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FOOD SECURITY ACTION PLAN

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TABLE OF CONTENTS

ACRONYMS **5**
EXECUTIVE SUMMARY **7**
1. BACKGROUND **12**
1.1 Performance of the Agricultural Sector 12
1.2 Food Security Situation in Malawi 12
1.2.1 Conceptual Issues 12
1.2.2 The Food Security Policy 14
1.3 The Agricultural Development Programme (ADP) 16
1.3.1 Link between Food Security Policy and ADP 16
1.4 Food Security Action Plan 17
2. PRIORITY STRATEGIES **18**
2.1 Methodology for Setting Priorities 18
2.2 The Selection Criteria and Weighting 18
3. OPERATIONAL GUIDELINES FOR IMPLEMENTING THE PRIORITISED STRATEGIES **21**
3.1 Rationale for introducing Operational Guidelines 21
3.2 Specific purpose of the Operational Guidelines 21
3.3 Application of the Operational Guidelines to Improve FS Interventions 23
3.3.1 General application of Operational Guidelines 23
3.3.2 OGs as a tool for systematic assessment and monitoring of project alignment with FSAP 23
4. FOOD SECURITY STRATEGIES AND ACTIVITIES **33**
4. 1 Promote Contract farming for agricultural production development (FSP Priority Strategy No. 3.1.1.1) 33
4.1.1 Background 33
4.1.2 Constraints 34
4.1.3 Activities 34
4.2 Encourage domestic production of high quality improved varieties (FSP Priority Strategy No. 3.1.3.2) 35
4.2.1 Background: Production of Field Crops 35
4.2.2 Production of Horticultural Crops 43
x. Build capacity of farmers in vegetable processing [Operational Guidelines 2.16.1(x) and 2.10(x)]. **49**
x. Build capacity of farmers in vegetable processing [*Operational Guidelines* 2.17.1(x) and 2.10 (x)]. **50**
4.3 Promote integration of livestock into smallholder farming systems (FSP Priority Strategy No. 3.1.9.3) 52
4.3.1 Background 52
4.3.2 Provide Technical Assistance to Increase Dairy Production 52
4.3.3 Provide Technical Assistance to Increase Beef Production through Stall Feeding 53
4.3.4 Goat Production 54
4.3.5 Poultry Production 55

4.4 Create a conducive environment for private sector investment and local community participation in irrigation development (FSP Priority Strategy No.3.1.2.1) 56
4.4.1 Background 56
4.4.2 Constraints 56
4.4.3 Activities 56
4.5 Promote environmental and land and water management for sustainable agricultural development (FSP Priority Strategy No. 3.1.7) 57
4.5.1 Background: Environmental degradation 57
4.5.2 Factors accelerating environmental degradation under smallholder farming systems 58
4.5.3 Activities 58
4.6 Promote off-farm employment opportunities through economic empowerment and Income Generating Programmes (FSP Priority Strategy No. 4.1.2.2) 59
4.6.1 Background 59
4.6.2 Constraints 60
4.6.3 Activities 60
4.6.3.2 Develop productive local forestry activities e.g. fuel wood, timber, and fruit tree production (Operational Guideline 6.2) 61
4.7 Establishment of Community Grain Banks (FSP Priority Strategy No. 3.1.3.3) .. 62
4.7.1 Background 62
4.7.2 Constraints 62
4.7.3 Activities 62
5. INSTITUTIONAL ARRANGEMENTS 64
5.1 Institutional Framework 64
5.2 Implementation Plan 68
5.2.1 Preparation Phase 68
5.2.2 Implementation Phase 69
5.2.3 Monitoring and Evaluation of the FSAP 70
ANNEXES 74
ANNEX 1: RANKING OF PRIORITISED STRATEGIES 74
ANNEX 2: PROCESS OF DEVELOPING THE FOOD SECURITY ACTION PLAN . 81

LIST OF TABLES

Table 1: Ranking of selected strategies 19
Table 2: Criteria for Categorizing Projects/Programmes..... 24
Table 3: An example of project grading using Operational Guidelines (for project promoting dairy production)..... 28
Table 4: Example of how to calculate an overall grade for a multi-component/activity project 29
Table 5: Roles and Responsibilities of Major Actors 65
Table 6: Timetable for Operationalizing the FSAP 69
Table 7: Levels at which FSAP shall be monitored..... 71
Table 8: Monitoring indicators for the FSAP 72

ACRONYMS

ADCs	Area Development Committees
ADD	Agricultural Development Division
ADMARC	Agricultural Development and Marketing Corporation
ADP	Agricultural Development Programme
AI	Artificial Insemination
AIDS	Acquired Immune Deficiency Syndrome
CSOs	Civil Society Organisations
DADO	District Agricultural development Officer
DAES	District Agricultural Extension Services
DAPS	Department of Agricultural Planning Services
DARS	Department of Research Services
DAHLP	Department of Animal Health and Livestock Development
DAs	District Assemblies
DEC	District Executive Committee
CONGOMA	Council for Non-Governmental Organisations in Malawi
DDPs	District Development Plans
EPA	Extension Planning Area
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FNSJTF	Food and Nutrition Security Joint Task Force
FRIM	Forest Research Institute of Malawi
FSP	Food Security Policy
FSAP	Food Security Action Plan
FSP&P	Food Security Policy and Programmes Committee of the Food and Nutrition Security Joint Task Force
FUM	Farmers' Union of Malawi
GDP	Gross Domestic Product
GoM	Government of Malawi
HIV	Human Immune Deficiency Virus
IDEAA	Initiative for Development and Equity in African Agriculture
IGA	Income Generating Activities
IP	Implementing Partner
IPM	Integrated Pest Management
LRCD	Land Resources Conservation Department
M&E	Monitoring and Evaluation
MASAF	Malawi Social Action Fund
MASIP	Malawi Agricultural Sector Investment Programme
MDG	Millennium Development Goals
MK	Malawi Kwacha
MLGRD	Ministry of Local Government and Rural Development
MoAFS	Ministry of Agriculture and Food Security
MoTPSD	Ministry of Trade and Private Sector Development
MPRS	Malawi Poverty Reduction Strategy
NADP	National Agriculture Development Programme
NAPF	National Agriculture Policy Framework
NASFAM	National Association of Smallholder Farmers in Malawi

NCD	Newcastle Disease
NEPAD	New Partnership for Africa's Development
NFRA	National Food Reserve Agency
NGO	Non-Governmental Organisation
NORAD	Norwegian Development Agency
NPC	National Project Coordinator
OGMR	Operational Guidelines Minimum Requirements
OPC	Office of the President and Cabinet
OPV	Open Pollinated Varieties
PBA	Project Based Approach
PCAG	Project Compliance Assessment Grid
PMU	Project Management Unit
PRSP	Poverty Reduction Strategy Paper
PSIP	Public Sector Investment Programme
SGR	Strategic Grain Reserve
SWAp	Sector Wide Approach
UNDP	United Nations Development Programme
VDCs	Village Development Committees
WHO	World Health Organization

EXECUTIVE SUMMARY

In July 2005 the Cabinet approved a Food Security and Nutrition Policy (FSNP) for Malawi, which was developed over a period of five years. The Cabinet decided to split the Policy into a Food Security Policy (FSP) under the MoAFS and a Nutrition Policy under the Department of Nutrition, HIV and AIDS in the Office of the President and Cabinet (OPC). The FSP has 59 strategies. In 2007, Government decided to develop a Food Security Action Plan (FSAP) to ensure systematic, coordinated and harmonised operationalization of the FSP. The FSAP formulation process was started in June 2007. A highly consultative process was adopted culminating in this document which outlines the proposed Action Plan.

The Food Security Action Plan (this document) is designed as a '*Reference Action Plan*' to guide project/programme implementation in specific strategies/sub-sectors (e.g., livestock, off-farm employment, etc). The main actors under each "*thematic or sub-sector Action Plan*", are the implementing agencies at field/operational level including government and non-government agencies but coordinated by the MoAFS under whose auspices responsibility for implementation of the FSAP rests.

The FSAP is elaborated in two Volumes. Volume I (this document) is the main report describing the various components of the action plan. It has 5 chapters. The first provides a background covering the agricultural sector performance, nutrition trends and government's policy response. Chapter 2 details the prioritisation process of FSP strategies. The third chapter introduces the Operational Guidelines and how they will be used to align projects with the Action Plan. The chapter sets out an easy-to-use methodology for grading projects/programmes relative to compliance with Operational Guidelines Minimum Requirements (OGMR). Chapter 4 spells out the details in terms of specific activities required under each of the 8 prioritised strategies. The constraints that each strategy is trying to address are also highlighted and the actions (activities) needed are elaborated. Chapter 5 concludes Volume I by defining the institutional and implementation arrangements foreseen for the Action Plan and by laying out an appropriate monitoring and evaluation plan. Roles and responsibilities of the various actors are clearly spelt out and a time table of activities to operationalize the Action Plan is also presented.

The FSAP covers the period 2008 – 2013 and communicates Government's priorities in relation to the 59 strategies of the FSP. Out of these, the FSAP prioritises 7 strategies. It then identifies the major activities to be undertaken under each of the strategies and provides detailed Operational Guidelines and Minimum Requirements that will direct the implementation process of on-going and pipeline projects/programmes in line with these 7 strategies. This way, the FSAP provides a platform for re-orienting projects/programmes to the FSP to maximise their impact initially focusing on the 7 prioritized strategies. The Operational Guidelines will also be used by the Ministry of Agriculture and Food Security (MoAFS) as a monitoring tool to assess the extent to which the projects/programmes are re-aligning towards the country's preferred approach to delivery of food security interventions. The FSAP has been designed in such away that

apart from coordination, all costs related to re-orientation and implementation can be borne by the budgets of implementing partners.

In an effort to provide a reliable and cost-effective route out of the chronic food insecurity and dependence on food aid that has held Malawi development back over the past decade, MoAFS decided to develop the Agriculture Development Programme. The Agricultural Development Program (ADP) aims at harmonising the investment and support programs in agriculture which have the highest potential for contributing to food security and agricultural growth in the next five years. The ADP is therefore a prioritised results-oriented framework for implementing the agricultural components of the Malawi Growth and Development Strategy (MGDS), aiming at harmonized and gradually aligned investments by Government and donors.

The process of formulating the ADP started after the Food Security Policy was already in place but before the formulation of the FSAP. The development of the FSAP therefore took cognisance of the Agriculture Development Programme (ADP) formulation process.

Seven criteria were used to prioritise the FSP strategies of the Food Security Action Plan. One of these was consistency with the ADP. All seven strategies that have been prioritised for implementation under the FSAP are therefore in line with the strategic objectives of the ADP. The rationale for this link is to ensure complementarity between the achievement of agricultural development goals in the context of the Malawi Growth and Development Strategy and the realisation of national food security objectives. This is especially so given the fact that whilst achievement of national food security is just but one of the many objectives of the ADP, the Government considers this objective paramount among its national development priorities. The action plan therefore serves as a means to direct resources in the short to medium term to pre-identified high impact areas from a food security perspective which are also articulated by the ADP. The latter providing the overarching framework through which resources for agriculture and rural development will be mobilised.

The highly consultative formulation process of the FSAP culminated in the prioritisation of seven strategies at national level, namely:

1. Promotion of contract farming for agricultural production development (*FSP Strategy No. 3.1.1.1*).
2. Encouragement of domestic production of high quality improved varieties (*FSP Strategy No. 3.1.3.2)*.
3. Promoting the integration of livestock into smallholder farming systems (*FSP Strategy No. 3.1.9.3)*.
4. Creation of an enabling environment for private sector investment and local community participation in irrigation development (*FSP Strategy No. 3.1.2.1)*.
5. Promotion of environment, land and water management for sustainable agricultural development (Policy Statement No.3.1.7).
6. Promotion of off-farm employment opportunities through economic empowerment and Income Generating Activities (IGA) programmes (*FSP Strategy No. 4.1.2.2)*.
7. Supporting the establishment of community grain banks (*FSP Strategy No. 3.1.3.3)*.

Under each of these 7 strategies, a set of priority activities were identified. To guide implementation of each activity (either by government or its development partners), a set of Operational Guidelines (OGs) and sub-guidelines were necessary to develop and these are also presented in this Action Plan. Whilst the activities of the strategies spell out "what to do" under a given strategic objective, the OG provide more details on "how to do it" in practice. For example, the strategy to promote contract farming entails a number of activities, one of them training. The OGs (Volume II) of the Action Plan provide more specific guidance, for instance on what content such training should cover. The OGs are therefore meant to recommend best practice to all agencies on the ground implementing food security projects/programmes. These projects could be addressing one, two or several activities envisaged under one or more of the seven food security strategies prioritised at national level. The OGs set the parameters that will define the scope and depth of these programmes if they are to contribute effectively to the national food security agenda.

The Operational Guidelines also serve as benchmarks against which pipeline/on-going programmes can be assessed in terms of how well aligned they are with the Food Security Policy. For this purpose, the guidelines stipulate the minimum requirements to be achieved by projects and programmes implementing the envisaged activities under each priority strategy.

Projects or programmes will be required by Government to consult these OGs and check for compliance especially with the minimum requirements that are set for each activity. If they are not compliant, the projects should at the earliest opportunity be realigned by changing their orientation and scope to be in harmony with the Operational Guidelines Minimum Requirements (OGMR) set at national level. To assess level of compliance, an easy-to-use performance assessment grid has been defined. The project evaluation grid contains four possible ratings for a given project, namely: A; B; C; and D. Category A is the highest possible rating and represents projects meeting the OGMR and at least 90% of the sub-guidelines for a particular activity in the strategy. Category D is the lowest and is for those projects not compliant with the OGMR. A project fully compliant with OGMR but not addressing at least 90% of the sub-guidelines can be rated B or C depending on the extent to which it falls below the 90% threshold. A project will not be rated against a minimum requirement for an activity that is not part of its scope.

The purpose of the FSAP is to focus attention on the high priority strategies (themes). It provides a clear link between the strategies envisaged in the Food Security Policy, priority activities to be implemented and how they should be implemented (i.e. Operational Guidelines). The document therefore appropriately cross-references these three in the relevant sections of the report.

The FSAP has two phases for its operationalization: a) the *preparatory phase* and b) the *implementation phase*. The Preparatory Phase comprises five main steps:

a) The approval of the FSAP by the Food and Nutrition Security Joint Task Force (FNSJTF);
b) The dissemination of the Operational Guidelines to relevant national and district level stakeholders;

c) Training of district level government and non-government staff on how to use the OGs;
d) Development of an inventory of existing and pipeline food security projects/programmes; and
e) Dissemination of the Action Plan and negotiation and signing of MoUs between MoAFS and interested development partners implementing FS projects/programmes (e.g., donor partners, Project Management Units, NGOs, etc).

Training is a key element of the preparatory phase and shall target the District Agricultural Development Officers (DADO), the Monitoring and Evaluation Officers of the Ministry of Local Government and Rural Development and relevant district authorities. Operational Guidelines will remain the "living part of the Action Plan" and feedback from trainees on the practicality of using the Guidelines will be used to improve the Action Plan.

FSAP implementation will take two forms: *centralised* and *decentralised* implementation. At the centralised level, responsibility for approval of the Action Plan and steering of the course shall lie within the already established structure of the Food and Nutrition Security Joint Task Force (FNSJTF) which shall task its Food Security Policy and Programmes Committee to assume this role. Day-to-day coordination of the entire process shall lie with the Planning Department of the Ministry of Agriculture and Food Security. MoAFS shall also maintain strong interaction with Ministry of Economic Planning and Development to ensure that the FSAP is in line with priorities and orientation of the Malawi Growth and Development Strategy (MGDS) and complements other national development programmes. The Ministry will spearhead the information dissemination to raise awareness on the FSAP within government, the donor community and among Implementing Partners (IPs). Donor agencies will support the Action Plan by ensuring flexibility in programming and financing of FS projects/programmes. The aim is that future interventions should prioritise the 7 strategies in the FSAP and their design should as much as possible be drawn from the OGs so that they are in compliance with the Minimum Requirements (MR).

