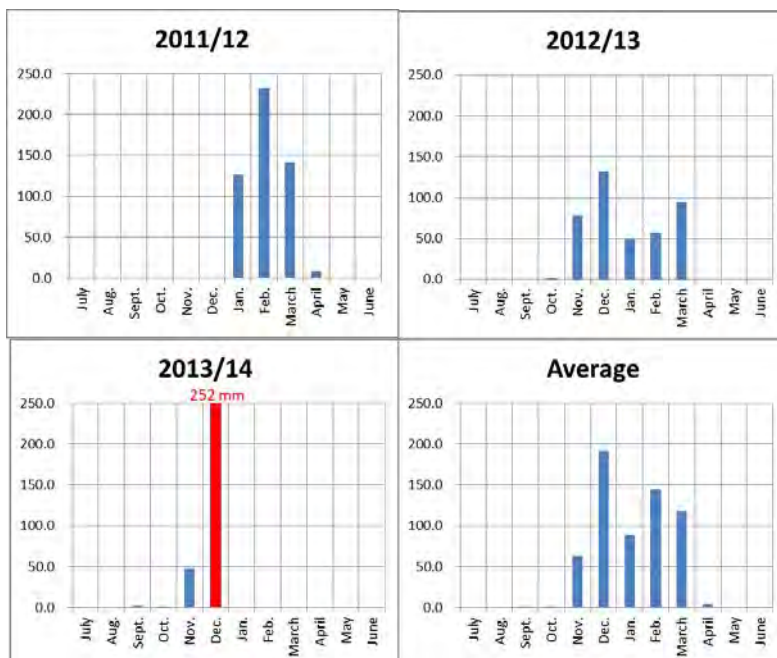
Source: Prepared by the Study Team based on Collected Data from ATs

Rainfall Distribution (mm) at Omuundangilo ADC in Ohangwena Region

Rainfall at Ongla Ya Netanga ADC in Ohangwena Region between 2011/12 and 2013/14

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	Total
2011/12	-	-	-	-	-	-	127.2	232.7	142.0	8.0	0.0	0.0	509.9
2012/13	0.0	0.0	0.0	0.8	78.3	132.5	50.2	57.0	94.5	0.0	0.0	0.0	413.3
2013/14	0.0	0.0	2.0	0.5	47.9	251.9	-	-	-	-	-	-	302.3
Average	0.0	0.0	1.0	0.7	63.1	192.2	88.7	144.9	118.3	4.0	0.0	0.0	612.8

Source: Prepared by the Study Team based on Collected Data from ATs



Source: Prepared by the Study Team based on Collected Data from ATs

Rainfall (mm) at Ongla Ya Natanga ADC in Ohangwena Region

What is significant about the data above is the large variation over the years, both in terms of total rainfall received and monthly rainfall figures. Yearly rainfall data obtained highlights the significant variability between years as well. This is typical of an arid and semi-arid environment where rainfall co-efficient exceeds 30%

(2) Natural Disasters

Several natural disasters types are mentioned by respondents namely floods, frost, drought, veld fire and pests. Table below reflects the findings of different disaster types per region.

Occurrence of Natural Disasters per Region

Disaster Type	Total	Ohangwena	Oshikoto	Oshana	Omusati
Floods	13	2	2	6	3
Frost	2	1	0	0	1
Drought	14	2	3	2	7
Veld fires	1	0	1	0	0
Pests	3	0	0	0	3

Source: Prepared by the Study Team based on collected data from ATs

A total of 13 respondents indicated that floods occur in their areas, with the most in Oshana (6) and Omusati (3) regions. Frost is mentioned as a disaster in only 2 regions namely Ohangwena and Omusati, while droughts occur mainly in Omusati (7) and Oshikoto (4) regions. Veld fires are only mentioned in the Oshikoto region while pests are mentioned in only in the Omusati region.

Table below provides a summary of responses by farmers to these natural disasters.

A Summary of Responses by Farmers to Natural Disasters

Disaster	Measures Taken	
Flood	<ul style="list-style-type: none"> ◆ Early planting ◆ Get assistance from GRN and NGOs ◆ Plant rice ◆ Keep grain in granaries ◆ Keep crop residues for livestock 	<ul style="list-style-type: none"> ◆ Keep melon and melon seed for humans and livestock ◆ Relocate to higher land ◆ Help themselves ◆ Make furrows and pans where water can gather
Frost	<ul style="list-style-type: none"> ◆ Use seed of frost tolerant varieties 	
Drought	<ul style="list-style-type: none"> ◆ Move livestock to cattle posts ◆ Plant early maturing crop varieties ◆ Use drought tolerant varieties ◆ Do early planting ◆ Do conservation agriculture 	<ul style="list-style-type: none"> ◆ Nothing can be done ◆ Build up a grain surplus ◆ Change cultivation practices ◆ Buy supplementary feeds for livestock ◆ Sell some livestock
Veld fire	<ul style="list-style-type: none"> ◆ Make fire breaks 	
Pest	<ul style="list-style-type: none"> ◆ Hand picking ◆ Use pesticides ◆ Cultivate land earlier ◆ Dig trenches 	<ul style="list-style-type: none"> ◆ Do mechanical control ◆ Do biological control ◆ Apply chilli-salt water mixtures

Source: Prepared by the Study Team based on Collected Data from ATs

II-1.2.4 Crop Production

This sub-section reflected on which crops are planted, number of farmers doing cultivation, areas under cultivation, intercropping practices, inputs used, disease control and farming practices applied. Table below provides the frequency with which each crop was mentioned per region.

Frequency of Crops Mentored to be Planted per Region

Region	Bambara	Cabbage	Cow Pea	Cucumber	Guava	Maize	Mango	Millet	Onion	Pumpkin	Papaya	Rice	Sorghum	Tomato	Water Melon
Ohangwena	3	1	3	1	1	3	1	5	1	3	1	3	4	1	3
Omusati	9	2	9	1	3	9	3	9	2	9	3	3	9	4	9
Oshana	7	5	7	2	4	8	4	8	4	6	5	3	8	6	6
Oshikoto	5	1	8	0	0	8	0	8	1	7	0	1	8	3	7
Total	24	9	27	4	8	28	8	30	8	25	9	10	29	14	25
Rank	7		4			3		1		5			2		6

Source: Prepared by the Study Team based on Collected Data from ATs

Millet (30) is planted in all ADCs in all regions, followed by sorghum (29), maize (28), cow pea (27), pumpkin (25), water melon (25), and bambara nuts (24). Table below reflects the number of farmers that plant different crops per region.

Number of Farmers Planting Different Crops per Region

Region	Millet	Sorghum	Maize	Cow Pea	Pumpkin	Water Melon	Bambara
Ohangwena	17 446	5 996	10 941	10 941	5 149	5 600	10 941
Omusati	56 380	52 414	46 372	49 599	37 439	45 714	49 599
Oshana	13 834	7 786	4 980	6 300	4 500	4 000	3 200
Oshikoto	57 006	33 683	33 683	33 683	46 187	54 483	22 736
Total farmers	144 666	99 879	95 976	100 523	93 275	109 797	86 476

Source: Prepared by the Study Team based on Collected Data from ATs

Most farmers in the target regions plant millet followed by water melon, cow pea, sorghum, maize, pumpkin and Bambara nuts.

Following table indicates the area (ha) being planted by the major crop types per region.

Total Area (ha) Planted with Different Crops per Region

Region	Millet	Maize	Sorghum	Cow Pea
Ohangwena	31 371	11 654	11 684	11 599
Omusati	109 397	5 055	14 230	5 045
Oshana	22 214	4 810	7 700	4 500
Oshikoto	73 608	35 956	41 098	19 690
Total area (ha)	236 590	57 475	74 712	40 834

Source: Prepared by the Study Team based on Collected Data from ATs

The largest area (236,590 ha) is planted with millet, followed by sorghum (74,712 ha), maize (57,475 ha) and cow pea (40,834 ha). Farmers in Omusati region plant in total 109,397 ha with millet, followed by Oshikoto region (73,608 ha), Ohangwena region (31,371 ha) and Oshana region (22,214 ha). Farmers in Oshikoto region plant the most maize (34,956 ha), sorghum (41,098 ha) and cow pea (19,690 ha) compared to other regions. Table below reflects the calculated average area (ha) planted per crop per farmer per region.

Calculated Average Area (ha) Planted per Farmer for Different Crops per Region

Region	Millet	Maize	Sorghum	Cow Pea
Ohangwena	1.80	1.94	1.07	1.06
Omusati	1.94	0.10	0.31	0.10
Oshana	1.61	0.62	1.55	0.71
Oshikoto	1.29	1.07	1.22	0.58
Average area (ha/farmer)	1.64	0.58	0.78	0.41

Source: Prepared by the Study Team based on Collected Data from ATs

The average area planted with millet per farmer is 1.64 ha. In Omusati nearly 2 ha (1.94 ha) is planted with millet per farmer, followed by Ohangwena (1.80 ha), Oshana (1.61 ha) and Oshikoto (1.29 ha).

Table below provides the findings in terms of the frequency that different crops were mentioned by ATs to be used for intercropping per region.

Frequency of Use of Different Crops for Intercropping per Region

Region	Sorghum	Maize	Cow Pea	Pumpkin	Water Melon	Bambara
Ohangwena	2	2	2	2	0	2
Omusati	9	6	7	7	7	5
Oshana	3	5	5	1	1	4
Oshikoto	5	4	6	3	5	3
Total	19	17	20	13	13	14

Source: Prepared by the Study Team based on Collected Data from ATs

Cow peas are the most commonly used (20), followed by sorghum (19), maize (18), bambara nuts (14), and water melons and pumpkin both with 13 recordings. Table below shows the frequency by which the use of different inputs was mentioned by ATs per region.

Frequency of Use of Inputs by Farmers per Region

Region	Use of Local Seeds	Use of Manure	Use of Fertilizer	Use of Compost	Use of Improved Seed
Ohangwena	11	10	8	0	0
Omusati	20	37	36	1	8
Oshana	5	13	8	0	0
Oshikoto	27	19	15	0	0
Total	63	79	67	1	8

Source: Prepared by the Study Team based on Collected Data from ATs

The use of manure (79) was the most frequently reported by ATs, followed by the use of fertilizer (67) and the use of local seeds (63). What is however significant is the low frequency that the use of improved seeds (8) was mentioned, and only in Omusati region.

Table below reflects a summary of the different crops, their diseases and control measures.

Different Crops, Diseases and Control Measures Used

Crop	Disease	Control Measures
Bambara nuts	Aphids	
	Bean fly	Apply <i>malathion</i>
	Mole (<i>onunangwi</i>)	
Cabbage	Aphids	Apply <i>malathion</i>
	Bollworm	Apply <i>medalnan</i>
	Beatles	
Cow Pea	Aphids	Apply ash; hot chilli mix
	Pests	Mechanical control; biological control
	Mild mottle	
	Bitter bush	Use ash
	Armoured crickets	
Cucumber	None reported	
Guava	Fruit rot	Use resistant cultivars
	Worms	Use old oil
Maize	Stock 6	
	Ball worms	Hand picking
	Caterpillars	Hand picking
	Stalk borer	Hand picking; mechanical
	Leaf blight	Use treated maize seeds
	Maize dwarf	
	Mosaic maize streak	
	Tassel smut	
Mango	Aphids	Use ash
	Ants	Use ash
Millet	American 6-row worms	
	Smut got	Selection
	Birds	Scaring
	Army worms	Hand picking
	Maggots	Seed selection
	Head mold	No control
	Leaf spot	No control
	Dawn mildew	No control
	Striga	
	Aphids	
	Armoured cricket	
Guinea fowl		
Onion	Trips	Crop rotation
	Leaf rot	Spray
Pumpkin	Fruit fly	
	Fusarium wilt	Burn infected plants
	Red spider	Spray
	Dawn mildew	
Papaya	None reported	
Rice	None reported	
Sorghum	American 6-row worm	
	Smut	Burn plants; use resistant varieties
	Striga	Crop rotation
	Witch weeds	Weeding
	Spittle bug	
	Army worms	
	Covered kernel	
	Leaf blight	
	Crazy top	
	Boll worm	Crop rotation
	Roast	Spray bitter bush
	Striga	Crop rotation
	Aphids	Apply <i>malathion</i>
	String weed	
Armoured crickets		
Bacteria		
Tomato	Red spider mite	Chemical
	Early blight	Destroy infected plants

Crop	Disease	Control Measures
Water melon	Dawn mildew	
	Flies	
	Stink bug	Hand picking
	Aphids	Mechanical
	Fruit fly	
	Melon fly	Bury infected plants
	Jasid fly	
	Worms	
	Red spider	
	Dawn mildew	

Source: Prepared by the Study Team based on Collected Data from ATs

Tables below summarizes a management calendar for some of the most important crops focusing on the most common management activities being performed by farmers.

Calendar for Important Management Activities for Selected Crops

Bambara nuts	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sep.	Oct.	Nov.	Dec.
Land preparation												
Planting	X	X								X	X	X
Weeding	X	X	X									
Fertiliser												
Harvesting				X	X	X	X	X				
Threshing						X	X					
Marketing								X	X			
Cow Pea	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sep.	Oct.	Nov.	Dec.
Land preparation												
Planting	X	X								X	X	X
Weeding	X	X	X	X								
Fertiliser												
Harvesting	X		X	X	X	X	X	X				
Threshing						X	X	X				
Marketing								X	X			
Maize	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sep.	Oct.	Nov.	Dec.
Land preparation												
Planting	X	X								X	X	X
Weeding	X	X	X	X								
Fertiliser	X											
Harvesting		X	X	X	X	X	X	X				
Threshing							X	X				
Marketing								X	X	X		
Millet	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sep.	Oct.	Nov.	Dec.
Land preparation	X	X	X							X	X	X
Planting	X	X	X							X	X	X
Weeding	X	X	X	X	X							
Fertiliser				X								
Harvesting			X	X	X	X	X					
Threshing					X	X	X	X				
Marketing								X	X	X		
Sorghum	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sep.	Oct.	Nov.	Dec.
Land preparation										X	X	X
Planting	X	X								X	X	X
Weeding	X	X	X	X								
Fertiliser				X								
Harvesting	X		X	X	X	X	X	X				
Threshing					X		X	X				
Marketing								X	X	X		

Source: Prepared by the Study Team based on Collected Data from ATs

The wide range over which activities are being implemented confirms the high degree of variability in temporal and spatial distribution of rainfall, especially with the commencement of the rainy season.

II-1.2.5 Livestock Production

This subsection reflects on livestock types, livestock numbers, feeding and management practices, as well as diseases and disease control in the four study regions. Table below presents the total number of livestock numbers per livestock type per region as provided by the ATs.

Livestock Numbers per Region as Provided by ATs

Region	Cattle	Chicken	Donkey	Goat	Horse	Pig	Sheep	Duck
Ohangwena	53 656	18 156	4 447	64 731	106	912	0	0
Omusati	161 691	75 807	26 165	144 021	668	9 176	31 615	300
Oshana	71 201	54 015	37 517	50 349	140	830	16 513	540
Oshikoto	199 543	263 679	37 639	337 339	616	4 211	8 745	40
Total	486 091	411 657	105 768	596 440	1 530	15 129	56 873	880

Source: Prepared by the Study Team based on Collected Data from ATs

As a comparison, the data in table below reflects the NamLits data collected by Directorate of Veterinary Services in 2012.

Livestock Numbers per Region

Region	Cattle	Poultry	Donkeys	Goats	Horses	Pigs	Sheep
Oshana	156 798	59 673	26 135	121 473	2 653	8 475	7 412
Omusati	332 584	183 729	49 840	255 537	899	19 522	16 832
Ohangwena	212 773	-	-	-	-	-	-
Oshikoto	283 088	135 303	26 217	221 531	834	9 615	3 206
Total	985 243	378 705	102 192	598 541	4 386	37 612	27 450

Source: NamLits (2012)

Considerable discrepancies are evident between 2 tables, however this may be due to data obtained from only a portion of the ADCs.

Table below indicates the number of farmers that own different livestock types per region as reported by the ATs.

Number of Farmers Owning Different Livestock Types per Region

Region	Cattle	Chicken	Donkey	Duck	Goat	Horse	Pig	Sheep
Ohangwena	14 766	12 341	5 946	0	11 149	5 180	5 149	5 152
Omusati	60 243	49 485	23 350	10	47 337	6 331	9 475	9 703
Oshana	12 034	8 897	3 347	1 182	5 882	19	1 387	1 743
Oshikoto	34 308	35 878	33 608	20	34 958	23 088	27 576	27 662
Total	121 351	106 601	66 251	1 212	99 326	34 618	43 587	44 260

Source: Prepared by the Study Team based on Collected Data from ATs

By dividing the number of livestock by the number of farmers the average number of livestock per farmer per region is calculated. Considerable variation occurs between different regions, especially in terms of donkeys, ducks and sheep.

Calculated Average Livestock Numbers per Farmer per Region

Region	Cattle	Chicken	Donkey	Duck	Goat	Horse	Pig	Sheep
Ohangwena	3.63	1.47	0.75	0	5.81	0.02	0.18	0
Omusati	2.68	1.53	1.12	30.00	3.04	0.11	0.97	3.26
Oshana	5.92	6.07	11.21	0.46	8.56	7.37	0.60	9.47
Oshikoto	5.82	7.35	1.12	2.00	9.65	0.03	0.15	0.32

Source: Prepared by the Study Team based on Collected Data from ATs

Table below summarizes the feeding regimes of different livestock types.

Feeding Regimes of Different Livestock types

Livestock Type	Feeding Regime
Cattle	Free ranging; supplementary feeding in terms of crop residues, hay, lucerne, and bought licks
Chicken	Free ranging; mahangu; grass; sunflower seeds; bought chicken feed; maize meal; maize grain; sorghum seed; melons; crop residues
Donkeys	Free ranging, grass, stovers, crop residues, mineral licks, melons, sorghum straw, bran, hay

Livestock Type	Feeding Regime
Ducks	Millet; maize; grass; bought feeds; grain
Goats	Free ranging; stovers, crop residues, cow pea leaves; lucerne; Lucien fruit; bought feeds; melons; hay
Horses	Free ranging; stovers; lucerne; sorghum leftovers; <i>mahangu</i> grains; hay; crop residues
Pigs	Crushed <i>mahangu</i> ; marrows; cooked millet grains; water melons; pumpkins; food bought from shop; grass; sorghum grains; maize; porridge; melon seeds; melon bran
Sheep	Free ranging; crop residues; bought feeds; melons; cow peas; millet stover; hay

Source: Prepared by the Study Team based on Collected Data from ATs

Most of the livestock are free ranging, supplemented by mostly crop residues and sometimes bought feeds, especially during droughts.

Table below indicates the different diseases occurring per livestock type and treatments applied by farmers.

Disease and Treatments for Different Livestock Types

Livestock Type	Disease	Treatment
Cattle	Internal/External parasites	Drenching and dipping
	Lung sickness	Vaccination
	Black Quarter	Vaccination
	Botulism	Vaccination/phosphate licks
	Lumpy skin	Vaccination/ <i>Neem</i> extract
	Foot & Mouth disease	Vaccination
	Anthrax	Vaccination
	Rabies	Vaccination
	Anaplasmosis	Medicines
	Abscesses	Medicines
	Foot rot	Medicines
	Diarrhoea	
	Pasteurella	Vaccinate
	Blackles	
Mastitis	Medicine	
Chicken	Internal/External parasites	Medicines; hot ash in feathers
	Chicken pox	<i>Terevita</i> , <i>terramycin</i>
	Lice	<i>Karbadust</i>
	Mites	Powder
	Swelling eye lid	Eye drops
	Newcastle disease	Put <i>endombo (Aloe vera)</i> in water
	Coccidiosis	Bitter bush
	Blindness	Medicines
Donkeys	Internal/External parasites	<i>Panacur</i> ; hand-pick ticks
	Mange	
	Rabies	Vaccination
	Diarrhoea	Burnt <i>makalani</i> palm in food
Ducks	Heat stress	
	Internal parasites	Deworming
	Chicken pox	
Goats	Internal/External parasites	Deworming remedies from pharmacy
	Lung sickness	Vaccination
	Foot rot	Vet drugs
	Mange	Dipping
	Pulpy kidney	Vaccination
	Mites	Dipping
	Pasteurella	Vaccination
	Abortion	Vaccination
	<i>Okanyange</i>	
	Diarrhoea	
	Black quarter	<i>Supavax</i> vaccination
	Rabies	Vaccination
	Botulism	Vaccination
	Brucellosis	Vaccination
	Anaplasmosis	Treatment
	Anthrax	Vaccination
Mastitis	Treatment	
Horses	Internal/External parasites	Drugs; <i>panacur</i>

Livestock Type	Disease	Treatment
Pigs	Lung sickness	
	Diarrhoea	Sugar water with salt
	Internal/External parasites	Remedies from pharmacy
	Anaemia	Vaccinate
	Mange	Dipping with <i>Nomec</i>
	Swine pox	Vaccinate
	Diarrhoea	
	Kerato	Sugar water with little salt
	Conjunctivitis	Snuff in eyes
	Brucellosis	Vaccinate
	Mastitis	Treatment
	Foot rot	Treatment
	Anaplasmosis	Treatment
	Botulism	Vaccination
	Anthrax	Vaccination
Sheep	Lung sickness	Medicines from pharmacy
	Rabies	Vaccination
	Internal/External parasites	Dipping and drenching
	Lung sickness	Vaccinate
	Scrub	Dipping
	Mange	Dipping
	Pasteurella	Vaccinate
	Rabies	Vaccinate
	Black quarter	Vaccinate
	Orff	Wash with salty water
	Diarrhoea	Sugar water with salt
	Brucellosis	Vaccinate
	Mastitis	Remedy from pharmacy
	Foot rot	Remedy from pharmacy
	Anaplasmosis	Medicines from pharmacy
Botulism	Vaccinate	
Anthrax	Vaccinate	

Source: Prepared by the Study Team based on Collected Data from ATs

II-1.2.6 Crop and Livestock Marketing

This sub-section summarizes a collation of responses by the ATs on market related information of a number of major crops and livestock types per region. Following tables provide the summary of marketing for different crops and livestock types.

Bambara Nuts Marketing Information per Region

Region	Major Market Location	Major Market Season	Price (N\$)	Customer	Customer Needs Varieties	Customer Needs Season	Customer Needs	Marketing Techniques by Farmers
Ohangwena		-Jun-Sept	-120- 140/kg	-Individual	N.A.	N.A.	N.A.	N.A.
Omusati	-Communities -Open Market	-March -Jun-Sept	-10/kg -5/cup	-Individual -Negotiable	-Local -White beans	-Mar-Jun -Jul-Dec	-Fresh -Good quality with big grains	N.A.
Oshana	-Oshakati open market, -Local	-Mar-May -May-Jun -Jul-Sept	-10/kg -5 -50/kg -20-100/kg	-Individual	-Local Varieties -Nakale, local varieties	-Apr-Jun -Jun-Jul -October -May, Aug, Dec	-Fresh grain -Good quality	-Open market -Shows, <i>cuca</i> shops, community centers -1kg cup or plastic bag 2kg (bottle 750ml)

Source: Prepared by the Study Team based on Collected Data from ATs

Cattle marketing information per region

Region	Major Market Location	Major Market Season	Price (N\$)	Customer	Customer Needs Varieties	Customer Needs Season	Customer Needs	Marketing Techniques by Farmers
Ohangwena	-Formal: auction, MeatCo. -Informal: other farmers	-March, Jun, August	-Vary	-Individual	N.A.	N.A.	N.A.	-Auction - Individual
Omusati	-Meatco & local -Auction kraal, local buyers -Othika -No formal market	-Throughout -August	-10/kg -20/kg -6000- 8000/head	-Group -Individual	-Improved breed -Brahman Bulls -Meat	-Throughout -May, Apr, Nov	-3 year old cattle -Tender, Fat	-local buyer -speculators -Meatco -hanging on the trees -Price is negotiable
Oshana	-Local -Auction -At HH -Meatco -Open market	-any time -through out	-3500-7000/head ->4000/head -5000-9000/head -4000-8000/head	-Individual -Meatco	-Sanga -Brahman -Exotic -Local	-throughout	-2-3 years -150-200kg Brahman	-Meatco -One by One -Per meat cut

Source: Prepared by the Study Team based on collected data from ATs

Millet marketing information per region

Region	Major Market Location	Major Market Season	Price (N\$)	Customer	Customer Needs Varieties	Customer Needs Season	Customer Needs	Marketing Techniques by Farmers
Ohangwena	-AMTA -Open market -Informal -Local	-Oct-Dec -Jun-Sept	-100 /20kg -7.2/kg -80-100/kg	-Individual	-Kangara	-Dec-Feb -Oct-Dec	-Good	-Pprefer Open Market (Omatala) -Market where they can get higher prices
Omusati	-Local Markets -AMTA	-Throughout -Jul-Sept	-120/kg -64/kg	-Individual -Negotiable	-Local, Kangara,	-Nov-Dec -Jul-Sept	-Pest free -Good quality	-Bargaining and bartering -NAB, AMTA, Local Association

Region	Major Market Location	Major Market Season	Price (N\$)	Customer	Customer Needs Varieties	Customer Needs Season	Customer Needs	Marketing Techniques by Farmers
	-Tsandi -Individual farmers -Onaanda -Community	-Jun-Oct -Jun-Aug -August	-3.6/kg -6/kg -2.87/kg -Negotiate -80/15kg -3.6/kg -4.05/kg	-AMTA -millers	Kashana Mix	-May-Oct -August	-Large size	-selling per lata (17kg) -put on 20kg lata -Grains sold at open market -Register with ADC to sell to GRN agency
Oshana	-Locally -Oshakati open market -Agronomic Board	-Dec-Jan -After harvest -Jun-Nov	-120/kg -7.50/kg -90-120/kg -20/2kg -200/150kg -90-120/kg -360/kg	-AMTA -Individual -Mahangu group -Open Market	-Local -Okashana 2	-Aug-Feb -Jul-Nov -Jul-Aug	-New grain -Grade 1 -Fresh	-Individual farmers -Open Market -Price information from NAB (calendar) -ADC distributes information -container of 20- 25kg (lata) 5kg, 2kg -Within local community
Oshikoto	-ADC for NAB -Oniipa, Onethi ndi, Onambango -Ondangwa & Omuthiya Open Markets	-Jul-Aug -Jul-Oct -Aug-Oct	3.6/Kg 4.5/kg	-Individual -AMTA	-Mahangu -All	-Jul-Aug -Jul-Oct -Seasonal	-New/Fresh grains -Pure mature grains -Crop pest free -Grade A grain	-Register at ADC & NAB/AMTA -Buy grains from ADC -Market research for price and demand

Source: Prepared by the Study Team based on collected data from ATs

Maize marketing information per region

Region	Major Market Location	Major Market Season	Price (N\$)	Customer	Customer Needs Varieties	Customer Needs Season	Customer Needs	Marketing Techniques by Farmers
Ohangwena	-Open market: informal	N.A.	N.A.	-Individual	N.A.	N.A.	N.A.	N.A.
Omusati	-Local buyers -No formal market	-Apr-Dec -Apr-May	-6/kg -5/kg	-Individual	N.A.	N.A.	N.A.	N.A.
Oshana		-May-Jun	-20-25/kg	-Individual	-Local -Malia	-Jul, Aug, Nov	-Fresh	-1kg cup or package of 1kg plastic bag
Oshikoto		-Jul-Aug	-120/20kg	-Individual -AMTA	-Maize	-Jul-Aug	-Fresh	-Farmers sell on their own & negotiate with buyers

Source: Prepared by the Study Team based on collected data from ATs

Sorghum marketing information per region

Region	Major Market Location	Major Market Season	Price (N\$)	Customer	Customer Needs Varieties	Customer Needs Season	Customer Needs	Marketing Techniques by Farmers
Ohangwena	-Open market: informal	-Jun-Sept	-100-150/kg -Exchange with millet or others	-Individual	-Macia, Red Sorghum	-Oct-Dec	-Good	-Market where they can get higher prices
Omusati	-Local Markets -Local buyers -Open Market -farmers, houses -Communities	-Throughout -Jul-Dec -Jun-Sept -August	-150/kg -7.50/kg -5/kg -Negotiate -180/17kg -10/kg	-Individual -Negotiable -request	-Improved -Macia, Red sorghum -Traditional -Local	-Dec-Jan -Jul-Dec -Throughout -August	-New certified seeds -Good quality with big grains -Old and New	-Bargaining -Local Buyer -Price/lata set by owner -Open market -Register with ADC to sell to GRN agency
Oshana	-Oshakati. Local -Open market -Brewery beer -NAB	-Dec-Jan -After harvest -May-Dec -Jun-Nov	-120/kg -10/1lata -50-120/kg	-Farmer trade - Individual -Mahangu group	-Local -snk 3636 -Red Sorghum -marcia	-Aug-Dec -Jul-Dec -Jul-Aug -Sept, Nov, Dec -Oct-Nov	-Good quality -Brewery need new grain -Grade 1 -Fresh	-Open market -1kg cup or plastic bag 2kg -Local community -NAB
Oshikoto	-Ondangwa -Oniipa, Onethi ndi, Onambango -Omuthiya Open Markets -Locally	-Jul-Sept -Aug-Oct	-5/kg -11.11/kg -11.20/kg	-Individual	-All	-Jul-Oct -Seasonal	-Pure mature grains -Pest free -Grade A	-Market research for price and demand

Source: Prepared by the Study Team based on collected data from ATs

Goat marketing information per region

Region	Major Market Location	Major Market Season	Price (N\$)	Customer	Customer Needs Varieties	Customer Needs Season	Customer Needs	Marketing Techniques by Farmers
Ohangwena	-Open market							-Farmers market their livestock
Omusati	-Local Markets -Auction kraa,	-throughout	-6/900g -25/kg -700-1200/head -1200/head -12/kg	-Individual -Group	-Boer goat -Local	-Throughout -Jan-Dec	-Young -Fat & medium -Young & Old	-Speculators -Local buyer -Slaughtering to sell fresh meat at open markets -Sold live at auctions -Sell to abattoirs and butcheries
Oshana	-Meatco -Local Auction -At house or shows	-need from farmer -throughout -Jul-Sept	-900-1500/head -1000-1500/head -500 up -100-1500 -500/1200	-Individual	-Boer Goats -Local breed	-throughout	-60-80kg -2 years	-Meatco -One by One -Meat cut -Sold within the village and at shows

Source: Prepared by the Study Team based on collected data from ATs

II-1.2.7 Group Activities

This sub-section reflects on organizational activities of farmers in the different regions. Table below indicates the number of different organizations related to crop and livestock farming operating per region.

Organizations Related to Crop and Livestock Production

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Red Cross	1	1	0	0	0
Farmers' association	7	2	1	3	1
Farmers Support Project	3	0	2	1	0
Hango Nashaale Association	1	0	0	0	1
Mentorship organisation	1	0	0	1	0
Farmers Extension Development Group	1	0	0	1	0
Livestock marketing group	1	1	0	0	0
Ximinia oil group	1	1	0	0	0
Rangeland Management - CBRLM	1	1	0	0	0

Source: Prepared by the Study Team based on Collected Data from ATs

Farmers' associations are the most common type of organizations for farmers with 7 in total over the four regions. There are also 3 farmer support groups in total with 2 in the Oshikoto region and 1 in the Oshana region.

II-1.2.8 Agricultural Support Services and Training

This sub-section provides information on different agricultural support services being provided by ATs per region. It also reflects on training programmes provided by ATs and external organizations as well as support services provided to women groups.

Following table reflects the crop related agricultural support services per region.

Crop Related Agricultural Support Services Provided by ATs per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Sell seeds & fertilizers	9	2	4	2	1
Disseminate Agriculture information	8	2	2	4	0
DCPP	6	2	0	0	4
Fertilizer Application	11	2	3	5	1
Conservation Agriculture	1	0	0	0	1
Management Practice	2	1	1	0	0
Weeding	3	0	0	0	3
Horticultural Training	1	0	1	0	0
Veg & Fruit production	1	0	0	1	0

Source: Prepared by the Study Team based on Collected Data from ATs

Fertilizer application seems to be the activity mostly frequently provided by ATs to farmers, followed by the selling of seeds and fertilizer, dissemination of agricultural information and supporting the implementation of DCPP.

Table below provides similar information regarding livestock related agricultural support services provided by ATs per region.

Livestock Related Agricultural Support Services Provided by ATs per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Livestock Breeding materials	4	1	2	0	1
Animal Husbandry	8	2	2	1	3
Health & Marketing	10	2	1	3	4
Management Practice	6	1	3	2	0
Livestock Feeding	1	0	1	0	0
Poultry Production	1	0	1	0	0

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Farm meetings	1	0	0	1	0
Lease Grazing	2	0	1	1	0
Castration/Dehorning	3	0	0	3	0
Training on livestock	1	0	0	1	0

Source: Prepared by the Study Team based on Collected Data from ATs

Support services in relation to animal health and market are the most frequently mentioned by ATs, followed by animal husbandry related support and support on livestock breeding and management practices in general.

Table below provides information regarding farm management related agricultural support services provided by ATs per region.

Farm Management Related Agricultural Support Services Provided by ATs per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Rotational grazing	2	0	1	1	0
Water point location	1	0	1	0	0
Crop Rotation	1	0	0	1	0
Supplemental feeding	1	0	0	0	1
Record Keeping	5	0	0	1	4
Group formation	1	0	0	0	1

Source: Prepared by the Study Team based on Collected Data from ATs

Record keeping is the farm management service most often provided by ATs, followed by support in terms of rotational grazing.

Table below provides information regarding other agricultural support services provided by ATs to farmers per region.

Other Agricultural Support Services Provided by ATs to Farmers per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Connecting AMTA and farmers	1	1	0	0	0
Ploughing	8	1	4	2	1
Farmers' Loans	1	0	1	0	0
Marketing	3	0	2	0	1
Using Input	1	0	0	0	1
Rangeland Management	1	0	0	0	1
Climate change	2	0	0	2	0
Farmers meetings	1	0	0	0	1
DAP training and Pig Farming	2	0	1	0	1

Source: Prepared by the Study Team based on Collected Data from ATs

Ploughing services are provided most frequently by ATs to farmers under DCPD program.

Following table gives information on training programmes provided by ATs and external organizations per region.

Training Programmes by ATs and External Organizations per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Agricultural Production (crop)	11	1	4	3	3
Leadership	9	0	7	0	2
Livestock Management	8	0	3	2	3
Livestock Production	6	1	0	2	3
Livestock Marketing	5	1	3	1	0
DAP	5	0	2	1	2
Animal Health	4	1	2	1	0
Rangeland Assessment	4	0	0	1	3
Conservation Agriculture	3	1	0	1	1
Hectare Measurement	2	0	0	2	0
Fruit and Veg	2	0	0	2	0
Climate Change	2	0	0	2	0
Horticulture	2	0	2	0	0

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Supplements	1	1	0	0	0
Poultry Production	1	0	0	1	0
Fruit Trees	1	0	1	0	0
Disseminate - Castration - Dehorning	1	0	0	1	0
Hoof trimming	1	0	0	1	0
Tsotso Stoves	1	0	1	0	0
Baskets	1	0	1	0	0
Jam Making	1	0	1	0	0
Management of Orchard	1	0	1	0	0
Group Management	1	0	1	0	0
Mushroom Cultivation for women	1	1	0	0	0
Agriculture show	1	0	0	1	0
DCPP	1	0	0	0	1
Farming as a business	1	0	1	0	0
Weeding with Animals	1	0	0	1	0
Fertilizer for mahangu & millet	1	0	0	1	0

Source: Prepared by the Study Team based on Collected Data from ATs

Most training was provided on crop production followed by leadership training, livestock production and management, livestock marketing, DAP, animal health and rangeland assessment.

Table below reflects what crop production related training courses are generally preferred by farmers per region.

Crop Related Training Courses that Farmers Would Want to Attend per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Fertilizer Application	8	3	2	1	2
Crop production	7	1	1	3	2
Disease and pest control techniques	7	2	2	2	1
Processing and manufacturing of crop products	6	1	3	2	0
Soil fertility	4	0	3	1	0
Marketing	4	0	0	2	2
Area measurement	3	1	1	1	0
Horticulture Training	3	1	1	1	0
Ripper Training	3	1	0	0	2
Conservation Agriculture	2	0	0	0	2
Use of cultivator drawn by animals	2	1	0	0	1
Seed multiplication	2	1	0	0	1
Fruit/Crop management	2	0	1	1	0
Use of walking tractor	1	1	0	0	0
Value addition to local produce	1	0	0	0	1
Conservation Agriculture	1	1	0	0	0
Water harvesting	1	0	1	0	0

Source: Prepared by the Study Team based on Collected Data from ATs

Farmers need mostly training in fertilizer application, crop production, disease and pest control techniques, processing and manufacturing of crop products, soil fertility and marketing of crops.

Table below provides similar information regarding the training needs of farmers related to livestock production.

Livestock Related Training Courses that Farmers Would Want to Attend per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Animal Health & Marketing	22	2	8	6	6
Animal husbandry	8	4	0	3	1
Disease identification	6	0	4	2	0
Animal production	5	0	1	3	1
DAP animals keeping	5	0	0	2	3
Supplementary Feeding	2	1	0	0	1
Breeding techniques	2	0	0	2	0
Farm management	1	0	0	0	1
Grazing planning	1	0	0	0	1

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Culling cows and bulls	1	0	0	0	1
Hide & Skin Processing	1	0	1	0	0

Source: Prepared by the Study Team based on Collected Data from ATs

Training in animal health is the most needed training by farmers, followed by training in animal husbandry, disease identification, animal production and the keeping of DAP animals.

Table below indicates the other training courses that farmers would want to attend per region.

Other Training Courses that Farmers would want to attend per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Manufacturing and processing	4	1	1	2	0
Farming as a business	4	0	1	0	3
Recording and Marketing	3	0	1	0	2
Training for tree planting	2	2	0	0	0
Production cost	2	0	1	1	0
Climate change water harvesting	2	0	0	2	0
Planting	2	1	1	0	0
Leadership	2	0	1	0	1
Saving and Credit association	1	0	0	1	0
Ploughing	1	0	0	1	0
Cultivated Pasture	1	1	0	0	0
Project Management	1	0	1	0	0

Source: Prepared by the Study Team based on Collected Data from ATs

The most popular other training courses that farmers would want to attend are manufacturing and processing, farming as a business and recording and marketing.

Table below reflects information on ethnic based group-wise issues and considerations per region.

Ethnic Based Group-wise Issues and Considerations per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
San People	4	1	3	0	0
Farmers Association	1	0	0	1	0
HIV support Project	1	0	0	1	0
NCAP (Conservation)	1	0	0	1	0
Youth groups	1	0	0	1	0
To allocate land for cultivation	1	0	1	0	0
To be permanent at a place	1	0	1	0	0

Source: Prepared by the Study Team based on Collected Data from ATs

Issues related to the San people are by far the most needed ethnic based group-wise topics to be considered by ATs.

Table below reflects on extension activities focusing on women groups per region.

Extension Activities Focusing on Women Groups per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Gardening	3	0	2	1	0
Food processing	2	0	1	1	0
Modern Basket making	2	0	1	1	0
Mushroom cultivation	1	1	0	0	0
Weaving, dye, Knitting	1	0	1	0	0
Marketing of grains/beans	1	0	0	1	0
Marula kernels	1	0	0	1	0
Weeding group	1	0	0	0	1
Packaging	1	0	0	1	0
Market of stock and grain	1	0	0	1	0
Women support group	1	0	0	1	0

Source: Prepared by the Study Team based on Collected Data from ATs

Gardening, food processing and modern basket making are the most important extension related activities focusing on women groups.

II-1.2.9 Constraints and Future Plans

This sub-section summarizes the constraints that ATs are facing at ADC level and how they think these constraints could be overcome. It also indicates some of the future plans of the ATs.

Table below shows the constraints mentioned by ATs per region.

Constraints Mentioned by ATs per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Transport/vehicle problems	13	0	3	2	8
Lack of tractors	11	2	7	2	0
Not enough ATs	6	0	1	2	3
No Internet Connection	6	1	0	0	5
PC not functioning	6	2	0	0	4
Irrigation problems (for livestock included)	5	0	3	2	0
Insufficient information on crop selection	4	2	0	2	0
Inadequate of farm tools and implements	4	2	0	1	1
Lack of equipment	3	1	0	0	2
Allocated budget is not enough	3	0	2	0	1
Credit	3	0	1	1	1
There is no vehicle garage	3	2	0	1	0
Poor soil fertility and lack of information for soil testing and analysis	2	1	0	0	1
Poor pasture conditions due to overstocking	2	1	1	0	0
Staff too big	2	0	0	1	1
Village headman sells out land for grazing	2	0	2	0	0
Farmers' poor attendance to meetings	2	0	0	1	1
Travel long distance to ADC	2	1	0	1	0
ADC coverage to farmers is too high	2	2	0	0	0
Office space too small	2	0	0	1	1
Low productivity and market demand	1	0	0	0	1
Lack of grazing land	1	0	1	0	0
No photo copier	1	1	0	0	0
Office not separated from the house	1	1	0	0	0
No livestock auction kraal in the area	1	0	1	0	0
No multi-purpose kraal in area	1	0	1	0	0
Lack of seeds	1	0	1	0	0
lack of Livestock grazing area	1	0	1	0	0
Inadequate short courses for ATs	1	0	0	1	0
Big constituency but one ADC	1	0	1	0	0
No administrative officer	1	1	0	0	0
Lack of animal handling facilities	1	0	0	1	0
Not enough staff	1	0	0	0	1
No security to guard the office	1	0	0	1	0
More ADCs needs to be build	1	0	0	1	0
Subsidy on animal drugs	1	0	0	0	1
Need AMTA	1	0	0	1	0

Source: Prepared by the Study Team based on Collected Data from ATs

The major constraints are transport and vehicle problems, not sufficient tractors per ADC, not enough ATs, computers that are not functioning and limited internet connections.

Table reflects the future plans of ATs to improve production in their ADC areas.

Future Plans as Expressed by ATs per Region

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Continue training farmers for rangeland and livestock management	9	2	1	5	1
Train young staff	8	2	1	2	3
More transport	4	0	0	0	4
ATs to be allocated in the area	4	1	0	2	1
Internet at the centre	3	0	0	0	3
Soil fertility improvement	2	1	1	0	0
Fencing material loans	2	0	0	1	1
Provision of tools and implements, engineering and farm mechanics for farm implements	2	1	0	0	1

Region	Total	Ohangwena	Oshikoto	Oshana	Omusati
Better network	2	0	0	0	2
Use of cultivators to be reinforced	2	2	0	0	0
ADC to supply enough inputs to farmers in the area	2	1	0	0	1
Government to replace headman	2	0	2	0	0
Creating platform of communication with farmers by sharing relevant agriculture info	2	1	0	0	1
More Short term courses	1	0	0	1	0
More office space should be built	1	0	0	1	0
To improve farmer's farming production and breeding techniques	1	0	0	1	0
Increasing the budget per constituency	1	0	1	0	0
Animal husbandry training	1	1	0	0	0
More Agricultural Technicians	1	0	0	0	1
Have auctions, multipurpose kraals, semi irrigation schemes in the ADC area	1	0	1	0	0
Measure Area by GPS	1	1	0	0	0
More women groups in the ADC area	1	0	1	0	0
Build more ADCs	1	0	1	0	0
Seed multiplication promotion	1	1	0	0	0
Mahangu marketing sector in the area	1	0	1	0	0
More extension staff to cover farmers	1	0	1	0	0
Visual Aid and Internet Global network	1	0	1	0	0
Set up Women's group	1	0	0	1	0
Regional management	1	0	1	0	0

Source: Prepared by the Study Team based on Collected Data from ATs

ATs will continue to train farmers in rangeland and livestock management. Other important future plans include the training of young staff, provision of more transport, location of people in their ADC areas and the provision of internet services.

II-1.3 Detailed Thematic Survey

II-1.3.1 Methodology

As similar to the overall review survey, a comprehensive questionnaire was designed with ATs in each of the ADCs in the target regions. Then, ATs identified one livestock-based, one crop-based and one horticulture-based farmer in their areas to be interviewed. The questionnaire consisted of 9 sections:

- ◆ **Section A:** general information on the respondent;
- ◆ **Section B:** focused on the household characteristics of the respondent and his/her family;
- ◆ **Section C:** focused on the living conditions of the respondents and their families;
- ◆ **Section D:** covered information on agricultural and livestock production and income of the respondents;
- ◆ **Section E:** focused on farm management practices;
- ◆ **Section F:** focused on crop and livestock marketing;
- ◆ **Section G:** explored group activities of the respondents;
- ◆ **Section H:** covered agricultural support services, including extension services, provided to farmers; and
- ◆ **Section I:** asked about major constraints experienced and future plans of respondents.

Table below presents an overview of the ADCs that responded to the questionnaire per region and

constituency.

ADCs that Responded to the Questionnaire per Region and Constituency

Region	Constituency	Name of ADC
Ohangwena	Ongenga	Ongenga
	Engela	Omafo
	Ohangwena	Omafo
	Omundaungilo	Omundaungilo
	Oshikango	Edundja
	Endola	Endola
	Omulongi	Ongulayanetanya
	Ondobe	Ondobe
	Eenhana	Eenhana
Oshikoto	Onyaanya	Onankali
	Onayena	Onayena
	Okankolo	Onyuulaye
	Oniipa	Oshigambo
	Omuntele	Omuntele
	Olukonda	Onayena
	Guinas	Tsumeb
	Nehale Lyampinga	Okapya
	Olukonda	Olukonda
Omusati	Etayi	Etayi
	Ongongo	Iipanda
	Anamulenge	Onawa
	Okalongo	Okalongo
	Otamanzi	Onkani
Oshana	Tsandi	Tsandi
	Oshakati West	Okaukanashe
	Uuvudhiya	Engombe
	Ompundja	Enguwantale
	Ongwediva	Ongwediva
	Uukwiyu	Uukwiyu
	Ondangwa	Ondangwa
Okatjali	Okatjali	

Source: Prepared by the Study Team

II-1.3.2 General Information on Respondents

The table below indicates that a total of 64 farmers² responded with 20 from Ohangwena, 20 from Oshikoto, 9 from Oshana and 12 from Omusati regions. In total 22 crop-based farmers were interviewed, 18 livestock-based, 6 horticulture-based, 3 where all three enterprises are implemented and 12 where both crop and livestock were reported on.

Different Farmer Types Interviewed per Region

Farmer Type	Total	Ohangwena	Oshikoto	Oshana	Omusati
Crop-based	22	10	6	4	2
Livestock-based	18	6	6	2	4
Horticulture-based	6	2	2	1	1
All three farmer types	3	0	1	1	1
Crop & Livestock-based	12	2	5	1	4
Others	3	0	0	1	2
Total	64	20	20	10	14

Source: Prepared by the Study Team

² Note that not all respondents provided information on all questions in the questionnaire, therefore sometimes different number of responses to certain questions.

II-1.3.3 Household Characteristics of Respondents

The table below indicates that from the total of 64 respondents, 33 are male and 29 are female (3 are unknown). In Ohangwena (14) and Oshikoto regions (11) more males were interviewed while in Oshana (6) and Omusati (8) regions more females were interviewed.

Gender of Respondents per Region

Gender of Respondent	Total	Ohangwena	Oshikoto	Oshana	Omusati
Male	33	14	11	3	5
Female	29	6	9	6	8
Unknown	2	0	0	1	1
Total	64	20	20	10	14

Source: Prepared by the Study Team

The table below indicates that the average age of respondents per region is very similar with Ohangwena the highest at 59 years and Oshana the lowest at 56 years of age.

Average Age of Respondents per Region

	Ohangwena	Oshikoto	Oshana	Omusati
Average age of Respondents	59	57	56	58

Source: Prepared by the Study Team

According to the following table, on average Ohangwena has the highest number of adult males (4.14) of all regions with Omusati (2.86) the lowest average. Omusati region on the other hand has the highest (3.77) average number of adult females per region with Oshana (3.00) the lowest. Ohangwena region again has the highest average number of children (5.00) with Oshana region (2.80) the lowest average number.

Average Number of Different Family Member Categories per Region

Family member category of respondents	Average	Ohangwena	Oshikoto	Oshana	Omusati
Adult male (15 years and above)	3.61	4.14	3.95	3.50	2.86
Adult female (15 years and above)	3.40	3.33	3.50	3.00	3.77
Children (less than 15 years old)	4.15	5.00	4.25	2.80	4.54

Source: Prepared by the Study Team

The table below indicates that the vast majority of the respondents are farmers that are full-time (52) with 6 that are part-time and 5 that are working full-time in the non-agriculture sector.

Number of Different Farmer Types per Region

Farmer Type	Total	Ohangwena	Oshikoto	Oshana	Omusati
Full – time	52	18	14	8	12
Part – time	6	1	4	1	0
Full-time worker in non-agriculture sector	5	0	2	1	2
Total	63	19	20	10	14

Source: Prepared by the Study Team

According to the following table, household heads in Oshana region (45.4 years) has the highest average farming experience in years, followed by Omusati region (43.1 years), Ohangwena region (34.8 years) and Oshikoto region (29.4 years).

Average Years of Farming Experience of Household Heads per Region

	Ohangwena	Oshikoto	Oshana	Omusati
Average years of farming experience of household head	34.8	29.4	45.4	43.1

Source: Prepared by the Study Team

II-1.3.4 Living Conditions of Respondents

This sub-section reflects some aspects of the living conditions of respondents.

Ownership of Different Assets on Average per Household per Region

Asset Type	Ohangwena	Oshikoto	Oshana	Omusati
Cultivator	1	1	1	1
Hoe	10	9	8	9
Tractor	1	1	1	1
Bicycle	1	1	-	1
Cart	1	1	1	1
Radio	2	1	1	1
TV	1	1	1	1
Stove	1	1	1	1

Source: Prepared by the Study Team

According to the table above, households of respondents have on average 10 hoes in Ohangwena and 8 in Oshana regions. Note that the average number of hoes per household does not differ substantially from each other. In Ohangwena households have on average 2 radios per household, while in the other regions households only have 1 radio per household. Other assets are on average the same per household for all regions.

Average Size of Different Land Uses per Region

Land use (ha)	Ohangwena	Oshikoto	Oshana	Omusati
Farm land (for crops)	4.98	10.21	4.85	5.62
Grazing land (not commonage)	3.64	8.28	14.67	5.04
Orchard	1.29	0.37	0.60	1.92

Source: Prepared by the Study Team

The average size of farm land for crop production is the largest in Oshikoto region (10.21 ha) and the smallest in Oshana region (4.85 ha). In Oshana the average size of grazing land (excluding commonage) is 14.67 ha per household with the smallest size 3.64 ha in Ohangwena region. In Omusati region the average size of orchards is 1.92 ha while in Oshikoto region it is only 0.60 ha.

Average Number of Different Livestock Types per Region

Livestock Type	Ohangwena	Oshikoto	Oshana	Omusati
Cattle	35.83	39.57	30.22	17.69
Goats	56.53	71.21	29.25	38.15
Sheep	5.33	11.33	25.25	2.67
Pigs	4.62	2.40	1.75	4.36
Donkeys	2.64	9.00	7.00	7.33
Chicken	29.11	26.88	19.50	20.85
Ducks	1.50	11.00	6.00	2.00
Guinea Fowl	2.40	4.00	-	-

Source: Prepared by the Study Team

The average cattle herd of respondents in Oshikoto region is 39.57, followed by Ohangwena region (35.83 cattle), 30.22 cattle in Oshana region and 17.69 cattle in Omusati region. Respondents in Oshikoto region also have on average the biggest goat flock (71.21 goats), followed by Ohangwena (56.53 goats), Omusati (38.15 goats) and Oshana with 29.25 goats per respondent household. Oshana is the region with the biggest average sheep herd per respondent household of 25.25 sheep. In Ohangwena (4.62 pigs) and Omusati regions (4.36 pigs) respondent households have on average the biggest pig herd. The biggest average donkey herd per respondent household is found in Oshikoto region (9.00 donkeys) with the smallest in Ohangwena region (2.64 donkeys). The respondent household with the biggest average chicken population is in Ohangwena with 29.11 chickens and the smallest in Oshana region

with 19.50 chickens per respondent household. Average number of ducks per respondent household is the biggest in Oshikoto region (11 ducks) and the smallest in Ohangwena region with 1.50 ducks. Not all households in all regions have guinea fowl.

II-1.3.5 Agriculture Production and Income

This sub-section reflects on the agricultural (crop) production and income of respondents.

Average Size (ha) of Different Crops to be Planted by Respondents the Next Season per Region

Crop	Ohangwena	Oshikoto	Oshana	Omusati
Millet	4.06	7.65	3.61	3.64
Sorghum	1.33	1.18	0.57	0.75
Maize	0.33		0.30	0.36
Rice	0.40	0.75	1.00	0.05
Cowpea	0.47			0.22
Others				
- Bambara nuts	0.43			0.14
- Groundnuts			2.00	0.07
- Vegetables				0.26

Source: Prepared by the Study Team

Millet is planned to be planted on average on 7.65 ha per respondent household in Oshikoto region, followed by 4.06 ha in Ohangwena, 3.64 ha in Omusati and 3.61 ha in Oshana regions. The average area to be planted per respondent under sorghum varies between 1.33 ha in Ohangwena region to 0.57 ha in Oshana region. Very small areas are to be planted with maize varying from 0.36 ha per respondent in Omusati region to on average 0.30 ha in Oshana region. Rice is to be planted on 1.00 ha on average in Oshana region to as little as 0.05 ha on average in Omusati region. Other crops are to be planted on very small areas, with vegetables only to be planted in Omusati region.

Average Production and Income This Season from Millet per Region

Millet	Ohangwena	Oshikoto	Oshana	Omusati
Average area planted (ha)	4.20	6.61	3.67	3.68
Average production (kg/ha)	324.03	461.64	471.21	468.74
Average home consumption (kg)	1 260.83	1 045.00	350.14	878.67
Average seed kept for next year (kg)	188.18	61.92	64.17	84.08
Average sold to market (kg)	1 362.50	289.58	18.55	600.00
Average price received (N\$/kg)	5.00	3.00		2.60

Source: Prepared by the Study Team

On average between 3.67 ha (Oshana region) and 6.61 ha (Oshikoto region) of millet were planted per respondent during the previous season. Average production per hectare varies between 324.03 kg in Ohangwena region to 468.74 kg per hectare in Omusati region. Average home consumption (kg) per respondent household varies between 350.14 kg in the Oshana region to 1,260.83 kg in the Ohangwena region. On average respondents held between 61.92 kg (Oshikoto region) to 188.18 kg (Ohangwena region) back as seed for next year. Respondents in Oshana region only sold on average 18.55 kg of millet to the market, while in Ohangwena they sold on average 1,362.50 kg to the market. Average price received per kg of millet sold varies between 2.60 N\$/kg in Omusati region and 5.00 N\$/kg in Ohangwena region.

Average Production and Income This Season from Sorghum per Region

Sorghum	Ohangwena	Oshikoto	Oshana	Omusati
Average area planted (ha)	0.50	3.70	9.50	0.60
Average production (kg/ha)	31.03	0.40		28.41
Average home consumption (kg)	134.44	95.50	205.00	76.80
Average seed for next year (kg)	61.75	23.00	62.83	39.54
Selling to market kg		29.17	101.82	

Source: Prepared by the Study Team

Respondents in Oshana region planted on average the biggest area with sorghum (9.50 ha), with 3.70 ha in Oshikoto region and very small areas in Ohangwena and Omusati regions. Average production per hectare varies between 28.41 kg in the Omusati region to 31.03 kg in the Ohangwena region. No figures for Oshana region could be calculated and the 0.40 kg/ha for Oshikoto region is a total outlier. Average home consumption of sorghum varies between 205.00 kg in Oshana region to 76.80 kg per respondent in the Omusati region. Respondents keep on average between 23.00 kg in Oshikoto region to 61.75 kg in the Ohangwena region for seed, while very little is actually being sold to the market.

Average Production and Income This Season from Maize per Region

Maize	Ohangwena	Oshikoto	Oshana	Omusati
Average area planted (ha)	1.16	1.75	1.50	0.23
Average production (kg/ha)	676.19	382.50	200.00	1 228.18
Average home consumption (kg)	109.29	258.50	19.00	34.00
Average seed for next year (kg)	43.57	55.50		13.20
Average sales to market (kg)				49.00
Average price received (N\$/kg)				20.00

Source: Prepared by the Study Team

Very small areas are planted on average with maize per region varying from 0.23 ha in Omusati region to 1.75 h in Oshana region. Average production per respondent varies considerably from 1.228.18 kg/ha in Omusati region to as low as 200.00 kg/ha in Oshana region. Average home consumption varies from 258.50 kg per respondent household in Oshikoto region to 19.00 kg in the Oshana region. On average between 13.2 kg (Omusati region) and 55.50 kg (Oshikoto region) maize are held back by respondents as seed for the next year, while sales of maize to the market was done in very small quantities only in Omusati region.

Average Production This Season from Rice per Region

Rice	Ohangwena	Oshikoto	Oshana	Omusati
Average area planted (ha)	0.40			0.37
Average production (kg)	50.00			1.50
Average production (kg/ha)	125.00			4.05

Source: Prepared by the Study Team

Rice was only planted by respondents in Ohangwena (0.40 ha) and Omusati (0.37 ha). Average rice production varied between 125 kg/ha in Ohangwena region to as low as 4.05 kg/ha in Omusati region.

Average Production and Income This Season from Cowpeas per Region

Cowpea	Ohangwena	Oshikoto	Oshana	Omusati
Average area planted (ha)	0.35	1.50	2.10	0.10
Average production (kg/ha)	160.00	1 666.67	1 334.44	2 000.00
Average home consumption (kg)	77.22	63.00	45.00	85.00
Average seed for next year (kg)	15.86	21.00	46.86	24.40
Average sales to market (kg)	40.00		50.67	45.00
Average price received (N\$/kg)	2.00			3.30

Source: Prepared by the Study Team

Very small areas are planted with cowpea varying from 0.10 ha in Omusati region to 2.10 ha in Oshana region. Apart from Ohangwena region (160 kg/ha), average production of cowpeas per hectare varies from 1,334.44 kg/ha in Oshana region to 2,000.00 kg/ha in Omusati region. Average home consumption varies between 45 kg per respondent household in Oshana to 85 kg in Omusati. In Ohangwena on average 40 kg of cowpeas are sold to the market, with 45 kg in Omusati and 50.67 kg in Oshana region. Average price received per kg of cowpeas sold varies between N\$2.00 in Ohangwena to N\$3.30 in Omusati region.

II-1.3.6 Livestock Production and Income

This sub-section reflects on livestock production and income received from livestock sales per region.

Average Sales and Income from Cattle per Respondent per Region for 2013 & 2014

Cattle – 2013 & 2014	Ohangwena		Oshikoto		Oshana		Omusati	
	2013	2014	2013	2014	2013	2014	2013	2014
Average number sold or slaughtered	3.14	5.82	4.90	6.42	3.00	4.60	4.40	3.00
Average number consumed at home	1.33	2.20	1.00	1.67	1.50	4.00	1.00	2.00
Average number marketed at formal market			3.80	4.33	2.50	2.00	6.00	7.00
Average price received at formal market (N\$/animal)			7 125	5 000	4 200	4 250	4 000	6 300
Average number sold at Informal market	2.33	4.78	4.57	5.33	3.00	1.00	4.00	1.00
Average price received at informal market (N\$/animal)	5 933	5 500	7 117	6 385	7 500	5 000	7 000	5 500
Average number consumed at weddings/funerals	1.00	2.50	1.00	4.00	2.00	2.00	1.67	1.57

Source: Prepared by the Study Team

Average numbers of cattle sold or slaughtered differ very little between regions. Except for the Omusati region, respondents indicated that they sold or slaughtered on average more cattle in 2014 than in 2013. The average number of cattle consumed at home varies considerably both between regions and between years. The biggest variation is in the Oshana region where on average 1.5 cattle were consumed at home in 2013 and it went up to 4 on average in 2014. Average number of cattle marketed at the formal market also varied considerably between regions, but not so much between years. In Ohangwena region no cattle were marketed at the formal market, while in Omusati region more animals were formally marketed than in any of the other regions. Average prices received at the formal markets varied between regions and years. In Oshikoto region, prices seem to decline more than in other regions, while in Omusati region the average formal price per animal increased considerably. The average number of cattle sold at the informal market also varied considerably between regions and years, while the average price per animal received at the informal markets tends to decline from 2013 to 2014 in all regions. On average between 1 and 4 cattle are annually used at weddings and funerals with considerable variations between regions and years.

Average Sales and Income from Goats per Respondent per Region for 2013 & 2014

Goats – 2013 & 2014	Ohangwena		Oshikoto		Oshana		Omusati	
	2013	2014	2013	2014	2013	2014	2013	2014
Average number sold or slaughtered	3.75	7.00	6.38	11.00	12.00	19.00	2.25	4.25
Average number consumed at home	3.00	4.75	2.63	4.40	4.50	3.33	2.00	2.29
Average number marketed at formal market			8.00	11.67		4.00		
Average price received at formal market (N\$/animal)			800.00	733.33		600.00		
Average number sold at Informal market	2.00	3.00	4.33		8.50		2.67	5.00
Average price received at informal market (N\$/animal)	980.00	666.00	1 316.67	900.00	1 050.00		633.33	725.00
Average number consumed at weddings/funerals	1.00	4.67	1.00	3.00	2.00	2.50	1.67	2.20

Source: Prepared by the Study Team

Average number of goats sold or slaughtered varied considerably between regions and years. The average number increased from 2013 to 2014 with Oshana region having sold the most and Omusati

region the least. Very little difference occurred in the average number of goats consumed between regions and years. Only Oshikoto and Oshana regions indicated that they sold goats at the formal market at prices varying between N\$600 and N\$800 per animal. Average number of goats sold at the informal market also varied very little between regions and years, except in Oshana region where on average 8.5 goats were sold per respondent in 2013. Average price received for goats decreased between years from 2013 to 2014, except for Omusati region. Average price per animal sold in Oshikoto and Oshana regions also seem to be higher than in other regions. Average number of goats consumed at weddings and funerals seem to increase from 2013 to 2014 with the highest numbers in Ohangwena region in 2014.

Average Sales and Income from Pigs per Respondent per Region for 2013 & 2014

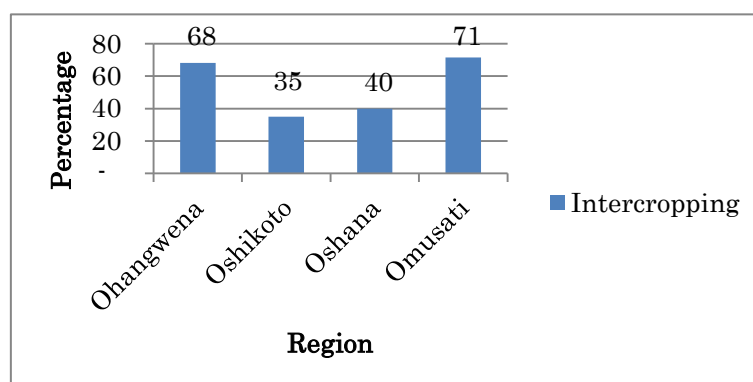
Pigs – 2013 & 2014	Ohangwena		Oshikoto		Oshana		Omusati	
	2013	2014	2013	2014	2013	2014	2013	2014
Average number sold or slaughtered		2.86						2.00
Average number consumed at home		2.00				2.00		
Average price received at formal market (N\$/animal)						800.00		500.00
Average number sold at Informal market		3.00				1.00		3.00
Average price received at informal market (N\$/animal)		400.00				800.00		275.00
Average number consumed at weddings/funerals		2.00						1.00

Source: Prepared by the Study Team

No trading in sheep was reported on in this survey and very few pigs were sold as well.

II-1.3.7 Farm Management Practices

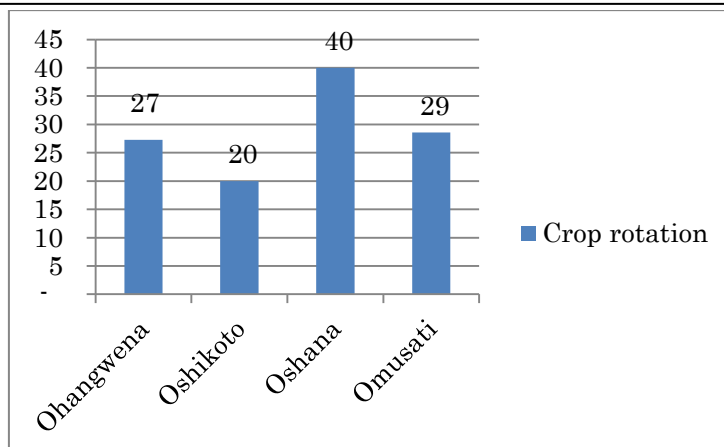
This sub-section reflects on farming practices that respondents are applying on their land for both crop and livestock enterprises.



Source: Prepared by the Study Team

Percentage of Respondents that apply Intercropping per Region

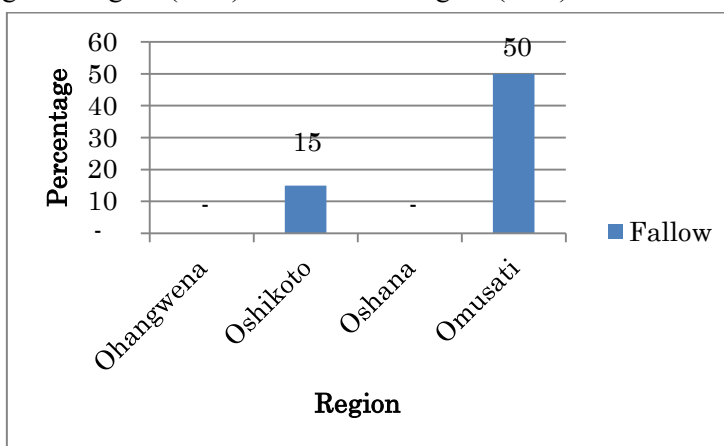
The majority of respondents indicated that they apply intercropping in Omusati region (71%), followed by Ohangwena region (68%), Oshana region (40%) and Oshikoto region (35%).



Source: Prepared by the Study Team

Percentage of Respondents that apply Crop Rotation per Region

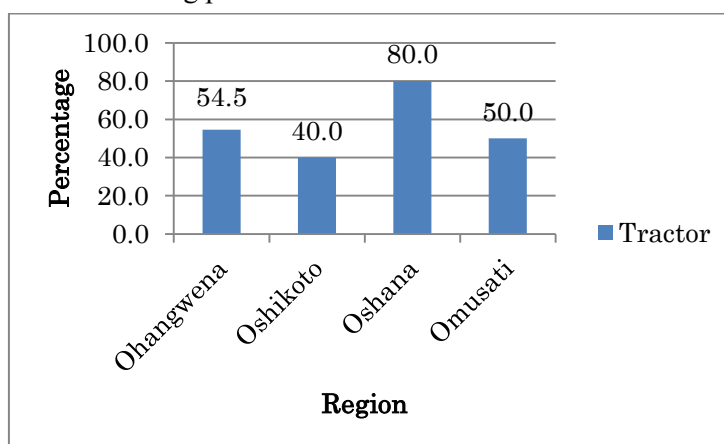
In Oshana region 40% of respondents indicated that they apply crop rotation, followed by Omusati region (29%), Ohangwena region (27%) and Oshikoto region (20%).



Source: Prepared by the Study Team

Percentage of Respondents that apply Fallowing per Region

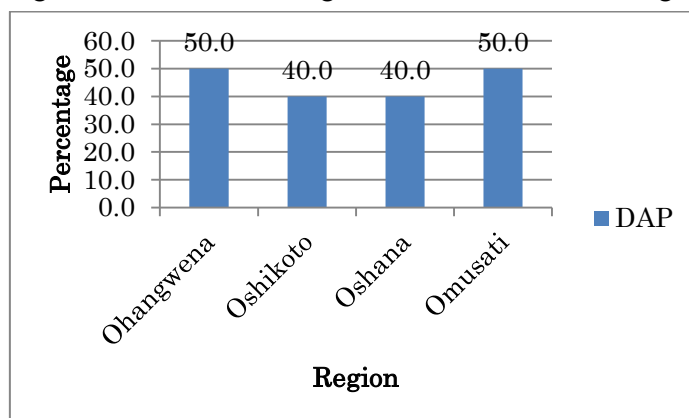
In Omusati region 50% of the respondents indicated that they apply fallowing practices, while in Oshikoto region only 15% indicated it. None of the respondents in Ohangwena and Oshana region reported the application of fallowing practices.



Source: Prepared by the Study Team

Percentage of Respondents that use Tractor Services per Region

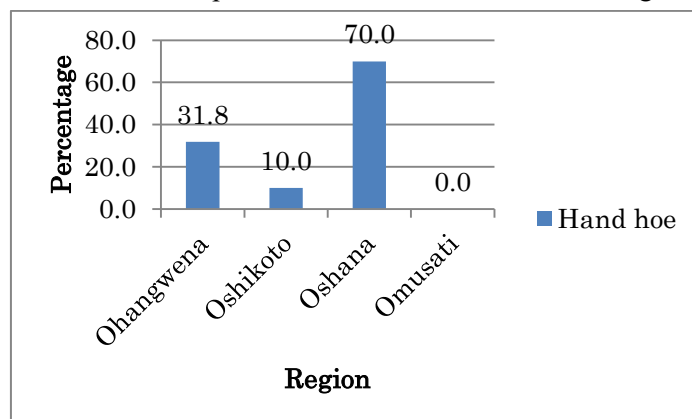
In Oshana region 80% of the respondents indicated that they make use of tractor services, followed by 54.5% in Ohangwena region, 50% in Omusati region and 40% in Oshikoto region.



Source: Prepared by the Study Team

Percentage of Respondents that use Draught Animal Power per Region

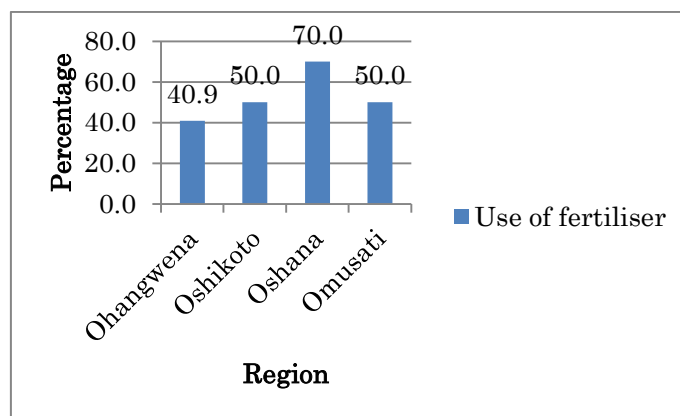
Half of the respondents in both Ohangwena and Omusati regions indicated that they make use of draught animal power (DAP), while 40% of respondents in Oshikoto and Oshana regions use it.



