

**Social Impact Assessment of Farmer Field Schools
-Participatory Rural Development Approach- in a rural area in
Malawi**

Cassava and HIV/AIDS

参加型農村開発アプローチ「Farmer Field Schools」のマラウイ農村に

おける社会影響評価の試み: キャッサバと HIV/AIDS

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日本語要旨(Summary in Japanese)

マラウイは世界最貧国のひとつである。主食であるメイズの生産は、不安定な降雨と化学肥料の投入量に大きく影響を受けるため、慢性的な食料不足が続いている。HIV/AIDS の深刻な影響から、国家的なレベルで生産的労働力が失われつつあり、政府による公共サービス機能が破綻の危機にある。農業普及事業もその例外ではなく、食料の安定供給に大きな鍵を握っているのにもかかわらず、人員や資金不足のために正常に機能していないということが指摘されている。このことにより、食糧危機は悪化しつつある。

HIV/AIDS は農家の生計 (Livelihood) や作付作物の選択に様々な影響を与えると考えられている。マラウイの統計から見てとれるキャッサバの増産の背景には、HIV/AIDS がその大きな要因のひとつとしてあると主張する「新変種飢饉 (New Variant Famine)」という仮説がある。この仮説をマラウイにおいて検証するため、キャッサバの増産の原因調査を試みた。

また、参加型農村開発アプローチである Farmer Field School (FFS) は、1990 年代後半にマラウイに導入された。この手法では、対象作物の耕作期間を通じて、農民自身が実際の圃場での経験と発見に基づき、また仲間の農民との意見交換、分析を通して学習する。当該アプローチにより、副次的に参加者の人的・社会的資本が増加することも指摘されており、農民を取り巻く他の環境、たとえば農薬の健康被害や、HIV/AIDS へのリスク、農産物市場の状況などについて、客観的かつ批判的に判断をすることができるようになるという途上国での事例がある。とはいえ、アフリカでの、特に自給用作物を対象とした FFS の成功例は限られているのが現状である。

本研究では、北部マラウイのカロンガ地域で実施されているキャッサバおよび稲作を取り上げた FFS 参加者と非参加者を対象とし、キャッサバを病虫害の管理方法を中心として、作物の選択・管理の状況を明らかにすることにより、その影響評価を試みた。

さらに、HIV/AIDS が人々の生計に直接・間接に与えている具体的かつ詳細なインパクトを確認し、生計戦略 (Livelihood strategy) への影響を調べるため、民族誌学的調査手法を用いた綿密なインタビュー調査を実施した。

本報告は、現在継続中の博士論文のため、2007 年 1 月から 12 月にマラウイにおいて実施した現地調査の中間報告である。この研究の分析成果に基づき、将来、自給用作物を扱ったアフリカにおける FFS のカリキュラムの改善や、その評価用の枠組み・指標の開発に向けた提案や、また作物選択や HIV/AIDS の詳細な状況に配慮した援助実施手法改善のための提言に繋げることとしたい。

Summary

Malawi is one of the poorest countries in the world. The rainfall pattern and the use of inorganic fertilizer have a significant impact on the production of maize as a staple food in Malawi. However, due to the instability of these factors, food supply is chronically insecure. The productive labour is being lost due to the serious impact of HIV/AIDS at a national level, and the public service provision by the government is in critical situation. The agricultural extension service, which plays an important role in stable food production, is no exception, in the face of shortages of personnel and financial resources. The country's food insecurity is hence aggravated.

It has been argued that HIV/AIDS has a various impact on the livelihood of the farmers in rural Africa, and one aspect is crop selection. According to the official statistics of Malawi, the production of cassava has increased. The "New Variant Famine" hypothesis argued that the HIV/AIDS is one major factor contributing to this trend. This study tried to explore the reason for cassava production increase in Malawi in light of this hypothesis.

The Farmer Field School (FFS) is a participatory rural development approach which was introduced to Malawi in the late 1990s. In this approach, the farmers learn by experiences and discovery in the field and the throughout the cultivation period of the concerned crops and by discussion and analysis together with the fellow farmers. It is claimed that this approach also contributes to the increase in the participants' human and social capitals (Gallagher 2000). For example, the cases in other developing countries indicate that the participants become better equipped to analyse their surrounding environment critically: the health hazard of agrochemicals, markets access, risk perception to HIV/AIDS. However, the previous cases of successful examples of FFSs based on subsistence food crop in Africa are still limited.

This research tried to explore the impact of FFS in Chilumba, Karonga in northern Malawi. The participants and non-participants of FFSs on cassava and rice in this area were interviewed as individuals as well as groups on their perception on annual rainfalls and crop protection and management approaches such as pest control. Their field was visited and FFS sessions were observed for better understanding of the individual situations.

In addition, elaborate interviews using the ethnographic technique were conducted in order to understand the actual, intricate impact of HIV/AIDS on people's lives directly and indirectly, and to look at its influence on their livelihood strategies.

This paper is an interim report of the field research conducted in Malawi from January to December 2007 as part of an ongoing PhD dissertation study. The contents will be developed further in the future offering detailed analysis of the cases of HIV/AIDS epidemic and crop protection and suggestions for strengthening the curriculum of FFS on subsistence food crop in Africa, thereby contributing to the enhancement of the development agenda.

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List of abbreviations

ACMD: African Cassava Mosaic disease
ACMV: African Cassava Mosaic virus
AESAs: Agro-Ecosystem Analysis
AIDS: Acquired Immune Deficiency Syndrome
ARV: Anti-retroviral
BNM: Biographic Narratives Method
CBO: Community-based Organisation
CGM: Cassava Green (spider) Mite
EPA: Extension Planning Area
FAO: Food and Agriculture Organization of the United Nations
FFS: Farmer Field Schools
FLS: Farmer Life Schools
FEWS: Famine Early Warning Systems
GTZ: Deutsche Gesellschaft für Technische Zusammenarbeit
HDI: Human Development Index
HESA: Human Ecosystems Analysis
HIV: Human Immunodeficiency Virus
IFAD: the International Fund for Agricultural Development
IPM: Integrated Pest Management
JICA: Japan International Cooperation Agency
NGO: non-governmental organisation
OVOP: One Village One Product
PLWHA: People Living with HIV/AIDS
SLA: Sustainable Livelihood Analysis
T/A: Traditional Authority
T&V: Training and Visit
ToT: Training of Trainers
UNDP: United Nations Development Programme
USAID: U.S. Agency for International Development-
VH: Village Headman

1 Introduction

Malawi is one of the poorest countries in the world. Its human development index (HDI) was 0.437 in 2005, ranking 164th of 177 countries (UNDP 2008). In 2002 and 2005, the production of maize, the main staple crop, was particularly low due to erratic annual rainfall patterns (FEWS 2008, Dorward and Kydd 2004). This has aggravated already chronic insecurity of available foodstuff, since most of the farmers in Malawi rely on rain-fed agriculture. Inorganic fertilisers are widely used to uplift productivity. Another indication of unpredictable and low rainfall is the dramatic change in vegetation in some agro-ecological zones in Africa. Rain-fed agriculture has now become a high-risk challenge in Africa (Ngambeki 2003).

In recent years, HIV/AIDS is considered to be (directly or indirectly) the cause of nearly 75% of total deaths in the age group 15-49 years (Malawi National AIDS Commission 2003: 13). Adult HIV prevalence rate is estimated at 14.1 per cent in 2005 (University of California 2007) and overall life expectancy had fallen from 45.5 years to 38.5 years during the period between 1996 and 2002 (Garbus 2003). With the loss of a major productive age group, agricultural production has been further compromised, inducing major shifts in food and nutrition security, labour allocation, cropping systems, and land husbandry. Government services to cater for the rural population, including agricultural extension services have been impaired due to lack of capacities and resources (Malawi National AIDS Commission, 2003). Thus, the HIV/AIDS epidemic has been another important factor to exacerbate the already serious food insecurity in Malawi.

A participatory farmer education approach, Farmer Field School (FFS) is a model developed to assist farmers in obtaining Integrated Pest Management (IPM) skills through experimentation and discovery-based learning in their own fields. Because FFSs seek to build local agricultural knowledge systems and skills to deal with the site-specific dynamism of agro-ecological conditions in interaction with the local context and farmers' own objectives, IPM/FFSs are also considered to have positive impacts on the well-being of individuals and the community (Gallagher 2000, Mancini 2006). The FFS approach was introduced to Malawi in the late 1990s, but its experiences are not documented or assessed in detail. This paper tries to look at examples of FFSs in northern Malawi and suggests research and analytical methodologies to assess its various impacts on people's livelihoods in the rural area.

2 Background/ Overview

2.1 Context

Malawi is a landlocked country in southern Africa. It borders with Zambia to the north-west, Tanzania to the north and Mozambique on the south.

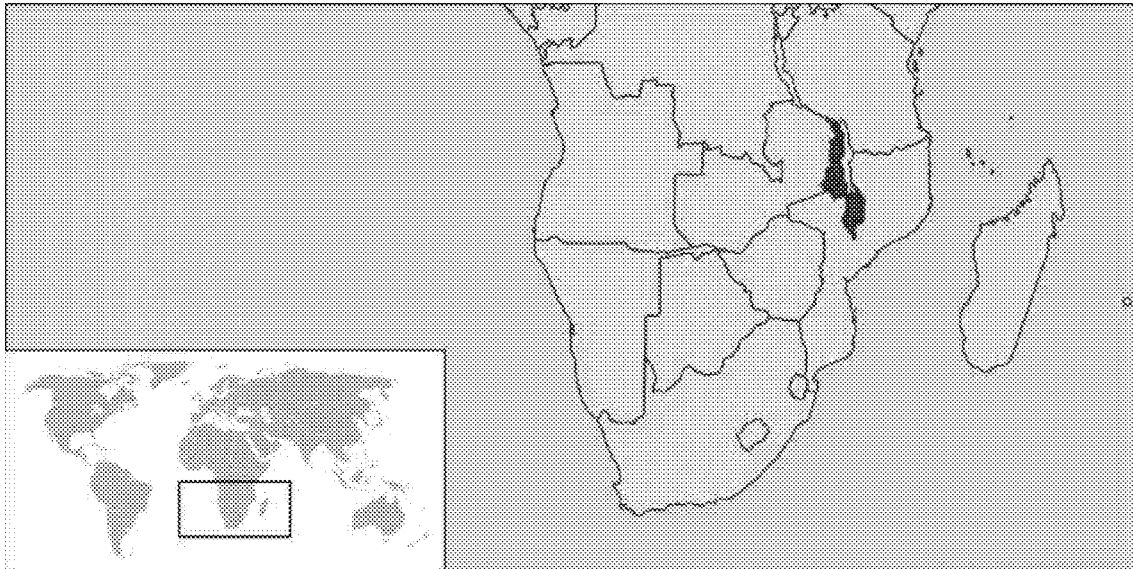


Figure 1 Location of Malawi

Source: Wikipedia 2008

The climate of Malawi is sub-tropical, which varies by regions. Lower Shire Valley is semi-arid, while in the highlands it is sub-humid, with distinctly seasonal rainfall pattern: the warm-wet season starts in November and continues up to April, during which almost 95% of the annual rainfall occurs, and most of the country does not receive any rains from May to October (Reynolds 2006). The average annual precipitation ranges between 725mm to 2,500mm by regions; with Lilongwe an average of 900mm, Blantyre 1,127mm, Zomba 1,433mm and Mzuzu 1,289mm (Malawi Meteorological Services 2006). The three main areas with precipitation of over 1,524 mm are Mulanje, Nkhata Bay and the northern lakeshore areas, including some parts of Karonga District (Reynolds *ibid.*). However, unfavourable conditions occur such as the drought in 1991/92 season and the floods of 1988/89, particularly the low-lying areas like Lower Shire Valley and some parts of Salima and Karonga are vulnerable to floods (Malawi Meteorological Services *ibid.*).

The economy of the country is based significantly on agriculture. Agriculture accounts for 40% of the GDP in 2001, over 87% of the total employment, and about 80% of all exports (Project for Economic Governance 2002). Nearly 90% of the working population are engaged in subsistence farming (Foreign Commonwealth Office 2007). Major export crops include tea, tobacco, sugarcane, cotton, tea, coffee, cashew nuts and macadamia nuts. Typically, smallholder farmers produce mixed variety of subsistence crops, such as maize, rice, cassava, pulses, tobacco, pumpkins, groundnuts and coffee (National Statistics Office 2002). Inorganic fertilisers are commonly used especially on maize crop to improve its yield.