At the decentralised level (i.e., district or project level), the first step will be for Implementing Partners (IPs) to be trained on how to use the OGs for assessing the compliance of their projects. They will then use the OGs and re-orient activities accordingly. This will be a continuous realignment and refinement process and shall be done with the technical backstopping of MoAFS at central and district level as well as other relevant government officers working at the district level. The M&E Officer of the Ministry of Agriculture and Food Security stationed at the Agricultural Development Division (ADD) level will monitor project/programme compliance with the FSAP. In addition, the Ministry of Local Government and Rural Development (MLGRD) M&E Officer stationed at the district level shall regularly monitor the projects/programmes to assess their achievements in terms of outputs, outcomes and impacts. Once a year, the District Executive Committee will meet to review the process and reach consensus on key action points for implementing partners to address in the following year. IPs will be expected to submit as usual, periodic reports on the progress they are making and this

reporting can be mainstreamed into their existing M&E reports which they submit to the local assemblies.

This process at decentralised level will be monitored through random visits to districts and project sites by senior MoAFS and MLGRD staff from the central level. In addition, the need for a joint annual review exercise is foreseen. The Food Security Policy and Programmes Committee of the Food and Nutrition Security Joint Task Force (FNSJTF) shall review progress through review workshops which .will be organised by the MoAFS. Other key government ministries (MEPD, OPC, etc), development partners (EC, WB, NORAD etc), UN Agencies and IPs may participate in the joint verification of progress and impact achieved vis-à-vis the Food Security Action Plan agenda and the associated development outcomes at local, regional and national levels.

Further details on the roles and responsibilities of different institutions in the implementation of the Action Plan are elaborated in Chapter 5 of this report. The Ministry will be responsible for creating an enabling environment and for overall coordination and monitoring of the FSAP implementation process as well as reviewing and updating the "living part of the document" (Volume II: Operational Guidelines). MoAFS will spearhead the setting up of a national project approval system that will ensure that all new food security projects/programmes satisfy the OGMR of the FSAP prior to their approval by the government.

MoAFS through its Planning Department will also roll-out a national training programme and, later on, a series of refreshers on the use of the Project Compliance Assessment Grid (PCAG) to raise awareness and equip with relevant skills all implementing partners that have on-going or pipeline food security projects/programmes. ADD MoAFS and MLGRD district staff will also be trained for regular monitoring of project compliance, technical backstopping of projects/programmes and the evaluation of the performance of the FSAP. The district M&E Officer (under MLGRD) and the ADD M&E Officers will be the two main focal points for this M&E and technical assistance functions at district level. The DEC will review annually progress made and development results achieved so as to advise Implementing Partners on the way forward.

Volume II of the FSAP provides detailed description of the Operational Guidelines which will provide the basis for reorienting ongoing and directing pipeline projects/programmes. It is the "*living part*" of the Action Plan and shall be updated from time to time based on implementation experience and the emergence of new approaches and best practices.

1. BACKGROUND

1.1 Performance of the Agricultural Sector

Malawi has been experiencing a growing food insecurity problem and only recently this trend is being reversed. Rainfall is erratic and persistent droughts have over time eroded the capacity of poor households to produce enough food or earn sufficient income to purchase from the market. On average, over the last decade, the country has only managed to produce enough staple food to feed its population once in every three years. Food shortages at both the national and household levels have of late been exacerbated by macro-economic instability and a general stagnation of the economy. The country in the recent past relied on food imports and food aid. Currently about 10% of Malawians are chronically food insecure and are in need of long-term safety nets to sustain their livelihoods.

Although the country is endowed with a good supply of labour for agriculture, yields are low even in good rainfall years.[1] Many farmers fail to access critical inputs such as improved seed and fertilisers due to lack of capital and access to credit. When available, fertilisers are expensive due to the high freight costs. This has often persuaded the government to subsidise and target the input, although at high cost to the government's fiscal budget. A combination of growing population pressure and limited use of soil fertility management practices has resulted in perpetual land degradation, which manifests itself in declining soil fertility and therefore low yields. About 60% of households in Malawi cultivate less than one hectare of land with 25% having access to less than half a hectare. Only about 15% of smallholder farmers produce marketable surpluses. About 55% of households cannot generate any income through farming. Thus they offer their labour for cultivation of other farms on the basis of a daily wage, which earns a meagre income. Experience with these types of problems has increased the Government's commitment to ensure that the country has access to adequate supplies of food at all times to meet subsistence and commercial needs.

1.2 Food Security Situation in Malawi

1.2.1 Conceptual Issues

Food security is defined as access by all people at all times to the food needed for a healthy and active life. To achieve this goal four conditions have to be met, namely (i) ensuring adequacy of food supply or **availability**, (ii) ensuring **stability** of supply, (iii) ensuring **access** to food and (iv) ensuring the safe **utilisation** of food. These dimensions provide the framework for the FSP.

Food Availability: Malawi is increasingly unable to fulfill its growing national food need through its own food production. This lack of food availability is related to declining soil fertility, and apparent lack of capacity to introduce sustainable production-enhancing technology, including fertilizer, improved seed, and irrigation. In recent times, Malawi's food

[1] At the moment average yields range from 2,000 -3,000kgs/ha for hybrids against a potential of up to 10,000kg/ha. The average yields for the open pollinated varieties range from 1,400 – 2,000 kg/ha against a potential of 6,000 kg/ha.

crisis has signs that the country is becoming dependent on the world community to fill its food needs though international food aid donations.

Food Access: In Malawi, most households are below the poverty line,[2] and are unable to afford a minimum basket of food and non-food items. Access to food is critically dependent on income and food price movements. When the climate is unfavorable, as demonstrated in the 2001-2003 food crisis, high maize prices and low incomes can lead the country to the brink of famine, especially in the rural southern part of the country, where agricultural land holdings are too small, and the central region, where most of the country's poor are found.

Food Utilization: Poor food utilization in the form of inadequate food consumption and perhaps the dominance of bulky maize in the weaning diet contribute to the extraordinarily high proportion of children in Malawi who are severely stunted.

Stability: Natural disasters, especially, droughts over the past 15 years have eroded Malawi's household livelihood and productive assets**.** With little or no resilience to climatic, economic or social shocks, and without coping capacity, households are increasingly *vulnerable* to food insecurity. HIV/AIDS pervades the food security problem, where an estimated 14 percent of adults are affected by the disease. It negatively affects household productive capacity, decreasing agricultural labor output and increasing dependency.

[2] According to the 1998 Integrated Household Survey1, 65.3 percent of the population was poor, or roughly 6.3 million people. Within this figure, about 28.7 percent of the population were living in extreme poverty.

Box 1: Major Constraints to achieving food security in Malawi

- High levels of poverty with about 65% of the population poor
- High population density with only 0.23 hectares of land per person living in the rural areas - compared to 0.86 in neighbouring Zambia and 0.40 in Sub Saharan Africa as a whole
- Heavy dependence on rain-fed cultivation with only 18% of irrigable land under irrigation
- Land pressure is severe with average land size holding per household in of 1.2 hectares while the average land per capita is 0.33 hectares. In addition, per capita land holdings are highly skewed, with the poor holding only 0.23 hectares per capita compared to the non-poor that hold 0.42 hectares per capita (GOM and World Bank, 2006).
- Inadequate extension services with only 13 percent of agricultural households getting advice from an agricultural adviser on crop and input management thus negatively affecting the extent to which research and technology development can be disseminated, adopted and efficiently be used by smallholder farmers.
- High agriculture input prices coupled with poor agricultural credit
- Low profitability of smallholder agriculture as a result of weak links to markets, high transport costs, unsustainable farmer organizations, poor quality control and lack of market information.
- Lack of value addition in agricultural products
- High HIV/AIDS incidence of 14% of the adult population aged between 15-49 reducing the labourforce for agriculture

1.2.2 The Food Security Policy

Following a Presidential declaration of 'state of disaster' in February 2002, the Government of Malawi launched a National Food Crisis Task Force to advise government on viable mechanisms to address the food crisis and on medium-to-long-term food security strategies. The Task Force had broad-based representation consisting of government institutions, donors, civil society as well as the UN agencies. Its Technical Secretariat was also set up in the MoAFS. The period 2000-2005 thus saw the development and approval by Cabinet in July 2005 of a new Food and Nutrition Security

Policy (FNSP) for Malawi under the Food and Nutrition Security Policy and Programmes Subcommittee of the Joint Task Force (FSP&P).

When Cabinet approved the policy it decided to split it into an Agriculture and FSP under MoAFS and a Nutrition Policy under the Department of Nutrition, HIV and AIDS in the Office of the President and Cabinet. Through the Department of Nutrition, HIV and AIDS, the government has since developed a National Nutrition Policy that now awaits Cabinet approval. Furthermore, the Department has elaborated its Strategic Plan which will operationalise the National Nutrition Policy.

The MoAFS in 2005 finalised the streamlining of the food security component of the FNSP into a fully fledged FSP in line with the Cabinet Directive. Although there are projects/programmes on the ground that are implementing food security related activities, an action plan has not yet been developed. Additionally, there is need to reorient existing programmes to be in line with the policy.

Food security is not a stand-alone sector. It is best understood as an amalgam of policies designed to stimulate agricultural production, support rural livelihoods, reduce vulnerability through safety nets, and stimulate broad based economic growth. The FSP explicitly addresses all four components of food security. It seeks to: (1) increase household and national food availability of food particularly by stimulating household agricultural production through irrigation, access to fertilizer, and better access to land, (2) sustain access to food through improved rural market infrastructure and household purchasing power, (3) build proper utilization and nutrition through a variety of health and dietary service interventions, and (4) stabilize food security through better disaster management, food reserves, market interventions and surveillance and food security information systems.

The long-term goal of this policy is to significantly improve food security of the population. The goal implies increasing agricultural productivity as well as diversity and sustain agricultural growth and development. The specific objective of the FSP, is to guarantee that all men, women, boys and girls, especially under-fives in Malawi have, at all times, physical and economic access to sufficient nutritious food required to lead a healthy and active life. The concept of food security implies that:

(a) All Malawians at all times have both physical and economic access to enough nutritious food for an active, healthy life;

(b) The ways in which food is produced and distributed should be environmentally friendly and sustainable;

(c) Both the production and consumption of food are governed by social values that are just and equitable as well as moral and ethical;

(d) The ability to acquire food is ensured; and

(e) The food is obtained in a manner that upholds human dignity.

1.3 The Agricultural Development Programme (ADP)

Development strategies and policies in Malawi since independence have been heavily biased towards agricultural development but the impact of these policies has been limited. Substantial resources have been devoted to the agricultural sector for the development of both estate and smallholder agriculture. Malawi has benefited from substantial donor programmes over many years but, until very recently, has suffered from chronic food insecurity at both household and national levels. Agricultural exports have remained undiversified, with little value added.

In an effort to provide a reliable and cost-effective route out of the chronic food insecurity and dependence on food aid that has held Malawi development back over the past decade, MoAFS decided to develop the Agriculture Development Programme. The Agricultural Development Program (ADP) aims at harmonising the investment and support programs in agriculture which have the highest potential for contributing to food security and agricultural growth in the next five years. The ADP is therefore a prioritised results-oriented framework for implementing the agricultural components of the Malawi Growth and Development Strategy (MGDS), aiming at harmonized and gradually aligned investments by Government and donors.

The ADP is organised in relation to three broad areas, called priority focal areas, namely: (a) improved food security at household and national levels; (b) commercial agriculture, agro-processing and market development (c) sustainable agricultural land and water management with agricultural research & extension services and institutional development & capacity building as key support services.

The process of formulating the ADP started after the Food Security Policy was already in place but before the formulation of the FSAP. The development of the FSAP therefore took cognisance of the Agriculture Development Programme (ADP) formulation process

1.3.1 Link between Food Security Policy and ADP

The Food Security Action Plan will contribute mainly to the improved food security focal area of the ADP and also to the commercial agriculture, agro-processing and market development as well as the agricultural and water management focal areas. One of the criteria for selecting the strategies for the FSAP was consistence with the ADP such that all the 7 strategies that have been selected for implementation of the FSAP are in line with the strategic objectives of the ADP. The guidelines for implementation of the FSAP will ensure common approach to implementation of 7 strategies and will thus contribute to achievement of the strategic objectives and expected outcomes of the ADP. Also worth noting is the fact that the unlike the ADP which is an investment programme, the FSAP has been formulated in such a way that its implementation will not attract new funding, but rather will provide a foundation (Operational Guidelines) for harmonizing the implementation process of on-going and pipeline food security projects and programmes. The FSAP will also help to ensure that even projects that are not funded by major donors and are not major components of the ADP are in line with, and are contributing to the priorities of the ADP.

1.4 Food Security Action Plan

The overall objectives of the Food Security Action plan are to:

i. Assist in coordinating the FSP with the National Nutrition Policy;
ii. Enhance the collaboration between the projects and the Government both at central and district level and
iii. Ensure complementarity and support to the ADP process.

The specific objectives are:

i. Prioritize the strategies in the FSP which should be implemented immediately at ground level (in line with ADP objectives); and
ii. Develop approaches/modalities for reorienting on going projects and programmes or pipeline projects (in line with the ADP process).

2. PRIORITY STRATEGIES

2.1 Methodology for Setting Priorities

A weighted scoring method was used to prioritize the FSP strategies. It was adopted because:-

i. it is simple and can be administered in a short period of time;
ii. it is easy and all stakeholders can participate in the process;
iii. it does not, like other methods, demand a wide range of data;
iv. it is relatively transparent, which facilitates its understanding by projectors, administrators, policy-makers and stakeholders;
v. it can use quantitative as well as qualitative information; and
vi. it facilitates the weighing of multiple goals and objectives.

2.2 The Selection Criteria and Weighting

Seven criteria have been used to prioritise the FSP strategies, namely:

a. All strategic objectives in the FSP that are not covered by the ADP were not taken into the Action Plan despite their high ranking.
b. Strategies that emphasise on **livelihoods**, such as promotion of agricultural **production** (crop and livestock) (50%)
c. Strategies that promote **poverty alleviation**, by increasing the income of the poor through **employment generation**, and the increase in quantity and quality of production (20%)
d. Strategies that are within the **institutional capacity** of the different Government Ministries, **decentralised** offices and NGOs and have a good chance of success. (20%). This is more important with respect to the skills available to plan, implement, and monitor the programme activities.
e. Strategies that have a large **social and equity impact**, i.e. the ability to directly benefit a large number of chronically food insecure households (10%).
f. All nutrition activities contained in the FSP were excluded because they will be implemented through the National Nutrition Programme.

The criteria were analysed on how they impacted on the various target groups in the agricultural sector. It was acknowledged that the smallholder agricultural sector is not homogenous but comprise of farmers who can be broadly be grouped into:

- Marginal farmers and the most vulnerable (landless, women-headed households, the destitute, the elderly, orphans, the chronically ill). These are the poorest households, cultivating less than 0.5 hectares. They account for 41% of the total smallholders.
- Emerging small scale commercial farmers. These are the better off farmers who are able to produce sufficient maize for both consumption and for sale. These are emerging as commercial farmers. It is amongst this group that there is large potential to increase productivity and diversify production for the market. They account for 31% of the smallholders.
- Potential medium scale commercial farmers.

The criteria were given "weights" ranging from 1 to 5 (1 = poor and 5 = excellent) based on the Food Security Policy and Programmes Committee of the Food and Nutrition Security Joint Task Force priority rankings. The weights were then applied to each strategy, and the points earned from each criterion were summed to give each strategy a total "score". The strategies were then sorted in numerical order to indicate a preliminary priority order for the proposed strategies. All strategic objectives in the FSP that are not covered by the ADP were not taken into the Action Plan despite the fact that their strategies may have received high scores. The prioritized strategies were discussed and agreed with the key stakeholders in two stakeholder meetings. The stakeholders in considering other factors outside the set criteria elevated a few strategies into the Action Plan despite the fact that some had received lower scores. The final list of the prioritized strategies is therefore a product of a mixture of considerations and is presented below:-:

A. Improve staple food availability at household and national level

1. Promote contract farming for agricultural production development.
2. Encourage domestic production of high quality improved varieties.
3. Promote integration of livestock into smallholder farming systems.
4. Create conducive environment for private sector investment and local community participation in irrigation development.
5. Promote environment, land and water management for sustainable agricultural development.

B. Increase Food Access at Household Level

6. Promote off-farm employment opportunities through economic empowerment and IGA programmes.

C. Improve stability at national level

7. Establish community grain banks.

The Action Plan therefore focuses only on the first seven prioritized strategies. A list of the prioritized strategies and their scoring are presented in Table 1 below. Annex 1 provides a detailed list of all strategies that were assessed for prioritization and a complete ranking of all FSP strategies.