Source: Prepared by the Study Team

Percentage of Respondents that use Hand Hoes per Region

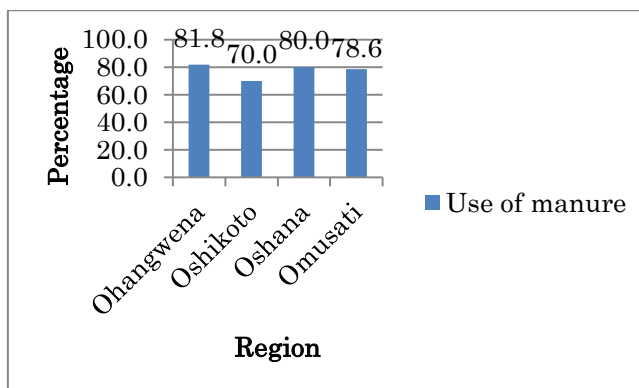
Seventy percent of respondents in Oshana use hand hoes, while in Ohangwena only 31.8% of them use it. Only 10% of respondents use hand hoes in Oshikoto region, while no respondent indicated using a hand hoe in Omusati region.



Source: Prepared by the Study Team

Percentage of Respondents that use Fertilizer per Region

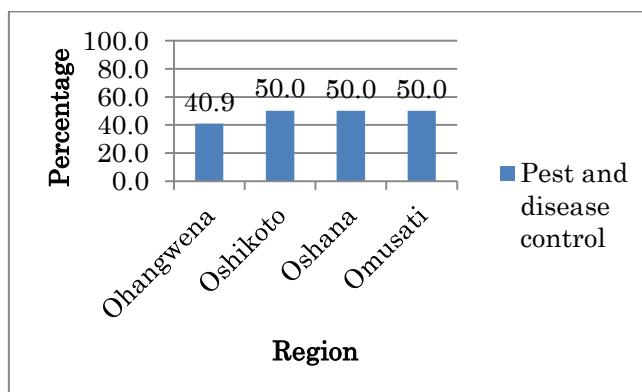
In Oshana region, 70% of respondents indicated that they use fertilizer, while in both Oshikoto and Omusati regions only 50% make use of fertilizers. In Ohangwena region only 40.9% of the respondents make use of fertilizer.



Source: Prepared by the Study Team

Percentage of Respondents that use Manure per Region

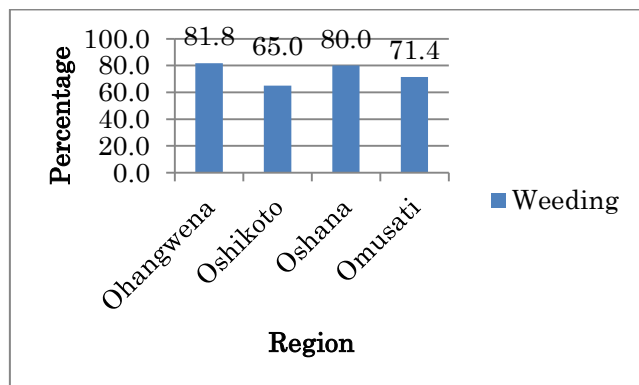
Relatively high proportions of respondents in all regions indicated that they make use of manure, with Ohangwena the highest at 81.8%, followed by Oshana with 80%, Omusati with 78.9% and Oshikoto with 70%.



Source: Prepared by the Study Team

Percentage of Respondents that do Pest and Disease Control per Region

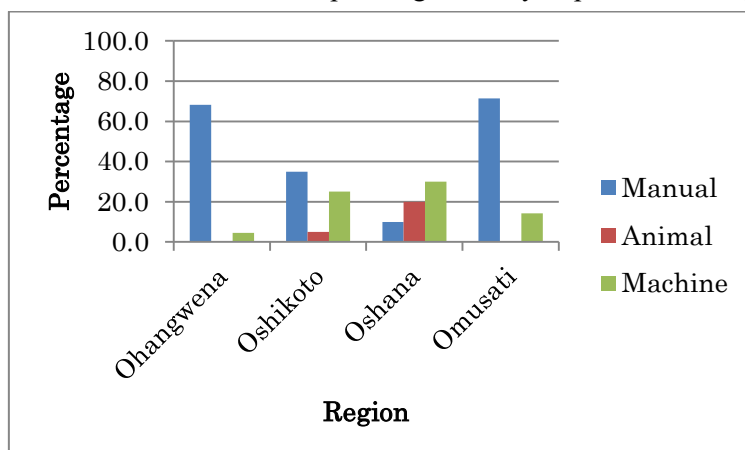
Relatively low proportions of respondents indicated that they do pest and disease control. In Oshikoto, Oshana and Omusati regions 50% are doing it, while in Ohangwena region only 40.9% are doing pest and disease control.



Source: Prepared by the Study Team

Percentage of Respondents that do Weeding per Region

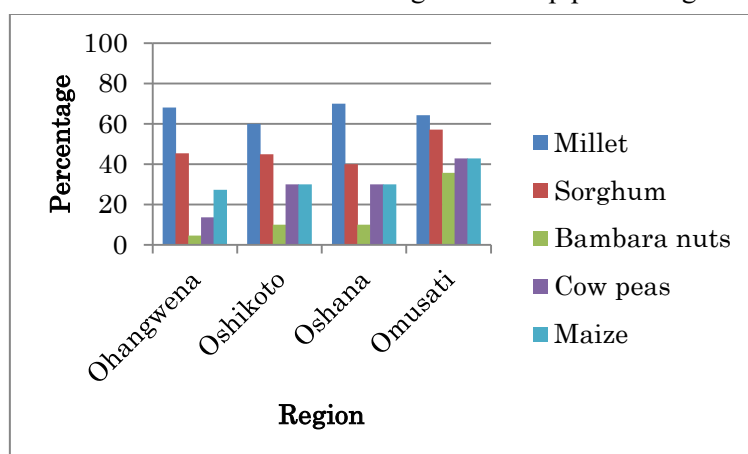
In both Ohangwena and Oshana regions 80% and more respondents are doing weeding, but in Omusati region only 71.4% and in Oshikoto 65% are implanting this very important farming practice.



Source: Prepared by the Study Team

Percentage of Respondents using Different Means of Processing their Crops per Region

Manual processing is the most commonly used technology used in Ohangwena, Oshikoto and Omusati regions, while machine technology is most commonly used amongst respondents in the Oshana region. Animal power is also used in Oshikoto and Oshana region for crop processing.



Source: Prepared by the Study Team

Percentage of Respondents that Use Improved Seed Varieties for Different Crops per Region

Millet is the crop where most respondents use improved seed varieties, followed by sorghum, cow peas, maize and bambara nuts. In Omusati region, the largest proportion of respondents use improved seed varieties of all the mentioned crops.

Average Cattle Production of Respondents for 2013 and 2014 per Region

Cattle production (2014)	Ohangwena	Oshikoto	Oshana	Omusati
Average number of cows	12.75	27.18	13.50	8.67
Average number of births (calves)	7.06	9.92	6.50	5.45
Average production rate (%)	50.22	41.46	56.11	54.95
Average number of calves died	1.00	2.92	0.38	1.45
Average mortality rate (%)	7.84	10.75	2.78	16.78
Cattle production (2013)	Ohangwena	Oshikoto	Oshana	Omusati
Average number of cows	15.08	25.00	9.86	9.42
Average number of births (calves)	7.08	8.69	5.38	3.73
Average production rate (%)	40.20	51.04	60.89	41.98
Average number of calves died	3.80	3.33	0.67	2.25
Average mortality rate (%)	25.19	13.33	6.76	23.89

Source: Prepared by the Study Team

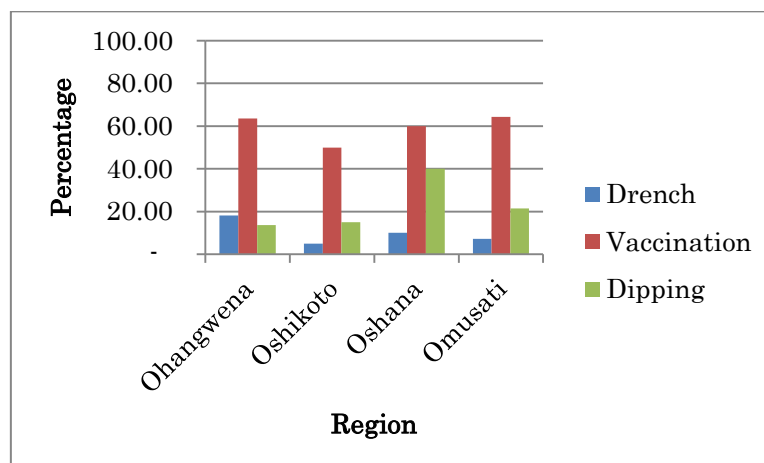
Average number of cows per respondents is highest in Oshikoto for both 2013 (25 cows) and 2014 (27.18 cows). Average production rates are the highest in Oshana region for both 2013 (60.89%) and 2014 (56.11%). Average mortality rates for calves are the lowest also in Oshana region for both 2013 (6.76%) and 2014 (2.78%). Average mortality rates for calves are generally too high in all other regions, mainly in Ohangwena region in 2013 (25.19%) and in Omusati region in both 2013 (23.89%) and in 2014 (16.78%).

Average Goat Production of Respondents for 2013 and 2014 per Region

Goat production (2014)	Ohangwena	Oshikoto	Oshana	Omusati
Average number of breeding does	26.6	24.8	18.9	65.2
Single	16.4	14.8	7.3	26.7
Twins	9.0	8.2	6.7	9.8
Triplets	5.0	1.0	0.3	0.0
Average number of Kids	10.5	20.1	9.4	9.4
Average production rate (%)	71.35	70.74	68.49	107.63
Average number of kids died	6.6			
Average mortality rate (%)	13.30	12.05	21.67	18.12
Goat production (2013)	Ohangwena	Oshikoto	Oshana	Omusati
Average number of breeding does	28.9	25.1	13.3	25.1
Single	15.8	4.0	4.6	16.4
Twins	0.0	16.4	2.8	6.0
Triplets	0.0	6.0	0.0	0.0
Average number of Kids	7.2	19.9	5.4	15.1
Average production rate (%)	49.00	101.24	66.67	65.42
Average number of kids died	4.50	5.43	2.17	2.60
Average mortality rate (%)	8.3	7.5	13.6	10.5

Source: Prepared by the Study Team

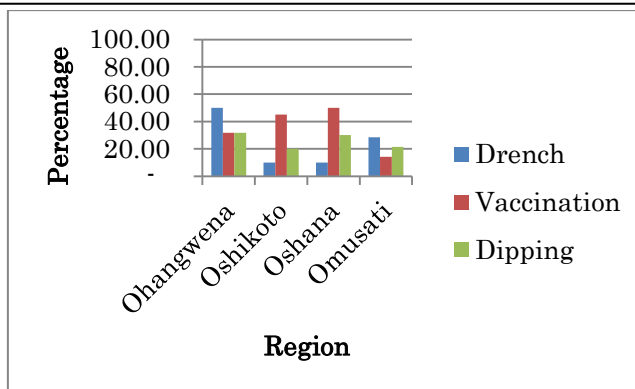
The average number of goat does in the flock vary from 65.2% in Omusati region to 18.9 in Oshana region. Average production rates for goats are low compared to the 150% that should be the target in commercial farming areas. Mortality rates are also alarmingly high is goats are to be used in commercial livestock production.



Source: Prepared by the Study Team

Average Percentage Respondents that Drench, Vaccinate and Dip Cattle per Region

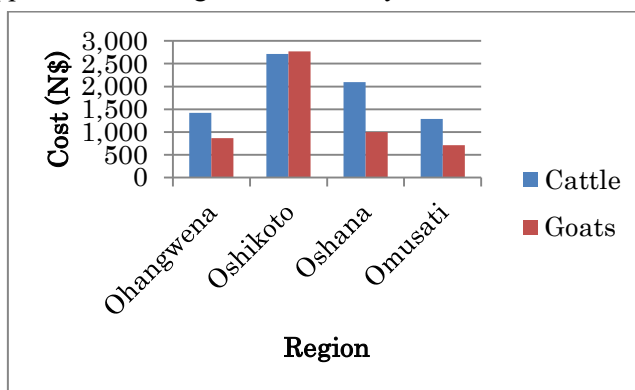
Vaccination is the most commonly applied husbandry practice by cattle farmers for all the regions, although only between 50% and 65% of them apply it, which is alarming. Dipping is being done by a small proportion of farmers in all regions, with the highest in Oshana region. Drenching of cattle also takes place, but at very low proportions.



Source: Prepared by the Study Team

Average Percentage Respondents that Drench, Vaccinate and Dip Goats per Region

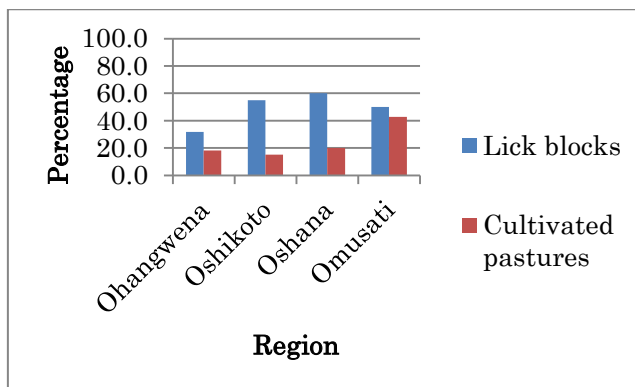
Variable application of vaccination for goats takes across the regions. In Oshana the highest proportion of respondents indicated that they vaccinate their goats, followed by Oshikoto, Ohangwena and Omusati regions. It is however alarming that very few farmers are actually applying this important practice. Drenching of small stock takes place in Ohangwena mostly, followed by Omusati, Oshana and Oshikoto. Dipping is also being applied over all regions, but to very low levels, which is alarming.



Source: Prepared by the Study Team

Average Cost (N\$) for Drenching, Vaccination and Dipping of Cattle and Goats per Region

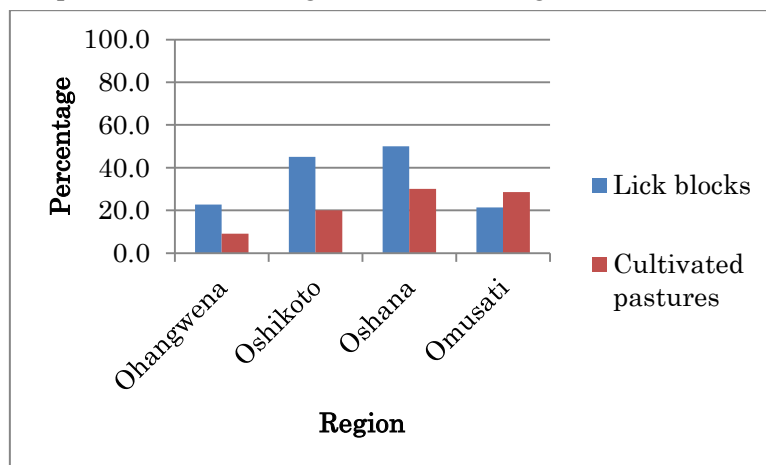
Average cost of husbandry practices are the highest for both cattle and goats in the Oshikoto region, followed by the Oshana region and then the Omusati and Ohangwena region. The costs for applying these husbandry practices are higher for the cattle component of the farming enterprise compared to the goat component.



Source: Prepared by the Study Team

Average Percentage Respondents using Lick Blocks and Cultivated Pastures for Cattle per Region

Lick blocks are being provided by cattle farmers in all four regions, with the highest incidence in Oshana region, followed by Oshikoto, Omusati and Ohangwena regions. Cultivated pasture are being use by a small proportion of respondents, with the highest in Omusati region.



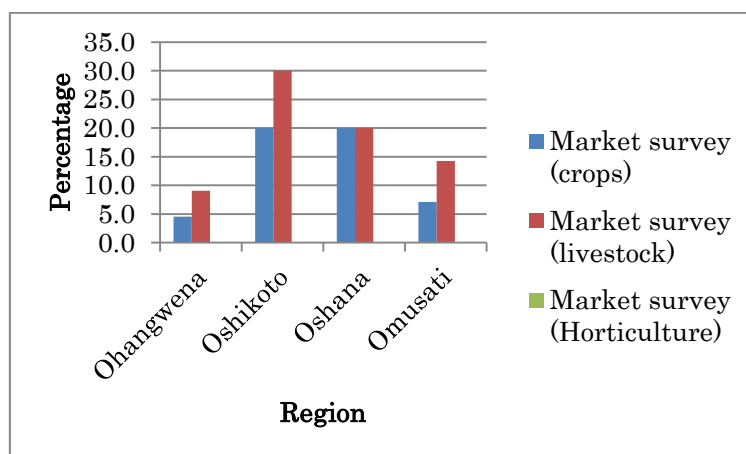
Source: Prepared by the Study Team

Average Percentage Respondents using Lick Blocks and Cultivated Pastures for Goats per Region

Lick blocks are also provided to goats in all four regions, with the highest incidence in Oshana region, followed by Oshikoto, Ohangwena and Omusati regions. Cultivated pastures are being used by a small proportion of respondents in all four the regions, with the highest in Oshana region.

II-1.3.8 Crop and Livestock Marketing

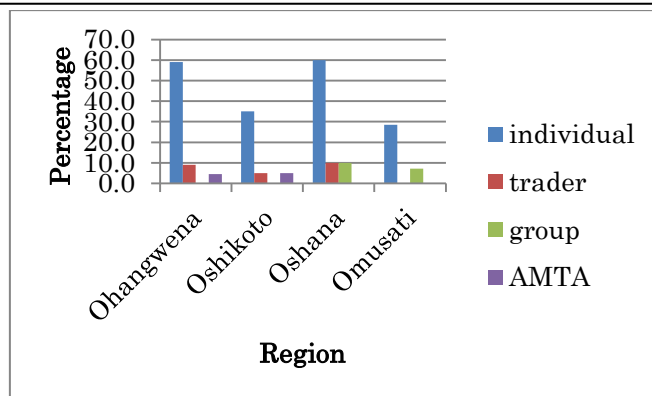
This sub-section reflects on marketing related practices being applied by crop, livestock and horticulture farmers.



Source: Prepared by the Study Team

Percentage of Respondents doing Market Surveys per Region

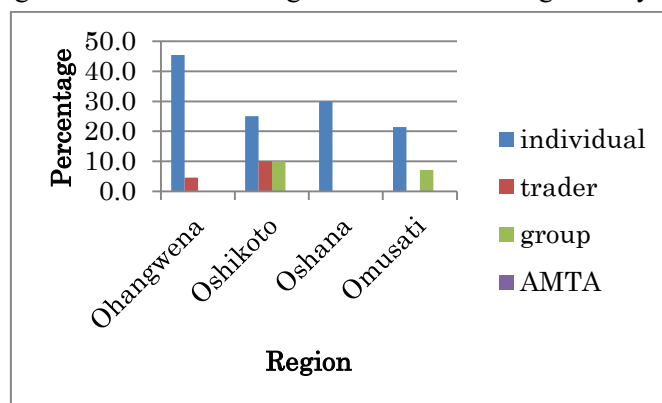
Respondents in all regions have indicated that they do market surveys for both crop and livestock farming, while for horticulture farming no evidence of such activities amongst respondents were recorded. Although the proportion of respondents that are applying these surveys remains low, it is the highest in Oshikoto region for both crops and livestock marketing. In most cases, except Oshana region, market surveys for livestock are more frequently done than for crop production.



Source: Prepared by the Study Team

Percentage of respondents using different channels of market survey for crops per region

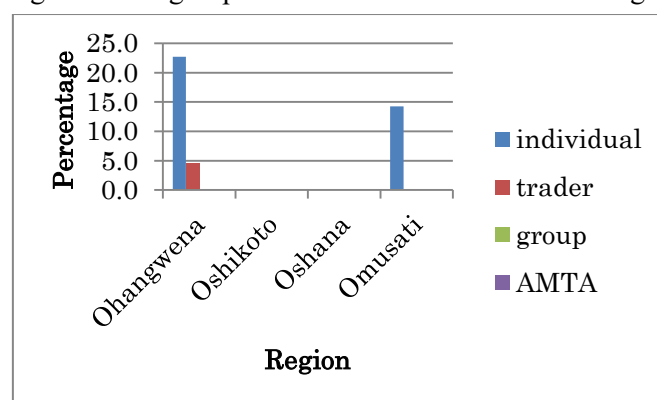
In all regions respondents farming with crops indicated that visiting the markets on an individual basis is by far the most common way of doing market research. In some regions traders (Ohangwena, Oshikoto and Oshana) are used, and in Oshana and Omusati regions other groups are also used for marketing purposes. Only in Ohangwena and Oshikoto regions AMTA are being used by respondents.



Source: Prepared by the Study Team

Percentage of respondents using different channels of market survey for livestock per region

For livestock production a similar situation than for crops exists in terms of the way of doing market research. In most cases in all regions farmers go individually to the market and obtain market information. In some regions like Ohangwena and Oshikoto traders seem to play a bigger role, while in Oshikoto and Omusati regions other groups are also used to obtain marketing information.



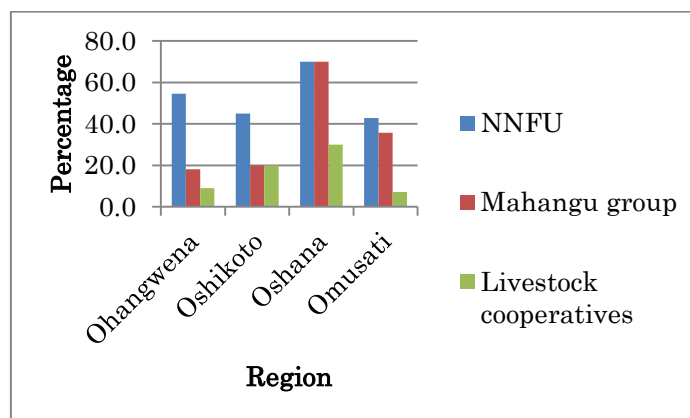
Source: Prepared by the Study Team

Percentage of respondents using different channels of market survey for horticulture per region

For obtaining market information by horticulture farmers, mainly individuals go to the markets themselves. Only in Ohangwena region some traders are being used, while no other groups or even AMTA have been mentioned by respondents as mechanisms for obtaining information on horticultural prices.

II-1.3.9 Group Activities

This sub-section reflects on the participation of respondents in group activities and organized agriculture.



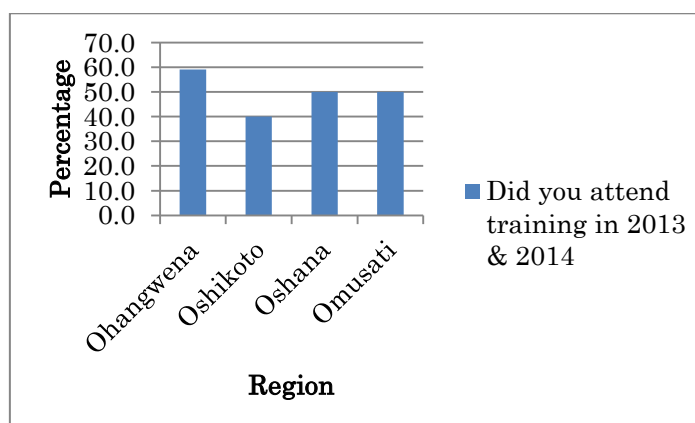
Source: Prepared by the Study Team

Percentage Respondents belonging to Different Farmer Groups per Region

In all regions respondents indicated that they belong to the NNFU, with the highest membership in Oshana region, followed by Ohangwena, Oshikoto and Omusati regions. In the Oshana region a considerable proportion of respondents indicated that they belong to Mahangu groups, while a small proportion of respondents indicated that they belong to livestock marketing cooperatives.

II-1.3.10 Agriculture Support Services including Extension

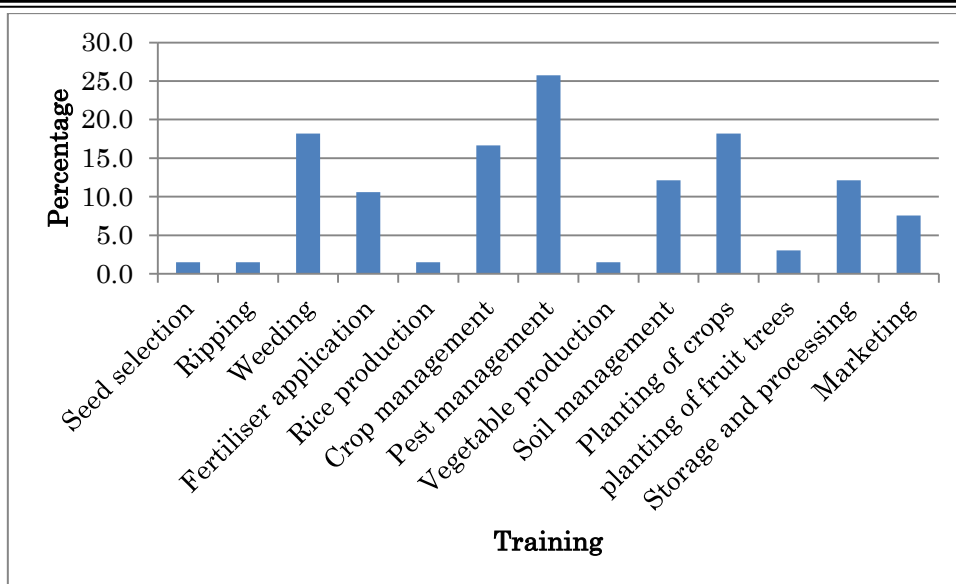
This sub-section reflects on agricultural support services (including extension services) that were received over 2013 and 2014.



Source: Prepared by the Study Team

Percentage Respondents that attended Training in 2013/14 per Region

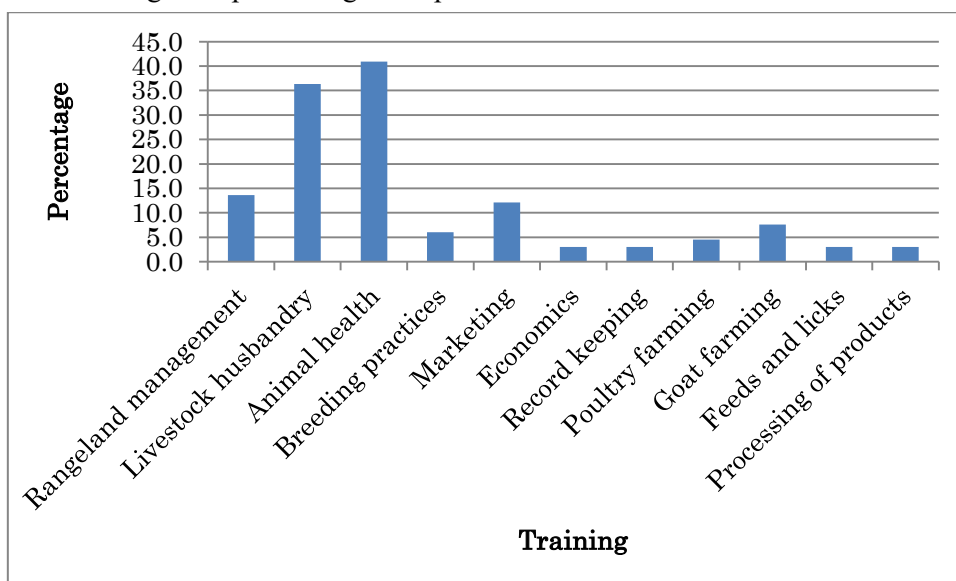
Respondents indicated in all regions that they attended training courses in 2013 and 2014, with the highest percentage in Ohangwena region, followed by Oshana and Omusati regions, and Oshikoto region. Although all of them attended some training, the proportion of the respondents that did it, is very low.



Source: Prepared by the Study Team

Training Courses received by Respondents on Crop Production for all Regions combined

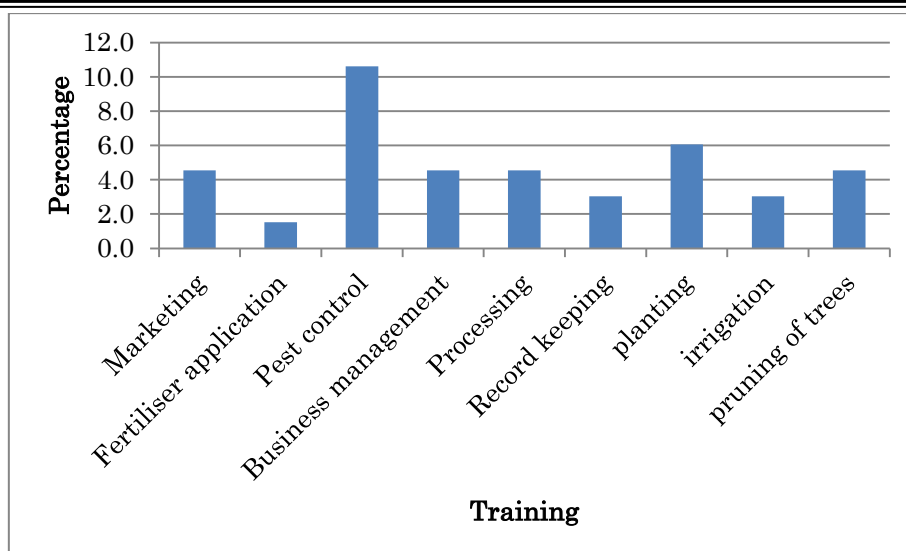
Pest management amongst crops followed by planting of crops, weeding, and crop management and fertilizer application were the major topics that respondents received training. Some training on soil management and storage and processing of crops were also received.



Source: Prepared by the Study Team

Training Courses received by Respondents on Livestock Production for all Regions combined

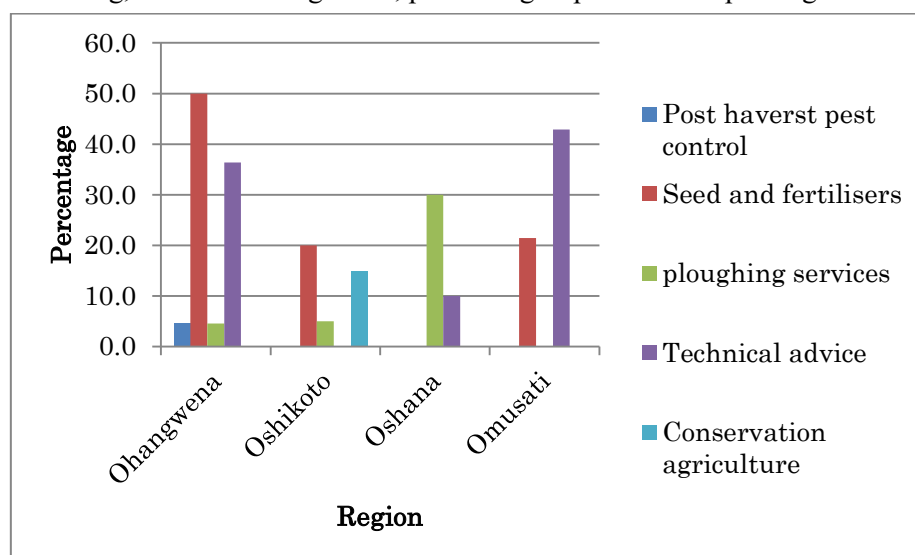
Topics of training courses received by livestock farmers are dominated by animal health and livestock husbandry. Although some trainings were provided on rangeland management and marketing, only small proportions of respondents attended to them.



Source: Prepared by the Study Team

Training Courses received by Respondents on Horticulture Production for all Regions combined

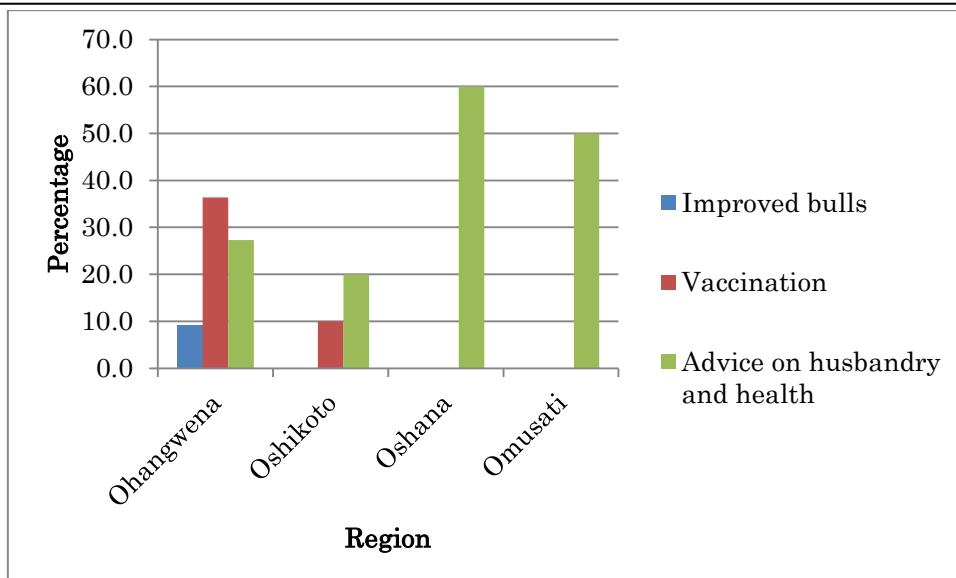
Pest control was the most prominent training topic for horticulture respondents, followed by planting techniques, marketing, business management, processing of produce and pruning of trees.



Source: Prepared by the Study Team

Services received by Respondents in Crop Production per Region

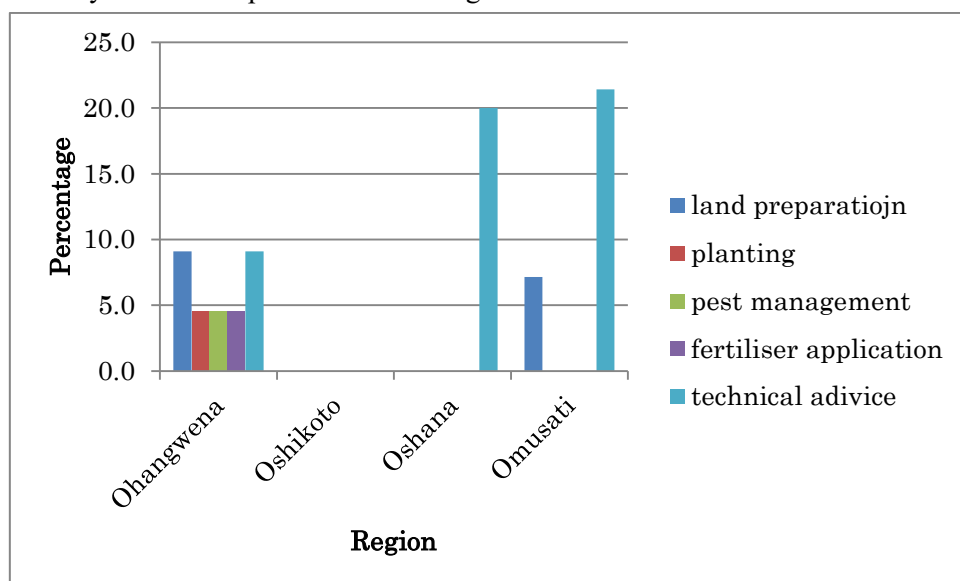
Respondents indicated that services in terms of seed and fertilizer provision was the most prominent service provided to them in Ohangwena region, while some are also provided in Oshikoto and Omusati regions. Technical advice on crop production is provided to respondents in Ohangwena, Omusati and Oshana regions. In the Oshikoto region some inputs in terms of conservation agriculture were provided to respondents.



Source: Prepared by the Study Team

Services received by Respondents in Livestock Production per Region

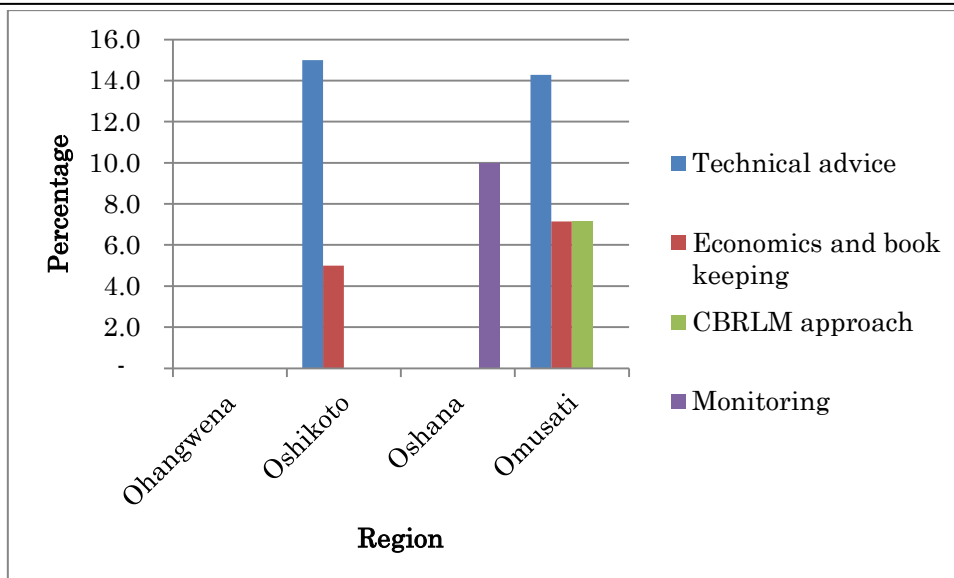
In terms of services provided to respondents, advice on husbandry and livestock health was the most prominent in Oshana and Omusati regions. In Ohangwena region and to a limited extent in Oshikoto region, vaccination services were provided by government. Respondents in the Ohangwena region indicated that they received improved bulls from government.



Source: Prepared by the Study Team

Services received by Respondents in Horticulture Production per Region

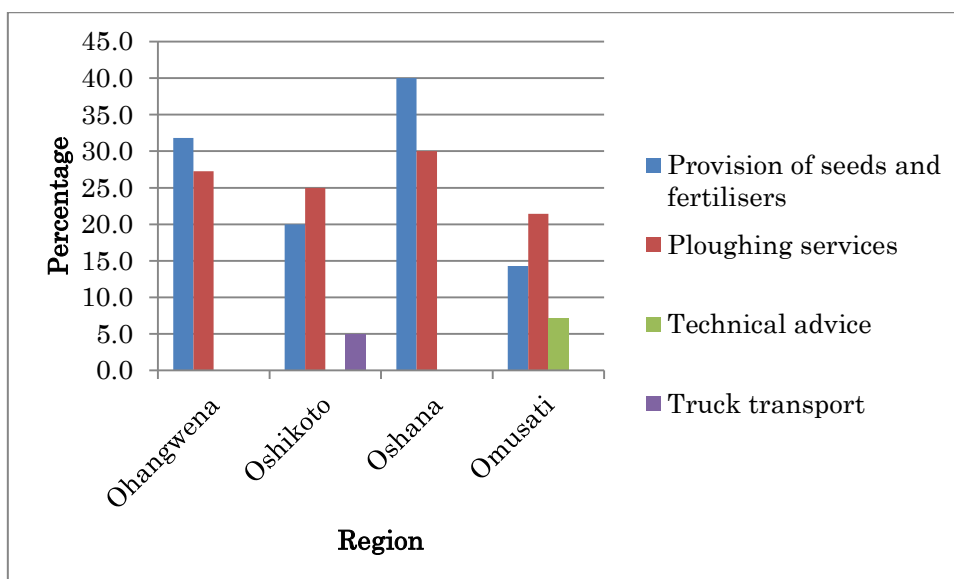
In terms of services provided to horticulture farmers, the respondents indicated that the most dominant service was in terms of land preparation, mainly in Oshana and Omusati regions. Some services in terms of pest management, planting practices, and fertilizer application were also provided in the Ohangwena region.



Source: Prepared by the Study Team

Services received by Respondents in Farm Management per Region

Technical advice on farm management was the most popular service provided to farmers in Oshikoto and Omusati regions, with some advice on economics and book keeping in Omusati and Oshikoto regions as well.



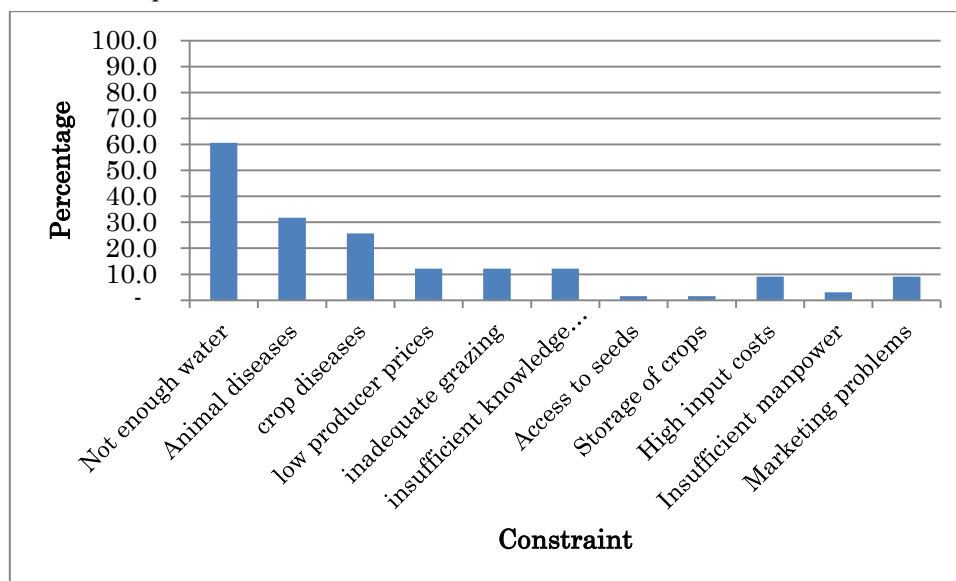
Source: Prepared by the Study Team

Services received by Respondents through DCPD per Region

In the DCPD programme respondents indicated that they mainly received services in the provision of seeds and fertilisers, followed by ploughing services.

II-1.3.11 Intentions of Farmers

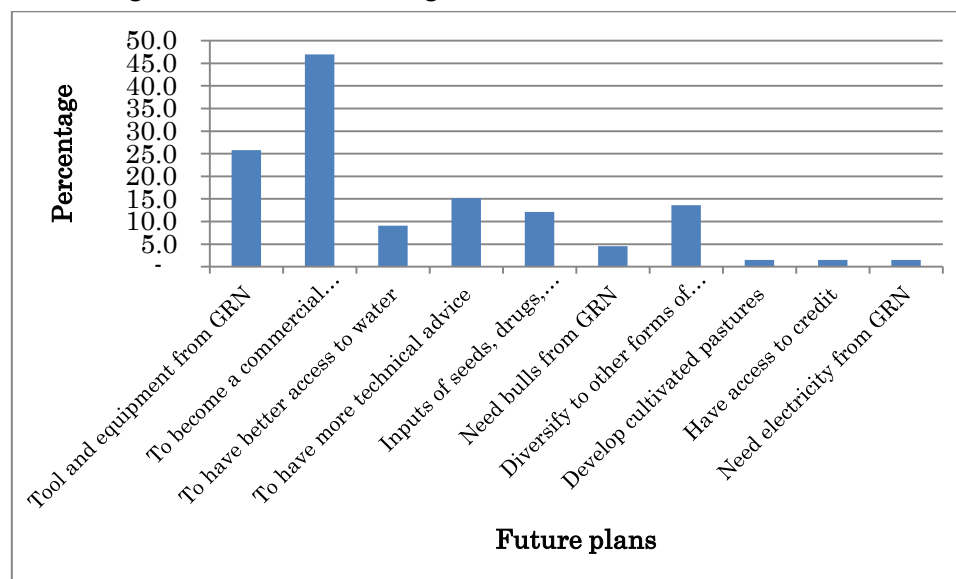
This sub-section reflects on the major constraints that respondents face in their farming operations, as well as on their future plans.



Source: Prepared by the Study Team

Constraints faced by Respondents in all Regions combined

Limited access to good water is definitely the most prominent constraint that respondents face, followed by a high prevalence of livestock diseases, crop diseases, low producer prices, inadequate grazing and insufficient knowledge on commercial farming.



Source: Prepared by the Study Team

Future Plans of Respondents for all Regions combined

Nearly half of the respondents indicated that their future plan is to become a commercial farmer. They however also indicated a high priority to access to tools and equipment to be provided by government, access to more technical advice, and diversification of their enterprises into rice, vegetables, goat and chicken farming. Access to clean and affordable water was also highlighted in their future plans.

II-1.4 Fixed Point Observation

II-1.4.1 Introduction

Through the interview in Detailed Thematic Survey, micro level information of crop, livestock and horticulture production in each ADC is collected, while seasonal or periodical challenges and problems may occur during cropping season, which cannot be captured enough in the questionnaire. In order to collect such additional information, fixed point observation had been conducted for the selected farmers from those who were interviewed during Detailed Thematic Survey.

II-1.4.2 Methodology

Among the farmers interviewed in Detailed Thematic Survey, Three farmers are selected in each region for fixed point observation. The selection of the target farmers have been done in 3rd Stakeholder Meetings together with Chief Agricultural Scientific Officers (CASO), Chief Agricultural Technicians (CAT) and ATs in each region. Technical assistant of JICA Study Team together with AT of the ADC visit the selected farmer's fields every 2 weeks to have short interviews to them to monitor and follow-up their activities by using monitoring sheet. Following information are collected during the observation; activities during past 2 weeks, plan for next 2 weeks, problems and challenges observed. Major check points for observation are listed below.

Check Points for Observation for each Production Type

Crop Production	Livestock Production	Horticulture
-Type of crops cultivated (main, intercrop, variety, etc) -Land preparation (timing, cost) - Seeding (timing, method, volume, cost) -Fertilizer/manure application (timing, method, volume, cost) -Agricultural chemical application (timing, method, volume, cost) -Weeding (timing, method, cost) -Protection method from animal -Water availability -Harvest (timing, method, volume, cost) -Post harvest (threshing, winnowing, etc) -Marketing (timing, place, volume, price) -Group activities	-Type and number of livestock -Mode of feeding/watering -Place for grazing (maintenance, if any) -Disease control (timing, method, cost) -delivering (timing, etc.) -By-product -Marketing (timing, place, volume, price) -Group activities	-Type of vegetables cultivated (including variety) -Land preparation (timing, cost) - Seeding (timing, method, volume, cost) -Fertilizer/manure application (timing, method, volume, cost) -Agricultural chemical application (timing, method, volume, cost) -Weeding (timing, method, cost) -Protection method from animal -Water availability -Harvest (timing, method, volume, cost) -Post harvest (threshing, winnowing, etc) -Marketing (timing, place, volume, price) -Group activities

Source: Prepared by the Study Team

The observation starts from February 2015 to beginning of May, end of cropping season. The detailed observation schedule is described below:

Schedule for Observation

	Omusati	Oshana	Oshikoto	Ohangwena
1st Visit	Feb 13 2015	Feb 04 2015	Feb 12 2015	Feb 17 2015
2nd Visit	Feb 27 2015	Feb 19 2015	Feb 26 & Mar 11 2015	Feb 25 & Mar 03 2015
3rd Visit	Mar 12 2015	Mar 05 2015	Mar 24 2015	Mar 17 2015
4th Visit	Mar 26 2015	Mar 19 2015	Apr 07 2015	Mar 31 2015
5th Visit	Apr 09 2015	Apr 17 2015	Apr 22 2015	Apr 14 2015
6th Visit	Apr 23 2015			

Source: Prepared by the Study Team

II-1.4.3 Results and Findings

The observation results per production type are shown in Table II-1.4.1 and summarized below.

Observation Results per Production Type

	Crop Production	Livestock Production	Horticulture
Main Activities	-Land preparation -Fertilizer application -Cultivating and ploughing -Transplanting -Weeding -Pest control	-Herding -Dehorning -Vaccination -Branding -Castrating	-Land/plot preparation -Planting -Irrigating -Mulching -Fertilizer and Pesticides application
Findings	-Planting at the beginning December 2014 after the good rains and at the beginning of February 2015. -Many farmers will have a low harvesting due to lack or limited rainfall. -Types of Ploughing used are cattle, and private and GRN tractors.	-Farmers are always on the looking for better grazing areas -Auctions are held at ADCs or Community Centre in each region, every 2-3 months. This depends on the organizing committee and the farmers. -Most of the farmers have the livestock at the Cattle posts where there are better grazing areas and they employ herders to look after the animals. -Medicines are available in most towns and at Councilors' office but there is a concern regarding the cost -Agra Trade in Oshakati is the main suppliers of the Supplementary feeds and medicine. -Households usually make a contribution of N\$300-600 on a monthly basis for community water supply usually a borehole – the contribution also goes towards the payment for the pump operator. -There is a need for natural water storage – dams- to be built as water dry up quickly	-Gardening skills need to be enhanced as some farmers
Problems and Challenges	-Delayed and no rainfall -Damage of birds and pests such as crickets, ants, worms and millipedes -Sun is too harsh -Recruitment of laborers for fields work is costly about N\$200/day per worker. -Most farmers during this season only managed to cultivate certain parts of the land due to lack of rain and delayed GRN tractors. This has also led farmers to do replanting at the first cultivated areas where the seeds did not germinate well.	-Water from natural dams drying up -Medicines are expensive and suppliers are far -Supplementary feeders are located far from the cattle posts -GRN services are mostly delayed due to one AT serving a big number of farmers. -Price of herders in some areas is expensive -In some areas, some farmers are hesitant in joining/forming farmers' groups, which prevent willing farmers to receive benefits from the GRN such as free vaccination, and trainings	-Damage of pests and diseases -Lack of enough space, garden structures, irrigation systems, shading, cultivating tools and machineries -Lack and limited gardening skills -Rural Water Supply has put the water application on hold thus it reduces the farming activities -Expensive transport to go and sell the vegetables at markets

Source: Prepared by the Study Team

Insufficient water is the biggest challenges for all the production type farmers. While livestock production farmers and horticulture farmers try to tackle with the problem by utilizing community water supply for their animals and vegetables, crop production farmers can only manage to minimize the damage by re-planting their crops. Financial problems are found in all the production type farmers but the reasons are varied such as: expensive laborer cost for crop and livestock production farmers, cost for medicines for livestock farmers, and cost for water for livestock and horticulture farmers. Most farmers have attended meetings and trainings organized by MAWF, MeatCo, Farmer's

Associations, AgriBusDev and other training bodies. Among all, training for gardening skill is most required.

The following table described the comparison of observation results per regions.

Comparison of Results according to Regions

Type	Omusati	Oshana	Oshikoto	Ohangwena
Crops	Sufficient rainfall in some parts of the region will be better yield.	The rainfall was not sufficient enough. Most farmers' fields will not produce good and enough crops.	They do receive better rainfall thus fields have better crops but pests are a big problem	Because of limited water farmers have not managed to cultivate the whole fields. Damages of Animals and birds are a big problem
Livestock	Better grazing areas as the region receives sufficient rainfall lead to healthy and productive livestock Livestock at the cattle post	Meetings conducted on regular basis Livestock at the Cattle post	Type of livestock mainly cattle, goats, chicken, and goats and chicken are easily affected by diseases Livestock at Cattle post	Affected by lack of rain – always looking for better grazing areas Livestock at the Cattle post
Horticulture	The region has better soil for gardening compared to the three regions.	Garden and nursery with variety of vegetables and plants located at the main road for great marketing. Attends a lot of trainings	Has a variety of vegetables and fruits in the garden such as herbs, potatoes, Irrigation system need to be upgraded	Lack of water because of Rural water Supply has put applications on hold, and irrigation system need to be installed

Source: Prepared by the Study Team

Omusati and Oshikoto regions got better rainfall compared to the other 2 regions, which lead better growth of crops. Damage on crops by animals, birds and pests are observed only in Oshikoto and Ohangwena. All the livestock production farmers brought their animals to cattle post, and the grazing area in Omusati seems to be better than the others because of good rain. Horticulture farmers are varies from region to region such as with better soil condition in Omusati, market potential in Oshana, various vegetables with irrigation facility in Oshikoto, while water problem is serious in Ohangwena. In conclusion, farmers in Omusati region have better agricultural environment than those in other regions in this year.

CHAPTER II-2 PRELIMINARY ASSESSMENT OF DEVELOPMENT POTENTIAL

II-2.1 General

In order to formulate the master plan for crop and livestock development in the northern part of Namibia, it is inevitable to evaluate development potential in the target area. There are various study and research in this field of subjects as listed below:

Spotlight on Agriculture published by MAWF

- ◆ No.28: Mapping the Soils of Namibia (2000)
- ◆ No.34: Farm Database of Namibia (2000)
- ◆ No.38: Vegetation Survey of Namibia (2000)
- ◆ No.41: Good Land Husbandry Starts Here: Inventorying and Assessing the Land Resources of Namibia (2001)
- ◆ No.48: NAMSOTER: A Soil and Terrain Database and Geographical Information System for Namibia (2001)
- ◆ No.65: Characteristics of Namibian Soils in a Nutshell (2003)
- ◆ No.99: Using Remote Sensing in Search of Grazing Capacity (2006)
- ◆ No.100: An Accurate Grazing Capacity Map for Namibia - Myth or Reality (2006)
- ◆ No.107: Using Remote Sensing in Search of Grazing Capacity - an Update from 2007 (2008)
- ◆ No.113: Using Remote Sensing in Search of Grazing Capacity - the Saga Continues (2009)
- ◆ No.120: Using Remote Sensing in Search of Grazing Capacity - Short Note on the Final Data (2010)

Others

- ◆ Celeste Espach, Leon G. Lubbe and Nicholas Ganzin (2006), Determining grazing capacity in Namibia: Approaches and Methodologies, AGRICOLA 2006
- ◆ Ute Shneiderat, Marianna Siegmund-Schultze and Jorg Steinbach (2005), Do Communal Rangelands Meet the Requirements of Livestock in Namibia, document for the Conference on International Agricultural Research for Development
- ◆ Ministry of Environment and Tourism (2002), Atlas of Namibia, compiled in collaboration with relevant Ministries including MAWF
- ◆ Ministry of Environment and Tourism (2000), A profile of north-central Namibia, compiled in collaboration with relevant Ministries including MAWF

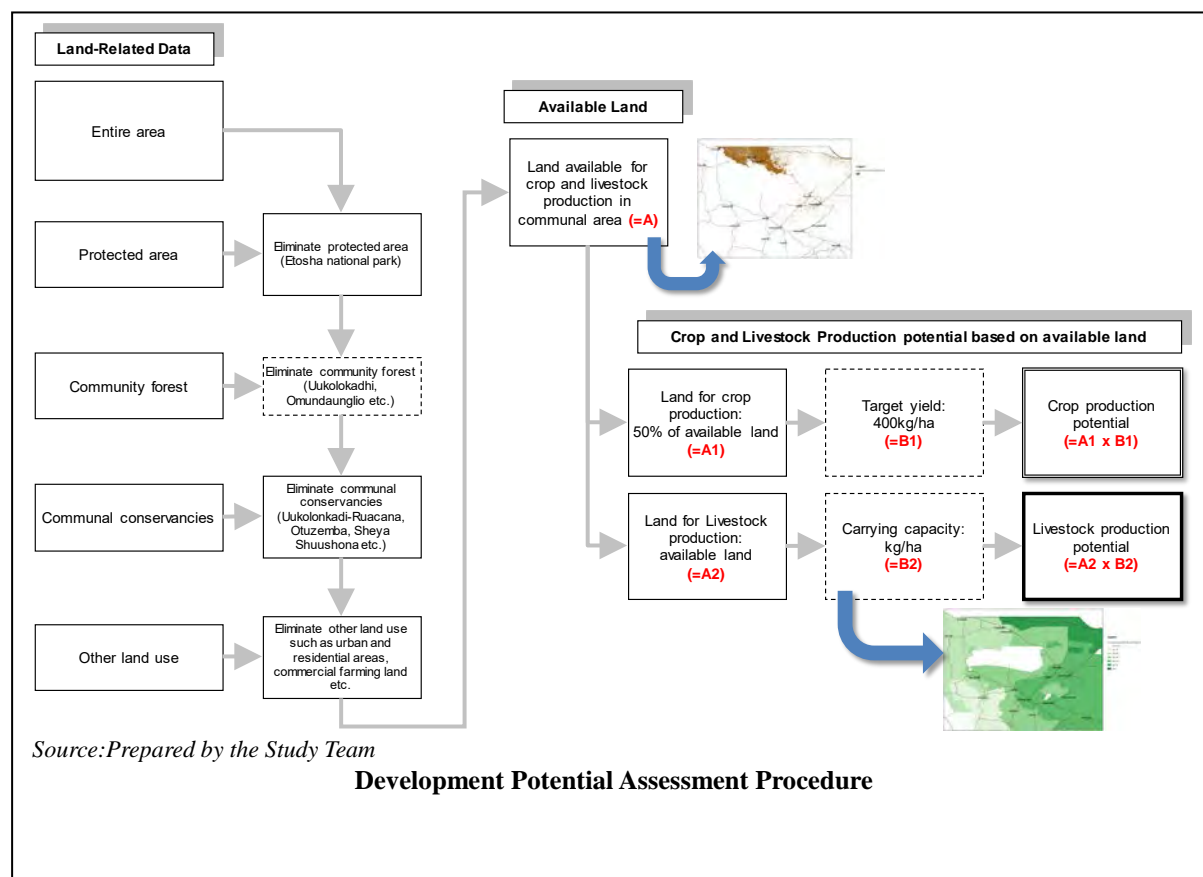
Under N-CLIMP, crop and livestock development potential is preliminary assessed by land resources using available electronic files. In particular, comprehensive GIS data is available from Atlas of Namibia, therefore, these resources are utilized for the assessment practices. This chapter hereunder describes the procedure and the results of assessment.

II-2.2 Assessment Procedure

Agriculture (cereal particularly millet) and livestock production are largely dependent upon three important resource factors: (i) water resource, (ii) land resource and (iii) human resource (availability of labor forces). Among others, N-CLIMP focuses on land resources for the development potential assessment due to the following reasons:

- ◆ The cereal production is currently practiced through rain-fed only. And intensified irrigation development is not realistic solution for cereal production, therefore, rainfall will be generally sole resources for the production in the future. As mentioned in the previous chapter, rainfall pattern in northern part of Namibia significantly differs among locations, some of which have meteo-hydrological data based on regular observation and others are completely not. Spot-based rainfall data is not extensively available at present. For the simplification of the steps, water resources can not considered for the analysis under N-CLIMP.
- ◆ Population of farming household is gradually decreasing and farm land integration would be in progress. Communal farming population would be anticipated to be polarized into: (i) medium-scale farmers and (ii) small-scale farmers. Crop production is generally extensive and not labor-intensive farming style in northern Namibia at present. In addition, medium-scale farmers would be expected to utilize agricultural machinery to complement required forces. Therefore, human resources (availability of labor–forces) would not be a determinant factor for development potential.

On the basis of discussion above, land resource potential assessment by identifying available land resources is carried out as illustrated below:



Using the land potential identified in the above-depicted process, crop and livestock development potential are assessed as follows:

Basic Conditions to Crop and Livestock Development Potential Assessment

Crop/Livestock	Contents
Crop Development Potential	<p>Cropped area (ha) x average yield (kg/ha)</p> <ul style="list-style-type: none"> ◆ Cropped area (ha) is determined by land resources assessment above and also actual cropped area in the statistics. ◆ Average yield is based on information from ADC and farmers as well as field survey by the Study Team. ◆ Rotational farming is practiced with fallowing every 3 years.
Livestock Development Potential	<p>Carrying capacity (kg/ha) x average livestock weight (kg/head)</p> <ul style="list-style-type: none"> ◆ Carrying capacity (kg/ha) is obtained from the Atlas of Namibia. ◆ Cropping season in 4 regions is typically from December to May, 6 months annually. During this period, the land is not available for grazing of animals. Therefore, fifty percent of unit carrying capacity shown in the Atlas of Namibia is applied to calculate total carrying capacity. ◆ Average livestock weight (kg/head) is given from previously utilized figure and also based on information from ADC and farmers as well as field survey by the Study Team.

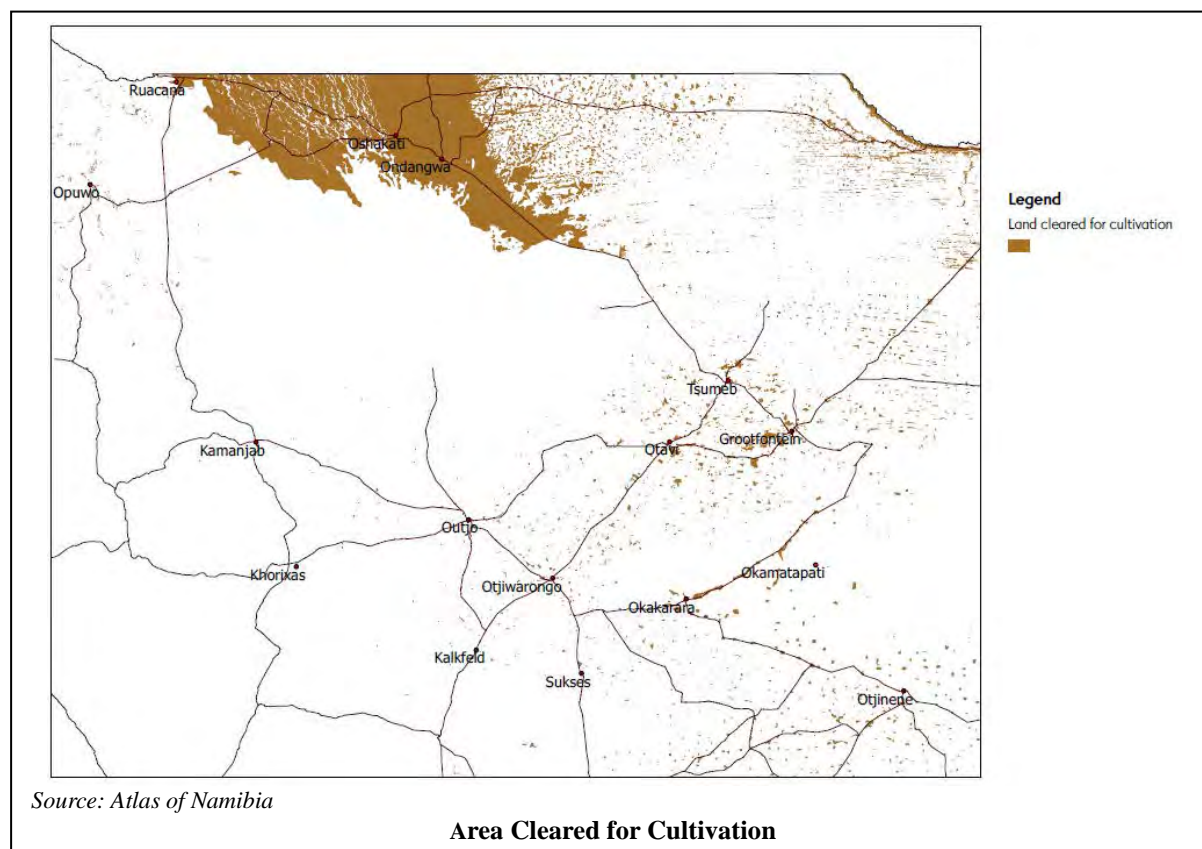
Source: Prepared by the Study Team

II-2.3 Assessment Result

II-2.3.1 Land Resources for Crop and Livestock Production

(1) Land Resources Available

Land available for crop and livestock production is illustrated and tabulated as follows:



Source: Atlas of Namibia

Land Resource Available for Crop and Livestock Production in Communal Area

Unit: km²

Land Use \ Region	Ohangwena	Oshikoto	Oshana	Omusati	Total
Total area (=1)	10,694	38,669	8,682	26,558	84,603
Protected area (=2)	0	11,933	3,590	7,408	22,931
- Etosha National park	0	11,933	3,590	7,408	22,931
Community forest (=3)	215	0	0	0	215
- Omundaunglio	215	0	0	0	215
Communal conservancies (=4)	1,339	508	1,181	11,940	14,968
- Uukolonkadi-Ruacana including community forest (1,436km ²)	0	0	0	2,705	2,705
- Uukwanluudhi	0	0	0	1,436	1,436
- Otuzemba	0	0	0	251	251
- Sheya Shuushona	0	0	0	5,065	5,065
- Orupapa	0	0	0	645	645
- Ehirivopuka (part)	0	0	0	572	572
- lipumbu ya Tshilongo	0	0	1,181	366	1,547
- Okongo including community forest (765km ²)	1,339	0	0	0	1,339
- King Nehale	0	508	0	0	508
Other land use (=5)	6,640	22,128	1,845	2,404	33,017
- Urban and residential area	90	225	151	35	501
- Commercial farming area	0	9,024	0	0	9,024
- Others (miscellaneous)	6,550	12,879	1,830	2,369	
Area available for crop and livestock (=1-(2+3+4+5))	2,500	4,100	1,930	5,706	14,236
(Percentage)	(17.5%)	(28.8%)	(13.6%)	(40.1%)	(100.0%)

Remarks: Nine hundred square kilometer of "area cleared for farming" is included in Omusati region.

Source: Prepared by the Study Team based on the Analysis

The analysis shows that the land available for crop and livestock production in 4 regions is 14,236 km² or 1,423,600 ha in total, which involves both crop and livestock production. There is no clear boundary between the area utilized for either crop production or livestock production. However, according to the empirical evidence by ATs discussed during the series of Stakeholder Meetings, it is judged that the half of the land is utilized for crop production and the remaining for livestock production. Therefore, the areas available for crop and livestock production would be substantially allocated as follows according to the analysis:

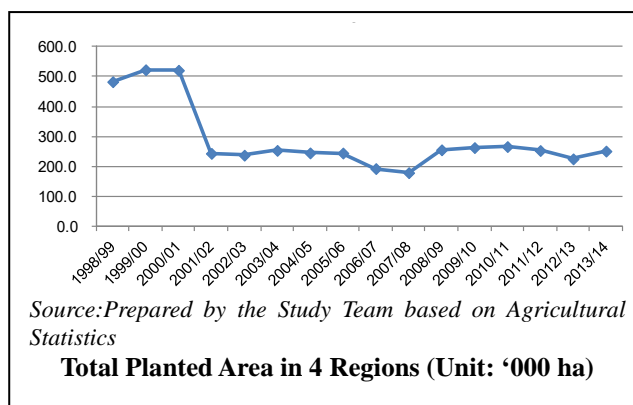
- ◆ Crop production: 711,800 ha (50% of total land available)
- ◆ Livestock production: 711,800 ha (50% of total land available)

(2) Previous Planted Area

Since the category of the GIS data is not so detailed and the figures obtained through the analysis might be overestimated. Therefore, previous planted area is reviewed to compare with the analysis result to finally determine the area to be utilized for crop and livestock production.

The Total planted area of the medium-term trend since the 1990s, in 4 target regions is illustrated in the right figure in next page showing that maximum planted area (523,000 ha) is observed in 1999/2000 while minimum planted area (178,000 ha) is seen in 2007/2008. Nearly or more than 500,000 ha is utilized for crop production in 3 consecutive years from 1998/1999 to 2000/2001. On the other hand, another cropping season fell into 260,000 ha or under. Maximum planted area is far below

the figure obtained from the analysis probably due to: (i) limitation of GIS data and (ii) social factors such as land holding right and so forth. Therefore, it would be reasonable that the area to be utilized for crop production in sustainable manner is somehow 530,000 ha, which is based on the maximum planted area from 1998/1999 to 2000/2001.



(3) Land Resources to be Applied for N-CLIMP

On the basis of the discussion above, land resources for crop and livestock production to be applied for N-CLIMP is as follows:

Land Resources Available for Crop and Livestock Production to be Applied for N-CLIMP

Crop/livestock	Area (ha)	Remarks
Crop development	353,300	◆ Since the rotational farming practiced with fallowing every 3 years is recommended, potential area for cop production is 353,300 ha (=530,000 ha x 2/3).
Livestock development	1,521,500	◆ As for the livestock development, commercial farming area (902,400 ha) in Oshikoto Region needs to be considered. Among total commercial farming areas, it is estimated that half of the areas are utilized for crop production while others are used for livestock production. ◆ Therefore, the figure is obtained from total available land for communal area (1,423,600 ha) – area for crop development (353,300 ha) + commercial farming area (451,200 ha).
Total	1,874,800	

Source: Prepared by the Study Team

II-2.3.2 Crop Production Potential

Currently, average millet yield is approximately 200kg/ha according to agriculture statistical data including data from ATs through overall review survey and stakeholder meetings. Through the analysis of previous yield in the statistics, discussion with ATs in the Stakeholder Meeting and research stations, N-CLIMP set the target at averagely 400kg/ha using proposed technical measures explained in the following chapters. Therefore, potential crop production is calculated as shown in the following table.