2.1.1 Agricultural extension system in Malawi

The approach introduced for agricultural training in Malawi in the 1980s was called Training and Visit (T&V) system, which was supported by the World Bank since 1977 (Benor and Harrison 1977). This system follows a top-down approach to disseminate technical information to farmers from research via extension workers as subject matter specialists, who bear strong and active leadership (Benor 1984) and has proven effective in some Asian countries like India (Anderson, Feder and Sushma 2006). Later on, it was considered that T&V was not likely to suit the diverse farming context in Africa and its design was therefore “unlikely to be the most appropriate approach for improving extension in many African countries” (Purcell and Anderson 1997: 98).

Initially, FFS was developed to help farmers tailor Integrated Pest Management (IPM) practices to diverse and dynamic ecological conditions, using Agro-Ecosystem Analysis (AESA) (van den Berg 2004). They are based on the concept that farmers learn through cycles of field observation and experimentation, followed by peer analysis and review of the data and field observations. Groups of farmers meet in regular sessions from land preparation until harvest, to observe and discuss the target crops’ ecosystem dynamics, to improve their understanding of the functional relationships of ecological processes, by means of observation, measurement, and experimentation (van den Berg 2004).

The four major principles of IPM/ FFS are as follows (Williamson 1998, Pontius 2003, CIP-UPWARD 2003: 17):

- Grow a healthy crop
- Conduct regular field observations
- Conserve natural enemies

- Farmers understand ecology and become experts in their own fields,

The FFS approach applies adult education principles to assist the participants to build their human and social capitals (Gallagher 2000). Through a season-long group session based on a curriculum, FFS facilitates farmers' learning through discovery, thereby strengthening their capacities through empowerment. In West Africa, cotton growers have begun to apply expertise gained in FFS, such as observations, analytical skills, collective interpretation and decision-making, to transform individual and group behaviours in a larger context, involving a range of actors operating along the cotton production, processing and marketing chains (INREF 2005). In the cases of the Farmer Life Schools (FLS) in Cambodia and South Africa, the introduction of Human Ecosystems Analysis (HESA) has been shown to have stimulated critical thinking about the participants' own health and nutritional status and vulnerability (Chhaya et al 2004; Margriet Bredewold, personal communication¹). A meta review of FFS impact study data indicates that FFSs can be both robust and effective (van den Berg and Jiggins 2007).

FFSs have been implemented widely in Asia and Latin America and in an increasing number of African countries- thirty developing countries in total (van den Berg 2004). It has been argued that IPM/ FFSs have shown limited success in Malawi (Kamwela and Sande 2007). However, there is no comprehensive analysis on the relevance and effectiveness of the IPM/FFS approach in the country.

The concept was introduced in Malawi in 1997 when five master trainers from the Ministry of Agriculture participated in the training in Zimbabwe and Ghana in the 1997-98 planting season. It was only in 2003 when a season-long Training of Trainers (ToT) was held in Salima, facilitated by the three master trainers then remaining², funded by the Food and Agriculture Organization of the United Nations (FAO) and the International Fund for Agricultural Development (IFAD), involving 30 extension staff members selected from different parts of the country. The subsequent follow-up survey revealed that there were FFSs implemented by some of the ToT graduates. However, due to lack of resources (funding and loss of trained individuals in particular) and policies to support this initiative, it was difficult to scale-up these initial efforts. In

¹ Comments at the Social Learning Group Discussion presented by Midori Yajima, Wageningen 11/05/2005

² Out of 5 ToT graduates, one passed away and another left the government post.

recent years, interests in the FFS approach have grown among international NGOs, donor agencies and universities working in Malawi (Kamwela and Sande 2007).

The Karonga district was selected for this research because 38 out of the total of 84 FFSs in the country have been conducted since the above-mentioned ToT in 2003 (Ministry of Agriculture and Food Security 2006). The FFSs dealt with rice in an irrigation scheme and with cassava and maize in the upland areas (Ministry of Agriculture *ibid.*). On the district level, a total of 261 women and 206 men have graduated (Kamwendo 2007). Within the Hara Rice Irrigation Scheme in Chilumba area, a total of 120 farmers have graduated from four field schools and a fifth one is currently in progress (Kamwendo *ibid.*). A distinct characteristic of these FFSs in Karonga, or in Malawi, is that the curriculum does not necessarily focus on IPM, but rather on general agronomic practices (Kamwendo *ibid.*, Kamwela and Sande *ibid.*).

This research looks at the comparative relevance of FFSs conducted on cassava, rice and maize crops. It aims to discuss its dynamics and the design taking into account farmers' motivations. It also tries to evaluate the appropriateness the FFS curricula used for the crops.

2.1.2 Cassava in Africa

Cassava is an important food crop in Africa. It is tolerant to drought, can survive on marginal soils, and provide reasonable yields where many other crops can fail (Tewe 2004). It produces higher calories per unit land area per unit of time than other staple crops: cassava produces 250×10^3 cal/ha/day while maize produces 200×10^3 , rice 176×10^3 , wheat 110×10^3 , and sorghum 114×10^3 (Balagopalan et al. 1988).

Cassava (*Manihot esculenta*: manioc, cassava, or yucca) is a woody shrub of the Euphorbiaceae (spurge family). Its starchy tuberous root is an important source of energy and in fact, it is the third largest source of carbohydrates for human food in the world. Therefore, cassava is extensively cultivated as a perennial crop in tropical and subtropical region (Adachi et al 2006).

Cassava is native to central and southern America, and was introduced to central Africa in the seventeenth century by the Portuguese and to West Africa in the nineteenth century by

the slaves emancipated from Brazil and West Indies. Thereafter it has gradually expanded to East and Southern Africa through migration (Carter et al 1992)

Cassava is known by its high adaptability to the environment, and can produce on less fertile or acidic soils without fertiliser (Howeler 1991). The crop can survive on dry soils and erratic rainfalls, which is common in semi-arid tropics in Africa (Cock and Howeler 1978, Adachi et al *ibid.*). Currently, Africa produces over half of the total cassava production in the world, and the area is over 70 per cent of the world's total grown with this crop. Production growth in the last decade is caused by the expansion of planting areas and does not necessarily indicate the improvement in productivity or yield (FAO 2005).

The varieties of cassava are customary divided into two categories: bitter and sweet varieties. The bitter cassava contains a high concentration of cyanogenetic glycoside which could cause fatal food poisoning if the cyanide is not removed through diverse way of processing. The sweet varieties do not require detoxification, and can even be eaten raw, or after simple boiling or baking. Boiling can help to remove the traces of cyanogenetic glycoside (Grace 1977). There are diverse ways of detoxification of bitter varieties: shredding, grating, soaking in water, fermentation, sun drying, or by heating (Lancaster et al 1982, Ankei 2003). The content of cyanogenetic glycoside is not only dependent on varieties but also on the degree of water stress whilst in the field (Milingi and Bainbridge 1994). Tubers grown with less rainfall tend to show a higher concentration (Cardoso et al 2005). Therefore, it is difficult to distinguish sweet and bitter cassava varieties by their cyanogenetic glycoside contents (Adachi et al *ibid.*).

The major content of tuber is carbohydrates, and other important food nutrients are lost during processing, except for protein when fermented (Hahn 1989). The leaves, on the other hand, is an important vegetable in some African countries, and are rich in protein, calcium, vitamin A, B1 (thiamin), B2 (riboflavin) (Adachi et al *ibid.*), and are available throughout the year (Hillocks 2002).

	Ref	Calories Kcal	Moisture %	Protein g	Fat g	Total carbo- hydrate g	Fibre g	Ash g
Cassava leaf, raw	A	91	71.7	7.0	1.0	18.3	4.0	2.0
	b	60	81.0	6.9	1.3	9.2	2.1	1.6
Chinese cabbage, raw	B	17	94.2	1.7	0.2	3.1	0.7	0.8
Spinach, raw	B	19	93.0	2.4	0.4	2.8	0.7	1.4
Soybean whole seeds salted, black	B	330	20.1	18.1	9.4	46.3	8.5	6.1

Wheat whole grain, hard	B	332	12.5	11.6	2.2	72.1	2.1	1.6
Maize yellow	B	349	13.6	9.1	4.2	71.7	2.3	1.4
Rice unhulled, rough	B	341	13.7	5.8	2.3	73.4	10.4	4.8

	Ref	Ca mg	P mg	Fe mg	Vitamin A Carotene equivalent g	Thiami ne mg	Ribofla vin mg	Niacin Mg	Ascorbi c acid mg
Cassava leaf, raw	A b	303 144	119 68	7.6 2.8	11,275 8,280	0.25 0.16	0.60 0.32	2.4 1.8	8 82
Chinese cabbage, raw	B	102	46	2.6	2,305	0.07	0.13	0.8	53
Spinach, raw	B	62	39	3.9	3,640	0.06	0.22	0.7	56
Soybean whole seeds salted, black	B	29	163	1.1	520	0.07	0.27	18.6	-
Wheat whole grain, hard	B	48	382	3.3	0	0.37	0.12	4.6	0
Maize yellow	B	14	245	2.8	270	0.29	0.11	2.1	0
Rice unhulled, rough	B	24	236	1.4	-	0.33	0.06	5.6	-

Table 1 Composition of cassava leaves and selected other foods in terms of 100g edible portion, fresh weight

Source: IITA 1990

Cassava is planted either on mounds or ridges because it favours soils with high drainage (Adachi et al 2006: 44). Cassava can be easily multiplied by cuttings. Therefore, to control pests and diseases transmitted by cuttings is a challenge. In Malawi, over 72 varieties of cassava germplasm have been identified (Harry Mleta, personal communication), most of which are local varieties brought in by people in the form of cuttings. Almost all cassava in Malawi is produced by smallholders.

Cassava is considered to demand less production labour and fewer inputs than maize. Although the time to harvest is relatively long (7 to 18 months, depending on the variety), the timing of weed control and the need for fertiliser application are not as critical (Cock 1985: 70) as in the case of maize. An increasing number of researchers and donor organisations, such as U.S. Agency for International Development (USAID), are supporting a shift to cassava as one of the 'labour economizing agricultural crops' especially for those who are affected by the HIV/AIDS epidemic (Shah et al 2002).

2.1.3 The 'New Variant Famine' hypothesis

The overall production of cassava in Malawi has increased over the last few decades (FAOSTAT 2005, Figure 2). It has increased dramatically from 250,066 to 2,559,319 metric tons in the decade between 1994 and 2004, whereas the maize production increase remained modest: from 1,129,316 to 1,537,650 metric tons over the same period

(FAOSTAT *ibid.*). The production of cassava has also increased in some other parts of Africa, such as Nigeria, Democratic Republic of Congo, Ghana and Uganda (Adachi et al *ibid.*). The increase in the case of Malawi may be caused by more people consuming cassava instead of maize or due to the promotion campaign of cassava by the government and some international organisations. The production of Malawi ranks 14th in Africa (Adachi 2006: 92).

The ‘New Variant Famine hypothesis’ (de Waal and Whiteside 2003) argues that HIV/AIDS is the major contributing factor to the persistent food shortage, arising from the interaction among four effects: labour shortage, asset and skill loss, the increasing burden of care for the sick and orphans, and malnutrition (de Waal and Whiteside *ibid.*). The hypothesis assumes that the available farm labour is likely to be directed towards less labour-intensive root crops such as sweet potatoes and cassava, further compromising nutritional values (de Waal and Tumushabe *ibid.*). On the other hand, the increase in cassava consumption has been usually considered a sign of lower social welfare, and studies have shown that its consumption declines with a rise of income level (Prudencio 1994: 62, Cock 1985: 37-40). The ‘de Waal and Whiteside’ hypothesis is illustrated by the examples of Malawi and Zambia, claiming that the progressive increase in cassava production (FAOSTAT 2005) is an indication of impoverishment (de Waal and Whiteside *ibid.*).

However, other explanations are also possible for the increase in cassava production in Malawi. Traditionally, cassava has been an important staple food crop in the north and lakeshore regions of Malawi. At the same time, there are growing commercial interests in cassava in the central and southern regions, particularly in peri-urban areas, to meet the increasing demands of urban markets as well as industrial sectors. Cassava is increasingly recognised as a source of income. Also in the central and southern regions, cassava is gradually gaining importance as a staple food in order to supplement shortfalls of maize production due to erratic rainfall in recent years.