Table 1: Ranking of selected strategies

Strategy	**Score**
Encourage/promote domestic production of high quality improved varieties	**4.6**
Promote off-farm employment opportunities through econ. Programs and IGAs	**4.6**
Encourage/Promote integration of livestock into smallholder farming systems	**4.5**
Promote environmental and land management for the sustainable agriculture development	**4.2**
Promote contract faming for agricultural production development	**4.0**
Create conducive environment for private sector investment and local community participation	**3.4**

in irrigation development	
Promote community grain banks for easy access and sustainability	**3.1**

3. OPERATIONAL GUIDELINES FOR IMPLEMENTING THE PRIORITISED STRATEGIES

3.1 Rationale for introducing Operational Guidelines

Currently there is diversity of food security and nutrition projects/programmes country-wide and some are in the pipeline. These projects are financed through different sources of funding and some of the financiers are not even represented in Malawi. However, these projects/programmes largely implement activities without systemized and coordinated approaches in the delivery of services. This poses a challenge to the MoAFS to monitor the implementation process as well as assess the extent to which the activities being implemented are in tandem with the FSP. Such uncoordinated implementation of food security projects has compromised on their impact on food security at household and national level. In order to systemize and harmonize project delivery approaches Operational Guidelines or 'Reference Standards' have been developed during the process of formulating the Action Plan. *Minimum requirements* have also been defined in the Operational Guidelines and these are basic or primary interventions that projects/programmes have to implement in order to bring positive change in the targeted community.

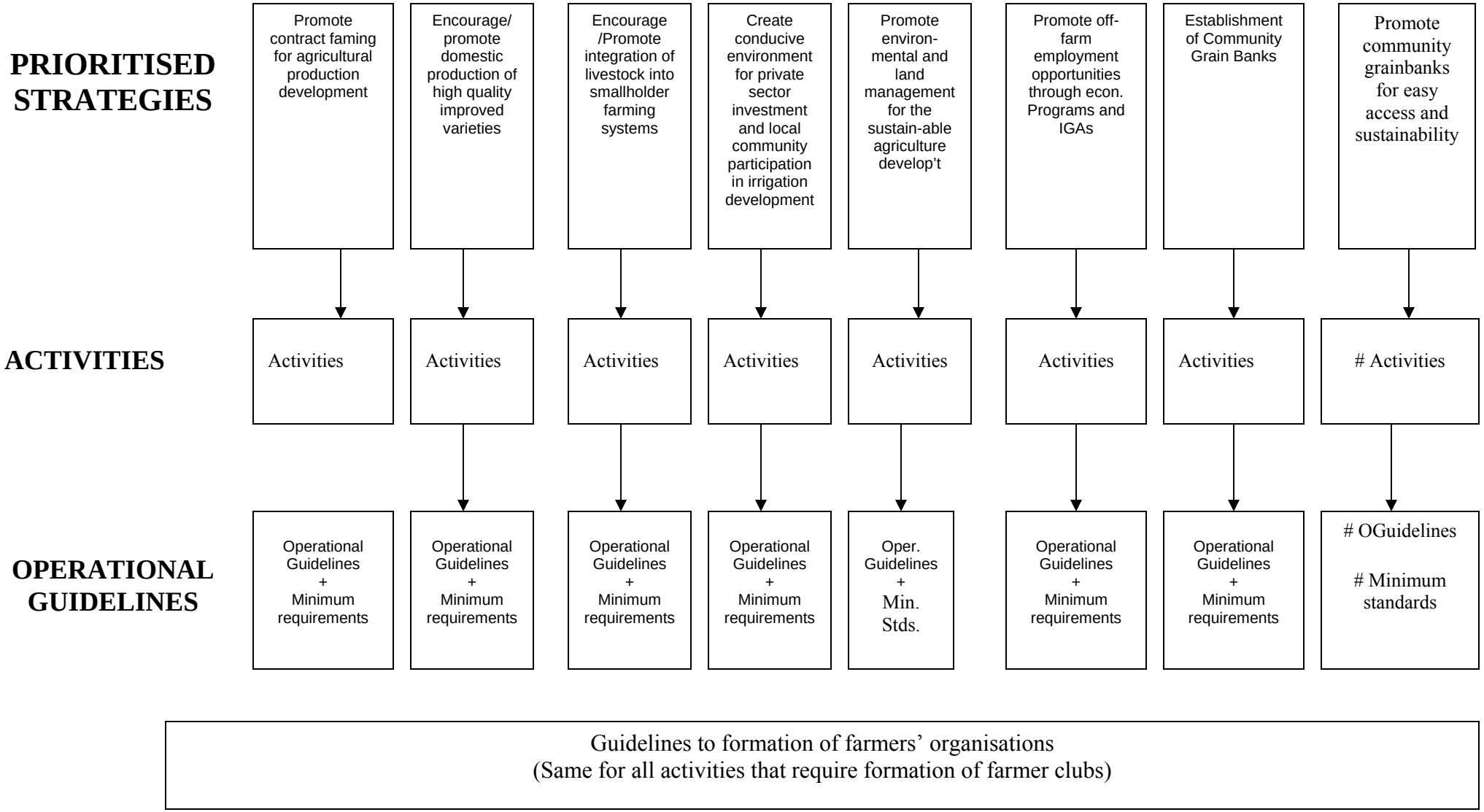
The ***minimum requirements*** identified for each component in the Operational Guidelines and are presented in **Volume II.**

3.2 Specific purpose of the Operational Guidelines

Operational Guidelines have been developed initially for the **Seven** prioritized strategies. The Operational Guidelines provide 'Reference Standards' to enable the implementation of projects/programmes in a harmonized manner. The OGs have been developed to serve as a manual or technical resource to organisations designing and implementing food security interventions. To achieve this objective, a lot of literature has been reviewed and a number of specialists on the various subjects covered have been consulted. The OGs are technical in nature and hence much effort was made to draw on already established guidelines or manuals for agronomic practice or recent lessons learnt from practical experience of IPs. For example much of the OGs on crop production are derived from the MoAFS Guide to Agricultural Production whilst much of the content on Grain Banks, which is a relatively new field has been taken from the documented experience of IPs working on that subject in Malawi and other regions in Africa. The OGs are an attempt to sufficiently cover various important aspects that would contribute to the achievement of the objectives of each strategy. They are therefore meant to serve as much as possible as a complete picture of activities that a project should undertake in order to be effective in this endeavour to contribute to achievement of food security objectives.

The Operational Guidelines have a dual purpose: a) to guide pipeline projects that target interventions in a particular sub-sector, and b) to enable existing projects/programmes align their interventions with the FSP that is in line with the ADP framework. It is envisaged that in future all projects/programmes will follow a unified approach in the implementation of activities in a particular sub-sector. The Operational Guidelines have been premised on documented best practices and consultations with the MoAFS and other project implementers. Figure 1 below illustrates the connection between the strategies, activities and operational guidelines

FIGURE 1: STRUCTURE OF FOOD SECURITY ACTION PLAN



3.3 Application of the Operational Guidelines to Improve FS Interventions

3.3.1 General application of Operational Guidelines

The Operational Guidelines elaborated in Volume II of this Action Plan are designed to be freely accessed and used by any food security project or programme that is supporting any of the seven FSAP strategies. They are intended to serve as a handbook or technical resource for ideas on the best approaches and ideal project/programme content. In reality the Operational Guidelines (OGs) are about "how to" implement a specific intervention. They define either the basic ingredients (components or content of activities for a particular intervention) or the step-by-step process to be followed or criteria for evaluation of specific options (e.g., technologies) at project design stage. The OGs can also serve simply as a menu of options.

Up-coming projects shall use the OGs as the first point of verification whether their proposed activities, approaches or technologies match with government priorities in the food security field. The OGs can therefore be viewed as a tool to benchmark requirements in terms of the design and implementation of food security initiatives in Malawi. Government, donors and Civil Society Organisations (CSOs) will also use these Operational Guidelines as a means for channeling public resources to high impact interventions in the food security sector.

For on-going projects/programmes, the unveiling of Operational Guidelines for the seven priority food security strategies provides an opportunity for IPs to reflect upon the adequacy of design and performance of their own programmes and revisit the content and approaches if necessary. Whilst in the past projects would be reviewed without a common reference point, the OGs can actually now serve as the benchmark against which the quality of all food security projects can be assessed and standardized.

3.3.2 OGs as a tool for systematic assessment and monitoring of project alignment with FSAP

3.3.2.1 The project grading system

Together with these OGs, a project grading system has been introduced. The ultimate aim is to: a) systematically categorise/grade individual food security projects/programmes at the district level to ascertain the degree of re-alignment required to comply with the Action Plan; and b) monitor the re-orientation process at district level to ensure the projects/programmes have a harmonised and synergetic approach to the implementation of food security activities at community level.

Projects/programmes will be required to meet *minimum requirements* as starting points in a targeted food security sub-sector. To determine the degree of reorientation required, the grading system rates projects/programmes according to the level of compliance with the minimum requirements as well as other technical requirements. A 4 point rating scale is used: A – D using criteria summarised in the following table.

Table 2: Criteria for Categorizing Projects/Programmes

RATING	PERFORMANCE STANDARD ACHIEVED
Category **A**	Project meets *minimum requirements* and achieves Overall Score of at least 90% for compliance with the Technical Guidelines. **Requires minimum re-orientation.**
Category **B**	Project meets *minimum requirements* and achieves Overall Score of greater than or equal to 70% but less than 90% for compliance with the Technical Guidelines. **Requires some orientation in specified areas.**
Category **C**	Project meets *minimum requirements* and achieves Overall Score of greater than or equal to 40% but less than 70% for compliance with the Technical Guidelines. **Requires a higher degree of orientation than B.**
Category **D**	Project doesn't meet the *minimum requirements* or Overall Score is less than 40%. **This project requires fundamental adjustment.**

Each project is assessed and given points up to a maximum of 100 points (or 100%). The percentage is a simple summation of two scores: Score 1 (maximum 39 points) being earned by achieving the minimum requirements and Score 2 (maximum 61 points) being earned according to the degree of compliance with the other Operational Guidelines. Scores 1 and 2 are calculated by simple algebra as follows:

*Score 1 = number of minimum requirements achieved /total number of minimum requirements * 39%.*

*Score 2=number of other guidelines achieved /total number of other guidelines * 61%.*

If a project meets all minimum requirements it automatically gets 39% for Score 1, if half of minimum requirements are achieved, then half of the maximum possible score (i.e., 19.5%) is also earned.

Similarly, if a project complies with all other guidelines it is awarded full points (61%) under Score 2. A project that meets minimum requirements (Score 1 = 39%) and also all other remaining operational guidelines (Score 2 = 61%) will get an Aggregate Score of 100%, (i.e., Score 1 + Score 2 = 39%+61%=100%).

This overall score is the one used to rate projects on the 4 point rating scale. The higher the overall score implies the higher the degree of congruence between the project design and the ideal design which is described in the Operational Guidelines. The lower the score the greater the variance between a project and the ideal project scope as defined by the FS Action Plan.

The degree of variance with the Operational Guidelines will determine the rating/categorization of a particular project, with those rated "A" being relatively well aligned with the FSAP whilst those in category "D" being far from meeting even the basic minimum requirements. For example, a project categorized as A would be in compliance with the minimum requirements and, in addition, would also be

implementing other interventions identified in the Operational Guidelines for the sub-sector. Such a project would have earned a total score of 90% and above. The degree of re-orientation required would be minimal. A project that meets minimum requirements and some of the other technical guidelines and obtains an overall score between 70-89.9% is rated Category "B".

However, projects that do not comply with the minimum requirements set for the sub-sector will automatically be rated "D" as they are missing the most critical components and thus need substantial reorientation. They are automatically rated "D" regardless of the total score they achieve. The same applies to projects that comply with the minimum requirements (Score 1 = 39%) points) but miss all other operational guidelines (Score 2 = 0%). Their total score is 39% and are rated "D".

Projects will be required to comply with only those minimum requirements applicable to their core-business. The rating system is therefore not punitive of highly specialised projects which concentrate only on a few subjects within a given sub-sector. A good example is a project involved in the promotion of dairy production. The project may not be interested in promoting the processing of dairy products. Hence a project will not necessarily be graded D if it fails to satisfy minimum guidelines on dairy processing. However, over time, capacity building of IPs that will be carried out through the support and coordination of MoAFS may eventually see more IPs being interested to incorporate a component on dairy processing in their project design. Once the project starts implementing activities to promote dairy processing, the minimum requirements for dairy processing will then become applicable.

A project/programme that does not meet the minimum requirements, and therefore automatically downgraded to category D, will need substantial revision to align with the operational guidelines. Such projects are likely to be under-performing in any case and the respective IPs will be looking for options to strengthen their interventions, including substantial revision to the mix of activities. This re-orientation will thus be in the interest of both the IP and funding agencies, on the one hand, and communities on the other, to achieve development results. However, some IPs may not be conversant with the other activities identified in the Operational Guidelines as these will be totally new areas where the organisation will be venturing into. For this reason, MoAFS will put up a comprehensive orientation programme to build capacities of IPs in new areas identified in the Operational Guidelines.

Pipeline projects will be encouraged to incorporate the minimum requirements at project design stage such that the costs associated, say, with training and exposure for activities that may be considered new territories can be incorporated into the budgets of the new programmes.

3.3.2.2 Applying the project grading system in practice

Testing and refining the methodology further

During the design of the grading system a few projects were sampled to test a number of options. The final rating system above is not cast in stone. The practicality of using the

technique will be ascertained and any further refinements necessary made during the dissemination phase of the FSAP. During that phase, potential users of the methodology will put it to test and come up with suggestions for further refinement of the methodology.

It should be noted that essentially, the grading methodology has been developed for production-oriented rather than service-oriented food security interventions. The latter would need a different approach. For example, contract farming is a transaction between the contractor and farmers or farmer associations. A project/programme can only play a facilitating role such as building the capacity of farmers to undertake the contract in an informed manner or in supplying relevant information to facilitate the transaction rather than being fully responsible for the transaction. A modified approach is therefore necessary for service-related projects/programmes. This would involve negotiations with projects/programmes to facilitate services delivery that are deemed necessary to increase the productivity and incomes of smallholder farmers. Grading of such services would pose challenges because the projects/programmes may not be providing the services under the current term and this can only be achieved through MoUs to undertake such interventions. In this case projects should just be assessed on activities which are relevant to their scope.

Steps to be followed in grading projects

The grading system focuses on three critical elements of the FSAP: (1) the strategy being supported by the project (i.e., out of the 8 FSAP strategies, one or two or more strategies could be identified that are relevant to the project); (2) the activity or activities under the strategy which match the project type; and (3) the Operational Guidelines for that activity (or a number of activities) which spell out the minimum requirements in terms of project scope.

Accepting these as the three key elements guiding the grading system, the following generic steps are proposed to guide IPs when assessing compliance with the FSAP.

Step 1: Confirm the sector under which the project's activities belong

The first step would be to determine which sector (food security; nutrition; health; etc) a particular project falls under. This can be done by examining the statement of the "overall objective" of the project in its logical framework matrix. A fundamental assumption is that each project will have a well articulated log-frame with statements on "goal" or "overall objective" clearly spelt out.

Step 2: Confirm the FSP strategy to which the particular project is contributing

If the sector of the project is food security, the second step shall entail identifying the strategy out of the 8 identified in the FSAP, which the project concerned is supporting. As an example, the strategy could be to "promote contract farming". The strategy can easily be deduced from the wording of the "project purpose" again in the project's logical framework matrix.

Step 3: Identify the main activities sponsored by the project and the matching FSAP Operational Guidelines

The main activities of the project should be detailed in the log-frame or elsewhere in the main body of text of the project design document of the particular project. What is critical at this stage is to find out which activities identified in the FSAP under a particular strategy match those the project is undertaking. At this stage the objective is not to rate the extent of congruence. It is the subject of the grading system. At this stage, emphasis is on establishing activities and whether they correspond to the general areas emphasised by the FSAP. For example a project promoting Contract Farming, interest may be in establishing whether the project has a farmer training component; farmer training being one of the core activities identified by the FSAP and for which operational guidelines have been developed. The objective of stage 3 is not to rate how well the project articulates the strategies of the FSAP because this is the objective of Step 4 below. Step 3 is interested in identifying the main activities sponsored by the project and the matching FSAP Operational Guidelines.