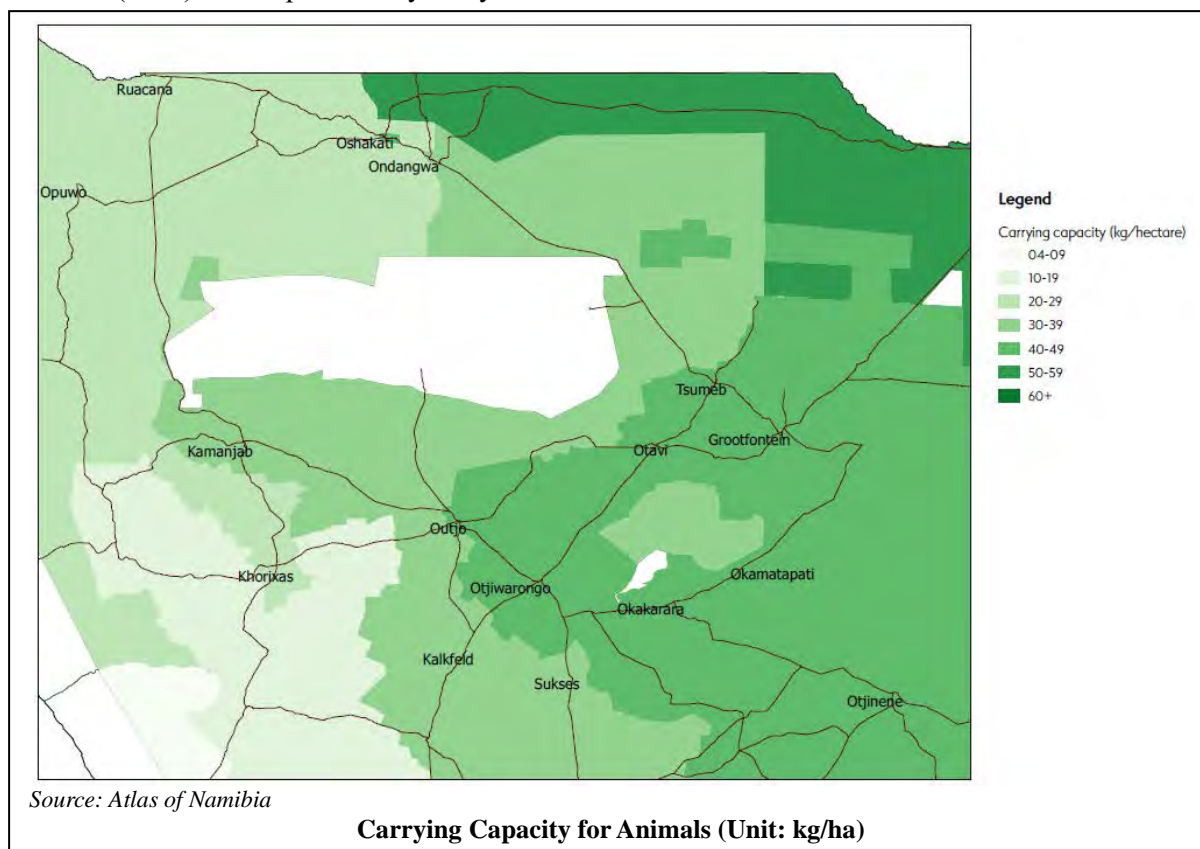
Crop Production Potential in 4 Regions

Region	Ohangwena	Oshikoto	Oshana	Omusati	Total
Area available for crop production (=1)	61,800	101,800	48,100	141,600	353,300
(Percentage)	(17.5%)	(28.8%)	(13.6%)	(40.1%)	(100.0%)
Yield (kg/ha) (=2)	400	400	400	400	-
Production (ton) (=1x2)	24,700	40,800	19,200	56,600	141,300

Source: Prepared by the Study Team

II-2.3.3 Livestock Production Potential

As mentioned above, there are many study and analysis for carrying capacity by MAWF and other relevant organizations. Among others, the unit carrying capacity (kg/ha) is obtained from the Atlas of Namibia (2002) for the preliminary analysis under N-CLIMP as illustrated below:



In accordance with the data above, carrying capacity for each region can be summarized as follows:

- ◆ **Area for calculation:** Although substantial land resources available for livestock production is calculated at 1,521,500 ha as mentioned above, area utilized for the Atlas of Namibia covers entire area of the regions for their analysis. Therefore, the latter figures (=entire area deducted by protected area) are applied under N-CLIMP.
- ◆ **Carrying capacity unit:** The carrying capacity in the Atlas of Namibia is expressed by ranges such as 10-19 and 20-29. For the calculation, the median value is utilized for each category (for example, 10-19 is interpreted to 15).
- ◆ **Weight of cattle:** Although 450 kg is utilized for the weight of cattle, it would be larger figure than the actual field conditions. Through the field survey, data collection and discussion with ATs, the alternative 2 figures, 360 kg and 250 kg, considering average weight including both matured and immatured, are also utilized for the calculation.
- ◆ **Number of animals at present:** Namclits database (2012) is utilized for the analysis. In the case of Ohangwena region, however, the data from ATs through the overall review survey is tentatively applied for goat and sheep since no data is available in the database.

Carrying Capacity for in 4 Regions

Region	Ohangwena	Oshikoto	Oshana	Omusati	Total	
Area, Carrying Capacity and Production						
Area utilized for calculation of livestock production (km²)						
- Entire area (=a1)	10,694	38,669	8,682	26,558	84,603	
- Protected area (=a2)	0	11,933	3,590	7,408	22,931	
Total (=1=a1 - a2)	10,694	26,736	5,092	19,150	61,672	
Carrying capacity (kg/ha) Unit						
a. Carrying capacity (=b1)	55	25	15	15	-	
Percentage (=b2)	100	87	97	90	-	
b. Carrying capacity (=c1)	-	35	45	35	-	
Percentage (=c2)	-	13	3	10	-	
Accumulated (=2=b1 x b2 +c1 x c2)	55	26	16	17	-	
Percentage	100	100	100	100	100	
Carrying Capacity (kg) total (=A=1 x 2)	58,817,000	69,513,600	8,147,200	32,555,000	169,032,800	
Present Conditions						
Cattle (=1 LU)	212,773	283,088	156,798	332,584	985,243	
Goat (=1/6 LU)	64,731	221,531	121,473	255,537	663,272	
Sheep (=1/6 LU)	0	3,206	7,412	16,832	27,450	
Total LU at present	223,562	320,544	178,279	377,979	1,100,363	
Total weight of animals at present (kg) (=B)	450kg	100,602,675	144,244,875	80,225,475	170,090,475	495,163,500
	360kg	80,482,140	115,395,900	64,180,380	136,072,380	396,130,800
	250kg	55,890,375	80,136,042	44,569,708	94,494,708	275,090,833
Comparison between A and B (=A/B)	450kg	58%	48%	10%	19%	34%
	360kg	73%	60%	13%	24%	43%
	250kg	105%	87%	18%	34%	61%

Remarks: The area utilized for calculation of livestock production is obtained from total area of each region deducted by protected area (Etosha national park) in order to ensure consistency with data of carrying capacity from the Atlas of Namibia to calculate total carrying capacity.

Source: Prepared by the Study Team

As a result, even if 250 kg is utilized for cattle weight, satisfaction rate {=carrying capacity total (=A) divided by total weight (=B)} is 61% in total meaning that overgrazing is currently practiced. Among others, Oshana and Omusati regions are comparatively overstocked than other 2 regions.

CHAPTER II-3 TECHNICAL MEASURES TO BE APPLIED FOR N-CLIMP

II-3.1 General

(1) General Framework of Technical Measures

There are 2 pillars for technical measures: (i) crop production and (ii) livestock production. In addition farm management techniques are related with both crop and livestock production so as to adopt and manage proposed technical measures for both sub-sectors. The strategy of N-CLIMP is to strengthen crop and livestock extension system to disseminate proposed technique and technical measures by fully applying SHEP approach to expand to target areas of 4 regions.

(2) Source of Technical Measures

Technical measures were studied with members of DC, SM and ATs based on the technical approach-2: maximum utilization of existing techniques as MAWF has been accumulating valuable technical know-how through implementing crop and livestock-related development projects in Northern Namibia. Major data sources reviewed and examined are listed as follows:

- ◆ Spotlight on Agriculture,
- ◆ Report and technical manuals/guidelines prepared by previous and on-going projects such as: (i) Community-based Rangeland and Livestock Management, (ii) Farmers Support Project, (iii) Farmers' Mentorship Program, (iv) Oshikoto Livestock Development Project, (v) Sustainable Animal and Rangeland Development Program, (vi) Northern Livestock Development Program and so forth,
- ◆ Technologies at research stations, and
- ◆ Technical needs identified through overall review survey.

(3) Spotlight on Agriculture

MAWF have been periodically publishing *Spotlight on Agriculture* with the aim of introducing crop and livestock production or other techniques. Techniques introduced are listed and preliminary evaluated whether each technique can be applied for pilot site activities or master plan to be formulated under N-CLIMP from the view point of: (i) crop production, (ii) livestock production, (iii) farm management and (iv) development potential assessment required for quantitative target setting for master plan as shown in Table II-3.1.1 and summarized as follows:

Preliminary Evaluation of Techniques Introduced in Spotlight on Agriculture

Subject Evaluation	Crop Production	Livestock Production	Farm Management	Development Potential Assessment for Master Plan
A: Applicable	8	25	6	5
B : Need further examination	29	52	7	6
Total	37	77	13	11

Source: Prepared by the Study Team

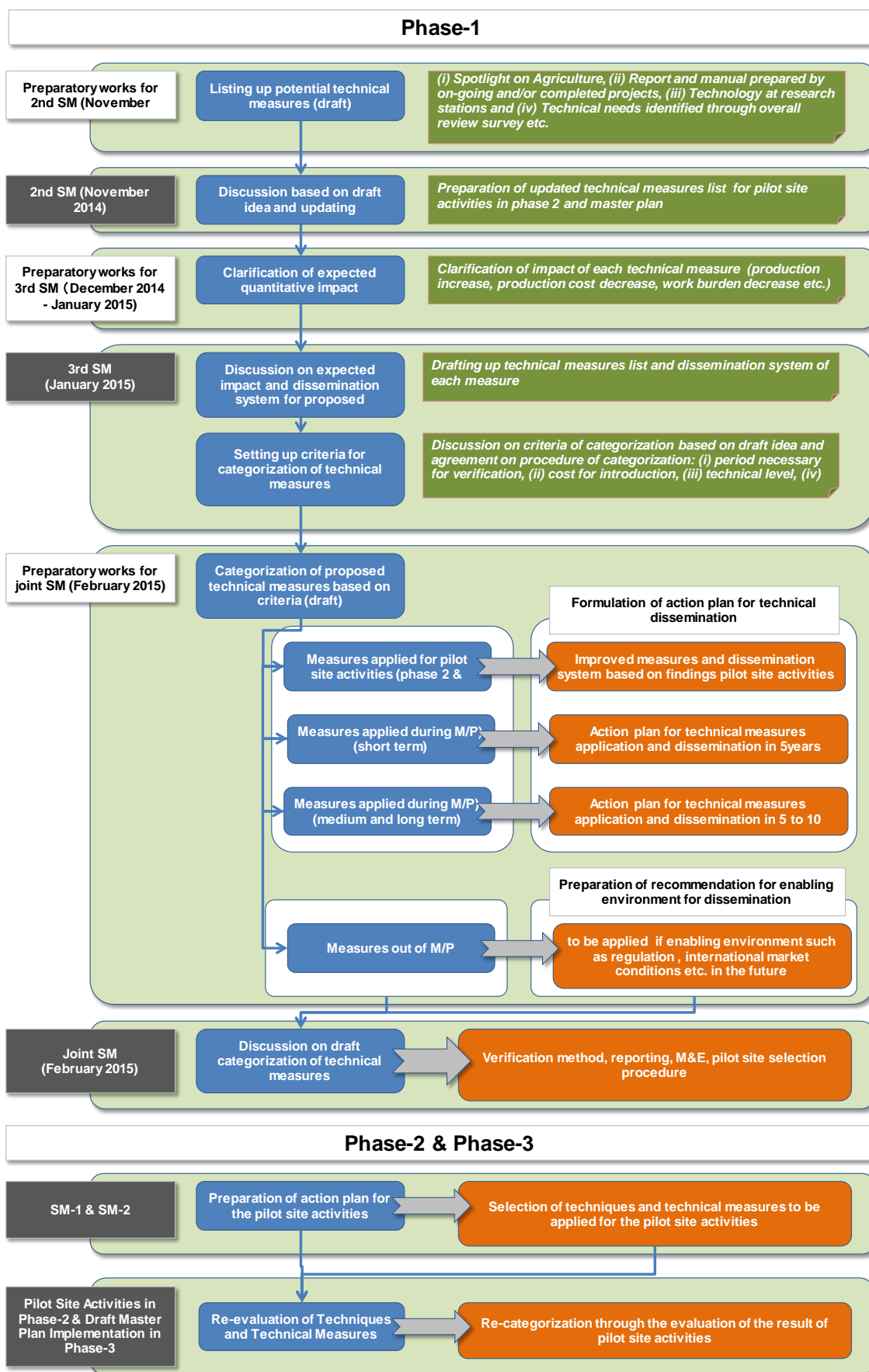
Major techniques introduced in the Spotlight on Agriculture are as follow:

- ◆ Crop production: (i) alternative crops promotion (vegetables, fruits, cowpea etc.), (ii) millet cultivation improvement, (iii) plant tissue analysis, (iv) soil sampling and analysis, (v) farm database, (vi) livestock feed crops production through mixed cropping, (vii) rural water supply improvement for crop production, (viii) fertility improvement by earthworm, (ix) traditional leaf vegetable production experiment etc.
- ◆ Livestock production: (i) Community-based range management for ensuring feed supply in sustainable manner, (ii) feed crop varieties study, (iii) livestock feed crops production through mixed cropping, (iv) dairy products production system establishment, (v) rural water supply improvement for livestock, (vi) assessment of carrying capacity for animals using remote sensing techniques for suitable range management
- ◆ Farm management: (i) Farm database¹, (ii) institutional development for community-based range management, (iii) marketing examples for crops and dairy products), (iv) rural water supply improvement through establishing and strengthening water point user association, (v) financial management for supporting commercial agriculture
- ◆ Development potential assessment:
 - (i) Soil map and its evaluation (ii) farm database for large area development potential evaluation, (iii) land resources evaluation, (iv) soil and topography evaluation, assessment of carrying capacity for animals using remote sensing techniques for suitable range management

(4) Procedure of technical measures listing and categorization

The procedure of technical measures preparation and categorization is illustrated in the following figure:

¹ The technique introduced are rather macro level covering large area, however, it could be applicable if procedure of technique are simplified to be applied for smaller areas.



Source: Prepared by the Study Team

Procedure of Technical Measures Preparation and Evaluation

Phase-1

As explained, through discussion in 3rd SM in January and Joint SM in February 2015, technical measures are planned to be categorized into four: (i) measures to be applied for pilot site activities in phase 2 & phase 3, (ii) measures to be applied during M/P, short term in approximately 5 years, (iii) measures to be applied during M/P, medium and long term in approximately 5 to 10 years and (iv) measures out of M/P which is to be applied, if enabling environment is prepared.

On the basis of discussion above, subject-wise technical measures currently consider are explained in the following sections.

Phase-2&Phase-3

At the beginning of the phase-2 and the phase-3, the action plan for the pilot site activities is formulated including the selection of technical measures to be applied. After the evaluation of the result of pilot site activities, re-categorization of technical measures are made.

II-3.2 Crop Production Techniques

II-3.2.1 General

In NCD, crop production is traditionally subsistence level, and pearl millet, so called as “mahangu” locally, is the main crop. Out of total households of 165,000 in NCD, about 108,000 households or 65% of total households have been engaging the crop production, as shown below:

Number of Households in North Central Division

Total Households	Growing Crops	Raising Livestock	Horticulture	Main Income: Farming
165,100 (100%)	107,700 (65%)	68,700 (42%)	2,000 (below 2%)	38,800 (24%)

Source: Compiled by the Study Team, based on the Population Census 2011.

Horticulture growers have been recently increasing in NCD, and about 2,000 households are estimated to producing vegetables. Horticulture producing households are divided into two types according to their objectives and production scales. One is the small scale commercial horticulture growers in the north western part of Omusati and the southern part of Oshikoto where irrigation is available. This type of farmers is about 100 households in Omusati and 20 in Oshikoto. Other type is the “home garden” growers to produce vegetables in a micro scale (about 30-50 m²) mainly for home consumption and partly for small cash income.

Taking the above situation into account, crops are broadly classified into two categories: (i) cereal grains traditionally grown and pearl millet as the main crop and (ii) horticulture crops rather newly introduced, as shown below:

Category of Crop Production

Category	Crops	Remarks
Cereal grains and associated crops under inter-cropping	Cereal grains: pearl millet as the main crop, inter-cropping with sorghum, maize, cow pea, bambara nuts, groundnuts, pumpkin, water melon, melon.	Cropping under rainfed condition, the primary purpose is for home consumption, and sometimes cash income if surplus available.
Horticulture crops	Various kind of vegetables and fruits (tomato, spinach, cauliflower, broccoli, carrots, onion,	Cropping under irrigation, the purpose is different by the type of

Category	Crops	Remarks
	cabbage, sweet pepper, pumpkin, water melon, etc.)	farmers: commercial production for the small scale commercial farmers, and home consumption and small cash income for communal farmers.

Source: Prepared by the Study Team.

Since cropping conditions and farming practices are different between cereal grains and horticulture, technical measures are separately discussed below:

II.3.2.2 Technical Measures List

(1) Cereal Grains

Production of pearl millet is largely depending on the rainfall in the summer season (November to March), however, unit yield of pearl millet remains low as 200 kg/ha due to the unstable and erratic rainfall, drought and flood. In order to reduce the risk of unstable rainfall, farmers have been taking such measures like planting pearl millet every month from December to February with frequent supplemental planting.

According to the production statistics, average production of pearl millet in NCD during 1996/97 to 2012/13 is approximately 60,000 ton from 300,000 ha with the unit yield of 200 kg/ha, corresponding to about 60% of regional demand of 100,000 ton per annum. Cereal production has been largely fluctuating from 24,000 ton to 100,000 ton due to erratic rainfall, as shown below.

Past Range on Production, Planted Area and Unit Yield of Pearl Millet

	Minimum	Average	Maximum
Production	24,000 ton (2012/13)	59,000 ton	104,000 ton (2005/06)
Planted Area	179,000 ha (2007/08)	290,000 ha	523,000 ha (1999/00)
Unit Yield	110 kg/ha (2012/13)	200 kg/ha	430 kg/ha (2005/06)

Source: Prepared by the Study Team, based on the Crop Prospects and Food Security Situation Report, June 2014, MAWF.

This unstable production and low level of productivity are the most serious challenges to constrain the food security to the communal farmers.

Unstable production and low productivity of cereal grains are mainly caused by (1) erratic rainfall (drought, flood and limited water source), and (2) land degradation (low fertility, continuous cropping, surface soil erosion and over-grazing of livestock).

In order to improve the cereal production, the following technical measures are proposed:

Technical Measures for Cereal Grains

No.	Technical Measures	Constraints and Challenges	Techniques
CR-1	Fertilizer application	Land degradation (low fertility)	<ul style="list-style-type: none"> - Proper method of fertilizer application to avoid fertilizer burn. - Appropriate dosage of manure and fertilizer, based on the result of soil analysis. - Adjustment of top dressing of fertilizer depending on rainfall..
CR-2	Cropping pattern	Unstable rainfall (drought, flood), land degradation (low fertility, continuous cropping)	<ul style="list-style-type: none"> - Planting in several times from December to February for reduction of drought risk. - Combination of local and improved varieties in cropping pattern. - Improvement of thinning and weeding based on the appropriate plant density.

No.	Technical Measures	Constraints and Challenges	Techniques
CR-3	Conservation agriculture	Drought, low fertility, continuous	<ul style="list-style-type: none"> - Ripper furrow to accelerate percolation of rain water in the root zone. - Crop rotation and mulch to improve soil fertility and structure (soil granule). - Fallowing to increase water holding capacity and
CR-4	Flood- and drought-adaptive cropping system (rice mahangu mixed cropping)	Drought, flood	<ul style="list-style-type: none"> - Mixed cropping of rice and pearl millet in the seasonal wetland
CR-9	Establishment of crop production and marketing cooperatives	Low marketing activities to procure inputs, to sale products, less chance to obtain credit and information.	<ul style="list-style-type: none"> - Collective procurement of farm inputs - Collective sales of products - Saving and credit - Market information

Source: Prepared by the Study Team.

Target of expected impacts derived from the technical measures are assumed in the table below;

Target of Expected Impact

No.	Technical Measures	Expected Impact	Remarks
CR-1	Fertilizer application	Production increase by 20%	Increase of unit yield, increase of application area, saving of fertilizer cost
CR-2	Cropping pattern	Production increase by 20%	Increase of cropping area, increase in unit yield
CR-3	Conservation agriculture	Production increase by 20%	Increase of cropping area, increase in unit yield
CR-4	Flood- and drought-adaptive cropping system	Production increase by 20%	Increase of cropping area, increase in unit yield
CR-9	Establishment of crop production and marketing cooperatives	Profit increase by 20%	Decrease of procurement cost, increase of sales opportunities,

Source: Prepared by the Study Team

(2) Horticulture

National horticultural production has been increasing from 7,400 ton in FY2010 to 19,500 ton in FY2012, corresponding at 40% of total supply, as shown below:

Target of Expected Impact

Unit: ton

	FY2010	FY2011	FY2012	Demand 2011
Domestic	7,440 (17%)	19,040 (34%)	19,470 (38%)	-
Import	35,560 (83%)	37,800 (66%)	31,930 (62%)	-
Total Supply	43,000 (100%)	56,840 (100%)	51,400 (100%)	62,000

Source: Prepared by the Study Team, based on the data from Agri-Marketing and Trading Agency in February 2015, demand estimation based on the Population Census 2011 and FAO Food Balance Sheet (2007 to 2011).

According to the FAO Food Balance Sheet, annual per capita consumption of vegetables in Namibia has been steadily increasing from 18.5 kg (1997 – 2001) to 29.5 kg (2007 – 2011). Based on the population census data and per capita consumption, demand in NCD area is estimated at 14,000 ton in 2001 and increased at 25,000 ton in 2011 by 70% increment. It is estimated that horticulture market is still expanding due to increase in population and per capita consumption at the national and NCD levels.

At the communal farmers' level, diversification to horticulture from the cereal grain is important from the view point of family nutrition as well as cash income, and major focus is given to the micro scale "back yard garden" of the communal farmers. In this regard, the points to be covered by the technical measures are (1) water source / water harvesting in addition to piped water, (2) water saving culture

like drip irrigation to reduce the consumption of piped water, (3) crop selection according to the market demand, (4) cropping plan and crop management. All these measures will be conducted along with the SHEP Approach, after modification of the original steps to fit to the Namibian situation and environment.

Technical Measures for Horticulture

No.	Technical Measures	Constraints and Challenges	Techniques
CR-5	Water source / water harvesting	Drought, limited water source.	- Utilization of seasonal wetland. - Roof catchment
CR-6	Water saving cultivation	Drought, limited water source.	- Low pressure drip irrigation system - Simple drip irrigation by pet bottle
CR-7	Crop selection and marketing	Short of information on market demand.	- Integration of market information and plant characteristics.
CR-8	Cropping plan and horticulture crop management	Lack of basic cultivation technique on horticulture.	- Basic cultivation technique and knowledge for crop management.
CR-9	Establishment of crop production and marketing cooperatives	Low marketing activities to procure inputs, to sale products, less chance to obtain credit and information.	- Collective procurement of inputs - Collective sales of products - Saving and credit - Market information

Source: Prepared by the Study Team

Small scale commercial farmers will be involved for training on the basic cultivation technique of horticulture crops, since such basic techniques are not popular as bed preparation, mulching, bud picking, shading, branch training, branch lifting, etc.

Target of expected impacts derived from the technical measures are assumed in the table below;

Target of Expected Impact

No.	Technical Measures	Expected Impact	Remarks
CR-5	Water source / water harvesting	Production increase by 20%	Increase of unit yield, increase of application area, saving of fertilizer cost (proper method and appropriate dosage)
CR-6	Water saving cultivation	Production increase by 20%	Increase of cropping area and harvested area,
CR-7	Crop selection and marketing	Production increase by 20%	Increase in production and productivity meeting the market needs
CR-8	Cropping plan and horticulture crop management	Production increase by 20%	Increase of cropping area, increase in unit yield, improvement of product quality
CR-9	Establishment of crop production and marketing cooperatives	Profit increase by 20%	Decrease of procurement cost, increase of sales opportunities

Source: Prepared by the Study Team.

Through application of the above technical measures, medium term target of unit yield of vegetables are assumed in the following table:

Target of Expected Impact in medium term

Vegetables	Target Unit Yield	Remarks
Fruit Vegetables		
Tomato	4 kg/m ²	[Row width 100 cm with 60 cm path]:x [plant interval: 50 cm], 12,500 plants/ha, 3 kg/plants
Egg Plant	2.3 kg/m ²	[Row width 160 cm with 60 cm path]:x [plant interval: 60 cm], 7,600 plants/ha, 3 kg/plants
Sweet Pepper/Capsicum	2 kg/m ²	[Row width 150 cm with 60 cm path]:x [plant interval: 50 cm], 9,500 plants/ha, 2 kg/plants
Cucumber (lifting)	4 kg/m ²	[Row width 100 cm with 60 cm path]:x [plant interval: 50 cm], 12,500 plants/ha, 3 kg/plants
Pumpkin	2 kg/m ²	[Row width 300 cm with 60 cm path]:x [plant interval: 100 cm],

Vegetables	Target Unit Yield	Remarks
Fruit Vegetables		
		2,800 plants/ha, 7 kg/plants
Water Melon	2 kg/m ²	[Row width 300 cm with 60 cm path]:x [plant interval: 100 cm], 2,800 plants/ha, 7 kg/plants
Melon	1 kg/m ²	[Row width 250 cm with 60 cm path]:x [plant interval: 60 cm], 5,400 plants/ha, 4 kg/plants
Okura	3 kg/m ²	[Row width 100 cm with 60 cm path]:x [plant interval: 40 cm], 15,500 plants/ha, 2 kg/plants
Bitter Gourd (net lifting)	2 kg/m ²	[Row width 150 cm with 60 cm path]:x [plant interval: 150 cm], 3,200 plants/ha, 6 kg/plants
Root Vegetables		
Carrot	3 kg/m ²	[Row (2 lines) width 80 cm with 60 cm path]:x [plant interval: 8 cm], 179,000 plants/ha, 0.2 kg/plants
Turnip	3 kg/m ²	[Row (4 lines) width 120 cm with 60 cm path]:x [plant interval: 15 cm], 148,000 plants/ha, 0.2 kg/plants
Onion	2 kg/m ²	[Row (4 lines) width 150 cm with 60 cm path]:x [plant interval: 20 cm], 95,000 plants/ha, 0.2 kg/plants
Sweet Potato	2 kg/m ²	[Row width 100 cm with 60 cm path]:x [plant interval: 30 cm], 20,800 plants/ha, 2 kg/plants
Leaf Vegetables		
Cabbage	2 kg/m ²	[Row width 60 cm with 60 cm path]:x [plant interval: 40 cm], 20,800 plants/ha, 2 kg/plants
Chinese Cabbage	1.5 kg/m ²	[Row width 70 cm with 60 cm path]:x [plant interval: 50 cm], 15,400 plants/ha, 1 kg/plants
Cauliflower, Broccoli	3 kg/m ²	[Row width 70 cm with 60 cm path]:x [plant interval: 45 cm], 73,900 plants/ha, 0.4 kg/plants
Spinach	2 kg/m ²	[Row (4 lines) width 120 cm with 60 cm path]:x [plant interval: 10 cm], 222,000 plants/ha, 0.1 kg/plants

Source: Prepared by the Study Team.

II-3.3 Livestock Production Techniques

II-3.3.1 General

Number of livestock in commercial area and communal area are shown below. Concerning cattle number, commercial area shares from 35 percent to 40 percent of total numbers. Pig (swine) raising is really poor in both of commercial and communal areas and most of consumed pork is imported. Sheep raising is dominant in commercial area and goats are kept in communal area mainly. Most of goats in communal area are indigenous and body size is small.

Number of livestock

		2000	2001	2002	2003	2004	2005	2006	2007
Cattle	Total	2,504,948	2,508,570	2,329,553	2,336,094	2,309,393	2,219,330	2,383,960	2,353,498
	Commercial	845,656	908,264	858,391	943,210	887,667	788,507	743,919	745,176
	Communal	1,659,292	1,600,308	1,471,162	1,392,884	1,462,003	1,430,823	1,640,041	1,608,332
Sheep	Total	2,446,146	2,233,578	2,764,253	2,955,454	2,619,363	2,663,795	2,660,252	2,652,658
	Commercial	2,086,867	2,011,478	2,389,401	2,565,243	2,272,715	2,309,305	2,278,752	2,279,863
	Communal	359,279	222,100	374,852	390,211	346,648	354,490	381,500	372,795
Goats	Total	1,849,569	1,769,055	2,110,092	2,086,812	1,977,172	2,043,479	2,061,403	1,926,429
	Commercial	491,511	536,847	608,313	555,192	529,131	536,067	534,335	535,446
	Communal	1,358,058	1,232,208	1,501,779	1,531,620	1,468,041	1,521,378	1,527,068	1,390,983
Pigs	Total	23,148	21,854	47,805	46,932	52,624	55,931	51,972	51,863

		2000	2001	2002	2003	2004	2005	2006	2007
	Commercial	12,807	12,284	6,825	12,336	15,700	16,197	15,591	15,963
	Communal	10,341	9,570	40,980	34,596	36,924	39,734	36,381	35,900

Source: National Livestock Census – Number 2000-2007

The NCAs are broadly classified into high density small-scale cereal and livestock production areas and extensive cattle ranching areas with variety of livestock e.g. cattle, goats, horses, and donkeys. Constraints to the livestock industry in the NCAs include:

- ◆ Distance from markets (or marketing services);
- ◆ Inadequate marketing schemes and incentives;
- ◆ Distances from banking services; and
- ◆ Societal norms (keeping livestock as non-cash banks and for status, with limited focus on production and off-take).

As farmers in north of VCF and in the NCA give a high priority on traditional aspects of their livestock, livestock numbers are very important than economic value so that non-productive, older animals, that would otherwise be culled are retained, are still kept in their herd, resulting in very low off-take rates. Such attitude of farmers has contributed to the degradation of rangelands in the NCA.

Cattle Herd Structure per Region

	NCA	Kunene	Omusati	Oshana	Ohangwena	Oshikoto	Kavango
Rangeland size(ha)	10,416,718	5,584,014	1,263,873	313,128	653,589	497,771	2,104,343
Cattle population estimate	1,265,053	187,226	294,206	14,958	199,392	291,994	142,650
Cattle density (number/ha)	0.12	0.03	0.23	0.48	0.31	0.59	0.07
% cows	37.4	39	39.4	38	34.5	36	37.6
% bulls	4.4	1.4	2.8	7.9	4.6	5.7	4.1
%heifers	17.3	19.2	18.5	20.9	16.1	17.8	11.2
%oxen	24	19.2	27.1	20	29.9	22.7	25.1
%male calves	9.2	11.5	6.5	7.2	7.9	9.8	12
%female calves	7.8	9.8	5.6	6.1	7.1	8.1	10.1

Source: Study on Informal Trade of Beef/Cattle in the Northern Communal Areas, Data from the NamLITS 2011 database

Table above shows the large share of oxen in herd structure. Although cows and heifers are utilized for reproduction for long period, to keep large portion of oxen in the herd cause wasting of intake fodders and labour time to take care of oxen. The main purpose of oxen raising is for meat production and draught power so it does not need to keep as much as oxen for long time till they become old in the herd. More than 70% of cattle slaughtered at Meatco are C grades; 60% are 0 and 1 fatness grades of which nearly 70% are oxen. In general it can be concluded that the vast majority of cattle slaughtered at Meatco are old and lean oxen.

Reproduction Parameters of Cattle Herds per Region

Region	Calf/Cow Ratio	Bull/Cow Ratio	Calf Mortality Rate
Kunene	54.4%	3.6	11.0%
Omusati	30.7%	7.2	7.0%
Oshana	35.2%	20.8	5.0%
Ohangwena	43.6%	13.2	21.0%
Oshikoto	49.6%	15.9	16.0%
Kavango(W&E)	58.7%	10.9	12.0%
Average	45.5%	11.9	12.0%

Source: Study on Informal Trade of Beef/Cattle in the Northern Communal Areas, Data from the NamLITS 2011 database

A ratio of 4 % of bull/cow is generally considered optimum among commercial farmers, that is to say, bull/cow ratios are considerably high in NCA except Kunene region. The calf mortality rates are very high in Ohangwena (21.0%) and Oshikoto (16.0%) than the other regions. Decreasing number of oxen and bulls and improved calf mortality would highly contribute to increase of off-take rate.

Ratio between Number of Cattle consumed and Number of cattle weaned per Region

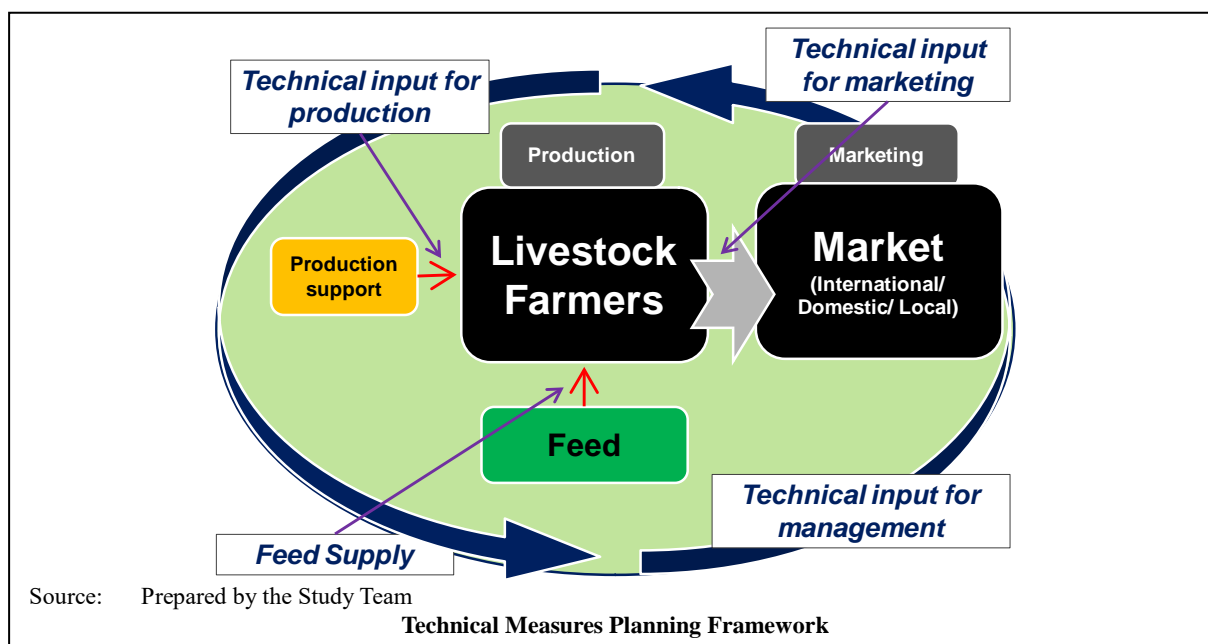
Region	% of Cows in Herd	Total Number of Cow	Total Number of Cattle (all Households)	Calf/Cow Ratio	Number of Calves born	Mortality Rate	Number of Calves weaned	Number of Cattle consumed
Kunene	39.0	73,018	187,226	54.3%	39,649	11.0%	35,287	7,714
Omusati	39.4	115,917	294,206	30.7%	35,587	7.0%	33,096	22,057
Oshana	37.9	56,693	149,585	35.2%	19,956	5.0%	18,958	36,967
Oshikoto	36.0	105,118	291,994	49.6%	52,138	16.0%	43,796	12,180
Ohangwena	34.5	68,790	199,392	43.7%	30,061	21.0%	23,748	20,534
Kavango	37.6	53,078	141,164	58.7%	31,157	12.0%	27,418	13,007
Total	37.4	472,574	1,263,567	45.4%	208,548	12.6%	182,304	112,460

Source: Study on Informal Trade of Beef/Cattle in the Northern Communal Areas, Data from the NamLITS 2011 database

Official off-take (Meatco statistics) of livestock in the NCA through the Eloo abattoir in Oshakati is currently very low at less than 2% (Verlinden and Kruger, 2007). By increasing off-take to 7- 10% over the short-term and to 20–25% over the longer-term, livestock farmers can generate considerable income. Off-take figures in communal areas in the south of the VCF are reported to be around 14% while off-take among established commercial farmers is between 20-30%. To increase off-take in NCA, more animals have to be marketed, and the quality of animals must also be improved. Intervention such as improved animal husbandry practices, nutrition (including better rangeland management), breeding, and animal health care are prerequisites to achieving higher off-take of better quality animals on a consistent basis and to securing more income.

II-3.3.2 Technical Measures List

Livestock as the products of farmers are brought into livestock market formally or informally. Farmers should input many items until they gain the profits from livestock sales at the market. In order to support and strengthen farmer's livestock productivities, proper technical measures for livestock development are required at right stages of livestock development in sustainable manner. Through the study of livestock situation in NCA, necessary supports for better livestock management are categorized into 4; (i) feed supply, (ii) production, (iii) marketing and (iv) management. The following figure describes the flow of livestock improvement techniques.



(1) Feed Supply

A low reproductive performance of 45% calving rate means that a cow gives a calving every more than 2 years (26-27 months) and 12% of calf mortality rate are mostly caused by the lack of nutrition. Most of poor livestock production is derived from nutrition problems due to fodder scarcities as a result of poor rangeland management. Although the number of livestock and population of people are increasing, fodder supply per one livestock is decreasing. To widen fodder resources not only from grasses of rangeland also other fields such as cultivated lands is required.

At the same time, it needs prompt countermeasures to improve the fodder productivity of deteriorated rangeland in order to satisfy requirement of livestock. Water harvesting is also very important. Even if there is grass rich rangeland in remote areas, livestock mainly cattle cannot access without watering points.

Since many farmers in NCA are currently facing the lack of nutritious feed supply for pig and chicken raising. They have to find out alternative measures to get feed available locally although purchasing feed is one of solution.

In order to improve feed supply, the following technical measures are proposed:

Technical Measures for Feed Supply

No.	Technical Measures	Challenges	Strategies
LS-1	Fodder Production	- Lack of planting materials - Insufficient experiences in ATs and farmers	- Cultivated pasture - Cultivated fodder
LS-2	Range Management	- Insufficient coordination among livestock farmers	- Group formation, group grazing
LS-3	Water Harvesting and/or construction of water resource facilities for animals	- Insufficient number and distribution of facilities	- Construct medium & small-scale facilities at potential sites
LS-4	Nutritious Feed Supply particularly for Pig and Chicken	- Currently not provided widely	- Purchase of feed for fattening small stock - Or provide animals with locally available feed - Financial analysis to confirm feasibility

Source: Prepared by the Study Team

Target of expected impacts derived from the technical measures are assumed in the table below;

Target of Expected Impact

No.	Technical Measures	Expected Impact	Remarks
LS-1	Fodder Production	Production increase by 10%	to be implemented together with LS-2
LS-2	Range Management	Production increase by 10%	initial activities to be implemented together with LS-1
LS-3	Water Harvesting and/or construction of water resource facilities for animals	Production increase by 10%	to be implemented at potential site as basic activities for animal health improvement
LS-4	Nutritious Feed Supply particularly for Pig and Chicken	Production increase by 10%	to be implemented at potential site as basic activities for animal health improvement

Source: Prepared by the Study Team

(2) Production

Even though feed supply for livestock is fully satisfied, there are many difficulties to be solved during production periods in order to raise their market values.

Animal disease control is very important to keep livestock in good conditions and prevent diseases brought huge economic losses. In Namibia, owners of livestock are facing economic difficulties to purchase vaccines, drugs and so on because all drugs are not necessary free of charge except FMD and CBPP during vaccine campaign.

Fattening of livestock and periodical production are profitable activities to increase livestock values at any livestock markets formally and informally. Lack of feeding materials from markets and/or agricultural farms and reproductive record keeping skills are main obstacles.

Production of goat, pig and chicken are suitable activities especially for women and children in rural areas to gain cash. However, these productions have difficulties such as:

- ◆ Internal parasite (goat)
- ◆ Limited breeding materials (goat, pig, chicken)
- ◆ Insufficient facilities (pig)
- ◆ Insufficient experiences in ATs and farmers for brooding and rearing (chicken)

In order to improve production, the following technical measures are proposed:

Technical Measures for Production

No.	Technical Measures	Challenges	Strategies
LS-5	Disease control	- Limited knowledge in farmers - High cost of drugs - High cost of drench	- Awareness campaign for promoting periodical vaccine and drench
LS-6	Large and small stock fattening	- Limited feeding materials	- Use of grain & legume residue - Fodder production
LS-7	Periodical Production	- No recording	- Strengthen mentorship program
LS-8	Expansion of quality meat	- Limited off-take - Off-take cattle in untimely manner (old cattle)	- Encourage farmers to sell steer in timely manner - Introduction of exotic breed and selection through back fat thickness (pig)
LS-9	Bull Scheme	- Insufficient number of bull - Insufficient knowledge in farmers	- Distribution of bull in reasonable price - Breeding program
LS-10	Multiplication of Sanga bull	- Limited pasture - Limited production capacity	- Increase grazing area - Cultivate pasture
LS-11	Goat production	- Internal parasite - Limited breeding materials	- Awareness campaign for periodical drench - Breeding program - Milk production system

No.	Technical Measures	Challenges	Strategies
LS-12	Pig production	<ul style="list-style-type: none"> - Limited breeding materials - Insufficient facilities 	<ul style="list-style-type: none"> - Purchase exotic breed (from import or domestic market) - Construction and management of facilities - Partnership with private farms
LS-13	Chicken production	<ul style="list-style-type: none"> - Limited breeding materials (insufficient supply agent) - Insufficient experiences in ATs and farmers for brooding and rearing 	<ul style="list-style-type: none"> - Establishment of chicken supply chain from parents stocks, egg and chick production - Brooding and rearing techniques acceptable for farmers

Source: Prepared by the Study Team

Disease control, large and small stock fattening and periodical production will be implemented at potential site as basic activities for animal health improvement. Goat, pig and chicken production will be implemented at potential site as a part of small stock promotion.

Target of expected impacts derived from the technical measures are assumed in the table below;

Target of Expected Impact

No.	Technical Measures	Expected Impact	Remarks
LS-5	Disease control	Production increase by 20%	to be implemented at potential site as basic activities for animal health improvement
LS-6	Large and small stock fattening	Production increase by 20%	to be implemented at potential site as basic activities for animal health improvement
LS-7	Periodical Production	Production increase by 20%	to be implemented at potential site as basic activities for animal health improvement
LS-8	Expansion of quality meat	Production increase by 20%	to be implemented at potential site as basic activities for animal health improvement
LS-9	Bull Scheme	Production increase by 20%	to be implemented at potential site as basic activities for animal health improvement
LS-10	Multiplication of Sanga bull	Production increase by 20%	to be implemented at potential site as basic activities for animal health improvement
LS-11	Goat production	Production increase by 20%	to be implemented at potential site as a part of small stock promotion
LS-12	Pig production	Production increase by 20%	to be implemented at potential site as a part of small stock promotion
LS-13	Chicken production	Production increase by 20%	to be implemented at potential site as a part of small stock promotion

Source: Prepared by the Study Team

(3) Marketing

The livestock market should be attractive for sellers (farmers owned livestock). However, there is insufficient matching between sellers and buyers and the auction deals only cattle. Moreover there is not any auction of small stock and most of small stock goes into informal markets.

In order to improve marketing, the following technical measures are proposed:

Technical Measures for Marketing

No.	Technical Measures	Challenges	Strategies
LS-14	Promotion and strengthening of auction for both large and small stocks	<ul style="list-style-type: none"> - Insufficient matching between buyers and sellers - Cattle auction only at present 	<ul style="list-style-type: none"> - Improvement of auction system by linkage development - Introduction of goat auction system
LS-15	Development of formal market for small stock	<ul style="list-style-type: none"> - Insufficient formal market for small stock in NCA 	<ul style="list-style-type: none"> - Awareness raising for farmers to sell product - Attracting private sector (joint production and marketing among meat company and farmers)

Source: Prepared by the Study Team

(4) Management

Management of livestock cooperative is extremely limited and it needs establishment and strengthening livestock cooperatives. The poor management of group causes stagnant activities for wide range.

In order to improve management, the following technical measures are proposed:

Technical Measures for Management

No.	Technical Measures	Challenges	Strategies
LS-16	Establishment and strengthening livestock cooperatives	- Group activities currently limited	- Establishment and strengthening the group through providing necessary training and support (group formation and management etc.)

Source: Prepared by the Study Team

Target of expected impacts derived from the technical measures are assumed in the table below;

Target of Expected Impact

Technical Measures	Expected Impact	Remarks
Establishment and strengthening livestock cooperatives	Production increase by 10%	focus given to strengthening existing cooperatives

Source: Prepared by the Study Team

II-3.4 Farm Management Techniques

II-3.4.1 General

Technical measures for Farm Management are prepared with purpose of appropriately disseminating and managing technical measures for crop and livestock sub-sectors proposed. In both sub-sectors there are techniques which can be applied for individual farmers and/or for groups, accordingly the technical measures for farm management are broadly divided into individual activities and group activities.

For individual farmers limited financial resource is one of the major constraint for agricultural activities. Procurement for agricultural inputs such as seed, fertilizer, feed, medicines and equipment at the right time is the fundamental for maximizing agricultural production. Technique for improving household accounting management will help to solve such kinds of financial problems.

Formation and strengthen of groups are necessary for the success of rangeland management and cooperative activities. Formation of water users association is also very important for efficient use of water resources for both crop and livestock production. In addition, there are some activities which working as a group is financially more effective such as collective sales or purchase because of the bargaining power. Working as a group has also advantage for improvement of access to rural finance and market information.

Post harvest plays one of the key roles for marketing improvement. Post harvest techniques vary from basic techniques such as washing, sorting or grading which individual farmers can manage in their homestead to processing which needs certain amount of investment that is not easy for individual farmer to afford. The level of introduced techniques should be carefully considered based on the ability of targets.

II.3.4.2 Technical Measures List

Based on the above discussion, the Technical measures listed up for farm management together with relating techniques for crop and livestock production summarized as follows:

List of Technical measures

Target		Technical measures	Relating techniques
Individual	Household financial improvement	【FM-1】 Household accounting management	- Financial support for procurement agricultural input and equipment: fertilizer, seed, drip irrigation system, feed, medicine, improved breed - Financial support for hiring agricultural machine: ripper
		【FM-2】 Book keeping 【FM-4】 Business plan	
Group	Production improvement	【FM-5】 Group formation / group strengthen	- Bargaining power for bulk procurement for agricultural input and bulk sales of the products - Supporting efficient group activities: rangeland management, cooperative, marketing
		【FM-6】 Group accounting management 【FM-8】 Collective selling / purchasing 【FM-9】 Rural finance accessibility improvement 【FM-10】 Market information access improvement	
	Efficient water use	【FM-7】 Formulation of water users association	- Effective use of water for crop production - Effective use of water for livestock
both	Post harvest	【FM-3】 Post harvest	- Post harvest based on market information

Source: Prepared by the Study Team

II-3.5 Technical Measures Pre-Evaluation

II-3.5.1 Criteria for Evaluating Candidate Technical Measures

Through the discussion with ATs during the series of stakeholder meetings and comprehensive information gathering, 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.

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

No.	Name
Crop Production	
CR-1	Fertilizer application
CR-2	Cropping pattern
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

No.	Name
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	Book 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 and categorized into 3 as follows:

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

In order to categorize technical measures into 4, the criteria for the categorization 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

II-3.5.2 Categorization of Technical Measures

(1) Crop Production

Categorization result for technical measures for crop production is shown in Table II-3.5.1 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 II-3.5.1 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. ◆ 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.

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 II-3.5.1 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					Total
		1	2	3	1-2	2-3	
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 adopted for Pilot Site Activities in Phase-2

In accordance with the discussion above, the following technical measures, in total 27 numbers, are adopted for verification in the phase-2 and the phase-3.

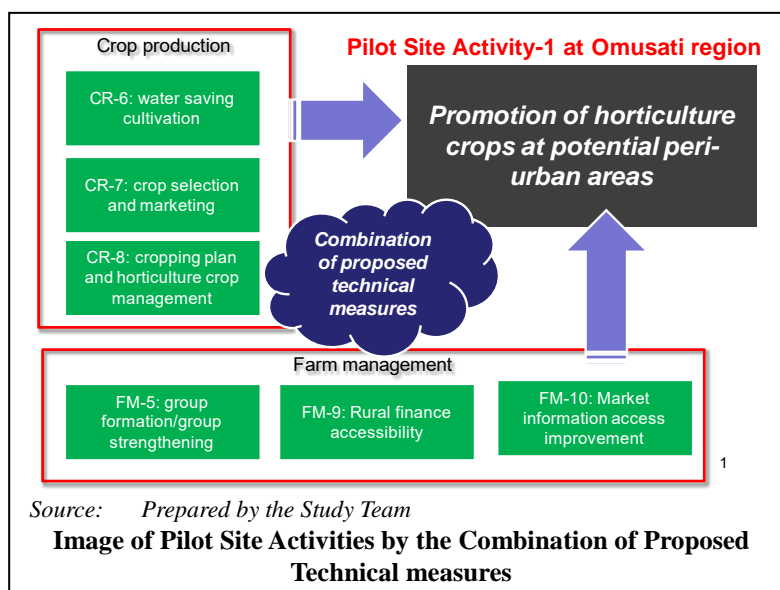
List of Technical Measures according to the Categorization during the Phase-1

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 (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"> ◆ Book 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

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

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



II-3.6 Re-categorization of Technical Measures in the Phase-2 and the Phase-3 (Details are explained in the Main Report)

(1) Selected Technical Measures for the Pilot Site Activities in the Phase-2 in the Phase-3
Through the discussion with farmers’ group and ATs, the following technical measures are selected for the pilot site activities based on the needs of each site.

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

Crop production (8 nos.) (8 nos.)	Livestock production (11 nos.) (8nos.)	Farm management (8 nos.) (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) ◆ 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"> ◆ Book 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)

Remarks: “Red” represents technical measures applied during the pilot site activities.

Source: Prepared by the Study Team

(2) Selected Technical Measures for the Pilot Site Activities in the Phase-2 and the Phase-3

After the result of pilot site activities in phase-2, re-categorization of technical measures are made as shown in Table II-3.5.1 with the comparison of categorization result in the phase-1.

Points on Re-categorization of Technical Measures

based on the Pilot Site Activities in Phase-2

Subject	Categorization result
Crop production	<ul style="list-style-type: none"> ◆ All the 8 technical measures are tried and verified during the phase-2 pilot site activities, therefore, no re-categorization of technical measures is required.
Livestock production	<p><u>Re-categorization: LS-3, LS-12 and LS-16</u></p> <ul style="list-style-type: none"> ◆ Since the drought in the period during the phase-2 pilot site activities, potential sites for water harvesting and/or construction of water resource facilities for animals (LS-3) are identified. It is proposed that the regional offices of MAWF prepare potential sites list for those facilities and construction will be carried out stepwise. ◆ Through the discussion with farmers' group and ATs, it will be difficult for small-scale farmers to promote Pig production (LS-12) at the communal level. Therefore, this technique is re-categorized for medium term. ◆ Since the pilot site activities are carried out for newly selected farmers by ATs, activities are focused for basic practice for the group. Establishment and strengthening livestock cooperatives (LS-16) is expected in the medium term (Category-2).
Farm Management	<p>Re-categorization:</p> <ul style="list-style-type: none"> ◆ Group activities in the communal area are still challenging, therefore, only basic activities are carried out for the pilot site activities. Such technical measures not been carried out are categorized into medium-term (category-2)

Source: Prepared by the Study Team

CHAPTER II-4 OUTLINE OF NAMIBIAN SHEP APPROACH

II-4.1 General

Based on the activities in the course of N-CLIMP since September 2014 through applying SHEP approach, the Namibian specific SHEP approach is developed as explained in this chapter. The activities of of N-CLIMP are categorized according to the 4 major steps of SHEP approach as listed below consisting of

- ◆ Step-1: Selection of targets and sharing vision/goal,
- ◆ Step-2: Awareness of current situation and new information,
- ◆ Step-3: Facilitation of making plan, and
- ◆ Step-4: Provision of technical solutions.

Comparison of SHEP Approach between Namibia and Kenya

Step	Kenya SHEP UP	Namibian	
	Farmer's view point	Farmers' view point	Project Implementation
Step-0: Preparatory stage	-		<ul style="list-style-type: none"> ◆ Overall review survey (macro level) ◆ Detailed thematic survey (micro level) ◆ Review and share constraints and potential
Step-1: Selection of targets and sharing vision/goal	<ul style="list-style-type: none"> ◆ Sensitization Workshop ◆ Selection of Target District through Proposal System ◆ Selection of Target Groups by District 	<ul style="list-style-type: none"> ◆ Explanatory workshop ◆ Selection of target constituencies (ADCs) based on the set of criteria ◆ Selection of target farmers from selected constituencies by ATs 	<ul style="list-style-type: none"> ◆ Set of criteria for the selection of pilot sites
Step-2: Awareness of current situation and new information	<ul style="list-style-type: none"> ◆ Participatory Baseline Survey ◆ FABLIST Forum ◆ Market Survey after JEF2G 	<ul style="list-style-type: none"> ◆ Preparatory training for farmers' group (baseline survey, gender training and FABLIST forum) ◆ Coordination with GRN scheme in FABLIST forum 	
Step-3: Facilitation of making plan	<ul style="list-style-type: none"> ◆ Crop Selection ◆ Action Plan Making 	<ul style="list-style-type: none"> ◆ Formulation of Action Plan by Farmers' Group 	<ul style="list-style-type: none"> ◆ Formulation of Support Plan by ATs
Step-4: Provision of technical solutions	<ul style="list-style-type: none"> ◆ In-field trainings after ToT 	<ul style="list-style-type: none"> ◆ In-field trainings after ToT 	

Note: The activities of each step in Kenya SHEP UP are provided by JICA. Although the activities related with project implementation were carried out for Kenya SHEP UP as well, attention is paid to the activities from farmers' view point for Kenya SHEP UP.

Source: Prepared by the Study Team

In Namibian SHEP approach, Step-0: Preparatory stage is defined additionally, activities of which

consist of: (i) overall review survey (macro level), (ii) detailed thematic survey (micro level) and (iii) review and share constraints and potential among stakeholders, with the purpose of confirming and sharing constraints and potential for crop and livestock production in the target area and smoothly implementing the pilot site activities including the selection of the pilot site activities..

The measures taken from step-0 to step-4 in Namibian SHEP approach under N-CLIMP are illustrated as follows:

Step	Activities	Measures taken
Step-0: Preparatory stage	◆ Overall review survey and detailed thematic survey	◆ Opportunity to share development constraints and potential amongst stakeholders
Step-1: Selection of target and sharing the goal	◆ Criteria agreed among stakeholders ◆ Simplification of selection of target area and formulation of action plan	◆ Quick selection procedure of target constituencies (ADCs)
Step-2: Farmers' awareness of current situation and new information	◆ Preparatory training for farmers' group	◆ Providing farmers' group with options of solution ◆ Use of GRN scheme in FABLIS Forum
Step-3: Facilitation of making plan	◆ Formulation of Action Plan by Farmers' Group selected ◆ Formulation of Support Plan by ATs	◆ Strengthening relationship between ATs and farmers' group through planning process
Step-4: Provision of technical solution	◆ In-field training ◆ Periodical monitoring and modification of schedule	◆ Flexible modification of activities based on the realities observed on the ground (weather conditions etc.)

Source: Prepared by the Study Team

Majors taken for each Step in Namibian SHEP Approach

Format developed for Namibian SHEP approach are listed as follows:

◆ FORM-1:	Questionnaire for Overall Review Survey
◆ FORM-2:	Questionnaire for Detailed Thematic Survey
◆ FORM-3:	Monitoring Form for Fixed Point Observation
◆ FORM-4:	Selection procedure of Pilot Site Activities
◆ FORM-5:	Baseline survey for farming activities
◆ FORM-6:	List of Key Farmers
◆ FORM-7:	Action Plan for Pilot Site Activities
◆ FORM-8:	Support Plan by ATs
◆ FORM-9:	Monitoring Form for Pilot Site Activities of Technical Measures Verification
◆ FORM-10:	Market Survey
◆ FORM-11:	Farming Schedule
◆ FORM-12:	Progress of Technical Dissemination

SHEP Activities in N-CLIMP
STEP-4: Provision of technical solutions (1/4)

Technical Dissemination through Training of Trainers (TOT)

Training of ATs for techniques of crop and livestock production and farm management

Training of farmers' group by AT at Ondobe in Ohangwena Region ATs

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SHEP Activities in N-CLIMP
STEP-4: Provision of technical solutions (2/4)

Stepwise technical dissemination

Step-1
Demonstration farm
- Intensive training and technical verification

Step-2
Key farmers
- Dissemination based on training and support

SHEP Activities in N-CLIMP
STEP-4: Provision of technical solutions (3/4)

Training materials based on field needs

Husbandry – "Orange"

Dehazing
Age 4 - 6 weeks: Dehazing is best done at an early stage with hot iron, gun or fire braked tool.

The important thing to remember is that the growth of the horns takes place when the hair line marks. This growth line is created during the hair removal to prevent regrowth of the horns. The second step is to remove the hair from the horns. This is done by using the hot iron, gun or fire braked tool. This is done when the horns are growing in the hair line.

Dehazing with hot iron

Essential tools for dehazing

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SHEP Activities in N-CLIMP
STEP-4: Provision of technical solutions (4/4)

Dissemination of techniques and technical measures through farmers' field day

Presentation by representative farmer (Ukuwiyu Ushona, Oshana Region)

Joint inspection of site by the participants

Activities introduced by the media

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II-4.2 Outline of Namibian SHEP Approach

II-4.2.1 Step-0: Preparatory Stage

Opportunity to share development constraints and potential amongst stakeholders

Step	Namibian	
	Farmers' view point	Project Implementation
Step-0: Preparatory stage		<ul style="list-style-type: none"> ◆ Overall review survey (macro level) ◆ Detailed thematic survey (micro level) ◆ Review and share constraints and potential
Step-1: Selection of Target and sharing the goal	<ul style="list-style-type: none"> ◆ Explanatory workshop ◆ Selection of target constituencies (ADCs) based on the set of criteria ◆ Selection of target farmers from selected constituencies by ATs 	<ul style="list-style-type: none"> ◆ Set of criteria for the selection of pilot sites
Step-2: Awareness of Gap	<ul style="list-style-type: none"> ◆ Preparatory training for farmers' group (baseline survey, gender training and FABLIS forum) ◆ Coordination with GRN scheme in FABLIS forum 	
Step-3:	<ul style="list-style-type: none"> ◆ Formulation of Action Plan by Farmers' Group 	<ul style="list-style-type: none"> ◆ Formulation of Support Plan by ATs

Step	Namibian	
	Farmers' view point	Project Implementation
Facilitation of Making Plan		
Step-4: Provision of Solution	◆ In-field trainings after ToT	

Source: Prepared by the Study Team

Objective of Step-0, Preparatory Stage, is:

- ◆ to collect agriculture and livestock-related information on each ADC coverage,
- ◆ to enable ATs to confirm and recognize potential, constraints and challenges for crop and livestock production, and
- ◆ to share awareness amongst ATs in their ADC areas in preparation of the development plan.

Overall Review Survey: macro level survey through collecting and compiling ADC level statistical data



Detailed Thematic Survey: micro level survey to interview to model farmers in each ADC area: (i) crop production-based farmers, (ii) livestock production-based farmers and (iii) horticulture farmers

Source: Prepared by the Study Team

Two Steps of Collecting Crop and Livestock Production-related Data through Overall Review Survey and Detailed Thematic Survey

(1) Overall Review Survey (FORM-1)

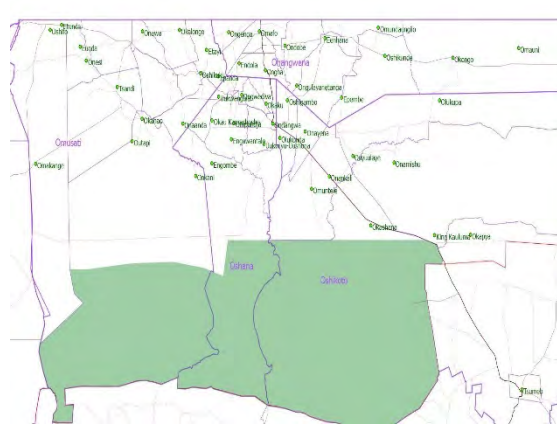
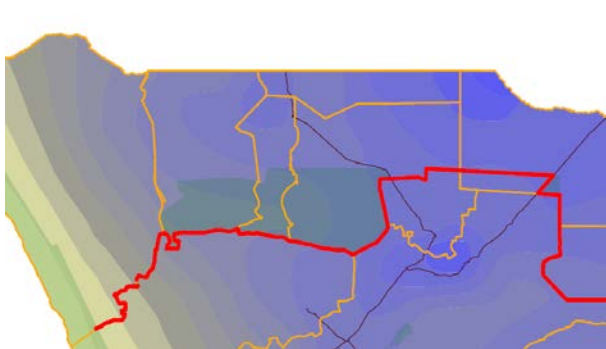
- ◆ Target of data collection: each ADC
- ◆ Data collected by: ATs supervised by CAT and CASO of each region
- ◆ Questionnaire: shown in FORM-1 and summarized as follows

Contents of the Questionnaire for Overall Review Survey

◆ Section A: general information on location of the ADC, staff profiles and access to farming related equipment;
◆ Section B: focused on the natural environment and climatic conditions in the ADC area regarding rainfall, temperature, occurrence of natural disasters and mitigation measures taken by farmers;
◆ Section C: focused on crop production topics like different crops and varieties planted, areas under cultivation, inputs technologies used by farmers and crop production techniques implemented;
◆ Section D: covered information on livestock production including livestock species and livestock numbers, feeding regimes for livestock and production techniques used;
◆ Section E: focused on crop and livestock marketing providing information on market locations and marketing methods used;
◆ Section F: explored group activities in the ADC area;
◆ Section G: covered agricultural support services, including extension services, provided to farmers; and
◆ Section H: asked about major constraints experienced and future plans of staff in each ADC. (See Annexure A for detailed questionnaire).

Source: Prepared by the Study Team

◆ Sample outputs: as shown in FORM-1 and follows

 <p style="text-align: center;">Location Map of ADCs</p>	 <p style="text-align: center;">Rainfall Pattern of 4 regions</p> <p>Average annual rainfall</p> <ul style="list-style-type: none"> 0-50 100-150 150-200 200-250 250-300 300-350 350-400 400-450 450-500 500-550 550-600 more than 600
<ul style="list-style-type: none"> ◆ Information suggests that on average there is only one Agricultural Technician for 3,327 farmers. ◆ Although the ratio of technical versus support staff seems to be appropriate, too few professional scientific staff exists to provide backstopping and support to ATs. ◆ Not every ADC has a vehicle, and only about half of the ADCs have internet connectivity. <p style="text-align: center;">Narrative Summary of Findings (1/4)</p>	<ul style="list-style-type: none"> ◆ Millet is the most commonly planted crop in all regions, followed by Sorghum, Maize, Cow Pea, Pumpkin, Water melon, and Bambara nuts. ◆ The largest area (236,590 ha) is planted with millet, followed by sorghum (74,712 ha), maize (57,475 ha) and cow pea (40,834 ha). ◆ Cow peas are the most commonly used for intercropping, followed by sorghum, maize, Bambara nuts, and water melons and pumpkin. ◆ The use of manure was the most frequently reported technology ATs, followed by the use of fertiliser and the use of local seeds. <p style="text-align: center;">Narrative Summary of Findings (2/4)</p>
<ul style="list-style-type: none"> ◆ Fertiliser application seems to be the activity most commonly provided by ATs to farmers, followed by the selling of seeds and fertiliser, dissemination of agricultural information and supporting the implementation of DCP. ◆ Support services in relation to animal health and marketing were the most mentioned by ATs, followed by animal husbandry related support and support on livestock breeding and management practices in general ◆ Most training <u>provided</u> was on crop production followed by leadership training, livestock production and management, livestock marketing, DAP, animal health and rangeland assessment. <p style="text-align: center;">Narrative Summary of Findings (3/4)</p>	<ul style="list-style-type: none"> ◆ Issues related to the San people are by far the most needed ethnic based group-wise topics to be considered by ATs ◆ Gardening, food processing and modern basket making are amongst the most important extension related activities focusing on <u>women</u> groups ◆ The major <u>constraints</u> are transport and vehicle problems, insufficient tractors per ADC, not enough Agricultural Technicians, computers that are not functioning and limited internet connectivity. ◆ ATs will <u>continue</u> to train farmers in rangeland and livestock management. Other important future plans include the training of young staff, provision of more transport, location of people in their ADC areas and the provision of internet services. <p style="text-align: center;">Narrative Summary of Findings (4/4)</p>

(2) Detailed Thematic Survey (FORM-2)

- ◆ Target of data collection: 3 model farmers from each ADC (crop production-based farmer, livestock

production-based farmer and horticulture farmer)

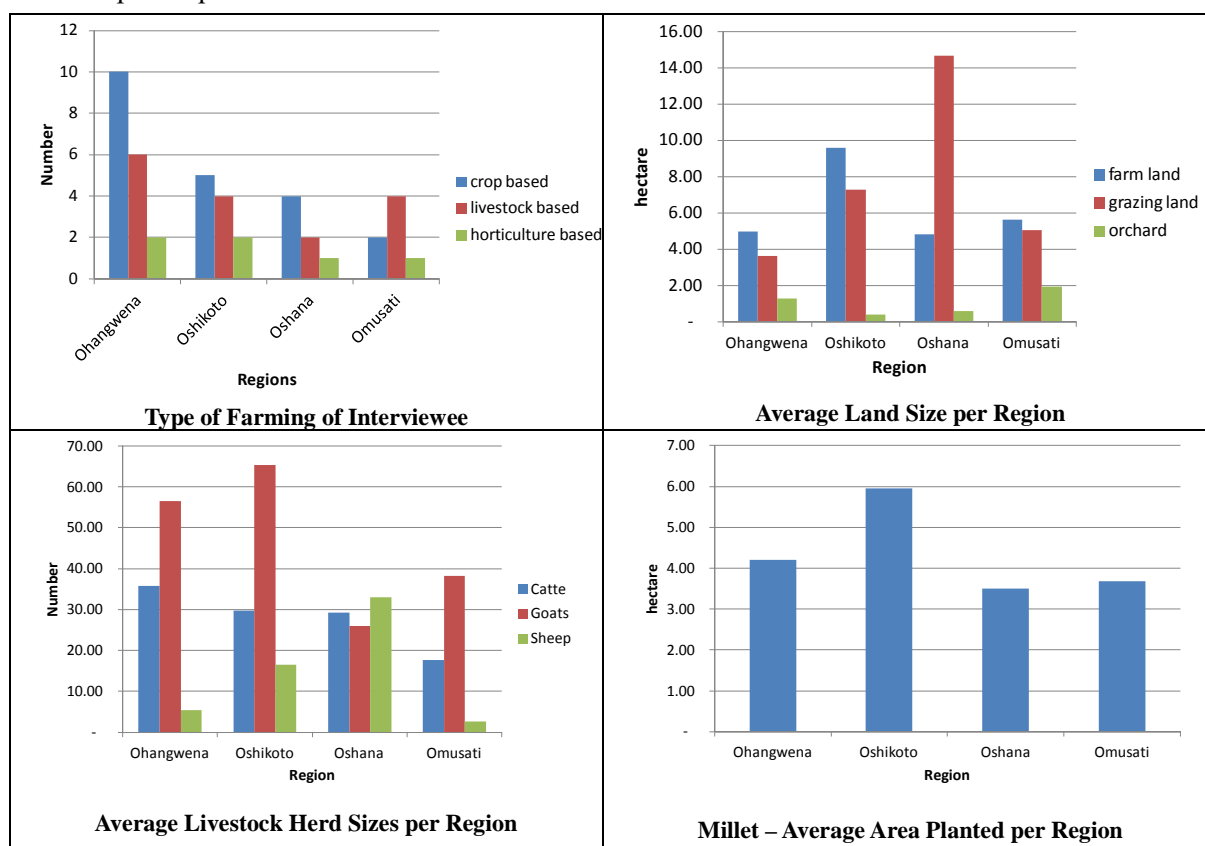
- ◆ Data collected by: ATs supervised by CAT and CASO of each region
- ◆ Questionnaire: shown in FORM-2 and summarized as follows

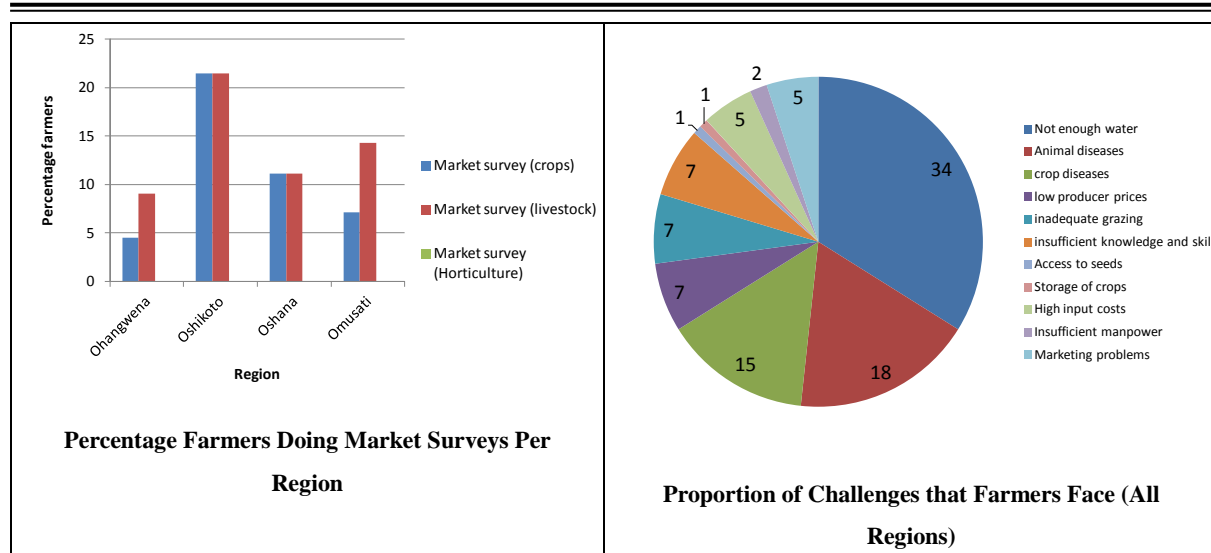
Contents of the Questionnaire for Detailed Thematic Survey

◆ Section A: general information on the respondent;
◆ Section B: focused on the household characteristics of the respondent and his/her family;
◆ Section C: focused on the living conditions of the respondents and their families;
◆ Section D: covered information on agricultural and livestock production and income of the respondents;
◆ Section E: focused on farm management practices;
◆ Section F: focused on crop and livestock marketing;
◆ Section G: explored group activities of the respondents;
◆ Section H: covered agricultural support services, including extension services, provided to farmers; and
◆ Section I: asked about major constraints experienced and future plans of respondents.