The exploratory survey conducted is a research attempt to grasp the dynamics of the links among poverty, food security, cassava production increase and HIV/AIDS risks, in light of the ‘New Variant Famine hypothesis’ in different areas of the country. This will be discussed further in 4.1.

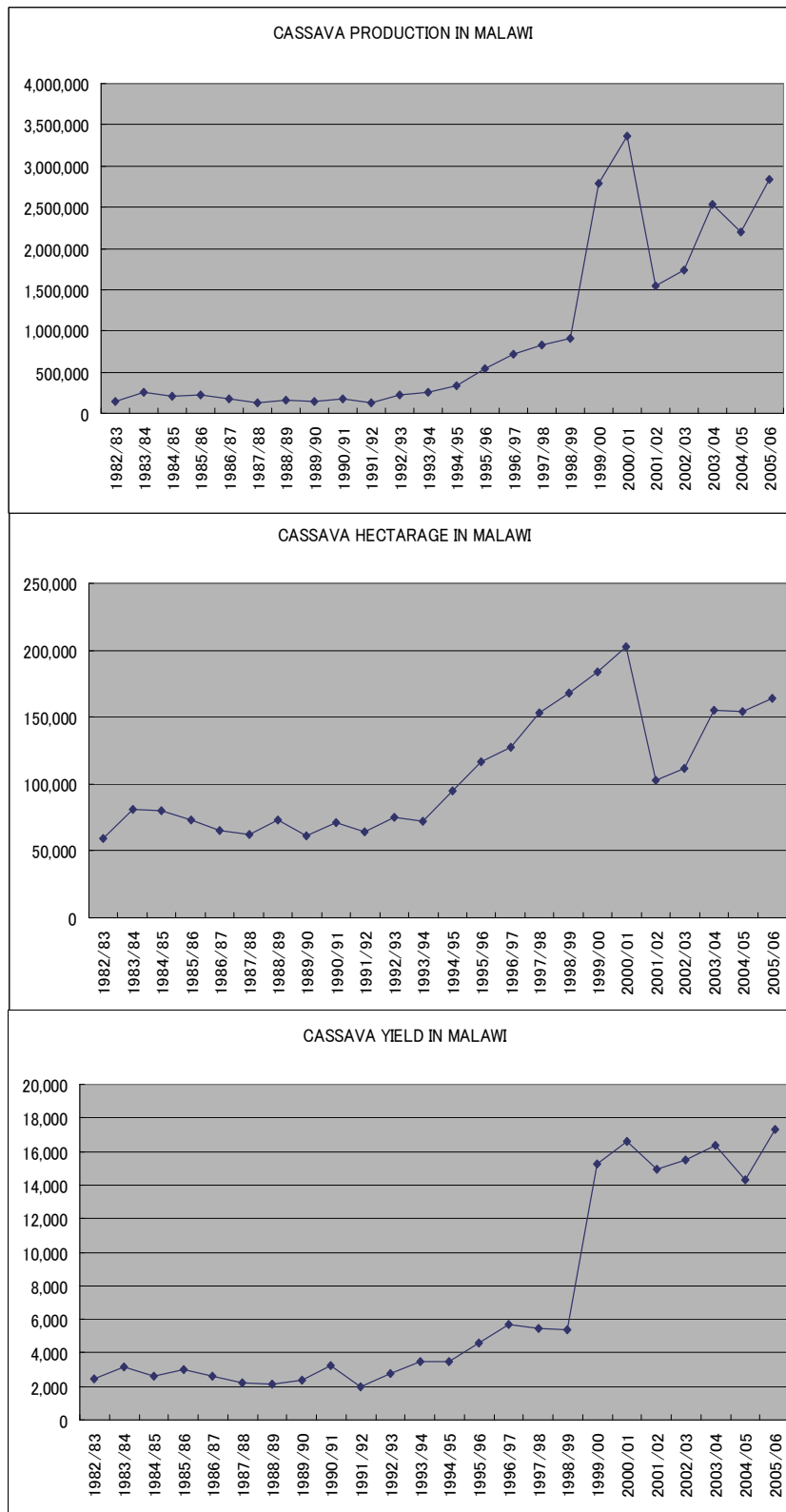


Figure 2 Cassava Production, Hectarage and Yield in Malawi

Data source: FEWS/ Ministry of Agriculture and Food Security Malawi 2006

2.2 Overview of the thesis: Chapter outline

2.2.1 Context

This paper comprises five parts including the general introduction and the list of papers. This paper forms a basis of a PhD thesis at Wageningen University in the Netherlands. The outline of the three main chapters is shown below.

2.2.2 Chapter outline/ planned papers

The titles for the planned papers are as follows. These will be discussed in detail in the respective chapters.

Title	Chapters
Farmers' perception of crop production and protection: a comparison of rice and cassava in 2 FFS villages	3
HIV/AIDS, food security and cropping systems	4.1
Life history analysis of "HIV-affected and non-affected" HHs in rice and cassava-based cropping systems	4.2

Table 2 Chapter outline of the thesis

2.2.3 Position of this paper

This paper particularly focuses on the first chapter: Farmers' perception of crop production and protection: a comparison of rice and cassava in two FFS villages. The objective of this chapter is to present preliminary outcome of the field surveys and interview activities conducted between January and December 2007 in Karonga, Malawi which was supported by the Foundation for Advanced Studies on the International Development (FASID). The contents mainly concentrate on describing the objectives and framework of the research. Thus, each chapter will be developed further with supplementary data collection, analysis and discussion in the near future and will be submitted to Wageningen University graduate school and international refereed journals.

3 Main chapter of this paper: Farmers' perception of crop production and protection: a comparison of rice and cassava crop in two FFS villages and one non-FFS village

3.1 Introduction

This chapter is an interim report of an on-going research project in Chilumba, Karonga district, northern Malawi, looking at cassava as a subsistence crop and at the impact of the Farmer Field School (FFS) approach. In Chilumba, agricultural extension workers have conducted several IPM/FFSs not only on rice (a cash crop) but also on cassava with local farmers in order to address plant protection as well as agronomic issues. In the northern part of Malawi, cassava is grown as a staple food, though the production is hampered by various conditions. Some of the major issues in growing cassava are plant protection through management of planting stems, soil fertility, and control measures for pests and diseases.

Farmers' perception on the incidence of pests and diseases on their crop and on production constraints are being assessed among small-scale farming households in three different locations in the area. In two of these three locations, FFSs on rice, cassava and maize have been conducted. The impact of FFS activities in this area has not yet been assessed. It is therefore important to look into various impacts of these attempts in Chilumba, including the immediate effects on cassava cropping.

3.2 Context

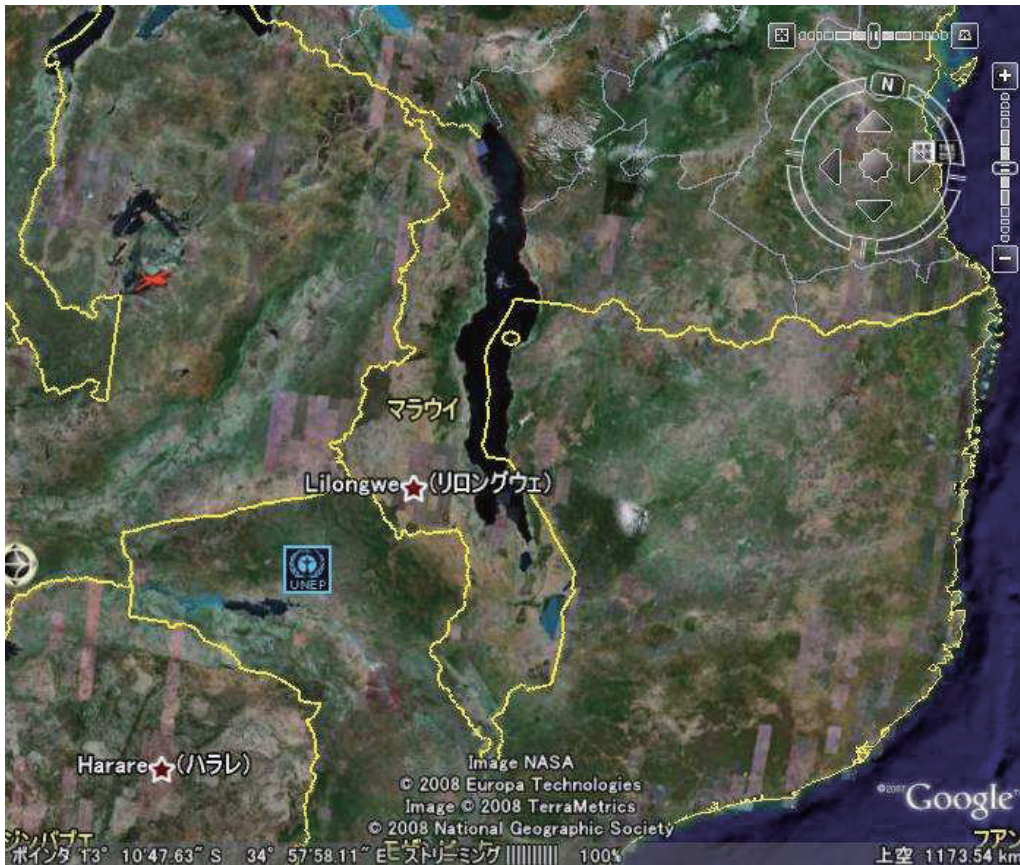


Figure 3 Map of Malawi

Source: Google Earth

The study area is in the Karonga District, northern Malawi. Chilumba is hot compared to other parts of Malawi with the temperature of 18-20 degrees Centigrade minimum and 30-32 maximum with rainfall of 1,001 - 1,200mm per annum (Malawi Meteorological Services 2006).

The main crops in the area are cassava, maize and rice. Cassava is predominantly grown as a subsistence crop for staple food and is often not exchanged for commercial reasons. Rice is grown in irrigation schemes twice a year and is meant for cash income, sold either individually or collectively. For the Hara Water Users Association at the Hara Irrigation Scheme in Chilumba, a rice mill and packaging machine were installed with the assistance of One Village One Product (OVOP) project by Japan International Cooperation Agency (JICA) and is managed by the association (photo in Appendix). Although maize is a major food crop in most parts of Malawi, it is less common in Chilumba area due to unfavourable agro-ecological conditions and to severe damages

by vertebrate pests (baboons in particular) in the lakeshore areas. Planting of cassava, often intercropped with maize, starts between December and April (during rainy season), and is harvested after September the following year.

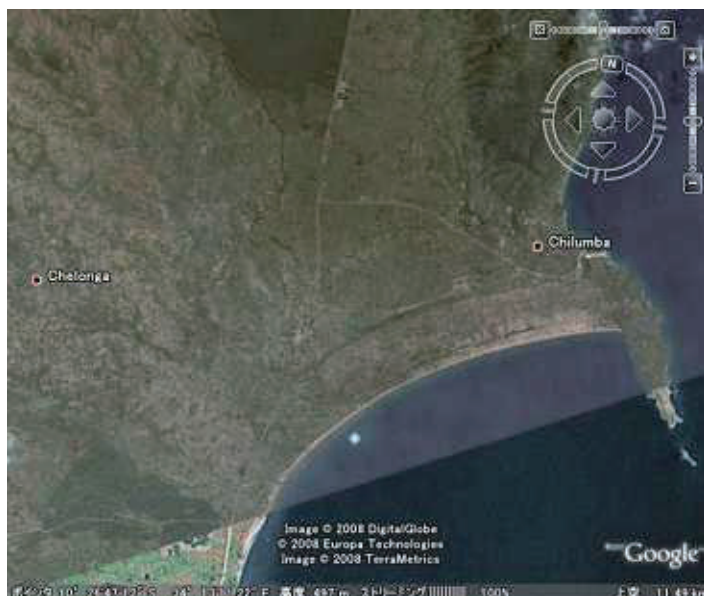


Figure 4 Map of Chilumba

Source: Google Earth

In Chilumba area, three FFSs have been conducted in Hara section (upland maize and cassava) and ten in the Hara Rice Irrigation Scheme (irrigated rice and upland maize), with 20-30 participants for each school. Out of the graduates, three farmers have so far been trained to be farmer facilitators (Kamwendo *ibid.*).