Step 4: Rating the level of compliance of a project to FSAP minimum requirements

Having identified the main activities of the project, more in-depth scrutiny of each activity is made in step 4. A closer analysis of the content and type of interventions under a particular activity is done and this is contrasted with the minimum requirements as defined in the FSAP. For some guidelines, discussions with the project staff and verification through documents will be adequate . As explained ealier in some cases a field visit (FV) to verify the type of interventions and how they are being implemented will be necessary and this will involve discussions with the beneficiaries and even physical verification of existence of certain features..

As discussed above, projects that meet all the minimum requirements for their core activities are rated either A, B or C depending on the degree of alignment with other operational guidelines which may not be minimum requirements. Those rated A must meet the minimum requirements as well as attain an aggregate score of at least 90%. Those rated B meet the minimum requirements plus achieve an aggregate score of 70-89.9%. Projects that meet minimum requirements and achieve an overall score of 40-69.9% are rated "C". Those that meet minimum requirements but fail to reach an overall score of at least 40% are rated "D". Similarly, projects whose core activities miss any one of the minimum operational guidelines are automatically rated "D" irrespective of how well they cover other guidelines/sub-guidelines (that is irrespective of their overall score).

Example 1: Grading a project addressing a single theme

An example to illustrate how a project concentrating on one theme ("Dairy Production") can be graded using this systems is presented in Table 2.

Table 3: An example of project grading using Operational Guidelines (for project promoting dairy production)

Operational Guidelines Activities	Operational Guidelines Minimum Requirements	Project 1 Missing all minimum requirements	Project 2 Meeting all requirements	Project 3 Meeting all minimum requirements	Project 4 Meeting all minimum requirements	Project 5 Meeting minimum requirements only	Project 6 Missing one of the minimum requirements
1. Promote formation of milk bulking groups	√		√	√	√	√	
2. Facilitate farmer' access to dairy animals of approved improved breeds	√		√	√	√	√	√
3. Encourage farmers to keep a minimum of 2 dairy animals			√	√	√		√
4. Encourage farmers to construct a standard khola	√		√	√	√	√	√
5. Encourage farmers to establish pasture		√	√	√	√		√
6. Encourage farmers to feed the animals both roughage and concentrates		√	√	√	√		
7. Encourage farmers to milk the cows twice/day		√	√	√	√		√
8. Encourage farmers to clean utensils before milking and check for mastitis		√	√		√		√
9. Encourage farmers to apply acaricides regularly		√	√		√		
10. Promote milk processing		√	√				
11. Link farmers to markets		√	√				
Overall Score (=Score 1+Score 2)		(0%+53%) **=53%**	(39%+61%) =**100%**	(39%+30.5%) **=69.5%**	(39%+46%) **=85%**	(39%+0%) **=39%**	(26%+30.5%) **=56.5%**
Grading/Rating		D	A	C	B	D	D

Dairy Farming has 11 OGs in total, 3 of which constitute the minimum requirements, namely:

i. Promote formation of milk bulking groups;
ii. Facilitate farmer' access to dairy animals of approved improved breeds; and
iii. Encourage farmers to construct a standard khola.

Despite achieving an overall score of 53%, Project 1 is automatically rated "D" for non-compliance with the minimum requirements. Project 2 is graded "A" for full compliance (all minimum requirements and all other guidelines), Overall Score is 100%. Project 3 is rated "C" for achieving minimum requirements (Score 1=39%) and for meeting 4 of the remaining 8 OGs (Score 2=4/8*61%=30.5%) thus yielding an overall score of 69.5%.

Project 4 is rated "B" for meeting all the minimum requirements (score 1=39%) and 46% for the other guidelines thus attaining an overall score of 85% (39%+46%). Project 5 although it meets all the minimum requirements (score 1=39%) it falls into category "D" because its Overall Score is below the 40% threshold to qualify into Category "C". Project 6 although it achieved a score of 56.5% (Score1 26% + Score2 30.5%) it is rated "D" for failure to fulfil one of the OGs which is a minimum standard.

Example 2: Grading a project addressing multiple strategies/themes

If a project is addressing more than one strategy or theme e.g. an integrated rural development project, usually the project activities will be divided into components or sub-projects each addressing a particular strategy or theme (e.g., promoting dairy farming; supporting village grain banks; and promoting horticulture production). First go through Stages 1 to 4 above. Then calculate Scores 1 and 2 for all components to get an Average Overall Score for the entire project. Give an overall rating (A-D) depending on the Average Overall Score. The minimum standard rule also applies to the Average Overall Score (projects that do not meet any of the minimum requirements for any of the activities will be rated D) regardless of the percentage point.

Table 3 provides an example on how to calculate an overall grade for a project using Project 3 above and assuming that the project is, in additional to dairy production, promoting village grain banks and also promoting production of high quality tomatoes.

As already mentioned, to rate this multiple-theme project, first go through Steps 1- 4 for all the three project components. Calculate the average percentage for all the components. Determine the grade (A-D). If there is any component in which the project did not meet the minimum requirement the overall grade will be D regardless of the percentage.

Table 4: Example of how to calculate an overall grade for a multi-component/activity project

Operational Guidelines	Minimum Requirement	Project Performance
Project		
Diary production		
Promote formation of milk	√	√

Operational Guidelines	Minimum Requirement	Project Performance
bulking groups		
Facilitate farmer' access to dairy animals of approved improved breeds	√	√
Encourage farmers to keep a minimum of 2 dairy animals		√
Encourage farmers to construct a standard khola	√	√
Encourage farmers to establish pasture		√
Encourage farmers to feed the animals both roughage and concentrates		√
Encourage farmers to milk the cows twice/day		√
Encourage farmers to clean utensils before milking and check for mastitis		√
Encourage farmers to apply acaricides regularly		√
Promote milk processing		
Link farmers to markets		
Percentage		**(39%+45) 84%**
Rating		**B**
Village grain banks		
1. Conduct needs assessment		
2. Conduct awareness meetings on the need for a community grain bank in the area. Spell out the benefits of the community banks		√
3. Facilitate the identification of a location of community grain bank		√
4. Facilitate the election of a grain bank committee	√	√
5. Facilitate the election of a grain bank committee	√	√
6. Train grain bank committees in grain bank management	√	√
7. Select an appropriate storage facility		√
8. Construct the storage facility		√

Operational Guidelines	Minimum Requirement	Project Performance
9. Facilitate the opening of a bank account		
10. Support grain purchases		
11. Encourage pest control		
12. Encourage the committee to sell grain during the lean period		
13. Encourage Annual Review of grain bank operations and reconciliation of records		
Percentage		**(39%+22%) 61%**
Rating		**C**
Encourage domestic production of high quality tomatoes		
1. Encourage farmers to join vegetable producers clubs		√
2. Train farmers in nursery establishment		√
3. Promote early field preparation and timely planting.		√
4. Compost manure	√	
5. Encourage farmers to follow recommended planting technology to achieve optimum plant population.		
6. Promote use of improved and high quality varieties.	√	√
7. Encourage farmers to use fertilizer.		√
8. Encourage farmers to control pests and promote IPM		√
9. Encourage timely harvesting.		
10. Link farmers to markets	√	
Percentage		**52% (0%+52%)**
Rating		**D**

Operational Guidelines	Minimum Requirement	Project Performance
Overall grade/Rating		
Dairy production	84	B
Village grain Banks	61	C
Tomato production	52	D
Overall Score and Rating	**66%**	**D**

3.3.2.3 Projects to be graded

The starting point for identifying projects/programmes to be considered for re-orientation should be a desk-review/screening of the projects/programmes in the food security database using four main criteria:-

a) All projects/programmes that do not fall directly within the Food Security Policy should be screened out.

b) Projects/programmes with less than US $200,000 total funding should also be left out because they are too small and would possibly not need to reorient.

c) Projects/programmes that will phase out in 2007 or 2008 should also be left out since at the margin the benefits of orienting a phasing out project may not be sufficiently large to justify the additional cost introduced by the exercise.

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d) All nutrition projects/programmes should be left out as these are to be implemented under the Nutrition Policy.

All other projects regardless of whether they quality according to the above criteria will still be required to submit monitoring information to the Department of Planning Services using existing information systems.

4. FOOD SECURITY STRATEGIES AND ACTIVITIES

4. 1 Promote Contract farming for agricultural production development (FSP Priority Strategy No. 3.1.1.1)

4.1.1 Background

Contract Farming is defined as an agreement between farmers and processing and/or marketing firms for the supply and production of agricultural products under forward agreements, frequently under predetermined prices. The arrangement involves the purchaser providing a degree of production support through, for example, the supply of inputs and the provision of technical advice. The basis for such arrangements is a commitment on the part of the farmer to provide a specific commodity in quantities and at quality requirements determined by the purchaser and a commitment on the part of the contractor to support the farmer's production and to purchase the commodity at an agreed price.

Smallholders may enter contracts to reduce transaction costs of accessing new markets, borrowing, managing risk, acquiring information or increasing employment opportunities. The success of contracts reflects both the contracting environment and management practices. The contracting environment includes the strength of markets for contracted output, government macro policies, technical sophistication in production and attenuation of land ownership while important management elements are farm groups, selection of participants for contracts, managing contract default and conflict resolution.

Direct benefits from contracting that accrue to smallholder farmers include improved access to markets and improved technology, better management of risk and opportunities for employment of family members. Indirect benefits occur from empowerment of women and increased commercial acumen on the part of smallholders. Contract farming has the potential to improve the welfare of smallholders; however it is not a sufficient condition for such improvement. Smaller farmers can be excluded from contracts because of selection bias by agribusiness firms through awarding contracts to larger farms. Smallholder farmers can also be adversely affected by the second-round effects of contracts on incomes and prices and suffer from narrowing of markets that lie outside of contracts. Institutional developments that might ameliorate this type of exclusion are anti-trust legislation, policies to directly improve the contracting environment, policies to address specific problems smallholders face in entering contracts and participation by NGOs in contract facilitation.

A pre-requisite for contract farming is the organisation of smallholders into farmer associations, sufficient literacy among farmers to be able to read contract terms, good access to information, sound negotiation skills and an enabling policy and legislative environment. Farmers, through better organisation, have a greater potential to identify buyers for their produce and arrange for delivery to markets. This, however, requires strong extension service support in a number of subject areas: (i) identifying buyers and

providing information on product prices, terms and conditions; (ii) organising farmers to sell produce to buyers or market centres; (iii) organising farmers to assemble their produce in a central location, to make it attractive for buyers to visit the farming community.

4.1.2 Constraints

i. Uncoordinated production
ii. Lack of contract negotiation skills among farmers causing either exploitation of farmers or high transaction costs on the part of the agribusiness partners
iii. Lack of access to information on contract farming opportunities
iv. Illiteracy
v. Absence of clear policy and legislative framework regarding contract farming, and limited awareness of what frameworks exist
vi. Default risk either by farmers or agribusiness concerns (due to natural disasters; macroeconomic risk or just poor business practices by either party)

4.1.3 Activities

4.1.3.1 Promote coordinated crop and livestock production [Operational Guideline 1.1]

i. Identify suitable production areas [*Operational Guideline 1.. (i)*].
ii. Select the farmers [*Operational Guideline 1.1(ii)*].
iii. Facilitate the Formation of Farmers Associations/Clubs [*Operational Guideline 1.1(iii)*].

4.1.3.2 Train farmers on different topics. [Operational Guideline 1.2]

i. Benefits of contract farming [Operational Guideline 1.2(i)]
ii. Establishing terms of agreement [Operational Guideline 1.2(ii)]
iii. Researching the other party [Operational Guideline 1.2 (iii)]
iv. Preparing for an agreement [Operational Guideline 1.2.(iv)]
v. Conducting a negotiation [Operational Guideline1.2(v)]

4.1.3.3 Promote adult literacy training [Operational Guideline 1.3]

4.1.3.5 Link farmers to providers of legal services to prepare them for recourse in the event of breach of contract by agribusiness partners sponsoring CF [Operational Guideline 1.4]

4.1.3.5 Link farmers to public and private agribusiness partners [*Operational Guideline 1.5.]*

i. Develop inventory of organisations (public and private) with interest in sponsoring contract farming [*Operational Guideline 1.5.(i)]*
ii. Develop screening criteria for farming enterprises [*Operational Guideline 1.5(ii)*].
iii. Develop screening criteria for agribusiness organisations to select the most beneficial to the category of farmers targeted. [*Operational Guideline 1.5 (iii)*].
iv. Organise exchange visits to allow farmers entering into CF to learn from peers with some experience in contract farming. [*Operational Guideline 1.5 (iv))*].

v. Facilitate farmer organisation linkages with relevant information providers eg IDEAA, FUM, Agribusiness Officers, Chamber of commerce, and NASFAM to share information [*Operational Guideline 1.5.(v)*]

4.1.3.6 Promote disaster risk insurance for crop and livestock commodities [Operational Guideline 1.6]

4.2 Encourage domestic production of high quality improved varieties (FSP Priority Strategy No. 3.1.3.2)

4.2.1 Background: Production of Field Crops

Household food security in Malawi is usually equated with maize-dominated production system, which is characterized by low and stagnant maize yields. Average maize yields on smallholder farms has remained below 1000 kg/ha for over a decade and this has been influenced by dependence on rain fed farming and low level of irrigation development, limited crop diversification, declining soil fertility, and overall poor agricultural practices. Other factors contributing to low agricultural productivity include weak extension services, inaccessibility to improved production technologies, HIV/AIDS pandemic, weak linkages to input and output markets and post harvest losses. To enhance smallholder agricultural productivity there is need to intensify and diversify household level production systems, improve farmers' access to productive technologies (fertilizer and improved seed varieties) and extension services, improve farmers' access to markets, and improve management of land and water resources for environmental sustainability.

4.2.1.1 Maize

Maize is the staple food in Malawi and is grown throughout the country under rain fed and irrigation conditions. As a staple food, farmers should be encouraged to sell only surplus maize to ensure adequate stocks for household needs up to the next harvest. The national aim is to attain and maintain self-sufficiency in maize requirements at national and household level.

4.2.1.1.1 Constraints

The main constraint to maize production is low productivity due to dependence on rain fed farming and low level of irrigation development, inaccessibility to improved production technologies such as improved OPV and hybrid seed varieties, poor crop husbandry practices, declining soil fertility and limited use of soil fertility improving technologies such as manure and fertilizers, post harvest losses and weak linkages to markets.

4.2.1.1.2 Activities

4.2.1.1.2.1 Provide technical assistance to ensure high productivity of maize

i. Encourage early field preparation and timely planting [Operational *Guideline 2.1.1 (i)]*
ii. Encourage farmers to follow recommended planting technology to achieve optimal plant population [*Operational Guideline 2.1.1 (ii)]*.
iii. Promote use of improved and high quality seed [*Operational Guideline 2.1.1.(iii)]*.
iv. Encourage farmers to use manure *[Operational Guidelines 2.1.1 (iv)]*.
v. Encourage farmers to use fertilizer *[Operational Guidelines 2.1.1(v)]*
vi. Encourage farmers to control pests and promote IPM [*Operational Guideline 2.1.1. (vi)*
vii. Encourage timely harvesting [*Operational Guideline 2.1.1(vii)]*
viii. Encourage use of good storage facilities [*Operational Guideline 2.1.1 (viii*)].

4.2.1.1.2.2 Improve access to high quality hybrid maize seed and fertilizer

i) Promote access to credit to finance purchase of OPV/Hybrid seeds [Operational Guideline 2.1.2 (i)]
ii) Promote crop diversification [Operational Guidelines 2.1.2(ii) and 2.6.2]
iii) Improve access to OPV maize seed through community seed multiplication [Operational Guidelines 2.1.2 (iii) and 2.6.2]

4.2.1.2 Rice

Rice is one of the many cereals grown along the lakeshore, Phalombe Plain, Shire Valley and areas around Lake Chirwa and is grown either under irrigation or rain fed conditions. Small quantities of rice are also produced in upland areas. The national aim is to increase paddy yields per unit area under irrigation and also increase both the yield and area of rainfed rice to meet both the domestic and export demand.