Source: Prepared by the Study Team

- ◆ Sample outputs: as shown in FORM-2 and follows





(3) Review and Share Constraints and Potential

The results of overall review survey and detailed thematic survey are reviewed among ATs to share constraints and potential. On this basis, technical measures are discussed and proposed in order to improve the current situation of crop and livestock production. Program for the meeting are shown as follows:

Program for Reviewing the Result of Overall Review and Detailed Thematic Survey

Time	Subject
08:45-09:00	Registration
09:00-09:10	Opening Remarks
09:10-10:00	Summary of overall review survey ◆ Summary of overall review survey ◆ Sharing awareness among ATs through discussion
10:00-11:00	Review of detailed thematic survey ◆ Confirmation of the progress ◆ Sharing awareness among ATs through discussion
11:00-11:15	Coffee break
11:15-12:20	Technical measures for crop production, livestock production and farm management ◆ Group work ◆ Presentation ◆ Criteria for categorization
12:20-12:30	Closing Remarks

Source: Prepared by the Study Team by modifying the agenda of Stakeholder Meeting-3 in Phase-1

(4) Fixed Point Observation (FORM-3)

Fixed point observation is the survey to supplement the data obtained from the interview survey. Under N-CLIMP, the fixed point observation was carried out together with ATs continuously to collect information on crop and livestock farmers over 1 cropping season.

Outline of Fixed Point Observation

◆ Purpose: Monitor selected farmers continuously to clarify farming activities, problems and challenges during cropping season
◆ Target farmers: to be selected from sample farmers surveyed for detailed thematic survey
◆ Number of farmers to be monitored: 3 farmers per region (crop, livestock and horticulture)
◆ Frequency: every 2 weeks

◆ To be carried out by: ATs at selected constituencies

◆ Monitoring Form


Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia
N-CLMP
Fixed Point Observation Sheet

Date: _____


Observation point	ADC: _____				
	Region: Oshikoto Oshana Oshana Oshana Oshana Oshana				
	Village name: _____	Farmer or group name _____			
Type of farmer	Crop production-based / Livestock production-based / Horticulture				
Planned activities	◆ Crop production or livestock raising				
Period: From: _____ To: _____	◆ Meeting				
	Planned activities				
	◆ Training				
Actual activities	◆ Crop production or livestock raising				
Period: From: _____ To: _____	◆ Meeting				
	Actual activities				
	◆ Training				
Plans for next 2 weeks	◆ Crop production or livestock raising				
Period: From: _____ To: _____	◆ Meeting				
	Plans in next 2 weeks				
	◆ Training				
Problems, Challenges and Findings	1. _____				
	2. _____				
	Problems, challenges and findings				

Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia
N-CLMP
Fixed Point Observation Sheet


Photographs




Title
Description




Title
Description




Title
Description



Title
Description



Title
Description



Title
Description

Photographs showing major activities

II-4.2.2 Step-1: Selection of Target and Sharing Vision/Goal

Quick selection procedure of target constituencies (ADCs)

Step	Namibian	
	Farmers' view point	Project Implementation
Step-0: Preparatory stage		<ul style="list-style-type: none"> ◆ Overall review survey (macro level) ◆ Detailed thematic survey (micro level) ◆ Review and share constraints and potential
Step-1: Selection of Target and sharing Vision/goal	<ul style="list-style-type: none"> ◆ Explanatory workshop ◆ Selection of target constituencies (ADCs) based on the set of criteria ◆ Selection of target farmers from selected constituencies by ATs 	<ul style="list-style-type: none"> ◆ Set of criteria for the selection of pilot sites
Step-2: Awareness of current situation and new information	<ul style="list-style-type: none"> ◆ Preparatory training for farmers' group (baseline survey, gender training and FABLIS forum) ◆ Coordination with GRN scheme in FABLIS forum 	
Step-3: Facilitation of Making Plan	<ul style="list-style-type: none"> ◆ Formulation of Action Plan by Farmers' Group 	<ul style="list-style-type: none"> ◆ Formulation of Support Plan by ATs
Step-4: Provision of technical solutions	<ul style="list-style-type: none"> ◆ In-field trainings after ToT 	

Source: Prepared by the Study Team

(1) Explanatory Workshop

The explanatory workshop is a kind of sensitization meeting that is an opportunity to explain the purpose of pilot site activities and discuss selection procedure among the stakeholders at each region.

- ◆ Participants: member of stakeholder meeting including CAT, CASO, ASO, ATs, stakeholders
- ◆ Facilitator: Chief of SM in each region
- ◆ Program: as follows

Program for Explanatory Workshop for the Pilot Site Activities

Time	Subject
09:00-09:30	Registration
09:30-09:40	Opening Remarks
9:40-10:10	Major Outputs from Phase-1 ◆ Background and major works carried out during Phase-1 ◆ Framework of the Master Plan
10:10-10:40	General Work Schedule of Phase-2 ◆ Overall work schedule ◆ Consideration to phase-2
10:40-10:55	Coffee break
10:55-11:15	Selection procedure of pilot site activities
11:15-13:15	Selection of pilot site activities ◆ Techniques and technical majors to be adopted ◆ Potential site listing ◆ Selection criteria discussion ◆ Selection
13:15-13:45	Lunch
13:45-14:15	Confirmation of next activities
14:15-14:35	Question and answer
14:35-14:45	Closing remarks

Source: Prepared by the Study Team by modifying the agenda of Stakeholder Meeting-1 in Phase-2

(2) Selection Procedure including the Discussion on Selection Criteria

Principle of pilot site activities selection is as follows:

Principle of Pilot Site Activities Selection

- | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ◆ Four Sites in each region covering: (i) crop production (cereal grains and/or horticulture crops), (ii) livestock production and (iii) farm management <p style="text-align: center;">PLUS</p> <ul style="list-style-type: none"> ◆ Potential sites for water supply improvement, if it is available: (i) reservoir, (ii) roof catchment, (iii) drip irrigation etc. |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The selection of pilot site activity was carried out according to the following 3 steps:

Selection Procedure of Pilot Site Activities

Step-1: Discussion on technical challenges in the region

What are the technical challenges to be focused for the following activities: (i) crop production (cereal/grains), (ii) crop production (horticulture crops), (iii) livestock production (large stock), (iv) livestock production (small stock) and (v) others, if any, in your region based on overall review survey and detailed thematic survey in phase-1?



Step-2: Discussion on selection criteria

Discuss criteria for pilot site selection

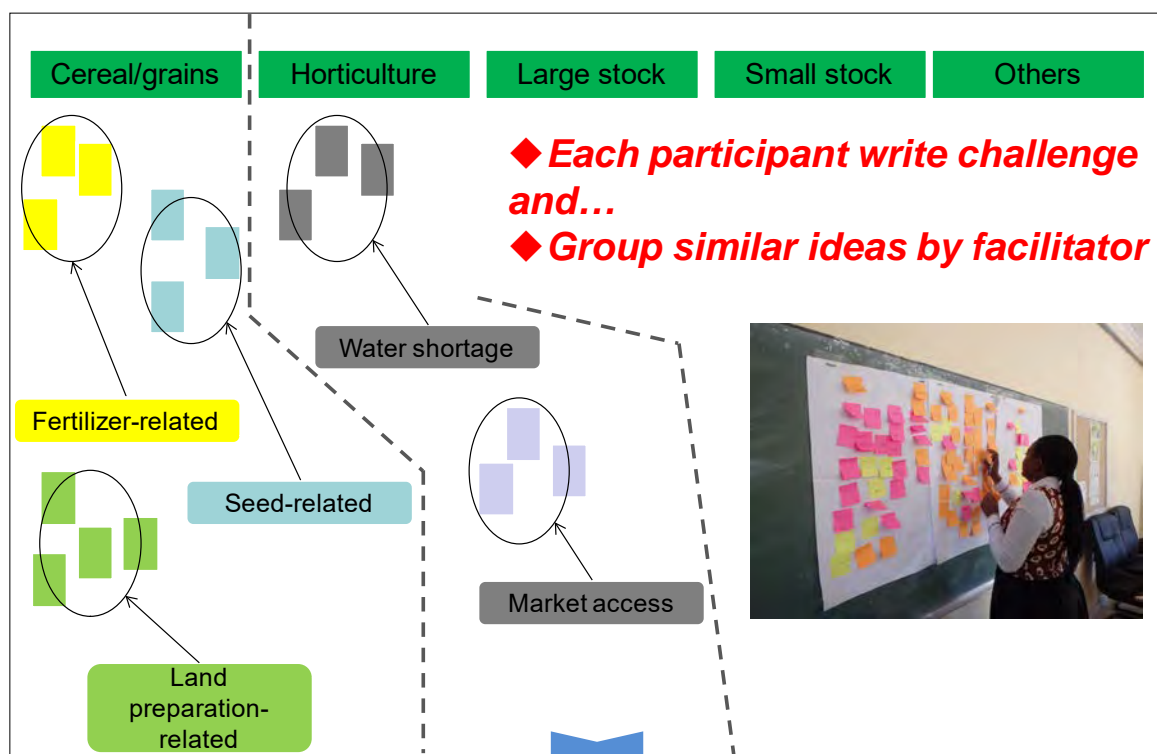


Step-3: Selection of appropriate sites based on the criteria discussed

Where are the potential sites to implement pilot site activities based on agreed selection criteria? Select ADC for each activity.

<Example>

Step-1: Discussion on technical challenges in the region



Technical Challenges Matrix for Major Activities of Crop and Livestock Production

Crop Cereal	Horticulture	Livestock Large	Livestock Small	Others
Tractors – not enough/ late	Water harvesting	Diseases and pests	Diseases and Pests	AT's are not enough
Weeding	Lack of Skills on irrigation	Over-Grazing and over stocking	Lack of proper skills for small livestock farming	Transport
Seeds not enough	No piloting projects for demonstrations e.g. Greenhouse, vegetable production, water harvesting etc.	No subsidy from GRN on Feeds and supplements during drought periods	Feeds are expensive	Lack/insufficient funds
Fertilizers/Manure/ Soil Fertility	Land preparation	Availability of Vaccines	Lack of Technical skills & knowledge in Livestock husbandry practices	Lack of facilities such as Auction kraals

Rain	Training in Horticulture skills	Accessibility to livestock marketing facilities (Distance)	Grazing areas for goats and sheep	
Birds & Pests	Seeds are expensive	Grazing area		
Low Crop Yield				

Step-2: Discussion on Selection Criteria

Selection criteria for pilot site activities are discussed among the participants:

Principle: All the ATs agree to the criteria and the selection result!

Selection Criteria applied for N-CLIMP during the phase-2 pilot site activities

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"> ◆ Farmers' group are existing or not... ◆ If farmers' group are not available, the site would be excluded from pilot site activities.
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

Note: In addition to the above-listed criteria, Ohangwena Region paid attention to the presence of influential farmers in the area (leadership of group leader and social conflict).

Step-3: Selection of Appropriate Sites based on the Criteria

Appropriate sites are selected based on the criteria agreed in order to solve technical challenges.

Selected ADCs in Ohangwena Region (Sample)

Activities	ADC
Crop Production (Cereal) + Water Supply + Farm Management	Ondobe (Eengonyo)
Crop Production (Horticulture) + Water Supply + Farm Management	Epembe (HIV support group)
Livestock Production (Cattle) + Water Supply + Farm Management	Okongo
Livestock Production (Small) + Water Supply + Farm Management	Endola

<Photograph>



ATs are discussing and listing constraints and technical challenges related with crop and livestock production in the region.

Identification of Technical Constraints and Challenges at Oshikoto Region (August 2015)

(3) Selection of Key Farmers for the Pilot Site Activities

Prior to the preparatory training for farmers' group in the next Step, key farmers and the demonstration farm for the pilot site activities are selected for each pilot site by ATs in charge according to the following criteria:

Criteria for the Selection of Key Farmers for the Pilot Site Activities		
No.	Criteria	Contents
Key farmers		
1	Number	◆ Maximum 15 farmers
2	Gender consideration	◆ Both male and female farmers are included in key 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

Selected farmers are listed and shared among stakeholders using the following form.

List of Key Farmers for the Pilot Site Activities (FORM-5)

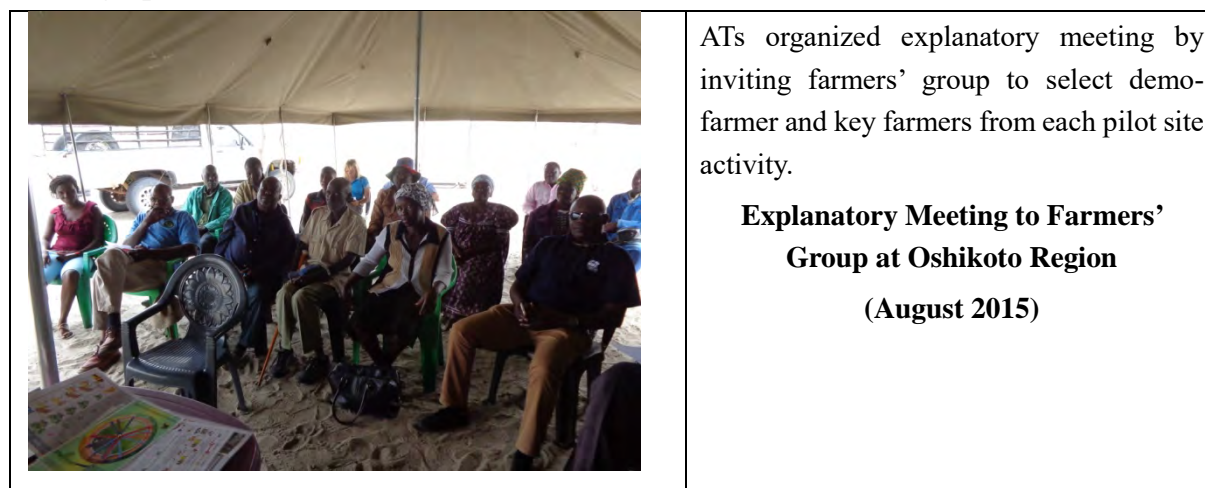
Date: _____

Implementation period: October 2015 to April 2016

1. General Information				
1.1 Region	Omusati	Oshikoto	Oshana	Ohangwena
1.2 Constituency				
1.3 ADC				
1.4 AT in charge				
1.5 Activities	Cereal/Grain	Horticulture	Cattle	Small stocks
2. List of key farmers				
	Name	Village	Sex	Contact
1	(Demonstration farm)			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Source: Prepared by the Study Team

<Photograph>



ATs organized explanatory meeting by inviting farmers' group to select demo-farmer and key farmers from each pilot site activity.

Explanatory Meeting to Farmers' Group at Oshikoto Region (August 2015)

II-4.2.3 Step-2: Awareness of current situation and new information

Providing farmers' group with options of solution

Use of GRN scheme in FABLIS Forum

Step	Namibian	
	Farmers' view point	Project Implementation
Step-0: Preparatory stage		<ul style="list-style-type: none"> ◆ Overall review survey (macro level) ◆ Detailed thematic survey (micro level) ◆ Review and share constraints and potential
Step-1: Selection of Target and sharing Vision/goal	<ul style="list-style-type: none"> ◆ Explanatory workshop ◆ Selection of target constituencies (ADCs) based on the set of criteria ◆ Selection of target farmers from selected constituencies by ATs 	<ul style="list-style-type: none"> ◆ Set of criteria for the selection of pilot sites
Step-2: Awareness of current situation and new information	<ul style="list-style-type: none"> ◆ Preparatory training for farmers' group (baseline survey, gender training and FABLIS forum) ◆ Coordination with GRN scheme in FABLIS forum 	
Step-3: Facilitation of Making Plan	<ul style="list-style-type: none"> ◆ Formulation of Action Plan by Farmers' Group 	<ul style="list-style-type: none"> ◆ Formulation of Support Plan by ATs
Step-4: Provision of technical solutions	<ul style="list-style-type: none"> ◆ In-field trainings after ToT 	

Source: Prepared by the Study Team

(1) Preparatory Training for Farmers' Group

Preparatory training for farmers' group is conducted to enable farmers' group to deeply understand the activities of the project (N-CLIMP) and to their raise awareness to solve technical challenges related with crop and livestock production in their area by providing options of solution prior to substantial training. More specific objectives are:

- ◆ Explain outline of N-CLIMP particularly pilot site activities,

- ◆ Discuss crop and livestock marketing in the region,
- ◆ Discuss gender issues, and
- ◆ Prepare action plan of pilot site activities by farmers' group

Participants of the preparatory training of farmers' group are:

- ◆ Representative from selected farmers' group: 2 males and 2 females from each group
- ◆ Member of stakeholder meetings (CAT, CASO, ATs, relevant organizations etc.) and
- ◆ Potential business partners (traders) for FABLIST forum

Program for the training is shown as follows:

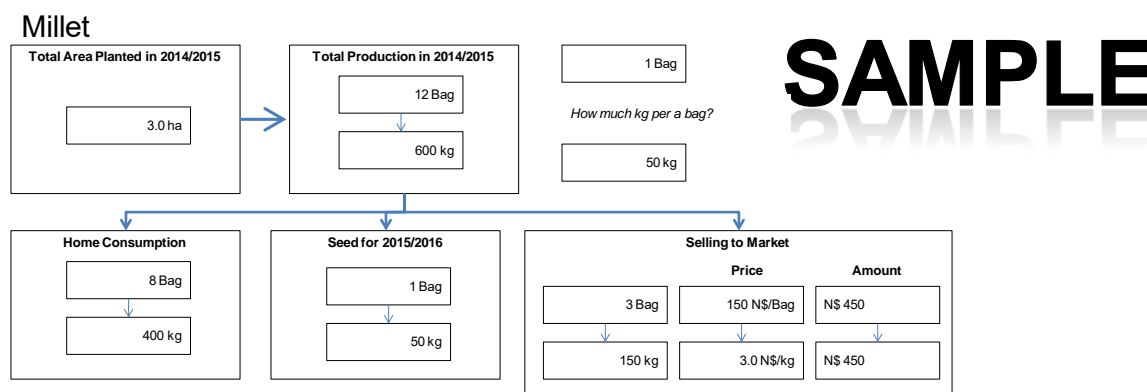
Program for Preparatory Training for Farmers' Group	
Time	Subject
09:00-09:30	Registration
09:30-09:40	Opening Remarks
9:40-10:00	Outline of N-CLIMP <ul style="list-style-type: none"> ◆ Background of N-CLIMP ◆ Pilot Site Activities in Phase-2
10:00-10:30	Discussion on General Farming Activities (Baseline Survey)
10:30-11:10	Farm Business Linkage Stakeholder Forum (FABLIST Forum) <ul style="list-style-type: none"> ◆ Current issues and market needs of crop and livestock products in the region
11:10-11:30	Coffee break
11:30-12:00	Discussion on Gender Issue
12:00-13:00	Action Plan Preparation
13:00-13:30	Lunch
13:30-14:00	Action Plan Preparation
14:00-14:40	Presentation of Action Plan
14:40-14:55	Confirmation of next activities
14:55-15:00	Closing remarks

Source: Prepared by the Study Team by modifying the agenda of Preparatory Training for Farmers' Group in Phase-2

General farming activities (baseline survey)

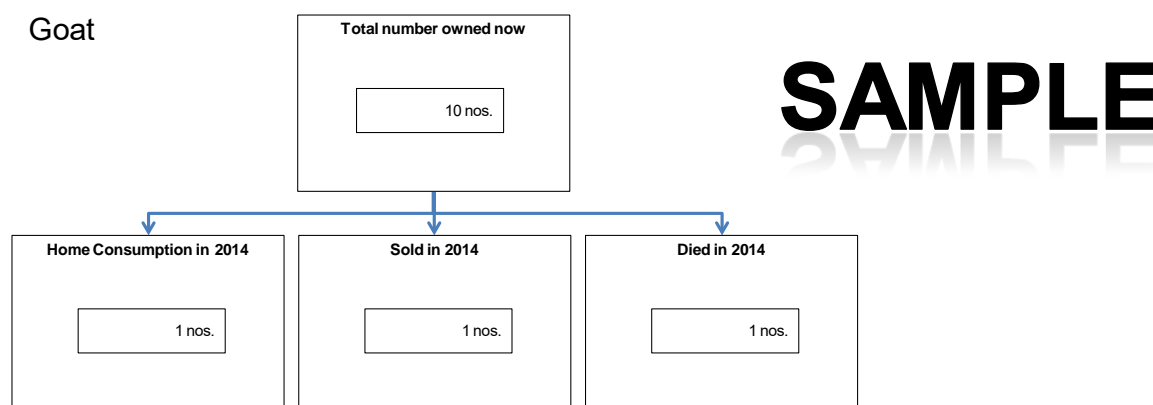
Current crop and livestock production activities are discussed using simple format as shown below (FORM-5):

<Crop production>



Source: Prepared by the Study Team based on the information by farmers' group

<Livestock production>



Source: Prepared by the Study Team based on the information by farmers' group

(2) Farm Business Linkage Stakeholder (FABLIS) Forum

Major characteristics of FABLIS Forum in Namibian SHEP approach under N-CLIMP is to strengthen the linkage between GRN scheme and farmers. Potential "marketer" participated in the FABLIS Forum are:

- ◆ Meat Board: in charge of auction for livestock as livestock market and
- ◆ Officers: in charge of National Strategic Food Reserve as cereal grains market

II-4.2.4 Step-3: Facilitation of Making Plan

Strengthening relationship between ATs and farmers' group through planning process

Step	Namibian	
	Farmers' view point	Project Implementation
Step-0: Preparatory stage		<ul style="list-style-type: none"> ◆ Overall review survey (macro level) ◆ Detailed thematic survey (micro level) ◆ Review and share constraints and potential
Step-1: Selection of Target and sharing the goal	<ul style="list-style-type: none"> ◆ Explanatory workshop ◆ Selection of target constituencies (ADCs) based on the set of criteria ◆ Selection of target farmers from selected constituencies by ATs 	<ul style="list-style-type: none"> ◆ Set of criteria for the selection of pilot sites
Step-2: Awareness of Gap	<ul style="list-style-type: none"> ◆ Preparatory training for farmers' group (baseline survey, gender training and FABLIS forum) ◆ Coordination with GRN scheme in FABLIS forum 	
Step-3: Facilitation of Making Plan	<ul style="list-style-type: none"> ◆ Formulation of Action Plan by Farmers' Group 	<ul style="list-style-type: none"> ◆ Formulation of Support Plan by ATs
Step-4: Provision of Solution	<ul style="list-style-type: none"> ◆ In-field trainings after ToT 	

Source: Prepared by the Study Team

(1) Preparation of Action Plan by Farmers' Group

As a part of preparatory training for farmers' group, the action plan for the pilot site activities is prepared by farmers' group, based on the review of general farming activities (baseline survey), options to solve the challenges, with the assistance of ATs in charge. The contents of the action plan are:

- ◆ General information: administrative information including region, constituency, village, ADC, ATs in charge and relevant organizations
- ◆ Group information: group name, representative and number of group members
- ◆ Major activities: current constraints and major proposed major activities based on the constraints
- ◆ Work schedule: activity and person in charge

Sample outputs are as follows:

Action Plan of the Pilot Site Activities Prepared by Farmers' Group (Sample)

Date: 9-Sep-15										
Implementation period: October 2015 to April 2016										
1. General Information										
1.1 Region/ Oshitolwa shopolitika	Ohangwena									
1.2 Constituency/ Oshikandjohogololo	Epembe									
1.3 Village/ Omukunda	Opumba Ondjamba									
1.4 ADC/ Ombelewa yuunamapya	Epembe									
1.5 AT in charge/ Omunambelewa	Kasaona Bruce									
1.6 Relevant organizations/ Omahangano tagadhana onkandangala yasimana	Regional Council, DAPEES, AMTA									
2. Group Information										
2.1 Group name/ edhina lyongundu	Omwene Tutalulula Support Group									
2.2 Representative/ Omukalelipo	Helena Shitelemi (Coordinator)									
2.3 Number of Group Members/ Omwaalu gwilyo yongundu	49									
3. Major Activities										
3.2 Crop (horticulture) / likwayihape (eemboga)	Training on vegetables, Irrigation System, Seeds, Garden tools, Fencing									
4. Work Schedule										
No.	Activity / linyangadhalwa	Person in charge / Omuwiliki	Monitoring Okukonakona	2015			2016			
				Oct	Nov	Dec	Jan	Feb	Mar	Apr
4.1	Group meeting & feedback	Cordinator	Plan/Ethaneko Actual/lizemo	x						
4.2	De-Bushing + Fence	All members	Plan/Ethaneko Actual/lizemo	x						
4.3	Market research	Executives	Plan/Ethaneko Actual/lizemo	x						
4.4	Drip irrigation installation	All members	Plan/Ethaneko Actual/lizemo	x						
4.5	Land preparation	All members	Plan/Ethaneko Actual/lizemo	x	x	x				
4.6	Planting	All members	Plan/Ethaneko Actual/lizemo	x	x	x				
4.7	Harvesting + Marketing	All members	Plan/Ethaneko Actual/lizemo	x					x	x
4.8	Group meeting for next cropping	All members	Plan/Ethaneko Actual/lizemo	x					x	x
4.9			Actual/lizemo Plan/Ethaneko							

Source: Prepared by the farmers' group in Ohangwena Region

<Photograph>



Farmers' group members are preparing the action plan of pilot site activities with the support of ATs in charge.

**Formulation of Action Plan of Pilot Site
Activities at Ohangwena Region
(September 2015)**

(2) Preparation of Support Plan by ATs

In order to strengthen commitment of ATs, support plan is prepared by ATs based on the action plan formulated by the farmers' group. The contents of the support plan are:

- ◆ General information: region, constituency, ADC, AT in charge and activities
- ◆ Relevant technical measures: farmers' challenge, relevant techniques and necessary inputs corresponding to technical challenges

Sample outputs prepared by ATs are as follows:

Support Plan for the Pilot Site Activities by ATs (Sample)

Date: Sept 09 2015

Implementation period: October 2015 to April 2016

1. General Information			
1.1 Region	Ohangwena		
1.2 Constituency	Epembe		
1.3 ADC	Epembe		
1.4 AT in charge	Kasaona Bruce		
1.5 Activities	Horticulture		
2. Relevant Techniques and Technical Measures			
Farmers' Challenge	Relevant Techniques	Necessary Inputs	
		By N-CLIMP	By Farmers
1 Lack of training on vegetables	CR-8	Seeds, fertiliser, chemicals - all farmers	
2 Lack of Irrigation system	CR-6	tank : 1 Drip irrigation kits for each vegetables	
3 Lack of gardening tools			
4 Lack of fencing materials		Fence - demonstration farm	
5 Lack of seeds			
6	FM-2		
7	FM-5		
8	FM-6		
9	FM-7		
10	FM-3		

Source: Prepared by ATs in Ohangwena Region

<Photograph>



ATs in charge are preparing the support plan for farmers' group based on the action plan of pilot site activities.

**Formulation of Support Plan of Pilot Site
Activities at Oshikoto Region
(August 2015)**

II-4.2.5 Step-4: Provision of Technical Solutions

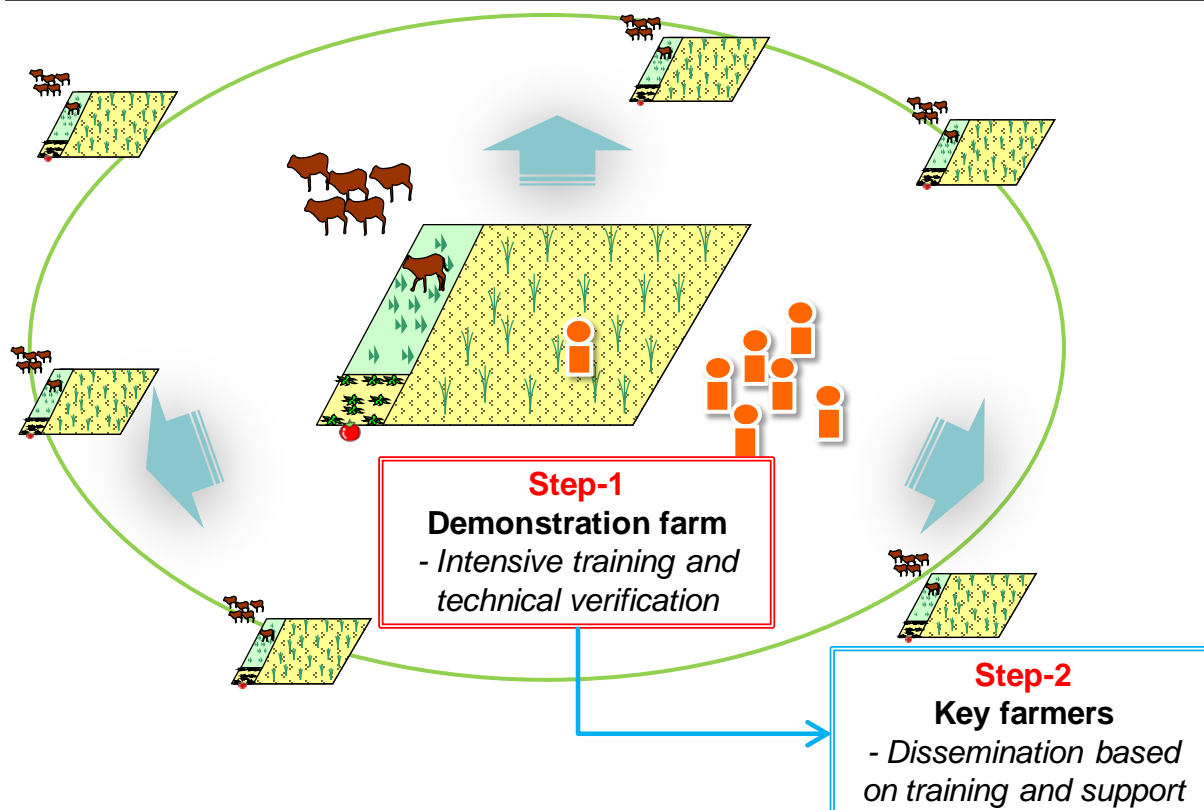
Flexible modification of activities based on the realities observed on the ground

Step	Namibian	
	Farmers' view point	Project Implementation
Step-0: Preparatory stage		<ul style="list-style-type: none"> ◆ Overall review survey (macro level) ◆ Detailed thematic survey (micro level) ◆ Review and share constraints and potential
Step-1: Selection of Target and sharing Vision/goal	<ul style="list-style-type: none"> ◆ Explanatory workshop ◆ Selection of target constituencies (ADCs) based on the set of criteria ◆ Selection of target farmers from selected constituencies by ATs 	<ul style="list-style-type: none"> ◆ Set of criteria for the selection of pilot sites
Step-2: Awareness of current situation and new information	<ul style="list-style-type: none"> ◆ Preparatory training for farmers' group (baseline survey, gender training and FABLIS forum) ◆ Coordination with GRN scheme in FABLIS forum 	
Step-3: Facilitation of Making Plan	<ul style="list-style-type: none"> ◆ Formulation of Action Plan by Farmers' Group 	<ul style="list-style-type: none"> ◆ Formulation of Support Plan by ATs
Step-4: Provision of technical solutions	<ul style="list-style-type: none"> ◆ In-field trainings after ToT 	

Source: Prepared by the Study Team

(1) In-field Training Procedure

The pilot site activities are implemented jointly with ATs in charge and JICA N-CLIMP Team, image of which is depicted as follows:



Source: Prepared by the Study Team

Image of Technical Training and Dissemination System

- ◆ Training of Trainers (TOTs): Train program is conducted for ATs based on the action plan of pilot site activities in order to meet the training needs of target farmers' group.
- ◆ Demo-farmer and key farmers: in general, 1 demo farmer and 14 key farmers are selected for each pilot site activities.
- ◆ Establishment of demo-farms at each site: demo farms are established at each site for intensive training of both demo-farmer and key farmers.
- ◆ Stepwise technical dissemination: following step are taken for the dissemination of proposed technical measures as step-1 for training and technical verification at the demonstration farm and step-2 dissemination based on training and support.

(2) Training Agenda

Training agenda for ATs and farmers' group are shown as follows:

Training Agenda for ATs

Time	Subject
08:45-09:00	Registration
09:00-09:10	Opening Remarks
09:10-9:50	Review and Lesson Learnt from Previous Training ◆ Schedule, points to be discussed
9:50-10:30	Crop ◆ Cereal Grains ◆ Horticulture

Time	Subject
10:30-10:40	Coffee Breaks
10:40-11:20	Livestock
11:20-12:00	◆ Large Stock ◆ Small Stock (Chicken & Goat)
12:00-12:40	Farm Management
12:40-13:00	Training Coaching
13:00-14:00	Lunch
14:00-15:00	Assessment, Baseline Survey, Scheduling
15:00-15:15	Closing

Source: Prepared by the Study Team by modifying training agenda for ATs for the pilot site activities

Training Agenda for Farmers' Group (Horticulture Crops Production) (Sample)

1.	Opening with a Prayer (where applicable)
2.	Welcome Farmers
3.	Introduction <ul style="list-style-type: none"> a) Introduce the team members b) Introduce N-CLIMP, tell them about the demo sites and that they will undergo 4 different training days. Inform them that we will only work on the demo site and they need to copy what is done on the demo site. c) Ask them about their expectations d) Conduct the baseline survey, first explain to them the purpose of the survey
4.	Horticulture- introduce the concept of record-keeping. Explain the following Technical Measures: <ul style="list-style-type: none"> a) CR-1: Fertilizer application- explain to farmers that we will create a demo site where we will apply specific fertilizers and techniques so that we can all learn from the results. For this exercise we will be marking specific areas on the demo site. b) CR-6: Water Saving Cultivation- Introduce drip irrigation vs conventional method c) CR-8: Cropping plan and Horticulture crop management- the importance of an action plan, from daily to weekly and taking to market activities need to be planned and executed. Start with the procurement of seeds, then nursery preparation, start seedlings, 1st transplanting, second crop management (weeding, fertilizers, etc.) and lastly harvesting. We also need to select the specific vegetables that will be planted.
5.	Farm Management- explain the importance of keeping records <ul style="list-style-type: none"> a) FM 2: Farm records (Black Book!) b) FM-3: Post Harvest- The right time to harvest crops, right procedure of packing and value by good package. c) FM 5: Group formation – important of forming a group to take collectively decisions And to assist/support each other. <ul style="list-style-type: none"> d) FM 6: Group Account Management- explain the importance of budgeting and monitoring of group cash flow. (Treasure) e) FM 7: Formulation of WUA
6.	Closure – Action plans, the way forward, what needs to be done next and inform them of monitoring actions which will take place.

Source: Prepared by the Study Team by modifying training agenda for farmers' group training for the pilot site activities

Training Agenda for Farmers' Group (Livestock Production) (Sample)

1.	Open with a prayer (where applicable)
2.	Welcome Farmers
3.	Farmers' Expectations <ul style="list-style-type: none"> a) Mention we recorded them and will start executing them, cannot do all in this session b) Mention the expectations that will be addressed: <ul style="list-style-type: none"> i) Animal Husbandry (dehorning and castration) ii) Vaccination programme iii) Injections for sick cattle iv) Parasite control
4.	Fodder production – demo site preparation evaluation (Are the poles planted, can we proceed with the barbed wire)
5.	LS 6: Fattening – licks and feeds, importance of giving licks so that cattle become more fertile and calving rate can increase. Body scoring.

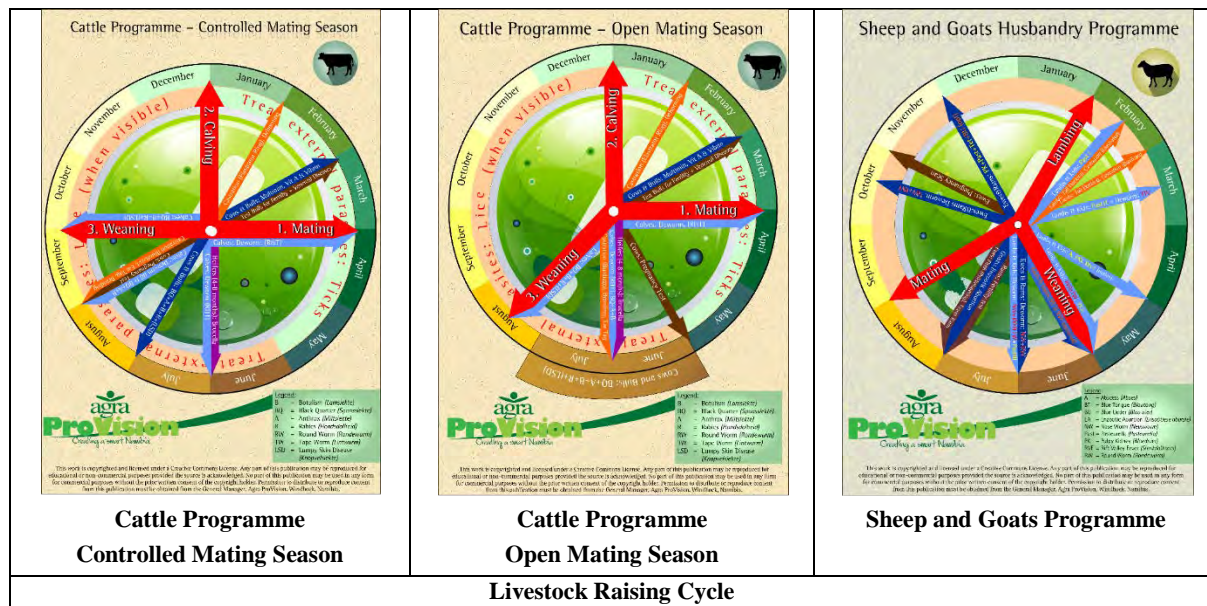
6. Farm Management – explain the importance of keeping records
 - a) Review the content recorded in the black book.
 - b) Sign the book and explain again the difference between record-keeping and bookkeeping.
 - c) FM 5: Group formation – importance of forming a group to take collectively decisions and to assist/support each other
7. Baseline survey – explain the importance of it and explain the different sections that need to be completed.
8. Closure – Action plans, the way forward, what needs to be done next and inform them of monitoring actions which will take place.
 - a) Inform them of the monitoring dates as well as the next training date.

Source: Prepared by the Study Team by modifying training agenda for farmers' group training for the pilot site activities

As for the training for farmers' group, training program is conducted for 2 to 3 hours depending upon the understanding of farmers and consideration of their farming activities.

(3) Training Materials (refer to Volume-III of the Report)

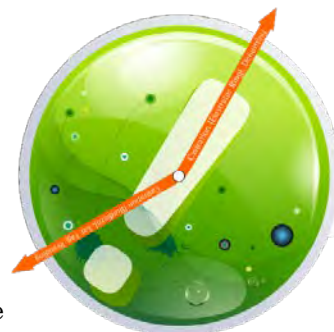
Based on the action plan and proposed technical measures, training materials are prepared for crop and livestock production, image of which are shown as follows:



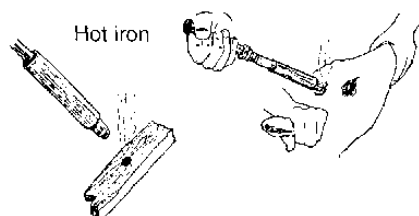
Husbandry – “Orange”

Dehorning

- 🕒 Age 4 – 6 weeks: Dehorning is best done at an early stage with hot iron, gas- or fire-heated tool.



The important thing to remember is that the growth of the horn take place where the hair line starts. This growth line must be destroyed during the burning process to prevent regrowth of the horn. The surest way of doing this is to separate the skin from the burning process by using the burning iron in a wide circle around the centre of the horn during the burning process. This will cut through the remainder of the hot skin giving a clear demarcation line indicating a successful branding.



Dehorning with hot iron



Different tools for dehorning

<Photograph>



Training program for famers' group is prepared by ATs with the assistance of the member of JICA N-CLIMP Team

**Preparation of Training Programme for
Farmers' Group
(Joint Training of Oshana and Ohangwena
Regions)
(April 2016)**

	<p>Disease control for livestock is discussed as a part of preparation of farmers' group training.</p> <p>(Joint Training of Omusati and Oshikoto Regions)</p> <p>(April 2016)</p>
	<p>Dehorning training is carried out through the practice with farmers.</p> <p>Practical Training for Livestock Production</p> <p>(Oshikoto Regions)</p> <p>(April 2016)</p>
	<p>Drip irrigation kit is installed as a part of training programme for horticulture crops production</p> <p>Drip Irrigation Kit Installation</p> <p>(Ohangwena Regions)</p> <p>(April 2016)</p>
	<p>Market survey is conducted by farmers' group at Onayena in Oshikoto Region.</p> <p>Market Survey for Horticulture Crops</p> <p>(Oshikoto Regions)</p> <p>(January 2016)</p>

(3) Progress of Technical Measures Dissemination (FORM-12 and refer to Progress Report (2))
It is planned that proposed technical measures are introduced through the training program and

disseminated to key farmers. The progress of dissemination is monitored using the format shown in FORM-12. To do so, questionnaire is designed according to the activities of each pilot site, sample of which are shown as follows:

Questionnaire for Proposed Technical Measures Dissemination (Sample)

Region: Oshikoto

Activities	Question
Cereal grains production	Pilot sites: Okashana ◆ Basal application by manure ◆ Top dressing ◆ Thinning ◆ Farm record (Which techniques did you try?)
Horticulture crops production	Pilot sites: Onayena ◆ Crop selection by SHEP ◆ Installation of drip irrigation kit ◆ horticulture production through water saving (ex: drip irrigation) ◆ Farm record (Which techniques did you try?)
Cattle raising	Pilot sites: Omuntele ◆ Vaccination (what medicine? Please differentiate vaccine and deworming medicine) ◆ Deworming (what medicine? Please differentiate vaccine and deworming medicine) ◆ Dehorning ◆ Castration ◆ General treatment(what treatment?) ◆ Fodder production (what process? Land preparation, silage making...) ◆ Farm record (which did you use?)
Small stock raising	Pilot sites: Onankali ◆ Nutritious feed supply what nutritious feed? maggot, termite, bone) ◆ Chicken house ◆ Vaccination (what medicine? Please differentiate vaccine and deworming medicine) ◆ Deworming (what medicine? Please differentiate vaccine and deworming medicine) ◆ Laying nest and hatching nest ◆ Farm record (which did you use?)

Source: Prepared by the Study Team by modifying questionnaire utilized for the progress of dissemination at Oshikoto Region

(4) Review of Activities after Cropping Season

Every after cropping season, the pilot site activities need to be reviewed and lessons should be extracted for improving future activities.

Box (Draft Master Plan Workshop):

Discussion made for the review of pilot site activities in the phase-2 are as follows:

- 1. What did you find from the presentation of each region? (after presentation of the activities are made from representative farmers and chief of regions)**
- 2. Do you have any recommendations for improving the activities in the phase-3?**
- 3. How will you apply SHEP approach for the activities of cereal grains, cattle and small stock in phase-3?**

Answer

- 1. What did you find from the presentation of each region?**

- ◆ Farmers are trained on new farming techniques and are applying knowledge to their daily farming practices. (CAT)
- ◆ I find that all the presentation from both regions was very good and feeling well for what JICA N-CLIMP done to them. (Farmer)
- ◆ Satisfactory but it seems some officers from regions not informed on time for them to prepare on time, poor coordination from regional officers from MAWF or stakeholders. (AT)
- ◆ The presentation of Oshana on crop production and livestock production very good (AT)
- ◆ The presentation from other region was good but MAWF should continue to support the projects of horticulture, crops, chicken and livestock. (Farmer)
- ◆ Fantastic (Stakeholder)
- ◆ The presentation from each region was well prepared. It has the potential of improving the farming produce and food security. (Stakeholder)
- ◆ Farmers still need to be strengthened since they are not fully adopted to the activities. They still need to be directed until they are qualified to do everything they were trained on their farms. Farmers get training either on crops or livestock. (Farmer)
- ◆ Findings are obvious that the ATs together with JICA study has made a positive contribution / impact in the regions. (AT)
- ◆ Ohangwena: it was good and detailed by the farmer side comprehensive for CASO, Oshikoto well prepared for both farmer and CASO, Oshana generally good and detailed, Omusati good. (AT)
- ◆ Excellent (AT)
- ◆ Ohangwena-short and straight forward but maybe to brief no enough information, Oshana-no formal presentation, they need to organize themselves next time, Omusati-good presentation, time management very important flow of presentation not consistent, Oshikoto-well organised, short and straight to the point .appreciation of progress done in the region as far as N-CLIMP is concerned. (ASO)

2. Do you have any recommendations for improving the activities in the phase-3?

- ◆ In horticulture, the need to assist farmers on rain water harvesting technique on small (dams) (CAT)
- ◆ Yes I have a recommendation for the MAWF to do the way forward of their activities. (Farmer)
- ◆ Communication, coordination between MAWF, and other stakeholders to be improved. (AT)
- ◆ To address the challenge mentioned by AT`s and farmers especially by providing water sources for livestock especially Uuvudhiya in Oshana region.
- ◆ MAWF should also put any activities of farmers to visit other areas in different regions and outside the country. (Farmer)
- ◆ The programme should be more broadened to include more farmers and the aim should be focused at the assurance on food security, farmers should be trained to move away from subsistence farming of sustaining themselves and their families through profit making. (Stakeholder)
- ◆ The project must include the stakeholders institution in the steering committee meeting but not

be represented by ministry's staff members. (Stakeholder)

- ◆ To replant the plots (fodder production) that did not germinate ,as they did not reach their purpose on the demo plot. To drill boreholes in the grazing area of okahao constituency. Emphasise on group strengthening in animal production. (Farmer)
- ◆ Provide detailed training to AT's on SHEP approach. (AT)
- ◆ MAWF should allocate more funds to the project to expand water harvesting techniques e.g the digging of big water points (OMATALE) to harvest large volumes of water for drip irrigation. Purchase one tractor for each region to complement existing ones for GRN. (AT)
- ◆ All leader of farmers' group should have made presentation of activities (AT)
- ◆ Good progress but more practical exercise are needed for the farmers to fully understand and be able to replicate what they have learned in their own fields. Exposure visits for farmers to areas where agriculture production is flourishing. (ASO)

3. How will you apply SHEP approach for the activities of cereal grains, cattle and small stock in phase-3?

- ◆ Provide incentives through marketing of livestock to encourage them to appreciate marketing of livestock as a business. Provide training based on farmers demand and needs.in overall provide sufficient inputs of seeds, fertilizers, irrigation and training support. (CAT)
- ◆ Yes, according to my own feelings, SHEP approach can carry on with its activities, so that the country might improve in agricultural activities. (Farmer)
- ◆ Sensitation of farmers (AT)
- ◆ By working together with farmers and AT's to practice the approach. (AT)
- ◆ We should work together in order to increase food security in Namibia and make sure to implement farmers input. (Farmer)
- ◆ Water availability is a crisis and as a matter of fact it should be given a bigger attention, which can unlock all other potentials to enable farmers to do it better. The markets should be created and broadened. (Stakeholder)
- ◆ I am in support of the proposal of the project technically. (Stakeholder)
- ◆ Through discussion with farmer in meetings and on individual basis. By growing fodder of 2 hector to give an example. Sell cattle to give an example of destocking. (Farmer)
- ◆ AT's will train farmers on the approach. AT's will continuously work with farmers based on the SHEP approach. (AT)
- ◆ Allocating of more resources to benefit other participating farmers to go start with at their individual crop fields. (AT)
- ◆ Integrate the principled into the master plan. (AT)
- ◆ The need to be fully involved in this trainings, when you have practical exercise where farmers are participating then they will take ownership. (ASO)

(5) Farmers' Field Day for facilitation of farmer to farmer extension

In order to disseminate proposed technical measures widely in the community, N-CLIMP considered facilitating farmer to farmer extension system. To do so, farmers' field day is one of the methods in Namibia to share new technical measures with other community members. The purpose of farmers' field

day is: (i) to share information among stakeholders in the community, (ii) to dissemination of techniques and technical measures and experiences to surrounding farmers including farmers doing similar activities in other regions and (iii) to extract lessons for revising techniques and technical measures. The sample agenda of farmers' field day is as follows:

Agenda of Farmers' Field Day (Sample)

Organized at Ukuwiyu Ushona in Oshana Region (February 9th 2017)

Time	Subject
08:30-09:30	Arrival of guests and registration
09:30-09:40	Opening remarks and welcoming of invited guests and prayer by Kuku Rauha Nangula
09:40-09:50	◆ Confirmation of agenda and Farmer's Field day output
09:50-10:00	◆ Entertainment
10:00-11:50	Sharing of Information and Experience from Farmers and ATs from Pilot Sites. ◆ Ls4: Nutritious Feed Supply (growing maggots, termites, preparing bone meal) ◆ Ls5: Disease Control (disease control, vaccination programme) ◆ Ls13: Chicken production (housing, feeding, laying and hatching nests) ◆ Fm1: Booking keeping (record in black books) ◆ Fm5: Group Formation and Strengthening ◆ Field Visit by all the participants, invited Guests ◆ Feedback from Farmers and ATs
11:50-12:00	◆ Entertainment
12:00-12:25	◆ Closing remarks
12:25-13:05	◆ Refreshment and snacks

Source: Prepared jointly by DAPEES at Oshana Region and the Study Team

<Photograph>

	<p>Participants for the Farmers' Field Day at Ukuwiyu Ushona is registering before the meeting.</p> <p style="text-align: center;">Registration by the Participants (February 2017)</p>
	<p>Farmer of Ukuwiyu Ushona site explains the activities with holding skin of predator caught at her chicken house.</p> <p style="text-align: center;">Presentation by Demo Farmer of Ukuwiyu Ushona (February 2017)</p>



The Deputy Director of DAPEES cum chief of NCD expresses the importance of activities at Ukuwiyu Ushona and future continuation of activities by ATs and farmers.

Closing Remarks by the Deputy Director of DAPEES cum chief of NCD
(February 2017)



After the meeting, the participants visited chicken house and other facilities.

Joint Visit of Site by the Participants
(February 2017)

Box (Farmers' Field Day):

Farmers' field day was held at one of the sites for draft master plan implementation in phase-3. Major presentation and discussion made by farmers of chicken farming sites (Oshana, Oshikoto and Omusati Regions) are as follows.

Challenges faced by farmers before pilot site activities are:

- ◆ Low number of laying eggs and no skill of hatching
- ◆ High mortality rate of chicks and chickens by diseases and predators
- ◆ Insufficient availability of chicken feed
- ◆ Insufficient technical management of poultry
- ◆ Low profitability from poultry raising
- ◆ Poor market access

In order to overcome those challenges, techniques and technical measures tried at chicken farming sites are:

- ◆ LS-3 Nutritious feed supply to chicken
- ◆ LS-5 Disease control
- ◆ LS-13 Chicken production
- ◆ FM-2 Record keeping
- ◆ FM-5 Group formation/ Strengthening



Joint field visit by the participants of Farmers' Field Day

Positive outcomes from the activities are:

The cycle that the farmers have purchased chicks from market and sold chickens, hens and eggs are established as a model. The farmers have not any skills for hatching and brooding. At present, they have already prepared nest for laying and hatching so the numbers of chicks increasing. Since the space for chicks from hatching is not enough, she has constructed special house for chicks by herself.

- ◆ Facilities for chicken raising: housing, laying nests, hatching nests,
- ◆ Disease control: vaccination and parasite control to decrease any loss from disease
- ◆ Feeding improvement: purchasing and self-made feeds
- ◆ Group formation: group purchase for vaccination, fund raising for medication, bank account open and management
- ◆ Record keeping: for recording any activities and sharing with others

Comments from individuals are listed below:

Farmers' from Tsandi in Omusati Region

- ◆ Chicken farming in Ukuwiyu Ushona would be more advanced than those in our site. The farmers of Tsandi continue communicating with farmers of Ukuwiyu Ushona to develop our activities.

Farmers' from Onankali in Oshikoto Region

- ◆ Since the project has commenced from 2015 together with ATs and JICA N-CLIMP team, the farmers have learnt various techniques and technical measures for chicken farming including chicken house construction, chicken feed preparation and balance nutritious feed supply.
- ◆ In particular, feed preparation was really useful for the group in order to carry out cost effective chicken farming.
- ◆ Also, disease control by timely vaccination has contributed to reduce mortality rate of chicken.
- ◆ Since then, many farmers have opened their bank account at Nampost to save money for chicken farming.
- ◆ In addition, linkage with community members are strengthened through exchanging information about chicken farming. Many farmers visited pilot sites to learn how to carry out chicken farming.

Farmers' from Ukuwiyu Ushona

- ◆ As seen in our site, chicken farming has contributed to income generation of community members. Although chickens are attacked by predators such as snakes, number of chickens sold to the market have increased.
- ◆ In addition, the community have received assistance from constituency for fencing. Therefore, farmers continues promoting chicken farming as well as other farming activities to develop integrated farming model.
- ◆ Currently, the number of chicken has increased, therefore, effective feed preparation would be next challenges for the community.

Representative from Oshikoto Farmers' Union

- ◆ Although member farmers in our Union are facing insufficient resources to purchase materials for chicken farming, we would like to gradually disseminate techniques and technical measures tried at Ukuwiyu Ushona site to our farmers to start chicken farming.
- ◆ As a representative from the Union, we would like to work with MAWF to support out member farmers to start chicken farming.

Ms. Enny Namalambo, Deputy Director of DAPEES cum chief of North Central Division of MAWF

- ◆ In order to alleviate poverty reduction in the rural communities, sustainable agriculture development including appropriate chicken farming is one of the options. Therefore, MAWF continues supporting communities by the use of techniques and technical measures as proposed by N-CLIMP.

II-4.2.6 Monitoring and Evaluation

Monitoring and evaluation are essential to understand the level of progress and constraints on a regular basis. The results to be obtained from monitoring and evaluation will give useful information for operation and management of ongoing or future extension activities. In this section, monitoring and evaluation system in Namibian SHEP developed through joint implementation of draft master plan in the phase-3 together with ATs at the regional level.

(1) Monitoring of annual Namibian SHEP implementation (FORM-13)

In order to facilitate monitoring of Namibian SHEP implementation at the management level, FORM-13 shows the checklist of annual Namibian SHEP implementation. The format includes:

- ◆ Standard work item,
- ◆ Expected timing for each work item,
- ◆ Responsible (relevant organization in charge for each work item),
- ◆ Implemented or not for each work item, and
- ◆ Remarks describing the situation/progress of each work item.

(2) Evaluation of achievement through extension activities (FORM-14)

In the draft master plan implementation in the phase-3 based on SHEP approach, the project evaluated the level of understanding among stakeholders including ATs and target farmers for proposed technical measures. Such evaluation is required to extract lessons learnt for the improvement of extension activities in the following farming season. Following questions are generally included to confirm the level of understanding of technical measures.

- ◆ Already aware of technical measures before N-CLIMP?
- ◆ Having experience of technical measures before N-CLIMP?
- ◆ Explanation of technical measures to farmers through N-CLIMP?
- ◆ Practice of technical measures by farmers through N-CLIMP?
- ◆ Effects of technical measures appeared through N-CLIMP?

Questionnaire to assess the understanding of Technical Measures for ATs (Sample)

CR-1: Fertilizer Application (grains) CR-2 Cropping Pattern & Crop Management (grains)	Remark <u>Fertilizer Application and Thinning according to the Crop Growing Stage</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know about “fertilizer application and thinning” of mahangu according to the crop growing stages?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you practice fertilizer application and thinning of mahangu according to the stages?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain “fertilizer application and thinning” according to the crops to farmers?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers practice fertilizer application and thinning” according to the crops?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did mahangu grow better?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No

Source: Prepared by the Study Team

Questionnaire to assess the understanding of Technical Measures for Farmers (Sample)

CR-1: Fertilizer Application (grains) CR-2 Cropping Pattern & Crop Management (grains)	Remark (Okau k., Ondobe, Omuthiya, Etayi) <u>Fertilizer Application & Thinning according to the Crop Growing Stage</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP, before and after N-CLIMP Training	Did you know “fertilizer application & thinning” of mahangu according to the crop growing stages?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes / <input type="checkbox"/> No
2. Practice of TM by Farmer before N-CLIMP,	Did you practice fertilizer application and thinning of mahangu according the stage?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	X
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you find any improvement in “fertilizer application and thinning”?	X	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	After N-CLIMP, are you practicing the TM?	X	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform and explain to other farmers about TM?	X	<input type="checkbox"/> Yes / <input type="checkbox"/> No

Source: Prepared by the Study Team

II-4.3 Consideration to Simplification of Namibian SHEP Approach

In this chapter, procedure based on Namibian SHEP approach is explained as a standard model of agriculture extension. In order to make proposed procedure more practical and workable at the field level in the future, it is required to simplify by considering available resources in the regions through prioritizing each work item in SHEP steps. Some of the works are put priority and/or compulsory according to SHEP principle and others are kind of options to be implemented, if resources are available, to enhance the effectiveness of agricultural extension services. The following table shows the priority of work items in Namibian SHEP approach for major agricultural activities: (i) crop production, (ii) livestock production, (iii) large stock and (iv) small stock.

Work Priority in Namibian SHEP Approach

A: First Priority, essential work to be implemented every cropping season

B: Second Priority, work to be implanted, if resources are available, to enhance effectiveness of extension activities

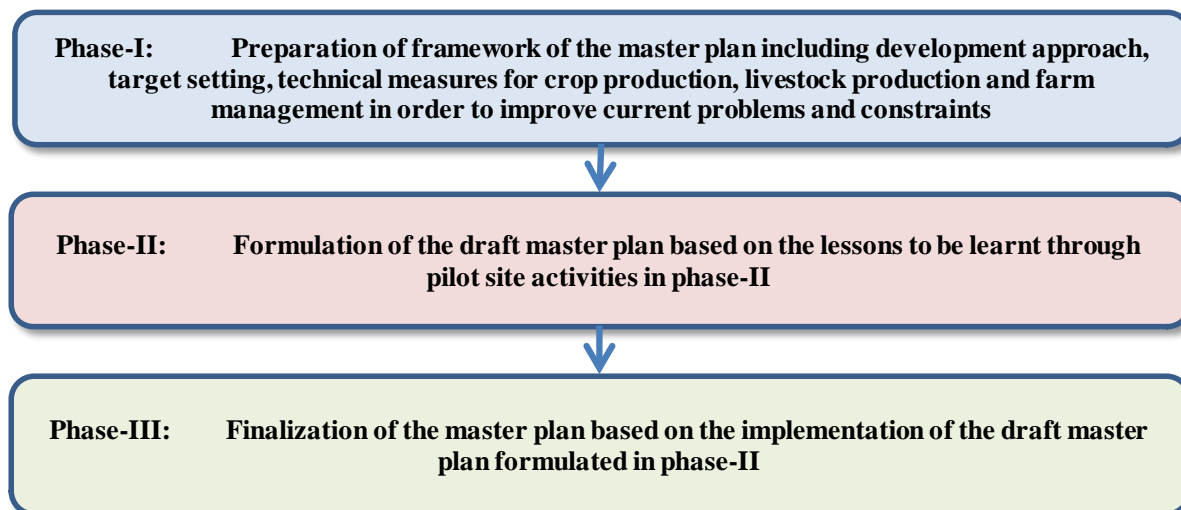
Step	Work Item	Priority				Remarks
		Cereal	Horti-culture	Large Stock	Small Stock	
Step-0: Preparatory stage	Overall review survey	B	B	B	B	Macro level survey are recommended to be carried out not every year but every several years to confirm regional level accomplishment of activities.
	Detailed thematic survey	B	B	B	B	
Step-1: Selection of target and sharing the goal	Explanatory workshop	A	A	A	A	They are essential works.
	Selection of target constituencies	A	A	A	A	
	Selection of target group	A	A	A	A	
Step-2: Awareness of GAP	Preparatory training for selected farmers' group	B	B	B	B	If selected sites are same as previous year, this activity can be skipped. Instead, some alternative meetings to review previous activities are required.
	- Baseline survey	A	A	A	A	It is essential to confirm the baseline.
	- FABLIST Forum	B	B	A	B	For large stock, information and linkage with the Meat Board would be effective to improve off-take for the livestock farmers.
	- Gender training	B	B	A	B	Decision-making for large stock is done mainly only by man. It would be required to improve the activities for large stock through raising awareness of gender relations among farmers.
	- Market survey	B	A	A	A	Cereal: Major "market" for cereal is currently GRN scheme, Strategic Food Reserve. Large stock: Major cattle market for communal farmer is auction and communal market.
	- Crop selection/crop ranking	B	A	B	B	It is mainly related with horticulture crops production.
Step-3: Facilitation of making plan	Prepare action plan for farming activities	A	A	A	A	The activities are essential.
	Preparation of support/extension plan	A	A	A	A	Together with above action plan, support/extension plan by ATs is essential.
Step-4: Provision of technical solution	In-field training after ToT	A	A	A	A	Number of training depends upon the action plan. It will be effective if the training is conducted together with GRN scheme. (DCPP, auction etc.) N-CLIMP Phase-2: Four times (October, November, February and March) Phase-3: Three times (November December & March)

Source: Prepared by the Study Team

CHAPTER II-5 MASTER PLAN FOR CROP AND LIVESTOCK DEVELOPMENT

II-5.1 General

The procedure of formulation of the master plan is described as follows. On this basis, in the draft master plan workshop held in February 2016, the draft master plan for crop and livestock development was discussed among stakeholders. In phase-III, the draft master plan implementation was carried out by MAWF and to finalize the master plan based on the lessons learnt during the implementation.



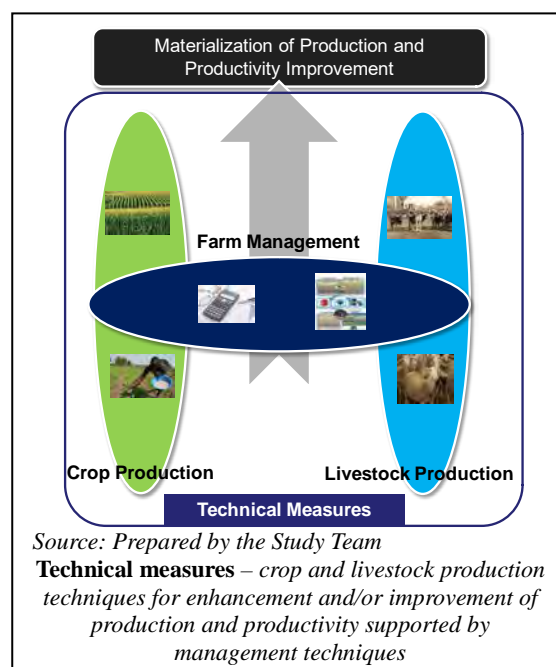
Source: Prepared by the Study Team

Flow of the Master Plan Formulation

II-5.2 Approach

II-5.2.1 Technical Focus for Cop Production, Livestock Production and Farm Management

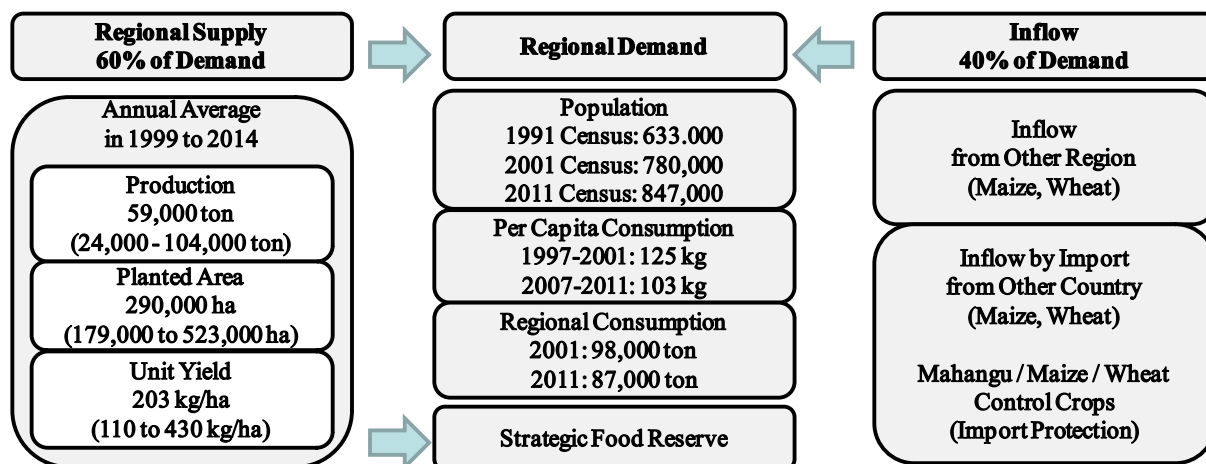
As explained in the previous chapter, technical measures to solve current problems and constraints are proposed for crop production, livestock production and farm management.



(1) Crop production:

Combination of stabilization of cereal grains production and promotion of horticulture crops production at potential areas

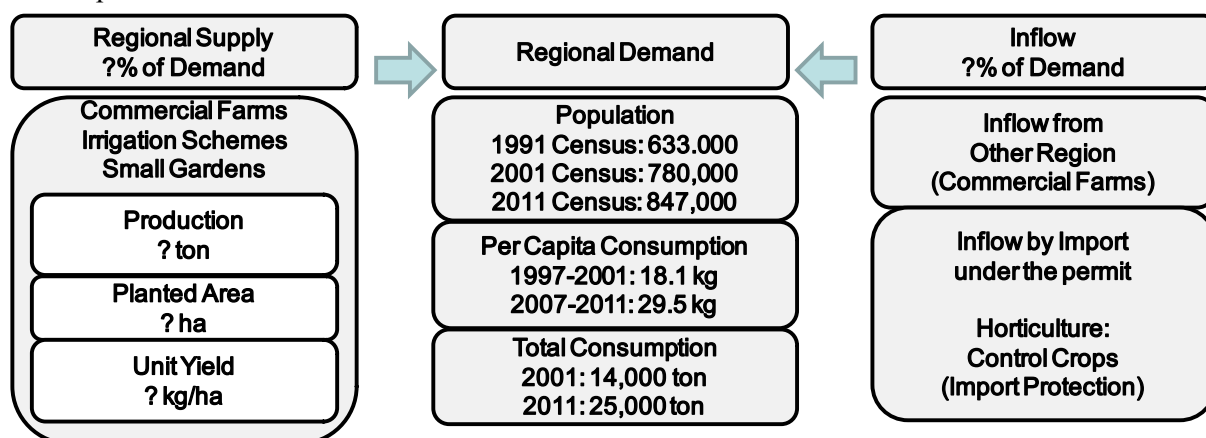
The population of N-CLIMP target areas in the 4 regions has been increasing from 633,000 in 1991 to 847,000 in 2011. In order to catch up the increasing demand of food, MAWF has been making greatest effort to support communal farmers for ensuring food security in the region. In accordance with the agricultural statistics, although per capita consumption is in the trend of slight decreasing, cereal (millet) production in the 4 regions covers averagely 60% of regional demand in the period from 1999 to 2014 while the remaining 40% of the demand is satisfied by the inflow from other regions as illustrated below:



Source: Prepared by the Study Team

Regional Food Balance in North-Central Division (Millet)

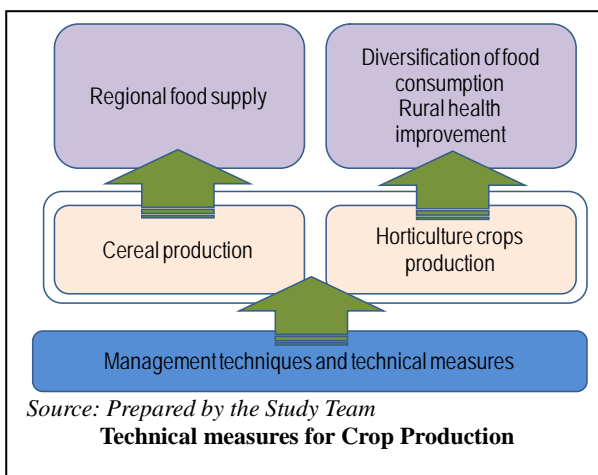
On the other hand, horticulture demand in the 4 regions is depicted in the following figure. Although the statistics on the regional supply and inflow is not clear at present, per capita consumption is gradually increasing from 18.1 kg (1997-2001) to 29.5 kg (2007-2011) due to diversification of regional food consumption.



Source: Prepared by the Study Team

Regional Food Balance in North-Central Division (Horticulture Crops)

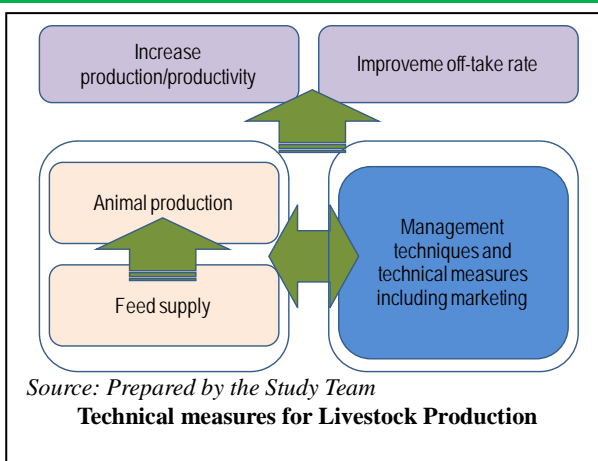
Technical measures for crop production is, therefore, focused on 2 pillars: (i) stabilization of cereal production and (ii) promotion of horticulture crops using appropriate technology such as simple drip irrigation system for improving rural health and increase of cash income at potential communal areas particularly peri-urban areas where the market access is comparatively better. Appropriate management including marketing of cereal and horticulture crops are supported by the management technical measures, CR-2: cropping pattern (for cereals) and CR-8: cropping plan and horticulture crop management as proposed.