The cassava crop in Malawi faces several production constraints, in particular shortage of quality planting stems, poor soil fertility, and the occurrence of pests and diseases. Major pests include Cassava mealybug (*Phenacoccus manihoti*), Cassava Green Spider Mite (*Mononychellus tanajoa* Bondar) (CGM), Elegant grasshopper (*Zonocerus elegans*) micro-/ macro termites and Cassava Whitescale (*Aonidomytilus albus*). Important diseases include African Cassava Mosaic Disease (ACMD) caused by African Cassava Mosaic Virus (ACMV), transmitted by the Whitefly (*Bemisia tabaci*) and Cassava Brown Streak, Bacterial Blight, Black root rot. Numerous efforts have been made in Malawi since the importance of crop protection was recognised. Four improved varieties have been introduced between 1970 and 1998 (Manyong et al 2000). The use of disease-free cutting is important for crop protection. In biological control, natural enemies have been

introduced to control Cassava mealybug by *Anagyrus lopezi* and *Diomus spp.* (Neuenschwander 2003) and to control CGM by *Typhlodromalus aripo* (Yaninek and Hanna 2003). Unfortunately, government rearing and release of the control agents for the Cassava mealybug ceased when the pest population apparently reduced, and the donor agency (GTZ) have withdrawn. This has led to a current resurgence of the mealybug problem in the country (G.K.C. Nyirenda, personal communication³). Technical options to control pests of cassava are limited for farmers because often they are not able to invest in inputs and the National Agricultural Research and Extension System is not strong enough to provide support and monitor the epidemiological situations (Bellotti et al 1999).

3.3 Objectives

The production loss of cassava is often overlooked despite its importance as a staple crop and the seriousness of pest and disease damages. Evaluating farmers' perceptions on these issues and comparing the results with the outcome of field surveys on pests and diseases would be relevant in assessing impact of FFSs. One assumption is that the FFS farmers might demonstrate deeper insights on plant protection issues compared to non-FFS farmers.

The past FFS experiences in Africa dealing with subsistence foodcrops have not been positive. Thus, the results between the FFSs conducted in cassava and rice may indicate that the rice-FFS participants may be more motivated than the cassava-FFS participants. While the production potential and constraints of cassava tend to be neglected, rice as a cash crop may receive more attention and interest.

The objectives of this study are as follows:

- To assess farmers' perceptions of plant health/ plant protection in cassava.
- To compare agronomic and pest management knowledge and practices between FFS farmers and non-FFS farmers
- To compare agronomic and pest management knowledge and practices between the rice and cassava farmers.
- To understand why the rice-based FFSs seem to work better than cassava-based FFSs.

³ Lilongwe 30/06/2006

The information will help us understand reasons for relative ineffectiveness of cassava-based FFS, and may offer suggestions on improving FFS curriculum. One Masters student is currently working on a similar study on rice as a cash crop in the same location. The result of this research will provide a set of comparative data for this study.

3.4 Materials and methods

3.4.1 Research area

Three farmer groups were identified in the Chilumba area in three locations. One group had graduated from FFS on cassava and maize in upland areas (FFS-cassava); the second on rice and maize in Hara Rice Irrigation Scheme (FFS-rice), and the third group never participated in FFS (non-FFS).

The overview of the locations for each group is as follows:

- Hara Irrigation Scheme: FFS-rice

With the total area of 238 hectare, Hara Irrigation Scheme covers three villages and the largest population is in Bonje village. Almost all household have been allocated one or more 'plots' (0.07 hectare each) in the Scheme to grow rice twice a year for cash income. For dry season, 227 hectare is used for irrigation due to water shortage. Many households grow maize, cassava and other crops for home consumption in separate locations away from the Scheme. Regular sessions of FFSs on rice and maize are taking place. Many farmers keep livestock for ploughing. Hara irrigation Scheme has inhabitants with a diverse mix of ethnic groups from different parts of Malawi and numerous Tanzanian migrant workers are engaged in various trading and service businesses.

- Mwandovi village: FFS-cassava

Located on Luromo peninsula, Mwandovi village is close to the shore of Lake Malawi and Chilumba Jetty, where there is a small market, a few local shops, restaurants and rest houses. Almost all male inhabitants in the village are, to some extent, engaged in fishing, typically using fishing nets and dugout canoes. Each household is allocated a piece of land to cultivate cassava for their home consumption. FFS on cassava and maize started but was not concluded. Maize is not favoured due to the attack by animal pests (baboons). Agricultural crops are generally not considered as a source of cash income but for consumption. In this village, it is common for young men to spend some

years working in neighbouring countries (South Africa, Tanzania, Zambia, Zimbabwe) as migrant workers. The peninsula is a place of scenic beauty, a South African company is planning to develop a nearby island at the tip of the peninsula for tourism.

■ Kachere village: Non-FFS

Kachere village is about 4 km from the town of Uliwa, a major trading centre in Chilumba. Some of younger men are operating ‘cargo’ (bicycle taxi) business stationed and registered at Uliwa. Though some households have access to the Hara Irrigation Scheme, almost all inhabitants are subsistence farmers, mainly growing cassava and maize (intercropped) for their consumption. So far, there has been no FFS initiative in this village. The people keep various types of livestock, such as cow, goat, pigs and poultry. Compared to other two locations, the inhabitants appear more homogeneous (in terms of ethnic group) and less mobile (moving with marriages within surrounding localities, not much migrant work etc).

3.4.2 Sampling

The FFS-rice farmers, the FFS-cassava farmers and non-FFS farmers, twenty each, were selected to be part of this research.

	Hara Irrigation Scheme (FFS-rice)	Mwandovi village (FFS-cassava/maize)	Kachere village (non-FFS)
Attended FFS	10	10	-
No-FFS	10	10	20

Table 3 Sampling: mapping

For FFS participants, samples were selected randomly from the list of graduates provided by the local extension staff. For non-FFS participants, the farmers were selected randomly from the list of households provided by the village headman (VH).

3.4.3 Data collection methods

For the preliminary data, semi-structured questionnaires were used for socioeconomic surveys, and social livelihood diagnostic assessments by investigation of the five capitals concept, using the Sustainable Livelihood Analysis (SLA) framework. In understanding and conducting analysis of the holistic contributions of FFS, the application of the SLA

framework has been useful (Mancini 2006), based on changes over time in natural, physical, human, social and financial capitals (Chambers and Conway 1992). Secondary data were collected by expert interviews to extension staff and farmer leaders. Although initially ‘double delta design’ was initially planned, the baseline data were not sufficient in terms of the number and quality to serve its purpose. Thus, recall information would be used for impact assessment.

The results of the preliminary surveys pest and diseases of the farmers’ cassava fields in 2006 indicated that the most prevalent disease in this area was ACMD. The important pests were CGM and Cassava Mealybug. Since cassava is a low-input subsistence crop in this area, and since many farmers eat leaves as vegetables, chemical control is not a viable option for the farmers. Fertilisers are not applied on cassava.

The main part of the research tried to find out the following:

- the occurrence of pests and diseases and their injury to the cassava crop;
- farmers’ perception of the damage by scoring in farmers’ fields, and by interviewing how the farmers acquired planting stems;
- How farmers dealt with soil fertility;
- How they controlled their pests and diseases.

Four main methods were used in this study. (1) Semi-structured in-depth interviews about farmers’ fields, status of crop, classification and allocation of soils (mapping technique); (2) visits to cassava farms and informal interviews with farmers; (3) participatory research exercise using a local board game as a tool (*Bawo* exercise; photo in Appendix); (4) direct surveys by scouting on the farmers fields, and (5) participant observations of rice and cassava FFS sessions, informal interviews with the participants and comparing FFS curricula. As of December 2007, the surveys are close to completion.

■ Mapping technique: (1) and (2)

Farmers were interviewed on these points in their homes and fields (Appendix 2).

- Distribution of their plots and crop allocation, soil fertility management practices/ reasons
- Cassava production (self estimates) and constraints
- Varietal selection and reasons

- Each task in cassava production and the person responsible in the household -who does what
- Pest and diseases incidences, local perception on pests and diseases and natural enemies - especially Cassava Mealybug, CGM, Whitefly and ACMD)
- Varietal comparison on susceptibility to pests and diseases
- Planting stem management practices (acquisition, access, quantity, variety, treatment by heat, planting time, planting methods, etc.)/ reasons

■ *Bawo* exercise: (3)

Using a local game board as a research tool, a group of farmers took part in the exercise scoring on the following points for the past four years.

- Rainfall (both amount and distribution)
- For each crop (cassava, maize, rice if applicable)
 - ✧ Production
 - ✧ Pest prevalence
 - ✧ Disease prevalence

During and after the scoring, group members verified the value and discussed relationships between these variables and their scores (photo in Appendix).

The *Bawo* exercise investigated localised chronological memory of annual rainfall, crop production, and pest and disease prevalence. The method incited further discussion and explanation on farmers' perceptions on interactions between these variables.

■ Scouting on the farmers fields: (4)

Pest and disease incidence was observed by scouting in the field. Direct field surveys on the selected gardens of each sample group, using the modified version of the standard protocols administered by Baka Research Station (Appendix 3).

■ Observations in FFS sessions

FFS sessions were observed as participants, and the curriculums was obtained from the extension worker.

The research team comprised local social researchers with experiences in conducting semi-structured interviews. They also knew how to facilitate participatory research exercises. The interviews were mainly carried out in the local language (*ChiTumbuka*);

English was used occasionally. Scouting for pest and disease was conducted under the guidance of the natural scientists from national/ local agricultural research stations. The results were supplemented by background data previously collected.

A Masters student at Wageningen University has conducted fieldwork using a similar research tool to Mapping technique in Chilumba between September and November 2007, addressing the production and marketing constraints concerning rice growing, in particular, pests and diseases, soil fertility management, and weed control.

3.4.4 Preliminary findings and challenges

The collected field data has not been completely entered in an electronic database. The analysis will be conducted during the second half of 2008. Below are notes of some preliminary indications obtained through the data collection exercise.

Considerations on language

During the development of semi-structured interview questionnaires and preparation with local assistants, it turned out that there did not exist any term in the local vernacular (*ChiTumbuka*) equivalent to 'insects'. Farmers used *vibungu* (referring to larvae), *bongololo* (millipede, also commonly used for 'worms') and *vinenene* (flying/ jumping creatures) and specific local names for some insects. However, there was no generic term covering the notion of 'insect' as a whole. For example, Cassava Mealybug (*Phenacoccus manihoti*) does not fall into the categories above. Often extension staff tend to assume that farmers have no knowledge of pests when they refer them as either 'problems' or 'diseases', but it might be due to lack of vocabulary. The team used these local terms with some additional probing, although we were aware of this shortfall. Thus, there was a limitation when capturing farmers' understanding on insect- plant interactions in their language.

Some local names were notably used to mean more than one specific problem. *Kayuwiri* was used for both ACMD and whitescale- as well as for leaf diseases in rice crop, while *Ntchembere zandonda* was used for both cassava mealybug and armyworm in maize crop. It was therefore necessary to visit individual farmers' gardens in order to avoid confusions due to the confusion of terminologies. Special attention had to be paid to the names of varieties. For example, many farmers used local names not only for conventional varieties but also for improved ones (Silira was nicknamed as

Matakolembwende to symbolise its high-yielding characteristics). Preliminary consultations and surveys with technicians at the local research station were also useful in order to understand these technical issues in the area.

Labour issues

Data on division of labour in cassava production is currently being analysed in detail. Typically, land clearing and ridging involved either men (husbands or sons) and/or hired labourers within the community while tasks after planting- weeding, harvesting are mostly done by women. For the majority of farmers, ridging was the hardest tasks of all. Processing was often rated as time-consuming, and this was almost exclusively done by women and children.

African Cassava Mosaic Disease (ACMD): *Kayuwiri*

Many FFS-cassava farmers were able to identify plants showing symptoms of ACMD (locally called *Kayuwiri*). Some could relate the cause to whitefly (*Bemisia tabaci*) as a vector. Some also mentioned a possible control strategy (e.g. remove the affected parts of the plant and burn them, or change to improved, more tolerant varieties), although only a few of them practiced it.

Out of the Non-FFS farmers interviewed, some recognised ACMD as a disease (or a general problem). Some attributed it to infested cuttings, while others related it to Mealybug infestation (saying ACMD is a sign that Mealybug is going to attack the same plant), and yet others related the cause to the heat from the sun. Some also mentioned their control method (cut affected parts), which was taught by extension staff, and practiced it. Many farmers, both FFS and non-FFS, could name the varieties susceptible to ACMD (especially local cultivars). Some knew about improved varieties (Silira and Sauti) which are more tolerant.