4.2.1.2.1 Constraints

Rice production is mainly constrained by factors such as use of low yielding seed varieties, poor husbandry practices, limited use of fertilizer to increase yield, poor water control and management, poor storage facilities, limited processing to add value and poor linkages to markets.

4.2.1.2.2 Activities

4.2.1.2.2.1 Provide technical assistance to ensure high productivity of rice

i. Encourage early nursery preparation and sowing [*Operational Guideline 2.2.1 (i)]*
ii. Encourage early field preparation and timely planting [*Operational Guideline 2..2.1 (ii)]*.
iii. Encourage farmers to follow recommended planting technology to achieve optimal plant population. [*Operational Guideline 2.2.1 (iii)]*
iv. Promote use of improved and high quality seed [*Operational Guideline 2.2.1 (iv)]*
v. Encourage efficient water use, control and management [*Operational Guideline 2.2.1 (v)]*.

vi. Encourage farmers to use fertilizer [*Operational Guideline 2..2.1 (vi)]*
vii. Encourage farmers to control pests by promoting IPM *[Operational Guideline vii) and 2.1.1 (vi)*]
viii. Encourage timely harvesting [*Operational Guideline 2.2.1 (viii)]*
ix. Encourage use of good storage facilities [*Operational Guideline 2..2.1 (ix)]*
x. Encourage rice processing/milling [*Operational Guideline 2..2.1 (x)]*
xi. Link farmers to markets [*Operational Guideline .21.1(xi)]*

4.2.1.3 Cassava

Cassava is the food crop in the lakeshore areas of Nkhota-Kota, Nkhata- Bay, Rumphi and Karonga. In some districts such as Mzimba, Kasungu, Lilongwe, Dedza, Dowa, Machinga, and Mulanje cassava is increasingly becoming a major cash crop. It is also grown in other parts of Malawi as a food security crop. The main advantage of growing cassava is that it is drought tolerant, its ability to yield well on marginal soils, it is tolerant to pests and diseases, requires minimum labour, has low yield fluctuations compared to grains, and its leaves are used as relish. The national aim is to increase yield and production in all areas.

4.2.1.3.1 Constraints

Cassava production is mainly constrained by limited use of improved varieties, poor husbandry practices including pest and disease incidence, lack of processing to add value and poor linkages to markets for processed cassava products.

4.2.1.3.2 Activities

4.2.1.3.2.1 Provide technical assistance to ensure high productivity of cassava

i. Promote early field preparation and timely planting [*Operational Guideline 2.3.1 (i)*]
ii. Encourage farmers to follow recommended planting technology to achieve optimal plant population [*Operational Guideline 2.3.1 (ii)*]
iii. Promote use of improved and high quality planting material [*Operational Guideline 2.3.1 (iii)*]
iv. Encourage farmers to control pests and promote IPM [*Operational Guidelines 2.3.1 (iv) and 2.1.1(vi)*]
v. Encourage timely harvesting [*Operational Guideline 2.3.1 (v)*]
vi. Encourage cassava processing [*Operational Guideline 2.3.1 (vi)*]
vii. Encourage use of good storage facilities [*Operational Guideline 2. 3.1 (vii)*]

viii. Link farmers to markets for processed cassava [*Operational Guideline 2.2..1 (viii)*]

4.2.1.3.2.2 Increase access to improved cassava varieties

i. Conduct community awareness [*Operational Guideline 2.3.2 (i)]*.

ii. Facilitate the formation of farmers groups [*Operational Guideline 2.3.2 (ii)]*

iii. Build the capacity of the group in nursery management [*Operational Guideline 2.3.2 (iii)]*.

iv. Provide improved high quality, clean and disease-free planting material [*Operational Guideline 2.3.2 (iv)]*.

v. Provide technical assistance during the development phase of community nurseries *[Operational Guideline 2.3.2 (v)]*.

vi. Encourage the groups to distribute planting material to other community members for free and for sale *[Operational Guideline 2.3.2 (vi)]*.

4.2.1.4 Sweet Potato

Sweet potato is widely grown in the country as a food security and cash crop and is often eaten as a snack. Leaves of sweet potato are used as relish and are a good source of vitamin A and protein. The national aim is to increase yield and production throughout the country.

4.2.1.4.1 Constraints

Poor husbandry, lack of appropriate storage technology and use of unimproved varieties are the main constraints for sweet potato production.

4.2.1.4.2 Activities

4.2.1.4.2.1 Provide technical assistance to ensure high productivity of sweet potato

i. Promote early field preparation and timely planting [*Operational Guideline 2.4.1 (i).*

ii. Encourage farmers to follow recommended planting technology to achieve optimal plant population [*Operational Guideline 2.4.1 (ii)]*.

iii. Promote use of improved and high quality planting material [*Operational Guideline 2.4.1 (iii)].*

iv. Encourage farmers to control pests and promote IPM [*Operational Guideline* 2.4.1 (iv) and 2.1.1(vi)]

v. Encourage timely harvesting. [*Operational Guideline 2.4.*1 (v)

vi. Encourage use of good storage facilities [*Operational Guideline 2.4.1 (vi)*]

vii. Link farmers to markets for processed cassava [*Operational Guideline 2.2.1 (xi)*]

4.2.1.4.2.2 Increase access to improved sweet potato varieties

i. Conduct community awareness [*Operational Guideline 2.3.2 (i)]*.
ii. Facilitate the formation of farmers groups [*Operational Guideline 2.3.2 (ii)]*.
iii. Build the capacity of the group in nursery management [*Operational Guideline 2.3.2 (iii)]*.
iv. Provide improved high quality, clean and disease-free planting material [*Operational Guideline 2.3.2 (iv)]*.
v. Provide technical assistance during the development phase of community nurseries [*Operational Guideline 2.3.2 (v)]*.
vi. Encourage the groups to distribute planting material to other community members for free and for sale [*Operational Guideline 2.3.2 (vi)]*.
vii. Provide technical assistance as required [*Operational Guidelines 2.4.1.(i) to (vii)]*.

4.2.1.5 European Potato

European potato locally known as *kachewere* grows successfully in areas of high altitude, which have a cool climate and high rainfall. These areas include Tsangano, Dedza, Ntcheu, Neno, Shire Highlands, Viphya plateau, Ntchisi, Phoka, and Misuku Hills. In these areas it is an important cash and food crop. The national aim is to improve yields and increase production to meet the national demand.

4.2.1.5.1 Constraints

The main constraints are use of unimproved varieties, poor husbandry practices, low fertilizer usage, pests and disease incidence and poor linkages to markets.

4.2.1.5.2 Activities

4.2.1.5.2.1 Provide technical assistance to ensure high productivity of European potato

i. Promote early field preparation and timely planting [*Operational Guideline 2.5.1 (i)]*.

ii. Encourage farmers to follow recommended planting technology to achieve optimal plant population [*Operational Guideline 2.5.1 (ii)]*.

iii. Promote use of improved and high quality planting material [*Operational Guideline 2.5.1 (iii)]*.

iv. Promote use of manure [*Operational Guideline 2.5.1 (iv)]*.

v. Promote use of fertilizer [*Operational Guideline 2.5.1 (v)]*.

vi. Encourage farmers to control pests and promote IPM [*Operational Guidelines 2.5.1 (vi) and 2.1.1 (vi)]*

vii. Encourage timely harvesting [*Operational Guideline 2.5.1 (vii)]*.

viii. Encourage use of good storage facilities [*Operational Guideline 2.2.3.1 (viii)]*.

ix. Link farmers to markets *[Operational Guideline 2.2.1 (xi)]*

4.2.1.6 Phaseolus Beans

Phaseolus beans grow throughout the country mostly in cool plateau areas. Beans can also be grown in low altitude areas during winter. They are a good source of protein and cash income. The long storability advantage that they have makes their availability wide in space and time dimensions. The national aim is to increase production by improving yields while ensuring that varieties of desirable cooking characteristics and marketable colours are promoted.

4.2.1.6.1 Constraints

The main constraints for low productivity of Phaseolus beans limited access to improved bean varieties, poor husbandry practices, pest and disease control, and poor linkages to markets.

4.2.1.6.2 Activities

4.2.1.6.2.1 Provide technical assistance to ensure high productivity of Phaseolus beans

i. Promote early field preparation and timely planting [Operational Guideline 2.6.1 (i)].
ii. Encourage farmers to follow recommended planting technology to achieve optimal plant population. [Operational Guideline 2.6.1 (ii)].
iii. Promote use of improved and high quality seed [Operational Guideline 2.6.1 (iii)].
iv. Promote use of fertilizer. [Operational Guideline 2.6.1 (iv)].
v. Encourage farmers to control pests and promote IPM [Operational Guidelines 2.6.1. (v) and 2.1.1(vi)]
vi. Promote timely harvesting [Operational Guideline 2.6.1 (vi)].
vii. Promote use of good storage facilities [Operational Guideline 2.6.1 (vii)].
viii. Link farmers to markets [Operational Guideline 2.2.1 (xi)]

4.2.1.6.2.2 Improve access to Open Pollinated Varieties through community seed multiplication (OPV maize and grain legumes)

i. Create awareness among community members [Operational Guideline 2.6.2 (i).
ii. Set up a credit system [Operational Guideline 2.6.2 (ii).
iii. Assess improved seed availability in the community and farmers' seed needs [Operational Guideline 2.6.2 (iii)].
iv. Encourage farmers to organize into commodity associations [Operational Guideline 1.1.3]
v. Encourage group members to meet regularly [Operational Guidelines 2.6.2 (v)].
vi. Procure and distribute seed by commodity based on the requirements [Operational Guideline 2.6.2 (vi)]
vii. Promote community seed bank concept [Operational Guidelines 2.6.2 (vii)]

4.2.1.7 Groundnuts

Groundnut is one of the most important food and cash crops in Malawi. It is a good source of protein, vitamins and vegetable oil. Like other legumes groundnuts fix atmospheric nitrogen and when grown in rotation with other crops such as maize and tobacco it improves soil fertility. The national aim is to improve the yield and quality of both confectionary and oil nuts to meet the local and export demand and provide raw materials to the domestic vegetable oil industry.

4.2.1.7.1 Constraints

The main constraints for groundnuts are limited access to improved seed varieties, poor husbandry practices, pest and disease control, and poor linkages to markets.

4.2.1.7.2 Activities

4.2.1.7.2.1 Provide technical assistance to ensure high productivity of groundnuts

i. Promote early field preparation and timely planting [Operational Guidelines 2.7.1 (i)]
ii. Encourage farmers to follow recommended planting technology to achieve optimal plant population [Operational Guideline 2.7.1 (ii)]
iii. Promote use of improved and high quality seed [Operational Guideline 2.7.1 (iii)]
iv. Encourage farmers to control pests and promote IPM [Operational Guidelines 2.7.1 (iv) and 2.1.1(vi)]
v. Promote timely harvesting [Operational Guideline 2.7.1 (v)]
vi. Promote use of good storage facilities [Operational Guideline 2.7.1 (vi)]
vii. Link farmers to markets [Operational Guideline 2..2.1 (xi)]

4.2.1.7.2.2 Improve access to OPV groundnut seed through community seed multiplication [Operational Guideline 2.3.1.2]

4.2.1.8 Soya Beans

Soya bean is a very important and valuable grain legume because it can be put to many uses. It a very protein content (37%) and provides high quality protein for humans and livestock. It is used in the production of high-protein *Likuni Phala* and various other recipes at household level such as the production of milk and meat. It is also used in the production of feeds for poultry and other livestock. It is a good nitrogen fixer and therefore improves soil fertility. It can be grown under a range of climatic conditions ranging from warm to hot areas of the Shire Valley with marginal rainfall of less than 700mm to highlands with over 2000mm. The national aim is to encourage the growing and utilization of Soya beans and increase yields to meet the high demand in both domestic and export markets.

4.2.1.8.1 Constraints

The main constraints include limited access to improved seed varieties, poor use of *Rhizobium inoculum* to increase yield, poor husbandry practices, and poor linkages to markets.

4.2.1.8.2 Activities

4.2.1.8.2.1 Provide technical assistance to ensure high productivity of Soya beans

i. Promote early field preparation and timely planting [Operational Guideline 2.8.1 (i)]
ii. Encourage farmers to follow recommended planting technology to achieve optimal plant population [Operational Guideline 2.8.1 (ii)]
iii. Promote use of improved and high quality seed [Operational Guideline 2.8.1 (iii)]
iv. Encourage seed inoculation and use of fertilizer [Operational Guideline 2.8.1 (iv)]
    a. Inoculation
    b. Fertilisers
v. Encourage farmers to control pests and promote IPM [Operational Guidelines 2.8.1 (v) and 2.1.1(vi)]
vi. Promote timely harvesting [Operational Guideline 2.8.1 (vi)].
vii. Promote use of good storage facilities [Operational Guideline 2.8.1 (vii)]
viii. Link farmers to markets [Operational Guideline 2..2.1 (xi)]

4.2.1.8.2.2 Improve access to OPV Soya Bean seed through community seed multiplication [Operational Guideline 2.6.2]

4.2.1.9 Pigeon Peas

Pigeon pea is an important pulse in Malawi particularly in the Southern Region. It can be grown in almost all types of free draining soils in pure stand or mixed cultivation with other crops such as maize and cassava. Pigeon pea is a valuable source of vegetable protein and farmers grow it either for food or cash. It improves soil fertility through leafy

litter and nitrogen fixation. The national aim is to encourage the growing and utilization of pigeon peas and increase yield in order to meet the demand in both domestic and export markets.

4.2.1.9.1 Constraints

Pigeon pea is mainly constrained by limited access to improved seed varieties, poor use poor husbandry practices, and poor linkages to markets

4.2.1.9.2 Activities

4.2.1.9.2.1 Provide technical assistance to ensure high productivity of pigeon peas

i. Promote early field preparation and timely planting [Operational Guideline 2.9.1 (i)]
ii. Encourage farmers to follow recommended planting technology to achieve optimal plant population [Operational Guideline 2.9.1 (ii)]
iii. Promote use of improved and high quality seed [Operational Guideline 2.9.1 (iii)]
iv. Encourage farmers to control pests and promote IPM [Operational Guidelines 2.9.1 (iv) and 2.1.1(vi)]
v. Promote timely harvesting [Operational Guideline 2.9.1 (v)]
vi. Encourage use of good storage facilities [Operational Guideline 2.9.1 (vi)]
vii. Link farmers to markets [Operational Guideline 2.2.1 (xi)

4.2.1.9.2.2 Improve access to OPV Pigeon pea seed through community seed multiplication [Operational Guideline 2.6.2]

4.2.2 Production of Horticultural Crops

Fruits are a valuable source of income, and mineral salts and vitamins, which are essential for body protection against diseases. Some fruits provide proteins, carbohydrates, and oils. The wide climatic conditions in Malawi provide an opportunity for increasing fruit production. However factors such as poor husbandry/cultural practices, incidences of pests and diseases limit the yield and quality of fruits in the country. In addition lack of an organized market system for fruits and vegetables is an important factor limiting smallholder farmers to increase production because of the perishable nature of the commodities. The national aim is to increase fruit production in suitable areas to satisfy domestic demand and improve nutritional status of the urban and rural populations and export where opportunities exist. Therefore farmers should be encouraged to grow high quality fruits for domestic consumption.

Vegetables include exotic types such as cabbage, rape, lettuce, turnips, tomatoes, onions, leafy mustard, and indigenous types such as Bonongwe (*Amarathus spp)*, Mnkwani (*cucurbita maxina*), Khwanya (*Phaseolous vulgaris*), Mwamunaaligone (*Gatinsoga parviflora*), Chitambe (*Vigna unguiculata*), Denje (*Corchorus trilocularis, Corchorus aestuanis*) and many others. Vegetables are an important source of mineral salts and vitamins, which are vital for good health in addition to generating income when marketed. However vegetable production is characterized by: - a) low productivity with seasonal variation in availability with abundant supplies available during the rainy

season, b) susceptibility to pests and diseases, and c) unorganized marketing system. The national aim is to increase the production of vegetables to meet domestic demand in order to improve the nutritional status of urban and rural population and to supply to the export market.

4.2.2.1 Citrus Fruits

These include sweet orange, sour orange, tangerine, grape fruit, and lemon. Citrus fruits can be grown in many areas depending on varieties and species. Commercial production of moat varieties should be in areas below 1000 sea level. Adequate moisture is essential especially during flowering and fruit development from August to November.

