

「ナミビア共和国・気候変動対応型農業開発・農業支援に係る情報収集・確認調査」

面談記録・現地調査記録⑨ 「乾燥地農業」分野 (2/27～3/4 実施分)

1. 訪問日程

日	時間	行程
2/27(月)	8:30-13:30	ナミビア大学(UNAM) 対象稲作農家圃場視察
	15:00-16:30	Omahenene Project 視察(オシャカティ市内野菜生産圃場)
	17:00-17:30	オシャカティ青空市場調査(降雨のため途中で中断)
2/28(火)	9:15-9:30	MAWF オハングウェナ州事務所視察準備
	11:05-12:30	MAWF オハングウェナ州 Ongula/Netanga 農業開発事務所(ADC) 訪問 同展示圃場視察、農民インタビュー
	13:50-17:00	MAWF オハングウェナ州 Omafo ADC 訪問 Ouhekc 村(Engela 選挙区) 稲作試験栽培地視察 Oipya 村農民インタビュー
2/29(水)	11:00-12:00	MAWF オシコト州 Tsumeb ADC 訪問
	12:20-14:10	Mannheim 農業試験場訪問
	16:15-17:10	Oshakana 農業試験場訪問
3/1(木)	9:50-10:20	MAWF オムサティ州事務所訪問
	10:45-17:00	Olushandja 園芸作物生産者組合・組合員圃場視察(全5件)
3/2(金)	9:50-11:00	Tulongeni Twahangana 組合・組合長/組合員インタビュー
	12:40-13:50	Creative Entrepreneurs Solutions(現地 NGO) 訪問
	14:40-15:20	Training & Monitoring Unit- Namibia 訪問
	15:10-16:30	オシャカティ青空市場調査
3/3(土)	終日	ウントフックへ移動(陸路) 途中: Tsumeb 市 Agra にて野菜種子価格調査
3/4(日)	終日	英文報告書作成

2. 現地調査概要

2/27(月)

(1) ナミビア大学(UNAM) 対象稲作農家圃場視察

<イネ試験栽培の状況>

➤ 視察先: オムサティ州 Onesi 選挙区 Epalera 村

対象農家: ①Ms. Lydia Simon (S17° 25' 41.7" E14° 36' 55.4"、標高 1,115m)

②Ms. Antonia Linus (Ms. Simon の隣家、UNAM 副学長の姪)

- 両者とも、アンゴラのダムを水源とするオシャカティまでの用水路が圃場沿いにあり、その用水路からサイフォン方式でパイプを通して取水、灌漑稲作を行っている。そのため、ここでは畦で囲むことで湛水状態を維持している。なお、用水路は灌漑稲作を行うことを目的としていないため、この水を利用して灌漑稲作を広めることは水量からして困難であることから、このような灌漑稲作は例外的な事例となろう。

- 無施肥で栽培。Ms. Linus の圃場では、造成時に表土をはがしてしまったとのことで、養分欠乏が観察された。



取水用パイプ



畦のある水田



栄養不足による生育不良

## (2) Omahene Project 視察

### <プロジェクトの概要>

- オシャカティ市内で小規模の野菜生産圃場を運営している。2008 年に現在のプロジェクト長個人が開始し、現在は 8 人(男 4、女 4)の構成となっている。
- 水源は、アンゴラのダムから導水している用水路の末端部からの余水が溜まっているところで、水量は多くはないが、乾期でも涸れることはない。現在のところ、水は手で汲んでいるが、将来的には動力ポンプによる灌水を計画している。
- UNDP の支援を受け、その実施団体である Creative Entrepreneurs Solutions から簡易灌漑栽培システムの提供を得ている。これは、250 リットルの大型バケツからパイプを通して土を詰めた 6 リットルのプラスチック製の袋に灌漑するものである(写真参照)。
- オシャカティ市の青空市場へも近距離にあるが、生産量が少ないことから、生産物は多くが近所への販売に限られている。
- 規模は日本の市民農園程度であるが、野菜栽培が少ない地域にあつては、今後の野菜栽培の普及を推進していくための優良事例になる可能性がある。一方で、水源が限られていることから、規模の大幅な拡張は困難である。



圃場の様子



簡易灌漑栽培システム



2/28(火)

## (1) MAWF オハングウェナ州内 Ongula/Netanga ADC 訪問及び展示圃場視察

### <展示圃場の課題>

- 化学肥料と家畜糞との施用効果を比較しているとのことであるが、十分な展示効果があるとは思われ

ない。農家が一目でみて効果が分かるような設計が必要である。肥料投入が進まないことの理由の一つに、この展示圃場の実施方法の不十分さもあげられよう。(写真右:展示圃場の様子)



## (2) MAWF オハングウェナ州内 Omafo ADC 農民インタビュー

- ▶ Oipya 村対象農民: Ms Diina Mbinoi (位置: S17° 28' 48.3" E15° 44' 26.5"、標高 1,104m)。
- ▶ 普及員による研修を受講している農家で、特に反転鋤(ripper)の導入によりトウジンビエの収量が増加したとのことである。
- ▶ 一年前の雨期の洪水被害は大きく、村全体でトウジンビエの収量は大幅に減少し、多くの農民が家畜を失った。対象農家も同様の被害を受けているが、家畜を売ることにはなかったという。年金が頼りであるようである。
- ▶ 周辺と比べてトウジンビエの生育も良く、管理も的確になされていると推測された。

2/29(水)

## (1) MAWF オシコト州 Tsumeb ADC 訪問

- ▶ 管轄内では共有地はなく、商業農家か入植農家が普及の対象となっている。
- ▶ よって、オシコト州内にあるものの、我が国の直接の協力対象とはならないであろう。

## (2) Mannheim 農業試験場訪問

- ▶ 作物試験のほか、トウジンビエ Okashana 2 の原種生産を行っている。試験の種子生産の業務配分はほぼ半々とのことである。
- ▶ 原種生産圃場の生育状況は非常に良好である(センターピポッドによる灌漑)。一方、試験圃場の観察のみからは、系統の選抜試験が僅かに行われている程度のように見受けられた。

## (3) Oshakana 農業試験場訪問

- ▶ 作物試験のほか、トウジンビエ Okashana 2 の原種生産を行っている。試験の種子生産の業務配分はほぼ半々とのことである。
- ▶ 改良種 Okashana を開発した試験場であるが、対応した試験技術者は研究内容をプリントアウトした一覧表から読み上げるだけで、実際の試験が十分に行われているのか疑問に感じた。(研究一覧表を入手)

### <農業試験場の課題>

- ▶ どの試験場でも、Okashana 2 の潜在収量を応えられる者に会うことができなかった。唯一、この Oshakana の研究技術者は、期待収量は 2~3t/ha であろうと応えたが、自信はなさそうであった。多くの研究者・研究技術者は、基本的な知識が不足していると思われる。
- ▶ 研究が農民のニーズに答えられていない。その原因としては、研究と普及の連携が非常に弱く、農民のニーズを研究テーマとし、研究の成果を農民にフィードバック、更にそれを検証するシステムが欠如している。

3/1(木)

● Olushandja 園芸作物生産者組合・組合員圃場視察

<Mr. Epafra Hilengwa> 位置:S17° 27' 08.7" E14° 46' 45.4"、標高 1,108m

- 2011年2月に野菜栽培を開始し、組合へも加入した。用水路から動力揚水、1年目は畝間灌漑、2年目に点滴灌漑システムを導入した。
- 組合への加盟費はN\$450。組合の会合は月に2~3回、技術的な情報を交換を行っている。
- 野菜で最も利益の高いものはトマトであり、年2作(2~6月、7~12月)栽培している。
- 家畜糞のほか、NPK、硫安、尿素、燐安、硝酸カリ、カルシウム剤(石灰?)を施用している。
- 栽培の問題点としては、用水路の渇水、担保がないため銀行からの融資ができない、生産物の販売が困難、農薬が高価をあげた。なお、トウジンビエの栽培も1ha行っているが、鳥害の被害が大きいことから拡大する意志はない。

<Ms. Saint Salem Orchard> 位置:S17° 28' 32.2" E14° 39' 19.3"、標高 1,109m

- キリスト教会で管理している農園で、野菜栽培は1995年に開始し、野菜圃場は3.5haである。ダムから動力で取水、点滴灌漑システムは、2007年に導入した。
- 組合へは設立当初の2003年から加入している。
- 野菜栽培の問題点としては、害虫、家畜糞の不足、価格が高すぎる化学肥料、過剰な降雨、をあげた。

<Mr. Thomas Negonga> 位置:S17° 28' 49.7" E14° 39' 44.1"、標高 1,114m

- 2010年2月から野菜栽培を開始、組合へも加入した。栽培面積は2.5ha程度、ダムから動力で取水、点滴灌漑システムを導入している。
- 昨年の野菜の収益で、ピックアップトラックをローンで購入し、生産物の販売に利用している。
- 野菜栽培の問題点としては、野菜栽培には高すぎる気温、価格が高すぎる化学肥料、生産物販売の販売が困難で、腐らせてしまうことがある、をあげた。

<Nguti Vegetable Project> 位置:S17° 30' 10.1" E14° 40' 22.5"、標高 1,112m

- 2002年1月に野菜栽培を開始、ダムから動力で取水、2010年に点滴灌漑システムを導入した。
- 収穫物は、オシカティ市、オシカンゴ市、オダングワ市へ自家用ピックアップトラックで運搬して販売、一方、時々仲買人が買い付けにくる。トラクターも所有する規模の大きな農家である。
- 問題点としては、肥料価格の高さ、病虫害被害を上げた。

<Iinyangela Mwene Project> 位置:S17° 30' 44.7" E14° 39' 57.5"、標高 1,113m

- 18人の女性グループによる運営、グループは2007年7月に設立、野菜栽培は2009年に下記のようにFAOの支援を得たのちに開始した。
- この組合は、多くは個人で農園を経営している。その中で、この農園だけは、FAOの支援を得て、ソーラー発電によるモーターポンプで揚水し、地上高く設置されたプラスチックタンクへ貯水、以降はパイプによる重力灌漑を行っているプロジェクトがある



(写真参照、灌漑施設の施工はオカハンジャ市北 10km にある Aqualand 社)。農業省の普及員も定期的に指導に来ていると言うが、他の農場と比べて作物の生育状況は悪く、圃場管理も不十分である。この農場は、女性グループによる共同管理体制をとっている。政府等の外部関与による失敗例となる可能性は大である。他の農場主とでは、経営意識の欠如が一番の大きな違いであろう。

### 3/2(金)

#### (1) Tulongeni Twahangana 組合・組合長/組合員インタビュー

- 2004 年 9 月に、貧困解消のための所得向上を目指して組合を設立、主な活動内容は Ximenia (在来の樹木)の種子(油脂がコスメテックの原料となる)を集め、ウイントフックの CRIAA 社へ販売することである。
- 当初 25 人で発足、現在の組合員数は 600 人(男 15、女 585)である。組合員の居住範囲はオハングウェナ州全域とオシコト州の一部で、各組合員は地元で Ximenia の実を集め、エナナ市の組合センターへ持ち込んでいる。なお、センターの規模が限界に近いことから、希望者はあるものの現在は新規組合員の参入を取りやめている。
- 現在の問題としては、輸送手段が無いこと(組合員は歩いて、あるいはロバ等を利用)、ウイントフックまでの輸送費が高いこと、運搬中の種子の劣化、をあげた。
- 将来的には、原材料の提供だけではなく、工場を設立して、加工を行い、利益の向上と雇用の創出を目指している。ただし、銀行からの融資は難しく、実現は簡単ではないとのことである。

#### (2) Creative Entrepreneurs Solutions (現地 NGO) 訪問

- UNDP/GEF の気候変動対応プロジェクトの支援で、保全型農業を進めてきた。また、前述の Omahenene Project の簡易灌漑栽培システムを普及している。このシステムは学校へも導入している。
- 3 人(女 1、男 2)の小さな NGO であるが、農業技術専門家(コンサルタント)と連携して、科学的な根拠に基づいた活動を行っている。

#### (3) Training & Monitoring Unit- Namibia 訪問

- 農民組合 (Farmers Cooperative) を支援している団体である。対象は北中部 4 州で、各州に農民組合は存在するが、各組合の活動は非常に弱いと推察される。NNFU の事業と重複する活動を行っていて、政府が推し進めようとしているトップダウン型の農民組織化の問題点がみえる。

「ナミビア共和国・気候変動対応型農業開発・農業支援に係る情報収集・確認調査」  
 面談記録・現地調査記録⑩ 「畜産」分野（2/27～3/5 実施分）

1. 訪問日程

日	時間	行程
2/27(月)	8:30-9:00	MAWF オシヤナ州事務所訪問計画準備
	10:00-14:00	Oshikoto 州 OnankaliADC 訪問 Onankali 農家圃場視察
	15:00-16:30	獣医事務所訪問資料収集
2/28(火)	9:15-9:30	MAWF オハングウェナ州事務所視察準備
	11:05-12:30	MAWF オハングウェナ州 Ongula/Netanga 農業開発事務所(ADC) 訪問 同展示圃場視察、農民インタビュー
	13:50-17:00	MAWF オハングウェナ州 Omafo ADC 訪問 Ouhek 村(Engela 選挙区)稲作試験栽培地視察 Oipya 村農民インタビュー
2/29(水)	8:00-9:00	GOPA 事務所訪問 ワシントンよりの運営指導調査グループ評価立ち合い
	10:00-18:10	GOPA プロジェクトサイト視察
3/1(木)	8:30-10:00	MAWF オハングウェナ州事務所
	10:30-11:30	Omsati 州 Oshikuku ADC 訪問
	12:00-14:00	フィードロット生産農民インタビュー
	14:30-15:00	Etunda ADC 訪問
3/2(金)	8:00-8:30	GOPA 事務所プロジェクト関連資料収集
	9:00-10:00	MAWF オハングウェナ州事務所
	10:30-11:30	Mentorship の講師意見交換
	13:00-17:00	MAWF オハングウェナ州事務所
3/3(土)	終日	英文報告書作成
3/4(日)	終日	Grootfontein へ移動
3/5(月)	8:30-10:30	John Pandeni 家畜試験場訪問