Some female farmers commented that CMV-affected (class 2: Nzola M. Mahungu, personal communication) leaves are more palatable as vegetables due to its sugary taste. These farmers deliberately kept the affected plants without taking control measures.

Cassava Mealybug (*Phenacoccus manihoti*): *Ntchembere zandonda*

Although the time of interview (July- August) was not at the peak of the cassava mealybug, many farmers knew it by its local name (*Ntchembere zandonda*). It was felt,

however, that the perceived damage by the farmers was not very severe as compared to that of researchers.

Nearly all FFS-cassava farmers have ever observed the mealybug attacks in their fields and even the pest not being seasonally present, some could explain the damages they inflict on the crop. Most of them mentioned stunted growth and low yield, while some others said no harm, and a few did not know. Some FFS-cassava farmers commented that honeydew produced by mealybugs adds fertility to the soil (when dripped). When asked control measures, some said they remove and discard the affected parts, others mentioned the use of a plant *Tephrosia vogelii* called *mtetezga*, locally known as plant poison, whereas others said they do nothing.

Non-FFS farmers did not recognise the symptoms caused by Mealybugs; some confused it with ACMD (*Kayuwiri*)- while in other non-FFS cases, no Mealybugs were observed in their field. Concerning control, some of them mentioned removing the tip and discard or burn, while the others answered that no measures were taken.

During the *Bawo* exercise, both FFS-cassava and non-FFS groups noted that the Mealybug problem is more prevalent in years with low rainfall.

Elegant grasshopper (*Zonocerus elegans*): Botawota

At the time of surveys, no incidence of the Elegant grasshopper was noted. The majority of FFS-cassava and non-FFS farmers said they have either seen or heard about the pest eating the leaves and stems of the cassava plant. Some had memory of a localised outbreak in their neighbouring areas. Some said they kill them manually or by hitting with brooms, while others said they consult the local agricultural extension office to seek for assistance. Some FFS-cassava farmer mentioned the use of *Tephrosia vogelii* (*mtetezga*; the local plant poison also used for Mealybug).

Sources of cassava planting stems: what is a healthy cutting?

The majority of cassava cuttings have been sourced from locally grown varieties. Almost all FFS-cassava farmers and non-FFS farmers said they recycle the cuttings from existing fields, either their own or from those of friends and relatives. Some sourced improved varieties from extension workers. Some received cuttings from a local non-governmental organisation (NGO) called Every Home for Christ.

As for the criteria for healthy cuttings, according to farmers, both FFS-cassava and non-FFS farmers considered freshness as the most important criterion, followed by no disease and pest infestation. Some FFS-cassava farmers offered additional explanation on buds and holes in the middle of the stems.

FFS and non-FFS

The results between the knowledge and skills of FFS and non-FFS farmers will be compared. The preliminary results indicated that FFS-cassava farmers tend to demonstrate slightly deeper insights about damage symptoms and pest and disease control measures (though scientific grounds to each method need to be verified) compared to non-FFS farmers. This shows immediate impact of cassava-based FFS, even if one of the two FFS groups did not successfully complete their season-long training.

Challenges faced

Unfortunately, there were numerous deaths and funerals of people during the research period. It included also people directly involved in this research, such as a chairlady to the cassava-FFS, as well as a sister and a mother to my research assistants. On such occasions, the research programme had to be stopped or postponed for a while. During the field surveys, some assistants were attacked by snakes and scorpions, and they had to be sent to clinics. It was sometimes problematic to conduct field visits due to the distance to those plots since the fields are often scattered in the area. It turned out that some inhabitants (non-FFS members randomly selected) did not have farming plots hence visiting their field was impossible. There were also occasional misunderstanding with some respondents who had material expectations by participating in this project. Finally, the extension worker who provided substantial help in this research went for a training course in Japan during the fieldwork.

3.4.5 Plans for analysis

The software used are SPSS (version 8) and Atlas.Ti (ethnographic software, to be described in 4.2.5) to analyse the mapping data. Systematic guidance on the use of software will be received Wageningen University mid 2008. This will help upgrade and develop my skills in relevant statistical analyses and use of the non-numeric software.

The data set collected by the Masters student at Wageningen University looking at the rice crop in terms of the production and marketing constraints of rice, such as pests (both insects and animals including birds) and diseases, soil fertility management, and weed control issues. This student will be using the appropriate statistical analysis packages in order to (i) establish pest incidence and damage in FFS/ non-FFS farmers' fields; (ii) explore a limited number of impacts, using selected livelihood indicators and socio-economic indicators, based on qualitative statistical analysis and case study information in the same area. This data will be used for contrast between cassava and rice crop, in order to understand differences in motivation between cash and subsistence crops. This chapter will be analysed further and submitted to International Journal of Pest Management for publication.

3.4.6 Discussion

This mapping technique with open, in-depth interviews explored farmers' understanding of crop production and protection: the use of cultural control methods, perceived pest and disease damage, varietal selection, agronomic methods, labour use, local management practices of planting stems, classification of soils, and crop allocation by different soil types. Through this exercise, the farmers' concept of a 'healthy plant' was explored. These results will be validated by a scouting exercise for pests and diseases.

In principle, the FFS curricula are built around field-based observation, experimentation, comparative analysis, and group decision-making. In the case of FFSs in Malawi or in Chilumba area, the curriculum is based on agronomy rather than focusing on IPM. For example, the topics included in the rice-based FFS were as follows: nutrient management, timing of fertiliser application, plant population (spacing), rates of fertiliser applications, use of herbicides, crop protection and varietal studies (Kamwendo *ibid.*). Exercises to develop effective group management, leadership skills, conflict resolution, gross margin analysis, gender and HIV/AIDS, are also included as special topics (Kamwendo *ibid.*).

This study also tried to investigate farmers' motivation to participate in IPM/FFS, and compared the two cropping systems rice and cassava. Weekly FFS sessions were observed to find out the difference in farmers' motivations according to the types of

crops grown. The results of these observations and informal interviews indicated that cassava-FFS seem to face more challenges in the conditions described in terms of farmers' motivation to participate compared to the rice-FFS, perhaps due to the lack of farmers' understanding on low profitability as well as perceived damages by pests and diseases. The absence of chemical use in cassava crop could be another contributing factor. As for rice crop in the Hara Irrigation Scheme, some farmers occasionally use pesticides to control cutworms in nurseries and herbicides.

The application of IPM/FFS in Malawi, particularly on subsistence food crops, has been criticised (Orr and Ritchie 2004; Snapp and Minja 2003; Orr 2003). Orr (2003) emphasised challenges to design IPM for resource-poor farmers, for the following reasons:

- Low or unperceived economic loss from pests of subsistence staple food crops
- Farmers lack the additional labour required by participation in the IPM/ FFS
- Major problem is soil fertility and not pest management (the primary focus of IPM)

It was suggested that IPM in Africa should concentrate on cash crops because it involves high pesticide use, and thus by reducing the pesticide use on these crops, IPM could enhance both market opportunities and sustainability (Orr 2003). However, issues related to crops such as market access and soil fertility could also be addressed (Bruin and Meerman 2001: 100) following the dynamic nature of FFS as a demand-driven process.

Based on the analysis, this study intends to develop suggestions for strengthening the curricula for cassava-based IPM/FFS.

- Economic loss from pests and diseases prevalence to be included. Benefits by controlling will be clearly addressed;
- Potential for income by cassava to be recognised (especially cuttings of improved varieties), and marketing opportunities to be explored;
- Frequency of the meeting for perennial crops to be re-considered (e.g. from once every week to every fortnight) (Youdeowei 2004) taking into consideration agricultural calendar and labour issues;
- Farmers' problems to be carefully identified and reflected on the curriculum.

4 Complementary papers

4.1 HIV/AIDS, food security and cropping systems

4.1.1 Background

Chronic food insecurity has been one of the major issues of poverty in Malawi. Sixty-eight per cent of the total population in Malawi was short of food in 1998, which was a 'normal' year in terms of food availability (Iliffe 2006: 122). There are a number of ways of explaining the reasons for the severe food insecurity in recent years. Erratic rainfall patterns, coupled with unstable economic situations and policies on strategic grain reserves, problems with input (fertiliser) subsidy schemes are some of them. Famine researchers have also pointed out the availability of labour. The 'New Variant Famine hypothesis' (de Waal and Whiteside 2003), which gained momentum in 2003, argued that HIV/AIDS epidemic is the major contributing factor to the continuing food shortage, arising from the combination of four factors: labour shortages, asset and skill loss, the increasing burden of care for the sick and orphans, and malnutrition (de Waal and Whiteside *ibid.*).

The new factors addressed in the hypothesis are as follows (de Waal and Whiteside *ibid.*):

- (1) Household-level labour shortages are attributable to adult morbidity and mortality, as is in the rise of the numbers of dependants.
- (2) Loss of assets and skills result from increased adult mortality.
- (3) The burden of care for sick adults & children orphaned by AIDS.
- (4) Vicious interactions exist between malnutrition and HIV.
- (5) Food production/ access & availability of food has it been affected (declined) due to HIV/AIDS
- (6) Coping strategies.

It has also argued that the available farm labour is likely to be directed towards less labour-intensive root crops such as sweet potatoes and cassava, further compromising nutritional values (de Waal and Tumushabe 2003). The hypothesis is illustrated by the example of Malawi and Zambia; to claim that the progressive increase in cassava production (FAO 2002) in these countries is an indication of HIV/AIDS impact and can be regarded as an evidence of the hypothesis (de Waal and Whiteside *ibid.*).

There are some problematic features of the official statistical figures of Malawi's current crop production estimate survey, which was designed by the FAO supported by the Early Warning System for Food Security in the Planning Division of the Ministry of Agriculture. The survey is conducted annually. Previously it excluded estate lands but in 1996/97 estate lands were covered although in some cases, crop production from estate land is a substantial part of Malawi's total crop production. Area estimates are combined with yield-per-hectare estimates to obtain final production estimates for the average household. Estimates of total production are made by multiplying the production of an average household by the total number of households in the customary land section (Malawi Environmental Monitoring Programme 1997).

4.1.2 Problem statement

The claim on cassava and sweet potatoes in the context of 'New Variant Famine hypothesis' might not always be applicable to some of the current situation of Malawi.

It is of particular importance to find out and discuss relevance of the hypothesis under different contexts.

4.1.3 Methodologies and the data set

Based on statistical figures, the following locations in different regions of Malawi were selected purposively.

	Locations/ samples
Southern Region	Mangochi (-): 4 farmers, 1 extension worker Zomba (+): 7 farmers, 2 extension workers
Central Region	Lilongwe (+): 10 farmers, 2 extension workers
Northern Region	Karonga (/): 18 farmers, 1 extension worker

Table 4 Sampling: New Variant Famine survey

NB: cassava production indicators (assessment by extension workers)

(+): increased; (-): decreased; (/): unchanged

Features of locations

In October and November 2006, interviews using semi-structured interviews (Appendix 4) to selected farmers and extension workers were conducted in the following locations:

Nankumba area in Mangochi District is in the southern region of Malawi. This is an area known for growing cassava in the past, but severely hit by Mealybug outbreak several years ago. Interviews were conducted in T/A Nankumba (M'bwazulu EPA).

Zomba in the southern region of Malawi is an area known for growing cassava and supplying to urban demands in Zomba itself as well as in Blantyre. Farmers tend to grow cassava for cash as well as for food. Due to land shortage, farmers in this area typically intercrop cassava with maize. They process their cassava into *Makaka*⁴ forms, which are both for storage and later for consumption. Interviews were conducted in Thondwe EPA (south of Zomba township) and in Malosa EPA (north).

Lilongwe District is in the central region of Malawi. T/As Chiseka and Chadza (Mithundu EPA, Chitsime EPA respectively) are located in the southeast of Capital City Lilongwe within 50 km radius. This area grows sweet cassava to supply to the Lilongwe city for the last decade or so.

Karonga District is in the northern region of Malawi. This is an area resided by mixed tribes of Tumbuka, Ngonde among others. This area has been growing cassava as a staple foodcrop. Interviews were conducted in Chilumba area (T/A Wasambo, Vinthukutu EPA).