(2) Livestock production:

Improvement of animal health supported by feed supply and disease control contributing to increasing production and/or productivity and also off take rate backed by marketing support and development

As explained in the previous chapter, livestock numbers (cattle and goats) per region currently show more than the estimated carrying capacity in the region. As evident, in order to ensure sustainable animal production thereby contributing to the improvement of livelihood of livestock farmers, it will be required to establish sustainable animal production system in consideration of regional carrying capacity with various livestock production supporting measures such as animal feed production, improvement of access of farmers to superior breeding materials, group formation and strengthening, marketing promotion including strengthening of auction system and so forth leading to increasing off-take of livestock as one of the keys for development of livestock sub-sector.¹ Although actual off-take data is not so clear in the communal area, the official off-take figures of cattle in the NCAs are below 2% according to MeatCo and informal off-take figures does not seem to exist. However, it is clear that the off-take in NCAs are far below than that of south of VCF (14%) and in the commercial farming areas (25-30%).²



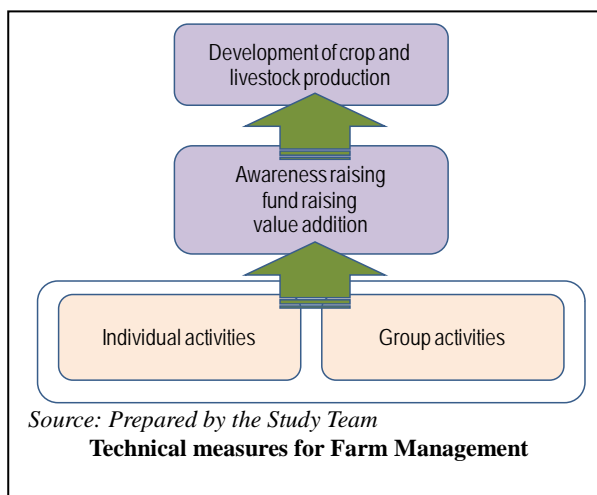
¹ Although long-term off-take target are not established, the Master Plan prepared by the Meat Board proposes that the total off-take of livestock reaches at least 16% over the next 4 years from 2013 to 2016.

² Meat Board of Namibia (2012), Master Plan for Increased Off-take and Marketing of Cattle and Beef from the Northern Communal Areas of Namibia

(3) Farm management:

Supportive technical measures to improve crop and livestock production in the sustainable manner

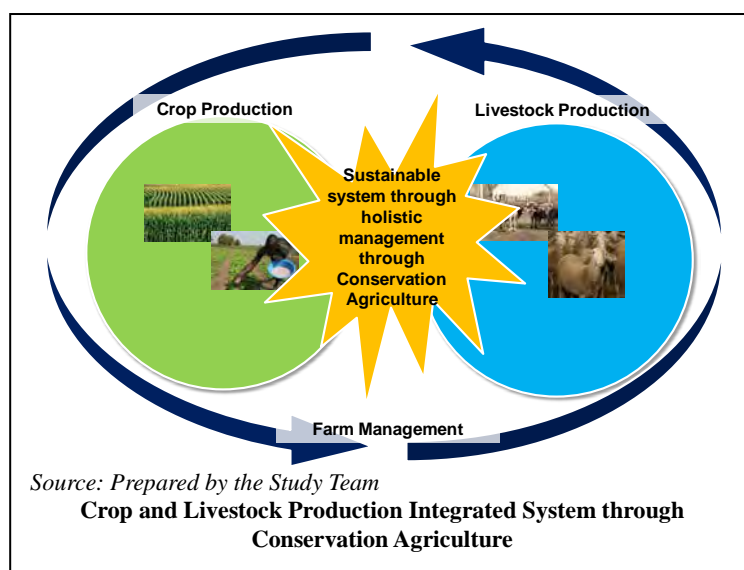
Farm management technical measures are means to appropriately enable farmers to adopt and implement proposed technical measures for crop and livestock production at the field level. Farm management technical measures can be largely divided into 2 sub-categories. One is those applied for individual activities and the other for group activities. Proposed measures would contribute to the enhancement of farmers' capabilities such as awareness raising of both individual and group farmers for business mind, common goods management and so forth, particularly rangeland, fund raising for expanding crop and livestock production and value-addition to products from crop and livestock.



II-5.2.2 Approach of Master Plan for Crop and Livestock Development


(1) Approach of the Master Plan

In accordance with the series of meetings with MAWF at the different levels consisting of: (i) Steering Committee Meeting, (ii) Divisional Committee Meeting, (iii) Stakeholder Meetings and (iv) Joint Stakeholder Meetings, findings from comprehensive information gathering (overall review survey and detailed thematic survey) with ATs, review of relevant policy and strategy document during the phase-I of N-CLIMP, overall goal, master plan goal and the approach of crop and



livestock is formulated as shown in the following table and figure. Crop and livestock production are not mutually independent instead they need to be conducted through integrated manner in NCAs.

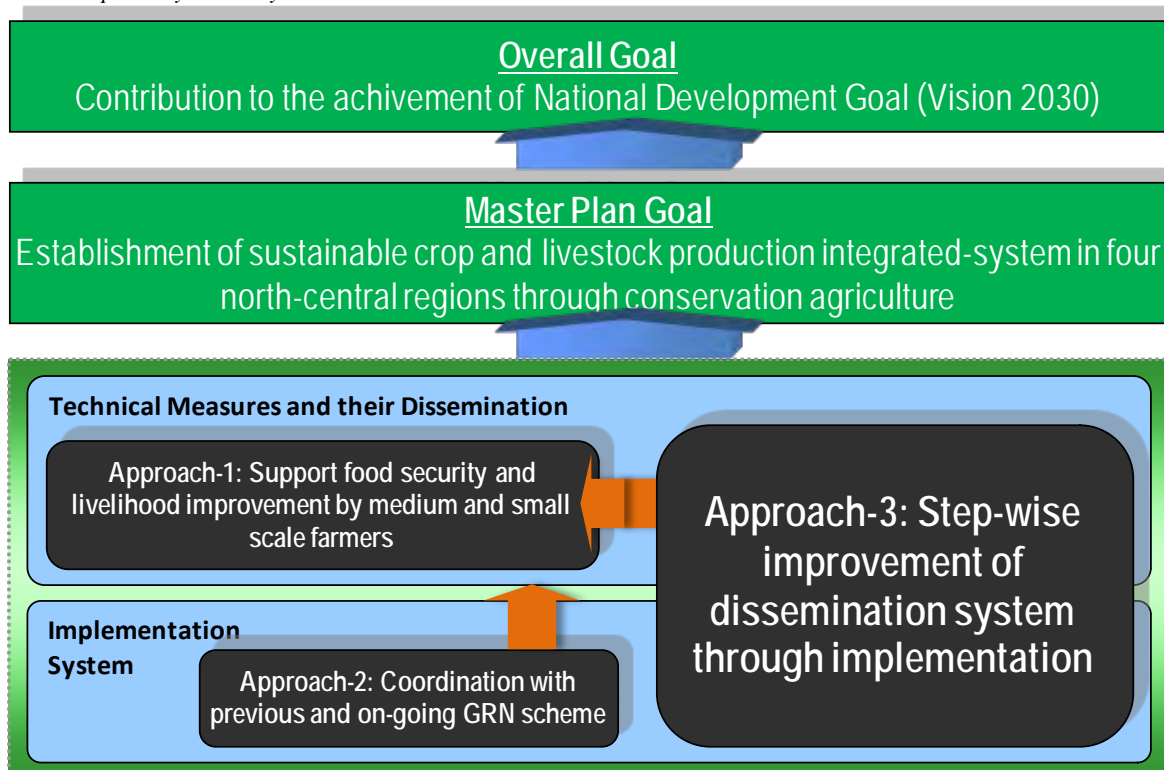
Under the approach of the master plan, conservation agriculture is put priority as a key word that satisfactory level of yield is accomplished by combining farming activities with sustainable environmental practices through the enhancement of natural biological processes above and below the ground so as to establish sustainable farming system in NCAs.

	<p>Under DCP, ripper furrow is currently promoted for tractor services for land preparation.</p> <p>Ripper Furrow Attachment currently promoted by MAWF (January 2016)</p>
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Overall Goal, Master Plan Goal and Development Approach

Overall goal:	Contribution to the achievement of National Development Goal (Vision 2030)
Master plan goal:	Establishment of sustainable crop and livestock production integrated system in four north-central regions through conservation agriculture
<i>Development Approach</i>	
Approach-1:	Support food security and livelihood improvement by medium and small scale farmers
Approach-2:	Coordination with previous and on-going GRN scheme
Approach-3:	Step-wise improvement of dissemination system through implementation

Source: Prepared by the Study Team



Source: Prepared by the Study Team

Approach for the Master Plan of Northern Crop and Livestock Development

Approach-1: Support food security and livelihood improvement by medium and small scale farmers

The statistics explains that farming population has been currently decreasing in NCAs while, on top of that, the number of part-time farmers are increasing. Under such circumstances, the number of medium-scale farmers will be expected to increase through farm land integration while small-scale farmers will remain in the northern communal areas. Scale-wise farming model in NCAs are tabulated as follows:

Small-scale Farmers remain

Horticulture farming particularly peri-urban areas increasing

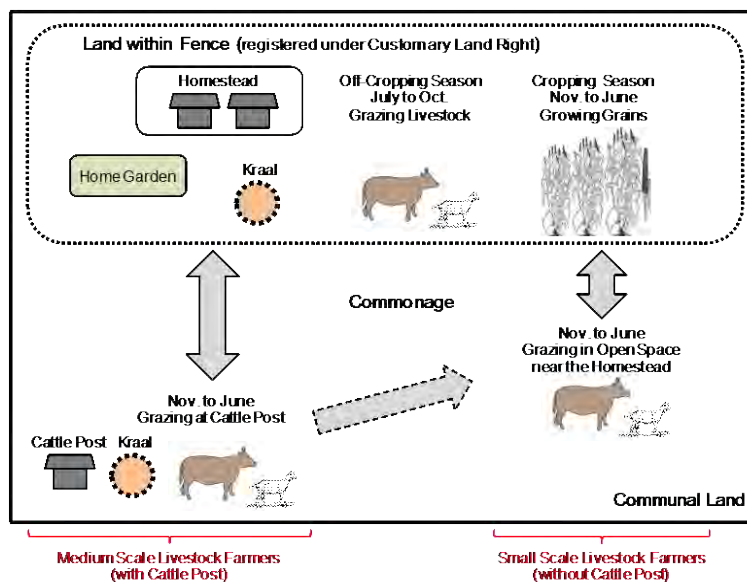
Farm Type & Size	No livestock Main income: other than livestock Livestock: no income	Livestock Small Scale below 25 - 30 cattle Livestock: sub-income	Livestock Medium Scale over 25 - 30 cattle Livestock: main income:	Horticulture
Crop Production No crop field or very small	Crop field: 0 - 2 ha No cattle	Crop field: 0 - 2 ha below 25 - 30 cattle	Crop field: 0 - 2 ha over 25 to 30 cattle	Home Garden 30 to 50 m ²
Grains: subsistence	Income: neither crops nor livestock	without cattle post or sharing cattle post	with cattle post	Self consumption & sales of surplus
Crop Production Small Scale	Crop field: 3 - 4 ha No cattle	Crop field: 3 - 4 ha below 25 to 30 cattle	Crop field: 3 - 4 ha over 25 to 30 cattle	Home Garden 30 to 50 m ²
Grains: home consumption & sub-income	Main Income: wage or other income	without cattle post or sharing cattle post	with cattle post	Self consumption & sales of surplus
Crop Production Medium Scale	Crop field: 5 - 10 ha No cattle	Crop field: 5 - 10 ha below 25 to 30 cattle	Crop field: 5 - 10 ha over 25 to 30 cattle	Home Garden 30 to 50 m ²
Grains: income	Main Income: grains & other crops	without cattle post or sharing cattle post	with cattle post	Self consumption & sales of surplus
Horticulture Farmers Horticulture: main income				Farmer with Irrigation Water Supply at Olshanda, Etunda and Etaka Canal

Medium-scale Semi-Commercial Farmers increasing in number

Source: Prepared by the Study Team

Scale-wise Farming Model in Northern Communal Area

General crop and livestock production activities in NCAs are illustrated in the right figure showing production cycle between land within fence (registered under customary land right) and commonage. Although farming activities are generally common to both medium- and small-scale farmers, some differences need to be considered are: (i) use of cattle post, (ii) adoption of farm mechanization, (iii) conduct of cereal crops marketing for sales purpose and so forth. Such differences should be carefully considered in the course of master plan implementation in order to establish farming models of both types of farmers and update of technical measures.

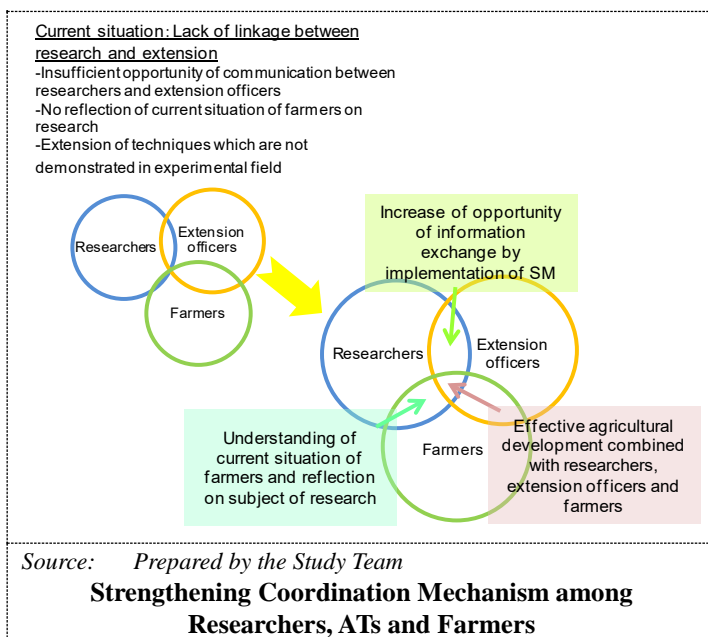


Source: Prepared by the Study Team

Image of General Farming Activities (Crop and Livestock Production)

Approach-2: Coordination with previous and on-going GRN scheme

In the Strategic plan 2013/14 to 2016/17, MAWF sets one of the targets, “Number of support mechanisms designed and operational,” which includes DCP, Strategic Food Reserve, Comprehensive Conservation Agriculture Programme, Livestock Development Master Plan by the Meat Board and so on related with crop and livestock production. In addition, as the key word for the master plan, MAWF also is promoting conservation agriculture, principles of which are: (i) minimal soil disturbance, (ii) permanent soil cover and (iii) crop rotation, as “number of farmers practicing conservation agriculture increased” is applied for key performance indicator (KPI) in the strategic plan. Also, there are appropriate techniques under experimental basis in the research stations of MAWF, although not necessarily widely disseminated, such as low pressure drip irrigation kit using bucket, drum and tank at Okashana Crop Research Station under MAWF (linkage among researchers, extension officers and farmers as shown in the right figure).



In order to carry out the master plan, therefore, it would be effective if training programs and/or technical dissemination for proposed technical measures are carried out through coordination with such on-going GRN schemes.



Under the pilot site activities in phase-2, training program was carried out for the installation and utilization of drip irrigation kit to promote horticulture crops production by the engineer from the crop research station under MAWF together with ATs in charge

**Conduct of Farmers’ Training jointly with the Research Station
(April 2016)**

Approach-3: Step-wise improvement of dissemination system through implementation

Dissemination system needs to be improved step-wise through the implementation in compliance with verification of technical measures proposed. To do so, monitoring and evaluation are essential to understand the level of progress and constraints on a regular basis. The results to be obtained from monitoring and evaluation will give useful information for operation and management of on-going or future technical dissemination. In addition, it is of importance to carry out the monitoring and evaluation

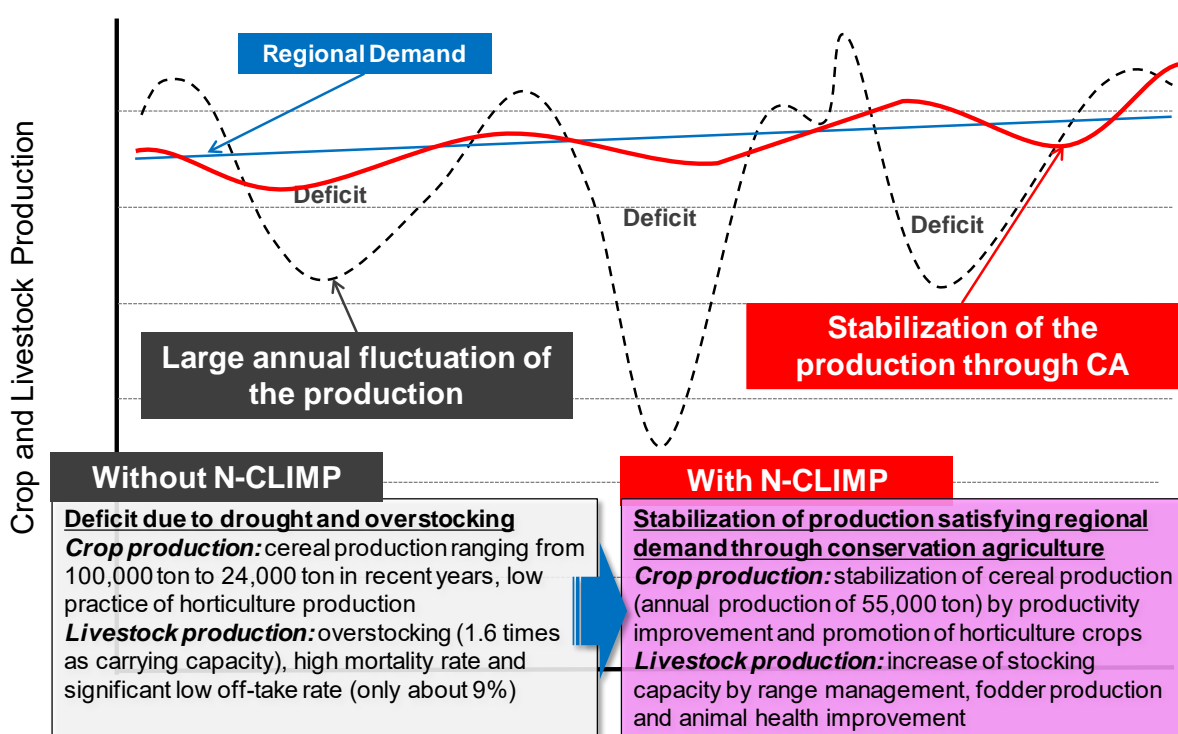
works for farmers’ capacity development since individual farmers and/or cooperatives, first and foremost, main actors to promote crop and livestock production, is expected through monitoring and evaluating their own activities and preparing recommendation based on this process.

Detailed monitoring and evaluation plan have been designed during the preparatory works of pilot site activities in phase-II of N-CLIMP. The indicators to be monitored and evaluated should be identified according to the objectives and expected outcomes of the implementation. Indicators must be objectively verifiable, and data and information for the verification must be retainable.

(2) Enhancement of Resilience of Crop and Livestock Production

Enhancing Resilience of Crop and Livestock Production

Important aspect of the master plan is “**Enhancing Resilience of Crop and Livestock Production.**” The image is illustrated as follows:



Source: Prepared by the Study Team

Enhancement of Resilience of Crop and Livestock Production in Northern Namibia

As previously discussed, by applying conservation agriculture, enhancement of resilience of crop and livestock production in Northern is a target for the master plan of N-CLIMP. Without-conditions of the master plan, annual production of cereal grains significantly fluctuate from approximately 100,000 ton to 24,000 ton due to erratic rainfall pattern. In addition, livestock production is not necessarily carried out in sustainable manner due to overstocking, high mortality rate as well as low off-take rate. With-conditions of the master plan, crop production is expected to be stabilized and horticulture crops production is promoted at the potential area. In addition, it is planned that the stocking capacity of livestock is improved by improving range management, fodder production and animal health using proposed technical measures in order to catch up regional demand of crop and livestock products.

II-5.3 Master Plan for Crop and Livestock Development

II-5.3.1 Contents of the Master Plan

The master plan is prepared by including the following contents:

- ◆ Phase
- ◆ Phase-wise development scenario
- ◆ Focal technical measures: phase-wise technical measures
- ◆ Implementation system: stakeholder for the master plan implementation, institutional framework and implementation flow
- ◆ Measurable figures of the development target: for crop and livestock production

II-5.3.2 Focal Technical Measures for Crop Production, Livestock Production and Farm Management

As discussed in the previous chapter, the focal technical measures for each phase are as follows based on the categorization using sets of criteria. Through this exercise, 21 numbers of technical measures are selected for verification during the pilot site activities in the phase-3 of N-CLIMP.

Focal Technical measures in each Phase

No.	Name	Category	Phase	Applied during N-CLIMP
Crop Production				(8 nos.)
CR-1	Fertilizer application	1,2 to 3	Short, medium to long	+
CR-2	Cropping pattern	1,2 to 3	Short, medium to long	+
CR-3	Conservation agriculture	1,2 to 3	Short, medium to long	+
CR-4	Flood- and drought-adaptive cropping system (Rice-Mahangu mixed cropping)	1,2 to 3	Short, medium to long	+
CR-5	Water source / water harvesting	1,2 to 3	Short, medium to long	+
CR-6	Water saving cultivation	1,2 to 3	Short, medium to long	+
CR-7	Crop selection and marketing	1,2 to 3	Short, medium to long	+
CR-8	Cropping plan and horticulture crop management	1,2 to 3	Short, medium to long	+
CR-9	Establishment of crop production and marketing cooperatives	3	Medium to long	
Livestock Production				(8 nos.)
LS-1	Fodder production	1	Short	+
LS-2	Range management	1,2 to 3	Short, medium to long	+
LS-3	Water harvesting and/or construction of water resource facilities for animals	1	Medium	

No.	Name	Category	Phase	Applied during N-CLIMP
LS-4	Nutritious feed supply particularly for pig and chicken	1	Short	+
LS-5	Disease control	1	Short	+
LS-6	Large and small stock fattening	1	Short	+
LS-7	Periodical production	1	Short	+
LS-8	Expansion of quality meat	2 to 3	Medium to long	
LS-9	Bull scheme	2 to 3	Medium to long	
LS-10	Multiplication of Sanga bull	2 to 3	Medium to long	
LS-11	Goat production	1	Short	+
LS-12	Pig production	1 to 2	Medium	
LS-13	Chicken production	1	Short	+
LS-14	Promotion and strengthening of Auction for both large and small stocks	2	Medium	
LS-15	Development of formal market for small stock	2	Medium	
LS-16	Establishment and strengthening livestock cooperatives	1, 2 to 3	Medium to long	
Farm Management				(5 nos)
FM-1	Household accounting management	2	Medium	
FM-2	Book keeping (Farm Record)	1	Short	+
FM-3	Post Harvest	1, 2 to 3	Medium to long	
FM-4	Business plan	2	Medium	
FM-5	Group formation/ group strengthening	1	Short	+
FM-6	Group accounting management	1	Short	+
FM-7	Formulation of Water Users Association	1	Medium	
FM-8	Collective Selling / Purchasing	1	Medium	+
FM-9	Rural finance accessibility improvement	1	Medium	
FM-10	Market information access improvement	1	Short	+
Total				21 nos.

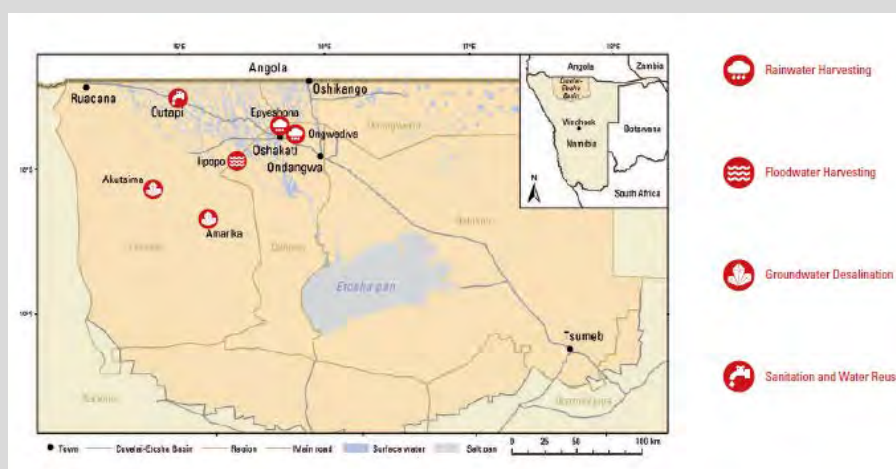
Source: Prepared by the Study Team

Box (Revitalization of existing water resources facilities):

Water is, first and foremost, essential resources for crop and livestock development, therefore, water resources development technical measures are included in both crop production and livestock production: (i) CR-5, water source and water harvesting and (ii) LS-3, Water harvesting and/or construction of water resource facilities for animals. These technical measures also include rehabilitation of existing water-related facilities to ensure cost-effective water resources development.

Following map shows the location of water resources facilities developed by the project CuveWaters.

Under the pilot site activities of N-CLIMP, rehabilitation of water resources facilities at Okatana in Oshana region was carried out to develop horticulture production model at peri-urban area.



Source: CuveWaters Report (2015)

Location of Water Resources Facilities developed by CuveWaters

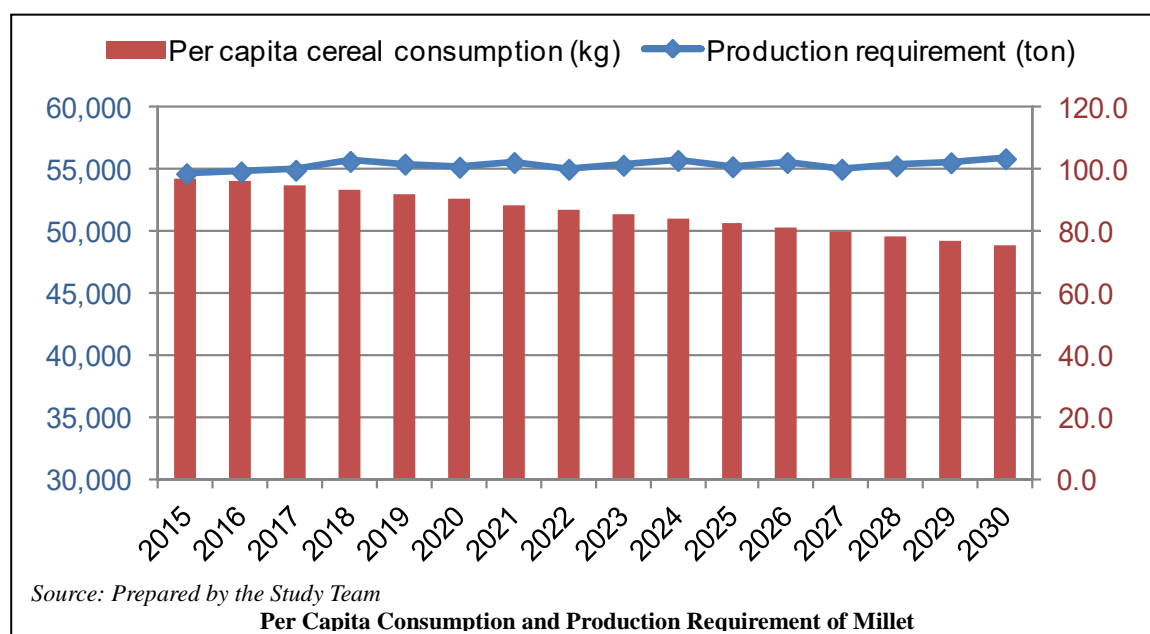
II-5.3.3 Measurable Figures of the Development Target

Measurable figures of the development target needs to be determined in order to improve implementation system based on the periodical monitoring and evaluation of the activities. The indicators would be prepared for: (i) crop production (cereal production and horticulture) and (ii) livestock production as follows:

(1) Crop production

For the crop production sub-sector, following targets are set as the master plan: (i) cereal production (millet), (ii) yield of cereal (millet), (iii) yield of horticulture crops, (iv) Number of farmers practicing ripper furrow and (v) Number of farmers practicing urban and peri-urban horticulture in accordance with GRN policy and strategy.

◆ Cereal production (millet):



Projection of per capita consumption and production requirement of millet is graphed in the figure above. Per capita cereal consumption is anticipated to be gradual decrease from approximately 100 kg at present to 76 kg in 2030 and food self sufficiency (cereal) is tentatively set to 68% through gradual increase.

Box: Assumption of Cereal Production Target Setting in the Master Plan

Cereal production target setting is carried out based on: (i) population projection, (ii) per-capita consumption and (iii) food self-sufficiency, assumption of which is shown as follows:

Assumption	Year	2017	2023	2030
Population (NCD) (=1)		963,666	1,027,189	1,085,500
Per capital cereal consumption (kg/person) (=2)		95.1	85.6	77.0
Demand of cereals (ton) (=3=1x2)		91,616	87,889	82,198
Cereal self-sufficiency in NCD (%) (=4)		60	63	68

Production requirement of cereals (=5=3x4)	54,969	55,370	55,894
Yield (kg/ha) (=6)	200	300	400
Planted area (ha) (=5/6)	274,847	184,568	139,736

Note: (1) Population projection is based on Namibia Statistics Agency (2014), Namibia Population Projections 2011 – 2041.
(2) At present, no projection is available in MAWF, per capital consumption (kg/person) is based on the recent trend of cereal consumption showing gradual decrease in general.
(3) Cereal self-sufficiency in NCD shows approximately 60% during the period between 1999 and 2014. Since no quantitative target is not available in MAWF, the figures are tentatively set by the Study Team

Source: Prepared by the Study Team

◆ Yield of cereal (millet):

At present, the yield of millet is 200 kg/ha according to the agricultural statistics. In the long run, the yield is expected to be doubled as discussed in the previous chapter.

◆ Yield of horticulture crops:

Currently, comprehensive statistical data on horticulture crops are not available, the targets of various horticulture crops are determined as a part of the master plan target based on the standard cultivation method for each horticulture crops.

Yield of Horticulture Crops (1/2) (Fruit Vegetables)

Item	Year/term	Short 2017	Medium 2023	Long 2030
<u>Fruit Vegetables</u>				
Tomato		Focal urban and peri-urban area in each region	4 kg/m ²	TBD
Egg Plant		Focal urban and peri-urban area in each region	2.3 kg/m ²	TBD
Sweet Pepper/Capsicum		Focal urban and peri-urban area in each region	2 kg/m ²	TBD
Cucumber (lifting)		Focal urban and peri-urban area in each region	4 kg/m ²	TBD
Pumpkin		Focal urban and peri-urban area in each region	2 kg/m ²	TBD
Water Melon		Focal urban and peri-urban area in each region	2 kg/m ²	TBD
Melon		Focal urban and peri-urban area in each region	1 kg/m ²	TBD

Source: Prepared by the Study Team

Yield of Horticulture Crops (2/2) (Root Vegetables and Leaf Vegetables)

Item	Year/term	Short 2017	Medium 2023	Long 2030
<u>Root Vegetables</u>				
Carrot		Focal urban and peri-urban area in each region	3 kg/m	TBD
Turnip		Focal urban and peri-urban area in each region	3 kg/m	TBD
Onion		Focal urban and peri-urban area in each region	2 kg/m	TBD
Sweet Potato		Focal urban and peri-urban area in each region	2 kg/m	TBD
<u>Leaf Vegetables</u>				
Cabbage		Focal urban and peri-urban area in each region	2 kg/m	TBD
Chinese Cabbage		Focal urban and peri-urban area in each region	1.5 kg/m	TBD

Cauliflower, Broccoli	Focal urban and peri-urban area in each region	3 kg/m ²	TBD
Spinach	Focal urban and peri-urban area in each region	2 kg/m ²	TBD

Source: Prepared by the Study Team

- ◆ Number of farmers practicing ripper furrow: as a part of conservation agriculture being promoted by MAWF
- ◆ Number of farmers practicing urban and peri-urban horticulture

Target of both activities are determined according to the strategic plan by MAWF as follows:

Number of Farmers for Conservation Agriculture and Horticulture Crops Production

Item \ Year/term	Short 2017	Medium 2023	Long 2030
Number of farmers practicing conservation agriculture utilizing ripper furrow for land preparation (nos.)	Direct: 4 groups (60 farmers)	Direct: 28 groups (420 farmers)	Direct: 56 (840 farmers)
	Indirect: 900 farmers	Indirect: 6,300 farmers	Indirect: 12,600 farmers
Number of farmers practicing urban and peri-urban horticulture (nos.)	Direct: 4 groups (60 farmers)	Direct: 18 groups (270 farmers)	Direct: 32 groups (480 farmers)
	Indirect: 900 farmers	Indirect: 4,050 farmers	Indirect: 7,200 farmers

Source: Prepared by the Study Team

Number of farmers (direct) is the farmers benefitted from agriculture extension activities while the number of farmers (indirect) is the number to be expected from farmer to farmer technical measures dissemination.

(2) Livestock production

As for the livestock production, stocking rate of livestock and off-take rate of cattle are the major targets for the master plan.

- ◆ Stocking capacity of livestock:
- ◆ Off-take rate of cattle

The target of stocking capacity and off-take rate is determined in consideration of that of commercial farming area, Meat Board Master Plan and so on.

Stocking Capacity and Off-take Rate of Livestock

Item \ Year/term	Short 2017	Medium 2023	Long 2030
Stocking capacity of livestock			
Cattle(nos.)	578,000 (1LU=250kg)	789,000 (1LU=250kg)	1,000,000 (1LU=250kg)
Goats (nos.)	389,000 (1/6LU)	544,000 (1/6LU)	700,000 (1/6LU)
Marketing			
Off-take rate (%)	12%	20%	30%

Source: Prepared by the Study Team

(3) Farming model for medium and small-scale farmers

Above measurable figures are macro level target for the master plan. In addition, by applying proposed technical measures for crop and livestock production and farm management, the following farming models are expected for medium and small-scale farmers as well as horticulture farmers as micro level target.

Expected Farming Model for Medium and Small-scale Farmers (1/3)

Summar

Farming Model	Crop (Cereal Grains, Horticulture)	Livestock (Cattle & Chicken)
Small Scale Farmer: N\$14,300 - Main income: off-farm income - Sub-income: farming, subsistence	Grains 3 ha + Garden 150 m ² Net Income: N\$2,800 (grains: N\$1,600, vegetables: N\$1,200)	10 Cattle + Chickens (1 cock + 10 hen) Net Income: N\$11,500 (cattle: N\$3,400, chicken: N\$8,100)
Medium Scale Farmer N\$26.600 - Main income: farming - Sub-income: off-farm income	Grains 6 ha + Garden 150 m ² Net Income: N\$5,900 (grains: N\$4,700, vegetables: N\$1,200)	30 cattle + Chickens (1 cock + 10 hen) Net Income: N\$21,700 (cattle: N\$13,600, chicken: N\$8,100)
Medium Scale Farmer 2: N\$41,300 - Main income: (farming) - Sub-income: off-farm income	-	114 cattle Net Income: N\$41,300 (300 cattle: N\$123,900)
Medium Scale Farmer 3: N\$19,600 - Main income: (farming) - Sub-income: off-farm income	Grain 100 ha (400 kg/ha) Net Income: N\$19,600	-
Small Scale Horticulture Farmer: N\$105,000 - Main income: farming - Sub-income: no income	Etunda Irrigation scheme 3 ha Net Income: N\$105,000 (10 ton/ha, 2 crops)	-

Source: Prepared by the Study Team

Expected Farming Model for Medium and Small-scale Farmers (2/3)

Breakdown of Crop Production

Farming Model	A. Production, Marketing Surplus	B. Production Cost
Grains: 3 ha Net Income: N\$1,600	Production: 3 ha x 400 kg = 1,200 kg Home Consumption: 100 kg x 5.1 person = 510 kg Marketable Surplus: 1,200 kg – 510 kg = 690 kg Gross income: 690 kg x N\$4.5/kg = N\$3,100	Home Manure for Basal, Family Labor Seed & Fertilizer: N\$200 Ploughing: Ripper Furrow N\$1,200 Miscellaneous: N\$100 Total Production Cost: N\$1,500
Horticulture: 150 m² Net Income: N\$1,200	Production: 2 kg/m ² x 150 m ² x 3 crops = 900 kg Home Consumption: 40 kg x 5.1 person = 200 kg Marketable Surplus: 900 kg – 200 kg = 700 kg Gross income: 700 kg x N\$3.5/kg = N\$2,450	Production Cost = 50% of Gross Income = N\$1,250
Grains: 6 ha Net Income: N\$4,700	Production: 6 ha x 400 kg = 2,400 kg Marketable Surplus: 2,400 kg – 510 kg = 1,890 kg Gross income: 1,890 kg x N\$4.5/kg = N\$8,500	Manure, Seed & Fertilizer: N\$400 Labor & Tractor Services N\$3,100 Miscellaneous: N\$300 Total Production Cost: N\$3,800
Grains: 100 ha Net Income: N\$19,600	Production: 100 ha x 400 kg = 40,000 kg Marketable Surplus: 40,000 kg – 510 kg = 39,490 kg Gross income: 39,490 kg x N\$4.5/kg = N\$177,700	Manure, Seed & Fertilizer: N\$56,700 Labor & Tractor Services: N\$22,000 Miscellaneous: N\$14,400

		Total Production Cost: N\$158,100
Small Scale (Etunda) Horticulture Farmer: 3 ha Net Income: N\$105,000	Production: 10 ton / ha x 3 ha x 2 crops = 60,000 kg Gross income: 60,000 kg x N\$3.5/kg = N\$210,000	Production Cost = 50% of Gross Income = N\$105,000

Source: Prepared by the Study Team

Expected Farming Model for Medium and Small-scale Farmers (3/3)

Breakdown of Livestock Production

Livestock Model	A. Production, Marketing Surplus	B. Production Cost
10 Cattle	2 Cattle Sale: 4,300 N\$ x 2 = 8,600 N\$	60% Cost: 5,200 N\$ Net income: 3,400 N\$
30 Cattle	7 Cattle Sale: 4,300 N\$ x 8 = 34,400 N\$	60% Cost: 20,800 N\$ Net Income: 13,600 N\$
114 Cattle	24 Cattle Sale: 4,300 N\$ x 24 = 103,200 N\$	60% Cost: 61,900 N\$ Net Income: 41,300 N\$
1 Cock + 10 Hens	90 Chickens Sale: 100 N\$ x 90 = 9,000 N\$ 90 Chicks Sale: 60 N\$ x 90 = 5,400 N\$ <u>Total 14,400 N\$</u>	Feeding : Case1: 0 N\$: Used own Mahangu Case2: 2,830 N\$: Half purchased Mahangu Case3: 5,660 N\$: All purchased Mahangu Disease control : 1,910 N\$, Water: 110 N\$, Housing etc.: 1,500 N\$ Net Income: Case1: 10,900 N\$, Case2: 8,100 N\$, Case3: 5,200 N\$
1 Cock + 30 Hens	405 Chickens Sale: 100 N\$ x 405 = 40,500 N\$ 405 Chicks Sale: 60 N\$ x 405 = 24,300 N\$ <u>Total 64,800 N\$</u>	Feeding : Case1: 0 N\$: Used own Mahangu Case2: 13,490 N\$: Half purchased Mahangu Case3: 26,980 N\$: All purchased Mahangu Disease control : 8,410 N\$, Water: 305 N\$, Housing etc.: 5,000 N\$ Net Income: Case1: 51,100 N\$, Case2: 37,600 N\$, Case3: 24,100 N\$

Source: Prepared by the Study Team

II-5.3.4 Master Plan for Crop and Livestock Development

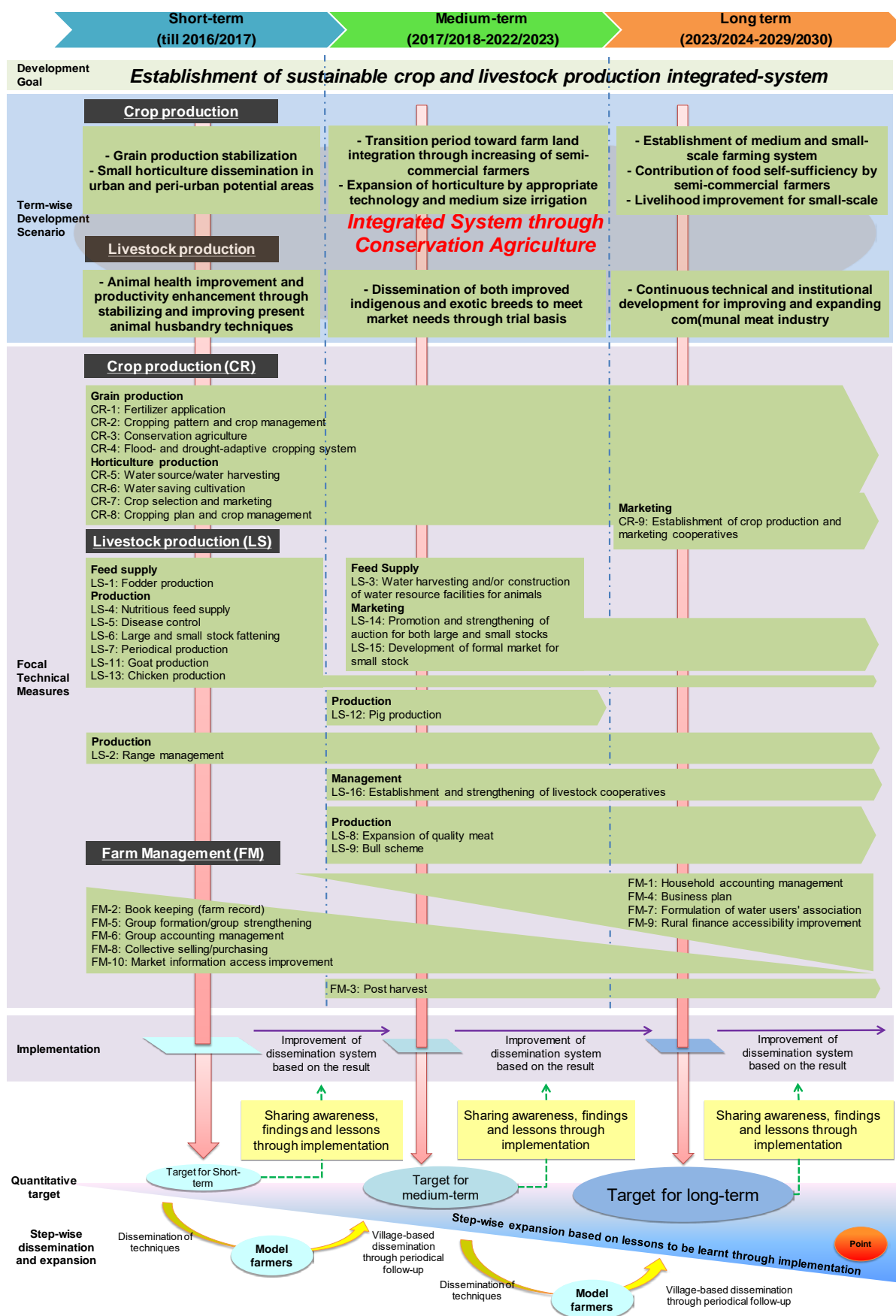
Based on the discussion above, the draft master plan for northern crop and livestock development is tabulated and illustrated as follows:

Master Plan for Northern Crop and Livestock Development

Subject	Contents		
Development Target	Establishment of sustainable crop and livestock production integrated system based on conservation agriculture		
Phase	Three phases as follows: <ul style="list-style-type: none"> ◆ Short-term: Until 2016/2017 (during the implementation of JICA Technical Cooperation) ◆ Medium-term: 2017/18 to 2022/23 ◆ Long-term: 2023/24 to 2029/2030 		
Phase-wise Development Scenario	<i>Through the implementation of the master plan, crop and livestock production integrated system is established based on the concept of conservation agriculture.</i>		
	Phase-wise development scenario is as follows based on the current conditions surrounding agriculture that the population is steadily increasing while farm household is decreasing:		
	Phase	Crop production	Livestock production
Short-term	<ul style="list-style-type: none"> ◆ Development and verification of technical measures for stabilization of cereal production ◆ Promotion of horticulture crops for health 	<ul style="list-style-type: none"> ◆ Improvement of animal health and enhancement of livestock productivity particularly using current techniques 	

		improvement and cash income increase at potential areas particularly peri-urban areas	
	Medium-term	<ul style="list-style-type: none"> ◆ Increase of semi-commercial farmers through farm integration ◆ Dissemination of improved production system of cereal production to both medium and small-scale farmers ◆ Promotion of horticulture crops through medium scale irrigation development by Green Scheme and dissemination of appropriate technology for drip irrigation system 	<ul style="list-style-type: none"> ◆ Continuation of animal health improvement and production enhancement programs ◆ Dissemination of both indigenous and exotic breeds to meet market needs through trial basis
	Long-term	<ul style="list-style-type: none"> ◆ Establishment of medium and small-scale farming system ◆ Contribution of food self-sufficiency by semi-commercial farmers (medium-scale farmers) ◆ Livelihood improvement for small-scale farmers 	<ul style="list-style-type: none"> ◆ Continuous technical and institutional development for improving and expanding communal meat industry
Focal Technical measures	Proposed basic, intermediate and advanced technical measures for crop and livestock production and farm management are adopted and disseminated stepwise based on the categorization.		
Implementation Structure	<ul style="list-style-type: none"> ◆ Technical measures are disseminated by crating key model farmers in each village. ◆ Technical measures are disseminated through continuous improvement of dissemination system based on periodical monitoring by NCD and regional offices and ATs of MAWF. 		
Measurable Figures of the Development Target	Development target is established for crop and livestock production-related indicators such as number of farmers and/or agriculture production.		

Source: Prepared by the Study Team



Source: Prepared by the Study Team

Master Plan Northern Crop and Livestock Development Master Plan

II-5.4 Implementation System

II-5.4.1 Stakeholder for the Master Plan Implementation

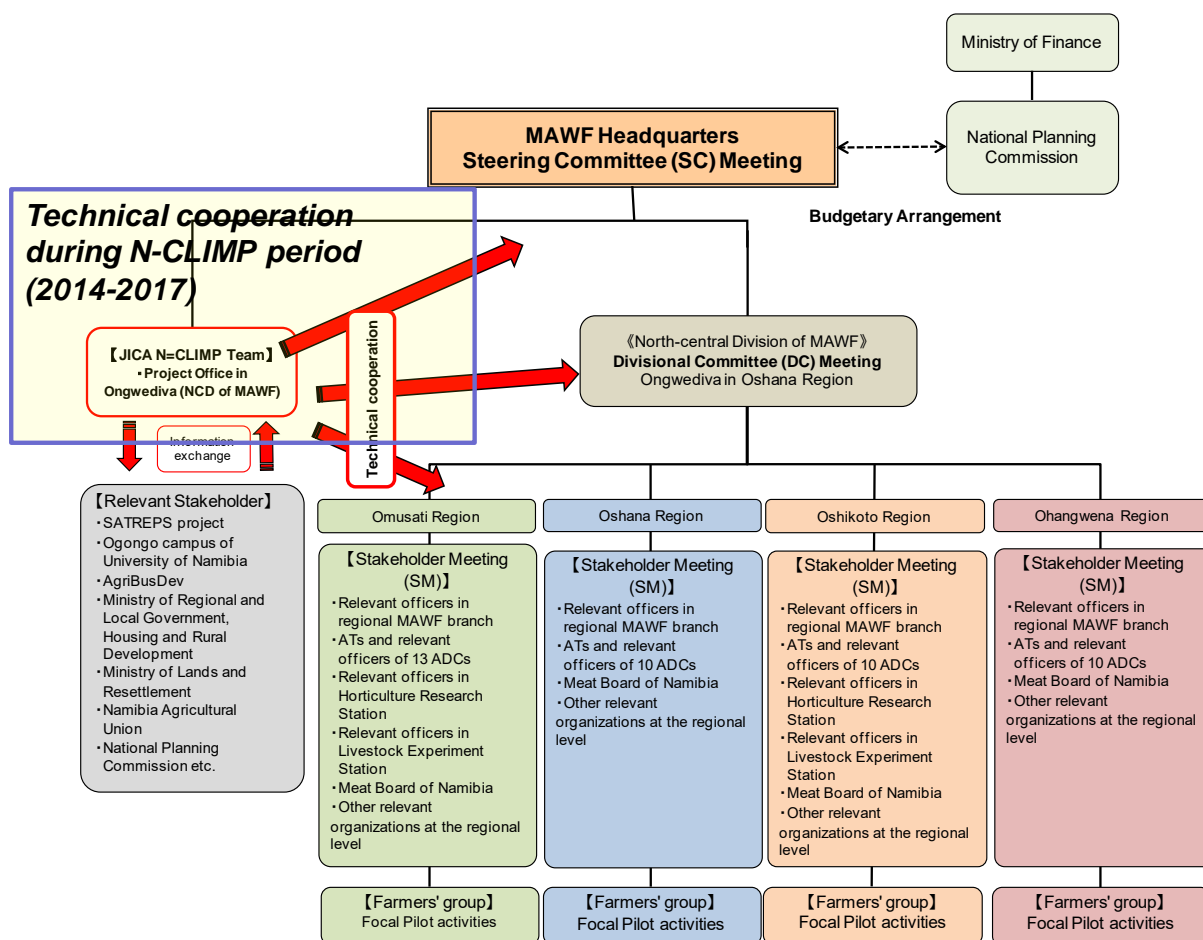
(1) Implementation Structure

List of ADCs and Staffs in 4 regions is shown in Table II-5.4.1. The implementing organization of the master plan is proposed as shown below according to the experiences of N-CLIMP.

Proposed Function, Members and Meeting of SC, DCM and SM			
Organization	Members	Meeting	
		Place	Frequency
1. Steering Committee (SC) <i>Function: Overall project management including budgetary arrangement</i>	<ul style="list-style-type: none"> ◆ Directorate and relevant services representative of MAWF ◆ North-central division representative of MAWF ◆ Four (4) Regional rep. of NCD 	◆ Windhoek	◆ Inception and completion of year
2. Divisional Committee Meeting (DCM) <i>Function: pipeline between SC and SM</i>	<ul style="list-style-type: none"> ◆ North-central division representative of MAWF ◆ Selected members from SC ◆ Stakeholders from relevant organizations 	◆ Outapi in Omusati region	◆ Inception and completion of year
3. 3. Stakeholder meeting (SM) <i>Function: Activities monitoring and technical dissemination at the site level</i>	<ul style="list-style-type: none"> ◆ North-central division representative of MAWF ◆ Four (4) Regional representative of NCD ◆ ATs of ADCs ◆ Regional research center ◆ Relevant private sectors 	<ul style="list-style-type: none"> ◆ Ongwediva in Oshana region ◆ Outapi in Omusati region ◆ Onankali in Oshikoto region ◆ Enhana in Ohangwena region ◆ Project site ◆ Others 	<ul style="list-style-type: none"> ◆ Monthly ◆ Before and after each field activities ◆ Others, if any

Source: Prepared by the Study Team

In addition, proposed implementation structure is illustrated based on the function, members and meeting of SC, DCM and SM as follows:

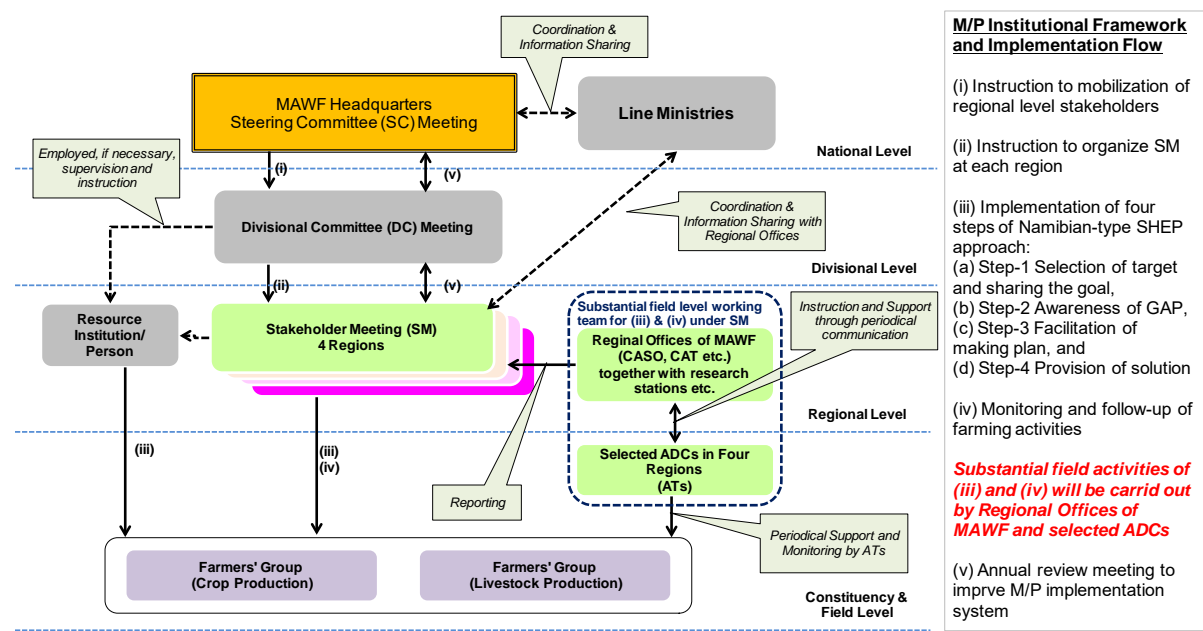


Source: Prepared by the Study Team

Master Plan Implementation Organization

(2) Institutional Framework

Based on the proposed implementing organization as shown above, institutional framework for the master plan is depicted as follows showing the linkage and role of stakeholders at the national level, divisional level, regional level and constituency & field level.



Source: Prepared by the Study Team

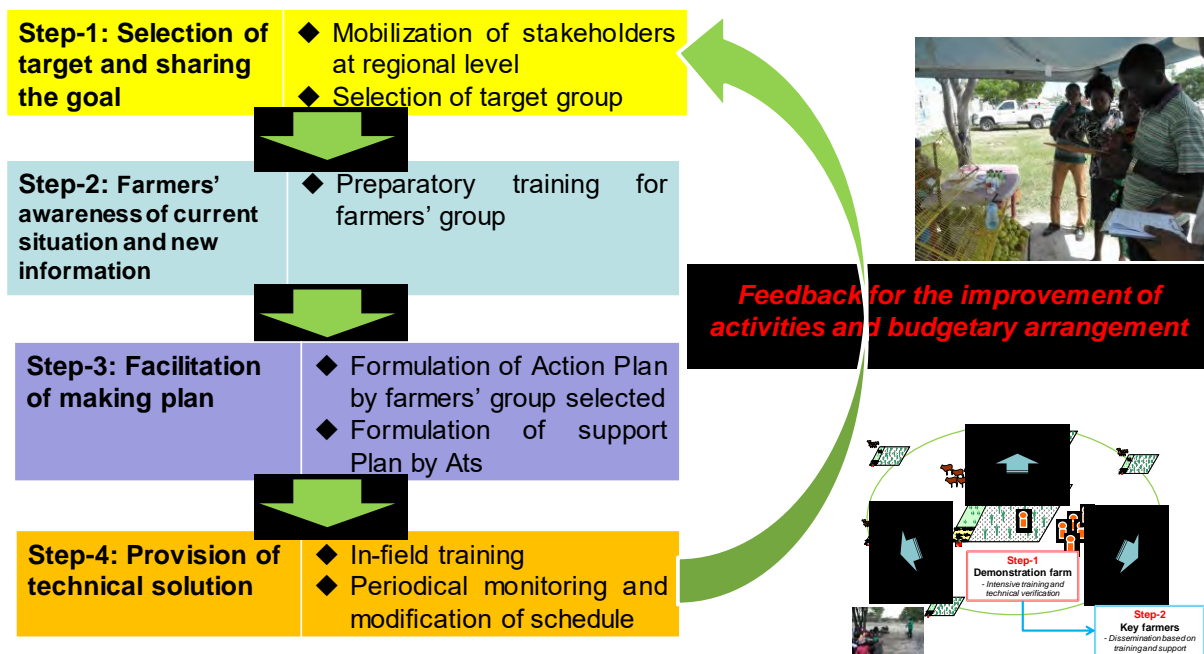
Master Plan Institutional Framework

The points in the institutional framework for the master plan are as follows:

- ◆ Instruction is given from the Steering Committee Meeting (SCM) to the Divisional Committee Meeting (DCM) for mobilization of regional level stakeholders.
- ◆ DCM informs and instructs to organize the stakeholder meeting at each region.
- ◆ Corresponding to the instruction from DCM, SM of each region is requested to mobilize the stakeholders to commence the activities according to the proposed procedure of Namibian SHEP approach.
- ◆ Substantial field activities are conducted by ATs together with engineers and technician from relevant organization supervised by senior staffs such as CASO and CAT.
- ◆ Monitoring is carried out based on the primary and subsidiary indicators relevant to the master plan target. The monitoring results are periodically reported to SM members using regional monthly meeting.
- ◆ Resource institution and/or person are requested to provide field level working team with support, whenever necessary, such as University of Namibia, AgriBusDev, AMTA, Agronomic Board, Meat Board, NNFU and so forth.
- ◆ In relation to the resource institution and/person, coordination with on-going programs and projects would be also another important aspect through joint training, data sharing and so on. The programs and projects would include: (i) DCP, (ii) National Strategic Food Reserve, (iii) Conservation Agriculture Namibia, (iv) Comprehensive Conservation Agriculture Programme, (v) Livestock Development Master Plan by the Meat Board etc.
- ◆ Based on the report from field monitoring team, SM periodically report to DCM and SM according to the reporting procedure of MAWF.

II-5.4.2 Implementation Flow

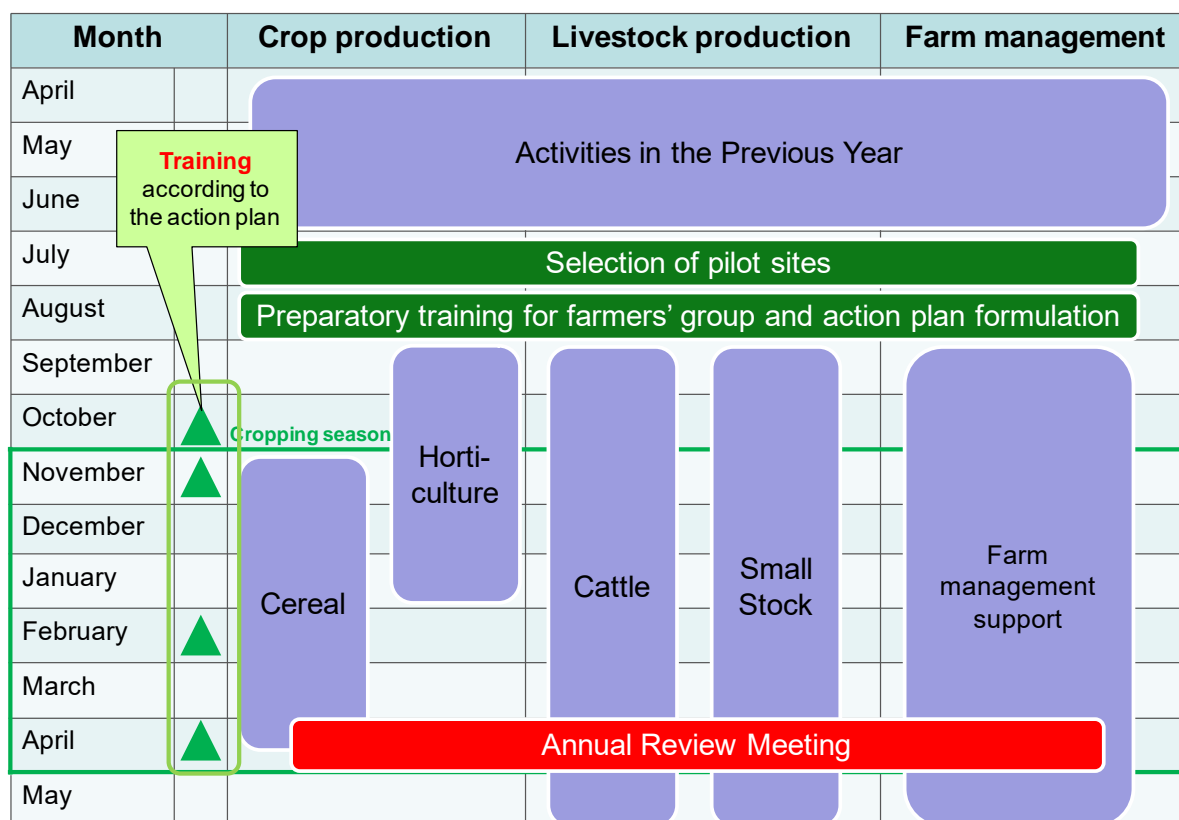
In general, Namibian SHEP approach as explained in the previous section and depicted in the following figure, is utilized for the implementation of technical training and dissemination under agriculture extension services.



Source: Prepared by the Study Team

Agricultural Extension Services based on Namibian SHEP Approach

Annual implementation flow of the master plan is shown in Figure II-5.4.1 and summarized below based on the proposed procedure.



Source: Prepared by the Study Team

Summary of Annual Implementation Flow

The points are listed as follows:

July – August

- ◆ Substantial activities commence from around July by selection of focal sites for major activities at each region: (i) cereal grains production, (ii) horticulture production, (iii) cattle and (iv) small stock.
- ◆ After focal sites are selected, target farmers are selected through discussion with existing group and/or local authorities.
- ◆ Prior to the field-based activities, preparatory training for farmers' group is conducted to raise awareness of farmers as well as formulation of action plan for the activities.

September to April

- ◆ Based on the action plan, the training and the field activities are started from September for horticulture crops production, cattle and small stock. As for the cereal grains production, activities are focused on preparatory works in September and October.
- ◆ Training and monitoring and conducted based on the action plan to be formulated.

April

- ◆ After the cropping season, field level evaluation and annual review meeting is organized to review and confirm the activities and extract lessons learnt, which will be reflect to the preparation of PIF of next fiscal year.

II-5.5 Master Plan Implementation Cost

Master plan implementation cost is estimated based on the following conditions:

- ◆ Implementation period: from 2016/17 (phase-3 of N-CLIMP) to 2029/30
- ◆ Unit cost for each technical measure is set for their verification and dissemination according to the experiences of the pilot site activities in the phase-2 of N-CLIMP.
- ◆ Monitoring cost is estimated for 10 % of cost for techniques and technical dissemination.
- ◆ Miscellaneous cost is set for 5 % of cost for technical measures dissemination.
- ◆ Term-wise cost is calculated: (i) short-term (2016/17), (ii) medium-term (2017/18 to 2022/23) and (iii) long-term (2023/24 to 2029/30)

The total cost is shown in Table II-5.5.1 and summarized in the following table.

Summary of Cost for the Master Plan

Unit: N\$1,000

No.	Item	Term		
		Short (2016/17)	Medium (2016/17-2022/23)	Long (2023/24-2029/29)
1	Technical measures Verification and Dissemination (=A)	315	30,390	45,858
2	Monitoring (=B=Ax10%)	31	3,039	4,586
3	Miscellaneous Cost (=C=Ax5%)	16	1,519	2,293
	Total (=A+B+C)	362	34,948	52,737
			Grand Total	88,047
			Annual Average over 15 years	5,870
			First 5 years	23,737

Source: Prepared by the Study Team

Table

N-CLIMP

Table I-3.1.1 Components of Dry-land Crop Production Program

Component	Content and Implementation
Ploughing Services	<ul style="list-style-type: none"> - DCPD provides the ploughing, planting and fertilizer application services to beneficiaries through government owned tractors and hiring of ploughing services through private tractor owners. - A maximum of three hectares will be ploughed at a subsidized rate shared between Government and the beneficiary. - The level of subsidy is determined from time to time depending on the prevailing prices and resources available for DCPD. - The private tractor owner shall claim the government subsidy directly after verification of the service provided. The beneficiary pay shall the other part of the costs as contribution, directly to the tractor owner.
Improved Seed	<ul style="list-style-type: none"> - DCPD provides improved seeds to beneficiaries at subsidized rates shared between Government and the beneficiary. - The level of subsidy is determined from time to time depending on the prevailing prices and resources available for DCPD. - The subsidized seeds are provided for a maximum of three hectares per beneficiary. - DCPD shall encourage beneficiaries to strive for the production of their own seeds thereby saving money in buying seeds. - Training shall be provided by MAWF officials.
Fertilizer	<ul style="list-style-type: none"> - DCPD provides fertilizers (NPK, MAP and Ammonium Sulphate, urea) to beneficiaries at subsidized rates shared between Government and the beneficiary. - The level of subsidy is determined from time to time depending on the prevailing prices and resources available for DCPD. - The subsidized fertilizer will be provided for a maximum of three hectares per beneficiary. - Based on an agreement between DCPD and the farmer, fertilizer will be applied on a portion of the farmer's land for demonstration purposes.
Weeding Services	<ul style="list-style-type: none"> - Provision of weeding services to beneficiaries at a subsidized rate shared between Government and the beneficiary. - DCPD shall facilitate the Youth Employment Schemes (YES) groups to provide weeding services to beneficiaries at subsidized rate. - The level of subsidy is determined from time to time depending on the prevailing prices and resources available for DCPD. - The subsidized weeding services are provided for a maximum of three hectares per beneficiary. - In order to further support the farmer, DCPD encourage the combination of herbicides with the use of youth and women groups providing weeding services.

Source: Prepared by the Study Team, based on the Dry Land Crop Production Program 2010 to 2013, Directorate of Extension and Engineering Services, MAWF, October 2010.

Table I-3.3.1 Summary of MCA-N Agriculture Activities

Activity and Sub-Activity	Aim and Achievement
<p>1. Land Access and Management</p> <p>Sub-Activity 1 Communal Land Support</p> <p>Sub-Activity 2 Community-Based Rangeland and Livestock Management (CBRLM)</p>	<ul style="list-style-type: none"> ● To address the barriers to effective and sustainable management and use of rangeland in the Northern Communal Area. - To strengthen the land owner verification and registration process towards improved land tenure on the Northern Communal Areas (NCAs), by working with Ministry of Lands and Resettlement. - To enhance the productivity and sustainability of land-based resources in the NCAs through introduction and support of CBRLM practices, developed and built upon the Community-Based Natural Resources Management.
<p>2. Livestock Support</p> <p>Sub-Activity 1 Veterinary Infrastructure Support</p> <p>Sub-Activity 2 Livestock Identification and Traceability System</p> <p>Sub-Activity 3 Livestock Market Efficiency Fund</p> <p>Sub-Activity 4 Environmental Assessment1</p>	<ul style="list-style-type: none"> ● To improve livestock productivity and incomes, through 1) reduction of animal diseases and mortality, 2) introduction of a traceability system, and 3) shrinking of costs and losses incurred from farm to gate-to-slaughter. - To construct new State Veterinary Offices at 5 locations including Eenhana, Outapi and Omuthiya, to upgrade 2 existing quarantine camps at Katima and Kopanp, and renovate 8 DVS staff houses in Zambezi Region. - To provide tool to monitor and manage herd performance at the farm level, through the Namibian Livestock Traceability System (NamLITS) managed by the Meat Board. - To improve livestock marketing, eliminate barriers to markets and improve the marketability of livestock for broad application to the livestock industry in order to ensure the competitiveness and sustainability of the livestock sector. - To prepare the environmental impact assessment to avoid adverse impact.
<p>3. Indigenous Natural Products (INP) such as Kalahari melon, ximenia, marula, hoodia, devil's claw, etc.</p> <p>Sub-Activity 1 Support to Producer and Processor Organizations</p> <p>Sub-Activity 2 INP Innovation Funds</p> <p>Sub-Activity 3 Market Information Delivery</p> <p>Sub-Activity 4 Environment Impact / Gender Assessment</p>	<ul style="list-style-type: none"> ● To increase economic opportunities for primary produces by increasing volumes of products harvested and processed and/or adding more value to the products, - To provide support to Produces and Processors Organizations (PPO) involved with indigenous natural products, by building the capacity to respond to market demands in terms of volume and quality. - To ensure continued growth in the sector by investing in new applications and processing innovations of indigenous natural products. - To avail timely, reliable and transparent market information essential to PPO, including . - To prepare the environmental impact assessment to avoid adverse impact, particularly focusing on rural women.

Source: Prepared by the Study Team, based on "MCA-N: 3 Years In and Making Good on Its Promises, September 2012, Millennium Challenge Account Namibia.