2月27日

OuanKali ADC

農家訪問

- \* 農家は 2ha ほどをミレットの栽培にあて残りを牛の放牧に使用している。牛は 18 頭ほど飼育しており 5 頭から搾乳している。他に牛 40 頭ほどの群れが遠隔地の広大な共有地で放牧されている。この群れには兄弟、親戚の牛が集められ放牧されている。この群れの特徴は一族の財産であり社会的地位でもある。一般的に売られることはなく、年令を重ねた牛は売りに出される。一方現在飼育中の 18 頭は居住地周辺で飼える最高頭数である。居住地周辺の共有地と遠方の放牧地の二か所に牛を飼っているのは、この地方では普通である。
- \* 居住地周辺で飼育される牛群の主な目的は牛糞を集めて畑に施すためであり、他の目的は乳を取り家庭の消費と現金収入の目的がある。現在 5 頭から毎日 10 リターの乳を搾乳しており 4 日おきに加工したバターで 100 ドルの現金を稼ぎだしている。乾季には餌がなく搾乳量は減り止まってしまう。
- \* 山羊は現在 5 頭しかいない。その多くは多雨による洪水で病気に罹り死んでいる。また乾季には餌がなく、異物（プラスチック）の飲み込みによる死亡が多い。以前は山羊の数は 80 頭近くおり、そのときは屠殺して自家消費し、残った肉は周辺農家へ販売していた。今は屠殺できるだけの数の山羊がいない。
- \* 飼料用作物の生産はされていない。乾季の飼料として収穫後のミレットの茎が木の上に保存されていた。
- \* 農民の要望：乾季の飼料として何かないか。  
回答：農家の庭にある灌木 *Leucaena* の種子を採取し畑の周辺にすべて植えること。温湯で一晩種子処理、播種。
- \* 所感：何らかの形で現金収入を得る方法を農民は模索しており、この農民には山羊と乳という二つの収入源を持っていたが、山羊の方が多くの死亡で収入が立たれている。山羊の安定した生産には雨季、乾季の飼料作物供給源を確立する必要がある。この農場では可能である。

2 月 28 日

## Ohangwena Region

### (1) MAWF オハングウェナ州 Ongula/Netanga ADC 訪問

#### 農家訪問

70 歳の老人は Windhoek で元牧師をやっていて退職とともに北部の出身地で農業を開始している。

- \* 牛 20 頭を持っているが 9 頭を失っている。牛は結婚式とかに使用していた。
- \* 山羊は 70 頭いたが 20 頭死亡している。山羊は洪水前には売って収入としていた。
- \* ミレットは 2~3ha 作っており 200latas の収穫があった。

(2) MAWF オハングウェナ州内 Omafo ADC 農民インタビュー

- \* Oipya 村対象農民: Paurous Haipinge
  - \* Komeho Development Agency(カナダ NGO)の指導によりロバによる耕起法を学び、ロバを使用した耕起を 45 農家に教えた。また一日 N\$200 で請負い作業を実施している。
  - \* 雌牛 8 頭、雄牛 2 頭、子牛 3 頭を保有。主な目的は糞尿を取ることである。
  - \* 山羊は 9 頭 foot rot で死んでいる。
  - \* 豚は雄 2 頭、雌 4 頭がおり子豚を販売している。小さいものは N\$ 0~100、大きなものでは N\$200~300 である。
  - \* Meatco の訓練には年 2 回参加し、学んだことは病気の症状とその対処方法である。
- 所感: 農民は何らかの収入を得る努力をしている。ここでは豚の販売と耕起により収入を得ている。

2 月 29 日 (水曜日)

Ohangwena

GOPA Community based Rangeland and Livestock Management

Oshamono 村-Spembe 選挙管理区, Oshangwena 州

Millenium による指導調査団

- 放牧がうまくいっているか  
牧童を選抜している。
- 女性がどのような責任を分担しているか。  
— ファシリテーターに 3 人起用されている。
- 穀物生産と家畜生産が同時並行的にできているか。  
— 家畜の糞尿を畑に還した栽培を実施しており効果が出ている。  
トウモロコシの栽培に糞尿を入れた区画となしの区画を設け、栽培比較を農家圃場で実施しており効果は十分に出ていた。
- 牛と並行して小家畜（山羊）をマーケティングに乗せることはできないか。  
— 現在小家畜の開拓を進めている。

家畜の糞尿を使用した

貯水池の建設 (Ohangwena 州のプロジェクト現場)

貯水池の建設は道路局が実施しており、非常に深く幅、長さも長く年間使用可能な水量を貯蔵することが可能である。GOPA では周囲をフェンスで囲い牛の水用にポンプでくみ上げタンクを設置し水を貯蔵し、牛の水飲み用水槽を設ける。他にポンプで水をくみ上げ周囲の小区画で小規模な野菜栽培を実施する。池を掘るコストは N\$ 300,000(300 万円)である。(正式の設計を組み込めばコストは N\$800,000 に跳ね上がる)





#### パイロット地域とコミュニティーの選定

GOPA ではプロジェクトのパイロット地域選定にあたっては家畜の多い Ohangwena 州の Spembe 選挙管理区を選定し、その中から 20 のコミュニティーにプロジェクトの概要を説明し、その内容に理解を示しホスト先として受け入れを希望表明した 7 のコミュニティーがパイロット地区として選定された。一方村々の中からリーダー格の者を集めファシリテーターとしての訓練を施し、ファシリテーターとして育てあげ、村々での共同作業などの計画作りなどをリードしている。7 のコミュニティーの内、4 つのコミュニティーが共同の放牧計画に賛同し共同でその作業作りに参加している。今まで個人、個人で放牧していたものを一つの牛群にまとめ上げ、200 頭の牛群、1000 頭の山羊群を 5 人の雇用された牧童により放牧管理がされるようになった。

#### 放牧地の管理

12 の農家の牛を 200 頭の群に取りまとめ一定区画の放牧地に放牧している。区画は境界線を 10m の幅の道路で区切っており、灌木で覆われていた木々を村人の共同作業で灌木を切り出している。

#### \* 牧童の雇用

共同の牛の群れを放牧するために 5 人の若者を雇用している。この費用はコミュニティーの参加者により支払われる。

#### \* 雄牛の購入

雄牛の購入に対しても参加者負担であり、雌牛 1 頭提供とか山羊 5 頭提供とかして負担分

を支払っている。

\* 疾病対策用薬品

これも参加者負担である。病気に対する予防は重要であることを認識し支払う義務を負っている。

\* 放牧地の境界線の伐採

境界線にある灌木は切り開かれ車の通れる広さに拡大される。この作業は村の参加者が一同に集まって伐採作業が行われる。

\* 他からの侵入家畜

他から侵入してきた家畜に対しては捕まえて一時コラールに引き止められる。罰金とともに解放される仕組みとなっている。

\* 穀物栽培

家畜の糞を利用した畑作りを各地で展開しておりトウモロコシ栽培などで成功を収めている。

\* メンバーへの連絡方法

学校、教会、店、飲み屋などに紙を貼り、または子供に持たせたりしている。

3月1日（木曜日）

\* Feedlot

農民 Jacob は 1000 頭の牛を有する牧畜農家であるが、450 頭の雌牛から毎年 200 頭近い子牛を生産している農家である。数年前にエツンダの灌漑地区から青刈り用のトウモロコシ残渣を購入利用してフィードロットでの肥育を始めたが餌の供給が途切れ、休止となったままである。彼には 450 頭の雌牛が生まれ、年間生まれる頭数は 200 頭である。そのうちの 100 が雄であり、三分の一の 30 頭前後をフィードロットに持ち込む用意がある。

3月2日（金曜日）

\* GOPA 事務所

Mr.Kambonde 氏は meat board の Mentor であるとともに、GOPA 事務所でも講師を務めている。Mentorship 訓練の内容を本人より聞き取り調査を行った。

\* 一か月に 5 か所の選挙管理区を回り一日コースを一日、一か所ではじめ、場所を代え合計 5 日間だけ教える。毎月一日コースを 12 回にわたり 5 か所で開催する。内容は家畜飼育、疾病対策、マーケティング、飼養管理等。

\* 最初の呼びかけには 1 人も現れなかった。その理由は Meatco の農民募集要項の参加基準が牛の保有頭数を基盤とした厳しいものであったためによる。

\* 参加基準を取り除き再度募集した結果、Ondangwa ADC 6 名、Okaku ADC 3 名、Ompundja ADC 10 名の参加を得た。

\* 現在まで参加者は増える傾向にあり、Ondangwa で 8 名、Okaku で 8 名加わってい

る。

3月5日（月曜日）

John Alphons Pandeni 農業試験場を訪問

山羊担当者 Melba Tjikmisa と意見交換。

\* 試験場では北部の4州を代表する山羊を集めており、その比較試験が実施されている。ローカル種、オバンボ、カーオカ、ルンデュ、カプリービの4品種に南アフリカ種のボアールゴウツの5品種の繁殖、成長比較試験が行われている。

\* 成績を見てみると2009年の大雨の影響をここ Gootfoutein でも受けており、全体の15%から22%と死亡率が多い。特に南ア産のボアールゴウツは死亡率が43%と非常に高い。これは多雨の年であり特別な気象環境の下で起こっているが、繁殖関係は正常に機能していることが見えるが死亡率が高くなっている。

\* 試験場としての機能は十分に果たしているが、繁殖方法が育種の専門家が立てた実験計画でなく、家畜飼育の専門家が組んでおり、雄15頭の中から雄3頭を選び大きな群れに投入しており、ランダム・メイティングが行われている。雄の判定が全くできない繁殖組立となっている。またこちらで働いて研究者はデータを取るだけで、結果の分析、整理は農業省本局にいる研究者がやっている。データそのものは確かである。

\* 結果としてはローカル4品種ともに2009年度は死亡率が高くなっており、北部地方の大量死と同じ結果を得ている。

表1. 2009年における北部地域の4種の山羊繁殖、生育と成績

種類	Ovambo	Kaaoko	Rundu	Caprivi	Boer goat
雌山羊	56	55	56	55	55
出産頭数	51	50	51	50	42
一人子	17	31	18	26	18
双子	62	40	62	40	46
三つ子	9	0	6	9	3
子合計	88	71	86	75	67
出生体重	2.4	2.6	2.5	2.5	3.8
離乳体重	8.9	11.8	10.6	9.5	11.9
一腹子率	1.7	1.4	1.7	1.5	1.6
死亡子数	13	16	13	14	29
死亡率(%)	15	22	15	18	43

資料：畜産試験場生データ

「ナミビア共和国・気候変動対応型農業開発・農業支援に係る情報収集・確認調査」

面談記録・現地調査記録⑩ 共通 (3/6～3/8 実施分)

(1) ナミビア Food and Agriculture Organization (FAO)

面談相手	PhD Admir P.M. Bay, FAO Representative in Namibia		
日時	3月6日(火) 15:10～16:15	面談場所	UN House 2階 FAO 図書室内
訪問者	(団員)相川、野口、(JICA 事務所) Mr. F. Unegu		
発言内容	<p>世界銀行ナミビアから FAO 訪問を勧められていたことから、訪問を実現したもの。</p> <p>(FAO の活動について)</p> <ul style="list-style-type: none"> <li>FAO ナミビアは、ナミビアが独立した 1990 年に活動を開始している。FAO ナミビアのスタッフは計 6 名で、内技術者は 2 名である。</li> <li>FAO (ローマ本部) – アクラ (アフリカ地域事務所) – ハラレ (南部アフリカサブ地域事務所) – FAO ナミビアとの構造になっている。そのため、ここでのプロジェクト申請はジンバブエのハラレ事務所に対して行うこととなる。</li> <li>ナミビアでの協力の規模は、それほど大きくなく、現在、2つのプロジェクトを実施している。             <ol style="list-style-type: none"> <li>1つ目は、デーツ(ナツメヤシ)の生産、商品化の促進と、それに伴う研修プロジェクトであり、ナミビア南部で実施している。ここでは、デーツ農家を育成し、商品は主に輸出向けになる。デーツ栽培は、Labor Intensive であるため、雇用創出にも貢献する。</li> <li>2つ目は、主にナミビア北中部地域で実施している小規模農家向けのプロジェクトである。自家消費用に作られているミレットやメイズなどを市場に出せるレベルの量に増やすことを目指すもの。また、園芸作物栽培に関するガイダンスも実施している。ここでの視点は、Community Farmer を Integrated to Market するものである。政策的な支援や、戦略作り、調査といったソフト面の協力も併せて行っている。</li> </ol> </li> </ul> <p>(ナミビア農業の課題)</p> <ul style="list-style-type: none"> <li>昨今、関心が高い課題としては、洪水下における農業のリスク管理である。北部の、場所によっては 6 か月間も洪水にさらされている場所がある。この分野は日本の得意とするところを理解する。</li> <li>課題として挙げられるのは、「どうすれば生産性を向上させられるのか」、また「Conservation Agriculture をどう進められるのか」がある。特に、Conservation Agriculture は北中部の重要な課題である。政府のグリーンスキームプロジェクトは、High Valued Crop を対象にしており、北中部で求められている Conservation Agriculture とは異なる視</li> </ul>		