4.2.2.2.1 Constraints

The main constraints include lack of smallholder farmer organizations to engage in citrus production as a commercial activity, use of local cultivars, poor husbandry practices, and poor linkages to markets.

4.2.2.1.2 Activities

4.2.2.1.2.1 Provide technical assistance to ensure high productivity for each fruit Type

i. Encourage farmers to form fruit producers clubs (One club covering all fruit types in a community) [Operational Guideline 2.10.1 (i)].
ii. Promote early field preparation and timely planting [Operational Guideline 2.10.1 (ii)].
iii. Encourage farmers to follow recommended planting technology to achieve optimum plant population. [Operational Guideline 2.10.1 (iii)].
iv. Promote use of improved and high quality varieties [Operational Guideline 2.10.1 (iv)].
v. Encourage farmers to use manure [Operational Guideline 2.10.1 (v)].
vi. Encourage farmers to use fertilizer [Operational Guideline 2.10.1 (vi)].
vii. Encourage farmers to control pests and promote IPM [Operational Guidelines 2.10.1 (vi) and 2.1.1(vii)]
viii. Build capacity of farmers in post-harvest handling and storage [Operational Guideline 2.10.1(viii)]
ix. Build capacity of farmers in fruit processing [Operational Guideline 2.10.1(ix)]
x. Link farmers to sources of finance to purchase the fruit processing technology or provide start-up capital through the programme[Operational Guideline 2.10.1(x)]
xi. Link farmers to markets [Operational Guideline 2.1.1 (xi)].

4.2.2.2 Bananas and Plantains

Bananas are widely grown in the country. In some parts of Thyolo, Mulanje, and Nkhata Bay, bananas are grown as a cash crop. In Misuku Hills and Karonga bananas and plantains are grown as staple food. Most lakeshore districts and plateau areas of Chitipa, Mzimba, Rumphi, Kasungu, Namwera, and Phalombe would grow good bananas with irrigation. There are three diseases of economic importance that are threatening banana and plantain production: *Black Sigatoka, Panama, and Banana Bunchy T*op.

4.2.2.2.1 Constraints

Constraints include lack of farmer organization to improve access to services and resources, poor husbandry practices, use of local low-yielding cultivars and poor access to markets.

4.2.2.2.2 Activities

4.2.2.2.2.1 Provide technical assistance to ensure high productivity of bananas and plantains

i. Encourage farmers to join fruit producers clubs [Operational Guideline 2.10.1 (i)]
ii. Encourage early field preparation and timely planting [Operational Guideline 2.11.1 (ii)]
iii. Encourage farmers to follow recommended planting technology to achieve optimum plant population. [Operational Guideline 2.11.1 (iii)]
iv. Promote use of improved and high quality varieties [Operational Guideline 2.10.1 (iv)]
v. Encourage farmers to use manure [Operational Guideline 2.11.1 (v)]
vi. Encourage farmers to use fertilizer [Operational Guideline 2.11.1(vii)]
vii. Encourage farmers to control pests and promote IPM [Operational Guidelines 2.11.1 (vii) and 2.1.1(vi)]
viii. Encourage timely harvesting [Operational Guideline 2.11.1 (vii)]
ix. Build capacity of farmers in post-harvest handling and storage [Operational Guideline 2.11.1 (ix)]
x. Build capacity of farmers in fruit processing [Operational Guideline 2.11.1(x)].
xi. Link farmers to markets [Operational Guidelines 2.11.1 (xi) and 2.1.2.1(xi)]

4.2.2.2.1 Pineapples

Pineapples can be grown at latitudes of up to 1200m above sea level with warm to hot temperatures ranging from 20 to 30 degrees Celsius. Pineapples grown above 1200 above sea level are bitter and fibrous. The objective is to encourage production in suitable areas such as Mulanje, Thyolo, Nkhata Bay, Phoka, and Songwe.

4.2.2.2.1 Constraints

The main constraints are lack of producer clubs to increase pineapple production, use of unimproved varieties, poor husbandry practices, and poor linkages to markets.

4.2.2.3.2 Activities

4.2.2.3.2.1 Provide technical assistance to ensure high productivity of Pineapples

i. Encourage farmers to join fruit producers clubs [Operational Guideline 2.10.1 (i)]
ii. Encourage early field preparation and timely planting [Operational Guideline 2.12.1 (ii)]
iii. Encourage farmers to follow recommended planting technologies to achieve optimum plant population [Operational Guideline 2.12.1 (iii)]
iv. Promote use of improved and high quality varieties [Operational Guideline 2.12.1 (iv)]
v. Encourage farmers to use manure [Operational Guideline 2.12.1 (v)]
vi. Encourage farmers to use fertilizer [Operational Guideline 2.12.1 (vi)]
vii. Encourage farmers to control pests and promote IPM [Operational Guidelines 2.12.1 and 2.1.1(vii)]
viii. Encourage timely harvesting planting [Operational Guideline 2.12.1 (viii)]
ix. Build capacity of farmers in post-harvest handling and storage [Operational Guideline 2.12.1 (ix)]
x. Build capacity of farmers in fruit processing [Operational Guideline 2.12.1(x)]
xi. Link farmers to markets [Operational Guideline 2.12.1 (xi) and 2.2.1 (viii)]

4.2.2.4 Mangoes

Mangoes are important food and cash crops and are widely grown in Malawi. They do well in warm to hot areas with altitudes up to 750m above sea level with well-defined wet and dry conditions. Yields are low in cool areas due to powdery mildew disease.

4.2.2.4.2 Constraints

Mango production is mainly constrained by poor husbandry practices including pest and disease control, use of local low-yielding cultivars, and poor linkages to markets.

4.2.2.4.2 Activities

4.2.2.4.2.1 Provide technical assistance to ensure high productivity of mangoes

i. Encourage farmers to join fruit producers clubs [*Operational Guidelines 2.10.1 (i)]*
ii. Promote early field preparation and timely planting [*Operational Guideline 2.13.1 (ii)]*
iii. Encourage farmers to follow recommended planting technology to achieve optimum plant population [*Operational Guideline 2.13.1 (iii)]*
iv. Promote use of improved and high quality varieties [*Operational Guideline 2.13.1 (iv)]*
v. Encourage farmers to use manure [*Operational Guideline 2.13.1 (v)]*
vi. Encourage farmers to use fertilizer [*Operational Guideline 2.13.1 (vi)]*

vii. Encourage farmers to control pests and promote IPM [*Operational Guidelines 2.13.1 (vii) and 2.1.1 (vi)]*
viii. Encourage timely harvesting [*Operational Guideline 2.13.1 (viii)]*
ix. Build capacity of farmers in post-harvest handling and storage *[Operational Guideline 2.13.1 (ix)]*
x. Build capacity of farmers in fruit processing *[Operational Guideline 2.13.1 (x)]*
xi. Link farmers to markets [*Operational Guidelines 2.13.1 (xi) and 2.2.1 (xi)]*

4.2.2.5 Avocado Pears

Avocado pears are important food and cash crops. The crop grows well in cool to warm areas with an average annual rainfall ranging from 750mm to 1800mm. It is grown in the Shire Highlands, Thyolo, Mulanje, Zomba, Nkhata-Bay, Songwe, Misuku Hills and other areas with similar climatic conditions. The crop does particularly well in free draining soils.

4.2.2.5.1 Constraints

The main constraints are lack of producer groups to increase productivity, use of unimproved cultivars, poor husbandry practices, and poor linkages to markets.

4.2.2.5.2 Activities

4.2.2.5.2.1 Provide technical assistance to ensure high productivity of Avocado Pears

i. Encourage farmers to join fruit producers clubs [*Operational Guidelines 2.14.1 (i) and 2.10.1 (i)*]
ii. Promote early field preparation and timely planting [*Operational Guideline 2.14.1 (ii*)]
iii. Encourage farmers to follow recommended planting technology to achieve optimum plant population [*Operational Guideline 2.14.1 (ii*)]
iv. Promote use of improved and high quality varieties [*Operational Guideline 2.14.1* (iv)]
v. Encourage farmers to use manure [*Operational Guideline 2.141* (v)]
vi. Encourage farmers to use fertilizer [*Operational Guideline 2.14.1* (vi)]
vii. Encourage farmers to control pests and promote IPM [*Operational Guidelines 2.14.1 (vi) and 2.1.1(vi)*]
viii. Encourage timely harvesting [*Operational Guideline 2.14.1 (vii*)]
ix. Build capacity of farmers in post-harvest handling and storage*[Operational Guideline 2.14.1 (ix)]*
x. Build capacity of farmers in fruit processing *[Operational Guideline 2.14.1 (x)]*
xi. Link farmers to markets [*Operational Guidelines 2.14.1(xi) and 2.2.1 (xi)*]

4.2.2.6 Paw Paws

Paw paws are widely grown in the country and are an important food and cash crop. The crop grows well up to an altitude of 1000m above sea level and requires an annual rainfall of 1000 to 2000mm, which should be well distributed.

4.2.2.6.1 Constraints

Production of paw paws is low due to lack of farmer organization to increase its productivity, use of local cultivars, poor husbandry practices, and poor access to markets.

4.2.2.6.2 Activities

4.2.2.6.2.1 Provide technical assistance to ensure high productivity of Paw Paws

i. Encourage farmers to join fruit producers clubs [*Operational Guidelines 2.15.1 (i) and (2.10.1 (i)*]
ii. Promote early field preparation and timely planting [*Operational Guideline 2.15.1 (ii*)]
iii. Encourage farmers to follow recommended planting technology to achieve optimum plant population [*Operational Guideline 2.15.1 (iii)*]
iv. Promote use of improved and high quality varieties [*Operational Guideline 2.15.1* (iv)]
v. Encourage farmers to use manure [*Operational Guideline 2.15.1* (v)]
vi. Encourage farmers to control pests and promote IPM [*Operational Guidelines 2.15.1 (v) and 2.1.1(vi)*]
vii. Encourage timely harvesting [*Operational Guideline 2.15.1 (vi*)]
viii. Build capacity of farmers in post-harvest handling and storage *[Operational Guideline 2.15.1 (vii)]*
ix. Build capacity of farmers in fruit processing *[Operational Guideline 2.15.1 (viii)]*
x. Link farmers to markets [*Operational Guideline and 2.15.1 (ix) 2.2.1 (xi*)]

4.2.2.7 Cabbages

Cabbages are commonly grown throughout the country. They grow in cool areas over 700m above sea level. They perform well where soils are free draining and rich in organic matter. The national aim is to improve quality and yield through recommended methods of production.

4.2.2.7.1 Constraints

Cabbage production is mainly constrained by lack of farmer organization to improve access to technical assistance, poor husbandry practices including pest and disease incidence, low usage of improved seed varieties, and poor access to markets.

4.2.2.7.2 Activities

4.2.2.7.2.1 Provide technical assistance to ensure high productivity of Cabbages

i. Encourage farmers to join vegetable producers clubs *[Operational Guideline 2.10.1(i)]*
ii. Train farmers in nursery establishment [*Operational Guideline 2.16.1 (ii*)]
iii. Promote early field preparation and timely planting [*Operational Guideline 2.16.1 (iii*)]
iv. Encourage farmers to follow recommended planting technology to achieve optimum plant population [Operational Guideline 2.16.1 (iv)]
v. Promote use of improved and high quality varieties [*Operational Guideline 2.16.1 (v)]*
vi. Encourage farmers to use manure [Operational Guideline 2.16.1 (iv)].
vii. Encourage farmers to use fertilizer [Operational Guideline 2.1.6.1 (vii)]
viii. Encourage farmers to control pests and promote IPM [*Operational Guidelines 216.1 and 2.1.1(viii)*]
ix. Encourage timely harvesting [*Operational Guideline 2.16.1 (ix)]*
x. Build capacity of farmers in vegetable processing [Operational Guidelines 2.16.1(x) and 2.10.1(ix)].
xi. Link farmers to markets [Operational Guidelines 2.1.16 (xi) and 2.2.1(xi)]

4.2.2.8 Tomatoes

Tomatoes are widely grown throughout the country and can be grown all year round except in extremely hot dry conditions because heat retards growth and fruit set. The soil should be free draining and rich in organic matter. The national aim is to improve yield, quality and availability throughout the year.

4.2.2.8.1 Constraints

The main constraints include lack of farmer producer organization, poor husbandry practices, use of unimproved varieties, poor pest management, and poor linkages to markets.

4.2.2.8.2 Activities

4.2.2.8.2.1 Provide technical assistance to ensure high productivity of Tomatoes

i. Encourage farmers to join vegetable producers clubs [*Operational Guidelines 2.17.1 (i) and 2.1.10 (i)*]
ii. Train farmers in nursery establishment [*Operational Guideline 2.17.1 (ii)]*
iii. Promote early field preparation and timely planting [*Operational Guidelines 2.17.1 (iii*)]
iv. Encourage farmers to follow recommended planting technology to achieve optimum plant population [*Operational Guideline 2.17.1 (iv)]*

v. Promote use of improved and high quality varieties [*Operational Guideline 2.17.1 (v*)]
vi. Encourage farmers to use manure *(Operational Guideline 2.17.1 (vi*)]
vii. Encourage farmers to use fertilizer [*Operational Guideline 2.17.1 (vii*)]
viii. Encourage farmers to control pests and promote IPM [*Operational Guidelines 2.17.1 and 2.1.1(viii)*]
ix. Encourage timely harvesting [*Operational Guideline 2.17.1 (ix*)]
x. Build capacity of farmers in vegetable processing [*Operational Guidelines* 2.17.1(x) and 2.10 (ix)].
xi. Link farmers to markets [*Operational Guidelines 2.17.1 (xi) and 2.2.1 (xi)*]

4.2.2.9 Onions

Onions are widely grown throughout the country both for food and for cash. They require cool to warm season for good bulb formation. Soils should be rich in organic matter and free draining and it should be sown from mid-February to April.

4.2.2.9.1 Constraints

Onion production is mainly constrained by lack of farmer organization to increase productivity, poor husbandry practices, use of unimproved cultivars, and poor access to markets.

4.2.2.9.2 Activities

4.2.2.9.2.1 Provide technical assistance to ensure high productivity of Onions

i. Encourage farmers to join vegetable producers clubs [*Operational Guideline 2.10.1 (i)*]
ii. Train farmers in nursery establishment [*Operational guideline 2.16.1 (ii*)]
iii. Promote early field preparation and timely planting [*Operational Guideline 2.18.1 (iii)]*
iv. Encourage farmers to follow recommended planting technology to achieve optimum plant population [*Operational Guideline 2.18.1 (iv*)]
v. Promote use of improved and high quality varieties [*Operational Guideline 2.18.1 (v)]*
vi. Encourage farmers to use manure [*Operational Guideline 2.18.1 (vi)]*
vii. Encourage farmers to use fertilizer [Operational Guidelines 2.18.1 (vii)]
viii. Encourage farmers to control pests and promote IPM [*Operational Guidelines 2.18.1 (vii) and 2.1.1(viii)*]
ix. Encourage timely harvesting [*Operational Guideline 2.18.1 (ix*)]
x. Build capacity of farmers in vegetable processing [*Operational Guidelines* 2.18.1(ix) and 2.10 (x)].
xi. Link farmers to markets [*Operational Guidelines 2.18.1 (xi) and 2.2.1 (xi*)]

4.2.2.10 Leafy vegetables

Popular leafy vegetables in Malawi include: - Rape (*Brassica napus*), Mustard (*Brassica carinata)* and Chinese cabbage (*Brassica Chinensis*). The best soils for these vegetables are well drained and rich in organic matter.

4.2.2.10.1.1 Constraints

Lack of farmer organization, poor husbandry practices, use of unimproved varieties, and poor access to markets are the main constraints affecting the productivity of Leafy vegetables.