Table II-1.4.1 Results of Fixed Point Observation (Omusati Region) (1/4)

	Crop Production	Livestock	Horticulture
Farmer's Name	Ms. Aili Abraham	Mr. Vendelinus K. Shikalepo	Mr. Phillipus Ipinge
Village Name	Onandjamba	Omudhuwuhwanga	Okalonga
Telephone	081-281-1204	081-236-3428	081-235-4586
Constituency	Okalongo	Ruacana	Onesi
ADC	Okalongo	Oshifo	Onesi
SAT / AR	Ms. Shapenga	Mr. Sheehama	Ms. Akwenga
Telephone	081-280-7455	081-202-2665	081-292-4410
1 st Visit Date	Feb. 13, 2015	Feb. 13, 2015	Feb. 13, 2015
2 nd Visit Date	Feb. 27, 2015	Feb. 27, 2015	Feb. 27, 2015
3 rd Visit Date	Mar.12, 2015	Mar.12, 2015	Mar.12, 2015
4 th Visit Date	Mar 26 2015	Mar 26 2015	Mar 26 2015
5 th Visit Date	Apr 09 2015	Apr 09 2015	Apr 09 2015
<u>Activities</u> <u>Finding &</u> <u>Observaion</u>	<ul style="list-style-type: none"> Weeding, watering, land preparation, planting, fertilizer application, weeding, thinning Goes to the MWF offices for information Has cultivated 3.5ha and about 2ha has good crops especially where organic fertilizers applied. Collect manure from the surrounding grazing area. also having a garden with tomatoes, spinach, green peppers, sugarcane, sweet melon, butternuts Attended a meeting on the 08 April 2015 at Omahenene on Cowpeas - the aim was to allow farmers to choose the varieties that are suitable for their soil in terms of Germination, grain, height – organised by the MWF. Waiting for the harvesting season 	<ul style="list-style-type: none"> Branding, vaccination, dehorning, giving water, and herding Has a cattle post 80km away from the household The produced milk is used for home consumption Being a member of the Ruhakana Farmers Association which consist of 250 member currently. A contribution of N\$100.00 membership fee is required. Fetching water by car or Donkey cart Water is supplied by the borehole by contributing N\$20 for the payment (salary) of the borehole operator and N\$350 for diesel monthly Will be taking part in an auction before the 26 march 2015 and also sell to individuals for profit making. Attended a meeting by MEATCO and Omusati Regional Farmers' Cooperative on 06 March Vaccination, Herding, branding Taking the livestock to the water point 	<ul style="list-style-type: none"> Land preparation, planting, weeding, watering, fertilizer & pesticides application Has attended a Olushendje Horticulture Producers Association (OHPA) meeting Has been trained in July 2014 in Business Management by OHPA Has a land of 4ha of which 3ha has been cultivated by a hired tractor Sweet potatoes, butternuts, cabbages, water melons are planted, Has attended a meeting organised by AMTA & AgriBusDev on studying local production on 09-11 March. Irrigation Meeting on the 19 March 2015 to discuss the cropping program and planting conducted by AMTA Clearing the land of old and dead plants Selling the vegetables Cultivation In the following weeks, he will do ploughing so he can plant butternut and cabbage
<u>Problems and</u> <u>Challenges</u>	<ul style="list-style-type: none"> Ants eating the crops Sun too harsh Seeds not germinating or crops burned by the manure due to lack of rain 	<ul style="list-style-type: none"> Lack of rain Lack of grazing land Supplementary feeders too far Water is scarce and there is no tap water at home only 	<ul style="list-style-type: none"> Water for gardening is not available, his application at Rural Water Supply (Namwater) has not been dealt with. Need training on gardening skills Sun is too hot

	<ul style="list-style-type: none"> • Lack of irrigation system in the garden • Pests are eating the crop, it has become worse since it has not rained in a while. 	<p>uses borehole but the fee for the use of borehole is too expensive to give water to the animals</p> <ul style="list-style-type: none"> • MEATCO prices too low and there are no other buyers. • The Assembly point in Oshifo is too far • Medicines suppliers are too far and individuals sell at higher prices. • Water is still far • Medicine still expensive and supplier is far 	<ul style="list-style-type: none"> • Irrigation system is in need of improvement as the pumping machine is has a broken engine and might be costly repairing other than buying a new one at N\$5 000.00 estimate. • At peak period, there will be an increase in the farming expenditure especially labour as the farm will require
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Table II-1.4.1 Results of Fixed Point Observation (Oshana Region) (2/4)

	Crop Production	Livestock	Horticulture
Farmer's Name	Ms. Lahia Reino	Mr. Keratus Iidhogela	Miss. Trefina Angolo
Village Name	<u>Ompundja</u>	<u>Uuthilindindi</u>	<u>Okau-Kamasheshe</u>
Telephone	081-033-0078	081-215-2196	081-382-8769
Constituency	Ompundja	Oshakati West	Oshakati West
ADC	Ompundja	Okau-Kamasheshe	Okau-Kamasheshe
SAT / AR	Mr. Haludila	Mr. Amon	Mr. Amon
Telephone	081-292-3353	081-252-2426	081-252-2426
1 st Visit Date	Feb. 04, 2015	Feb. 04, 2015	Feb. 04, 2015
2 nd Visit Date	-	-	Feb. 19, 2015
3 rd Visit Date	Mar. 05, 2015	Mar. 05, 2015	Mar. 05, 2015
4 th Visit Date	Mar. 19, 2015	Mar. 19, 2015	Mar. 19, 2015
5 th Visit Date	April 17 2015	Apr 17 2015	Apr 17 201
<u>Activities Finding & Observations</u>	<ul style="list-style-type: none"> • Land preparation, planting, weeding, thinning, harvesting, of which most of the activities are repeated due to lack/delayed rain. • Has a used private tractor to plough and has an labour. • Uses NPK fertilizer. • Crops planted in Dec 2014 (2ha) have survived and the rest has died or not germinated. • Weeding • Mulching as the sun is too strong to prevent evaporation • Will attend meeting in the following week (20 – 24 April 2015) on using pesticides and pest prevention as well as fertilizer application.. • 	<ul style="list-style-type: none"> • Herding, giving water to livestock • Taking the cattle to natural dams • Cattle are at a cattle post 15km away • Dehorning of the calves • Will go to the farm (cattle post) to continue with the dehorning <p>There will be a meeting on the 23 April 2015 at Uukwangula Offices on Small livestock, vaccination,</p>	<ul style="list-style-type: none"> • Watering, weeding, planting • Harvesting wild spinach and drying it to sell. • Water is collected with a bucket from the tap inside the house • She had travelled to Otjiwarongo (photos are available)
<u>Problems and Challenges</u>	<ul style="list-style-type: none"> • Lack of rain causes the crops to die • Worms destroying crops • No problems have been experienced 	<ul style="list-style-type: none"> • Natural dams lack of water due to little rainfall • Lack of food • Lack of grazing area • Supplementary feeder and medicine suppliers are too far and expensive when buying from AGRA Trade in Oshakati • Because of lack of groups benefits cannot be received • No problems are being experienced at this period as the rain has come and the livestock has enough grass 	<ul style="list-style-type: none"> • Lack of labourers • Pests (Amend Crickets) eating the crops • Lack of irrigation system • Lack of gardening skills – need training • Need for shading nets – sun too strong for the plants • Rats eating the tomato seeds • Water is very expensive

Table II-1.4.1 Results of Fixed Point Observation (Oshikoto Region) (3/4)

	Crop Production	Livestock	Horticulture
Farmer's Name	Ms. Secilia Andreas	Mr. Festus Akwaake	Mr. Vaino Vilio
Village Name	<u>King Kauluma</u>	<u>Oshitoshi</u>	<u>Ositi</u>
Telephone	081-338-8701	081-272-1018	081-332-8721
Constituency	(Guinas)	Omuntele	Onankali
ADC	King-Kauluma	Omuntele	Onankali
SAT / AR	Mr. Kanyangela	Mr. Haufiku	Ms. Shileka
Telephone	081-300-1558	081-231-3556	081-474-6549
1 st Visit Date	-	Feb. 20, 2015	Feb. 12, 2015
2 nd Visit Date	-	-	Feb 26, 2015
3 rd Visit Date	Mar. 11, 2015	Mar. 11, 2015	Mar. 11, 2015
4 th Visit Date	Mar, 24, 2015	Mar. 24 2015	Mar. 24, 2015
5 th Visit Date	Apr, 07, 2015	Apr, 07, 2015	Apr. 07 2015
<u>Activities</u> <u>Finding &</u> <u>Observation</u>	<ul style="list-style-type: none"> • Ploughing, weeding, transplanting, re-planting • Land preparation started on the 08 Dec 2014 after the good rains by using cattle, on the 02 Jan 2015 2nd ploughing with the GRN tractor, and on 03 Feb ploughed with cattle before the rain • Have received rain from the 20th March 2015 for about 4 days but still worrying about the crops. • Some crops are gaining life after the rains • Guarding the crops in the field from the birds and livestock • Start weeding the beans she planted 02 April 2015 • No meetings and training has been conducted so far. 	<ul style="list-style-type: none"> • Herding, giving water, Branding, vaccinating • Has attended a training by MEATCO in 24 February, and also attended meetings by Oshikoto Livestock Marketing Farmers' Cooperative. • Water payment contribution of N\$400-550 monthly • Will be taking part in the Auction on the 14 March 2015 at Omuntele to try and sell some of the goats to get money to buy Medicine and Supplementary Feeds. • Continuation of herding and taking the livestock to the water point from the Cattle post since water is becoming an issue • MEATCO organised a meeting in the Omentelle Community Hall on the 24 Feb. 2015 to discuss and advise Marketing and selling topics. • There was an Auction held by Ohangwena Marketing Cooperative and the famer sold 4 Goats at N\$400.00 each and uses the money to buy medicine (Anti bacteria) for the livestock • The GRN/Ministry will do vaccination to livestock next month (May 2015) 	<ul style="list-style-type: none"> • Land preparation, planting, irrigating, manure and fertilizer application • Selling of vegetables, fruits, seedlings and plants • Has introduced new vegetables such as Lettuce, Chinese cabbage, potatoes • Working on the physical structure of the garden to reduce the sun/heat problem by adding some shading. • Transplanting of tomatoe seedlings • Harvesting of green peppers • Apply pesticides • Continue selling to generate income
<u>Problems and</u> <u>Challenges</u>	<ul style="list-style-type: none"> • Millipedes and Crickets eating the crops • Birds eating from the panicles. • Lack of rain • Manure from cattle and goats burn the crops due to too much heat (Sun) 	<ul style="list-style-type: none"> • Supplementary feeder and medicine are too far. If the GRN can provide transport and buy from the suppliers and bring them nearby, then the farmers can buy them • Being left out at important farmers meeting because lack of farmers group formed in the area. 	<ul style="list-style-type: none"> • Pests (Red spider mites, cutworms, termites – applying Neem but not too effective • The sun is too strong, there is a need to buy shading nets • Transport to go and sell is too expensive

	<ul style="list-style-type: none"> • Birds are destroying the effective panicles • Ammol crickets destroying the crops by sucking liquid and eating the grains 	<ul style="list-style-type: none"> • Water shortage due to lack of rain and uses of the community borehole at the cattle post costly. • Water is becoming a big concern at the Cattle Post forcing the farmer to take his livestock to the water point which is close to his household almost every day. • There is one tap shared by 40 households and each household contribute N\$400.00 monthly. • Herders are also asking for higher salaries even though sometime the farmers are not satisfied with the work done. • The Goats are being infected by flies and they need better medication as they become re-infected after mixing with other livestock at the grazing area. • GRN usually take longer to do the vaccination as the AT has many farmers to deal with – Need for ATs to be assisited. 	<ul style="list-style-type: none"> • Garden land is too small • Fertilizers, building materials and planting bags are too expensive to purchase. • Land preparation takes a longer period – there is a need for a hand-held ploughing machine. • Lack of Processing skills • Broken pipe • The newly introduced/planted vegetables such as the Chines cabbage and the potatoes are being affected by termites • The irrigation system required upgrading, currently using tap and pipe and bucket • Vegetables plants and seedlings dying from the heat and too much sun
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Table II-1.4.1 Results of Fixed Point Observation (Ohangwena Region) (4/4)

	Crop Production	Livestock	Horticulture
Farmer's Name	MS. Victoria Mateus	MR. Sakeus H. Ndahangodja	Mr. Johannes Simon Kapokolo
Village Name	Oiyateko	Eendobe	Omakango 5 th
Telephone	081-602-6431	081-148-7739	081-355-6262
Constituency	Ondobe	Okongo	Endola
ADC	Ondobe	Okongo	Endola
SAT / AR	Mr. Shilumba	Mr. Mbaile	Mr. Nickolaus Enjala
Telephone	081-283-0902	081-215-4878	081-246-8194
1 st Visit Date	Feb. 23, 2015	Feb. 25, 2015	Feb. 17, 2015
2 nd Visit Date	Mar. 03, 2015	Mar. 03, 2015	Mar. 03, 2015
3 rd Visit Date	Mar. 17, 2015	Mar. 17, 2015	Mar. 17, 2015
4 th Visit Date	Apr 14 2015	Apr 14 2015	Apr 14 2015
<u>Activities Finding and Observation</u>	<ul style="list-style-type: none"> Land preparation using the Ripper furrow previously used cattle, planting, weeding, thinning, 4ha has been cultivated but only 2ha has crops. Has been trained by Ondombe Farmers Assosiation on 05 Feb and meeting on the 11 March Has been trained on the Ripper Furrow by CRUSRA in 2008-2010 Belongs to Ohangwena Livestock Cooperative Weeding the beans There is no further work to be done in the field since the crops are dying due to lack of rain Had a meeting at council office on the 13 April 2015 for their newly formed Farmers 'Association to elect leaders and committee members. 	<ul style="list-style-type: none"> Dehorning, branding, castrating, giving water to livestock, herding, vaccination Trained by Mr. Niko (AT) on dehorning Water is supplied by the borehole by contributing N\$350.00 monthly to purchase diesel Cattle graze up to Angola due to limited grazing land but are kept at the household. Attended a meeting on the 31 March 2015 organised by MWAf on injection/vaccination, branding and selling of livestock before drought comes and Have branded the calves on the 12 April 2015 with the Region's stamp Looking for a farm between Okongo and Rundu 	<ul style="list-style-type: none"> Gardening on an area of about 1ha Has planted mangoes, Guavas, apples, pawpaw, berries, grapes Water is collected from the natural dams and neighbours taps Uses hand held tools Planting and weeding Sells the fruits to community members Has attended training on Crop production on the 14 Oct by N_CAP (Namibia Conservation Agriculture Project) Cleaning the garden and land preparation Planted Mango and PawPaw on the 12 April 2015 Had a meeting to discuss the needs and problems faced by farmers with the fields and crops but only 6 farmers attended – it was not fruitful Would like to know how to plant cabbage
<u>Problems and Challenges</u>	<ul style="list-style-type: none"> Lack of rainfall Sun is too strong burning the crops Cannot afford labourers Children and Animals destroying the fence 	<ul style="list-style-type: none"> Loosing animals by predators such as hyenas, jackals, wild dogs Lack of communication with the AT – hardly meet – so information if not available 	<ul style="list-style-type: none"> Water for gardening is not available, his application at Rural Water Supply (Namwater) has not been dealt with. Need training on gardening skills

	<ul style="list-style-type: none">• Worms and birds eating seeds and seedlings• Lack of rainfall• Birds eating the crops• The sun/heat too strong• Beans infected by pests	<ul style="list-style-type: none">• Looking for better breeds• Lack of herders currently family members are herding.• There is need for a borehole to be brought nearby.• Rain• Grazing area – thinking of taking the livestock to Rundu for grazing• Need a water Pump	<ul style="list-style-type: none">• Sun is too hot• Water is far and has to be collected by foot with buckets• Birds• Need for shading
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Table II-3.1.1 List of "Spotlight on Agriculture" and Evaluation of Technical Measures to be applied for N-CLIMP (1/7 - 7/7)

Cr: Crop, Ls: Livestock, FM: Farm Management
 A: Candidate technical measures, B: Need further examination, C: out of M/P
 (as of May 2015)

Item No.	Title	Year/Month	Key Wards	Description	Preliminary Evaluation			
					Cr	Ls	FM	Potential Assessment Required for M/P
No. 1	Bush Encroachment: a Thorny Problem	September 1997	Livestock, Rangeland	Decline in carrying capacity (rangeland degradation), Control method: mechanical method, biological control method, herbicides	C	A	C	C
No. 2	Charcoal Production in the Karstvel: Facts to Ponder upon	October 1997	Livestock, Rangeland	Charcoal production of bush encroachment (thorny	C	B	C	C
No. 3	Sanga - the underrated Breed	November 1997	Livestock, cattle	Local cattle breed	C	A	C	C
No. 4	Damara Sheep - a Unique Heritage	January 1998	Livestock, sheep		C	B	C	C
No. 5	Oriental Tobacco: a Cash Crop for Namibia	February 1988	Crop, Cash Crop, Tobacco	1st Trial in 1995/96, 20 tons of dry tobacco in 1997	B	C	C	C
No. 6	Bush Encroachment: Goats a Solution or a Menace	March 1998	Livestock, Rangeland, Goat, SSS/LSU	17 million ha by Bush Encroachment	C	A	B	C
No. 7	Pearl Millet Improvements, Plant Material Description	April 1998	Crop, Cereals, Millet	Varieties: Kangara, Okashan2	A	C	C	C
No. 8	(No Sheet Available)						C	
No. 9	Ondetia, Problematic Cousin of "Vermeerbos"	June 1998	Livestock, Rangeland	Poisonous plants (nitrate poisoning, high concentration in leaves and flowers	C	B	C	C
No. 10	Karakul - Black Diamond	July 1998	Livestock		C	B	C	C
No. 11	Namibian Tree Atlas Project	August 1998	Vegetation		C	C	C	C
No. 12	Rabbits for meat in the Communal Areas?	September 1998	Livestock, Rabbits		C	A	C	C
No. 13	Frame size - the Bigger the Better?	October 1998	Smaller frame is better to utilize grazing land	Smaller body size can accommodate more number in same grazing area. Meat production efficiency per certain area is good for smaller animals.	C	A	C	C
No. 14	Indigenous Animals for Communal Farming? Does it make	November 1998	Livestock Cattle		C	A	C	C
No. 15	Pigs - Is a Pig a Pig?	December 1998	Livestock, Pig		C	A	C	C
No. 16	Namibia - a Watermelon Wonderland	January 1999	Crop, Watermelon	New crops for dry land agriculture, staple diet of subsistence farming community (intercropping with	A	C	C	C
No. 17	Sweet potato, Cutting Produce Additional Food	February 1999	Crop, Sweet Potato	Diversification in crop production, popular in northern Namibia. Complement to pearl millet, maize, rice,	A	C	C	C
No. 18	Grain Legumes in Namibian Agriculture	March 1999	Crop, Legumes	Cowpea (makande), Bambara groundnuts, Groundnut, Pigeonpea, Mungobean	A	C	C	C
No. 19	Helichrysum, A multi-purpose Plant of Major Economic Importance in Namibia	April 1999		National Botanical Research Institute, AntiInflammatory essential oil, Poisoning of Cattle,	B	C	C	C
No. 20	Namibia Challenges "World Date Industry"	May 1999		Date Palm	B	C	C	C
No. 21	Wild Silk, Pest & Opportunity	June 1999		Livestock due to ingestion of cocoons	B	B	C	C
No. 22	Plant Tissue Analysis, an AID for better Crop Production	July 1999		Tissue analysis for planning of fertilizer, nutrient deficiency, disease, irrigation	B	C	C	C
No. 23	Agricultural Laboratory	August 1999		Nutrition Laboratory, Soil Laboratory, Meat laboratory, RadioCisotope Laboratory, Physiology Laboratory	B	B	C	C
No. 24	Why, What, How, and When of Soil Sampling	September 1999			B	C	C	C
No. 25	National Botanic Garden of Namibia	October 1999			C	C	C	C

Item No.	Title	Year/Month	Key Wards	Description	Preliminary Evaluation			
					Cr	Ls	FM	Potential Assessment Required for M/P
No. 26	Indigenous Goats, Communal Farmer's Wealth	November 1999		Indigenous goats play a vital role as a source of a protein and income	C	A	C	C
No. 27	Ducks, a Good Option	December 1999			C	B	C	C
No. 28	Mapping the Soils of Namibia	January 2000			B	B	C	A
No. 29	Vegetable Production, a Growing Business ..., but What about Pests?	February 2000	Integrated Pest Management		B	C	C	C
No. 30	A Sustainable, Integrated Farming System: Generator of Tangible Profits & Provider of Essential nutrients	March 2000			B	A	C	C
No. 31	Community Based Range Management	April 2000	Community mobilization CBRLM project often used these approach	Major Steps: Introduction of the Approach to the Community, Community Organization, Community Mobilization for the Project, Selecting the Land, Project Strategy	C	A	A	C
No. 32	National Plant Genetic Resources Centre - saving our seeds for the future -	May 2000			B	C	C	C
No. 33	Indigenous Pigs, do they have a place?	June 2000	Oshana, Oshikoto, Omusati, Ohangwena		C	A	C	C
No. 34	Farm Database of Namibia	July 2000			B	B	A	A
No. 35	Kalahari Research Station, the Centre for Small Stock Performance and Progeny Testing	August 2000			C	B	C	C
No. 36	National Herbarium (WIND) - our wealth in Plants -	September 2000			C	C	C	C
No. 37	Farm Animal Genetic Resources C Namibia's Livestock	October 2000			C	B	C	C
No. 38	Vegetation Survey of Namibia	November 2000			C	C	C	A
No. 39	Farming Systems: Research & Extension in the Omaheke, Hardap and Karas Regions	December 2000			B	B	C	C
No. 40	Maintain Sweet Potato Planting Materials: Cycles of a Nursery	January 2001	Crop, Sweet Potato, nursery		B	C	B	C
No. 41	Good Land Husbandry Starts Here: Inventorying and Assessing the Land Resources of Namibia	Feb. 2001		Agro-ecological Zoning (AEZ) Program, GIS Data	C	C	C	A
No. 42	Hardap Research Station	Mar. 2001	Crop, Research	Irrigation, cotton, dates, grapes, lucerne, maize, sweet potato, wheat	B	C	C	C
No. 43	Buying Feed Safely	Apr. 2001	Livestock	The Act on Farm Feeds, Fertilizers, Agricultural and Stock Remedies (Act 36 of 1947), registration of	C	B	A	C
No. 44	Gallap-Ost Research Station	May 2001	Livestock, Karakul sheep, Boergoats, horses and cattle	160 camps in 13,734 ha, water supply from 9 boreholes with 70 km pipelines.	C	B	C	C
No. 45	Who buys my produce?	June 2001	Crops, Horticulture, Market (SHEP)	Kavango Horticultural Production and Marketing (KHPM) Project: small scale producers and traders, informal market, formal market, institutional market ⇒	B	C	A	C
No. 46	Saving Our Future, a Red Data list of Plants	July 2001	Red Data		C	C	C	C
No. 47	Rediscovering the Black Diamond, Upgrading of Karakul for the Commercial Farmers of Southern Namibia	Aug. 2001	Livestock	Karkul sheep in commercial and communal sector	C	A	C	C
No. 48	NAMSOTER: a Soil and Terrain Database and Geographical Information System for Namibia	Sept. 2001	Land resources, soil, terrain	Agro-ecological Zoning (AEZ) Program, GIS Data	C	C	C	B
No. 49	Demo Camps for Pasture Survey in the Southern Communal Area	Oct. 2001	Pasture management	Commercial farming management, Range in Hardap Region of the South Namibia	C	B	C	C

Item No.	Title	Year/Month	Key Wards	Description	Preliminary Evaluation			
					Cr	LS	FM	Potential Assessment Required for M/P
No. 50	Seed if Life	Nov. 2001	Crop, Certified Seed		B	C	C	C
No. 51	Soil fertility Management for Sustained Crop Production	Jan. 2002	Nutrient balance in soils, Soil fertility improvement	Soil nutrient loss under continuous cultivation, an appropriate nutrient management strategy on organic inputs and nutrient recycling. BiologicalCNitrogen	B	C	C	C
No. 52	Feed Microscope	Feb. 2002	Livestock, Camel	Feed Microscopy, reliable mentor of feed analysis to determine quality and/or quality of raw materials	C	B	C	C
No. 53	Why not Camels?	Mar. 2002	Livestock, Camel		C	B	C	C
No. 54	Sandveld Research station	Apr. 2002	Livestock, Sanga cattle, Crop, Tobacco	Sanga cattle from Caprivi Region, Simmentaler-Afrikaner crossbred cattle	C	A	C	C
No. 55	Drought versus Aridity	May 2002	Climate		C	B	C	C
No. 56	Old Vegetation data Source in Namibia: Possible for Long-term Monitoring	June 2002	Vegetation cover change		C	C	C	C
No. 57	Weirs: Experience in Southern Namibia	July 2002	Range Land, Soil Erosion	Top Soil Loss in the Hardap and Karas Regions, slowing down of water run-off by weir made from tvres. stones. old fencing material. old car wrecks.	B	B	C	C
No. 58	Sanga: One Breed or Many?	Aug. 2002	Livestock, Cattle, Sanga		C	A	C	C
No. 59	Developing a tailor-made Rangeland Management Plan for Sustainable Live Production	Sept. 2002	Livestock, Rangeland management		C	A	A	C
No. 60	Home-made Multi-nutrient Blocks for Improved Ruminant Performance in the Communal Area	Oct. 2002	Livestock, North Central Regions, commercial blocks		C	A	C	C
No. 61	Cereal-Legume Intercropping	Nov. 2002	Crop, Intercropping of Millet and Cowpea	Nitrogen Fixation, Cowpea high density, Phosphorus application	A	A	C	C
No. 62	Trachyandra laxa (Rolbos): a Poisonous Plant of Namibia	Dec. 2002	Livestock, Rangeland management		C	B	C	C
No. 63	El Nino and its effect on Namibia	Jan. 2003	Climate		C	C	C	C
No. 64	Management of Inorganic Fertilizers for Cotton	Feb. 2003	Crop, Cotton, Mineral Deficiency (NPK)		C	C	C	C
No. 65	Characteristics of Namibian Soils in a Nutshell	Mar. 2003	Soils Property		A	C	C	A
No. 66	Influence of Stocking Rate on the Glass Layer of the Camel Thorn Savanna	Apr. 2003	Livestock, Glass Yield, Stocking rate		C	A	C	C
No. 67	(No Sheet Available)							
No. 68	Camels can offer some solutions	June 2003	Livestock, Camel	Camel as the Possible Solution to Farmer Constraint in the Northern Namibia: bush encroachment, overgrazing, desertification, land degradation, lack of draught animal milk	C	C	C	C
No. 69	Cowpea: the Africa Beans	July 2003	Crop, Cowpea, Recommendation of	Effect of Cowpea Cultivation, Uptake, Dishes	A	C	C	C
No. 70	The Influence of Stocking Rate on the Grass Yield in the Camel Thorn Savanna	Aug. 2003	Livestock, Glass Yield, Stocking rate		C	B	C	C
No. 71	Grass Yield in the Camel Thorn Savanna: Rainfall vs. Stocking Rate	Sept. 2003	Livestock, Glass Yield, Stocking rate		C	B	C	C
No. 72	Grazing Capacity in the Sandveld Camel Thorn Savanna of	Oct. 2003	Livestock, Grazing Capacity		C	B	C	C

Item No.	Title	Year/Month	Key Wards	Description	Preliminary Evaluation			
					Cr	LS	FM	Potential Assessment Required for M/P
No. 73	Influence of Degree of Defoliation on the Grazing Capacity in the Camel Thoirn Savanna	Nov. 2003	Livestock, Grazing Capacity		C	B	C	C
No. 74	Influence of stocking Rate on the Distribution of Individual Grass Species in the Sward	Dec. 2004	Livestock, Grazing Capacity		C	B	C	C
No. 75	Assisting Upcoming Commercial Farmers in the Hardap Region	Jan. 2005	Livestock, Commercial Farmers, Financial	Income and Expense Record, Cash Flow Budget	C	C	A	C
No. 76	Influence of Stocking Rate on the Utilization of Individual Grass Species in the Sward	Feb. 2004	Livestock, Grazing Capacity		C	B	C	C
No. 77	Different Methods to Control Dichapetalum cymosum (Gifblaar)	Mar. 2004	Livestock, Control of Poisonous Glass		C	B	C	C
No. 78	Implementation of a Fodder Bank Grazing System in the Camel Thorn Savanna	Apr. 2004	Most basic approach to determine stocking rate	Determine stocking rate	C	A	C	C
No. 79	Hoodia	May 2004	Cactus	Succulent	C	C	C	C
No. 80	Is Global Warming a Reality?	June 2004	Climate	Namibia' effect	C	C	C	C
No. 81	Involvement of Plant Pathogenic Fungi in the Natural Dieback of Blackthorn in Namibia: Part 1	July 2004			C	C	C	C
No. 82	Involvement of Plant Pathogenic Fungi in the Natural Dieback of Blackthorn in Namibia: Part 2	Aug. 2004			C	C	C	C
No. 83	Involvement of Plant Pathogenic Fungi in the Natural Dieback of Blackthorn in Namibia: Part 3	Sept. 2004			C	C	C	C
No. 84	Involvement of Plant Pathogenic Fungi in the Natural Dieback of Blackthorn in Namibia: Part 4	Oct. 2004			C	C	C	C
No. 85	Involvement of Plant Pathogenic Fungi in the Natural Dieback of Blackthorn in Namibia: Part 5	Nov. 2004			B	C	C	C
No. 86	Involvement of Plant Pathogenic Fungi in the Natural Dieback of Blackthorn in Namibia: Part 6	Dec. 2004			C	C	C	C
No. 87	Earthworms C Nature's Tiny Humus Factories	January 2005	Soil Fertility	"the Smallest Horticulturists", "Types of Earthworms", "Worm Casts, or Vermicompost", "Worm Tea", "An Earthworm Farm"	A	C	C	C
No. 88	Introducing the Agricultural Scientific Society of Namibia	February 2005	Agricultural Scientific Society of Namibia (AGRISSON)	Mission & Objective, Congresses, Excursions, Seminars, Awards, Services to Members, Membership, Executive Committee	B	C	C	C
No. 89	Important Plant Areas in Namibia	March 2005	Conservation on Biological Diversity		C	C	C	C
No. 90	Dichapetalum cymosum (Poison-Leaf / Gifblaar): A Never-ending Problem	April 2005	Poisonous Plant to Livestock		C	B	C	C
No. 91	Herbicidal Control of Poison Leaf / Gifblaar: Dichapetalum cymosum	May 2005	Poisonous Plant to Livestock		C	B	C	C
No. 92	Manual Eradication of Poison-Leaf / Gifblaar: Dichapetalum cymosum	June 2005	Poisonous Plant to Livestock	Uprooting, Digging the main stem,	C	B	C	C
No. 93	Reducing Livestock Mortality From Poison-Leaf (Gifblar)	July 2005	Poisonous Plant to Livestock		C	B	C	C

Item No.	Title	Year/Month	Key Wards	Description	Preliminary Evaluation			
					Cr	LS	FM	Potential Assessment Required for M/P
No. 94	Potential of Traditional Green Leafy Vegetables C Cultivation Trials	August 2005	Crop, Vegetables	indigenous vegetables for home use, farming practices of TGLV	B	C	C	C
No. 95	Potential of Traditional Green Leafy Vegetables C Processing Potential	September 2005	Crop, Vegetables	Recommended practices for processing: 1st deep-freezing, 2nd drying	B	C	C	C
No. 96	Potential of Traditional Green Leafy Vegetables C Economic Options	October 2005	Crop, Vegetables	Economic value of traditional leafy vegetables	B	C	C	C
No. 97	Vegetation of the Mile 46 Livestock Development Centre and Surrounding Area	November 2005	Vegetation cover in LDC Kavango		C	B	C	C
No. 98	Preliminary Notes on the Biomas Production of Petelidium Linforlium (Lusermbos) on the Swartrant	December 2005	Livestock, Forage Plant	Important and valuable forage plant in the southern Namibia	C	B	C	C
No. 99	Using Remote Sensing in Search of Grazing Capacity	January 2006	Livestock, Grazing Capacity	Remote Sensing	C	B	C	B
No. 100	An Accurate Grazing Capacity Map for Namibia - Myth or	February 2006	Livestock, Grazing Capacity	Carring capacity, ha per LSU, ha per SSU	C	B	C	B
No. 101	Edible Herbs of Namibia, Common Species of Central	March 2006	Herbs		B	C	C	C
No. 102	Saving Our Succulent Plant Diversity, A National Survey of Adenia pechuelii and Lithops ruschiorum	April 2006		Global Strategy for Plant Conservation (GSPC), under the Convention on Biological Diversity (CBD).	C	C	C	C
No. 103	(No Sheet Available)							
No. 104	Lucerne (Medicago sativa L)	February 2008	Livestock, Feed, Alfalfa	Nutrient characteristics, Growth requirement, Land Preparation, Fertilizers, Weeds, Planting of Lucerne	C	A	C	C
No. 105	Urea Poisoning	March 2008	Livestock		C	B	C	C
No. 106	Inorganic Fertilizers Versus Organic Amendments in a Symmer Maize, Winter Wheat Rotation	April 2008	Crop, Maize & Wheat	Summer Maize C Winter Wheat Rotation, Application Practice (Irrigation Scheme?).	B	C	C	C
No. 107	Using Remote Sensing in Search of Grazing Capacity - an Update from 2007	May 2008	Livestock, Grazing Capacity		C	B	C	B
No. 108	Rural Water Supply in Namibia: Effects on natural Resource Management and Livelyhoods	June 2008	Rural Water Supply	Rural Water Supply Reform: (1) maximum involvement of users, (2) delegation of responsibility to lowest possible level, (3) an environmentally sound utilization of water resources.	B	B	B	C
No. 109	Restoration of a Gully System in a Key Upland Fertile Valley	July 2008	Degradation of Land (Rangeland)	Methods: putting filters made of braches cut for trapping sediments	B	B	C	C
No. 110	Nutrient Hotspots from Patch Burning on Rangeland	August 2008		Patch burning, increase nutrient	B	B	C	C
No. 111	Survey to Determine Botanical Composition of the Vegetation at Ashaamber Livestock Development Centre (Omusati region)	September 2008	Vegetation in Livestock Development Centre		C	C	C	C
No. 112	Effects of Grazing-Induced Shrub Encroachment on Animal Diversity in Southern Kalahari Rangeland	October 2008	Kalahari Rangeland		C	B	C	C
No. 113	Using Remote Sensing in Search of Grazing Capacity - the Saga Continues	November 2009	Grazing Capacity		C	B	C	B
No. 114	Impact of Shrub Encroachment on Animal Diversity (Bird, Reptiles, Mammals) in Namibian Savanna Rangelands	December 2009	Savannan Degradation due to Heavy Grazing, inducing shrub encroachment	Negative affect on economic value of rangeland	C	B	C	C
No. 115	Traditional Uses of Selected Members of the Apocynaceae Family in Namibia	January 2010	Herbs		C	C	C	C
No. 116	Development of Gellapper Sheep Breed at GellapCOst Research Station	February 2010	Livestock, Sheep Breed	Damara ram, Gellapper breed, 45 Dropper	C	B	C	C

Item No.	Title	Year/Month	Key Wards	Description	Preliminary Evaluation			
					Cr	LS	FM	Potential Assessment Required for M/P
No. 117	(No Sheet Available)							
No. 118	(No Sheet Available)							
No. 119	(No Sheet Available)							
No. 120	Using Remote Sensing in Search of Grazing Capacity - Short Note on the Final Data	June 2010	Grazing Capacity		C	B	C	B
No. 121	Grazing Plant Observations on the Swartrand: February 2006 to November 2008	July 2010	Grazing Capacity in the southern Namibia	Grazing Capacity and Rangeland condition measured according to the 7 plant factors: 1. available forage, 2. Total Digestible Nutrients (TDN), 3. canopy cover, 4. Potassium, 5. Calcium, 6. Magnesium and 7. Fat of grass and dwarf shrub species	C	B	C	C
No. 122	Notes on the Palatability of the two most dominant Forage Plants on the Swartrand, Stipagrostis uniplumis (Blinkaarboesman grass) and Petalidium linifolium (Lusernbo) for the period February 2006 to November 2008	August 2010	Palatability	Selection according to the contents of crude protein and crude fibre	C	B	C	C
No. 123	Dry Material (DM) Contribution of Some Selected Dwarf Shrubs on the Swartrand Area of Southern Namibia's Dwarf Shrub Svanna	September 2010	Grazing Capacity to be determined by the Quadrats (quantitative yield method)		C	B	C	C
No. 124	Notes on the Digestibility of the two most dominant Forage Plants on the Swartrand, Stipagrostis uniplumis (Blinka(h)arboesman grass) and Petalidium linifolium (Lusernbo) for the period February 2006 to November 2008	April 2012	Digestibility		C	A	C	C
No. 125	Characterization of the Dairy Production Systems Practiced by Livestock Keepers in the Omuthiya, Guinas and Ovitoto Constituencies of Namibia	May 2012	Mixed crop-livestock system in , livestock farming only	Dairy Production System, Breeding Season, Milk Production, Milk Processing Technology, Dairy Marketing	C	A	B	C
No. 126	Milk Quality and Public Health at the Informal Markets in the Omuthiya, Guinas and Ovitoto Constituencies of Namibia	June 2012	Hygiene and safety of dairy products	Milk Composition and Quality, Milking and Handling, Microbiological Quality Assessment, Conclusion, Recommendation ⇒SHEP?	C	B	C	C
No. 127	Dry Material (DM) Contribution of Some Selected Dwarf Shrubs on the Kalk Plateau Area of Southern Namibia's Mixed Dwarf Shrub Svanna from July 2009 to April 2012	July 2012	Grazing Capacity to be determined by the Quadrats (quantitative yield method)		C	B	C	C
No. 128	Notes on the Distribution of Rhigozum Trichotomum and other Encroaching Species over the South-East Namibia	September 2012	Bush Encroachment in the South-East Namibia		C	B	C	C
No. 129	Fodder Bank Grazing System in the Camelthorn Savanna at Sandveld Research Station: Changes in Dry Matter Production	October 2013	Fodder Bank Grazing Management	2/3 is being utilized, 1/3 is rested for a full growing season.	C	A	B	C

Item No.	Title	Year/Month	Key Words	Description	Preliminary Evaluation			
					Cr	Ls	FM	Potential Assessment Required for M/P
No. 130	Fodder Bank Grazing Management System in the Camelthorn Savanna at Sandveld Research Station: Change in Botanical Composition, Part 1	November 2013	Grazing	Resting, rainfall and correct stocking rates are the most important factors needed for the improvement of DM production and botanical composition of veld (arid pasture).	C	A	B	C
No. 131	Fodder Bank Grazing Management System in the Camelthorn Savanna at Sandveld Research Station: Change in Botanical Composition, Part 2	November 2013	Grazing		C	A	B	C
A					8	25	6	5
B					29	51	7	6
Subtotal					37	76	13	11

Source: Prepared by JICA Study Team based on MAWF, Spotlight on Agriculture

Table II-3.5.1 Categorization of Proposed Technical Measures for Crop Production, Livestock Production and Farm Management

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

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

Table II-5.4.1 List of ADCs and Staffs in 4 Regions

as of end March, 2017

Region (Sub-Division)	ADC List	Constituency	Staffs
Ohangwena			CASO: Ms. Margaret M. Matengu SASO: Vacant ASO: Ms. Johanna Amakali CAT: Mr. Immanuel Eelu CAT: Ms. Marina Kaambu
	1 Eenhana	Eenhana-North, South	SAT: Ms. Hambeleleni Nghipunya SAT: Ms. Helaria Mhanda SAT:
	2 Omafo	Engela, Ohangwena, Oshikango	SAT: Mr. Elikias Iyambo AT: Vacant SAT: Ms. Evelina Shuuluka
	3 Omauni	Okongo	SAT: Ms. Justah Nalushiya
	4 Okongo	Okongo	SAT: Mr. Paulus Mbaile
	5 Epembe	Epembe	SAT: Mr. Bruce Kasaona
	6 Omundaungilo	Omundaun-gilo	SAT: (Mr. Immanuel Eelu) Vacant
	7 Ongula Ya Netanga	Omulonga	SAT: Vacant represented by Mr. William Haishonga
	8 Ondobe	Ondobe	AT: Mr. Henry Shilumba
	9 Endola	Endola	AT: Mr. Nickolaus Endjala
	10 Ongenga	Ongenga	SAT: Vacant
	11 Ongha	Endola	Mr. Festus Nembia
12 Oshikunde	Epembe	Vacant	
Omusati			CASO: Mr. Martin Embuudile ASO: Ms. Anna Shivute CAT: Mr. Sylvanus Naunyango
	1 Outapi	Outapi,	AT: Ms. Aina Uusiku AT: Ms. Lina Aiyambo
	2 Okahao	Okahao	AT: Ms. Rachel Anguwo AT: Ms. Julia Shigwedha AT: Ms. Festus Iipumbu
	3 Onkani	Otamanzi	AT: Ms. Loide Shipateko
	4 Tsandi	Tsandi	AT: Ms. Monika Moses
	5 Onesi	Onesi	AET Ms. Agnes Akwenye
	6 Eunda	Onesi	AT: Vacant
	7 Iipanda (Ogongo)	Ogongo	AT: Vacant
	8 Oshikuku	Oshikuku	AT: Ms. Ottilie Nawa
	9 Onaanda	Elim	AT: Mr. Andreas Iipinge
	10 Etayi	Etayi	AT: Ms. Mirjam Fikunawa
	11 Okalongo	Okalongo	AT: Ms. Kaunapawa Shapenga
	12 Oshifo (Ruacana)	Ruacana	AT: Mr. Pombili Sheehama
	13 Etunda	Ruacana	AT: Ms. Lydia Sakeus ASO: Mr. Toivo Shivule AT: Ms. Lucia Naunyango
	14 Onawa	Anamulenge	AT: Mr. Erkki Shitowomunhu
15 Omakange	Ruacana	(vacant)	
Oshana			CASO: Ms. Mvoya Nakaande, Acting CASO CAT: Ms. Loide Endjala ASO: Mr. Charlie Mwaetako ASO: Ms. Vicky N. Iipinge
	1 Ompundja	Oshakati East	AT: Ms. Tuyenkelago Shitenda
	2 Uukwangula	Okatana	AT: Ms. Prucheria Mwanyangapo
	3 Okau-Kamasheshe	Oshakati West	SAT: Mr. Agast Amon
	4 Engombe	Uuvudhiya	SAT: Ms. Taimi Nambambi
	5 Enguwantale	Ompundja	SAT: Ms. Magdalena Haludilu
	6 Ongwediva	Ongwediva	SAT: Ms. Lucia Ipinge
	7 Uukwiyu-Uushona	Uukwiyu-Uushona	SAT: Ms. Kaarina Nghilwamo
	8 Okaku	Okaku	SAT: (vacant) AT: Ms. Elise Hasholo
	9 Okatyali	Okatyali	SAT: Ms. Anna Amwaalwa
	10 Ondangwa	Ondangwa	SAT: Ms. Klaudia Magano Mathias
Oshikoto			CASO: Mr. Oswald Mwanyangapo ASO: Ms. Benita Elago CAT: Ms. Lucia Shimi
	1 Onankali	Onyaanya	SAT: Ms. Hambelelni Shileka ASO Isaac Nghaamwa SAT: Ms. Veronika Nghishidimbwa
	2 Onayena	Onayena	SAT: Ms. Hilja Nghipangelwa AT: Ms. Ester Namushinga AT: Mr. Hosea Salomon
	3 Tsumeb	Tsumeb	ASO Mr. Lukas Kaholongongo: SAT: Under advertisement AT: Mr. Naholo Elias
	4 Onyuulaye	Okankolo	SAT: under Advertisement AT: Mr. Salmon Hosea
	5 Okapya	Guinas	AT: Mr. Sergius Kanyangela
	6 Oshigambo	Oniipa	SAT: Mr. Nuuyoma Erastus
	7 Omuntele	Omuntele	AT: Mr. George Haulfiku
	8 Okashana	Omuthiya-qwiipundi	AT: Mr. Wilhelm Kashimba
	9 Olukonda	Olukonda	SAT: Ms. Patricia Sheehama
	10 Onamishu	Eengodi	AT: Mr. Moscow Neo
	11 King Kauluma	-	AT: Mr. Sergius Kanyangela
12 Olukupa	Nehale IyaMpingana	AT: Mr. Joseph Jonas	

Table II-5.5.1 Number of Focal Pilot Sites and Cost Estimate of Master Plan Implementation for Crop and Livestock Development through N-CLIMP (2/3)

Unit: Number

No.	Techniques and Technical Measures	Period required for Verification	Category	Unit Cost (N\$)		Number of Pilot Sites, in which technical verification and dissemination are carried out													
				Development Cost	Operational Cost	Short Term	Medium Term						Long Term						
						2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030
1	Techniques and Technical Measures Verification and Dissemination																		
	Crop Production																		
CR-1	Fertilizer application	5 years	1, 2 to 3	1,000	2,000	4	4	4	4	4	4	4	8	8	8	8	8	8	8
CR-2	Cropping pattern	2 years	1, 2 to 3	1,000	2,000	4	4	8	8	8	8	8	8	8	8	8	8	8	8
CR-3	Conservation agriculture	3 years	1, 2 to 3	3,000	6,000	4	4	4	4	4	4	4	4	4	4	4	4	4	4
CR-4	Flood- and drought- adaptive cropping system (Rice-Mahanau mixed cropping)	2 years	1, 2 to 3	2,000	5,000	1	2	2	2	2	2	2	2	2	2	2	2	2	2
CR-5	Water source / water harvesting	2 years	1, 2 to 3	50,000	50,000		1	1	1	1	1	1	1	1	1	1	1	1	1
CR-6	Water saving cultivation	3 years	1, 2 to 3	5,000	10,000	4	4	2	2	2	2	2	2	2	2	2	2	2	2
CR-7	Crop selection and marketing	3 years	1, 2 to 3	1,000	3,000	4	2	2	2	2	2	2	2	2	2	2	2	2	2
CR-8	Cropping plan and horticulture crop management	3 years	1, 2 to 3	1,000	3,000	4	2	2	2	2	2	2	2	2	2	2	2	2	2
CR-9	Establishment of crop production and marketing cooperatives	3 years	3	100,000	100,000								4	1	1	1	1	1	1
	Livestock Production																		
LS-1	Fodder production	3 years	1	2,000	6,000	4	4	4	4	4	4	4	4	4	4	4	4	4	4
LS-2	Range management	5 years	1, 2 to 3	20,000	60,000	4	4	4	4	4	4	4	4	4	4	4	4	4	4
LS-3	Water harvesting and/or construction of water resource facilities for animals	3 years	1	50,000	50,000		1	1	1	1	1	1	1	1	1	1	1	1	1
LS-4	Nutritious feed supply particularly for pig and	3 years	1	2,000	4,000	4	4	4	4	4	4	4	4	4	4	4	4	4	4
LS-5	Disease control	3 years	1	2,000	4,000	4	4	4	4	4	4	4	4	4	4	4	4	4	4
LS-6	Large and small stock fattening	3 years	1	2,000	4,000	4	4	4	4	4	4	4	4	4	4	4	4	4	4
LS-7	Periodical production	3 years	1	1,000	3,000	4	4	4	4	4	4	4	4	4	4	4	4	4	4
LS-8	Expansion of quality meat	5 years	2 to 3	75,000	120,000		2	2	2	2	2	2	2	2	2	2	2	2	2
LS-9	Bull scheme	5 years	2 to 3	100,000	120,000		2	2	2	2	2	2	2	2	2	2	2	2	2
LS-10	Multiplication of Sanga bull	5 years	2 to 3	100,000	120,000		2	2	2	2	2	2	2	2	2	2	2	2	2
LS-11	Goat production	3 years	1	50,000	120,000	1	2	2	2	2	2	2	2	2	2	2	2	2	2
LS-12	Pig production	3 years	2	200,000	120,000		2	2	2	4	4	4	4	4	4	4	4	4	4
LS-13	Chicken production	1 years	1	20,000	60,000	3	3	3	3	3	4	4	4	4	4	4	4	4	4
LS-14	Promotion and strengthening of Auction for both large and small stocks	3 years	2	150,000	150,000		4	1	1	1	1	1	1	1	1	1	1	1	1
LS-15	Development of formal market for small stock	5 years	2	150,000	150,000		4	1	1	1	1	2	3	4	5	6	7	8	9
LS-16	Establishment and strengthening livestock cooperatives	3 years	1,2to3	150,000	150,000		4	1	1	1	1	1	1	1	1	1			
	Farm Management																		
FM-1	Household accounting management	-	2	1,000	2,000			8	8	8	8								
FM-2	Book keeping (Farm Record)	-	1	1,000	2,000	16		8	8	8	8								
FM-3	Post Harvest	-	1,2 to 3	1,000	2,000			8	8	8	8								
FM-4	Business plan	-	2	1,000	2,000			8	8	8	8								
FM-5	Group formation/ group strengthening	-	1	1,000	2,000	2		8	8	8	8								
FM-6	Group accounting management	-	1	1,000	2,000	16		8	8	8	8								
FM-7	Formulation of Water Users Association	-	1	1,000	2,000			8	8	8	8								
FM-8	Collective Selling / Purchasing	-	1	1,000	2,000			8	8	8	8								
FM-9	Rural finance accessibility improvement	-	1	1,000	2,000			8	8	8	8								
FM-10	Market information access improvement	-	1	1,000	2,000	4		8	8	8	8								
	Subtotal of 1 (=A)					-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Term-wise Total of 1																		
2	Monitoring (=B=Ax10%)																		
	Term-wise Total of 2																		
3	Miscellaneous Cost (=C=Ax5%)	0.05																	
	Term-wise Total of 3																		
	Total (=A+B+C)					-	-	-	-	-	-	-	-	-	-	-	-	-	-

- Note:
- (1) Category 1: Techniques and technical measures to be verified in short term
 - Category 2: Techniques and technical measures to be verified in medium term
 - Category 3: Techniques and technical measures to be verified in long term
 - (2) Verification period for proposed techniques and technical measures

Source: Prepared by JICA Study Team

Table II-5.5.1 Number of Focal Pilot Sites and Cost Estimate of Master Plan Implementation for Crop and Livestock Development through N-CLIMP (3/3)

Unit: N\$

No.	Techniques and Technical Measures	Period required for Verification	Category	Unit Cost (N\$)		Estimated Cost													
				Development Cost	Operational Cost	Short Term	Medium Term					Long Term							
						2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030
1	Techniques and Technical Measures Verification and Dissemination																		
Crop Production																			
CR-1	Fertilizer application	5 years	1, 2 to 3	1,000	2,000	3,000	12,000	12,000	12,000	12,000	12,000	12,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
CR-2	Cropping pattern	2 years	1, 2 to 3	1,000	2,000	3,000	12,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
CR-3	Conservation agriculture	3 years	1, 2 to 3	3,000	6,000	9,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000
CR-4	Flood- and drought- adaptive cropping system (Rice-Mahangu mixed cropping)	2 years	1, 2 to 3	2,000	5,000	1,750	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000	14,000
CR-5	Water source / water harvesting	2 years	1, 2 to 3	50,000	50,000		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
CR-6	Water saving cultivation	3 years	1, 2 to 3	5,000	10,000	15,000	60,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
CR-7	Crop selection and marketing	3 years	1, 2 to 3	1,000	3,000	4,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
CR-8	Cropping plan and horticulture crop management	3 years	1, 2 to 3	1,000	3,000	4,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
CR-9	Establishment of crop production and marketing cooperatives	3 years	3	100,000	100,000								800,000	200,000	200,000	200,000	200,000	200,000	200,000
Livestock Production																			
LS-1	Fodder production	3 years	1	2,000	6,000	8,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000	32,000
LS-2	Range management	5 years	1, 2 to 3	20,000	60,000	80,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000
LS-3	Water harvesting and/or construction of water resource facilities for animals	3 years	1	50,000	50,000		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
LS-4	Nutritious feed supply particularly for pig and	3 years	1	2,000	4,000	6,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
LS-5	Disease control	3 years	1	2,000	4,000	6,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
LS-6	Large and small stock fattening	3 years	1	2,000	4,000	6,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000	24,000
LS-7	Periodical production	3 years	1	1,000	3,000	4,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
LS-8	Expansion of quality meat	5 years	2 to 3	75,000	120,000		390,000	390,000	390,000	390,000	390,000	390,000	390,000	390,000	390,000	390,000	390,000	390,000	390,000
LS-9	Bull scheme	5 years	2 to 3	100,000	120,000		440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000
LS-10	Multiplication of Sanga bull	5 years	2 to 3	100,000	120,000		440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000	440,000
LS-11	Goat production	3 years	1	50,000	120,000	85,000	340,000	340,000	340,000	340,000	340,000	340,000	340,000	340,000	340,000	340,000	340,000	340,000	340,000
LS-12	Pig production	3 years	2	200,000	120,000		640,000	640,000	640,000	1,280,000	1,280,000	1,280,000	1,280,000	1,280,000	1,280,000	1,280,000	1,280,000	1,280,000	1,280,000
LS-13	Chicken production	1 years	1	20,000	60,000	80,000	240,000	240,000	240,000	240,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000
LS-14	Promotion and strengthening of Auction for both large and small stocks	3 years	2	150,000	150,000		1,200,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
LS-15	Development of formal market for small stock	5 years	2	150,000	150,000		1,200,000	300,000	300,000	300,000	300,000	600,000	900,000	1,200,000	1,500,000	1,800,000	2,100,000	2,400,000	2,700,000
LS-16	Establishment and strengthening livestock cooperatives	3 years	1,2to3	150,000	150,000		1,200,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000		
Farm Management																			
FM-1	Household accounting management	-	2	1,000	2,000		24,000	24,000	24,000	24,000									
FM-2	Book keeping (Farm Record)	-	1	1,000	2,000		24,000	24,000	24,000	24,000									
FM-3	Post Harvest	-	1,2 to 3	1,000	2,000		24,000	24,000	24,000	24,000									
FM-4	Business plan	-	2	1,000	2,000		24,000	24,000	24,000	24,000									
FM-5	Group formation/ group strengthening	-	1	1,000	2,000		24,000	24,000	24,000	24,000									
FM-6	Group accounting management	-	1	1,000	2,000		24,000	24,000	24,000	24,000									
FM-7	Formulation of Water Users Association	-	1	1,000	2,000		24,000	24,000	24,000	24,000									
FM-8	Collective Selling / Purchasing	-	1	1,000	2,000		24,000	24,000	24,000	24,000									
FM-9	Rural finance accessibility improvement	-	1	1,000	2,000		24,000	24,000	24,000	24,000									
FM-10	Market information access improvement	-	1	1,000	2,000		24,000	24,000	24,000	24,000									
	Subtotal of 1 (=A)					314,750	7,120,000	4,402,000	4,402,000	5,042,000	4,882,000	5,182,000	6,294,000	5,994,000	6,294,000	6,594,000	6,594,000	6,894,000	7,194,000
	Term-wise Total of 1					314,750			31,030,000						45,858,000				
2	Monitoring (=B=Ax10%)					31,475	712,000	440,200	440,200	504,200	488,200	518,200	629,400	599,400	629,400	659,400	659,400	689,400	719,400
	Term-wise Total of 2					31,475			3,103,000						4,585,800				
3	Miscellaneous Cost (=C=Ax5%)	0.05				15,738	356,000	220,100	220,100	252,100	244,100	259,100	314,700	299,700	314,700	329,700	329,700	344,700	359,700
	Term-wise Total of 3					15,738			1,551,500						2,292,900				
	Total (=A+B+C)					361,963	8,188,000	5,062,300	5,062,300	5,798,300	5,614,300	5,959,300	7,238,100	6,893,100	7,238,100	7,583,100	7,583,100	7,928,100	8,273,100
						361,963			35,684,500						52,736,700				

Note:

- (1) Category 1: Techniques and technical measures to be verified in short term
Category 2: Techniques and technical measures to be verified in medium term
Category 3: Techniques and technical measures to be verified in long term
- (2) Verification period for proposed techniques and tec

Grand Total	88,783,163
Annual Average	5,918,878
First 5 years	24,472,863

Source: Prepared by JICA Study Team

Figure

N-CLIMP

Figure I-5.1.1 Organization of MAWF

Directorate of Agricultural Production, Extension & Engineering Services [DAPEES]				
Director:	Agriculture Project Support	Administrative Support		
Division of APEES North-Eastern Region (DAPEES NER, Rundu)				
Division of APEES Central North-Western Region (DAPEES CNWR, Windhoek)				
Division	Sub-Division	Section	Sub-Section	
Division of APEES North-Central Region (DAPEES NCR, Oshakati)			64 ADCs	
Deputy Director	Agricultural Production, Extension & Engineering Services (Omusati Region) Chief Agricultural Scientific Officer	Plant/Crop Production Advisory Services	21 ADCs	
		Livestock & Land Use Advisory Services		
		Omusati South		8 ADCs
		Omusati West		6 ADCs
		Omusati East		7 ADCs
		Maintenance / Pest Control Plant Disease Surveillance		
	Agricultural Production, Extension & Engineering Services (Ohangwena Region) Chief Agricultural Scientific Officer	Plant / Crop Production Advisory Services	13 ADCs	
		Livestock & Land Use Advisory Services		
		Ohangwena East		5 ADCs
		Ohangwena West		8 ADCs
	Agricultural Production, Extension & Engineering Services (Oshana Region) Chief Agricultural Scientific Officer	Maintenance / Pest Control	14 ADCs	
		Plant Identification Traceability & Quarantine (Oshikango)		
		Plant / Crop Production Advisory Services		
	Agricultural Production, Extension & Engineering Services (Oshana Region)	Livestock & Land Use Advisory Services	14 ADCs	
		Oshana South		6 ADCs
		Oshana East		8 ADCs
Agricultural Production, Extension & Engineering Services (Oshikoto Region) Chief Agricultural Scientific Officer	Maintenance / Pest Control	16 ADCs		
	Plant / Crop Production Advisory Services			
	Livestock & Land Use Advisory Services			
	Oshana West		7 ADCs	
	Oshana East	9 ADCs		
	Maintenance / Pest Control			
Division of APEES Southern-Eastern Region (DAPEES SER, Mariental)				
Division of Plant Health				
	Agricultural Inputs	Pesticides & Fertilizer		
		Animal Feeds		
	Plant Health Control	Plant Diagnostics, Identification, Traceability & Quarantine		
		Plant Disease Epidemiology		
		Sanitary, Phytosanitary Advisory & Technical Services		
Division of Agricultural Engineering Services				
	Infrastructure, Soil Conservation and Irrigation			
	Energy Mechanization Technology & Agro-Industries			
	Project Design, Development & Management	Northwest & South North Central & North East		

Directorate of Agricultural Research & Development [DARD]

Director: Mr. S. N. A. Ipinge

Administrative Support

Division	Sub-Division	Section	Sub-Section	
<u>Division of Livestock Research & Production</u>				
Deputy Director	Livestock Development Schemes			
	Pasture Science Research			
	Large Stock Research	Sandveld Livestock Development Center		
		Alex Muranda Livestock Development Center		
		Sachinga Livestock Development Center		
Oshaambelo Livestock Development Center (Omusati)				
Okapya Livestock Development Center (Omusati)				
Sonop Research Station				
John Alfons Pandeni Research Station				
Omatjene Research Station				
Small Stock Research				
Gellap Ost Livestock Development Center				
Kalahari Research Station				

Division	Sub-Division	Section	Sub-Section
<u>Division of Crop Research & Production</u>			
Deputy Director	Crop Production &	Agro-Climatology	
		Modeling, Mapping Agro-Informatics	
		Crop Quality Control & Standardization	
		Crop Genetic Resource Management	
		Crop Registration & Supply	
Crop Research Chief Agricultural Scientific Officer	Bagani Crop Research Station		
	Okashana Crop Research Station (Oshikoto)		
	Kalimbeza Crop Research Station		
	Mannheim Crop Research Station (Oshikoto)		
	Omahenene Crop Research Station (Omusati)		

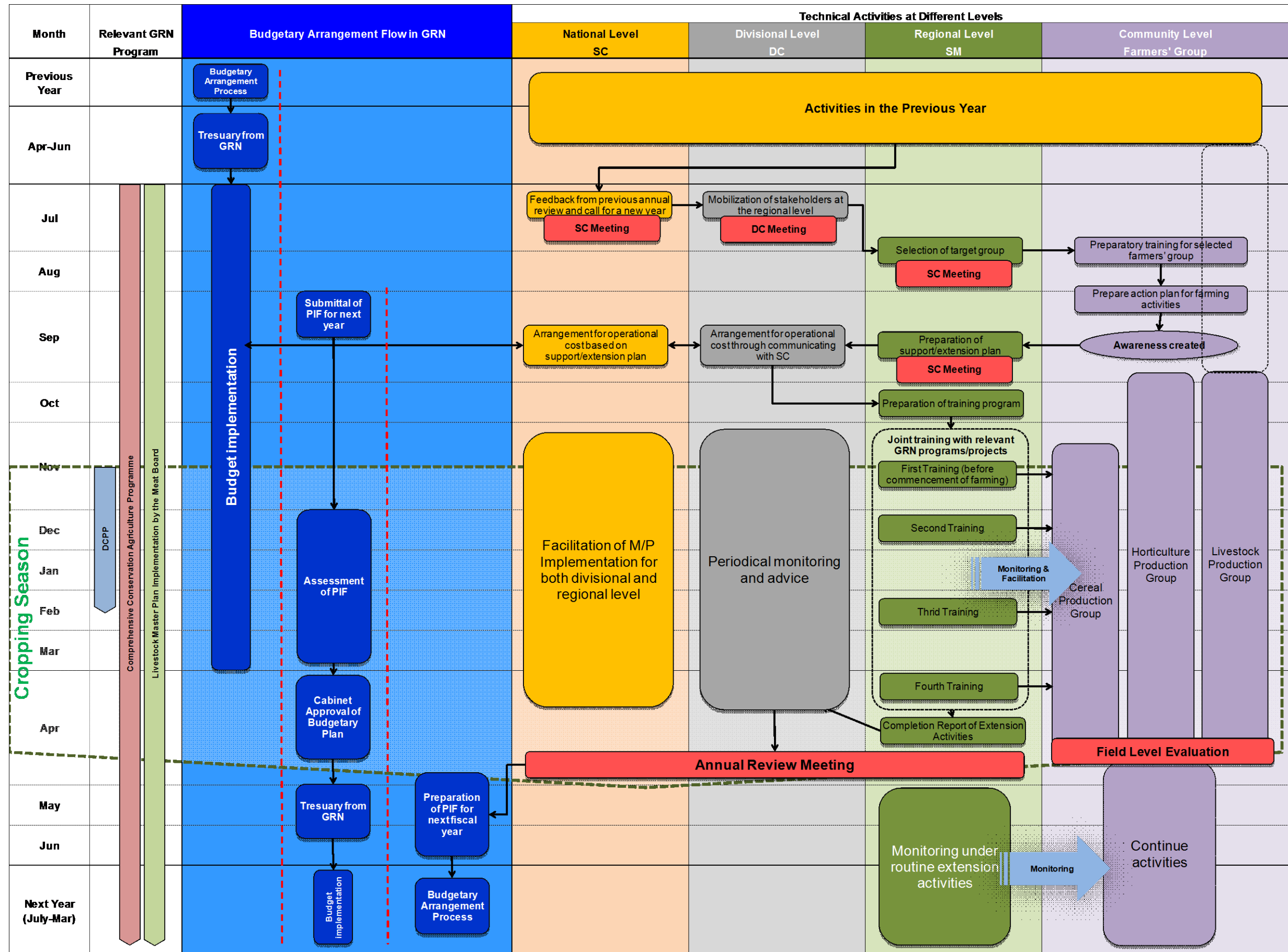
Division	Sub-Division	Section	Sub-Section
<u>Division of Product Development, Training & Quality Assurance</u>			
Deputy Director	Analytical Services & Product Development	Soil & Feed Analysis	
		Food Analysis	
		Agro-Industry	
	Training Material Development		
	Tsums Arid Zone Agricultural Center	Hospitality Services	
Agricultural Training			
Farm Operation			
Mashara Agricultural	Hospitality Services		Workshops Farm
	Agricultural Training		
	Farm Operation		

Directorate of Veterinary Services **[DVS]**

Veterinary Council Secretariat

Administrative Support

Division	Sub-Division	Section	Sub-Section
Division of Animal Disease Control North (Tsumeb)			
Chief Veterinarian Dr. K. K. Shoombe	Animal Health (North West) SADC NW (Oshakati)	Ondangwa (State Veterinary)	3 Subsections
		Oshakati (State Veterinary)	2 Subsections
		Eenhana (State Veterinary)	3 Subsections
		Okongo (State Veterinary)	4 Subsections
		Omuthiya (State Veterinary)	6 Subsections
		Outapi (State Veterinary)	6 Subsections
		Okahao (State Veterinary)	5 Subsections
		Opuwo (State Veterinary)	5 Subsections
		Okanguati (State Veterinary)	1 Subsection
		Animal Health (North East) SADC NE (Grootfontein)	5 Sections (State Veterinary)
Division of Animal Disease Control South (SADC Windhoek)			
	Animal Health (Central) SADC Central (Windhoek)	5 Sections (State Veterinary)	15 Subsections
	Animal Health (South) SADC South (Mariental)	6 Sections (State Veterinary)	18 Subsections
Division of Veterinary Public Health			
	Veterinary Public Health (Export Market)	Meat Co Windhoek Abattoir Meat Co Okahandja Abattoir Meat Co Eolool Oshakati Abattoir Meat Co Katima Mulilo Abattoir Witvlei Meat Processors Abattoir Natural Namibian Meat Producers Abattoir (Aranos) Farmers Meat Market Abattoir (Mariental) Gobabis Abattoir Brukkarros Meat Processors	
	Veterinary Public Health (Local Market)	GRN Local Abattoir: NCA: Eenahna GRN Local Abattoir: NCA: Outapi GRN Local Abattoir: NCA: Rundu	
Division of Epidemiology, Import / Export Control, Advisory Services & Traceability			
Deputy Chief Veterinary Officer Dr. Albertina Shilongo	Epidemiology, Surveillance & Import / Export Control, Advisory Services &	Import / Export Control	13 Border Posts 2 Airport 1 Cold Storage
		Identification & Traceability North (Ondangwa)	
		Advisory Services / Medicine Control	
Division of Diagnostic Services & Research			
	Food Science	Veterinary Drug Residue Analysis Veterinary Toxicology Food Hygiene	
	Diagnostic Services	Clinical Microbiology Serology (CVL) Pathology, Virology / Parastology (CVL) Ondangwa Laboratory Grootfontein Laboratory	
	Biotechnology	Molecular Diagnostics (Virology) Molecular Diagnostics (Bacteriology)	



Source: Prepared by JICA Study Team

Source: Prepared by JICA Study Team

Figure II-5.4.1 Annual Implementation Flow of Master Plan for Crop and Livestock Development

Attachment

N-CLIMP

Form for Namibian Specific SHEP Approach

N-CLIMP

FORM-1:
Questionnaire for
Overall Review Survey

N-CLIMP

Ref. No		Date		Name of AT	
---------	--	------	--	------------	--

Section A General

A1. Region	1. Omusati 2. Oshana 3. Oshikoto 4. Ohangwena				A1
A2. Constituency	A2 _____				A2
A3. ADC Name:	A3 _____				A3
A4. Inauguration Date:	A4 _____				A4
A5. Chief:					
A5-1 Name	A5-1 _____				A5-1
A5-2 Telephone number	A5-2 _____				A5-2
A5-3 E-mail address	A5-3 _____				A5-3
A6. Number of staff					
A6-1 Total	A6-1 _____				A6-1
A6-2 ATs	A6-2-1 <i>nos.</i> _____				A6-2-1
	A6-2-2 <i>Specialty</i> _____				A6-2-2
A6-3 Others, if any, position & nos.					
	A6-3-1 <i>Position</i> _____				A6-3-1
	A6-3-2 <i>nos.</i> _____				A6-3-2
	A6-3-3 <i>Position</i> _____				A6-3-3
	A6-3-4 <i>nos.</i> _____				A6-3-4
A7. Number of farmers under ADC:					
A7-1 Total number	A7-1 <i>Total nos.</i> _____				A7-1
A7-2 Commercial farmers number	A7-2 <i>Commercial nos.</i> _____				A7-2
A7-3 Subsistence farmers number	A7-3 <i>Subsistence nos.</i> _____				A7-3
A8. Equipment available					
1. PC	Yes <input type="text"/> No <input type="text"/>				A8-1
	→if yes, how many ?			nos.	A8-1-1
2. Vehicle	Yes <input type="text"/> No <input type="text"/>				A8-2-1
	→if yes, how many ?			nos.	A8-2-2
3. Tractor	Yes <input type="text"/> No <input type="text"/>				A8-3-1
	→if yes, how many ?			nos.	A8-3-2
4. Internet connection	Yes <input type="text"/> No <input type="text"/>				A8-4-1
	→if yes, how many ?			nos.	A8-4-2
5. Others specially useful for agriculture extension					
	Yes <input type="text"/> No <input type="text"/>				A8-5-1
	→if, yes,				
	specify	1	<input type="text"/>		A8-5-2
	how many ?			nos.	A8-5-3
	specify	2	<input type="text"/>		A8-5-4
	how many ?			nos.	A8-5-5

Section C Crop Production

C1. Crop production general information
 (1/2)

Crop varieties	Number of farmers under ADC	Main/	Cultivated area		Input use
		Intercropping	Total under ADC (ha)	Average area (ha)	
Millet	C1-1	C1-1-1	C1-16	C1-31	C1-46
Sorgham	C1-2	C1-2-1	C1-17	C1-32	C1-47
Maize	C1-3	C1-3-1	C1-18	C1-33	C1-48
Rice	C1-4	C1-4-1	C1-19	C1-34	C1-49
Cowpea	C1-5	C1-5-1	C1-20	C1-35	C1-50
Banbara beans	C1-6	C1-6-1	C1-21	C1-36	C1-51
Pampkin	C1-7	C1-7-1	C1-22	C1-37	C1-52
Water melon	C1-8	C1-8-1	C1-23	C1-38	C1-53
Tomato	C1-9	C1-9-1	C1-24	C1-39	C1-54
Cumcumber	C1-10	C1-10-1	C1-25	C1-40	C1-55
Onion	C1-11	C1-11-1	C1-26	C1-41	C1-56
Cabbage	C1-12	C1-12-1	C1-27	C1-42	C1-57
Mango	C1-13	C1-13-1	C1-28	C1-43	C1-58
Papaye	C1-14	C1-14-1	C1-29	C1-44	C1-59
Guava	C1-15	C1-15-1	C1-30	C1-45	C1-60

(2/2)

Crop varieties	disease and its control	Crop Production Techniques by farmers
Millet	C1-61	C1-76
Sorgham	C1-62	C1-77
Maize	C1-63	C1-78
Rice	C1-64	C1-79
Cowpea	C1-65	C1-80
Banbara bean	C1-66	C1-81
Pampkin	C1-67	C1-82
Water melon	C1-68	C1-83
Tomato	C1-69	C1-84
Cumcumber	C1-70	C1-85
Onion	C1-71	C1-86
Cabbage	C1-72	C1-87
Mango	C1-73	C1-88
Papaye	C1-74	C1-89
Guava	C1-75	C1-90

C2. Cropping schedule

Crops	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Millet	Start: C1-91 & harvet:C1-92											
Sorgham	Start: C1-93 & harvet:C1-94											
Maize	Start: C1-95 & harvet:C1-96											
Rice	Start: C1-97 & harvet:C1-98											
Cowpea	Start: C1-99 & harvet:C1-100											
Banbara beans	Start: C1-101 & harvet:C1-102											
Pampkin	Start: C1-103 & harvet:C1-104											
Water melon	Start: C1-105 & harvet:C1-106											
Tomato	Start: C1-107 & harvet:C1-108											
Cumcumber	Start: C1-109 & harvet:C1-110											
Onion	Start: C1-111 & harvet:C1-112											
Cabbage	Start: C1-113 & harvet:C1-114											
Mango	Start: C1-115 & harvet:C1-116											
Papaye	Start: C1-117 & harvet:C1-118											
Guava	Start: C1-119 & harvet:C1-120											

Section D Livestock Production

D1. Livestock production general information

(1/2)

Livestock species	Number of farmers under ADC	Livestock population		Feed crops varieties	Method of feeding
		Total under ADC (No.)	Average (No.)		
Cattle	D1-1	D1-9	D1-17	D1-25	D1-33
Goat	D1-2	D1-10	D1-18	D1-26	D1-34
Sheep	D1-3	D1-11	D1-19	D1-27	D1-35
Pig	D1-4	D1-12	D1-20	D1-28	D1-36
Chicken	D1-5	D1-13	D1-21	D1-29	D1-37
Donkey	D1-6	D1-14	D1-22	D1-30	D1-38
Horse	D1-7	D1-15	D1-23	D1-31	D1-39
Duck	D1-8	D1-16	D1-24	D1-32	D1-40

(2/2)

Livestock species	disease and its control	Livestock Production Techniques by farmers
Cattle	D1-41	D1-49
Goat	D1-42	D1-50
Sheep	D1-43	D1-51
Pig	D1-44	D1-52
Chicken	D1-45	D1-53
Donkey	D1-46	D1-54
Horse	D1-47	D1-55
Duck	D1-48	D1-56

D2. Cattle and goat delivering

D2-1 Cattle

- How old do a heifer usually give first calf under your ADC? months D2-1-1
- How often do a cattle deliver a calf (calving interval)? every months D2-1-2

D2-2 Goat

- How old do a goat usually give first kid in your ADC coverage? months D2-2-1
- How often do a goat deliver a kid (kidding interval)? every months D2-2-2

Section E Crop and Livestock Marketing

E1. Market and marketing method (Crop and Livestock)

(1/3)

Item	Major market				Method (trader/group marketing/individual/others)
	Location	Volume (ton)	Major season (month)	price (N\$/kg)	
E1-1	E1-11	E1-21	E1-31	E1-41	E1-51
E1-2	E1-12	E1-22	E1-32	E1-42	E1-52
E1-3	E1-13	E1-23	E1-33	E1-43	E1-53
E1-4	E1-14	E1-24	E1-34	E1-44	E1-54
E1-5	E1-15	E1-25	E1-35	E1-45	E1-55
E1-6	E1-16	E1-26	E1-36	E1-46	E1-56
E1-7	E1-17	E1-27	E1-37	E1-47	E1-57
E1-8	E1-18	E1-28	E1-38	E1-48	E1-58
E1-9	E1-19	E1-29	E1-39	E1-49	E1-59
E1-10	E1-20	E1-30	E1-40	E1-50	E1-60

(2/3)

Item	Customer needs			
	Varieties	Volume (ton)	Season (month)	Quality
E1-1	E1-61	E1-71	E1-81	E1-91
E1-2	E1-62	E1-72	E1-82	E1-92
E1-3	E1-63	E1-73	E1-83	E1-93
E1-4	E1-64	E1-74	E1-84	E1-94
E1-5	E1-65	E1-75	E1-85	E1-95
E1-6	E1-66	E1-76	E1-86	E1-96
E1-7	E1-67	E1-77	E1-87	E1-97
E1-8	E1-68	E1-78	E1-88	E1-98

E1-9	E1-69	E1-79	E1-89	E1-99
E1-10	E1-70	E1-80	E1-90	E1-100

(3/3)

Item	Marketing Techniques by farmers
E1-1	E1-101
E1-2	E1-102
E1-3	E1-103
E1-4	E1-104
E1-5	E1-105
E1-6	E1-106
E1-7	E1-107
E1-8	E1-108
E1-9	E1-109
E1-10	E1-110

Section F Group Activities

F1. Are there any organizations related with crop and livestock production under your ADC area?