点である。

- 国内の野菜をもっと消費してもらうようなプロモーション活動も重要になっている。

(質疑応答)

- (調査団の“国内の野菜消費をあげるにしても、農家の生産性が低い状況にあり、十分や共有がかなわないのではないか”に対して、) 全く、そのとおりであり、重要な課題である。そのためには、Conservation Agriculture をいかに実現するのかを考えなければならず、導入する技術もシンプルなものが良い。また、農業サービス提供に担い手である普及員の能力が不足しており、研修の機会を提供することも求められている。
- (調査団の“FFS と言った考えがナミビアでは浸透していないようであるが”との問いに対して、) Farmer Field School (FFS) については、FAO が 2008 年までに農業省に対して技術指導を行ってきた。北部の幾つかの地域でパイロット事業も実施し、デモンストレーション活動も行っている。ただし、農業省がそれをきちんと引き継いでおらず、そのためフォローアップを行わなければならないと考えている。
- (調査団から SATREPS 案件を概要を紹介し、農業省とナミビア大学との連携の重要性について説明したことを受けて、) 農業省と大学では目的が異なり、とるべきアプローチも違うため、どれだけ連携が可能かについてはコメントが難しい。ただし、大学での研究の成果は広く社会に還元する必要があると考えており、農家の要望をナミビア大学の研究に反映させるべきであることは確か。
- ナミビアは独立して 20 年しかない若い国である。そのため、まだまだ改善すべき点は多い。
- (調査団の“現状とのギャップが大きく、特に農業省が提供するサービスが、農家にとって必要なものであるかについては、疑問がある”に対して、) チャレンジングな部分である。
- 乾燥地農業に対する課題も少なくない。政府は補助金により肥料を提供しているが、農家によっては、その提供された肥料を使わず、闇市で売って、現金化してしまうという問題もある。
- 普及員は限られた知識だけでは農家の要望に応えられず、たとえばいつ植えればよいのか、どのような栽培方法が効果的なのか、家畜の病気はどうすればよいのかなど、現場では様々な知識が必要となるが、一方で普及員の能力を高める機会がほとんどない状況である。
- 長い道のりかもしれないが、農家の生産性を向上させ、それによって収入が増え、その代り政府の補助金の負担が減り、といったことを目指さなければならない。そのためにも、リサーチと普及の強化が必要となる。
- (調査団の“FAO の時期協力プロジェクトの構想は?”に対して、) 何かしらの協力は行うことになるが、内容は検討中である。また規模も小さいものになるだろう。

	<ul style="list-style-type: none"> <li>今後とも、JICA と議論できればと思う。</li> </ul>
収集資料	<ul style="list-style-type: none"> <li>FAO Subregional Office for Southern Africa Reports 1<sup>st</sup> Meeting, 2007</li> <li>FAO Subregional Office for Southern Africa Reports Annual Meeting, 2008</li> </ul>

(2) ナミビア農業・水・森林省（農業担当次官補説明）

面談相手	Mr. Des. R. Tshikesho, Under Secretary: Department of Agriculture		
日時	3月7日(水) 15:35~16:00	面談場所	農業・水・森林省
訪問者	(団員)相川、野口、(JICA 事務所)木川支所長、白田		
発言内容	<p>翌日の農業・水・森林省に対する調査結果報告会において、省代表が事前に概要説明した次官(PS)ではなく、Under Secretary(次官補)に変更となるの事を聞き、同氏には調査団の説明を行う機会がなかったことから、事前説明を行ったもの。</p> <ul style="list-style-type: none"> <li>(N)ナミビア農業省は、2KR や研修員の受け入れなどで日本からの協力を過去に受けており、自分も JICA のことはよく知っている。</li> <li>(N)この内、2KR については世界銀行カテゴリーで中進国扱いとなっており、そのため対象にならなくなったと理解している。たしかに、首都ウィンドフックだけを見ると中進国と言えるかもしれないが、地方の Communal Area は数々の問題を抱えている。一律にナミビアは中進国と考えるべきではない。</li> <li>(JICA)国の平均所得を基準とする無償資金協力の適用は難しいが、JICA 提供できる3つのスキームの内、ナミビアに対しては技術協力を中心に協力していきたいと考えている。</li> <li>(N)明日の調査報告会では、実際に何を見て、何を考えたのかについて、率直に説明してほしい。次官と副次官は用務があり、出席が叶わないが、他の局長には声をかけている。</li> </ul>		
収集資料	(なし)		

(3) ナミビア農業・水・森林省 調査結果報告

出席者	<ol style="list-style-type: none"> <li>1. Mr. Des. R. Tshikesho, Under Secretary: Department of Agriculture, MAWF (議長) 農業担当次官補</li> <li>2. Mr. A. Nehemia, Under Secretary: Department of Water and Forestry, MAWF 水・森林 担当次官補</li> <li>3. Mr. Jjimaans, L/AI, MAWF</li> <li>4. Mr. I.P. Mele, Deputy Director of DAR, MAWF</li> <li>5. Mr. E.D. Peirus, CAEO/Acting Director of DEES, MAWF</li> <li>6. Mr. M. Mulunga, Deputy Director, MAWF</li> <li>7. Mr. E. Kanguatjivi, Economist, MAWF</li> <li>8. Mr. V. N. Imalwa, Deputy Director of DEES, MAWF</li> <li>9. Mr. Pomnkegel R., DoP, MAWF</li> <li>10. Dr. N. S. Amethenu, State veterinarian, DVS, MAWF</li> <li>11. Mr. S.K. Awala, Lecture, University of Namibia</li> <li>12. Mr. Tobias Sisamu, Economist, National Planning Commission Secretariat (NPC)</li> <li>13. (JICA ナミビア支所) 木川、白田、Mr. F. Unegu</li> <li>14. (JICA 南アフリカ事務所) 大平</li> <li>15. 飯嶋盛雄 近畿大学 農学部 教授</li> <li>16. (調査団) 相川、鈴木、山本、中村、野口</li> </ol>		
日時	3月8日(木) 10:10~12:50	場所	農業・水・森林省
内容	<p>議事次第にそって、農業省に対して調査結果報告を行った。議長は農業分野担当の Under Secretary である。調査結果説明は、「農業普及システム分野報告(鈴木団員)」、「乾燥地農業分野報告(山本団員)」、「畜産分野報告(中村団員)」とこれら分野別報告を受けた総括(相川団長)の順で行われた。また、これに加えて、今まであまり説明の機会がなかった SATREPS 案件について、ナミビアを訪問中の近畿大学農学部飯嶋教授より、その概要説明を農業省側に行った。</p> <p>以下、これら報告に対する意見交換を示す。</p> <ol style="list-style-type: none"> <li>1. 調査団報告に対し <ul style="list-style-type: none"> <li>● (N1)まず、農業普及システムに関して、現状では、サービス活動を行うにしても、普及員の数が十分でなく、そのため農家とかかわれる程度も限られてしまっている。</li> <li>● (N1)Research に関して、農業省としてはもっと農業 dealer との関わりを強めていく必要性を感じている。</li> <li>● (鈴木)今回の調査で、質問票を配布して、普及員等が考えている問題点などの把握に努めた。その回答の中に、民間企業との関わりが重要であると回答する農業普及員がいた。しかし、一方で、民間企業は儲けにならないことは行わない。将来的に、政府と民間企業の関係強化には期待したいところである。</li> </ul> </li> </ol>		

- (N1)リサーチと普及と農家の連携(つながり)をいかに強化できるかが重要であると認識している。これに関して、いくつかの問題があり、①として政府は **Farming System Research and Extension Approach** (ママ)を取っているがそもそもリサーチャーの数が少ない。②として、農業普及員の能力強化が必要であり、人材育成に実績がある JICA に支援をお願いしたい箇所である。③として、農業組織化、農業共同体の強化も重要である。調査団からの報告にもあったエタカ農場のグループのような成功している共同体がナミビアにも存在する。一言で農家と言っても、自給作物レベルの農家から、商業的に成功している農家まで様々である。そこで、こういった農家のレベルに合った農業サービスが提供できるようにする箇所で JICA にアドバイスをお願いしたい。④として、これは農業省の問題であるが、移動手段(普及のための車両)が少ないことも挙げられる。農業省の予算の中で最大限努力しているが、まだまだ十分でない。⑤として **Farming System Research and Extension Approach** の中でデモンストレーションを行っているが、ナミビアにとって適した技術は何かの検証が十分行われていないとも言える。これらに関して、JICA のアドバイスがあれば大変喜ばしい。
- (N2)農家と農業普及員の関係強化に関して、現場では様々な課題に直面しており、農家から様々な種類の質問を受ける。農業普及員はそれにこたえられるだけの知識が必要であると感じている。作物のこと、水のこと、家畜の病気のこと、自分の生活のこと、クリニックのことなど幅広い。
- (N3) **Post-Harvest Loss** が深刻である。農家にとっては全く知識がないともいえる分野である。
- (N1)今回、様々な課題が指摘されたが、中でも **Conservation Agriculture** が良いのか、従来の **Conventional Agriculture** が良いのか、検証ができていない。JICA が得た他の国々での経験を下に、協力をお願いしたい。
- (山本) **Conservation Agriculture** か **Conventional Agriculture** については、まだ検証が必要と考えられる。特に乾燥地農業技術については、まだ知識が不足していると考えられ、この分野の研修は必要である。
- (相川) JICA にとっても、**Conservation Agriculture** の経験はそれほど多くはない。しかし、他の開発ドナーでは実績もあり、そこから学べると考えられる。
- (相川) **Post-Harvest Loss** については日本の農業でも重要なテーマであり、特に米作において様々な経験を積んできた。しかし、ナミビアに限って言えば、**Post-Harvest** よりはその前の生産性をいかに向上させるべきかが課題と認識しており、より優先度が高いと考える。
- (N4)ウォーター・ハーベスティング技術の導入は大変良いアイデアである。
- (N5) 地下ため池技術が紹介されたが、どのくらいの規模のものか？また、園芸作物栽培にも使えるものか？
- (山本)今回、写真で紹介したのは 10 名程度のグループで使える規模のものである。



	<p>住民の数や用途によって大きさはまちまちである。</p> <ul style="list-style-type: none"> <li>● (相川)住宅周辺での園芸作物栽培にも活用できる。</li> <li>● (N1)農業省は過去に日本の 2KR によって肥料の提供を受けたことがある。</li> <li>● (野口)ナミビアに対して、2006 年頃まで何度か日本は 2KR による協力を行った。しかし、対象資格は世界銀行の基準に沿っており、残念ながら現在、基準を超えているナミビアは 2KR の対象になっていない。</li> <li>● (N1)理解した。</li> <li>● (N1)畜産分野に関して、今回、報告があった通り、多くの農家は家畜を飼っている。そのため、政府の普及員のみならず、畜産関係者への技術研修にも JICA の協力をお願いしたい。</li> <li>● (N6)有用種牛の保存の関係で、現在のオス牛 (bull) 1頭に対して、メス牛 (cow) 25 頭の飼育数を変えるとの提案があったが、現実的にかなり厳しいといえる。</li> <li>● (中村)統計的な数字であるが、優良な種を適切に保存していくには、オス1に対してメス4、つまり 1:4 が望ましいとされている。</li> <li>● (N6)優良オス牛は高価で、農業省としても数を増やすことは難しい。Communal 地域でも優良なオス牛は求められている。</li> <li>● (中村)今回の話は、Communal 地域ではなく、試験場での遺伝資源管理に話となる。</li> <li>● (N7)MeatCo に売る際に、低い値段でしか売れないとの話があった。幹線道路に近い方が、牛を連れて行く距離が短いことから、痩せず、高く売れるとの報告もあった。</li> <li>● (N1)家畜疾病の予防に関しては、ほとんど手が付けられていない。特に、農家にとっては予防が重要であるという認識はほとんどないと思われる。農家の考え方、態度を変えるように仕向けることが必要である。もともと家畜は資産だという認識にある。</li> <li>● (N8)Sanga 種に対して、農家はあまり良い牛だと思っていない。</li> <li>● (中村)土着種の Sanga なの優位性もあると考えられる。</li> <li>● (N8)Sanga は体格が小さいので MeatCo に売りにくい。Sanga の品種改良が必要。</li> </ul> <ul style="list-style-type: none"> <li>● (N1)本日の説明で提案してくれた内容に同意する。まだまだ政府側の予算も限られているため、全て対応することは難しい。ただし、Horticulture はナミビアにとって新しい分野と言えるもので、農業省としては進めたいと考えている。また、水資源へのアクセス技術も大変重要である。家畜に関しては、Rang Management (放牧管理) 技術もチャレンジングな分野である。</li> <li>● (N9)今回、日本から提案のあった Growth to Sell を実践しようとしている団体もある。</li> <li>● (N10)農業普及員の能力向上の対応策の一つとして、ベテラン職員による若手職員への指導というものがあった。</li> <li>● (鈴木)常に一緒にいなくてはならないということではないが、何かトラブルが生じた際に、ベテランがアドバイスできる体制にあるかということ。組織的な知見や技術の蓄積</li> </ul>
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	<p>が必要で、それがないとベテランが引退したい際に、知識が残らない。</p> <ul style="list-style-type: none"> <li>● (N11) Post-Harvest に関するアセスメントが必要と考えている。特に、Value-Added Chain を意識し、生産者である農家をこの中に統合する必要がある。</li> <li>● (N1) ナミビア農業省として、ぜひ JICA にアドバイスをお願いできればと思う。協力期間の上限などはあるのか？</li> <li>● (相川) 仮に、農業開発マスタープランを行うとして、その中では実証試験も含める場合、3年間の事業が想定される。と、同時に、農業省本省に対してアドバイザーを派遣、ここでは農業省がマスタープランに沿って実施できるように支援するもの。</li> </ul> <p>-----</p> <p>2. 飯嶋教授のプレゼンに関し</p> <ul style="list-style-type: none"> <li>● (N) このプロジェクト(SATREPS)は既に開始されているのか？</li> <li>● (飯嶋) ナミビア大学のオゴンゴキャンパスにおいて、2012年から開始しているものである。</li> <li>● (N) このプロジェクト終了後の将来計画は？</li> <li>● (飯嶋) 本プロジェクト終了後の計画の取り扱いについては、その段階になったら、JICA に相談される様、お願いしたい。</li> </ul>
収集資料	(なし)