4.2.2.10.2 Activities

4.2.2.10.2.1 Provide technical assistance to ensure high productivity of Leafy Vegetables

i. Encourage farmers to join vegetable producers clubs [*Operational Guideline 2.10.1 (i)]*
ii. Train farmers in nursery establishment [*Operational guideline 2.16.1 (ii)]*
iii. Promote early field preparation and timely planting [*Operational Guideline 2.19.1 (iii*)]
iv. Encourage farmers to follow recommended planting technology to achieve optimum plant population [*Operational Guideline 2.19.1 (iv)]*
v. Promote use of improved and high quality varieties [*Operational Guideline 2.19.1 (v*)]
vi. *Encourage farmers to use manure* [*Operational Guideline 2.19.1 (vi*)]
vii. Encourage farmers to use fertilizer [*Operational Guidelins 2.19.1 (vii*)]
viii. Encourage farmers to control pests and promote IPM [*Operational Guidelines 2.19.1 (vi) 2.1.1(viii)*]
ix. Encourage timely harvesting [*Operational Guideline 2.19.1 (ix)]*
x. Build capacity of farmers in vegetable processing [*Operational Guidelines 2.19.1(x) and 2.10 (x)]*.
xi. Link farmers to markets [*Operational Guideline 2. 2.1 (xi*)]

4.2.2.11 Lettuce

Lettuce is a cool season crop and grows best in areas with temperatures of 10 to 20 degrees Celsius. It does well in soils that are well drained.

4.2.2.11.1 Constraint

The constraints include lack of farmer organization, poor husbandry practices, use of unimproved seed varieties, and poor market linkages.

4.2.2.11.2 Activities

4.2.2.11.2.1 Provide technical assistance to ensure high productivity of Leafy Vegetables

i. Encourage farmers to join vegetable producers clubs [*Operational Guidelines 2.2.1. (i) and 1.1.3*)]
ii. Train farmers in nursery establishment [*Operational guideline 2.16.1 (ii)]*
iii. Promote early field preparation and timely planting [*Operational Guideline 2.20.1 (iii)*]
iv. Encourage farmers to follow recommended planting technology to achieve optimum plant population [*Operational Guideline 2.20.1 (iv*)]
v. Promote use of improved and high quality varieties [*Operational Guideline 2.20.1 (v*)]
vi. *Encourage farmers to use manure* [*Operational Guideline 2.20.1 (iv*)]
vii. Encourage farmers to use fertilizer [*Operational Guideline 2.20.1 (vii*)]
viii. Encourage farmers to control pests and promote IPM [*Operational Guidelines 2.20.1 and 2.1.1(viii)*]
ix. Encourage timely harvesting [*Operational Guideline 2.20.1 (ix*)]
x. Build capacity of farmers in vegetable processing [*Operational Guidelines* 2.20.1(ix) and 2.10.1 (x)].
xi. Link farmers to markets [*Operational Guidelines 2.20.1 (xi) 2.2.1(xi)]*

4.3 Promote integration of livestock into smallholder farming systems (FSP Priority Strategy No. 3.1.9.3)

4.3.1 Background

The livestock industry in Malawi contributes about 8% of GDP and about 36% of the value of total agricultural products. Livestock supports rural livelihoods by providing food, income, animal traction, manure, and social security. The Department of Animal Health and Livestock Development (DAHLD) estimates that about 1.2 million farm families in Malawi own one or more types of livestock.

The rising demand for meat, milk and poultry products in the country offers an opportunity for the development of viable and well organized smallholder production systems, particularly in the peri-urban areas.

4.3.2 Provide Technical Assistance to Increase Dairy Production

Lack of improved breeding stock has been the major constraint for the growth of the dairy industry in Malawi and this is constraining smallholder farmers to access improved breeds or their crosses for milk production. Currently the demand for dairy animals, especially heifers, far exceeds the supply.

4.3.2.1 Constraints

Dairy production is mainly constrained by limited farmer organization into milk bulking groups, limited access to dairy animals of improved breeds and crosses by smallholder farmers, lack of cross-breeding programmes to improve the local breed, limited access to Artificial Insemination technology, lack of small-scale milk processing facilities, poor animal husbandry practices including housing, feeding regime, disease control, and poor market linkages.

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4.3.2.2 Activities

4.3.2.2.1 Promote formation of milk bulking groups [Operational Guideline 3.1.1 (i)]

4.3.2.2.2 Facilitate farmers' access to dairy animals of approved breeds and their crosses [Operational Guideline 3.1.1 (ii)]

4.3.2.2.3 Encourage small-scale dairy farmers to keep a minimum of two dairy animals [Operational Guideline 3.1.1 (iii)]

4.3.2.2.4 Encourage farmers to construct a standard khola [Operational Guideline 3.1.1 (iv)].

4.3.2.2.5 Encourage dairy farmers to establish pasture [Operational Guideline 3.1.1 (v)].

4.3.2.2.6 Encourage farmers to feed dairy animals roughage and concentrates [Operational Guideline 3.1.1 (vi)].

4.3.2.2.7 Train farmers to produce a locally compounded ration [Operational Guidelins 3.1.1 (vii)].

4.3.2.2.8 Encourage farmers to milk the animals twice per day [Operational Guideline 3.1.1 (viii)].

4.3.2.2.9 Encourage farmers to clean milk utensils before milking [Operational Guideline 3.1.1 (ix)].

4.3.2.2.10 Train farmer groups in heat detection and AI techniques [Operational Guideline 3.1.1 (x)].

4.3.2.2.11 Encourage farmers to apply recommended acaricides regularly [Operational Guideline 3.1.1 (xi)]

4.3.2.2.12 Promote milk processing into different milk products [Operational Guideline 3.1.1 (xii)].

4.3.2.2.13 Link farmers to markets [Operational Guidelines 3.1.1 (xiii) and 2.2.1 (xi)]

4.3.3 Provide Technical Assistance to Increase Beef Production through Stall Feeding

The main constraints limiting beef production in Malawi is lack of breeder stock to produce steers that would feed into beef production. In addition there is lack of an organized cattle marketing system for smallholder cattle farmers since the liberalization of cattle markets in the mid-1990s.

4.3.3.1 Constraints

Smallholder farmer beef production is constrained by a number of factors including: - limited farmer organization into stall feeding groups to increase productivity, limited access to steers for fattening by smallholder farmers, poor animal husbandry practices including housing, feeding regime, and disease control, and poor market linkages.

4.3.3.2 Activities

i. Encourage farmers to form cattle fattening groups [*Operational Guidelines 3.2.1 (i) and 3.1.1(i)*].
ii. Encourage farmers to use improved breeds[*Operational Guideline 3.2.1 (ii*)].
iii. Encourage farmers to construct pole and thatch *kholas* [*Operational Guideline 3.2.1 (iii*)].
iv. Encourage farmers to stall feed animals from April/May them [*Operational Guideline 3.2.1 (iv*)]
v. Encourage farmers to feed steers for 150 days before marketing [*Operational Guideline 3.2.1 (v*)].
vi. Encourage farmers to grow pastures [*Operational Guideline 3.2.1 (vi)]*.
vii. Train farmers to produce home made rations [*Operational Guideline 3.2.1 (vii)*].
viii. Encourage farmers to de-worm animals [*Operational Guideline 3.2.1 (viii*)].
ix. Link farmers to markets [*Operational Guideline 3.2.1 (ix) and 2.2.1(xi)*)].
x. Advice farmers to get valid livestock movement permits [*Operational Guideline 3.2.1 (x)]*.

4.3.4 Goat Production

4.3.4.1 Provide technical assistance to improve goat production

Goats are a source of protein and income for the rural population. They also supply manure that can be used in crop production. The aim is to increase the production and utilization of small ruminants.

4.3.4.1.1 Constraints

Factors that constrain goat production include: - lack of farmer organization into goat production groups to increase productivity, lack of access to improved breeds and crosses, lack of cross-breeding between exotic and local breeds to improve the local breed, lack of smallholder goat fattening practices to increase size and quality of the local goat, poor animal husbandry practices e.g. housing, feeding, and disease control, poor linkages to markets, and lack of effective approaches to broaden goat ownership at community level.

4.3.4.1.2 Activities

i. Encourage farmers to form goat rearing groups. [*Operational Guideline 3.1.1(i)]*

ii. Promote crossbreeding between the indigenous goat and the improved breeds [*Operational Guideline 3.3.1 (ii*].
iii. Encourage farmers to construct well-ventilated kholas [*Operational Guideline 3.3.1 (iii*)].
iv. Encourage farmers to feed confined goats on supplements [*Operational Guideline 3.3.1 (iv*].
v. Encourage farmers to graze herded goats away from dambos during the rainy season and encourage tethering during this period [Operational *Guideline 3.3.1 (iv*].
vi. Encourage farmers to de-worm goats [*Operational Guideline 3.3.1 (vi)*].
vii. Promote pass-on-the gift concept to broaden goat ownership [*Operational Guideline 3.3.1 (vii*].
viii. Link farmers to markets [*Operational Guidelines 3.3.1 (ivii) 2.2.1(xi*)]

4.3.5 Poultry Production

4.3.5.1 Provide technical assistance to increase poultry production

4.3.5.2 Constraints

Poultry production is mainly affected by poor farmer organization into poultry groups, lack of access to improved breeds and crosses especially the Black Australorp to improve the local breeds, lack of commercial-oriented production of eggs and meat under smallholder farming systems, poor husbandry practices, and poor linkages to markets.

4.3.5.3 Activities

i. Encourage farmers to form poultry production groups [*Operational Guideline 3*.1.1(i)].
ii. Encourage rearing of improved breeds and cross-breeds [*Operational Guideline 3.4.1 (ii*)].
iii. Encourage semi-intensive and intensive systems of poultry production [*Operational Guideline 3.4.1 (iii)*].
iv. Encourage farmers to practice good husbandry practices for egg production [*Operational Guideline 3.4.1 (iv*)].
v. Encourage farmers to practice good husbandry practices for meat production [*Operational Guideline 3.4.1 (v)]*.
vi. Encourage farmers to protect poultry from diseases [*Operational Guideline 3.4.1 (vi)*].
vii. Promote pass-on-the gift [*Operational Guideline 3.4.1. (vii*)].
viii. Link farmers to markets [*Operational Guidelines 3.4.1(viii) and 2.2.1 (xi*)].

4.4 Create a conducive environment for private sector investment and local community participation in irrigation development (FSP Priority Strategy No.3.1.2.1)

4.4.1 Background

Malawi has an abundant surface water resources and potential irrigable land is under utilised. The role of irrigation in increasing agricultural production is evident from the existing irrigation schemes throughout the country. Irrigation is important in Malawi partly because it addresses the challenges of food insecurity and poverty brought about by the effects of drought and a high population growth rate that put most at risk.

Potential irrigable land in Malawi is in excess of 200,000 hectares. However presently only about 60,000 hectares (30%) are irrigated, of which 12,000 (6%) are under smallholder farmers.

4.4.2 Constraints

i. Lack of guidance on site selection for irrigation development.
ii. Inadequate capacity to evaluate different types of irrigation methods.
iii. Poor community mobilisation for irrigation development.
iv. Lack of capacity and capabilities of smallholder farmers in water management and entrepreneurial skills.
v. Lack of skills in irrigation installation.
vi. Lack of credit facilities to finance irrigation operations.
vii. Lack of Water Users Associations to participate in irrigation development.
viii. Lack of water harvesting techniques.

4.4.3 Activities

i. Provide guidelines for irrigation site selection. [*Operational Guidelines:* 4.1]
ii. Provide guidelines for selection of appropriate irrigation methods *[Operational Guidelines: 4.2]*. The following should be taken into consideration:
    a. Previous experience with irrigation
    b. Costs / benefits analysis
    c. Environmental Protection
iii. Build capacities and capabilities of stakeholders, in water management, business management etc. *[Operational Guidelines: 4.3]*

    a. Ensure Participation, Ownership and Commitment to irrigation development
    b. Provide Technical Assistance to irrigation schemes
iv. Facilitate the formation of Water Users Association (WUA) *[Operational Guideline: 4.4]*

    a. Promote formation of WUAs which should be formed as private, non-profit judicial self supporting independent entities

b. Promote concepts of improved water management, farmer empowerment and advantages of formation of farmer-managed self sustained WUAs. Disseminate basic information about concepts in (a) above to local leaders and all interested parties in the scheme through group discussion, audio-video presentation, and the media.

c. Invite WUAs from other irrigation schemes to meetings with the community to discuss overall concepts of irrigation schemes, cost recovery, role and responsibilities of WUAs.
d. Arrange field trips to schemes where WUAs are operating efficiently.
e. Assist community in development of a draft constitution for WUA in which the basic rules and procedures for its operation would be explained to the community.
f. Widely circulate the draft constitution and have it discussed at a general meeting of the water users for approval.
g. Upon formation, facilitate registration of WUA with relevant authorities as a legal entity in accordance with the Law.
h. Encourage election of WUA leaders in democratic manner
i. Train WUA leadership

v. Facilitate Farmers' Access to Credit *[Operational Guideline: 4.5]*
vi. Build Capacity of Farmers Groups *[Operational Guideline: 4.6]*
vii. Provide guidance in selection of Recommended water harvesting techniques. *[Operational Guideline: 4.7]*

4.5 Promote environmental and land and water management for sustainable agricultural development (FSP Priority Strategy No. 3.1.7)

4.5.1 Background: Environmental degradation

Environmental degradation is a severe problem affecting food security in Malawi. Increasing population pressure coupled with cultivation of steep slopes, lack of conservation practices, poor farming practices and continuous cropping without nutrient recycling, overgrazing and improper land use practices are the main factors for accelerated soil erosion. Deforestation and encroachment are responsible for severe loss of biodiversity and negatively impact on water resources. Furthermore, agricultural practices have led to the depletion of soil nutrients with little effort to replenish such nutrients due to the high cost of inorganic fertilizers.

Over-exploitation of the natural resource base in some parts of the country is leading to serious environmental degradation, increased frequency and severity of drought, floods, decreases in livestock productivity (shortage of fodder, forage, supplemental animal feed and diminishing grazing land), loss of arable land, and declining crop and livestock productivity.

4.5.2 Factors accelerating environmental degradation under smallholder farming systems

i. Lack of environmental conservation awareness and practices
ii. Poor biological control measures
iii. Poor physical control measures.
iv. Depletion of water resources to meet the demand for domestic needs, industrial needs, and irrigation requirements.
v. Sedimentation and increased frequency of drought and floods.
vi. Degradation of water quality as a result of soil erosion and pollution wastes that are deposited in water courses.
vii. Floods that affect the lakeshore and lower Shire resulting in loss of life, livelihoods and infrastructure.
viii. Lack of gender mainstreaming
ix. Lack of Integrated Water Resources Management

4.5.3 Activities

4.5.3.1 Promote environmental awareness and conservation (Operational Guideline 5.1)

i. Facilitate the formation of community conservation committees [Operational Guidelines 5.1.1 (i)].
ii. Build farmers' capacity to carryout conservation activities [Operational Guidelines 5.1.1 (ii)].

4.5.3.2 Provide technical assistance to promote biological conservation (Operational Guideline 5.2)

i. Promote good agronomic practices to prevent soil erosion [*Operational Guideline 5.2.1*]
ii. Encourage farmers to use soil fertility improvement technologies [*Operational Guideline 5.2.2*]
    a) Encourage use of manure and incorporation of crop residues to improve soil fertility, structure, and water holding capacity.
    b) Conduct on-farm demonstrations on compost manure making, field application of manure, and incorporation of crop residues.
iii. Promote agro-forestry farming technologies [*Operational Guideline 5.2.3*]
iv. Promote alley cropping and mixed tree intercropping [*Operational Guideline 5.2.4*]

4.5.3.3 Provide technical assistance to promote physical conservation Operational Guideline 5.3)

i. Promote contour ridging [*Operational Guideline 5.3.1*]
ii. Promote Tie/Box ridging [Operational Guideline 5.3.2]
iii. Encourage gully reclamation [Operational Guideline 5.3.3]
iv. Encourage stream bank protection [*Operational Guideline 5.3.4*]

a. Discourage farmers from cultivating stream banks and encourage natural vegetation to grow, which provides more permanent and reliable protection than physical structures [Operational Guideline 5.3.4 (i)]
b. Encourage establishment of vegetation along stream banks[Operational Guideline 5.3.4 (ii)]

v. Encourage establishment of vetiver grass [Operational Guideline 5.3.5]
vi. Encourage protection of watershed areas [Operational Guideline 5.3.6]

4.5.3.4 Promote water storage systems (Operational Guideline 5.4)

i. Promote macro catchment techniques [Operational Guideline 5.4.1]
   a. Promote Flood diversion and spreading technique [Operational Guideline (5.4.1 (i)]
   b. Encourage the construction of permeable rock dams [Operational Guideline 5.4.1 (ii)]
ii. Promote rainwater storage systems [Operational Guideline 5.4.2]
   a. Assist communities to construct earth dams [Operational Guideline 5.4.2 (i)]
   b. Assist communities with information and skills to construct rock catchments [Operational Guideline 5.4.2 (ii)]
   c. Encourage the construction of sand dams [Operational Guideline (5.4.2 (iii)]
iii. Facilitate the construction of separate drainage channels [Operational Guideline 5.4.3]
   a. Promote the use of surface drainage system [Operational Guideline 5.4.3 (i)]
   b. Promote use of subsurface drainage system [Operational Guideline 5.4.3 (ii)]
   c. Promote the use of other types of drainage systems [Operational Guideline 5.4.3 (iii)]

4.6 Promote off-farm employment opportunities through economic empowerment and Income Generating Programmes (FSP Priority Strategy No. 4.1.2.2)

4.6.1 Background

Malawi is a country that faces widespread poverty, with a per capita annual GDP of around €205. Income inequality is the highest in Africa with more than 50% of the population living below the poverty line. About 85% of the population live in rural areas and depend almost entirely on subsistence agriculture with an average annual income per household of less than €100, which is insufficient household needs including access to productive resources such as improved seed and fertilizers. Agricultural incomes therefore need to be supplemented by off-farm income such as public works programmes and Income Generating Activities to support smallholder farmers' livelihoods.