These results were supplemented by open-ended interviews to experts in the following categories:

- Ministry of Agriculture and Food Security, staff members
- Agricultural Research Station technicians
- International organisations, staff members
- Members of local CBOs and NGOs
- Large-scale cassava farmers
- Staff members of the University of Malawi

⁴ Southern Region (Zomba, Mulanje). To do this, both thin and thick layers are peeled off and the tubers sun-dried without preliminary soaking. The dried tubers which are often very discoloured are then pounded into flour (Williamson 1972 :79).

4.1.4 Plans for analysis

The data has been entered electronically. It will be analysed using the following softwares: Excel and SPSS (version 8) and Atlas.Ti (ethnographic software, to be described in 4.2.5) especially for comments and open-ended expert interviews. This data will be further analysed and investigated and will be submitted to Wageningen University graduate school and international refereed journals.

4.2 Life history analysis of “HIV-affected and non-affected” households in rice and cassava-based cropping systems

4.2.1 Background

HIV/AIDS has become the direct and indirect cause of almost 75% of total deaths in the productive age group of Malawi’s population (Malawi National AIDS Commission 2003: 13). The projection of adult HIV prevalence rate in 2005 was at 14.1 per cent (University of California 2007) and overall life expectancy had dropped to 38.5 years from 45.5 years between 1996 and 2002 (Garbus 2003). The devastating situation of HIV/AIDS epidemic has had an enormous socio-cultural and economic impact on communities in sub-Saharan Africa, and this is a great challenge for development interventions affecting all sectors.

Ethnographic research methods are recognised as effective for grasping intricate situations in developing countries. It also helps assess diverse impact of development interventions. Watkins argues the three problems of conventional survey methodologies and interview techniques, which can be better addressed by using qualitative research methods (Watkins 2004). The three problems are as follows. The conventional methods can induce biased responses due to the respondents’ expectations for material benefits to donor-funded projects, they usually cannot provide sufficient information on intricate social networks and contexts, and the dynamism of conversations with participants’ anecdotal experiences and opinions which are important in understanding AIDS-related issues (Watkins *ibid.*). Often, development projects perceive their rural beneficiaries as a homogeneous group of farmers. Exploratory research for this study indicated that there are a variety of ethnic groups, with (naturally) diverse cultural background, perceptions, social norms, experiences and behaviours in the same locality. Since the HIV/AIDS issue concerns with reproductive health and sexuality, which is fundamental to human being, the personalised narrative information is extremely useful.

Life history becomes also important because the first cases of HIV/AIDS were reported in the 1980s in Malawi, implying that, as of 2008, there are people who lived during the transition period: before and after the epidemic has started. It is therefore important to record their experiences through oral narration of their life histories in order to underpin what happened in their lives, and their perception of these events as well as the gradual changes in intra-household dynamics possibly occurred through these experiences. The

HIV/AIDS epidemic triggered gradual changes in people's culture and perceptions such as stigma and discrimination as well as opening-up. It was recognised in previous studies that the changes in perceptions and behaviours as a result of HIV/AIDS epidemic by in-depth interviews in Malawi (Kaler 2003, Smith and Watkins 2005). The standardized surveys cannot always address the dynamics as vividly. This could be explored by in-depth, qualitative approaches including life history.

Since the research area is exposed to Farmer Field School (FFS) activities, by including some former participants in the samples, its indirect impact could also be assessed using case studies as supplementary information.

4.2.2 Problem statement

Compared to livelihood strategies taken by households not affected by HIV/AIDS, the ones affected by HIV/AIDS have taken different coping/ survival livelihood strategies in dealing with various problems.

Some of the farmers who graduated FFSs are open to share information on their sero-status, and are actively involved community support group activities.

4.2.3 Methodologies

The research area is Chilumba, in Karonga district, northern Malawi, where the other part of this research on FFSs was conducted. Coincidentally, rural areas in Karonga district has shown the earliest confirmative sign of HIV/AIDS epidemic in southern Africa and the evidence of "the silent epidemic" (Iliffe 2006: 33). With its geographic feature (close to Tanzanian and Zambian border), and the number of migrants, Karonga has shown an early epidemiological trend starting from the those who are more educated, traders, salaried employees, casual labourers gradually spreading to local farmers (Iliffe 2006: 42). According to the surveys conducted in 1999-2001, the female HIV prevalence rate in Karonga district was 15.0% (Crampin 2003). This figure is higher than national average of 14.1% (UNAIDS 2006) and Malawi's rural standard of 13.0% (National AIDS Commission 2005).

The practical research methodologies used in this study are based on the training manual for the Biographic Narratives Methods (BNM) developed by Gender and

development unit of the FAO (Deshpande 2005). The interview session comprises main narration (recorded with IC recorder), translation and transcription, follow-up interview and development of family trees, usually involving two to three home visits. Almost all narrations were given in the local language (*ChiTumbuka*) with one exception in English.

Fifty percent (30 out of 60) sub-sample of the separate study on ‘Farmers’ perceptions on pests and diseases’ was purposively selected in each location according to whether the individual or the household is affected by HIV/AIDS or not.

	Hara Irrigation Scheme (FFS-rice)	Mwandovi village (FFS-cassava/maize)	Kachere village (non-FFS)
HIV/AIDS affected	5	5	5
HIV/AIDS non-affected	5	5	5

Table 5 Sampling: life histories

When sampling started, however, it was noted that with the high prevalence rate, it is almost impossible to identify ‘non-affected’ households, since almost every household is somehow affected by having somebody suffering or passed away or fostering orphans of the deceased. Alternatively, the basic criteria used was ‘coping mechanisms’.

When taking a close look at the community, it turned out that in some households, life is crashing down due to the impact of this epidemic, such as losing main labour force or significantly compromising on their assets, or taking actions in the face of epidemic by starting or joining local CBOs (affected households). On the other hand, some households are continuing their lives, even though the problems exist, it is not of significantly at a devastating level (life is going on: non-affected households).

It was not the scope of this research to look for those who are infected, who are HIV positive or on Anti-retroviral (ARV) treatment. On a household level, it appeared that the degree of struggle was not always directly linked to the sero-status of the household members. For instance, households which are headed by an elderly person (who may well be negative), but finding difficulties with his/ her life looking after orphans due to the deaths of the children’s generation as productive age adults (who might have been

positive) could be regarded as ‘affected’ households. Some household heads who disclosed themselves positive but living life actively thanks to access to the medication.

Through discussions with village headman (VH) and extension workers, we came up with the tentative list of households in confidence. Thereafter, we obtained consent from each household and we included only those who were willing to participate in this research.

Though the challenges were anticipated due to the sensitive nature of this research, it was still difficult to go about sampling and visiting community members, and extra efforts in emphasizing that we are not only targeting those who are ‘sick’ (synonymous to being ‘positive’ which obviously have a negative connotation). The research team continuously provided explanation on the purpose of our visit, yet sometimes encountered negative attitudes of those who did not wish to participate due to stigma and discrimination.

When sampling ‘affected households’, the strategy used in this research was as follows:

1. We asked the VHs (for cassava-FFS1 and control) to come up with a list of households who have ‘problems’. The reason why VHs was consulted in the two groups was because we were in close contact with the VHs in these villages and they were in support of our research. We tried to pay courtesy calls and keep them updated on our activities. So approaching the VHs did not involve difficulties. Asking the VH, however, created some degree of misunderstanding, tension, anxiety, and/or expectations. Some community members were communicated by the VH that we were looking for “positive” people. Although it allowed us to approach people who were open about their sero-status and those who are in self-help groups of PLWHA, it created some sort of tension because the people thought whoever we visited had the same problem of HIV/AIDS even if it is not in the case of the non-affected ones. The group of PLWHA considered us as a potential provider of assistances and since we were not in a direct position to assist, the research team faced frustrations of some people.
2. We asked the extension worker (for cassava-FFS2 and rice-FFS) to come up with a list of households who have ‘problems’. Rice-FFS had three villages and due to the presence of an active extension worker, VH was not involved very much in the research activity from the start. Cassava-FFS2 was a small

supplementary group; brought in because cassava-FFS1 did not seem to be progressing well, and this group was also covered by the same extension worker, and VH was again not actively involved from the beginning.

3. Then from the list, we selected the households or individuals whom we would like to interview. Through the VH and the extension worker, we asked their consent to participate.
4. We made appointments and visited each village for interviews. Sometimes, when the person concerned was away or engaged (some even with appointments) their family members (often wives) were interviewed instead. The interview started after explanations on the purpose of this research, confirmation of their willingness to participate and permission to use the IC recorder.

4.2.4 The data set

Twenty-one interviews out of the target thirty were conducted in 2007. Each narration was then transcribed and translated into English with the help of local research assistants. Family tree data will be entered into a computer database software and will be shared with the respondents in 2008 for their confirmation and record. The remaining data will be collected in April 2008 and once the data collection and entry has been finalised, it will be used for analysis.

	Hara Irrigation Scheme (FFS-rice)	Mwandovi village (FFS-cassava/maize)	Kachere village (non-FFS)
HIV/AIDS affected	5 (0)	5 (5)	5 (5)
HIV/AIDS non-affected	5 (1)	5 (5)	5 (5)

Table 6 Data collected (in brackets): life histories

4.2.5 Plans for analysis

The case study analysis, text analysis, and genealogic software will be used to analyse these narrative, in-depth interviews related to HIV/AIDS. Ethnographic software (Atlas.Ti) will be used to analyse and interpret the qualitative data. This software helps analysis of textual information by coding and clustering it with keywords, grouping and

conceptualising in graphic maps by using a technique called 'networking'. Family tree will be analysed using a database software. Special attention will be paid when using the respondents' personal information in the thesis. When the analysis and discussion are complete, this data will be submitted to Wageningen University graduate school and international refereed journals.

5 A list of conference papers and seminars

Some parts of this PhD research have been presented in the past at international conferences listed below:

Chiwona-Karltun, L. Kambewa, P. Yajima, M. Mahungu, N.M. Jiggins, J. (2005). *Market-Oriented Responses Among Cassava Farmers in Domasi, Malawi*. Invited paper to: Theme 2: Local Responses, IFPRI Conference on HIV/AIDS, Food & Nutrition Security, 14-16 April, 2005, Durban.

Yajima, M. Chiwona-Karltun, L. Kambewa, P.S. van Huis, A. Jiggins, J. (September 2005). *Learning about cassava in an HIV/AIDS affected area of Malawi*. Invited paper to a Symposium: Learning and Sustainable Rural Livelihoods in the times of AIDS – Challenges and Prospects, 8th Oxford Conference on Learning and Development, 13-15 September 2005, Oxford.

Yajima, M. Masangano, C.M. Nyirenda, G.K.C. van Huis, A. Jiggins, J. (2007). *Farmers' Perceptions of Plant Health: The Case Of Cassava In Northern Malawi*. Offered paper to a Session: Tropical and Subtropical Crop Protection 1, BCPC XVIth International Plant Protection Congress: 15-18 October 2007, Glasgow.

The research proposal and interim results were also presented and shared with the Social Learning Discussion Group at the Wageningen University in May 2005 and at the postgraduate research-in-progress seminar at Bunda College of Agriculture, University of Malawi in December 2006.

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8 Appendices

Appendix 1 Photos



Photo1 Rice mill in Chilumba established by one-village one-product (OVOP) project under JICA



Photo2 *Bawo* exercise

Appendix 2 Mapping data collection sheet

Identity

Village name:

Chilimika (Chaka), zuwa: Date.....Malo: Place.....

Zina la wakufumba: Interviewer's name.....

Zina la wakulemba: Recorder's name.....

Zina la wakuzyora: Respondent's name.....

Viaka/ Vilimika: Age/ year of birth.....

Mwanalume/ Mwanakazi: M/F.....

Umoyo wa Banja: Marital status

1. **Wambula Nthengwa (kawiro): Single(never married)**
2. **Wapanthengwa na mfumu/ winu na winu mwanakazi: Married with monogamous**
3. **Wapanthengwa na wanakazi/ wanalume wa mitala: Married with polygamous**
4. **Kuwerako kunthengwa: Divorced**
5. **Walikulekaka na mfumu wake nanyifa: Widowed**
6. **Other.....**

Uyo akuwusa pabanja: Name of Household head.....

Unandi wa wana (winu): Number of Children (own)

Unandi wa wana (winu awo ali pakhomo): Number of Children (own; staying together)

Unandi wa wana (awo muukhala nawo): Number of Children (fostering, staying together)

Mulikufika mpha namasabiro yinu? How far have you gone with your education?