#### 4. 農業資機材等の価格リスト

##### 農業資機材等の価格リスト (2012年2月現在、VAT含まず)

##### 1. 乾燥地作物生産プログラムによる助成

種子	作物	品種	農民負担	政府補助	備考
	トウジンビエ	Okashana 2	N\$8.75/2kg	N\$8.75/2kg	50%補助 各品種最大6kg/農家
		Kangara	N\$8.75/2kg	N\$8.75/3kg	
	ソルガム	Macia	N\$8.75/2kg	N\$8.75/4kg	
		Red Sorghum	N\$8.75/2kg	N\$8.75/5kg	
	ササゲ	Nakare	N\$8.75/2kg	N\$8.75/6kg	
		Shindimba	N\$8.75/2kg	N\$8.75/2kg	
肥料	種類	成分	農民負担	政府補助	備考
	複合肥料 2.3.2	N:P:K:Zn=10:15:10:0.5	N\$127.00/50kg	N\$190.50/50kg	60%補助 各肥料最大300kg/農家
	リン酸アンモニウム	N:P:K:Zn=11:50.4:0:0.5	N\$120.00/50kg	N\$180.00/50kg	
	硫酸アンモニウム	N:P:K:Zn=21:0:0:0	N\$83.00/50kg	N\$124.50/50kg	
耕耘	分類	作業内容	農民負担	政府補助	備考
	政府トラクタ	リッパー耕	N\$150.00/ha	残額	各作業最大3ha/農家
		通常プラウ耕	N\$150.00/ha	残額	
		ディスクハロー耕	N\$150.00/ha	残額	
		トラクタによる施肥+播種	N\$100.00/ha	残額	
	民間トラクタ	リッパー耕	残額	N\$150.00/ha	
		通常プラウ耕	残額	N\$150.00/ha	
除草			農民負担	政府補助	
			残額	200/ha	最大3ha/農家

##### 2. 民間(Oshakati Pharmacy)の種子・肥料価格

Oshakati Pharmacy: 北中部4州の共有地(ツメブを除く)における最大の農業資材販売店で、種子、肥料に関しては南アフリカ共和国の企業と代理店契約を締結している。2011年12月にはオムサティ州に農業資材専門店 Etaka Agvet を開店した。

作物種子	品種	容量	価格N\$	作物種子	品種	容量	価格N\$
トマト	Rodade	100g	193.95	キャベツ	Copenhagen	100g	28.95
	Roma VF	100g	129.95		Trounchuda	100g	19.50
	Froloradade	100g	357.50		Cape Spit	100g	24.95
	Moneymaker	100g	186.95	タマネギ	Grano Select	500g	179.00
	Roma VFN	100g	41.95		Caledon Globe	100g	47.95
ピーマン	Capistrano	20g	106.95	Charlize 250M	1kg	4322.50	
	California Wonder	100g	58.50	Texas Grano	100g	35.25	
キュウリ	Rust Resiatant	100g	83.95	Texas Grano	500g	185.95	
カボチャ	Rebenuc	100g	315.00	ニンジン	Cape Market	100g	47.95
	Waltham	100g	54.95		Cape Market	500g	105.95
	Waltham	500g	215.95		Kuroda	100g	29.95
	Waltham	1kg	330.00		Kuroda	500g	96.95
	Flat White Boer	100g	38.95		Scarlet Nanites	100g	68.95
	Flat White Boer	500g	134.95	テーブルビート	Crimson Globe	400g	104.50
	Rolet	100g	31.95	トウモロコシ	White Kep	25kg	310.00
スイカ	Sweet/ P	100g	108.95	Sahara Yellow	5kg	158.50	
メロン	All Sweet	100g	84.95	Sahara Yellow	10kg	258.95	
	Crimson Sweet	100g	76.95	Zama Star	5kg	108.95	
	Hales Best	100g	147.55	Zama Star	10kg	213.50	
レタス	Great Lakes	100g	114.75				
化学肥料	種類	容量	価格N\$	化学肥料	種類	容量	価格N\$
	複合肥料 2:3:2	5kg	95.95		硫酸カリウム	25kg	359.95
	尿素	50kg	514.00		硝酸カリウム	25kg	860.00
	Wonder Kan: N28%	20kg	304.95		硝酸カルシウム	25kg	416.95

### 3. 簡易点滴灌漑システム

現地 NGO である Creative Entrepreneurs Solutions が普及を進めている簡易点滴灌漑システム:40L のビニールポットに土壌と堆肥を詰め、袋ごとに点滴灌漑を行い、野菜等を栽培する(写真参照)。

セット価格: N\$3,200(運送費込み)

セット内容	数量	セット内容	数量	セット内容	数量
250 litre tank plus lid	1	Male bend connector	1	T-pieces	3
Punch	1	Main line pipe	50m	Elbows	2
Tank connector	1	Drip tubing	100m	Main line stoppers	4
Water filter	1	Manifold connectors	56	Drip sticks	200
Control valve	1	Manifolds	56	40 litre nursery bags	200





Report  
on  
Data Collection Survey for the Agricultural  
Development and Extension adaptive to  
climate change in the Republic of Namibia

March 2012

Japan International Cooperation Agency (JICA)  
Ministry of Agriculture, Water and Forestry (MAWF)

Data Collection Survey for the Agricultural Development and Extension  
adaptive to climate change in the Republic of Namibia  
Report

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# 1. Outline of the Survey

## 1.1 Background and Purpose of the Survey

In Namibia, over 70% of the population is engaged in subsistence agriculture and/or livestock production in rural areas. Most of them are small-scale farmers living in poverty as their income level is generally low. Particularly northern part of the country has a higher concentration of such subsistence farmers, which has made this area one of the poorest and the most vulnerable regions in the country. Namibian Government has made efforts to improve their livelihood through various agricultural development programmes/projects since its independence in 1990. However, the government has been facing a number of challenges since these areas are in extremely harsh environment where droughts and floods have repeatedly occurred. In recent years, such unstable extreme rainfall patterns have become exacerbated due to climate changes at global scale.

Against such background, the Governments of Namibia and Japan agreed last year on the implementation of a technical cooperation project titled “Flood- and Drought-Adaptive Cropping Systems to Conserve Water Environments in Semi-Arid Regions” aiming at developing a water-saving farming technology based on rice and pearl millet adapted to the dry conditions in Namibia. The Project is scheduled to commence in March of this year and will be implemented for 5 years in collaboration between University of Namibia and JICA. However, it is also important to support extension of newly developed technologies in farming communities so that the technologies can benefit small-scale farmers. In this regard, a comprehensive cooperation programme to overview the agricultural sector needs to be formulated. JICA therefore intends to conduct a data collection survey to examine the possible cooperation scenario for the Namibian agricultural sector with a focus on “development and extension of farming technologies adaptive to climate change”. This survey mission has been dispatched for purpose of gathering basic information to examine the potential for the future cooperation particularly targeting North-central Regions (Oshikoto, Oshana, Omusati and Ohangwena) of Namibia.

## 1.2 Survey Points and Methodology

The survey will be carried out with particular attention to “Extension system”, “Dry-land agriculture” and “Livestock production” that are considered important areas to overview the agricultural sector in the North-central Regions. The following table has summarized points and methodology of the survey.

Survey Areas	Survey Points	Methodology
Agricultural Extension	To collect and analyze the following points: 1) Basic information on the Namibian agricultural sector including national development policies related to the sector 2) Progress of the agricultural policies/programmes such as the National Agricultural Policy and Green Scheme Policy 3) Current situation and challenges regarding agricultural extension services including those implemented by	➤ Review of relevant policy documents, reports, etc. ➤ Collect latest statics data ➤ Interviews to stakeholders (MAWF HQ, regional offices, UNAM, etc.) ➤ Conduct a questionnaire

Survey Areas	Survey Points	Methodology
	<p>MAWF and other service providers</p> <p>4) Other related policies such as policies for land, water, etc.</p> <p>5) Potential for collaboration with SATREPS (UNAM-JICA project)</p> <p>6) Potential for collaboration with other donor-supported projects</p>	<p>survey with regional and extension staff in target areas</p> <p>➤ Field visits to observe extension activities</p>
Dry-land Agriculture	<p>To collect and analyze the following points:</p> <p>1) Current situation and challenges of agricultural production in the North-central Regions including statistics of production and farmers, farming systems, post-harvest technologies, etc.</p> <p>2) Activities and challenges of farmers' organizations including water-users associations, farmers groups, etc.</p> <p>3) Current situation and potential of water-use technologies including rain-fed and irrigation farming systems, water-harvesting and water-saving technologies, etc.</p>	<p>➤ Obtain latest agricultural statistics by regions</p> <p>➤ Review of relevant documents (extension manuals, booklets, etc.)</p> <p>➤ Interviews to stakeholders (MAWF HQ, regional offices, farmers, extension staff in target areas, farmers, etc.)</p> <p>➤ Visits to farmers' fields</p>
Livestock Production	<p>To collect and analyze the following points:</p> <p>1) Basic information on livestock sub-sector including statistics of livestock production, marketing, processing, trade, etc.</p> <p>2) Implementation system of livestock related services such as government programmes, marketing, processing, training especially for small scale farmers, etc.</p> <p>3) Policies related to livestock production including input support, credit, settlement scheme, communal land reform, etc.</p> <p>4) Result of other donor-supported livestock projects for small scale farmers in Northern area.</p>	<p>➤ Obtain latest livestock statistics by regions</p> <p>➤ Review of relevant documents</p> <p>➤ Interviews to stakeholders (MAWF department of livestock, Meatco offices, , livestock farmers, etc.)</p> <p>➤ Visits to abattoir, markets, livestock farmers, etc.</p>

### 1.3 Team members

#### (1) Japanese Team members

Name	Task	Affiliation	Assignment
Dr. Jiro AIKAWA	Team Leader / Agricultural Development	Senior Advisor (Agriculture & Rural Development), JICA HQ.	08-16/02/2012 06-09/03/2012
Ms. Yoshimi TSUZUKU	Project Planning 1	Deputy Assistant Director, Rural Development Department, JICA HQ.	08-16/02/2012
Mr. Shinichi NOGUCHI	Project Planning 2	Deputy Director, African Department, JICA HQ.	05-09/03/2012
Mr. Atsushi	Agricultural Extension	Senior Consultant,	08/02-09/03/2012



SUZUKI	System	A&M Consultant Inc.	
Mr. Katsuyuki YAMAMOTO	Dry-land Agriculture	Assistant Director, Operations Department, Japan Association for International Collaboration of Agriculture and Forestry (JAICF)	08/02-09/03/2012
Mr. Takashi NAKAMURA	Livestock	Technical Consultant, YSK Consultants Co., Ltd.	08/02-09/03/2012

## (2) Namibian members

Name	Task	Affiliation
Mr. VEIKKO IMALWA,	Agricultural Extension System	Deputy Director (Northern Region), MAWF
PhD. MALIMA I. Benedic,	Dry-land Agriculture	Deputy Director, Plant Production Research, MAWF
Mr. Martin Shikongo	Livestock	Research Technician, MAWF

## 1.4 Schedule

The field exercise in Namibia will be undertaken from February 8 to March 9, 2012. The mission schedule is shown below.

Week	Date/Month	Sites	Activities
1	08 - 10/02	Windhoek	Arrival in Namibia, Internal meeting Courtesy calls to MAWF, UNAM, Embassy of Indonesia, Green Scheme Agency, Namibia National Farmers Union, etc.
	11 - 13/02	North-Cent ral Region (NCR) sites	Travel to North-central Region Courtesy calls to MAWF Regional Office, UNAM Faculty of Agriculture and Natural Resources, etc.
2-4	14/02 - 04/03		Field study by consultant members with Namibian counterparts <ul style="list-style-type: none"> <li>• Visits to Oshikoto, Oshana, Omusati and Ohangwena Regional Offices (Directorate Agriculture and Livestock)</li> <li>• Conduct interviews and questionnaire survey with extension officers</li> <li>• Visits to from farmers' fields, local markets, project sites, irrigation scheme, abattoir, processing companies, etc. and collect information</li> </ul>
5	05 - 08/03	Windhoek	Compile field reports Presentation on findings at MAWF Report to JICA Windhoek office
	09/03		Leave Windhoek

## 2. Results of the Survey

### 2.1 Summary of the Results

The results of the survey in each field are summarized in the below tables. The details of countermeasures are described in from section 2.2 to section 2.4.