1. Yes. →F2.
2. No.

F1

F2. What are the primary group activities?

1.	Crop production	F2-1	→Main commodity?	
2.	Livestock Production	F2-2	→Main product?	F2-3
3.	Processing	F2-3	→Main product?	F2-4
4.	Other manufacturing / handicraft	F2-4	→Main product?	F2-5
5.	Trade	F2-5	→Main commodity/ product?	F2-6
6.	Service	F2-6	→Specify	F2-7
7.	Saving	F2-7	→Specify	F2-8
8.	Credit	F2-8	→Specify	F2-9
9.	Others	F2-9	→Specify	F2-10

Section G Agriculture Support Services including Extension

G1. What kind of agriculture support services ATs are providing to farmers under your ADC?

		% of farmers who attend			
1.	Crop production	Subject	G1-1-1	%	G1-1-3
		Subject	G1-1-2	%	G1-1-4
2.	Livestock production	Subject	G1-2-1	%	G1-2-3
		Subject	G1-2-2	%	G1-2-4
3.	Farm management	Subject	G1-3-1	%	G1-3-3
		Subject	G1-3-2	%	G1-3-4
4.	Others	Subject	G1-4-1	%	G1-4-4
		Subject	G1-4-2	%	G1-4-5
		Subject	G1-4-3	%	G1-4-6

G2. Are there any training programs for farmers by ATs or by any other external organizations?

1. Yes →F.3
2. No

G2

G3. If yes, what kind of training were there organized previously?

1. Training subject (eg. Agriculture production, processing, leadership training, group management, marketing, business management)

(subject)	(organization) (programs) (projects)	(how often) 1. once a week, 2. once a month, 3. once a year, 4. irregular	Participants (nos.)
F3-1	by F3-2		F3-4
F3-5	by F3-6	F3-7	F3-8
F3-9	by F3-10	F3-11	F3-12
F3-13	by F3-14	F3-15	F3-16
F3-17	by F3-18	F3-19	F3-20

- G4. What kind of training crop and livestock farmers want to attend?
- | | | | | |
|--|------------|-------|-------|------|
| | Crop: | (i) | <hr/> | G4-1 |
| | | (ii) | <hr/> | G4-2 |
| | | (iii) | <hr/> | G4-3 |
| | Livestock: | (i) | <hr/> | G4-4 |
| | | (ii) | <hr/> | G4-5 |
| | | (iii) | <hr/> | G4-6 |
| | Others: | (i) | <hr/> | G4-7 |
| | | (ii) | <hr/> | G4-8 |
| | | (iii) | <hr/> | G4-9 |
- G5. Are there any ethnic group-wise issues and considerations, if any?
- | | | | | | |
|--|----------|-------------|-------|-------|------|
| | 1. Yes → | For example | (i) | <hr/> | G5-1 |
| | | | (ii) | <hr/> | G5-2 |
| | | | (iii) | <hr/> | G5-3 |
| | 2. No | | | | G5-4 |
- G6. Area there any extension activities or training focusing on women's group?
- | | | | | | |
|--|----------|-------------|-------|-------|------|
| | 1. Yes → | For example | (i) | <hr/> | G6-1 |
| | | | (ii) | <hr/> | G6-2 |
| | | | (iii) | <hr/> | G6-3 |
| | 2. No | | | | G6-4 |

Section H Intention of ADC

- H1. What are the current constraints?
- | | | |
|----|-------|------|
| 1. | <hr/> | H1-1 |
| 2. | <hr/> | H1-2 |
| 3. | <hr/> | H1-3 |
| 4. | <hr/> | H1-4 |
- H2. What are the future plans?
- | | | |
|----|-------|------|
| 1. | <hr/> | H2-1 |
| 2. | <hr/> | H2-2 |
| 3. | <hr/> | H2-3 |
| 4. | <hr/> | H2-4 |

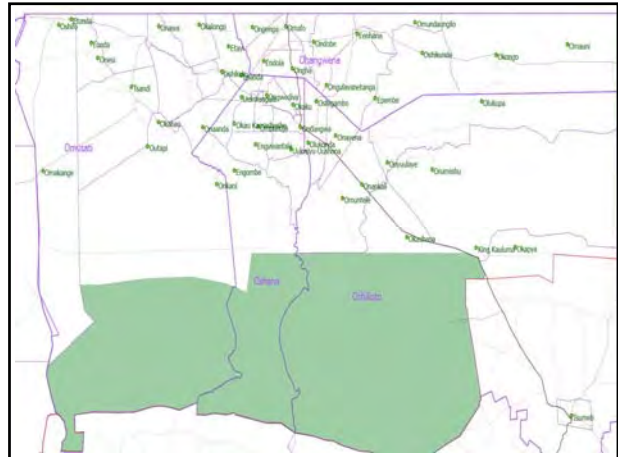
Thank you very much for your cooperation.

Ministry of Agriculture, Water and Forestry (MAWF)
Northern Crop and Livestock Development Master
Plan Study (N-CLIMP)

Overall Review Survey Report

27-30 January 2015

Japan International Cooperation Agency (JICA)
Nippon Koei Co., Ltd



Purpose of Overall Review Survey

- Collect macro-level information on each ADC area
- Enable ATs to confirm and recognize potentials, constraints and challenges for crop and livestock production in their ADC areas; and
- Share awareness amongst ATs in their ADC areas in preparation of the development plan.

Methodology

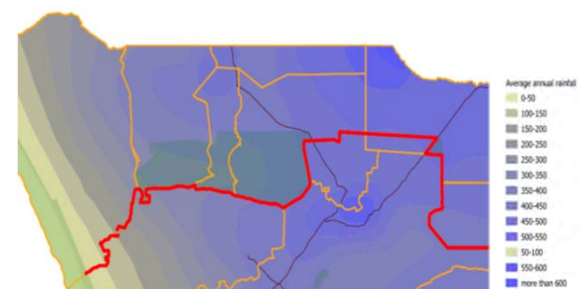
A total of 30 ADCs responded to the questionnaire: 5 (of 12) in Ohangwena region, 8 (of 12) in Oshikoto, 8 (of 10) in Oshana and 9 (of 15) in the Omusati region.

- Section A: general information
- Section B: natural environment and climatic conditions
- Section C: crop production
- Section D: livestock production
- Section E: crop and livestock marketing
- Section F: group activities in the ADC area
- Section G: agricultural support services
- Section H: major constraints experienced and future plans of staff in each ADC.

Findings

- Information suggests that on average there is only one Agricultural Technician for 3,327 farmers.
- Although the ratio of technical versus support staff seems to be appropriate, too few professional scientific staff exists to provide backstopping and support to ATs.
- Not every ADC has a vehicle, and only about half of the ADCs have internet connectivity.

Section B: natural environment and climatic conditions



- **Millet** is the most commonly planted crop in all regions, followed by **Sorghum, Maize, Cow Pea, Pumpkin, Water melon, and Bambara nuts.**
- The largest area (236,590 ha) is planted with **millet**, followed by **sorghum** (74,712 ha), **maize** (57,475 ha) and **cow pea** (40,834 ha).
- **Cow peas** are the most commonly used for intercropping, followed by **sorghum, maize, Bambara nuts, and water melons and pumpkin.**
- The use of **manure** was the most frequently reported technology ATs, followed by the use of **fertiliser** and the use of **local seeds**

- **Fertiliser application** seems to be the activity most commonly provided by ATs to farmers, followed by the **selling of seeds and fertiliser**, dissemination of agricultural **information** and supporting the implementation of **DCPP.**
- Support services in relation to **animal health and marketing** were the most mentioned by ATs, followed by **animal husbandry** related support and support on **livestock breeding** and management practices in general
- Most training provided was on **crop production** followed by **leadership training, livestock production and management, livestock marketing, DAP, animal health and rangeland assessment**
- Farmers are in most need for training in **fertiliser application, crop production, disease and pest control** techniques, **processing and manufacturing** of crop products, **soil fertility** and **marketing** of crops.

- Issues related to the **San** people are by far the most needed ethnic based group-wise topics to be considered by ATs
- **Gardening, food processing** and modern **basket making** are amongst the most important extension related activities focusing on women groups
- The major constraints are **transport and vehicle** problems, insufficient **tractors** per ADC, not enough **Agricultural Technicians, computers** that are not functioning and limited **internet connectivity.**
- ATs will continue to train farmers in **rangeland and livestock management.** Other important future plans include the **training of young staff**, provision of more **transport, location** of people in their ADC areas and the provision of **internet services.**

FORM-2:
Questionnaire for
Detailed Thematic Survey

N-CLIMP

Ref. No		Date		Name of AT	
---------	--	------	--	------------	--

Section A General

A1. Region	1. Omusati 2. Oshana 3. Oshikoto 4. Ohangwena		A1
A2. Constituency	A2 _____		A2
A3. ADC Name:	A3 _____		A3
A4. Village:	A4 _____		A4
A5. Respondent:			
A5-1 Type	1. Crop-main 2. Livestock-main 3. Horticulture		A5-1
A5-2 Name	A5-2 _____		A5-2
A5-3 Gender	1. male 2. female		A5-3
A5-4 Age	A5-4 _____		A5-4
A5-5 Telephone number	A5-5 _____		A5-5
A5-6 E-mail address, if any	A5-6 _____		A5-6

Section B Household Characteristics

B1. Family organization in your homestead B1 Please illustrate as follows _____

B1

B2. Number of members in your homestead:

B2-1 Adult male (15 years and above):	<input style="width: 80%; height: 20px;" type="text"/>	B2-1
B2-2 Adult female (15 years and above):	<input style="width: 80%; height: 20px;" type="text"/>	B2-2
B2-3 Children (less than 15 years old):	<input style="width: 80%; height: 20px;" type="text"/>	B2-3

From here, please kindly give us information on your family only and circle the objective family in the family organization in your homestead (B1.) given above.

B3. Number of members in your family:

B3-1 Adult male (15 years and above):	<input type="text"/>	<input style="border: 1px solid red;" type="text" value="B3-1"/>
B3-2 Adult female (15 years and above):	<input type="text"/>	<input style="border: 1px solid red;" type="text" value="B3-2"/>
B3-3 Children (less than 15years old):	<input type="text"/>	<input style="border: 1px solid red;" type="text" value="B3-3"/>

B4. Age of household head

B5. Gender of household head

1. male 2. female	<input type="text"/>	<input style="border: 1px solid red;" type="text" value="B5"/>
----------------------------	----------------------	----------------------------------------------------------------

B6. Your household head occupation

1. Full-time farmer
2. Part-time farmer
3. Full-time worker in non-agriculture sector

B7. Farming experiences (years)

Section C Living Conditions

C1. Water source (please select from the following list)

1. piped 2. ring pipe well 3. dug well 4. reservoir/pond
5. spring/river 6. borehole 7. others

C1-1 For drinking water	<input type="text"/>	<input style="border: 1px solid red;" type="text" value="C1-1"/>
C1-2 For agriculture (crop and livestock production)	<input type="text"/>	<input style="border: 1px solid red;" type="text" value="C1-2"/>
C1-3 For domestic use (except for drinking water)	<input type="text"/>	<input style="border: 1px solid red;" type="text" value="C1-3"/>

C2. Ownership of physical assets (Availability of following items)

1. plough	Yes	<input type="text"/>	No	<input type="text"/>	<input type="text"/>	nos. <input style="border: 1px solid red;" type="text" value="C2-2-1"/>
2. cultivator	Yes	<input type="text"/>	No	<input type="text"/>	<input type="text"/>	nos. <input style="border: 1px solid red;" type="text" value="C2-2-2"/>
3. hoe	Yes	<input type="text"/>	No	<input type="text"/>	<input type="text"/>	nos. <input style="border: 1px solid red;" type="text" value="C2-2-3"/>
4. tractor	Yes	<input type="text"/>	No	<input type="text"/>	<input type="text"/>	nos. <input style="border: 1px solid red;" type="text" value="C2-2-4"/>
5. bicycle	Yes	<input type="text"/>	No	<input type="text"/>	<input type="text"/>	nos. <input style="border: 1px solid red;" type="text" value="C2-2-5"/>
6. cart	Yes	<input type="text"/>	No	<input type="text"/>	<input type="text"/>	nos. <input style="border: 1px solid red;" type="text" value="C2-2-6"/>
7. radio	Yes	<input type="text"/>	No	<input type="text"/>	<input type="text"/>	nos. <input style="border: 1px solid red;" type="text" value="C2-2-7"/>
8. TV	Yes	<input type="text"/>	No	<input type="text"/>	<input type="text"/>	nos. <input style="border: 1px solid red;" type="text" value="C2-2-8"/>
9. stove	Yes	<input type="text"/>	No	<input type="text"/>	<input type="text"/>	nos. <input style="border: 1px solid red;" type="text" value="C2-2-9"/>

C3. Land holding (owned or customary land right)

1. farm land	<input type="text"/>	ha	<input style="border: 1px solid red;" type="text" value="C3-1"/>
2. grazing land (not commonage)	<input type="text"/>	ha	<input style="border: 1px solid red;" type="text" value="C3-2"/>
3. orchard/garden	<input type="text"/>	ha	<input style="border: 1px solid red;" type="text" value="C3-3"/>
4. others	<input type="text"/>	ha	<input style="border: 1px solid red;" type="text" value="C3-4"/>

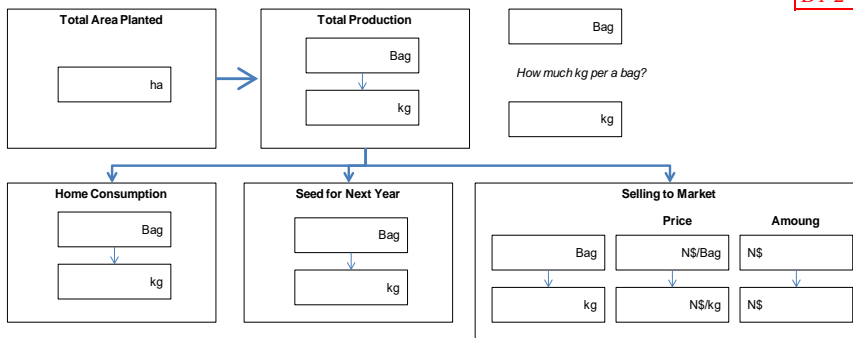
C4.	Livestock		
1.	cattle	<input type="text"/>	nos. C4-1
2.	goat	<input type="text"/>	nos. C4-2
3.	sheep	<input type="text"/>	nos. C4-3
4.	pig	<input type="text"/>	nos. C4-4
5.	donkey	<input type="text"/>	nos. C4-5
6.	chicken	<input type="text"/>	nos. C4-6
7.	duck	<input type="text"/>	nos. C4-7
8.	guinea fowl	<input type="text"/>	nos. C4-8
9.	others (specify) _____	<input type="text"/>	nos. C4-9

Section D Agriculture Production and Income

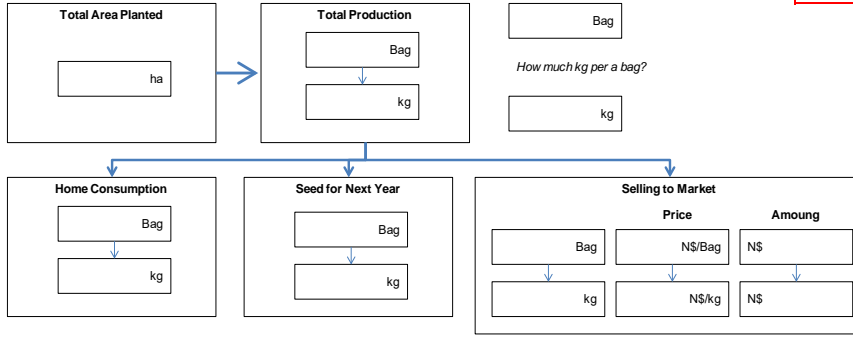
D1. Crop production & income D1-1-1
D1-1 **2014/2015 (Plan only)**

Name of crop	Area (ha)
Millet	<input type="text"/>
Sorgham	<input type="text"/>
Maize	<input type="text"/>
Rice	<input type="text"/>
Cowpea	<input type="text"/>
Others (please specify)	<input type="text"/>
-	<input type="text"/>
-	<input type="text"/>

D1-2 **2013/2014** D1-2-1
Millet



Sorgham D1-2-2



Maize D1-2-3

Total Area Planted <input style="width: 80%;" type="text"/> ha	Total Production <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> Bag How much kg per a bag? <input style="width: 80%;" type="text"/> kg												
Home Consumption <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	Seed for Next Year <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	Selling to Market <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">Price</td> <td style="width: 33%; text-align: center;">Amount</td> </tr> <tr> <td><input style="width: 80%;" type="text"/> Bag</td> <td><input style="width: 80%;" type="text"/> N\$/Bag</td> <td><input style="width: 80%;" type="text"/> N\$</td> </tr> <tr> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> </tr> <tr> <td><input style="width: 80%;" type="text"/> kg</td> <td><input style="width: 80%;" type="text"/> N\$/kg</td> <td><input style="width: 80%;" type="text"/> N\$</td> </tr> </table>		Price	Amount	<input style="width: 80%;" type="text"/> Bag	<input style="width: 80%;" type="text"/> N\$/Bag	<input style="width: 80%;" type="text"/> N\$	↓	↓	↓	<input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> N\$/kg	<input style="width: 80%;" type="text"/> N\$
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Rice D1-2-4

Total Area Planted <input style="width: 80%;" type="text"/> ha	Total Production <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> Bag How much kg per a bag? <input style="width: 80%;" type="text"/> kg												
Home Consumption <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	Seed for Next Year <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	Selling to Market <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">Price</td> <td style="width: 33%; text-align: center;">Amount</td> </tr> <tr> <td><input style="width: 80%;" type="text"/> Bag</td> <td><input style="width: 80%;" type="text"/> N\$/Bag</td> <td><input style="width: 80%;" type="text"/> N\$</td> </tr> <tr> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> </tr> <tr> <td><input style="width: 80%;" type="text"/> kg</td> <td><input style="width: 80%;" type="text"/> N\$/kg</td> <td><input style="width: 80%;" type="text"/> N\$</td> </tr> </table>		Price	Amount	<input style="width: 80%;" type="text"/> Bag	<input style="width: 80%;" type="text"/> N\$/Bag	<input style="width: 80%;" type="text"/> N\$	↓	↓	↓	<input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> N\$/kg	<input style="width: 80%;" type="text"/> N\$
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<input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> N\$/kg	<input style="width: 80%;" type="text"/> N\$												

Cowpea D1-2-5

Total Area Planted <input style="width: 80%;" type="text"/> ha	Total Production <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> Bag How much kg per a bag? <input style="width: 80%;" type="text"/> kg												
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	Price	Amount												
<input style="width: 80%;" type="text"/> Bag	<input style="width: 80%;" type="text"/> N\$/Bag	<input style="width: 80%;" type="text"/> N\$												
↓	↓	↓												
<input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> N\$/kg	<input style="width: 80%;" type="text"/> N\$												

Others 1 (specify) D1-2-6

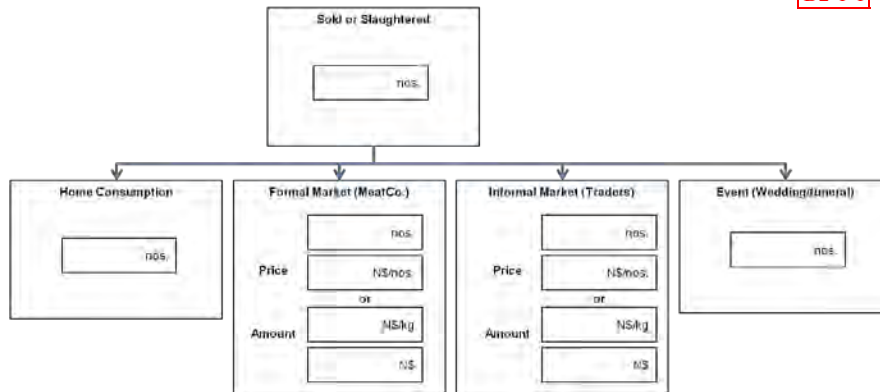
Total Area Planted <input style="width: 80%;" type="text"/> ha	Total Production <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> Bag How much kg per a bag? <input style="width: 80%;" type="text"/> kg												
Home Consumption <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	Seed for Next Year <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	Selling to Market <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">Price</td> <td style="width: 33%; text-align: center;">Amount</td> </tr> <tr> <td><input style="width: 80%;" type="text"/> Bag</td> <td><input style="width: 80%;" type="text"/> N\$/Bag</td> <td><input style="width: 80%;" type="text"/> N\$</td> </tr> <tr> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> </tr> <tr> <td><input style="width: 80%;" type="text"/> kg</td> <td><input style="width: 80%;" type="text"/> N\$/kg</td> <td><input style="width: 80%;" type="text"/> N\$</td> </tr> </table>		Price	Amount	<input style="width: 80%;" type="text"/> Bag	<input style="width: 80%;" type="text"/> N\$/Bag	<input style="width: 80%;" type="text"/> N\$	↓	↓	↓	<input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> N\$/kg	<input style="width: 80%;" type="text"/> N\$
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↓	↓	↓												
<input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> N\$/kg	<input style="width: 80%;" type="text"/> N\$												

Others 2 (specify) D1-2-7

Total Area Planted <input style="width: 80%;" type="text"/> ha	Total Production <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> Bag How much kg per a bag? <input style="width: 80%;" type="text"/> kg												
Home Consumption <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	Seed for Next Year <input style="width: 80%;" type="text"/> Bag <input style="width: 80%;" type="text"/> kg	Selling to Market <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%; text-align: center;">Price</td> <td style="width: 33%; text-align: center;">Amount</td> </tr> <tr> <td><input style="width: 80%;" type="text"/> Bag</td> <td><input style="width: 80%;" type="text"/> N\$/Bag</td> <td><input style="width: 80%;" type="text"/> N\$</td> </tr> <tr> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> <td style="text-align: center;">↓</td> </tr> <tr> <td><input style="width: 80%;" type="text"/> kg</td> <td><input style="width: 80%;" type="text"/> N\$/kg</td> <td><input style="width: 80%;" type="text"/> N\$</td> </tr> </table>		Price	Amount	<input style="width: 80%;" type="text"/> Bag	<input style="width: 80%;" type="text"/> N\$/Bag	<input style="width: 80%;" type="text"/> N\$	↓	↓	↓	<input style="width: 80%;" type="text"/> kg	<input style="width: 80%;" type="text"/> N\$/kg	<input style="width: 80%;" type="text"/> N\$
	Price	Amount												
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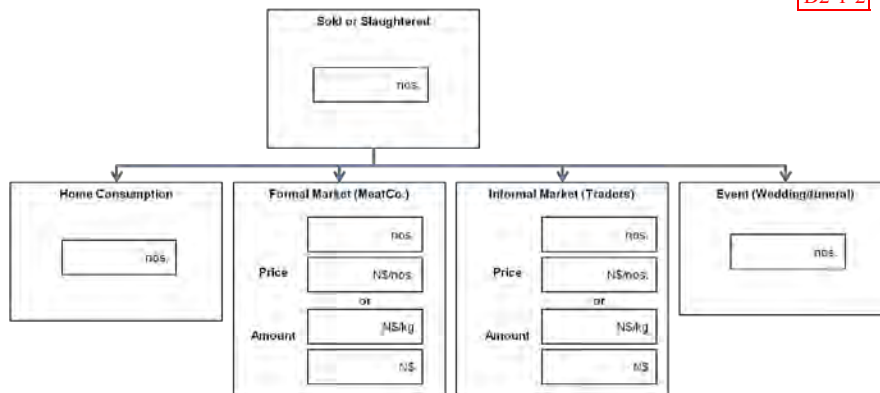
D2. Livestock production & income
 D2-1 2014
 Cattle

D2-1-1



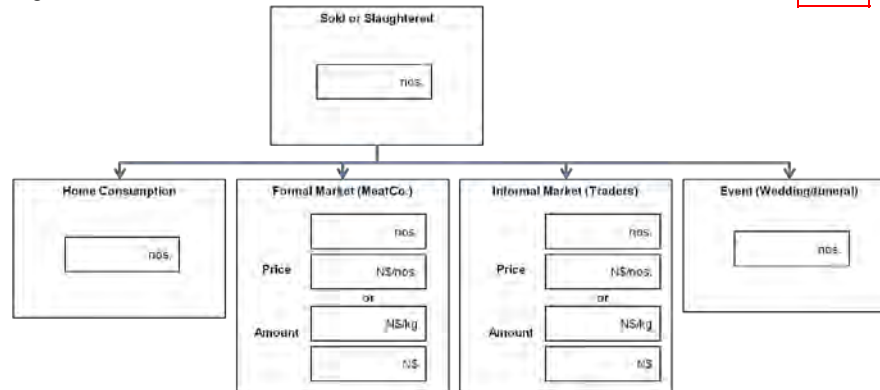
Goat

D2-1-2



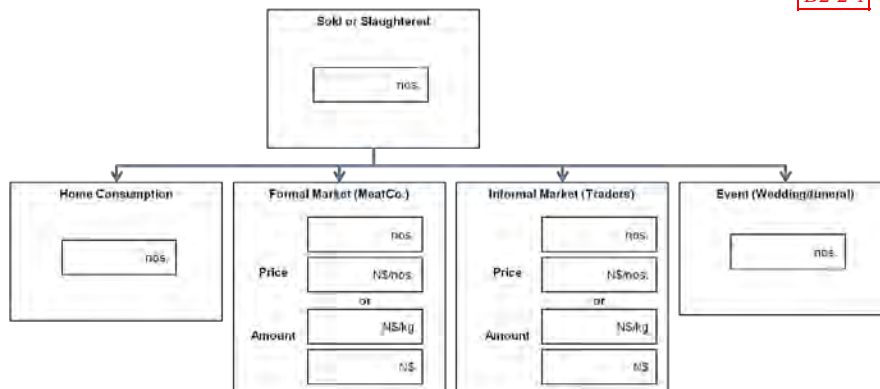
Pig

D2-1-3



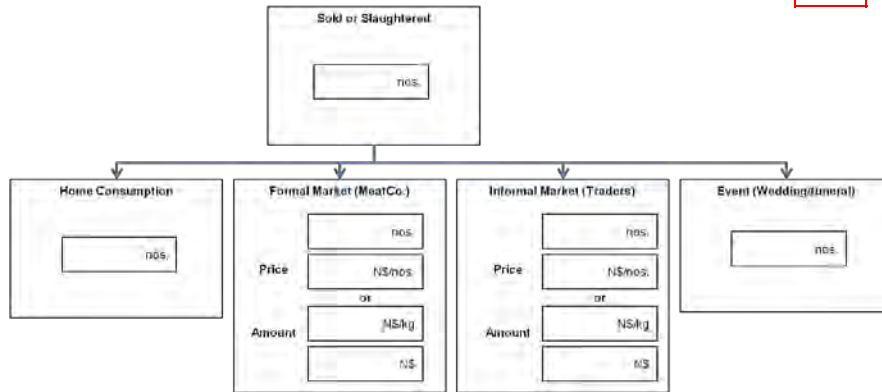
D2-2 2013
 Cattle

D2-2-1



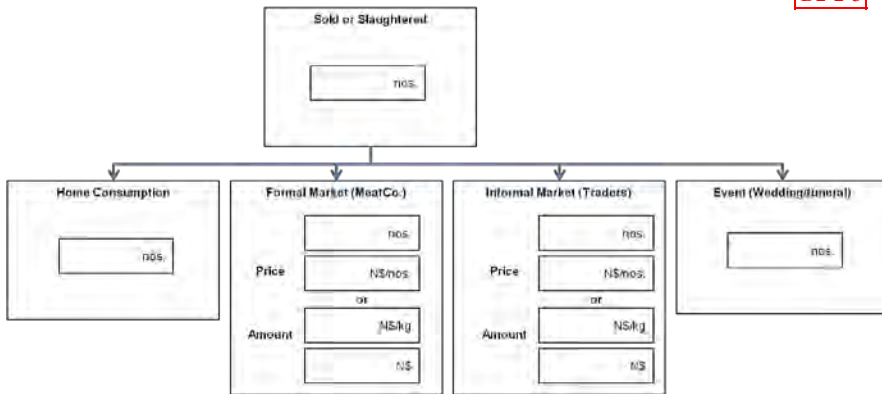
Goat

D2-2-2



Goat

D2-2-3



D3. Non-farm income

D3-1 2014

D3-1

Item	Source	Amount (N\$)
Remittance		
Pension		
Others (please specify)		
-		
-		

D3-2 2013

D3-2

Item	Source	Amount (N\$)
Remittance		
Pension		
Others (please specify)		
-		
-		

Section E Farming Management

E1. Crop production

E1-1 Cropping schedule (month)

1. Crop name and variety	Land preparation	Planting	Harvesting	Selling

E1-1

E1-2 Irrigation water
 Yes No E1-2-1

E1-3 Use of following practice

E1-3-1 Intercropping
 Yes No E1-3-1

E1-3-2 Crop rotation
 Yes No E1-3-2

E1-3-3 Fallow
 Yes No E1-3-3

E1-4 Land preparation
 Method
 1. tractor 2. DAP 3. hand hoe
 4. others (specify) E1-4

E1-5 Use of fertilizer
 Yes No E1-5

E1-6 Use of manure
 Yes No E1-6

E1-7 Pests and disease control
 Yes No E1-7

E1-8 Weeding
 Yes No E1-8

E1-9 Harvesting
 Crops

E1-9-1
E1-9-2
E1-9-3

 How to?

E1-9-4
E1-9-5
E1-9-6

 by manual,
 machine etc.

E1-10 Threshing and winnowing
 How to?
 1. by manual 2. by animal power 3. by machine
 4. others (specify) E1-10

E1-11 Use of improved seed variety

Millet	Yes	E1-11-1	No	E1-11-6	Specify	E1-11-11
Sorghum	Yes	E1-11-2	No	E1-11-7		E1-11-12
Bambaranuts	Yes	E1-11-3	No	E1-11-8		E1-11-13
Cowpe	Yes	E1-11-4	No	E1-11-9		E1-11-14
Maize	Yes	E1-11-5	No	E1-11-10		E1-11-15
Others specify						
<input type="text"/>	Yes	E1-11-16	No	E1-11-18		E1-11-22
<input type="text"/>	Yes	E1-11-17	No	E1-11-19		E1-11-23

E2. Livestock production

E2-1 Cattle

E2-1-1 Cattle production

2014 Production				
1. Number of cow	2. Number of birth (calves)	3. Production rate (%)	4. Number of calf died	5. Mortality rate (%) (=4/2)
E2-1-1-1	E2-1-1-2	E2-1-1-3	E2-1-1-4	E2-1-1-5

2013 Production				
1. Number of cow	2. Number of birth (calves)	3. Production rate (%)	4. Number of calf died	5. Mortality rate (%) (=4/2)
E2-1-1-6	E2-1-1-7	E2-1-1-8	E2-1-1-9	E2-1-1-10

E2-1-2 Milk production

Do you produce milk?

Yes No

E2-1-2-1

if yes,

1. home consumption only 2. home consumption and selling

E2-1-2-2

E2-1-3 Delivering

1. Age of first calving (months)	2. Calving interval (months)
E2-1-3-1	E2-1-3-2

E2-2 Goat

E2-2-1 Production

2014 Production							
1. Number of breeding does	2. Number of kids			3. Total kids (=total of 2.)	4. Production rate (%) (=3/1)	5. Kids died	6. Mortality rate (%) (=5/1)
	Single	Twins	Triplet				
							E2-2-1-1

2013 Production							
1. Number of breeding does	2. Number of kids			3. Total kids (=total of 2.)	4. Production rate (%) (=3/1)	5. Kids died	6. Mortality rate (%) (=5/1)
	Single	Twins	Triplet				
							E2-2-1-2

E2-2-2 Delivering

1. Age of first kidding (months)	2. kidding interval (months)
E2-2-2-1	E2-2-2-2

E2-3 Disease control

	Number of application in 2013			Cost (N\$)
	Drench	Vaccination	Dipping	
Cattle				
Goat				

E2-3

E2-4 Feed (please tick)

	Grazing for feed	licks block	leaves of trees/ forage	cultivated pasture
Cattle				
Goat				

E2-4

Section F Crop and Livestock Marketing

F1. Market and marketing method (crop)

F1-1 Market survey
 Yes No F1-1-1
 if yes, how to?
 1. go to market 2. contact ADC F1-1-2
 3. others (specify) F1-1-3

F1-2 Major market
 Name of the market (town) (specify) F1-2

F1-3 Major marketing method
 1. individual 2. trader 3. group 4. AMTA F1-3-1
 5. others (specify) F1-3-2

F1-4 Quality of the products market needs

1. variety	F1-4-1	specify	F1-4-2
2. color	F1-4-3	specify	F1-4-4
3. size	F1-4-5	specify	F1-4-6
4. others (specify)	F1-4-7		

F2. Market and marketing method (livestock)

F2-1 Market survey
 Yes No F2-1-1
 if yes, how to?
 1. go to market 2. contact ADC F2-1-2
 3. others (specify) F2-1-3

F2-2 Major market
 Name of the market (town) (specify) F2-2

F2-3 Major marketing method
 1. individual 2. trader 3. group 4. AMTA F2-3-1
 5. others (specify) F2-3-2

F2-4 Quality of the products market needs

1. variety	F1-4-1	specify	F1-4-2
2. color	F1-4-3	specify	F1-4-4
3. size	F1-4-5	specify	F1-4-6
4. others (specify)	F1-4-7		

F3. Market and marketing method (horticulture)

F3-1 Market survey
 Yes No F3-1-1
 if yes, how to?
 1. go to market 2. contact ADC F3-1-2
 3. others (specify) F3-1-3

F3-2 Major market
 Name of the market (town) (specify) F3-2

F3-3 Major marketing method
 1. individual 2. trader 3. group 4. AMTA F3-3-1
 5. others (specify) F3-3-2

F3-4 Quality of the products market needs

1. variety	F1-4-1	specify	F1-4-2
2. color	F1-4-3	specify	F1-4-4
3. size	F1-4-5	specify	F1-4-6
4. others (specify)	F1-4-7		

Section G Group Activities

G1. Do you belong to following farmers' organizations related with crop and livestock production?

1.	NNFU	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	<input type="checkbox"/>	G1-1
2.	Mahangu group	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	<input type="checkbox"/>	G1-2
3.	Livestock Cooperatives	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	<input type="checkbox"/>	G1-3
4.	Others (please specify) _____						G1-4

G2. What are the primary group activities? (if yes in F1, please tick and specify)

1.	Crop production	<input type="checkbox"/>	G1-2-1	→Main commodity?	<input type="checkbox"/>	G1-2-2
2.	Livestock Production	<input type="checkbox"/>	G1-2-3	→Main product?	<input type="checkbox"/>	G1-2-4
3.	Processing	<input type="checkbox"/>	G1-2-5	→Main product?	<input type="checkbox"/>	G1-2-6
4.	Other manufacturing / handicraft	<input type="checkbox"/>	G1-2-7	→Main product?	<input type="checkbox"/>	G1-2-8
5.	Trade	<input type="checkbox"/>	G1-2-9	→Main commodity/ product?	<input type="checkbox"/>	G1-2-10
6.	Service	<input type="checkbox"/>	G1-2-11	→Specify	<input type="checkbox"/>	G1-2-12
7.	Saving	<input type="checkbox"/>	G1-2-13	→Specify	<input type="checkbox"/>	G1-2-14
8.	Credit	<input type="checkbox"/>	G1-2-15	→Specify	<input type="checkbox"/>	G1-2-16
9.	Others	<input type="checkbox"/>	G1-2-17	→Specify	<input type="checkbox"/>	G1-2-18

Section H Agriculture Support Services including Extension

H1. What kind of agriculture support services provided to you in the last year cropping season (2013/2014)?

1.	Crop production	Subject	<input type="checkbox"/>	H-1-1-1
		Subject	<input type="checkbox"/>	H-1-1-2
2.	Livestock production	Subject	<input type="checkbox"/>	H-1-2-1
		Subject	<input type="checkbox"/>	H-1-2-2
3.	Horticulture	Subject	<input type="checkbox"/>	H-1-3-1
		Subject	<input type="checkbox"/>	H-1-3-2
4.	Farm management	Subject	<input type="checkbox"/>	H-1-4-1
		Subject	<input type="checkbox"/>	H-1-4-2
5.	DCPP	Subject	<input type="checkbox"/>	H-1-5-1
		Subject	<input type="checkbox"/>	H-1-5-2
6.	Others	Subject	<input type="checkbox"/>	H-1-6-1
		Subject	<input type="checkbox"/>	H-1-6-2
		Subject	<input type="checkbox"/>	H-1-6-3

H2. Did you attend any training programs in 2013 and 2014? H2

1. Yes →H.3
2. No

H3. If yes, what kind of training were there organized previously?

1. Training subject (eg. Agriculture production, processing, leadership training, group management, marketing, business management)

(subject)	(organization)	(how often)
	(programs)	1. once a week,
	(projects)	2. once a month,
		3. once a year,
		4. irregular
H3-1 _____	by H3-2 _____	H3-3 _____
H3-4 _____	by H3-5 _____	H3-6 _____
H3-7 _____	by H3-8 _____	H3-9 _____
H3-10 _____	by H3-11 _____	H3-12 _____
H3-13 _____	by H3-14 _____	H3-15 _____

H4. What kind of training do you want to attend?

Crop:	(i)	H4-1
	(ii)	H4-2
	(iii)	H4-3
Livestock:	(i)	H4-4
	(ii)	H4-5
	(iii)	H4-6
Horticulture:	(i)	H4-7
	(ii)	H4-8
	(iii)	H4-9
Others:	(i)	H4-10
	(ii)	H4-11
	(iii)	H4-12

Section I Intention of Farmers

II. What are the current constraints? (water supply, crop and livestock disease, marketing, products price etc.)

1. _____ H4-1
2. _____ H4-2
3. _____ H4-3
4. _____ H4-4

I2. What are the future plans?

1. _____ I2-1
2. _____ I2-2
3. _____ I2-3
4. _____ I2-4

Thank you very much for your cooperation.

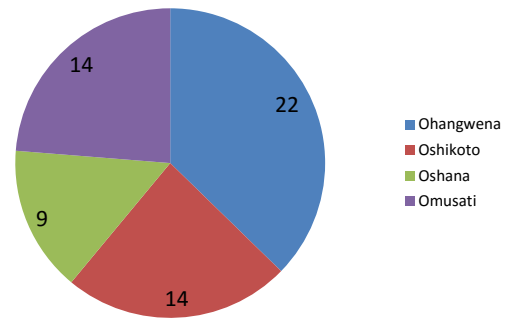
Ministry of Agriculture, Water and Forestry (MAWF)
Northern Crop and Livestock Development Master
Plan Study (N-CLIMP)

Detailed Thematic Survey Review

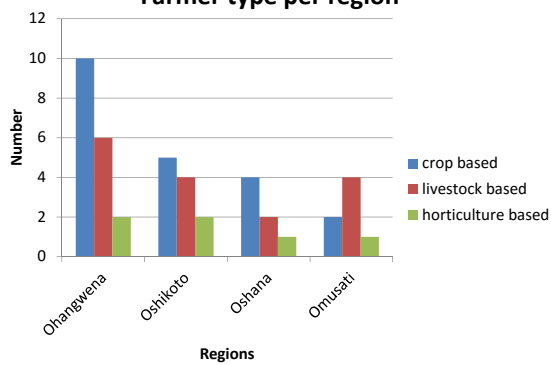
17 February 2015

Japan International Cooperation Agency (JICA)
Nippon Koei Co., Ltd

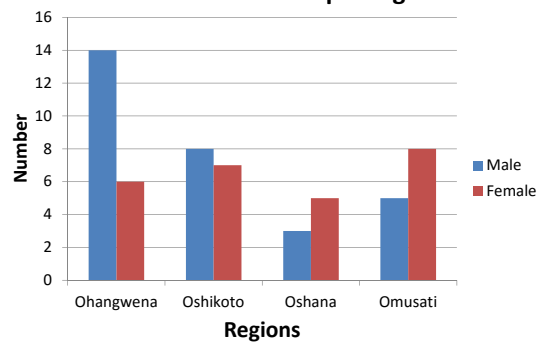
Number of farmers per region



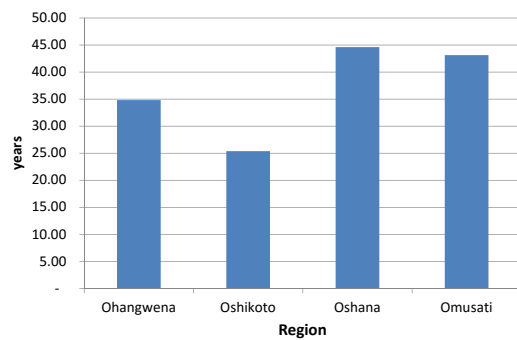
Farmer type per region



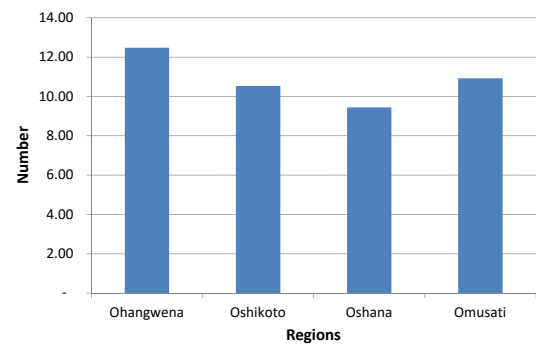
Gender of farmers per region

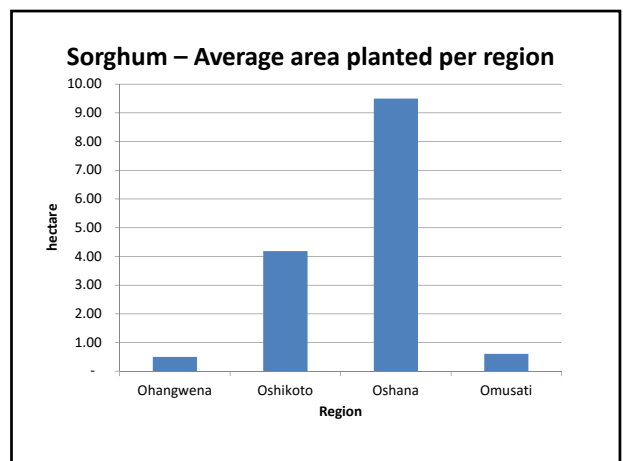
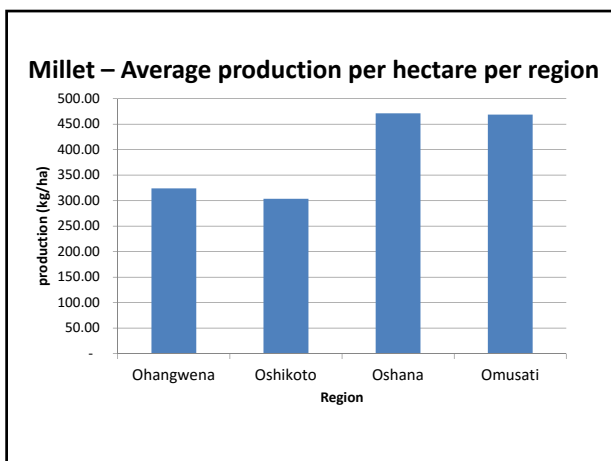
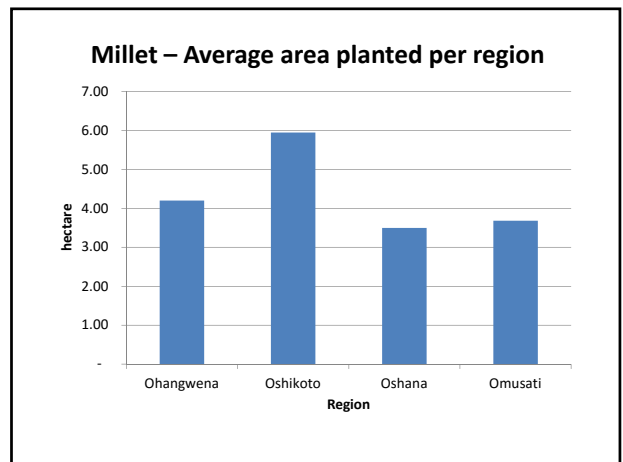
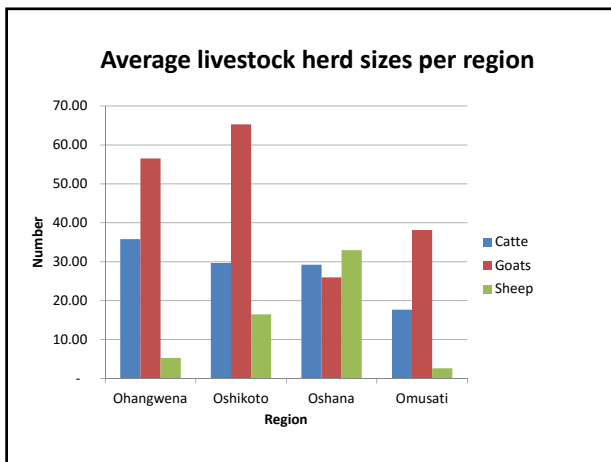
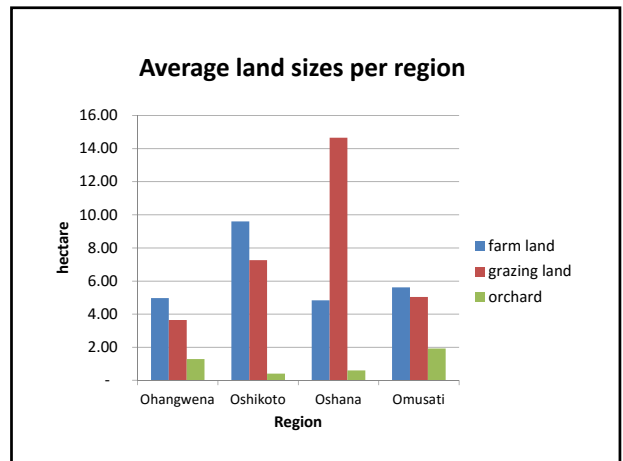
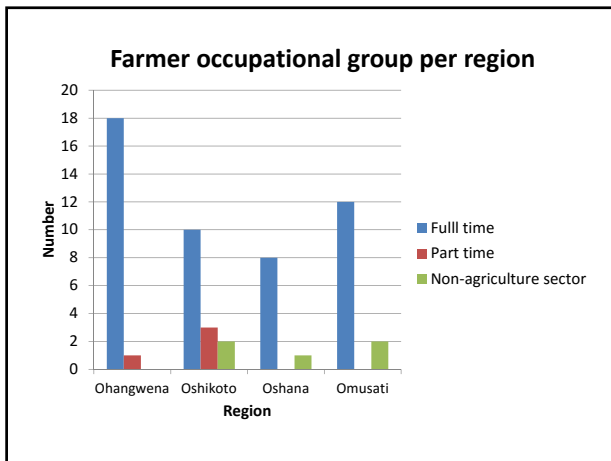


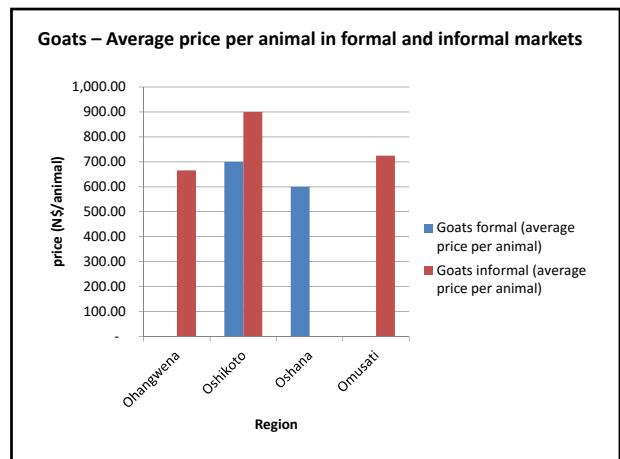
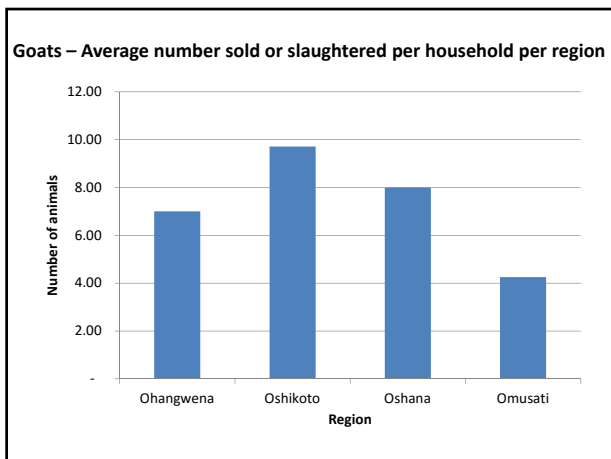
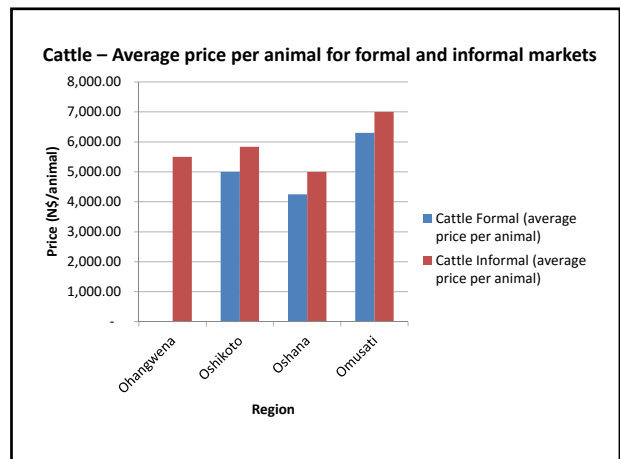
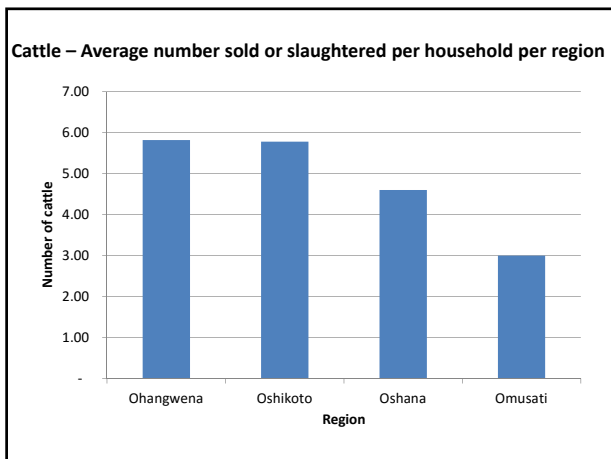
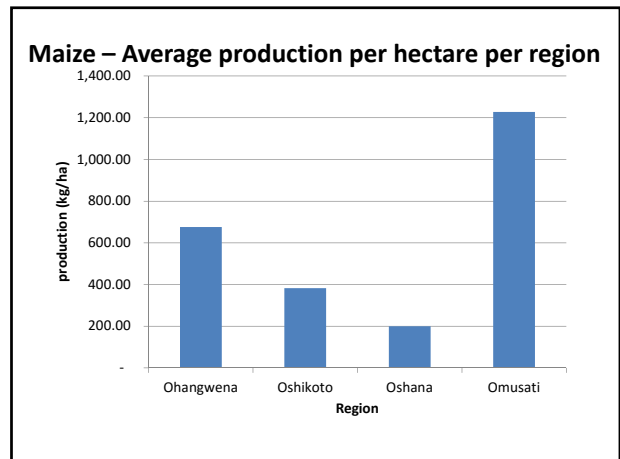
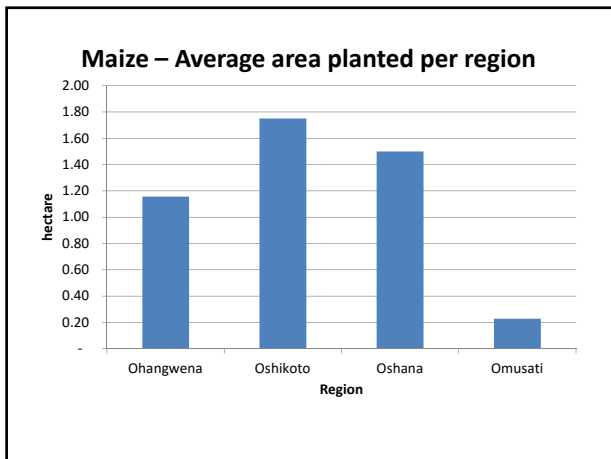
Years of farming experience per region

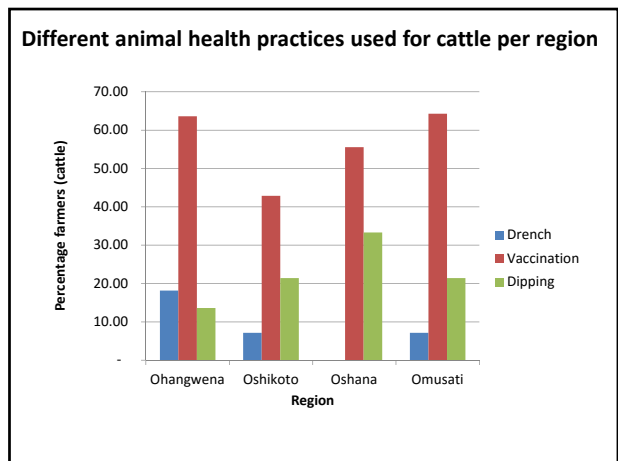
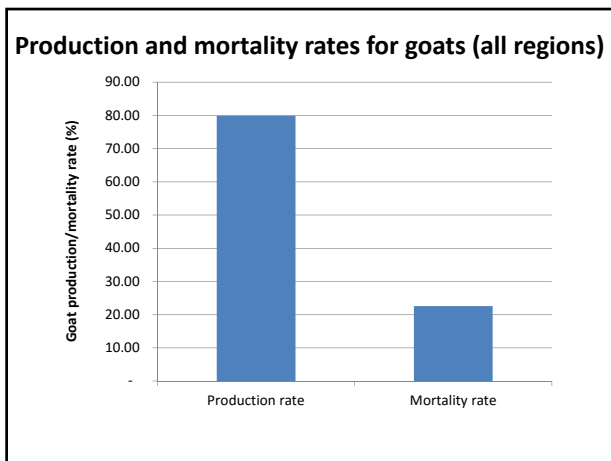
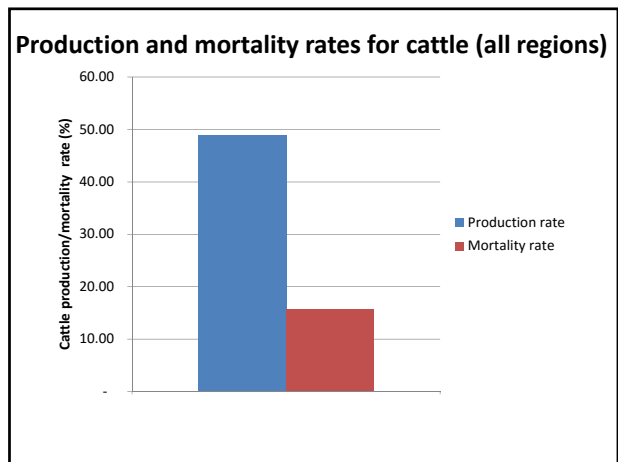
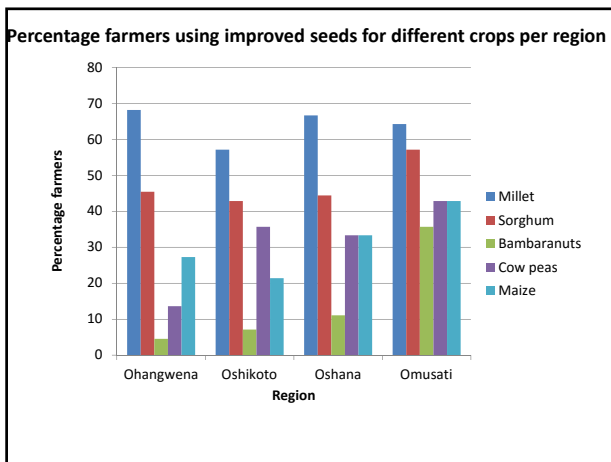
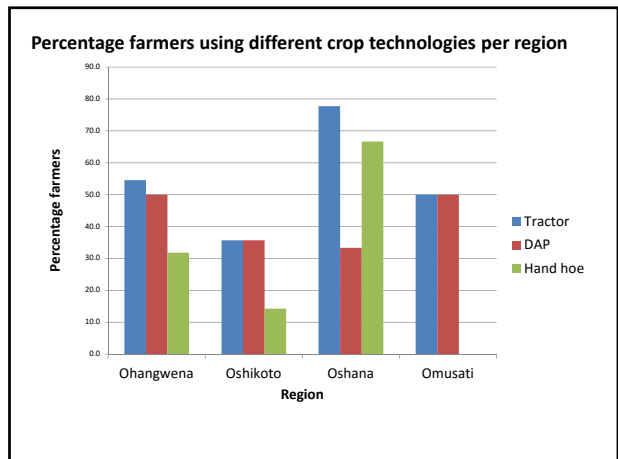
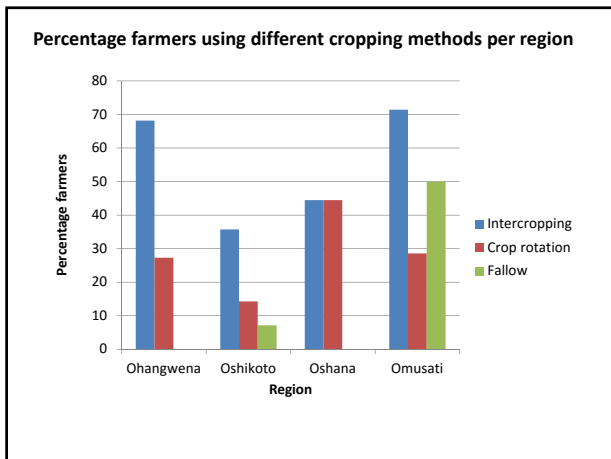


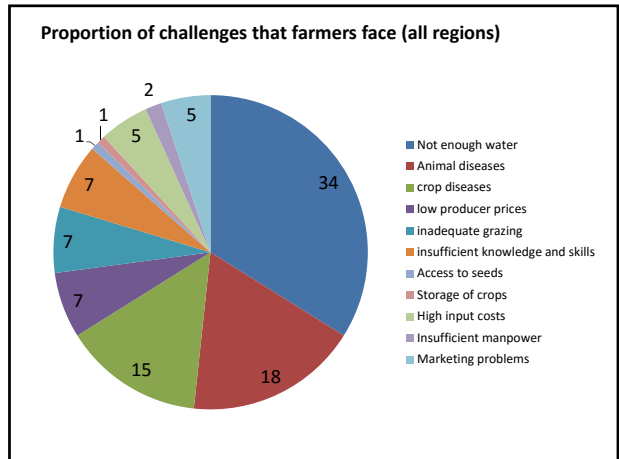
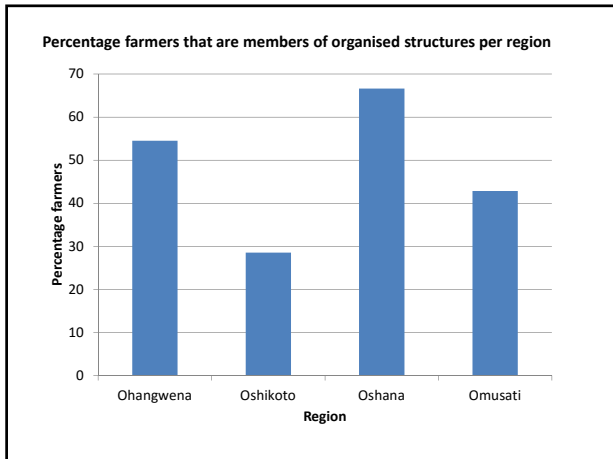
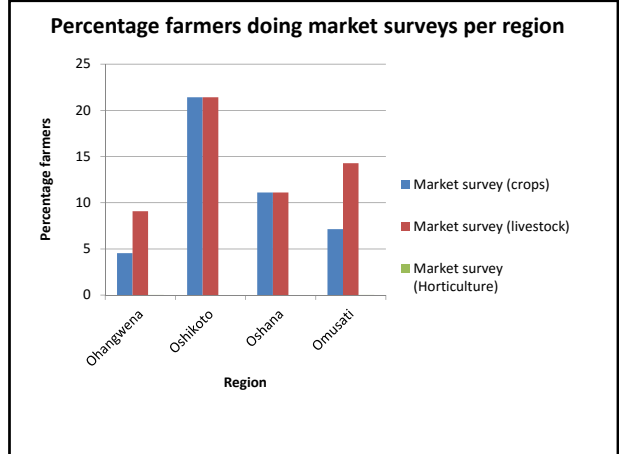
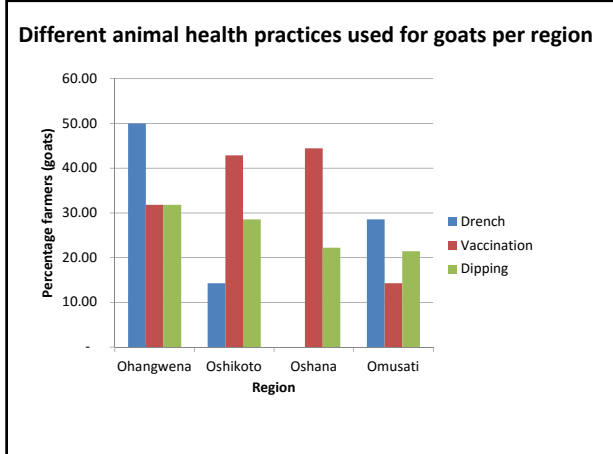
Total members in household per region











***FORM-3:
Monitoring Form for
Fixed Pointed Observation***

N-CLIMP

Japan International Cooperation Agency (JICA) Ministry of Agriculture, Water and Forestry (MAWF), Namibia

N-CLIMP

Northern Crop and Livestock Development Master Plan Study
Fixed Point Observation

Outline of Fixed Point Observation

- Purpose:** Monitor selected farmers continuously to clarify farming activities, problems and challenges during cropping season
- Target farmers:** to be selected from sample farmers surveyed for detailed thematic survey
- Number of farmers to be monitored:** 3 farmers per region (crop, livestock and horticulture)
- Frequency:** every 2 weeks
- To be carried out by:** ATs at selected constituencies

2

Monitoring Form

Please refer to the handout.

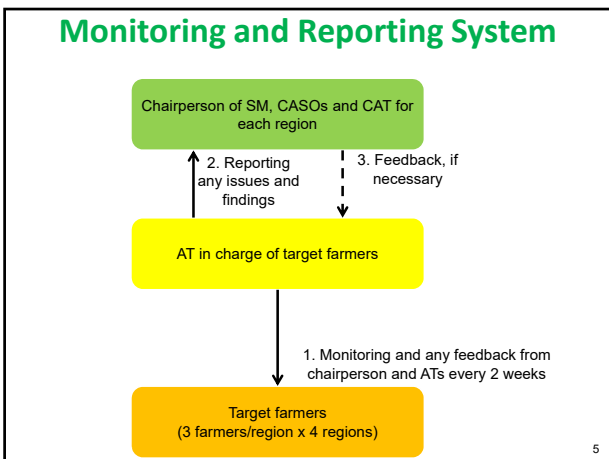
3

Selection of Typical Farmers

Target: 3 typical model farmers in each region

For example,

4



Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia
N-CLIMP
Fixed Point Observation Sheet

Date	
Observation point	ADC _____ AT _____ Region: Oshikoto Oshana Ohangwena Omusati Village name: _____ Farmer or group name _____ No of Household Members _____
General Information	Crop production-based / Livestock production-based / Horticulture Name: _____ Tel: _____ Land holding: _____ ha Area cultivated in 2014/2015: _____ ha Cost spent on Cultivation N\$..... GRN/Private..... Types of crops/Fruits/Vegetables..... No of workers:..... Irrigation System:..... Number of livestock: Cattle _____ Goat _____ Pig _____ Duck _____ Chicken _____ Others _____ No. at the Cattle Post..... Cattle Herders.....
Planned activities	◆ Crop production or livestock raising ◆ Meeting ◆ Training
Period: From: _____ To: _____	

Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia
N-CLIMP
Fixed Point Observation Sheet

<p>Actual activities</p> <p>Period: From: <u>Dec 2014</u> To: <u>Feb 2015</u></p>	<ul style="list-style-type: none"> ◆ Crop production or livestock raising ◆ Meeting ◆ Training
<p>Plans for next 2 weeks</p> <p>Period: From: <u> 2015</u> To: <u> 2015</u></p>	<ul style="list-style-type: none"> ◆ Crop production or livestock raising ◆ ◆ Meeting ◆ Training
<p>Problems, Challenges and Findings</p>	<p>1.</p> <p>2.</p>

Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia
N-CLIMP
Fixed Point Observation Sheet

Date of Visit	07 April 2015	Visit No. 5
Next Visit	21 April 2015	
Farmer Name	Mr. Vaino Vilho	
Observation point	ADC <u>Onankali</u> Region: Oshikoto Village name: <u>Ositi</u> Type of Farmer: <u>.....Horticulture.....</u>	
Planned activities Period: From: _____ To: _____	<ul style="list-style-type: none"> ◆ Crop production or livestock raising Planting of lettuce, Chinese Cabbage ◆ Meeting None ◆ Training None 	
Actual activities Period: From: _____ 2015 To: _____ 2015	<ul style="list-style-type: none"> ◆ Crop production or livestock raising Transplanting of Tomato seedlings, Planting of lettuce, Chinese cabbage, potatoes & egg-plants Improvement of the garden structure ◆ Meeting None ◆ Training None 	
Plans for next 2 weeks Period: From: _____ 2015 To: _____ 2015	<ul style="list-style-type: none"> ◆ Crop production or livestock raising <ul style="list-style-type: none"> ◆ Harvesting and selling of peppers and other vegetables, ◆ Applying of pesticides to affected potato and the Chinese cabbage ◆ Continue with the selling of the plants from the nursery ◆ Meeting None ◆ Training None 	

Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia
N-CLIMP
Fixed Point Observation Sheet

Problems, Challenges and Findings	<ol style="list-style-type: none">1. Termites infecting the Chinese cabbage and the potatoes2. Sun
Additional Activities Conducted by N-CLIMP Team	

FORM-4:
Selection Procedure of Pilot Site Activities

N-CLIMP

Japan International Cooperation Agency (JICA) Ministry of Agriculture, Water and Forestry (MAWF), Namibia

N-CLIMP

Northern Crop and Livestock Development Master Plan Study

Selection Procedure of Pilot Site Activities

Selection Steps of Pilot Site Activities

Step-1: What are the **technical challenges** to be focused for the following activities: (i) crop production (cereal/grains), (ii) crop production (horticulture crops), (iii) livestock production (large stock), (iv) livestock production (small stock) and (v) others, if any, in your region based on overall review survey and detailed thematic survey in phase-1?