.....

Kupatulako kusukulu, muli kusabirapo vya luso/ umisili uli wose? Any vocational trainings other than schools?

.....

Wovwiri kufuwa kuwabali (wana, dada, nkhazi etc): Remittances

.....

.....

Katundu na vyuma vwa ntheura: Type of Assets

.....

.....

Number of gardens (indicate in the map)

.....

Food/Hunger

Munda yinu yonse, napala vula yawa makola, yikumpasani vuna yakumkwunani chilimika chose? Inya/ Yayi

(With these fields, and good rains, do you produce enough for the whole year? Y/N)

.....

Usangi chara (yayi), mukukhala miyezi yiringa wambula chakurya?

(If not, for how many months without food?)

.....

Kwasono, kasi muli na chakurya cha kukwana kufikira vuna inyake Inya/ Yayi

(Currently, do you have enough till the next harvest?) Y/N

.....

Ntchito ya kumunda wa mayawo (ninja wakuchita vichi: Cassava tasks: who does what

Kuswa phanje, Kusangula: Land clearing.....

Kunozya malo (mizere, vingundumwa): Land preparation (ridging/mounding).....

Kupanda: Planting.....

Kupalira ka kwamba: 1st weeding.....

Kupwerelera ku tivibungu na matenda: Pests & disease management.....

Kupalira ka chiwiri: 2nd. Weeding.....

Kupalira ka chitatu: 3rd Weeding.....

Kuvuna: Harvesting.....

Processing.....

- **Kusuba** (peeling)
- **Kutupika** (soaking)
- **Kuzuula** (taking away from the water)
- **Kwanika** (drying)
- **Kupula** (pounding to make cassava flour)

Kusunga (Kulonga): Storage.....

Kunozya chakurya: Food preparation.....

Mlimo ngu pa iyi tazunura nguzito chomene? Which task is the hardest? [H]

.....

Mlimo ngu ukutola nyengo itali kuti ufisyike (umale)? Which task takes the longest time? [LT]

.....

Mukwamba nyengo uli kupanda? When do you start your planting?.....

.....

Mukuguliska kochi? Where do you sell your crop (if at all)?.....

.....

Pali masuzgo yaliyose ayo mukukumana nayo pakuguliska mpunga winu? Do you have problems when selling your crop? (Yes/ No/ I don't know)

.....

Farmer Field School (participants and drop outs) sukulu yawa

Kasi muli kumalizga sukulu ya FFS? *Have you graduated from FFS?.....*

Ni pauli apo mukawapo lumoza na wanyinu pa sukulu iyi?
When did you participate in the Farmer Field School (FFS)?.....

Ni chifukwa uli mukayanayana vyakunjira sukulu iyi?
Why did you join FFS?

.....

Kasi mukasambilanga visambizgo wuli kusukulu kwinu?
What topics did you cover in the FFS?

.....
.....
.....

Kasi mukuvwiraso walimi wanyinu ivyo mukasambira ku FFS? *Do you help fellow farmers with what you learned at FFS?.....*

Chifukwa: *explanation (how do you help them and what do you teach them)*

.....
.....

Kasi vili kumujumpha nipo visambizgo vya FFS? (inya/yayi/nkhumanya yayi)
Did you miss sessions? (Yes/ No/ Don't know/ other)

.....
Chifukwa: *explanation*

.....
.....

Pala muli kuleka, nivifukwa uli?
(If you have dropped out of FFS, what was the reason?)

.....
.....

Muchali mundanjire sukula ya FFS kasi mukawa na masuzgo uli?
What problems did you have before attending FFS?

.....
.....

Kasi sukulu ya walimi yili kumuvwilani kuchepesya masuzgo pa munda?[Inya,yayi,nkhumanya yayi]

Did the FFS help you reduce your problems in the field? (Yes/ No/ Don't know/ other)

.....

Chifukwa: *explanation (which problems and how)*

.....
.....

Pasono muli na masuzgo uli? *What problems do you have now?*

.....
.....

Kasi mwasintha kalimilo chifukwa cha sukulu ya walimi pa munda?

[inya,yayi,nkhumanya yayi] *Have you changed your cropping practices because of the FFS? (Yes/ No/ Don't know/ other).....*

Pala inya,yasintha uli? *If so how?(ask for cropping practice examples)*

.....

Muchali mundanjue sukulu ya FFS kasi mukasanganga unandi uil wa mayawo

How much cassava did you produce before attending FFS?

.....

Ndipo sono mukusanga uil? *How much do you produce now?*

.....

Kasi sukulu ya FFS ya mpindulilani pa umoyo winu? (inya/yayi/nkhumanya yayi)

Do you think the FFS has had a positive effect on your livelihood? (Yes/ No/ Don't know/ other).....

Pala enya, yapindula wuli? *If so how?*

.....
.....

Kwasono, kasi mukufwasa kugwila ntchito na wanyinu lumoza?

(inya/yayi/nkhumanya yayi)

Do you think you are better in working with groups? (Yes/ No/ Don't know/ other)

.....

Chifukwa: *explanation (ask for example)*

.....
.....

Kwasono, na umo mwasambilira FFS, kasi muli makola pa ku dumbiskana na wanthu? (inya/yayi/nkhumanya yayi)

As of now, do you think you are better in negotiation skills? (Yes/ No/ Don't know/ other).....

Chifukwa: *explanation (ask for example)*

.....
.....

Kasi mukakondweskekanga na vichi vya FFS? *What did you like about FFS?*

.....
.....

Kasi icho chikamukondweskaninge yayi ntchi vichi ku FFS? *What didn't you like about FFS?*

.....
.....

Pala mungapasika mwawi wakusintha FFS, mungasitha vichi?

If you could change the FFS, what would you change?

.....
.....

Kasi ni visambizgo uli vinyake ivyo imwe mukukhumba kuti viwemo mu sukulu iyi?

What topics would you like to have been included at the FFS?

.....

Kasi muli kusambirapo vya ulimi? *Have you received any other trainings on farming practices? (Yes/ No/ Don't know/ other)*

(Specify).....

Kupatulako ulimi mukuchitaso vichi? *Do you participate in other activities besides farming?.....*

Farmer Field School (non-participants)

Kasi muli kupulikapo vya FFS? (enya,yayi)

Have you heard about the Farmer Field School (FFS)? Yes/No

Pala muli kupulikapo mukapulika kwa njani?

- 1. walimi awo wakawamo kale**
- 2. walangizi**
- 3. walimi wanyakhe**
- 4. wachibale**
- 5. wabwezi etc**

If you have heard about FFS, who told you about it? (you can choose more than one)

- 1. Farmers who have participated in the FFS*
- 2. Extension workers*
- 3. (Other farmers)?*
- 4. Family members*
- 5. Friends*
- 6. Other.....*

Kasi mukumanyapo vichi pa FFS?

What do you know about the FFS?.....

.....
.....

Kasi Khumbo la kunjila FFS muli nalo?. (inya/yayi/nkhumanya yayi)

Would you like to join FFS? (Yes/ No/ Don't know/ other)

.....
.....

Vifukwa Reasons

.....
.....

Kasi muli na masuzgo uli mu ulimi wa mayawo? *What problems do you have in cassava production ?*

.....
.....

Sono mukumalana uli na masuzgo agha? *How do you solve them?*

.....
.....

Mukuvuna unandi uli wa mayawo? *How much cassava do you produce?*

.....

New methods and experiments

Kasi muli kusambirapo vya ulimi?

*Have you received any trainings on farming practices? (Yes/ No/ Don't know/ other)
(Specify).....*

Mukasambirapo vichi?

What topics did you cover?

Kasi mukuyezya nthowa zipya za ulimi mmunda mwinu?

Do you try new methods in your own field? (Yes/ No/ Don't know/ other)

Pala enya, ni nthowa zini? If so what kind of methods?

Mukasambira kochi nthowa izi?

Where did you learn those methods

Kasi mukupanga ulimi wa kuyezya mmunda winu? (inya/yayi/nkhumanya yayi)

Do you conduct experiments in your own field? (Yes/ No/ Don't know/ other)

Pala enya , viyezyo uli ?

If so what kind of experiments?

Kupatulako ulimi mukuchitaso vichi?

Do you participate in other activities besides farming?

Dondomeko ya kumunda (procedure): *Notes around Gardens (Munda)*

Munda: longolani munda pakugwirisha tchito vithuzi, ndipo mwambe munda uwo ukulongoleka kuti uri kufupi na nyumba yinu. *The fields: beginning with the field biggest or closest to the house, display the fields, using the pictures,*

- 1. Longolani Chiyezyerero cha ukulu wa munda winu, dera ilo wuri na mtunda wake kufuma pa nyumba. *Show the approx size, location/distance from home,***
- 2. Kapandiro ka mlimo winu (mbuto imoza pera, mbuto imoza kweni yakupambana mtundu, mbuto za kupambana). *Crop Stand (pure, mixed, intercropped), Varieties***
- 3. Munda uwo ukasangika uli. *How land was acquired***
- 4. Mtundu wa dongo/ vundira, (lamchenga,churu or lakusazgana), mtundu wake (lifipa lituwa.....) fumbaniso vyakukhwasana na nyata ya ndongo la munda. *Soil type(s) / colour at each field, ask about Soil Fertility issues***
- 5. Manyishani usangi munda unji ukuthika manyowa panyake feteleza wakugula. *Note if any field receives fertiliser or manure***
- 6. Manyishani usangi ulimi wakasithasitha (rotation) kasi mukuchirachi uli wakasinthasitha panyake munda mukugoneka munda (fallow). *Note any fallow or rotation practiced***
- 7. Manyaniso wanthu awo akugwira ntchito pamunda uwo (wenecho, banja lose, waganyu) *Type of Labour used (family or Ganyu)***

Pest and Diseases – Cassava Semi-Structured Interview in the field

Visit one field nearest the house – use Semi-Structured Interview for P&D survey.

Measure size of field; use self-metric to estimate distance from house

Ask the farmer if he can show an affected plant; if he doesn't show anything browse the field for no more than 5 minutes to get affected plants.

1. Sample mosaic virus:

Chikuchitika ntchivichi ku khuni ili? *What is happening to this plant?*

.....
.....

Pali kwanangika kulikose kukuchitika ku khuni iri? *Does it do any harm to the plant?*

.....
.....

Pali chilichose chikuchitika kuvuna chifukwa cha ichi? *Does it affect the yield?*

.....
.....

Kasi mukuchitafo uli pa kumazja suzgo ili? *What do you do to avoid this?*

.....
.....

Chifukwa vichi ivi vikuchitika ku hamba/khuni iri pera kwani kurinyake iri yayi? *Why is this leaf/plant affected and not this one?*

.....
.....

Nimtudu uli wa mbutu uwo koleka lubiro? *Which variety is more easily affected by this problem?*

.....
.....

Mukurya chigwada kukhuni ili? *Do you eat chigwada from this plant?*

.....
.....

Gwiritsani ntchito magalasi: kasi mukuwona vichi? *[use the glass: what do you see?]*

.....

Kasi mukuyanayana kuti tukuvyilapo nithowa iriyose pa suzyo iri? *[Do they have anything to do with this problem?]*

.....
.....

Mukuchitapo vichi pa suzgo ili? *(if so what do you do to this problem)*

.....
.....

Mbunandi uli wa mpunga uwo wasuzgika? *ACMD infestation rate*

.....%

Ridge 1 (number of plants infested: total number of plants scouted)

Vyakuwonapo *(Observations)*

.....
.....

2. Repeat with whitefly/mottled leaf virus

Chikuchitika ntchivichi ku khuni ili? *What is happening to this plant?*

.....
.....

Pali kwanangika kulikose kukuchitika ku khuni iri? *Does it do any harm to the plant?*

.....
.....

Pali chilichose chikuchitika kuvuna chifukwa cha ichi? *Does it affect the yield?*

.....
.....

Kasi mukuchitafo uli pa kumazja suzgo ili? *What do you do to avoid this?*

.....
.....

Chifukwa vichi ivi vikuchitika ku hamba/khuni iri pera kweni kurinyake iri yayi?

Why is this leaf/plant affected (by the nymphs) and not this one?

.....
.....

Ni mtudu uli wa mbuto uwo koleka lubiro? *Which variety is more easily affected by this problem?*

.....
.....