#### (1) Agriculture Extension System

Issues	Countermeasures
Limited linkage	1) Participatory extension/research methodologies
Capacity Development of the extension staff	1) Provide practical trainings for technician
	2) Ensure young technicians to take over the know-how from veteran staff
Farmers' organizations	1) Learning successful organizations
Farmer categorization and effective extension	1) More detailed categorization of farmers
	2) Appropriate support services for different types of farmers
Other logistical issues	1) Prioritize the national budget for necessary facilities and equipment

#### (2) Dry Land Agriculture

Issues	Countermeasures
Low crop production	1) Development and dissemination of appropriate fertilizer application
	2) Introduction of leguminous crops for inter-cropping and crop rotation
	3) Improvement of conservation farming
Underdevelopment of horticulture crop	1) Introduction of water harvesting technology (e.g.: underground tank, water catchment plan)
	2) Introduction of water-saving irrigation system (e.g.: drip irrigation)
	3) Strengthening ownership of farmers

#### (3) Livestock

Issues	Countermeasures
Low cattle off take	1) Activation of assembly point or auction place
	2) Mentorship training to change mentality
	3) Establishment of disposal system for young weaner, steer, old age cows
No grass during dry season	1) Fodder production plot in farmers field
	2) Fodder production plot in research station

<b>High goats mortality due to excessive wet condition</b>	1) Improvement of goats husbandry and grazing management
	2) Preservation of indigenous breed of Sanga
	3) Produce heavier cattle through fattening genetically improved breed
	4) Preservation of indigenous breed

## 2.2 Results of Survey on the Agricultural Extension System

IMALWA Veikko, Deputy Director (Northern Region), MAWF  
 SUZUKI Atsushi, Member of JICA Survey Team

### 2.2.1 Findings from the field survey

#### 2.2.1.1 Objectives and implementing structure for agricultural extension services in the NCRs

The main objectives of the MAWF agricultural extension services are stated as follows (*Technical Paper in Support of the Motivation on Budget 2011/12 for Vote 20, MAWF*):

- To provide agricultural extension services in form of communication, advisory and training services;
- To promote technology development, adaptation and information dissemination in the agricultural sector;
- To identify and implement technological needs and requirements in the areas of mechanization, irrigation, animal husbandry, soil conservation, water supply and agricultural structures;
- To contribute to the implementation of relevant national policies; and
- To contribute to increased food production and household food security.

Directorate of Extension & Engineering Services (DEES) under MAWF is responsible for implementation of agricultural extension services in the country. DEES has an office for Extension & Development Division and 4 Subdivision (regional) offices in the NCRs, namely Oshana, Ohangwena, Oshikoto and Omusati. Organizational structure is shown in Figure 1 below. Division office and subdivision offices are headed by Deputy Director and Chief Agricultural Extension Officers (CAEOs) respectively. Under each regional office, Agricultural Development Centers (ADCs) are established that are frontline for the extension services. There are currently 49 ADCs in the regions (6 are under construction) as shown in Figure 1.

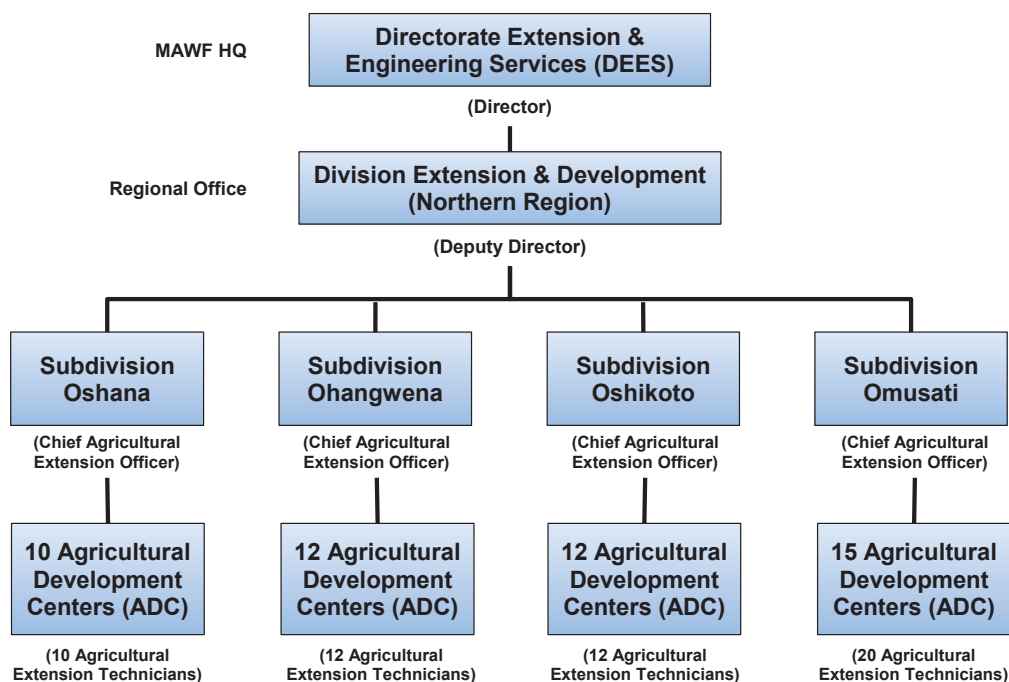


Figure 1 Organizational structure for agricultural extension services in the NCRs

Table 1 below summarizes the basic information on the 4 Regions in relation to the agricultural extension services implemented by the MAWF. At the regional office, a management team is formed consisting of CAEO, Agricultural Extension Officers (AEOs) and Chief Agricultural Extension Technicians (CAETs). ADCs are manned by Agricultural Extension Technicians (SAETs and AETs). 4 ADCs are not manned at the time of the survey. The management team at the regional office is supporting frontline extension technicians technically as well as logistically.

Table 1. Basic Information on 4 Regions in relation to Agricultural Extension Services

Regional Office	Area (km <sup>2</sup> )	Population <sup>1)</sup>	No. of HH <sup>1)</sup>	No. of Subsistence Farm HH <sup>2)</sup>	No. of ADCs	No. of SAETs AETs	AET: Subsistence Farm HH Ratio
Oshana	8,653	170,974	35,087	8,246	10	10	1:825
Ohangwena	11,258	238,325	38,997	18,953	12	12	1:1,895
Oshikoto	38,653	161,665	32,038	13,232	12	12	1:2,670
Omusati	26,573	235,417	45,161	26,916	15	20	1:1,346

1) Source: NHIES 2009-2010 provisional figures (NPC)

2) Households relying on “subsistence farming” as main source of income

It is stated that the extension activities are implemented through the participatory Farming Systems Research and Extension (FSR/E) approach. Figure 2 illustrates the implementing mechanism for extension services in relation to research system and farmers.

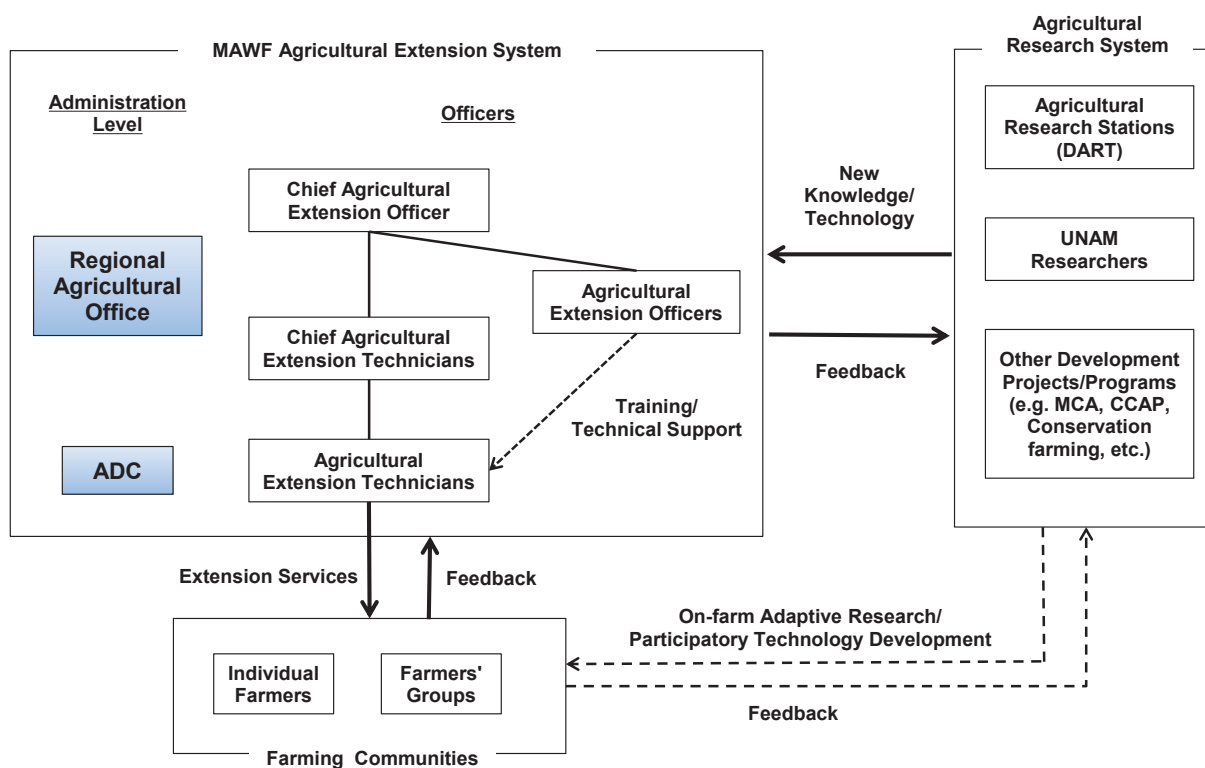


Figure 2. Implementing mechanism for agricultural extension services in relation to research and farmers

### 2.2.1.2 Current situation of agricultural extension services implemented in the NCRs

Out of 73 extension officers and technicians (19 management at regional offices and 54 technicians at ADCs) currently assigned in the 4 Regions, 57 answered the questionnaire. The Survey Team visited all the 4 Regional Head Offices, several ADCs, Agricultural Research Stations, some farmers and producer associations to collect supplementary information through interviews with relevant officers and stakeholders. The results of the survey concerning the current situation of agricultural extension services are summarized below.

#### (1) Age groups and academic background of field extension workers (technicians)

Tables 2 and 3 show the characteristics of extension technicians currently assigned in the NCRs. The largest number of them falls in the age range of 40-49 years followed by 30-39. While young technicians (less than 29 years old) have been employed, there are a number of veteran technicians who will get retired from the system within next 10 years. In terms of academic background, a majority of technicians obtained diploma in agriculture at Ogongo Campus of UNAM (formerly agricultural college). They answered to have studied either general agriculture or crop science at the school, and very few did other areas including animal science and forestry.

Table 2. Distribution of SAETs/AETs by age groups (n=44)

<b>Respondents by Age Group</b> (years old)			
< 29	30-39	40-49	50 <
6	10	19	9

Table 3. Academic background of SAETs/AETs (n=44)

<b>Respondents by Academic Background</b> (specialized areas)				
General agriculture	Crop science	Animal science	Extension methodology	Forestry
25	14	2	1	2

#### (2) Number of farmer groups and frequency of extension visits

According to explanation made by the technicians whom the Survey Team met, they visit either individual farmers or farmer groups for extension work. However, there was an impression that they had more focus on groups than individuals in terms of extension visits. Most technicians mentioned that they had FED (Farmers Extension Development) groups formed in their service areas and many activities were undertaken through these groups, though some technician said that the concept of FED groups had faded away. Tables 4 and 5 show the number of farmer groups that each technician regularly visits and frequency of visits for extension work. In regard to cooperatives and farmers' associations, it was observed that very few had so far been established in the regions.

Table 4. Number of extension groups regularly visited (n=38)

<b>Number of Groups regularly visited for extension activities</b>	1-5	6-10	11-15	16-20	20 <
<b>Number of Respondents</b>	6	15	8	5	4

Table 5. Frequency of extension visits (n=43)

<b>Frequency of Extension Visits</b>	More than 3 visits /week	1-2 visits/ week	1-2 visits/ 2 weeks	1-2 visits/ month	Less than 1 visit /month
<b>Number of Respondents</b>	14	12	6	10	1

### (3) Emphasized topics (extension messages)

Extension technicians are dealing with wide range of topics. Table 6 summarizes the list of topics (extension messages) that they are currently trying to disseminate among farmers in the respective service areas. Topics related to the livestock management were the most commonly cited by technicians followed by marketing issues (both livestock and crops) and government subsidy programmes (inputs, ploughing, weeding) through DCP. Control of insects and diseases (both livestock and crops) is another important issue.

Table 6. List of topics most frequently cited by extension technicians (n=44)

Activity Area	Topics (Extension Messages)	Number of Respondents
Livestock-related	1) Animal husbandry/management (general, dehorning, castration, vaccination, feeding, etc.)	39
	2) Livestock marketing	14
	3) Animal health/disease	6
	4) Conservation of pasture grazing land/Range management	5
	5) Improved animal breeding	3
Crop production	1) Crop marketing (Mahangu)	14
	2) Availability/registration of inputs through DCP	11
	3) Ploughing services/Ripping programme	11
	4) Insects & disease control	10
	5) Conservation agriculture	7
	6) Horticulture/Vegetable production	6
General	1) Farmers association/Cooperative formation	4
	2) Climate change adaptation	4

To a question as to how they had spent time on extension for livestock and crop farming, most technicians answered that they had spent more time on crop extension than on livestock during the rainy season while more time on livestock extension than crops or equal time during the dry season (Table 7).