Step-2: Discuss **criteria** for pilot site selection

Step-3: Where are the **potential sites** to implement pilot site activities based on agreed selection criteria? Select ADC for each activity.

2

Technical challenges listing (Step-1)

- Five numbers of sticky notes are distributed to all the participants.
- Participants are requested to write one technical challenge for each major activity: (i) crop production (cereal/grains), (ii) crop production (horticulture crops), (iii) livestock production (large stock), (iv) livestock production (small stock) and (v) others.

3

Technical challenges listing (Step-1)

For example...

Cereal/grains	Horticulture	Large stock	Small stock	Others
Fertilizer-related	Water shortage			
Seed-related				
Land preparation-related				
				Market access

◆ Each participant write challenge and...
◆ Group similar ideas by facilitator

4

Technical challenges listing (Step-1)

Crop Cereal	Horticulture	Livestock Large	Livestock Small	Others

Technical challenges listing (Step-1) (Image of discussion summary)

Crop Cereal	Horticulture	Livestock Large	Livestock Small	Others
Tractors – not enough/ late	Water harvesting	Diseases and pests	Diseases and Pests	AT's are not enough
Weeding	Lack of Skills on irrigation	Over-Grazing and over stocking	Lack of proper skills for small livestock farming	Transport
Seeds not enough	No piloting projects for demonstrations e.g. Greenhouse, vegetable production, water harvesting etc.	No subsidy from GRN on Feeds and supplements during drought periods	Feeds are expensive	Lack/insufficient funds
Fertilizers/Manure/ Soil Fertility	Land preparation	Availability of Vaccines	Lack of Technical skills & knowledge in Livestock husbandry practices	Lack of facilities such as Auction kraals
Rain	Training in Horticulture skills	Accessibility to livestock marketing facilities (Distance)	Grazing areas for goats and sheep	

Step-2:

Discussion on Selection Criteria for Pilot Site Activities

Principle: All the ATs agree to the criteria and the selection result!

For example...

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">◆ Farmers' group are existing or not...◆ If farmers' group are not available, the site would be excluded from pilot site activities.
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

Step-3:

Selection of ADC for Pilot Site Activities

Activities	ADC
Crop Production (Cereal) + Water Supply + Farm Management	
Crop Production (Horticulture) + Water Supply + Farm Management	
Livestock Production (Cattle) + Water Supply + Farm Management	
Livestock Production (Small) + Water Supply + Farm Management	

Japan International Cooperation Agency (JICA) Ministry of Agriculture, Water and Forestry (MAWF), Namibia

N-CLIMP

Northern Crop and Livestock Development Master Plan Study

Selection Procedure of Pilot Site Activities

Selection Steps of Pilot Site Activities

Step-1: What are the **technical challenges** to be focused for the following activities: (i) crop production (cereal/grains), (ii) crop production (horticulture crops), (iii) livestock production (large stock), (iv) livestock production (small stock) and (v) others, if any, in your region based on overall review survey and detailed thematic survey in phase-1?

Step-2: Discuss **criteria** for pilot site selection

Step-3: Where are the **potential sites** to implement pilot site activities based on agreed selection criteria? Select ADC for each activity.

2

Technical challenges listing (Step-1)

- Five numbers of sticky notes are distributed to all the participants.
- Participants are requested to write one technical challenge for each major activity: (i) crop production (cereal/grains), (ii) crop production (horticulture crops), (iii) livestock production (large stock), (iv) livestock production (small stock) and (v) others.

3

Technical challenges listing (Step-1)

For example...

Cereal/grains	Horticulture	Large stock	Small stock	Others
Fertilizer-related	Water shortage			
Seed-related				
Land preparation-related				
				Market access

◆ Each participant write challenge and...
◆ Group similar ideas by facilitator

4

Technical challenges listing (Step-1)

Crop Cereal	Horticulture	Livestock Large	Livestock Small	Others

Technical challenges listing (Step-1) (Image of discussion summary)

Crop Cereal	Horticulture	Livestock Large	Livestock Small	Others
Tractors – not enough/ late	Water harvesting	Diseases and pests	Diseases and Pests	AT's are not enough
Weeding	Lack of Skills on irrigation	Over-Grazing and over stocking	Lack of proper skills for small livestock farming	Transport
Seeds not enough	No piloting projects for demonstrations e.g. Greenhouse, vegetable production, water harvesting etc.	No subsidy from GRN on Feeds and supplements during drought periods	Feeds are expensive	Lack/insufficient funds
Fertilizers/Manure/ Soil Fertility	Land preparation	Availability of Vaccines	Lack of Technical skills & knowledge in Livestock husbandry practices	Lack of facilities such as Auction kraals
Rain	Training in Horticulture skills	Accessibility to livestock marketing facilities (Distance)	Grazing areas for goats and sheep	

Step-2:

Discussion on Selection Criteria for Pilot Site Activities

Principle: All the ATs agree to the criteria and the selection result!

For example...

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">◆ Farmers' group are existing or not...◆ If farmers' group are not available, the site would be excluded from pilot site activities.
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

Step-3:

Selection of ADC for Pilot Site Activities

Activities	ADC
Crop Production (Cereal) + Water Supply + Farm Management	
Crop Production (Horticulture) + Water Supply + Farm Management	
Livestock Production (Cattle) + Water Supply + Farm Management	
Livestock Production (Small) + Water Supply + Farm Management	

FORM-5:
List of Key Farmers

N-CLIMP

List of Key farmers

Date: _____

Implementation period: _____

1. General Information				
1.1 Region	Omusati	Oshikoto	Oshana	Ohangwena
1.2 Constituency				
1.3 ADC				
1.4 AT in charge				
1.5 Activities	Cereal/Grain	Horticulture	Cattle	Small stocks

2. List of key farmers			
Name	Village	Sex	Contact
1 (Demonstration farm)			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

FORM-6:
Baseline Survey for Farming Activities

N-CLIMP

Japan International Cooperation Agency (JICA) Ministry of Agriculture, Water and Forestry (MAWF), Namibia

N-CLIMP

Northern Crop and Livestock Development Master Plan Study

General Farming Activities of the Participants

Purpose of this session

- ◆ Re-confirm general farming activities of the participants,
- ◆ in particular, crop and livestock production and income in the last year

2

Format for crop production (cereal/grains and horticulture)

Variety of crops:

Total Area Planted in 2014/2015: [] ha

Total Production in 2014/2015: [] Bag, [] kg

How much kg per a bag? [] kg

Home Consumption: [] Bag, [] kg

Seed for 2015/2016: [] Bag, [] kg

Selling to Market:

Bag	Price NS/Bag	Amount NS
[] kg	[] NS/kg	[] NS

3

Format for livestock production (large and small stock)

Variety of livestock:

Total number owned now: [] nos.

Home Consumption in 2014: [] nos.

Sold in 2014: [] nos.

Died in 2014: [] nos.

4

Format filled (sample)

SAMPLE

Millet

Total Area Planted in 2014/2015: 3.0 ha

Total Production in 2014/2015: 12 Bag, 600 kg

How much kg per a bag? 50 kg

Home Consumption: 8 Bag, 400 kg

Seed for 2015/2016: 1 Bag, 50 kg

Selling to Market:

Bag	Price	Amount
3 Bag	150 NS/Bag	NS 450
150 kg	3.0 NS/kg	NS 450

Goat

Total number owned now: 10 nos.

Home Consumption in 2014: 1 nos.

Sold in 2014: 1 nos.

Died in 2014: 1 nos.

5

Format to be filled up

Farmers (ADC) belonging to the following activities	Format
Crop Production (Cereal) + Water Supply + Farm Management	Format for crop production (cereal/grain)
Crop Production (Horticulture) + Water Supply + Farm Management	Format for crop production (horticulture)
Livestock Production (Cattle) + Water Supply + Farm Management	Format for livestock production (cattle)
Livestock Production (Small stock) + Water Supply + Farm Management	Format for livestock production (small stocks)

FORM: Baseline Survey for Crop and Livestock Production

Format for crop production (cereal/grains and horticulture)

Variety of crops:

Total Area Planted in 2014/2015 <input type="text" value="ha"/>	Total Production in 2014/2015 <input type="text" value="Bag"/> <input type="text" value="kg"/>	<input type="text" value="Bag"/> How much kg per a bag? <input type="text" value="kg"/>
--------------------------------------------------------------------	------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------

Home Consumption <input type="text" value="Bag"/> <input type="text" value="kg"/>	Seed for 2015/2016 <input type="text" value="Bag"/> <input type="text" value="kg"/>	Selling to Market
Price Amount		
<input type="text" value="Bag"/>	<input type="text" value="NS/Bag"/>	<input type="text" value="NS"/>
<input type="text" value="kg"/>	<input type="text" value="NS/kg"/>	<input type="text" value="NS"/>

1

Format for livestock production (large and small stock)

Variety of livestock:

Total number owned now <input type="text" value="nos."/>		
Home Consumption in 2014 <input type="text" value="nos."/>	Sold in 2014 <input type="text" value="nos."/>	Died in 2014 <input type="text" value="nos."/>

2

Format filled (sample)

SAMPLE

Millet

Total Area Planted in 2014/2015 <input type="text" value="3.0 ha"/>	Total Production in 2014/2015 <input type="text" value="12 Bag"/> <input type="text" value="600 kg"/>	<input type="text" value="1 Bag"/> How much kg per a bag? <input type="text" value="50 kg"/>
------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------

Home Consumption <input type="text" value="8 Bag"/> <input type="text" value="400 kg"/>	Seed for 2015/2016 <input type="text" value="1 Bag"/> <input type="text" value="50 kg"/>	Selling to Market
Price Amount		
<input type="text" value="3 Bag"/>	<input type="text" value="150 NS/Bag"/>	<input type="text" value="NS 450"/>
<input type="text" value="150 kg"/>	<input type="text" value="3.0 NS/kg"/>	<input type="text" value="NS 450"/>

Goat

Total number owned now <input type="text" value="10 nos."/>		
Home Consumption in 2014 <input type="text" value="1 nos."/>	Sold in 2014 <input type="text" value="1 nos."/>	Died in 2014 <input type="text" value="1 nos."/>

3

FORM-7:
Action Plan for Pilot Site Activities

N-CLIMP

Action Plan for Pilot Site Activities of N-CLIMP

Date: _____

Implementation period: _____

1. General Information				
1.1 Region	Omusati	Oshikoto	Oshana	Oshana
1.2 Constituency				
1.3 Village				
1.4 ADC				
1.5 AT in charge				
1.6 Relevant organizations				

2. Group Information	
2.1 Group name	
2.2 Representative	
2.3 Number of Group Members	

3. Major Activities	
3.1 Crop (cereal/grains)	
3.2 Crop (horticulture)	
3.3 Livestock (cattle)	
3.4 Livestock (small stocks)	

4. Work Schedule										
No.	Activity	Person in charge	Monitoring							
				Oct	Nov	Dec	Jan	Feb	Mar	Apr
4.1			Plan							
			Actual							
4.2			Plan							
			Actual							
4.3			Plan							
			Actual							
4.4			Plan							
			Actual							
4.5			Plan							
			Actual							
4.6			Plan							
			Actual							
4.7			Plan							
			Actual							
4.8			Plan							
			Actual							

Action Plan for Pilot Site Activities in Phase-2 of N-CLIMP

Date: 9-Sep-15

Implementation period:

October 2015 to April 2016

1. General Information										
1.1 Region/ Oshitopolwa shopapolitika	Ohangwena									
1.2 Constituency /Oshikandjohogololo	Epembe									
1.3 Village/Omukunda	Opumba Ondjamba									
1.4 ADC/Ombelewa yuunamapya	Epembe									
1.5 AT in charge/ Omunambelewa	Kasaona Bruce									
1.6 Relevant organizations/ Omahangano tagadhana onkandangala yasimana	Regional Council, DAPEES, AMTA									
2. Group Information										
2.1 Group name/ edhina lyongundu	Omwene Tatalulula Support Group									
2.2 Representative/ Omukalelipo	Helena Shiteleni (Coordinator)									
2.3 Number of Group Members/ Omwaalu gwilyo yongundu	49									
3. Major Activities										
3.2 Crop (horticulture) / likwayihape (eemboga)	Training on vegetables, Irrigation System, Seeds, Garden tools, Fencing									
4. Work Schedule										
No.	Activity / linyangadhalwa	Person in charge / Omuwiliki	Monitoring Okukonakona	2015			2016			
				Oct	Nov	Dec	Jan	Feb	Mar	Apr
4.1	Group meetina & feedback	Cordinator	Plan/Ethaneko Actual/lizemo	x						
4.2	De-Bushina + Fence	All members	Plan/Ethaneko Actual/lizemo	x						
4.3	Market research	Executives	Plan/Ethaneko Actual/lizemo	x						
4.4	Drip irriqaation installation	All members	Plan/Ethaneko Actual/lizemo	x						
4.5	Land preparation	All members	Plan/Ethaneko Actual/lizemo	x	x	x				
4.6	Plantina	All members	Plan/Ethaneko Actual/lizemo	x	x	x				
4.7	Harvestina + Marketina	All members	Plan/Ethaneko Actual/lizemo	x					x	x
4.8	Group meetina for next croppina	All members	Plan/Ethaneko Actual/lizemo	x					x	x
4.9			Actual/lizemo Plan/Ethaneko							

Japan International Cooperation Agency (JICA) Ministry of Agriculture, Water and Forestry (MAWF), Namibia

N-CLIMP

Northern Crop and Livestock Development Master Plan Study

Action Plan Preparation

Purpose of this session

- ◆ Prepare action plan of each farmers' group for the implementation of pilot site activities

2

List of Pilot Site Activities

Activities	ADC
Crop Production (Cereal) + Water Supply + Farm Management	
Crop Production (Horticulture) + Water Supply + Farm Management	
Livestock Production (Cattle) + Water Supply + Farm Management	
Livestock Production (Small stock) + Water Supply + Farm Management	

Format for Action Plan (1/5)

Action Plan for Pilot Site Activities in Phase-2 of N-CLIMP

Date: _____
Implementation period: October 2015 to April 2016

1. General Information		Omusati	Oshikoto	Oshana	Ohangwena				
1.1 Region									
1.2 Constituency									
1.3 Village									
1.4 ADC									
1.5 AT in charge									
1.6 Relevant organizations									
2. Group Information									
2.1 Group name									
2.2 Representative									
2.3 Number of Group Members									
3. Major Activities									
3.1 Crop (cereals/grains)									
3.2 Crop (horticulture)									
3.3 Livestock (cattle)									
3.4 Livestock (small stocks)									
4. Work Schedule									
No.	Activity	Person in charge	2014			2015			
			Oct	Nov	Dec	Jan	Feb	Mar	Apr
4.1									
4.2									
4.3									
4.4									
4.5									
4.6									
4.7									
4.8									

Please refer to the handout.

Format for Action Plan (2/5)

1. General Information	
1.1 Region	Omusati / Oshikoto / Oshana / Ohangwena
1.2 Constituency	To which your group belongs
1.3 Village	To which your group belongs
1.4 ADC	To which your group belongs
1.5 AT in charge	Technician's name
1.6 Relevant organizations	For example, DAPEES, FU, AMTA, Meat Board, AgriBank, traders in your site etc.

3

Format for Action Plan (3/5)

2. Group Information	
2.1 Group name	Omusati / Oshikoto / Oshana / Ohangwena
2.2 Representative	Name of representative of the group
2.3 Number of group members	Number of group members who belong to and participate in N-CLIMP

6

Format for Action Plan (4/5)

3. Major Activities

- 3.1 Crop (cereal/grains)
- 3.2 Crop (horticulture)
- 3.3 Livestock (cattle)
- 3.4 Livestock (small stocks)

Select one activities from four listed above (as discussed in today's meeting).

Current constraints and activities to solve those constraints...

For example,

Constraints

- ◆ Water shortage, insufficient equipment, insect, disease for horticulture
- ◆ Lack of marketing activities

Activities

- ◆ Promotion of horticulture crops (tomato) by drip irrigation,
- ◆ Insect and disease management
- ◆ Marketing in the village for horticulture crops

7

Format for Action Plan (5/5)

4. Work Schedule

No.	Activity	Person in charge	Monitoring	2015			2016				
				Oct	Nov	Dec	Jan	Feb	Mar	Apr	
4.1	Group meeting for commencement	Chair-person	Plan	■							
			Actual								
4.2	Market survey	Mrs. A	Plan	■							
			Actual								
4.3	Drip irrigation kit installation	Mr. A / Mrs. B	Plan		■						
			Actual								
4.4	Cropping	All the members	Plan			■	■				
			Actual								
4.5	Harvesting	All the members	Plan						■		
			Actual								
4.6	Selling products	Mr. C / Mrs. D	Plan							■	
			Actual								
4.7			Plan								
			Actual								
4.8			Plan								
			Actual								

FORM-8:
Support Plan by ATs

N-CLIMP

AT's Action Plan for Pilot Site Activities of N-CLIMP

Date: _____

Implementation period: _____

1. General Information				
1.1 Region	Omusati	Oshikoto	Oshana	Ohangwena
1.2 Constituency				
1.3 ADC				
1.4 AT in charge				
1.5 Activities	Cereal/Grain	Horticulture	Cattle	Small stocks

2. Relevant Techniques and Technical Measures			
Farmers' Challenge	Relevant Techniques	Necessary Inputs	
		By N-CLIMP	By Farmers
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

AT's Action Plan for Pilot Site Activities in Phase-2 of N-CLIMP

Date: Sept 09 2015

Implementation period: October 2015 to April 2016

1. General Information	
1.1 Region	Ohangwena
1.2 Constituency	Epembe
1.3 ADC	Epembe
1.4 AT in charge	Kasaona Bruce
1.5 Activities	Horticulture

2. Relevant Techniques and Technical Measures				
Farmers' Challenge		Relevant Techniques	Necessary Inputs	
			By N-CLIMP	By Farmers
1	Lack of training on vegetables	CR-8	Seeds, fertiliser, chemicals - all farmers	
2	Lack of Irrigation system	CR-6	tank : 1 Drip irrigation kits for each vegetables	
3	Lack of gardening tools			
4	Lack of fencing materials		Fence - demonstration farm	
5	Lack of seeds			
6		FM-2		
7		FM-5		
8		FM-6		
9		FM-7		
10		FM-3		

Japan International Cooperation Agency (JICA) Ministry of Agriculture, Water and Forestry (MAWF), Namibia

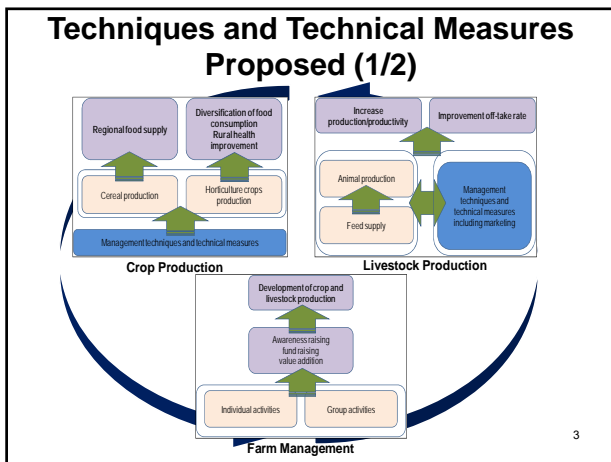
N-CLIMP

Northern Crop and Livestock Development Master Plan Study
Preparation of AT's action plan to support farmers' group

Purpose of this session

- ◆ Confirm the outline of proposed techniques and technical measures for pilot site activities,
- ◆ Select techniques and technical measures to be adopted corresponding to the challenges identified by farmers' group, and
- ◆ Estimate necessary inputs for each techniques and technical measures

2



Techniques and Technical Measures Proposed (2/2)

Crop Production	Livestock Production	Farm Management
CR-1 Fertilizer application	LS-1 Fodder production	FM-1 Organizational strengthening
CR-2 Cropping pattern	LS-2 Range management	FM-2 Book keeping (Farm Record)
CR-3 Conservation agriculture	LS-3 Water harvesting and/or construction of water resource facilities for animals	FM-3 Post Harvest
CR-4 Flood- and drought- adaptive cropping system (Rice-Maize mixed cultivation)	LS-4 Nutritious feed supply particularly for pig and chicken	FM-4 Business plan
CR-5 Water source / water harvesting	LS-5 Disease control	FM-5 Group formation/ group strengthening
CR-6 Water saving cultivation	LS-6 Large and small stock fattening	FM-6 Group accounting management
CR-7 Crop selection and marketing	LS-7 Periodical production	FM-7 Formulation of Water Users Association
CR-8 Cropping plan and horticulture crop management	LS-8 Expansion of quality meat	FM-8 Collective Selling/ Purchasing
	LS-9 Stocking of quality meat	FM-9 Rural finance accessibility improvement
	LS-10 Multi-breeds of Sanga bull	FM-10 Market information access improvement
	LS-11 Goat production	
	LS-12 Pig production	
	LS-13 Chicken production	
	LS-14 Livestock health management	
	LS-15 Development of formal market of formal market	
	LS-16 Establishment and strengthening livestock cooperatives	

Thirty five techniques and technical measures are proposed, out of which twenty seven will be applied for pilot site activities.

Let's prepare AT's action plan to support farmers' group.

5

Format for AT's Action Plan

Action Plan for Pilot Site Activities in Phase-2 of N-CLIMP

Implementation period: October 2015 to April 2016 Date: _____

1. General Information				
T.1 Region	Omusati	Oshana	Oshana	Ohangwena
T.2 Constituency				
T.3 ADC				
T.4 AT in charge				
T.5 Activities	Cereal/Grain	Horticulture	Cattle	Small stocks

Step 1

5. Relevant Techniques and Technical Measures				
Farmers' Challenge	Relevant Techniques	Necessary Inputs		
		By NCLIMP	By Farmers	
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Step 2 **Step 3** **Step 4**

Please refer to the handout

Step 1: General Information

1. General Information	
1.1 Region	<i>Omusati / Oshikoto / Oshana / Ohangwena</i>
1.2 Constituency	<i>In which you are in charge</i>
1.3 ADC	<i>In which you are in charge</i>
1.4 AT in charge	<i>Your name</i>
1.5 Activities	<i>Cereal / Horticulture / Cattle / Small stocks</i>

7

Step 2&3: Farmers' challenges and techniques and technical measures corresponding to challenges

2. Relevant techniques and Technical measures		
Farmers' challenge	Relevant techniques and technical measures	Necessary Inputs
EX) (Cereal) Low soil fertility	CR-1 Fertilizer application	
(Horticulture) Insufficiency of water	CR-5 Water harvesting CR-6 Water saving cultivation	
(Large stock) Diseases	LS-5 Disease control	
(Small stock) Lack of experience and knowledge for chicken farming	LS-13 Chicken production	
(Farm Management) Activities' record unavailable	FM-2 Book keeping	

Step 4

8

Step 4: Basic inputs covered by N-CLIMP(1/2)

1. Crop production	
Items	Notes
Land preparation (CR-3 Conservation Agriculture)	All the key farmers
Seed, Fertilizer, chemicals	All the key farmers
Fencing material	Demonstration farm only
Drip irrigation kit	All the key farmers
Water tank for roof catchment	Demonstration farm only
Pump for rice-mahangu mix cropping	For group
Fuel for pump	Demonstration farm only
Water harvesting by sand bag	Provide sand bag and tool

9

Step 4: Basic inputs covered by N-CLIMP(2/2)

2. Livestock Production	
Items	Notes
Seed	All the key farmers
Fencing material	Demonstration farm only
Medical kit	2 sets for the group
Medicine	Demonstration farm only
Livestock hut/cage	provide materials for demonstration farm only
Water harvesting by sand bag	Provide sand bag and tool

10

Step 4: Estimation of necessary inputs

2. Relevant techniques and Technical measures			
Farmers' challenge	Relevant techniques and technical measures	Necessary Inputs	
		By N-CLIMP	By Farmers
EX) (Cereal) Low soil fertility	CR-1 Fertilizer application	Seed 15 sets Fertilizer 15 sets	
(Horticulture) Lack of water	CR-5 Water harvesting CR-6 Water saving cultivation	Tank 1 Irrigation kit 15	Tank 14
(Large stock) Diseases	LS-5 Disease control	Medical Kit 2 Medicine 1 set	Medicine 14 sets
(Small stock) Lack of knowledge for chicken	LS-13 Chicken production	Chicken cage 1 set	Chicken cage 14 sets

11

***FORM-9:
Monitoring Form for Pilot Site Activities of
Techniques and Technical Measures Verification***

N-CLIMP

Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia
N-CLIMP
Pilot Site Activities Monitoring Sheet

Date: _____

Region	Omusati / Oshana / Oshikoto / Ohangwena
Activity	Cereal / Horticulture / Cattle / Small Stocks
Monitoring Points	
【Interview】 Activities done in 2 weeks	
【Interview】 Plans for next 2 weeks	
Observation	

**Northern Crop and Livestock Development Master Plan Study in the Republic of Namibia
N-CLIMP
Pilot Site Activities Monitoring Sheet**

Date: 12 January 2016 _____

Region	Omusati (Etayi)	
Activity	Cereal (Rice/Mahangu)	
Monitoring Points	<ul style="list-style-type: none"> -Progress of land preparation. -Observation of plant growth. -Water availability -Exposure visit (Rice/Mahangu). 	<ul style="list-style-type: none"> -Good record of book keeping. -record of rainfall
【Interview】 Activities done in 2 weeks	<ul style="list-style-type: none"> -Land preparation done 18th Dec 2015 -Watering of seedlings done twice a day, in the morning (6) buckets and afternoon (6) buckets. 	
【Interview】 Plans for next 2 weeks	<ul style="list-style-type: none"> -Putting the fence -Hoping for good rain so she start with transplanting seedlings. 	
Observation	<ul style="list-style-type: none"> -Seedlings are dying -no daily record of plant growth as there was no transplanting done. -no progress of fencing. -Transplanting has not yet been done. -corner posts needed for fencing from JICA Team -The ondobe is still dry for transplanting of seedlings. 	

Monitoring Plan for Pilot Site Activities (Example)

Year	2015			
Month	November			
Week	1	2	3	4
Event		1st Training		
Crop			<ul style="list-style-type: none"> -Progress of Land Preparation -Progress of fence construction -Progress of installation of Water harvesting facilities -Progress of installation of Drip irrigation kits -Progress of sand bag dike construction -Progress of Market visit -Follow up of cropping calendar -Preparation of inputs (seed, fertilizer) 	
Livestock			<ul style="list-style-type: none"> -Progress of Land Preparation -Progress of fence construction -Progress of installation of Water harvesting facilities -Progress of sand bag dike construction -Progress of Market visit -Progress of information gathering for vaccination -Progress of construction of cage -Follow up of range management (rotation plan) -Change of animal number (death, birth, sold, etc) -Preparation of inputs (seed) 	
Farm Management			<ul style="list-style-type: none"> -Book Keeping <li style="padding-left: 20px;">Crop: Tractor hiring/Fertilizer/Manure/Seed/Water <li style="padding-left: 20px;">Livestock: Tractor hiring/Manure/Seed/Water/Supplemental feed/Hey -Progress of group discussion - rules and regulations -Progress of group accounting management -Progress of WUA formulation -Progress of collective purchasing -Progress of loan application 	

Monitoring Plan for Pilot Site Activities (Example)

Year	2015			
Month	December			
Week	1	2	3	4
Event	2nd Training			
Crop		<ul style="list-style-type: none"> -Observation of plant growth (including thinning) -Progress of fertilizer application -Progress of weeding -Water availability -Follow up of cropping calendar -Exposure visit (Rice-Mahangu) 		
Livestock		<ul style="list-style-type: none"> -Observation of fodder growth -Progress of feed production -Progress of vaccination, medical treatment -Animal husbandry -Follow up of range management (rotation plan) -Water availability -Change of animal number (death, birth, sold, etc) 		
Farm Management		<ul style="list-style-type: none"> -Book Keeping Crop: Daily record of plant growth, disease, insect, death, fertilizer, water Livestock: Breeding record, medicine, vaccine, vitamin, water etc 		

Monitoring Plan for Pilot Site Activities (Example)

Year	2016			
Month	January			
Week	1	2	3	4
Event				
Crop	<ul style="list-style-type: none"> -Observation of plant growth (including thinning) -Progress of fertilizer application -Progress of weeding -Water availability -Follow up of cropping calendar 			
Livestock	<ul style="list-style-type: none"> -Observation of fodder growth -Progress of feed production -Progress of vaccination, medical treatment -Animal husbandry -Follow up of range management (rotation plan) -Water availability -Change of animal number (death, birth, sold, etc) 			
Farm Management	<ul style="list-style-type: none"> -Book Keeping <li style="padding-left: 20px;">Crop: Daily record of plant growth, disease, insect, death, fertilizer, water <li style="padding-left: 20px;">Livestock: Breeding record, medicine, vaccine, vitamin, water etc 			

Monitoring Plan for Pilot Site Activities (Example)

Year	2016			
Month	February			
Week	1	2	3	4
Event	3rd Training			
Crop		<ul style="list-style-type: none"> -Observation of plant growth (including thinning) -Progress of fertilizer application -Progress of weeding -Water availability -Harvest (amount, quality, etc) -Marketing -Follow up of cropping calendar 		
Livestock		<ul style="list-style-type: none"> -Observation of fodder growth -Progress of feed production -Progress of vaccination, medical treatment -Animal husbandry -Follow up of range management (rotation plan) -Water availability -Change of animal number (death, birth, sold, etc) -Hey making, Silage making -Marketing 		
Farm Management		<ul style="list-style-type: none"> -Book Keeping Crop: Daily record of plant growth, disease, insect, death, fertilizer, water, harvest, marketing Livestock: Breeding record, medicine, vaccine, vitamin, water ,hey, silage, marketing, etc 		

Monitoring Plan for Pilot Site Activities (Example)

Year	2016			
Month	March			
Week	1	2	3	4
Event				
Crop	<ul style="list-style-type: none"> -Observation of plant growth (including thinning) -Progress of fertilizer application -Progress of weeding -Water availability -Harvest (amount, quality, etc) -Marketing -Follow up of cropping calendar 			
Livestock	<ul style="list-style-type: none"> -Observation of fodder growth -Progress of feed production -Progress of vaccination, medical treatment -Animal husbandry -Follow up of range management (rotation plan) -Water availability -Change of animal number (death, birth, sold, etc) -Hey making, Silage making -Marketing 			
Farm Management	<ul style="list-style-type: none"> -Book Keeping <li style="padding-left: 20px;">Crop: Daily record of plant growth, disease, insect, death, fertilizer, water, harvest, marketing <li style="padding-left: 20px;">Livestock: Breeding record, medicine, vaccine, vitamin, water, hey, silage, marketing, etc 			

Monitoring Plan for Pilot Site Activities (Example)

Year	2016			
Month	April			
Week	1	2	3	4
Event	4th Training			
Crop		<ul style="list-style-type: none"> -Observation of plant growth (including thinning) -Progress of fertilizer application -Progress of weeding -Water availability -Harvest (amount, quality, etc) -Marketing -Follow up of cropping calendar -Exposure visit (Rice-Mahangu) -Post harvest (threshing, winnowing, drying , sorting, cleaning, grading, processing, etc) 		
Livestock		<ul style="list-style-type: none"> -Observation of fodder growth -Progress of feed production -Progress of vaccination, medical treatment -Animal husbandry -Follow up of range management (rotation plan) -Water availability -Change of animal number (death, birth, sold, etc) -Hey making, Silage making -Marketing 		
Farm Management		<ul style="list-style-type: none"> -Book Keeping <li style="padding-left: 20px;">Crop: Daily record of plant growth, disease, insect, death, fertilizer, water, harvest, marketing, post harvest <li style="padding-left: 20px;">Livestock: Breeding record, medicine, vaccine, vitamin, water, hey, silage, marketing, etc 		

FORM-10:
Market Survey

N-CLIMP

Manual for Market Survey for Namibian SHEP approach

Objective of Market Survey

Conducting Market Survey is very important to make your planting plan which is orientated by marketing activity. To make a planting plan which is market oriented, you have to know about the situation of the market which you want to target to sell. So, it can be said that your marketing activities is started already before you start planting.

Key Points of Market Survey

Market Survey is one of the most important activities of SHEP. There are 3 principles of SHEP's Market Survey; by the farmers, from a view point of the farmers, and information that suits the situation of the farmers.

The role of ATs and N-CLIMP staffs is to support farmers, not to go in front during Market

Procedure of Market Survey

- Determine the markets to be visited (by AT) 1 should be a nearby local market
- Prepare the survey questionnaire (by Project Team)
- Identify market survey team members (by AT with consensus of group members) *1
- Carry out the survey
- Crop selection based on market survey information (at 3rd training)

Time schedule

- 9:00 Registration and briefing at ADC *1
- 10:00 Arrival at 1st Market
- 11:30 Departure from 1st Market
- 12:00 Arrival at 2nd Market
- 13:30 Departure from 2nd Market
- 14:00 Back to ADC

Conducting Market Survey

During conducting the market survey, please pay your attention to those points listed below to carry out the survey effectively.

- Introduce interviewee about you and purpose of your visit to obtain their cooperation.
- Hold discussion when the interviewee is serving their customers.
- Avoid repetitions to save a time. Remember the interviewee is very busy for their business during the survey
- Use friendly language and express your gratitude at the end of the interview.

Please note that the interviewees are your potential business partners in the future. The market survey also gives you a good opportunity to make a linkage with them.

Items to be prepared

- Clipboard 5
- Pen 5
- Questionnaire sheet 20

*1 Formation of interview team

Among 15 participants, 3 teams will be formulated. Composition of each team should be carefully considered, specially for Oshikoto where farmers work individually (Based on crop, geographical position, gender balance and so on) preferably a team of 5 farmers

Each team to choose an interviewer and secretary amongst the team members.

Manual for Crop Selection for Namibian SHEP approach

Procedure of Crop Selection

- Fill up the crop selection sheet according to the results of market survey *1
- List down the crops covered during the market survey
 - Fill each column with accurate information for all candidate crops using: market survey results, crop production experience and other available information
 - To fill the column "Month of planting", it is important to consider "month of peak demand" of market survey sheet, to get better income.
 - After completing the Sheet, please select 2 priority crops based on your decision by information in the sheet. Crop selected should be easy implement, low technical requirement and affordable. Major production challenge should not be ignored for crop

Farming Schedule

After selection of 2 preferred crops, please make farming schedule for those selected crops. Farming schedule should be designed to harvest your target period of high demand season, which you identify in the market survey and its analysis. Please make sure farming schedule is practical and try to avoid to ignorance of your condition of

Items to be prepared

- Clipboard 5
- Pen 5
- Crop Selection sheet 20
- Farming schedule sheet 20

*1 Crop Selection sheet

A group share communal land and work together with all the group members such as the group in Epembe should prepare 1 sheet as a group, on the other hands, a group where land is allocated individually such as Etunda and Okatana, every member prepare a sheet

Crop Selection Sheet

Date: **2 February 2016**

Name: **Bernadette**

Crop & Variety	Experience in cultivating the crop	Maturing period	Month of planting	Major production challenges	Main market(s)	Marketing condition	Remarks	Ranking
Tomato Roma	Yes	3 months	6,12	Late blight disease	Ongwediva town market Ongwediva hub	10kg 50kg 1000kg	A need to avoid damage while transportation	1
Carrot	No	3 months	7,8,9	Termite damage	Ongwediva hub	1000kg	A need to spray insecticide	
Onion	Yes	4 months	11,5	None	Ongwediva town market Ongwediva hub	150kg 300kg 2000kg		2
Cabbage	Yes	3 months	6,12	Pests difficult to get controlled	Ongwediva town market Ongwediva hub	300kg 500kg 2000kg		
Brinjal (Eggplant)	No	4 months	6,12	None	Ongwediva hub	1000kg	A need to avoid damage while transportation	

***FORM-11:
Farming Schedule***

N-CLIMP

***FORM-12:
Progress of Technical Dissemination***

N-CLIMP

Farmers' Activities So Far

~ Have You Use Techniques and Technical Measures Proposed in N-CLIMP? ~

Purpose

To understand the situation about application of techniques and technical measures of key farmers. Then, utilizing the results for evaluating the techniques.

1. Conducting survey in sites (20~30 min in total)

(0) Preparation following material in the office

- Flip chart
- Post-it
- Pens for 15 farmers
- Marker

(1) Explain the following to the farmers

- Purpose of survey
- How to answer

(2) Distribute post-it to key farmers (the same time as "1")

※don't distribute post-it to demo farmer.

(3) Question farmers and let farmers answer (the same time as "1")

- The question is "Did the farmers use oo in the way that **we suggested** in 3rd training?"

(4) Collect post-it from farmers

- Some farmers answer faster, others answer slow. So, please collect the post-it from the farmers that are finished answering.

2. Analysis

- Calculate the percentage of the farmers that use techniques of survey like following tables.
- Make following tables about each kind of techniques (cereal, horticulture, cattle, chicken and goat).

Sites		Basal fertilizer application	Thinning	Rice-mahangu mixed cropping
Etayi (Omusati)	Number of famers' answers	***	***	***
	Percentage of famer's implementation (%)	***	***	***
Okaukamasheshe (Oshana)	Number of famers' answers	12	11	
	Percentage of famer's implementation (%)	25.0	100.0	
Omuthiya (Oshikoto)	Number of famers' answers	7	7	
	Percentage of famer's implementation (%)	71.4	71.4	
Total	Number of famers' answers	19	18	***
	Percentage of famer's implementation (%)	42.1	88.9	***

- Compare the data as follow.
 - (1) Comparison of percentage of each techniques among sites.

Ex) while only 1/4 of the farmers use basal fertilizer in Okaukamasheshe, more than 70% of all the famers use that techniques in Omuthiya.
 - (2) Comparison of percentage of total farmers among techniques

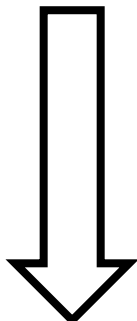
Ex) although basal fertilizer application is used by 42.1% of all farmers, thinning is used by nearly 90% of all famers.
- In cereal crop, please question again about “basal application” in 4th training because some farmers misunderstand that “basal application” is chemical fertilizer, not manure. In 4th training, please emphasize that “basal application” is by manure. If they cannot implement “basal application” by manure, please ask the reasons.
- In livestock, some famers misunderstood vaccine, deworming medicines and other medicines in this time survey.

Ex) Supervax is a vaccine. But, some farmers think the vaccine is deworming medicine by mistake and they use the vaccine as deworming medicine.

If you realize the mistake when you analyze the results, please modify data correctly based on the answer sheets (like the example in next page).

Ex)

	Deworming
Yes	3
No	2



Yes	<i>Supervax</i>
	<i>Detromax</i>
	<i>Supervax, terramycin</i>
No	<i>I don't have money</i>
	<i>I don't have any medicine</i>

	Deworming
Yes	1
No	4

If you get the result data, you should modify into the left table. It is because only Detromax is deworming medicine, Supervax is a vaccine and terramycin is antibiotic for general treatment.

For differentiation of vaccine, deworming medicines and other medicines, I made below table of medicines.

Medicine Name	Type of Medicine	Technique Name
Supervax	Vaccine	Vaccination
Ecomet	Deworming medicine	Deworming
Ecometic	Deworming medicine	Deworming
Deadline	Deworming medicine	Deworming
Doctmax	Deworming medicine	Deworming
Metabolic LA	Supplement	General treatment
Terramycin	Antibiotic	General treatment
Swamycin	Antibiotic	General treatment

- Please pay attention the number of answers.

Ex) Even if the percentage is "100%", the data reflect real situation of each site when the number of farmers 1 (like a following chart).

Sites		***
***	Number of famers' answers	1
	Percentage of famer's implementation (%)	100.0

←the percentage doesn't reflect real situation in each site

- Please make the chart for reasons that the farmers cannot implement the techniques (please refer following chart).

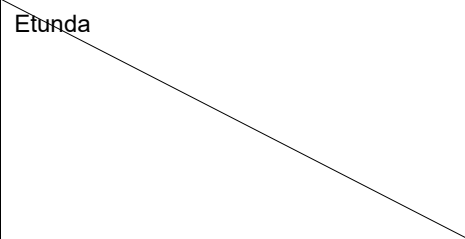
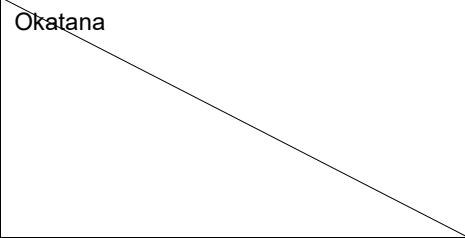
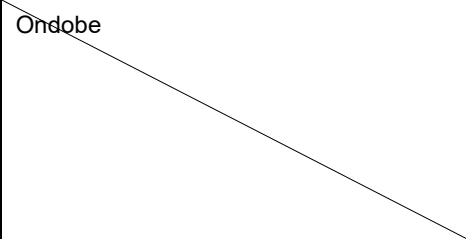
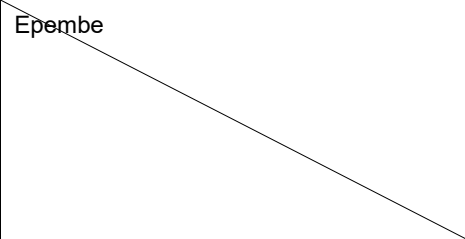
	Oshakati-west		Omuthiya		In whole	
	Number of reason for answer "No"	Percentage of reason for answer "No"	Number of reason for answer "No"	Percentage of reason for answer "No"	Number of reason for answer "No"	Percentage of reason for answer "No"
I don't have fertilizer	3	33.3%	1	50.0%	4	36.4%
I don't have money	3	33.3%	0	0.0%	3	27.3%
Fertilizer is not accessible	1	11.1%	0	0.0%	1	9.1%
It was too hot	0	0.0%	1	50.0%	1	9.1%
Other	2	22.2%	0	0.0%	2	18.2%
Total	9	100.0%	2	100.0%	11	100.0%

- Compare the data as follow.
 - (1) Comparison of percentage of each reason in among sites.
 - (2) Comparison of percentage of total farmers among reasons.
- Please try to write discussion about the results. Later, I will send the report about this assessment, so please refer to the report.

Questions in each site

Region	Cereal Grains	Horticulture	Cattle	Small Stock
Omusati	Etayi 1. Basal application by manure 2. Top dressing 3. Rice-mahangu mixed cropping 4. Farm record (Which techniques did you try?)	Etunda No technique is applied	Okahao 1. Vaccination (what medicine? Please differentiate vaccine and deworming medicine) 2. Deworming (what medicine? Please differentiate vaccine and deworming medicine) 3. Dehorning 4. Castration 5. General treatment (what treatment?) 6. Cattle fattening (what did they do? Lick?) 7. Fodder production (what process? Land preparation, silage making...) 8. Farm record (which did you use?)	Tsandi 1. Nutritious feed supply (what nutritious feed? maggot, termite, bone) 2. Chicken house 3. Vaccination (what medicine? Please differentiate vaccine and deworming medicine) 4. Deworming (what medicine? Please differentiate vaccine and deworming medicine) 5. Laying nest and hatching nest 6. Farm record (which did you use?)
Oshana	Okau-kamasheshe 1. Basal application by manure 2. Top dressing 3. Thinning 4. Farm record (Which techniques did you try?)	Okatana No technique is applied	Uuvudhiya 1. Vaccination (what medicine? Please differentiate vaccine and deworming medicine) 2. Deworming (what medicine? Please differentiate vaccine and deworming medicine) 3. Dehorning 4. Castration 5. General treatment(what treatment?) 6. Fodder production (what process? Land preparation, silage making...) 7. Farm record (which did you use?)	Uukwiyu 1. Nutritious feed supply what nutritious feed? maggot, termite, bone) 2. Chicken house 3. Vaccination (what medicine? Please differentiate vaccine and deworming medicine) 4. Deworming (what medicine? Please differentiate vaccine and deworming medicine) 5. Laying nest and hatching nest 6. Farm record (which did you use?)
Oshikoto	Okashana 1. Basal application by manure 2. Top dressing 3. Thinning 4. Farm record (Which techniques did you try?)	Onayena 1. Crop selection by SHEP 2. Installation of drip irrigation kit 3. horticulture production through water saving (ex: drip irrigation) 4. Farm record (Which techniques did you try?)	Omuntele 1. Vaccination (what medicine? Please differentiate vaccine and deworming medicine) 2. Deworming (what medicine? Please differentiate vaccine and deworming medicine) 3. Dehorning 4. Castration 5. General treatment(what treatment?) 6. Fodder production (what process? Land preparation, silage making...) 7. Farm record (which did you use?)	Onankali 1. Nutritious feed supply what nutritious feed? maggot, termite, bone) 2. Chicken house 3. Vaccination (what medicine? Please differentiate vaccine and deworming medicine) 4. Deworming (what medicine? Please differentiate vaccine and deworming medicine) 5. Laying nest and hatching nest 6. Farm record (which did you use?)
Ohangwena	Ondobe Group activity	Epembe Group activity	Okongo 1. Vaccination (what medicine? Please differentiate vaccine and deworming medicine) 2. Deworming (what medicine? Please differentiate vaccine and deworming medicine) 3. Dehorning 4. Castration 5. General treatment(what treatment?) 6. Fodder production (what process? Land preparation, silage making...) 7. Farm record (which did you use?)	Endola 1. Fodder production 2. Vaccination (what medicine? Please differentiate vaccine and deworming medicine) 3. Deworming (what medicine? Please differentiate vaccine and deworming medicine) 4. Castration 5. General treatment(what treatment?) 6. Exchange goats in each farmer's house 7. Farm record (which did you use?)

Farm Record Distributed in Each Site

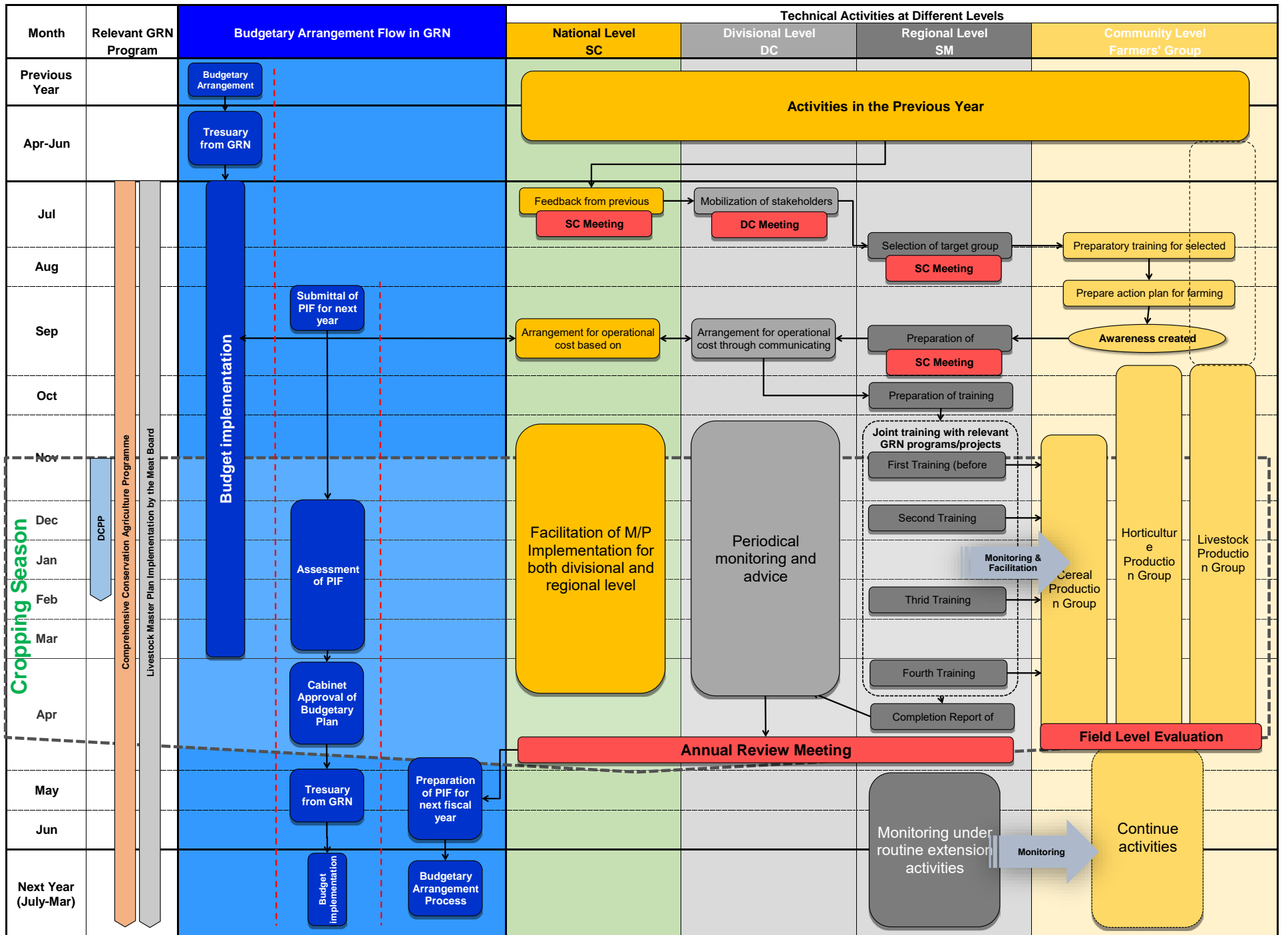
Region	Cereal Grains	Horticulture	Cattle	Small Stock
Omusati Etayi <ul style="list-style-type: none"> • Rainfall • Farm record 	Etunda 	Okahao <ul style="list-style-type: none"> • Disease control • Fodder production • Sold, Dead, Bought, Calving • Fattening • Cow record card • Farm record for vaccination 	Tsandi <ul style="list-style-type: none"> • Sold, Lost, Died, Bought, Hatched • Nutritious food for chicken • Farm record for vaccination 	
Oshana Okau-kamasheshe <ul style="list-style-type: none"> • Rainfall • Farm record 	Okatana 	Uuvudhiya <ul style="list-style-type: none"> • Disease control • Fodder production • Sold, Dead, Bought, calving • Fattening • Cow record card • Farm record for vaccination 	Uukwiyu <ul style="list-style-type: none"> • Sold, Lost, Died, Bought, Hatched • Nutritious food for chicken • Farm record for vaccination 	
Oshikoto Okashana <ul style="list-style-type: none"> • Rainfall • Farm record 	Onayena <ul style="list-style-type: none"> • Water bill • Farming schedule • Crop selection • Farm record 	Omuntele <ul style="list-style-type: none"> • Disease control • Fodder production • Sold, Dead, Bought, calving • Fattening • Cow record card • Farm record for vaccination 	Onankali <ul style="list-style-type: none"> • Sold, Lost, Died, Bought, Hatched • Nutritious food for chicken • Farm record for vaccination 	
Ohangwena Ondobe 	Epembe 	Okongo <ul style="list-style-type: none"> • Disease control • Fodder production • Sold, Dead, Bought, calving • Fattening • Cow record card • Farm record for vaccination 	Endola <ul style="list-style-type: none"> • Sold, Dead, Bought, kidding • Ewe record farm record for vaccination 	

FORM-13:
Monitoring of Annual Namibian SHEP
Implementation (Checklist)

N-CLIMP

Monitoring Sheet for Annual Namibian SHEP Implementation (Checklist)

No.	Work Item	Expected Timing	Responsible	Implemented or Not		Remarks
				Yes	No	
1	Feedback from previous annual review and call for a new year	July	SCM/DCM/SM	<input type="checkbox"/>	<input type="checkbox"/>	
2	Mobilization of stakeholders at the regional level		SCM/DCM/SM	<input type="checkbox"/>	<input type="checkbox"/>	
3	Selection of target group		SM	<input type="checkbox"/>	<input type="checkbox"/>	
4	Monthly monitoring report of activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
5	Preparation of PIF for next year based on the review of previous activities, if		SCM	<input type="checkbox"/>	<input type="checkbox"/>	
6	Commencement meeting	August	DCM/SM	<input type="checkbox"/>	<input type="checkbox"/>	
7	Preparatory training for selected farmers' group			<input type="checkbox"/>	<input type="checkbox"/>	
8	Prepare action plan for farming activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
9	Preparation of support/extension plan		SM	<input type="checkbox"/>	<input type="checkbox"/>	
9-1	- Baseline survey		SM	<input type="checkbox"/>	<input type="checkbox"/>	
9-2	- FABLIST Forum		SM	<input type="checkbox"/>	<input type="checkbox"/>	
9-3	- Gender training		SM	<input type="checkbox"/>	<input type="checkbox"/>	
9-4	- Market survey		SM	<input type="checkbox"/>	<input type="checkbox"/>	
9-5	- Crop selection/crop ranking		SM	<input type="checkbox"/>	<input type="checkbox"/>	
10	Arrangement for operational cost through communicating with SC		DCM	<input type="checkbox"/>	<input type="checkbox"/>	
11	Arrangement for operational cost based on support/extension plan prepared at DC and SM		SCM	<input type="checkbox"/>	<input type="checkbox"/>	
12	Monthly monitoring report of activities	SM	<input type="checkbox"/>	<input type="checkbox"/>		
13	Preparatory works for cropping season	September	SM	<input type="checkbox"/>	<input type="checkbox"/>	
14	Monthly monitoring report of activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
15	Preparatory works for cropping season	October	DC/SM	<input type="checkbox"/>	<input type="checkbox"/>	
16	Monthly monitoring report of activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
17	Preparatory works for cropping season	November	SM	<input type="checkbox"/>	<input type="checkbox"/>	
18	Monthly monitoring report of activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
19	Training of ATs and target farmers' group based on the action plan	December	SM	<input type="checkbox"/>	<input type="checkbox"/>	
20	Monthly monitoring report of activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
21	Training of ATs and target farmers' group based on the action plan	January	SM	<input type="checkbox"/>	<input type="checkbox"/>	
22	Monthly monitoring report of activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
23	Training of ATs and target farmers' group based on the action plan	February	SM	<input type="checkbox"/>	<input type="checkbox"/>	
24	Monthly monitoring report of activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
25	Training of ATs and target farmers' group based on the action plan	March	SM	<input type="checkbox"/>	<input type="checkbox"/>	
26	Monthly monitoring report of activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
27	Wrap-up meeting (annual activities review)	April	SCM/DC/SM	<input type="checkbox"/>	<input type="checkbox"/>	
28	Monthly monitoring report of activities		SM	<input type="checkbox"/>	<input type="checkbox"/>	
29	Monthly monitoring report of activities	May	SM	<input type="checkbox"/>	<input type="checkbox"/>	
30	Monthly monitoring report of activities	June	SM	<input type="checkbox"/>	<input type="checkbox"/>	



FORM-14:
Review of Technical Measures
for ATs and Farmers

N-CLIMP

Review of Technical Measures (Crops) for TOT

_____ Region, Organization: _____,

ADC: _____, Name: _____

CR-1: Fertilizer Application (grains) CR-2 Cropping Pattern & Crop Management (grains)	Remark <u>Fertilizer Application and Thinning according to the Crop Growing Stage</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know about “fertilizer application and thinning” of mahangu according to the crop growing stages?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you practice fertilizer application and thinning of mahangu according to the stages?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain “fertilizer application and thinning” according to the crops to farmers?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers practice fertilizer application and thinning” according to the crops?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did mahangu grow better?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-3 Conservation Agriculture (grains)	Remark <u>Reason of Ripper Furrowing</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know how ripper furrowing functions?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you practice ripper furrowing in your mahangu field?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how ripper furrow functions?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers apply ripper furrowing to their mahangu fields?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did mahangu grow better?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-4 Rice-Mahangu Mixed Cropping System (grains)	Remark <u>Water level required for Transplanting Rice Seedlings</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know how deep the water must be to transplant rice seedlings?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you transplant rice seedlings?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how to transplant rice seedlings?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers transplant rice seedlings?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmers harvest rice?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Crops) for TOT

CR-5 Water Source / Water Harvesting (horticulture)	Remark <u>Water Volume harvested by Roof Catchment</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Can you estimate water volume to be harvested from 100 m ² of roof?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Do you have water harvesting system of roof catchment at your house?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how to estimate water volume by roof catchment?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers install the roof catchment?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmers utilize the water from roof catchment?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-6 Water Saving Cultivation (horticulture)	Remark <u>Drip Irrigation System</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know what is drip irrigation system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you install and use drip irrigation system in your field (including ADC)?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain the drip irrigation system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmer install the drip irrigation system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmer grow vegetables using the drip irrigation system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-7 Crop Selection (horticulture)	Remark <u>Selection of Vegetables to Grow</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Do you know how to select vegetables to grow?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you select vegetables according to the market survey?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how to select vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers conduct market survey?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmers select vegetables according to the market survey?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
CR-8 Cropping Plan & Crop Management (horticulture)	Remark <u>Cropping Plan of Vegetables</u>	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM, <u>before N-CLIMP</u>	Did you know how to prepare a cropping plan for vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM, <u>before N-CLIMP</u>	Did you prepare a cropping plan for vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers, <u>with N-CLIMP</u>	Did you explain how to prepare a cropping plan for vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers, <u>with N-CLIMP</u>	Did farmers prepare cropping plan for vegetables?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared, <u>with N-CLIMP</u>	Did farmers grow vegetables according to the cropping plan?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Livestock) AT

Region: _____, ADC: _____, AT: _____

LS-1 Fodder Production	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know fodder production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you produce fodder before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach how to produce fodder to farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers produce fodders through your technical transfer?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did farmer produce fodder by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-2 Range management	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know range management before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you have experience of range management?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach farmer how to manage rangeland? : rotation, gathered grazing etc.,	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers try to manage rangeland by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmer group keep rangeland according to range management?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-4 Nutritious food supply for chicken	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know nutritious foods for chicken before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you produce nutritious food for chicken before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you give explanation concerning nutritious food for farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers produce nutritious food according to your technical transfer?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmer produce nutritious food by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-5 Disease Control	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the importance of disease control of cattle before? ① Vaccination. Parasite control, Powder On, Injection, etc. ② Dehorning , Castration, Hoof trimming , Way to fix , etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach how to control disease for farmers practically?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers control diseases by themselves through your training?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers control disease by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Livestock) AT

LS-6 Large and small stock fattening	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know what elements are needed for fattening? (Vitamins, minerals, licks, supplements etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
2. Having Experience of TM.	Did you give such elements to cattle before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
3. Explanation of TM to Farmers	Did you teach the importance of such elements and the way of administration for farmers?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers give such elements by themselves through your training?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers practice fattening by themselves?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-7 Periodical production	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the periodical production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
2. Having Experience of TM.	Did you know the reproductive cycle and seasonal cares of cattle?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
3. Explanation of TM to Farmers	Did you explain the importance of reproductive records for farmers and teach them how to note reproductive records?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did you teach farmers how to write reproductive records and how to access market information at high price period?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers keep reproductive records by themselves?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-11 Goat production	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know goat production and reproductive cycle before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
2. Having Experience of TM.	Did you experience treatment and husbandry for goat before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
3. Explanation of TM to Farmers	Did you teach what points were important in order to increase goat production for farmers?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers get enough skills to increase goat production by themselves?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers operate techniques for goat production by themselves?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-13 Chicken production (indigenous)	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know what was important for chicken production before? : Nests for laying and hatching, disease control, vaccination, de-worming, feeding, kind of chicken (layer, broiler, dual purpose, indigenous)	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
2. Having Experience of TM.	Did you have experience of indigenous chicken raising before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
3. Explanation of TM to Farmers	Did you teach how to manage chicken raising to farmers before?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers follow your training of chicken production correctly?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers manage their poultry houses according to your technical transfer?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Livestock) AT

LS-5 Disease Control (Goat)	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the importance of disease control of goat before? ① Vaccination. Parasite control, Powder On, Injection, etc. ② Castration, Hoof trimming, Way to fix, etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach how to control disease for farmers practically?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers control diseases by themselves through your training?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers control disease by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-5 Disease Control (Chicken)	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the importance of disease control of chicken before? : Vaccination. Parasite control, Powder On, Injection, Spray, kind of medicine etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did you teach how to control disease for farmers practically?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did farmers control diseases by themselves through your training?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Can farmers control disease by themselves?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Farm Management)

Region: _____, ADC: _____, AT: _____

FM-2 Record Keeping	Remark: Farm Record for Planning	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of Record Keeping?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you use records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers on the use of records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers use records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that the use of records for planning of farming gain better ways of farming by farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-5 Group Formation / Group Strengthening	Remark: Regular meeting, agreement on rules	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of Group Strengthening?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work with other farmers / people through agreement go rules?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers the ways of agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers work for agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that farmers gained better ways of farming through agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-6 Group Account Management	Remark: Transparency & Accountability	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of needs of Group Account Management	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you use account book for planning and reporting to other farmers and people?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers on the use an account book for planning and reporting to farmers for collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers use an account book for planning and reporting for collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that the use of an account book for planning and reporting to other farmers make transparency and accountability?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Farm Management)

FM-8 Collective Selling / Purchasing	Remark:	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work with other farmers / people through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers the ways of agreement on rules through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers work through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that farmers gained better ways of farming through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-10 Market Information Access Improvement	Remark: Market Survey, Grading, and Auction System	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefit of market surveys or other ways of improvement of market information access?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to farmers the ways of using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do farmers work through using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that farmers gained better ways of farming using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Crops for Famers)

_____ Region, Constituency: _____,

Village: _____, Farmers' Name: _____

CR-1: Fertilizer Application (grains)	Remark (Okau k., Ondobe, Omuthiya, Etayi) <u>Fertilizer Application & Thinning</u> <u>according to the Crop Growing Stage</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP, before and after N-CLIMP Training	Did you know "fertilizer application & thinning" of mahangu according to the crop growing stages?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes / <input type="checkbox"/> No
2. Practice of TM by Farmer before N-CLIMP,	Did you practice fertilizer application and thinning of mahangu according to the stage?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you find any improvement in "fertilizer application and thinning"?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	After N-CLIMP, are you practicing the TM?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform and explain to other farmers about TM?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-3 Conservation Agriculture (grains)	Remark (Okau k., Ondobe, Omuthiya, Etayi) <u>Reason of Ripper Furrowing</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP, before and after N-CLIMP Training	Did you know how ripper furrowing functions?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes / <input type="checkbox"/> No
2. Practice of TM by Farmer before N-CLIMP	Did you practice ripper furrowing in your mahangu field?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Do you understand how ripper furrow functions?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	After N-CLIMP, are you going to continue to practice TM?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform other farmers of TM?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-4 Rice-Mahangu Mixed Cropping System (grains)	Remark (Etayi only) <u>Water level required for</u> <u>Transplanting Rice Seedlings</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Did you know how much depth of water is required for transplanting rice seedlings?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	<input type="checkbox"/> Yes / <input type="checkbox"/> No
2. Practice of TM by Farmer before N-CLIMP	Did you transplant rice seedlings?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to transplant rice seedlings?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	Are you practicing TM?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform other farmers of TM?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No

Review of Technical Measures (Crops for Famers)

_____ Region, Constituency: _____,

Village: _____, Farmers' Name: _____

CR-5 Water Source / Water Harvesting (horticulture)	Remark (Okanata only) <u>Water Harvesting</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Can you estimate water harvesting from roof?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
2. Practice of TM by Farmer before N-CLIMP.	Do you have water harvesting system of roof catchment in your house?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to estimate water volume by roof catchment?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	Are you practicing "water harvesting from roof"?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform and explain to any other farmers about this TM ?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-6 Water Saving Cultivation (horticulture)	Remark (Epembe, Onayena, Etunda) <u>Drip Irrigation System</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Did you know what is drip irrigation system?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
2. Practice of TM by Farmer before N-CLIMP.	Did you install and use drip irrigation system in your field?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to use drip irrigation system?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	Did you grow vegetables using drip irrigation?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform and explain to other farmers about drip irrigation?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-7 Crop Selection (horticulture)	Remark (Epembe, Onayena, Etunda) <u>Selection of Vegetables to Grow</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Do you know how to select vegetables to grow?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
2. Practice of TM by Farmer	Did you select vegetables according to market survey?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to select vegetables?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers	Did you selection crops to grow through market survey?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform and explained to other farmers about crop selection through market survey?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
CR-8 Cropping Plan & Crop Management (horticulture)	Remark (Epembe, Onayena, Etunda) <u>Cropping Plan of Vegetables</u>	Before N-CLIMP	After N-CLIMP
1. Aware of TM before N-CLIMP	Did you know how to prepare cropping plan of vegetables?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
2. Practice of TM by Farmer before N-CLIMP	Did you prepare cropping plan of vegetables?	<input type="checkbox"/> Yes / <input type="checkbox"/> No	-
3. Training of TM by AT under N-CLIMP (any improvement of technique)	Did you understand how to prepare cropping plan of vegetables?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
4. Practice of TM by Farmers after N-CLIMP	Are you going to continue to practice TM?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No
5. Extension by Farmers	Did you inform other farmers about preparation of cropping plan and conduct crop management?	-	<input type="checkbox"/> Yes / <input type="checkbox"/> No

TM: Technical Measures.

Review of Technical Measures (Livestock)Farmer

Region: _____, ADC: _____, AT: _____

LS-1 Fodder Production	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know fodder production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Having Experience of TM.	Did you produce fodder before TM training?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Understanding of TM training by AT	Did you understand well concerning fodder production?	 	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice fodder production by yourself?	 	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is fodder production spreading to other farmers?	 	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-2 Range management	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know range management before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Having Experience of TM.	Did you have experience of range management?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Understanding of TM training by AT	Did you understand well concerning Range management? : rotation, gathered grazing etc.,	 	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice range management by yourself?	 	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is range management spreading among other farmers?	 	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-4 Nutritious food supply for chicken	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know nutritious foods for chicken before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you produce nutritious food for chicken before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Understanding of TM training by AT	Did you understand well concerning nutritious food for chicken?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you produce nutritious food for chicken by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is nutritious chicken food spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-5 Disease Control (Cattle)	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the importance of disease control of cattle before? ① Vaccination. Parasite control, Powder On, Injection, etc. ② Dehorning , Castration, Hoof trimming , Way to fix , etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Understanding of TM training by AT	Did you understand well concerning disease control?	 	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Livestock)Farmer

4. Practice of TM by Farmers	Can you practice disease control by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is disease control spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-6 Large and small stock fattening	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know what elements needed for fattening? (Vitamins, minerals, licks, supplements etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you give such elements for cattle before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Understanding of TM training by AT	Did you understand well concerning large stock fattening?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice large stock fattening by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is large stock fattening spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-7 Periodical production	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the periodical production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you know how the reproductive cycle and seasonal cares of cattle is?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Understanding of TM training by AT	Did you understand well concerning periodical production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice periodical production by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is periodical production spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-11 Goat production	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know goat production and reproductive cycle before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did you experience treatment and husbandry for goat before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Understanding of TM training by AT	Did you understand well concerning goat production?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice goat production by yourself?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is goat production spreading to other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-13 Chicken production (indigenous)	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know what was important for chicken production before? : Nests for laying and hatching, disease control , vaccination , de-worming , feeding , kind of chicken(layer, broiler, dual purpose,	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Livestock)Farmer

	indigenous),,		X
2. Having Experience of TM.	Did you have experience of indigenous chicken raising before?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
3. Understanding of TM training by AT	Did you understand well concerning chicken production?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice chicken production by yourself?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is chicken production spreading to other farmers?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-5 Disease Control (Goat)	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the importance of disease control of GOAT before? ① Vaccination. Parasite control, Powder On, Injection, etc. ② Castration, Hoof trimming , Way to fix , etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
3. Understanding of TM training by AT	Did you understand well concerning disease control?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice disease control by yourself?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is disease control spreading to other farmers?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
LS-5 Disease Control (Chicken)	Remark	Before N-CLIMP	With N-CLIMP
1. Already Aware of TM	Did you know the importance of disease control of chicken before? : Vaccination. Parasite control, Powder On, Injection, Spray , kind of medicine etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
2. Having Experience of TM.	Did you have practical experience to control disease?	<input type="checkbox"/> Yes <input type="checkbox"/> No	X
3. Understanding of TM training by AT	Did you understand well concerning disease control?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Can you practice disease control by yourself?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Is disease control spreading to other farmers?	X	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Farm Management)

Region: _____, ADC: _____, Farmers: _____

FM-2 Record Keeping	Remark: Farm Record for Planning	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of Record Keeping?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you use records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers on the use of records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers use records for planning of farming?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that the use of records for planning of farming gain better ways of farming by other farmers?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-5 Group Formation / Group Strengthening	Remark: Regular meeting, agreement on rules	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of Group Strengthening?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work with other farmers / people through agreement go rules?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers the ways of agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers work for agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that other farmers gained better ways of farming through agreement on rules through regular meeting?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-6 Group Account Management	Remark: Transparency & Accountability	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of needs of Group Account Management?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you use account book for planning and reporting to other farmers and people?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers on the use an account book for planning and reporting to farmers for collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers use an account book for planning and reporting for collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that the use of an account book for planning and reporting to other farmers make transparency and accountability?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Review of Technical Measures (Farm Management)

FM-8 Collective Selling / Purchasing	Remark:	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefits of collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work with other farmers / people through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers the ways of agreement on rules through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers work through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that other farmers gained better ways of farming through collective selling / purchasing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
FM-10 Market Information Access Improvement	Remark: Market Survey, Grading, and Auction System	Before N-CLIMP	After N-CLIMP
1. Already Aware of TM	Were / Are you aware of benefit of market surveys or other ways of improvement of market information access?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Having Experience of TM.	Did / Do you work using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Explanation of TM to Farmers	Did / Do you explain to other farmers the ways of using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Practice of TM by Farmers	Did / Do other farmers work through using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Effects of TM Appeared	Did / Do you think that other farmers gained better ways of farming using market surveys or other ways of market information such as grading and auction system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No