Gwiritsani ntchito magalasi: kasi mukuwona vichi? [*use the glass: what do you see?*].....
.....

Kasi mukuyanayana kuti tukuvyilapo nithowa iriyose pa suzyo iri? [*Do they have anything to do with this problem?*]
.....
.....

Mukuchitapo vichi pa suzgo ili? (*if so what do you do to this problem*)
.....
.....

Mbunandi uli wa mpunga uwo wasuzgika? % of plants affected.....%
Vyakuwonapo (Observations)
.....
.....

3. Repeat with mealybug

Chikuchitika ntchivichi ku khuni ili? *What is happening to this plant?*
.....
.....

Pali kwanangika kulikose kukuchitika ku khuni iri? *Does it do any harm to the plant?*.....
.....

Pali chilichose chikuchitika kuvuna chifukwa cha ichi? *Does it affect the yield?*
.....
.....

Kasi mukuchitafo uli pa kumazja suzgo ili? *What do you do to avoid this?*
.....
.....

Chifukwa vichi ivi vikuchitika ku hamba/khuni iri pera kwani kurinyake iri yayi?
Why is this leaf/plant affected and not this one?
.....
.....

Gwiritsani ntchito magalasi: kasi mukuwona vichi? [*use the glass: what do you see?*].....
.....

Kasi mukuyanayana kuti tukuvyilapo nithowa iriyose pa suzyo iri? *[Do they have anything to do with this problem?]*

.....
.....

Mukuchitapo vichi pa suzgo ili? *(if so what do you do to this problem)*

.....
.....

Mbunandi uli wa mpunga uwo wasuzgika? *% of plants affected.....%*
Vyakuwonapo (Observations)

.....
.....

4. Sample Elegant Grasshopper (Botawota):

Munda winu mukusagika botawota? *Do you have Botawota in your field?*

.....
.....

Mukuwona m'mbuto nji? *Do you see them with which crops?*

.....
.....

Pali kwanangika kulikose kukuchitika ku khuni iri? *Does it do any harm to the plant?.....*

.....
.....

Mukuchitapo vichi pa suzgo ili? *If so, what do you do to this problem?*

.....
.....
.....

Kasi mukuchitafo uli pa kumazja suzgo ili? *What do you do to avoid this?*

.....
.....

Kasi mukurya botawota? *Do you eat Botawota?*

.....
.....

Usange inya, mukurya uli? Mukufumya uli kununkha kwake? *If so, how do you eat them? (the way you process) esp to remove its smell.*

.....
.....

Mbunandi uli wa mpunga uwo wasuzgika? % of plants affected.....%
Vyakuwonapo (Observations)

.....
.....

5. Mbuto Stem cuttings:

Mbuto mukuyitora kochi? Where do you get your stems?

.....
.....

Mukumanya uli kuti iri makola? How do you know they are healthy?

.....
.....

Chiripo icho mukuchita kuti mbuto yilutirire kuwa machola? Is there something you can do to keep them healthy?

.....
.....

Mukusunga uli mbuto iyi para mwa vuna waka (jima)/ napara muli pafupi kupanda? How do you keep them after harvesting/before planting?

.....
.....

Wulipo wanji wakwiza kuzakatola mbuto iyi kumunda kwinu? Do people come to your field to collect planting stems?

.....
.....

5. (Other) Kasi mukukumanaso namasuzgo yanyake munda wamayawo? Do you experience any other problems in your cassava field?

.....
.....
.....

6. Vyakuwonapo (Observations)

.....
.....
.....

Plant #	Elegant grasshopper[6]		Micro/macro termites[7]	Whitescales [8]	Other insect pests	Bacterial Blight [9]	Tuber rot	Fungi diseases[10]	Remarks
	Population	Damage score							
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

[6] Elegant grasshopper scores: 1. No obvious symptoms; 2. Leaves slightly attacked; 1-25% leaves damaged; 3. 26-50% leaves damaged; 4. 51-75% leaves damaged; 5. 76-100% total defoliation, insects have started eating stems.

[7] Termite scores: 1. No obvious symptoms; 2. Plant moderately attacked but still standing (bark still remaining when scraped); 3. Severe damage: branch not fallen down (bark started to be eaten, 4. Plant is completely cut & fallen down.

[8] Whitescale scores: 1. No obvious symptoms; 2. Slight damage: stem slightly affected but leaves intact; 3. Severe damage: stem almost covered, leaves being lost; 4. Whole stem covered; plant dry; 5. Plant has dried up and died.

[9] Bacterial Blight scores (from top): 1: no symptoms; 2: only angular leaf spotting; 3: exclusive leaf blight, leaf wilt and defoliation, and gum exudation on stems and petioles; 4: extensive leaf blight, wilt, defoliation and stem die-back; 5: complete devoliation and stem die-back; stunting and die-back of lateral shoots

[10] Anthracnose and Ramularia should be indicated if observed. Anthracnose scores: 1: no symptoms; 2: few shallow cankers on woody stems, late in the growing season; 3: many deep cankers on woody stems followed by distortion; 4: many oval lesions on green stems and severe necrosis at leaf axils, followed by wilting and severe defoliation

Appendix 4 'New Variant Famine' semi-structured survey form

Name of Farmer: _____
FFS member?: Y/N --- Name of FFS: _____ Period: _____
Village: _____ T/A: _____
ADD: _____ District: _____ EPA: _____
Name of the recorder: _____ Date of survey: _____
Variety (% if mixed) : _____ Area (ha): _____

Date planted: _____

- 1 Cassava yield
 - 1.1 Is there any record of past year's yield? : _____
 - 1.2 When they harvest this season, can we record this year's harvest? : _____
 - 1.3 How does s/he estimate the yield? : _____

- 2 Local IPM approaches/ planting time
 - 2.1 Which month did they plant the cassava? : _____
 - 2.2 Why did they decide to plant in this particular month?

 - 2.3 How do you understand (perceive) first planting rains?

 - 2.4 Do you plant with the first planting rains? [Y / N / Don't know]
 - 2.4.1 If not, why?

 - 2.5 Does planting time affect pests and diseases attack on cassava? [Y / N / Don't know]
 - 2.5.1 Comments:

 - 2.6 Do you have different planting time depending on varieties? [Y / N / Don't know]
 - 2.6.1 If yes, why?

 - 2.7 What are the main problems of cassava?

 - 2.8 Does cassava have any insect pest damages? [Y / N / Don't know]
 - 2.8.1 If yes, how do you control insect pest damages?

 - 2.9 Does cassava have any diseases damages? [Y / N / Don't know]
 - 2.9.1 If yes, how do you control diseases damages?

- 2.10 Are there any measures being taken to reduce these damages? [Y / N / Don't know]
 2.10.1 If yes, what are these?
- 2.11 Do you know of any natural enemies of Mealybugs [Y / N / Don't know]
 2.11.1 If yes, please name them:
- 2.12 Do you know of any natural enemies of CGM? [Y / N / Don't know]
 2.12.1 If yes, please name them:
- 2.13 Do you know of any natural enemies of Elegant Grasshoppers? [Y / N / Don't know]
 2.13.1 If yes, please name them:
- 2.14 Do you know what causes Africa Cassava Mosaic Disease? [Y / N / Don't know]
 2.14.1 If yes, please name them:
- 2.15 Do you know of whiteflies (adults)? [Y / N / Don't know]
 2.15.1 If yes, how can they cause damages?
- 2.16 Do you know of whiteflies (nymphs)? [Y / N / Don't know]
 2.16.1 If yes, how can they cause damages?
- 3 Varietal comparison on susceptibility to pests and diseases
- 3.1 Which varieties do you grow?
- 3.2 Are they sweet or bitter? (Sweet/ bitter/ both)
- 3.3 Why did they choose to plant this variety?
- 3.4 Are there differences in susceptibility to *insect pests* between different varieties? (sweet and bitter)
- 3.5 Are there differences in susceptibility to *diseases* between different varieties? (sweet and bitter)
- 4 Planting stem management practices (acquisition, access, quantity, variety, treatment by heat, planting time, planting methods, etc.)/ reasons
- 4.1 How do they source cassava-planting stems (tick)? What do you do with surplus

if any?

	Recycle from own		Recycle from others		Recycle from both
	Research stations thru AEDO		Give/sell <i>surplus</i> to others *		Other (specify)

4.2 If recycle from own, how do you keep the planting stems for the next season (tick)? What do you do with surplus if any?

	Just leave them in the field as standing crop (rotate)
	Stuck the stems in bundles, and leave them at the lakeshore for moisture
	Put them in bundles and place them in a hole with water
	Keep them under the tree shade
	Cut up and plant the same day or the following day during rainy season
	Use the <i>surplus</i> as firewood
	Other (specify)

4.3 Are there enough planting stems for your field? [Y / N / Don't know]

4.3.1 If yes, from where do you get them?

4.3.2 If no, what do you think is the problem?

4.4 Can you obtain cuttings of the varieties you prefer to grow? [Y / N / Don't know]

4.4.1 If yes, from where do you get them?

4.4.2 If not, why?

4.5 Do you have different planting methods (like spacing) depending on varieties?

[Y / N / Don't know]

4.5.1 If yes, why?

4.6 Do you apply special treatment for cassava cuttings before planting (e.g. treatment by heat)? [Y / N / Don't know]

4.6.1 If yes, why?

4.7 Do you use insecticides? [Y / N / Don't know]

4.7.1 If yes, which ones and how?

5 Soil fertility management practices/ reasons

- 5.1 Do you have any problems with soil fertility with cassava growth? [Y / N / Don't know]
 5.1.1 If yes, how do you deal with the problem?
- 5.2 Do you rotate gardens by planting season? [Y / N / Don't know]
 5.2.1 If yes, what is the reason?
- 5.3 If you rotate, does it include leguminous crops (e.g. g/nuts)? [Y / N / Don't know]
 5.3.1 If yes, what is the reason?
- 5.4 Do you practice any intercropping? [Y / N / Don't know]
 5.4.1 If yes, which crops (legumes)?
- 5.5 Do you apply fertiliser in your cassava gardens? [Y / N / Don't know]
 5.5.1 If yes, why?
- 5.6 Do you think soil fertility is important in cassava cropping? [Y / N / Don't know]
 5.6.1 If yes, why?
- 5.7 Cassava is being criticised for depleting soils. Do you agree? [Y / N / Don't know]
 Comments:
- 6 (NVF) Are you growing more cassava than before? [Y / N / Don't know]
 6.1 (If yes) What are the reasons?
- 6.2 Are your fellow farmers growing more cassava than before? [Y / N / Don't know]
 Comments:
- 6.3 Do you think cassava is labour-saving crop compared to Maize? [Y / N / Don't know]
 (If yes) In what way?
- 6.4 Cassava has longer planting time than maize. Do you think it demands more land? [Y / N / Don't know]
 Comments:
- 6.5 Is cassava less nutritious than other cereals? [Y / N / Don't know]
 Comments:

6.6 Do you like (eat) cassava as your main (staple) food? [Y / N / Neither]

6.6.1 Has it changed over time?

6.6.2 (If yes) What caused the change?

6.6.3 Do you eat *chigwada*? [Y / N / Don't know]

Comments:

7 When have there been food shortages in the area? [Years]

7.1 In your opinion, what caused the food shortage?

7.2 How serious was the food shortage?

7.3 How did you cope with the problem?

8 What are the factors which you consider important in making decisions to grow which crop?

	Droughts		Dry spells		Climate changes
	Rainfall patterns/ distribution		Soil fertility		Pests/diseases outbreak
	Market opportunity		Input availability		Credit availability
	Government policies		Promotion campaigns (donors)		Promotion campaigns (NGOs)
	Extension messages (government)		Loss of labour due to deaths of able adults		Loss of labour due to deaths of sick adults

Comments:

9 Is the area affected by HIV/AIDS? [Y / N / Don't know]

If yes, in what way?

10 Overall comments

平成18年度研究フェロープログラム

参加型農村開発アプローチ「Farmer Field Schools」の
マラウイ農村における社会影響評価の試み：
キャッサバとHIV/AIDS

Social Impact Assessment of Farmer Field Schools
-Participatory Rural Development Approach- in a rural area in
Malawi:Cassava and HIV/AIDS

本論文は、外務省の委託による
財団法人 国際開発高等教育機構
平成18年度研究フェロープログラムの下
で研究を行なった成果です。本論文の内
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平成20年3月31日

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