Table 7. Difference of extension work on livestock and crops by season (n=39)

Time spent on extension work	Number of Respondents	
	Rainy season	Dry season
1) More time on livestock extension	0	15
2) More time on crops extension	32	3
3) Equal time on livestock and crops	7	21

### (4) Extension activities/methods undertaken

In regard to extension activities or methods, Table 8 summarizes the information as to which activities and how frequently extension technicians undertook in the past one year. The most common activities were individual and group meetings followed by farmers' trainings and field days. Although a number of technicians answered to have undertaken Farmers Field School (FFS), they may have misunderstood the question since the concept of FFS seems not known in the regions according to the interview with technicians.

Table 8. Extension activities undertaken in the past one year (n=44)

Extension Activities/Methods	Number of Technicians who undertook Each Activity by Frequencies			
	None	1-5	6 <	N/A
1) Individual meeting/discussion	0	22	20	2
2) Group meeting/discussion	0	20	21	3
3) Farmers' training in the field	2	35	5	2
4) Field days	8	31	2	3
5) Exposer trips	20	21	0	3
6) Demonstrations/On-farm trials	5	31	6	2
7) Farmer Field School (farmer to farmer extension)	13	26	1	4
8) Handout of printed materials (magazine, manuals, leaflets, posters, etc.)	3	20	16	5
9) Broadcasting agricultural radio programme	31	10	2	1
10) Use of audio-visual aids	32	8	1	3

## (5) Information channels/sources for extension technicians

Technicians were asked a question as to what extent they rely on different channels/sources to get information for extension work. They indicated each channel with 5 degrees from “very much” to “not at all”. The results were summarized and “importance scores” were computed using weighted average (scores: Very important=4, Important=3, Fair=2, Little important=1, Not important=0). The results are shown in Table 9. The higher the score is, the more technicians rely on those channels/sources with higher degree.

According to the Table 9, the most important channel was “regular meetings with supervisors” followed by “printed materials”, “other technicians”, “farmers”, “radio programs”, and so on. “MAWF research stations” and “UNAM researchers” did not show high scores, which means the technicians do not get much information from them. It is inferred that not much interactions between extension and research are currently taking place.

Table 9. Information sources by importance (n=44)

Information Sources by Importance Order	Importance Score
1) Regular meetings with supervisors	2.80
2) Printed materials (manuals, handbooks, textbooks, etc.)	2.52
3) Fellow officers in other areas	2.39
4) Farmers (Small-scale)	2.34
5) Radio programs	2.30
6) Internet	1.98
7) TV programmes	1.86
8) Newspapers	1.86
9) Agro-dealers (seed, fertilizer, chemical companies)	1.39
10) MAWF Research Stations	1.41
11) Traders/Business people	1.11
12) Farmers (Commercial)	0.64
13) UNAM lecturers/researchers	0.57

Scores: Very important=4, Important=3, Fair=2, Little important=1, Not important=0 (including N/A)



(6) Training opportunities

Regarding the trainings, the majority of technicians answered to have attended some short course trainings or workshops while 14 out of 43 technicians answered never attended in the past 3 years (Table 10). Table 11 summarizes the list of trainings/workshops they attended. As shown here, the topics and organizers were varied, but a good number of them were sponsored by donor projects.

Table 10. Attendance to trainings in the past 3 years (n=41)

Number of trainings attended	Number of Respondents
Non	14
1	6
2	6
3	9
4	2
5	4

Table 11. List of trainings/workshops attended by technicians

a) Local

Category	Training Topics	Duration	Organizers
Crops	Pest management	3 weeks	MAWF (DEES)
	Vegetable production	2 weeks	MAWF/UNDP
	Horticulture general theory	1 week	UNAM/FAO
	Conservation agriculture & practices	1 week	UNAM
	Mushroom production	1 week	UNAM/AU/NEPAD
	Seed inspection	4 days	MAWF
	Bush encroachment	1 day	UNAM
	Ripper planting	1 day	CALCC
	Crop forecasting	1 day	MAWF
	Marketing production economics	1 day	Agri-Bank
	GRN tractor monitoring	1 day	MAWF
Livestock	Draft animal power	3 weeks	DAPAP 2
	Animal health/Pasture science/Marketing	2 weeks	AGRA Limited
	Introduction to commercial livestock	1 week	Farmers Support Project
	Reading the land (Range management)	1 week	GOPA
	Community based land & livestock management	3 days	GOPA
	Licks making demonstration	2 days	UNAM
	Livestock marketing	1 day	CALLC
	Animal judging	1 week	MAWF
General	Trader's operation training	2 weeks	MAWF
	Climate change	1 week	CALLC
	HIV/AIDS and living positive	1 week	MAWF/CALLC
	Basic computer skills	1 week	CTPP (MAFW?)
	Financial management	1 week	CALLC
	Seminar: Tackling the impact of climate change	1 day	UNAM/Indonesia Embassy

b) Overseas

Category	Training Topics	Duration	Venue
Crops	Crop Estimator	1 week	UK
	Soil management	4w	Gabon/GUT
Livestock	Animal husbandry/Health	1.5 month	China
	Animal disease control	1 week	UK
General	Extension & rural development	3 months	Egypt

## (7) Challenges faced by technicians

To an open question regarding the challenges that the extension technicians had been facing, a wide range of issues were reported. The answers were sorted by making groups based on issues and summarized. Table 12 shows the results of this analysis. As shown in the table, the most commonly cited challenge was concerning transport that was mentioned by 31 technicians (out of 44). Because of the nature of services, availability of transport must be one of the most crucial issues for the technicians. Others included lack of in-service training opportunities or inadequate knowledge/skills mentioned by 14 technicians, too many farmers to serve or too heavy workload mentioned by 11, shortage of office equipment including communication mentioned by 11, bad road conditions or lack of bridges mentioned by 6. There were some issues about service conditions also mentioned by a few technicians.

Table 12. Major challenges faced by technicians (n=44)

Challenges/Issues	Number of Respondents
1) Shortage of transport for extension visits	31
2) Lack of in-service training opportunities/ Inadequate knowledge/skills on specific issues (animal science, computer skills, audio-visual aids, measuring skills, sub-receiver, English) Lack of training materials for demos.	14
3) Too many farmers to serve/ Lack of manpower during peak time, too much non-extension work (e.g. fertilizer sale)	11
4) Shortage of office equipment (computers, Fax, Internet, etc.)	11
5) Bad road conditions/Bridge	6
6) Low salary/Lack of over time payment	3
7) Lack of irrigation facilities/water	2

### 2.2.2 Constraints and issues to improve the extension services in the NCRs

#### (1) Linkage between the extension, research and farmers

Observations:

The DEES has stated that extension activities will be implemented through the FSR/E approach. It is important to keep it as a formal extension approach since it is an effective way to make the extension and research programs more relevant to farmers' needs. However, the Survey Team has observed that there are limited interactions between extension, researchers and farmers taking place on the ground. For instance, "Conservation Agriculture (CA)" (minimum tillage using rippers) is seen as one of important technologies that a number of extension technicians have been trying to promote, but this technology has not necessarily been tested by research side. The Survey Team heard from other sources that there were some farmers who were not satisfied with the technology and discontinued it. This is an example for limited interaction between extension and research. Besides that, feedback mechanism from farmers to extension and research is an important feature in the FSR/E system, but it appears that this mechanism is not fully functional at the moment. The reason could be that most extension (and research) staff has limited understanding on the use of participatory extension approaches.

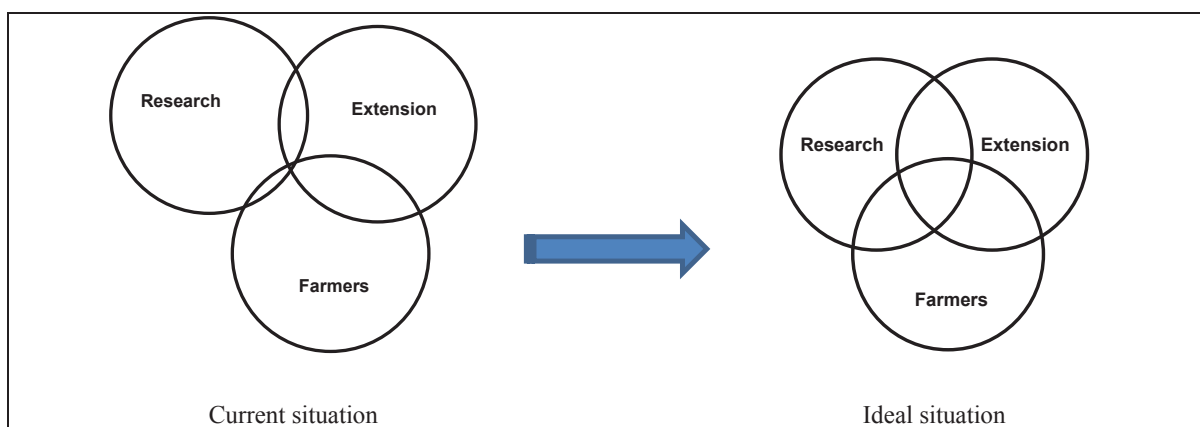


Figure 3 Relationship between research, extension and farmers

Countermeasures:

Figure 3 tries to conceptualize the relationship between research, extension and farmers. Currently the overlapped areas among three main actors of the agricultural sector are minimum and uneven (left side figure), which should be corrected to the situation described in the right side figure by increasing the overlapped areas.

The Survey Team proposes the following countermeasures to improve the relationship:

1) Capacity development of participatory extension/research methodologies

First of all, the Team proposes developing capacity of MAWF extension and research staff regarding the use of the participatory extension/research methodologies such as “Participatory Variety Selection (PVS)”, “Mother and Baby Trial System (MBTS)”, “Farmers Field School (FFS)” and so on. PVS and MBTS are approaches to provide choices of varieties to the farmers for increasing production. FFS is a group-based learning process in which farmers carry out experimental learning activities. Although some extension technicians indicated in the questionnaire to have used the FFS method, they might not have correctly understood the question since the concept seems not well-known in Namibia. The Survey Team visited in Ohangwena a demonstration site of the CA technology established by a technician, but such activity could be undertaken in collaboration among researchers, extension staff and farmers. Some officers reported that trials conducted on new technologies in the 90s involved all extension, farmers and research where results and concerns from farmers were shared, but this practice has since ceased.

2) Improved relationship between extension and research

According to the information obtained from research stations visited, it appears that “Field Day” organized by research stations once a year is the only opportunity for researchers and extension staff to formally meet with each other at the moment. Field Day is in fact a good opportunity to exchange ideas among participants, but this may not be enough. In order to improve the relationship between them, it is important to increase opportunities to work together by introducing above-mentioned participatory practices even on pilot basis. When such collaborative field work is increased, more meaningful relations between DEES and DART will be fostered in the future.

3) Enhanced interaction between UNAM and MAWF

Apart from MAWF, the Team has observed that UNAM also has been playing an important role in

undertaking research and development activities on agricultural technologies. However, it appears that there have been limited interactions between MAWF and UNAM so far. Since there are some areas where UNAM has advantages like rice production technologies, it is also essential for both parties to strengthen working relationship. A technical cooperation project on rice-millet farming system (SATREPS project) has just started in collaboration between UNAM and JICA, which might provide some opportunities for UNAM and MAWF to work together in conducting on-farm trials and extension work. It is proposed to organize workshops or seminars on rice production technologies in collaboration between two parties in the near future.

4) Learning experiences in other countries

In the process of strengthening the relationship among extension, research and farmers, it is proposed that experiences from JICA-supported projects to have introduced participatory approaches in other African countries (e.g. Zambia, Ethiopia, Kenya, Tanzania) could serve as useful references. And also, Namibian counterparts can learn from experiences of Japan where research-extension linkage has been enhanced through exchange of staff between research and extension organizations, enabling personnel to work for a specified time in each other's establishment.

(2) Support system to improve the knowledge and skills of the extension staff

Observations:

The Survey Team has recognized that support system to improve the knowledge and skills of the extension staff are currently weak, which could be one of constraints to improve the effectiveness of MAWF extension services. It was observed through interviews and questionnaires that extension staff (officers and technicians) had limited opportunities for in-service trainings; if any, they were conducted in an erratic way since most trainings were supported by other organizations. In order to realize effective and efficient extension services, it is essential to develop a system by which knowledge and skills of extension staff are continuously updated.

Countermeasures:

The Survey Team proposes the following countermeasures to this issue.

1) Enhancement of in-service trainings

Firstly the Team proposes introducing a program through which the extension staff can attend in-service trainings more frequently. Most extension technicians obtained diplomas and degrees in agriculture from UNAM but knowledge and skills obtained at the school were usually basic and rather general. Some young technicians the Team met said that once they started extension work, farmers often asked them a number of questions concerning issues that they didn't really learn at the school; therefore, continuous trainings to update the knowledge are required. Apart from technical knowledge about crops or livestock, extension workers need to be equipped with knowledge concerning social science aspects such as extension methodologies, rural sociology, group dynamics and etc. which are not really emphasized in the UNAM agriculture curriculum. And also, they need to improve communication skills with farmers to carry out extension work, which may be not taught at the school.

It is therefore proposed to introduce an in-service training program through which extension staff with insufficient knowledge can attend practical trainings on technologies at some appropriate places such as advanced commercial farms (e.g. horticulture) and UNAM. For areas appropriate resource persons or organizations are not found in the country (e.g. participatory extension approaches), inviting experts

from outside the country may need to be considered.

2) Transfer of knowledge and skills for extension from veteran staff to young staff

Secondly the Team proposes taking some measures to ensure young generation extension staff to take over the knowledge and skills for extension work from veteran staff. According to the results of questionnaire survey, there are a number of extension technicians who will get retired from the services within next 10 years. For those positions, newly employed young technicians will be assigned. It is important for MAWF to prevent knowledge and skills of veteran technicians being lost as they leave the office. Young technicians should develop their skills based on experiences that veteran staff has gained through their long-term services. Knowledge and skills of veteran staff need to be institutionalized.

As a concrete measure, the Team proposes ensuring newly employed technicians to be assigned to the centers posted with veteran technicians at least for the first 2-3 years so that young technicians are able to learn on know-how of extension work from veterans. Trainings by veteran officers like mentorship program might be the more effective and economical to develop capacity of young staff than going outside for trainings. Exchange visits on other service areas may be also effective.

(3) Extension services to strengthen farmers' organizations

Observations:

While the MAWF has been encouraging farmers to form cooperatives and associations, the Survey Team observed very few had been so far organized in the regions. Most extension technicians reported that they had formed some farmer groups for extension activities, but it appeared that these groups were far from reaching the level of cooperatives. However, developing and strengthening farmers' organizations is very important component for agricultural development in general and effective extension services in particular.

Countermeasures:

Process of developing farmers' organizations is influenced by many uncontrollable socio-economic factors such as culture of rural societies, opportunities for viable economic activities, existence of capable leaders and so on; therefore, it is not an easy task to come up with viable countermeasures concerning organization issues. One has to understand that it takes a long time for an organization to be developed. Substantial numbers of experiences in other countries have shown us lessons that top-down approaches for organizing cooperatives using government subsidies tend to fail fostering dependency syndrome among members.

However, the Survey Team observed a few number of viable farmer groups had started emerging in the regions. One of such groups was Olushandja Horticulture Producers Association in Etaka Dam area of Omusati Region. The group was formed with 15 members in 2003 and gradually developed to the current state with 37 members. According to the Chairman, the association has not received much assistance from the government except for recently constructed trading center building (assisted through the Country Pilot Partnership, CPP). As mentioned above, while there are no overnight measures to develop farmers' organizations, there have been some groups that have managed to develop over time like Etaka group. Therefore, it is proposed to continue step-by-step efforts to develop farmers' organizations by thoroughly studying factors affecting the organizational development process in rural communities. Since there are quite a number of success rural organizations developed across the world, it may be also useful for policy makers to learn from other countries' experiences and put in place enabling environment for the development of such organizations.

(4) Farmer categorization and flexible services according to the category of farmers

Observations:

Farm households are classified into two groups that are “subsistence farmers” and “commercial farmers” in the national statistical reports from NPC as shown in Table 13. However, the Survey Team has noticed that there exist in fact several categories of “subsistence farmers” in the regions, from women- or child-headed households who were struggling to secure daily food for family members to near-commercial farmers like the Team met in Etaka. They are apparently at different stage of economic development, but it appears that the government services including agricultural extension are being carried out uniformly without considering such differences.

Table13. Households by main source of income and region

Regions	Main Sources of Income				Total
	Subsistence Farming	Commercial Farming	Salaries /Wages	Pension /Business/Others	
<b>Ohangwena</b>	18,953 (48.6%)	0 (0%)	7,643 (19.6%)	12,401 (31.8%)	38,997 (100%)
<b>Omusati</b>	26,916 (59.6%)	0 (0%)	8,806 (19.5%)	9,439 (20.9%)	45,161 (100%)
<b>Oshana</b>	8,246 (23.5%)	0 (0%)	15,017 (42.8%)	11,824 (33.7%)	35,087 (100%)
<b>Oshikoto</b>	13,232 (41.3%)	64 (0.2%)	8,939 (27.9%)	9,803 (30.7%)	32,038 (100%)
<b>Namibia</b>	100,463 (23.1%)	2,621 (0.6%)	214,903 (49.2%)	118,808 (27.2%)	436,795 (100%)

(Source: NHIES 2009-2010 provisional figures, NPC)

Countermeasures:

Type of government services required by farmers is not the same between the different categories of farmers. Figure 4 tries to generalize the relationship between categories of farmers and types of support required.

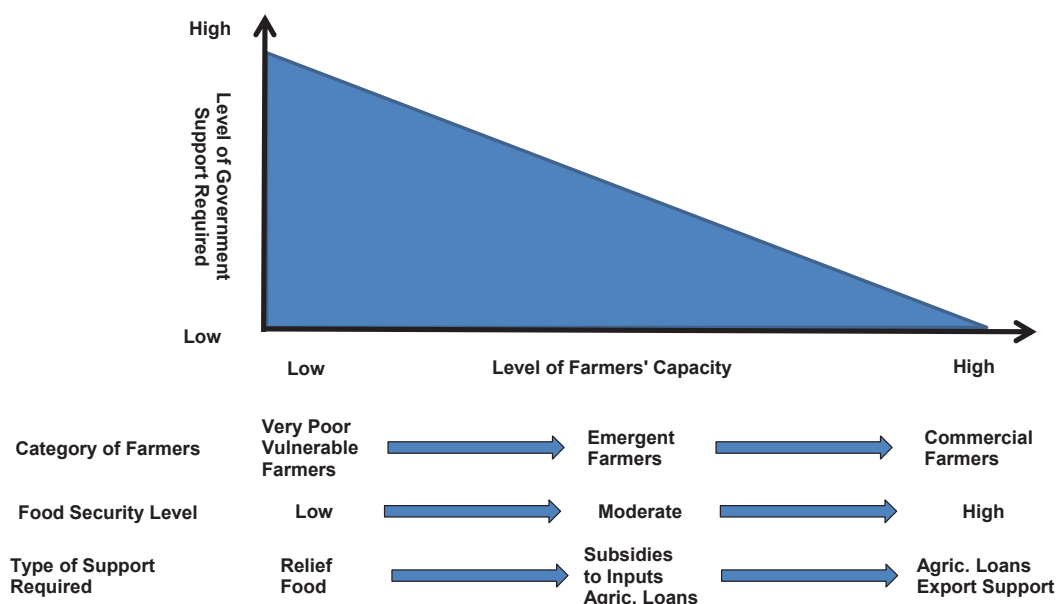


Figure 4. Categories of famers and types of support required

As the farmers gain economic capacity, the direct support from government tends to decline. While farmers in extremely poor conditions need more direct support from the government such as relief food, farmers who are about to take off economically need more indirect assistance such as credit loans to expand production base (e.g. loan facilities from Agric.-Bank) or subsidies for export of products. For commercial farmers, national economic policy environment is more relevant. In order to increase the effectiveness of extension services, the Survey Team proposes to conduct more detailed categorization of farmers in the regions and to analyze the needs according to the different category of farmers. Based on that, it will become possible to come up with appropriate support services for different types of farmers.

#### (5) Other logistical issues

##### Observations:

As reported above, the Survey Team has found that there were several logistical challenges faced by the field extension staff. It seems that shortage of transport means (vehicle) was the biggest concern for them at the moment. Because of the nature of extension services and conditions in which they are operating (covering vast areas and quite a number of farmers), it was understandable for their answers. Other issues included lack of in-service training opportunities (already discussed), lack of office equipment and poor road conditions.

##### Countermeasures:

Concerning logistical issues, only solution will be to allocate sufficient budget for necessary facilities and equipment. The Survey Team has learnt that the Namibian Government has been allocating quite an amount of budget for capital projects every year. Therefore, whether these challenges faced by the field technicians are attended or not is simply priority matter in the national budget. Since it is the technicians who carry out actual work of extension services on the ground, it is desired that these issues to be sorted out as soon as possible in order to improve the effectiveness of extension services in the NCRs.

(End)

## 2.3 Results of Survey on the Dry-Land Agriculture

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MALIMA I. Benedic, Deputy Director, Plant Production Research, MAWF

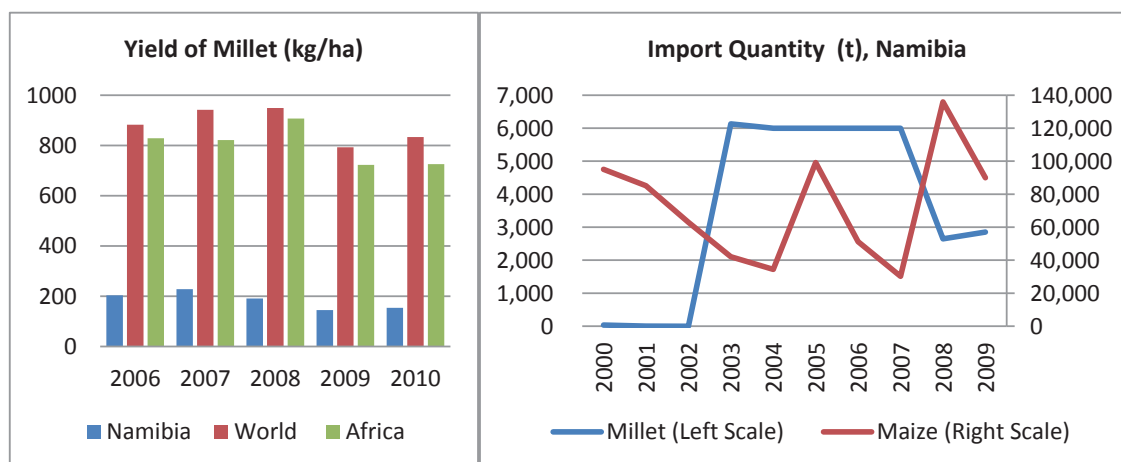
### 2.3.1 Overview of Agriculture in the North-Central Regions

Pearl millet (Mahangu) is the most major crop cultivated, while other food crops like sorghum, maize, cowpea and bambara-groundnut are also cultivated in North-Central Regions (NCRs) of Namibia, but in small amount. Vegetables and fruits are produced in the limited areas where irrigation systems are introduced.

Yields of cereals are very low due to an erratic rainfall, an extreme climate (drought, flood and dry spell during rainy season) and an unfertile soil. Soils of NCRs are naturally those of marginal fertility, and the soil fertility is declining as results of continuous mono-cropping and unreliable climatic factors. Additionally, decreasing yields is accelerated by not only soil degradation, but also poor farming practices and lack of access to farm inputs etc. The low and unstable levels of productivity, production and farm incomes characterize the NCRs. Lack of access to appropriate production technologies with regards to climate change result in poor yield.

Most of farmers keep livestock, and its manure plays an important role in improving soil fertility, because farm lands are not shifted, but continuously cultivated in NCRs. However, crop productivities are declining due to a decreasing volume of livestock manure applied to the farm. In addition, it is difficult to access chemical fertilize for the subsistence farmers. Namibia is almost entirely dependent on foreign sources for its fertilizers and other agro-inputs.

Market of agricultural products is too small, and marketing of vegetables and fruits is concentrated and limited to urban areas. Fresh vegetables and fruits available at the supermarkets are mostly produced in South Africa, even though horticulture traders are required to procure at least 35% of fresh produce locally. However there are progresses in setting up institutions which will facilitate the marketing of vegetables and cereal produced in these regions.



Source: FAOSTAT. Note: Millet is including pearl millet, finger millet and others.



## 2.3.2 Issues and Prospects for Agricultural Development in NCRs

### 2.3.2.1 Subject 1: Improvement of productivity of major crops for food security

It is reported that average yield of Mahangu is less than 400kg/ha. Productivity of major crops including Mahangu should be increased for the food security as well as the stable life and improving livelihood of farmers. Government of Namibia is implementing the Dry-land Crop Production Program to increase production of cereals and beans through provisions of ploughing services, improved seeds, fertilizers and weeding services. However, most of poor farmers are not able to access to these subsidized services. The following countermeasures should be taken to strengthen the program, to increase in crop productivity and to achieve the food security.

#### Countermeasures in Subject 1

##### (1) Short-term countermeasures

###### 1) Development and dissemination of appropriate technology of fertilizer application

Appropriate technology of fertilizer application is not fully developed, and subsidized fertilizers are provided with limited technical support. Inappropriate application of fertilizers might lead to little improvement of crop production and to lack of farmers' motivations. Technology based on economic rationales, which is combined with chemical fertilizers and livestock manures, should be developed. The CNRs common design of fertilizer trials on farm for demonstration should be formulated, and yield survey, data analysis and economical evaluation should be done, then the manual of fertilizer application should be compiled. Researchers and extension officers/ technicians will be able to compare the effect of fertilizer application under different conditions, and to utilize the results for their activities to improve crop productivity. In addition, design of the trial needs to have visual effects for farmers. Manual/ Guide might be compiled for 5 years, and the progress might be evaluated after 3 years. As deficiency of micronutrient like magnesium was observed, plant observation should be carefully taken. Application of organic manures might not be effected for micronutrient deficiency. In that case, only the application of specific fertilizer, eg: Magnesium Sulphate, will be effective.



Symptom of magnesium deficiency

###### 2) Development and dissemination of appropriate farming systems

Study on farming systems is proceeding at agricultural research stations, however, it should be accelerated for earlier dissemination to stop the trend of decreasing in cereals production. Research results on international agricultural research centers under CGIAR and fruits of JICA and development partners in other countries in Africa should be also introduced vigorously. In parallel, manual/ guide of appropriate

farming systems should be compiled.



**Crop rotation & Green manure  
Introduction of Mucuna, Tanzania**

**Inter-cropping Trial/ Pearl Millet and Cowpea  
ICRISAT Sahel Center, Niamey, 2008**

### **3) Improvement and promotion of conservation agriculture**

Conservation Agriculture has been promoted in NCRs to find out its consequential interest and impact in dry land crop production systems. It has been mainly developed under the conditions of low rainfall and drought. Therefore, it is not enough to evaluate under the recent conditions of high rainfall and flood. Method of evaluation of conservation agriculture should be developed, and improved technology should be promoted. The evaluation of this impact should be done with full participation of the farming community, taking the soil ecology and size of the equipment used into consideration.

#### **(2) Medium-to-long-term countermeasures**

##### **1) Collection and organization of basic information to clarify agricultural strategy and development program**

It is not easy to set and evaluate the target, because the statistical information is not been accumulated or organized. Necessary system should be established to collect, to analyze and to organize basic information.

##### **2) Utilization of meteorological forecast and selection of crops and varieties**

Selection of appropriate crops and varieties through utilization of meteorological forecast is effective to reduce the risk caused by the erratic rainfall. Recent climate change is not so easy to forecast, however, MAWF should deal with this issue.

##### **3) Improvement of access to agricultural inputs**

As mentioned above, it is not easy to access to the subsidized services for poor farmers. It is not possible to access to the credit without collateral under the present systems. Development and introduction of new credit systems, eg: refund in kind after harvesting, should be considered.

**2.3.2.2 Subject 2: Promotion of horticulture crops for improvement of farmers’ livelihoods**

The living standard of communal farmers is generally low because of subsistence farming, meanwhile Namibia is upper middle income country. The gap between commercial farmers and communal farmers is recognized as a big challenge. Soils in NCRs are mostly sandy and poor fertility, however, those physics are adequate for the growth of horticulture crops because of well-drained condition. Promotion of horticulture crops is one of the ways to improve farmers’ livelihoods. In addition, nutritional improvement of local people will be also expected. The other hands, volumes of production and consumption of horticulture crops are small in NCRs, therefore, small scale development is more sustainable under current conditions.

**Countermeasures in Subject 2**

**(1) Short-term countermeasures**

**1) Effective utilization of water resources and formulation of cropping plan**

Horticulture crops are not tolerant to dry spell even during rainy season, therefore, securing an adequate supply of water is needed for the stable production through the whole season. Some of the underground water in NCRs is high level of salt, and Etosha Pan located at the lowest part of NCRs was registered as a wetland under the Ramsar Convention. With these factors, underground water would be better not to be developed. Water harvesting technology should be introduced. Storage of surface water by underground tank and water catchment pan, storage of roof water by water tank, etc. should be examined through the pilot projects. Introduction of water-saving irrigation system should also be examined. In addition, it is necessary to give due consideration to the natural environment, the environmental impact assessment should be conducted before the project implementation.

Cropping plan conforming to the seasonal variation of water volume should be formulated. Cultivated crops should be selected based on the analysis of demand in the community and market access.



**Underground tank (Ethiopia)**



**Simple drip irrigation system (Ethiopia)**



**Roof water catchment (Omusati region)**



**Water catchment pan (Kenya)**

## **2) Strengthening of ownership and organization**

To strengthen ownership of participants, it is necessary to encourage labor power for the construction work of water harvesting system. Food for Work (FFW) program is implementing under the regional governments. Application of FFW should be considered to promote the construction of water harvesting system.

It is necessary to divide the farm to each participant farmer. Each farmer should manage own farm and develop business acumen. On the other hand, participant farmers should be organized for the operation of project and control of water etc. Training to the farmers is also needed.

## **3) Marketing of products**

Even Etunda irrigation scheme, marketing of products is a one of the most difficult problems. These small scale projects should target a market in their community or neighboring ones. Network of marketing should be expanded step by step for the sustainable project management.

### **(2) Medium-to-long-term countermeasures**

#### **1) Market-oriented production of horticulture crops**

Demand of horticulture production must be obtained for the sustainable management. Especially, during the process of business expansion, market-oriented production should be required.

#### **2) Improvement of market environment to promote private investments**

Market size of agricultural production in NCRs is small, and marketing network is poor. To promote horticulture development, participation and investment of private sector are necessary. Angola is an attractive market, therefore, improvement of market environment to export horticulture products from NCRs might be considered. Attraction of processing plants should be also promoted.

(End)

## **2.4 Results of Survey on the Livestock**

Takashi NAKAMURA (Mr.), Member of JICA Survey Team

### **2.4.1 Livestock production in Northern area**

Livestock production occupied 90% of agricultural income and 80% of agricultural exports. Livestock population in Northern area have 1.24 million of cattle and 0.9 million of goats while livestock population in Southern area have 1.14 million of cattle and 0.78 million goats. Northern area has bigger number of cattle and goat which incidentally comes from small scale farmers. Traditionally, farmer kept their livestock as an asset and preserved until it aged. Farmer lost their chances of higher income by selling their livestock at the wrong commercial time. Climate change, such as flood and drought also contributes to the animal loss. Farmer keeps an average of 10 to 20 cattle for manure and milk production. However range condition worsened due to overgrazing cattle and weight loss in livestock. The previous year, farmer income declined due to loss of goat caused by flood and drought. In order to solve these problems, numerous trainings were carried out however favorable results are not seen.

### **2.4.2 Future prospect for livestock production in North central area**

Cattle are sold in local market or individuals but numbers are limited in North central area. Meatco consumes the largest number of cattle from farmers however, purchase are made in lower price since aged cattle are less of a value. This marketing system reduces farmer willingness to sell. Damages caused by flood and drought have also reduced their livestock. In addition, extension agents are much accustomed to crop production rather than livestock production which is another problematic factor.

#### **2.4.2.1 Constraint 1: Cattle Off take is as low as 2 to 3% in Northern area**

Traditionally, farmers considered animals as an asset and were not to be sold. Aged cattle on the other hand, were to be sold except it had no value. Consequently farmers were left with no income since their resources for living were agricultural and livestock production. Cattle give manure and milk for household which concludes to farmers market oriented idea.

Cattle sold to Meatco from small scale farmers are tend to lower grade cattle with old age. One farmer sold 18 cattle to Meatco. 17 of them are female cattle and aged more than 6 years. In meatco meat is classified into three categories ABC and divided 20 grades. 15cattle had C class and 5 of them were judged worst class C4 , C5. Farmer got N\$3000 for most of them. In open market cattle price is around N\$5000.

#### **(1) Countermeasure 1: Activation of Assembly point or auction place**

Construction of auction facilities are implemented by the Government. On the other hand EU constructed 73 assembly points in Northern area. These Assembly points are managed by the local community members together with Meatco personel and extension agent. Opening of auction will be only two or three times a year. In auction farmer can sell in higher price compared to meatco price. If farmer learned about marketing

value chain in slaughtering of animals, farmer can contribute to establish new beef cattle industry.

## **(2) Countermeasure 2: Training of farmers and extension agents**

Immediate action will be needed in training farmers on changing mental attitude to fit to commercial orientation on cattle production together with a technical training. Mentor ship program under Agricultural Bank have already initiated to change mental attitude into commercial orientation by giving a household balance sheet of animals to fill up by farmers to evaluate present value of animals. Farmers stock can be expressed by multiplication of present price so present value can be understood by farmers. This method is quite successful.

### **(a) Farmers training**

Mentorship training held by Meatco have initiated in ADC among in Oshana region. Training has been initiated however participant did not come in first session of training due to tough screening process given by Meatco. ADC decided to recruit farmers again without any screening condition which led a portion of farmers to attend and start training. This training is fit for farmers who have more cattle. Training should be opened for small scale farmers as well.

### **(b) Training for Extension agents**

In order to effectively Mentor trainees, the extension agents must be knowledgeable in animal husbandry practices. Furthermore extension agents must influence farmers to have commercial mind in a participatory approach. Extension agents are to be trained by Mentorship training divided into two criteria of training held by AgriBank and participatory approach by GOPA which will help guide the extension agents. Extension agents who successfully accomplish participatory skills can then move on to be an adviser to persuade farmers to be market oriented mind through Farmers Field School.

## **(3) Countermeasure 3: Establish small scale feedlot operation**

One farmer has already tried to fatten steer in Oshifo, Ruacana. But feed supply from Etunda irrigation scheme was cut and stopped the operation. If farmer can establish own feed production plot in his farm feed can supply continuously and be very profitable. Farmer can learn market oriented beef production whole through year. This is the most fastest way to sell their cattle in shorter period.

## **(4) Countermeasure 4: Establishment of sale system of Weaner and Steer**

There is no habit to sell their weaner and steer by small scale farmer. If farmer can sell their weaner or steer in certain period and the other farmer buy those for fattening, systematic beef production system will be established. Through the Mentor ship training from birth to slaughtering stage, farmer can learn total value chain of meat industry. If participatory approach added into Mentor ship training the effect will be double. .

#### **2.4.2.2 Constraints 2 :No grass during dry season**

During dry season there is no grass in communal area and therefore cattle are lean and skinny. Farmer feed stalk of millet which is reserved after harvest of grain. There are no substitute at all. Lean and skinny cattle loses its value to sell and farmers are left with no income. Extension agents learn range management in school however lack of fodder production skills and practical experience. Range management specialist and researcher also have no experiences for intensive fodder production for supplemental feed.

##### **(1) Countermeasure 1: Establish fodder production in Research station**

Establishment of fodder production plot for experiment and multiplication of planting materials and seed for future extension work is needed in the Crop Research Station and also Livestock Development Center. If fodder banks established in the station the extension agents can bring these planting materials and seeds to the farmers. On the other hand when animals are segregated or separated during breeding or calving season fodder supply will be needed in the Livestock Development Center.

##### **(a) Establish grass type**

Penisetum, Panicum, Chinchro, Chroris, Para, Eragrostis etc should be established and be tested adaptation in the Research station.

##### **(b) Establish legume type**

Leucaena, Grilicidia, Sisbania, Pegion pea, Stylo, Alfarfa

##### **(c) Fodder production training for extension agents**

Train extension agents in intensive fodder production. After finishing training course the extension agents have to start to establish feed bank in the farmers field.

##### **(2) Countermeasure 2 : Establish fodder crop production in farmers land**

Fodder production skills are nil in Northern area. If fodder grass (such as Penissetum (Elephant grass) are planted beside the Millet field fodder grass can harvest for dry season.

Stalks of sorghum and millet can be used as a materials for making urea treated straw and silage.

#### **2.4.2.3 Constrain 3 : High mortality affect income generation**

There was many report that many goats were died due to wet climate. While farmer had been big flock farmer tend to slaughter and selling meat. This situation was changed with small number of goats in hand. Most of the farmer has goat waiting recovering of big flock.

##### **(1) Countermeasures 1 : Cope with environmental condition in goat production**

Goat is easiest to sell and get income from local market. To reduce goat mortality increase income from goat slaughtering or sale. At first grazing area should be kept in dry area and never be allowed to graze in wet places. Goat pens should be up lifted and be kept in dry. Drench and vaccination should be applied periodically.

##### **(a) Government Support for goat**

Government has initiated to reserve indigenous breed of goat and have a study for production performances in John Pandeni Research Station. Presently evaluated breed characterisation among 4

breeds of northern area. 3 bucks from 15 bucks are serving for mating with does. This station can help Northern area by distribution of superior bucks to the farmers. However breeding system have to be improved. All 15 bucks should be used for mating program in order to establish bigger Sire line. Random mating should be changed in 15 group mating.

## **(2) Countermeasure 2 : Preservation of indigenous breed of Sanga**

### **(a) Production of superior bull**

In the ADC one SANGA bull served for 25 female cattle and only two bulls are used for mating. Only 2 line of sire line established. If 40 female cattle involved at least 10 bull have to be recruited from local farmers area and be mated with Sanga cows. One bull for 4 Sanga cows is much appropriate for future evaluation. Breeding objectives should be established 10 sire lines in the center.

### **(b) Distribution of superior bull to the farmers**

When multiplication of superior bulls are successful, bull should be distributed among farmers. Farmer can get much faster growth rate after receiving of superior bull services.

1. Mentorship training course sponsored by AgriBank. Monitoring animal balance sheet.



2. Community based Rangeland and Livestock management by GOPA





3. Milk and goats are good source of income for small scale farmers.



4. Breeding stock in Livestock Development Center in Okapya



(End)



**2.5 Views of JICA mission team leader**

**“Farming as Business”**

Although the Government has made efforts to improve farming in the North, most of the communal farmers cannot harvest enough volume and quality of crops according to the results of survey. The concept of “Farming as Business” should be introduced in the North Namibia because farmers are normally passive or dependant on support from outside, mainly the government. It can contribute changes of farmers’ attitude towards their farming and eventually benefit them. As the report of the survey team indicated, the provision of technical services for farmers is very important. In addition to that, opportunities of self determination, for instance, which crops they grow, where and when to sell their products should be prepared for the purpose of their empowerment. The survey team learned the good practice of “Farming as Business” in Etaka. The farmers of the groups have received the minimum necessary supports and now the group is controlling the selling volume of products according to the market needs and prices.

On the other hands, \*Banerjee et al.(2011) mentioned in the chapter 8 that even the poorest farmers in Africa spend their money in vain, it means they don’t utilize their limited wealth effectively. Most of the poorest farmers failed to save money for the next planting season because of less hope in long-term and temptation in short-term like as alcohol. JICA project in Tanzania and Kenya introduced the training of Family Budgeting which was participated by husbands and wives. The training provided the opportunity for both men and women to consider how to use their limited budget effectively. Through the training, husbands and wives started to discuss family budgeting and keep some amount for the input of next season. As a result, the training contributed improvement of productivity. In the most cases, women are more serious for expenditure than men. So involvement of women in budgeting must be effective. The survey team didn’t investigate gender aspect in deep, but it can be assumed the situation in the North in terms of family budgeting might be same as other African countries.

\* Banerjee, Abhijit V. and Esther Duflo “*Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*”, New York: Public Affairs.

	
<p>They were enjoying alcohol drink during the daytime</p>	<p>Family Budgeting training using candy as money</p>

(End)

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Japanese Team Leader