4.6.2 Constraints

4.6.2.1 Rehabilitation and upgrading of rural roads and small bridges

i. Poor community needs assessments
ii. Non-competitive system in the selection of contractors for maintenance work.
iii. Poor community mobilisation and participation in project activities.
iv. Lack of community capacity in maintenance work

4.6.2.2 Maintenance of Roads

i. Poor Community Needs Assessments.
ii. Lack of village road maintenance clubs.
iii. Poor financial management.
iv. Poorly equipped clubs.

4.6.2.3 Afforestation activities through improved access to inputs

i. Lack of village forestry clubs.
ii. Lack of awareness by the communities on the benefits of forestry and a forestation.
iii. Lack of inputs for the establishment of tree nurseries.
iv. Lack of skills in forest and tree husbandry techniques.

4.6.2.4 Irrigation development through improved access to inputs

i. Lack of awareness by the communities on the benefits of irrigation.
ii. Limited number of irrigation clubs.
iii. Poorly trained clubs in irrigation techniques, marketing, and business management.
iv. Lack of low cost irrigation technologies.
v. Poorly equipped irrigation clubs.
vi. Lack of inputs for crop production.
vii. Lack of skills in crop husbandry.

4.6.3 Activities

4.6.3.1 Rehabilitation, maintenance and upgrading of rural roads and small bridges (Operational Guideline 6.1)

i. In consultation with DAs and ADCs and based on the District Development Plans, identify, prioritise and select the roads to be maintained, rehabilitated or upgraded. *[Operational Guideline 6.1(i)]*
ii. Identify and select contractors through a competitive bidding process*[Operational Guideline 6.1(ii)]*
iii. In consultation with the DAs and ADCs facilitate the formation of village road maintenance clubs [*Operational Guideline 6.1(iii).]*
iv. Define the approach and the roles of the clubs in public works programme *[Operational Guideline 6.1(iv)]*

v. Set up a bank account for the programme to facilitate maintenance work [*Operational Guideline 6.1.(v*)]
vi. Equip the clubs with necessary tools to carry out the maintenance work *[Operational Guideline 6.1.(vi)]*
vii. Train the clubs in tools and stores management to minimise losses [*Operational Guideline 6.1.(vii)]*

4.6.3.2 Develop productive local forestry activities e.g. fuel wood, timber, and fruit tree production (Operational Guideline 6.2)

i. Create awareness and provide trainings on local forestry activities [*Operational Guideline 6.2.(i)]*
ii. Using PRA techniques facilitate the formation of village forestry clubs. [*Operational Guideline 6.2.(ii)]*
iii. Train the clubs in the benefits of afforestration and reforestation, and fruit production [*Operational Guideline 6.2.(iii)]*
iv. Provide clubs with necessary inputs for the establishment of tree and fruit nurseries [*Operational Guideline 6.2(iv)]*.
v. Train clubs in forestry husbandry techniques (nursery development, planting out, management and maintenance of plantations [*Operational Guideline 6.2(v)]*.
vi. *Provide technical assistance in establishment and management of woodlot* [*Operational Guideline 6.2(vi)]*

4.6.3.4 Develop irrigation activities through improved access to inputs

i. Create awareness in the communities on irrigation activities and its benefits [*Operational Guideline 6.3(i)]*
ii. Encourage and facilitate the formation of irrigation clubs [*Operational Guideline 6.3(ii)]*
iii. Train clubs in leaderships, marketing, and business managements skills [*Operational Guideline 6.3.(iii)]*
iv. Open a Bank Account [*Operational Guideline 6.3(iv)]*
v. Encourage and promote gravity fed surface irrigation, water harvesting and storage, treadle pumps and other appropriate small-scale irrigation technologies [*Operational Guideline 6..(v)]*
vi. Provide appropriate tools and equipment to the clubs [*Operational Guideline 6.3.(vi)]*
vii. Provide necessary inputs for crop production [*Operational Guideline 6.3.(vii)]*
viii. Provide training in irrigation techniques [*Operational Guideline 6.3(viii)]*
ix. Provide training in good crop husbandry [*Operational Guideline 6.3.(ix)]*

4.7 Establishment of Community Grain Banks (FSP Priority Strategy No. 3.1.3.3).

4.7.1 Background

The concept of community grain banks is a relatively new concept in Malawi. A few NGOs such as NASFAM, MALEZA, Concern World Wide and others have supported grain bank activities in a number of districts in Malawi. Grain banks provide one approach to addressing food insecurity problems because it is simple, locally managed by those that benefit from it, and only requires limited external technical support particularly during the initial years of establishment, Because it is initiated at grassroots level, through participatory mechanisms, by those who benefit from it, grain bank development promotes community ownership. Grain banks enable communities to access food at affordable prices during the lean period when grain prices rise dramatically in the open markets. This means that the poor, who depend on the market for grain (especially maize), are cushioned by the grain banks during peak period of scarcity when private traders take advantage of grain scarcity. Grain banks can also be used to store seed within a community, which also cushions farmers from high seed prices just before the planting season. The establishment of community grain banks therefore needs to be supported.

4.7.2 Constraints

i. Weak community organisation for business
ii. Lack of appropriate community level grain storage facilities
iii. Poor pest control practices
iv. Low purchasing power and high grain prices during the lean period
v. Poor record keeping

4.7.3 Activities

4.7.3.1 Conduct needs assessment. [Operational Guideline 7.1]

4.7.3.2 Mobilise and conduct awareness meetings on the need for a community grain bank in the area. [Operational Guideline: 7.2]

i. Identify relevant stakeholders for the community grain banks project and determine resource availability *[Operational Guideline 7.2(i)]*
ii. Facilitate community meetings for problem identification and clarification of constraints to food security as well as an assessment of the scope and seriousness of the problem *[Operational Guideline 7.2(ii)]*
iii. Through PRA, brainstorm and identify a strategy on how such an intervention could be implemented *[Operational Guideline 7.2.(iii)]*
iv. Identify resource requirements, training needs and sources of same *[Operational Guideline 7.2.(iv)]*
v. Scale up campaigns to larger community spelling out the benefits of community grain banks *[Operational Guideline 7.2.(v)]*
vi. Agree on supervision and management arrangements and roles of various stakeholders *[Operational Guideline 7.2.(vi)]*

4.7.3.3 Facilitate the identification of a location for the community grain bank. [Operational Guideline 7.3]

4.7.3.4 Facilitate the election of a grain bank committee. [Operational Guideline 7.4]

i. Assist the communities to come up with constitution to guide the committee in its operations

ii. Ensure that at least some of the committee members are literate people since they will be required to keep various written records

4.7.3.5 Train grain bank committees in grain bank management. [Operational Guideline 7.5]

i. Relevant extension department to train committee on grain quality management. Training should cover such topics as financial management: bookkeeping, cashbooks, stock management, payment vouchers, reconciliation of different records, and cash flow budgets.

ii. Improve committee's understanding and knowledge of how markets function, selection of quality grain (to exclude pests and extraneous material from storage facilities), negotiating prices and general marketing of the concept to neighbouring communities

4.7.3.6 Select an appropriate storage facility. [Operational Guideline 7.6]

4.7.3.7 Construct the storage facility. [Operational Guideline 7.7]

i. Define the resource requirements for the construction of the storage facility. Programme support may be required to fund the construction of the structure particularly cement, iron sheets, nails, planks, and skilled labour *[* (Operational Guideline 7.7.1) *]*

ii. Community should contribute in the construction of the grain bank in cash or in kind *[* (Operational Guideline 7.7.2) *]*

4.7.3.8 Facilitate the opening of Bank Accounts. [Operational Guidelines 7.8]

i. A bank account needs to be opened to a) deposit revolving fund, b) to deposit all proceeds from sale of grain.

ii. The committee should identify signatories to the account including 1 or 2 non-grain bank committee members for transparency. These could be people with high regard in the community e.g. priest, or school headmaster.

4.7.3.9 Support the grain purchases. [Operational Guidelines:7.9]

i. Identify start up-up fund (revolving fund) to enable the community grain bank committee purchase grain *[*Operational Guideline 7.9.1*]*

ii. Identify 2 -3 people in the committee to be responsible for the purchase of grain *[*Operational Guideline 7.9.2*]*

iii. Purchasing should be done during the harvest season when the price is low *[*Operational Guideline 7.9.3*]*

iv. Offer the price that is slightly above that offered by competitors e.g. ADMARC and private traders to attract farmers that are selling grain *[*Operational Guideline 7.9.4*]*

4.7.3.10 Encourage pest Control. [Operational Guideline 7.10]

4.7.311 Encourage the committee to sell grain during the lean period. [Operational Guidelines 7.11]

4.7.3.12 Encourage Annual Review of grain bank operations and reconciliation of records [Operational Guidelines 7.12]

5. INSTITUTIONAL ARRANGEMENTS

5.1 Institutional Framework

The main actors to be involved in the implementation of the FSAP and their roles and responsibilities are summarised in Table 5. In addition to creating the enabling policy environment for re-orientation of food security projects/programmes, MoAFS will be responsible for the overall coordination and management of the FSAP implementation process as well as reviewing and updating the "living part of the document" (*Volume II: Operational Guidelines*). The Ministry will carry out this role through its Planning Department at central level. MoAFS will steer the course by information dissemination concerning the Action Plan targeting all national and district stakeholders. MoAFS will enter into MoUs to formalise the collaboration with development partners and Implementing Partners that are funding/implementing food security initiatives in the country.

The institutional structure of the Food and Nutrition Security Joint Task Force (FNSJTF) shall be used for approval of the Action Plan. The Food Security Policy and Programmes Committee will oversee progress in the implementation of the Action Plan and/or its amendment and update the Plenary Session from time to time on developments taking place. Joint Annual Reviews of progress and achievements of the FSAP at the central level will also be steered and overseen by the Food Security Policy and Programmes Committee.

MoAFS through its Planning Department will roll-out a national training programme and, later on, a series of refreshers on the use of the project compliance assessment grid (PCAD) to raise awareness and equip all implementing partners that have on-going or pipeline food security projects/programmes with relevant skills. ADD M&E Officer under MoAFS will be trained for regular monitoring of project compliance with minimum requirements. Technical backstopping of projects/programmes and the evaluation of the performance of the FSAP shall be done by the DADO. The ADD M&E Officer and the district M&E officer (under MLGRD) will be the main focal points for the day-to day backstopping and M&E functions at district level. They will review the achievements in terms of outputs and outcomes of FS projects and benefits from the re-orientation process. They will quantify FSAP achievements and analyze any constraints in collaboration with the district level staff of the MoAFS. They will add this information to the already existing reporting requirements.

The DEC will review an annual progress report produced by the DADO in collaboration with MLGRD district M&E Officer and advise implementing partners on the way forward. The Annual Progress report will not be an additional report but will be incorporated into the existing reporting requirements of District Agricultural Development Office and that of the MoLGRD at that level.

To effectively play this role, at the central level, MoAFS will ensure that the necessary skills are available within the Planning Department. Three key functions are envisaged.

These are: coordination; M&E and capacity building. Relevant skills will be required for these functions. The coordination function will entail information dissemination, negotiation of MoUs for the implementation of the Action Plan with development partners and practitioners and ensuring that all the 7 strategies get a fair share of attention by on-going and pipeline projects. M&E skills are required to ensure that the process of realignment continues at project and district levels; the contribution of the FSAP to outcome and impact indicators is measured and documented, and overall performance of the FSAP in terms of contribution to Food Security Policy objectives is quantified. M&E will be central to good quality management of the FSAP implementation process. Project implementers may require some training in the application of the Project Compliance Assessment Grid and in designing new projects or adding new components that they have not implemented in the past. The nature of capacity building foreseen will strengthen projects' technical capacities in design and implementation of interventions that address the 7 FSAP strategies, for example, contract farming, dairy farming, water management and environment and land management. It will involve design of training manuals and handbooks for use by IPs in implementing activities in non-traditional areas.

Table 5: Roles and Responsibilities of Major Actors

Sector	Major Actor	Role
Ministry Head Quarters	Ministry of Agriculture and Food Security (Planning Department-Food Security Unit)	• Overall coordination and management • Presentation of the FSAP to the Food and Nutrition Security Joint Task Force (FNSJTF) and higher level government structures for approval • Designing and implementing project approval criteria and procedure for pipeline food security projects/programmes to ensure compliance with FSAP • Roll out of FSAP to relevant national and district level stakeholders through appropriate IEC strategy – and capacity building on the use of Operational Guidelines • Dissemination of the FS *Action Plan* and negotiation and signing of MoUs with development partners implementing FS projects/programmes • Maintenance of an up-to date inventory of existing and pipeline food security projects/programmes • Regular updating of Operational Guidelines, based on new knowledge and technology acquired • Ensuring FSAP is in harmony with ADP implementation. • Monitoring and periodic review of FSAP achievements and constraints and production of progress reports • Coordination of Joint Annual reviews of FSAP
	Ministry of Local Government and Rural Development	• Ensuring FSAP priorities and minimum requirements in the OG are mainstreamed into district authority criteria for approval of food security projects
	Ministry of Economic Planning and Development	• Ensuring overall coherence between Malawi Growth and Development Strategy (MGDS) and FSAP in both its implementation and M&E
	Other line	• Realign national sectoral strategies and programmes to

Sector	Major Actor	Role
	ministries	focus on priorities in the FSAP
Development partners	Bilateral and Multilateral Financial Institutions	• Sign MoUs with MoAFS on the implementation of the FS Action Plan • Re-orient country strategies and current/planned food security programmes to focus on the approved short-to-medium term priorities in the FSAP • Provide technical advice to implementing partners on how best to reorient on-going projects and ensure flexibility in funding mechanisms • Increase resource allocation and technical assistance in support of the identified 8 priority strategies • Share information on best practices from elsewhere on focal activities identified by the FSAP • Participate in Joint Annual Reviews (of processes and outcomes) of FSAP
Civil Society	IPs	• Re-configure existing projects and adjust the design of pipeline projects to meet the minimum requirements spelt out in the Operational Guidelines of the FSAP in consultation with funding sources • Mobilize resources for the 8 strategies of the FSAP • Feed information to MoAFS on how the FSAP is working – achievements and constraints • Participate in Annual DEC Meetings to review FASP achievements and gaps • Participate in Joint Annual Reviews of FSAP
	Private Sector	• Realign strategic business plans, priorities and resource allocations to take advantage of new opportunities and initiatives arising from the re-orientation of NGO/donor/government projects and programmes • Supply training services for the roll-out of the FSAP • Take part in participatory monitoring and evaluation of FSAP (e.g., Joint Annual Review Meetings)
	Farmers/Farmer Unions	• Realign strategic plans and priorities to take advantage of new initiatives arising from the re-orientation of NGO/donor/government projects and programmes • Participate in monitoring and evaluation of FSAP (e.g., joint annual reviews)
MoLGRD	District Authority	• Screen projects for FSAP OGMR compliance • Disseminate information on the FSAP as and when required by implementing partners • Allocate resources to interventions that support the FSAP • Participate in regular monitoring and review of progress and measurement of development outcomes achieved
MoAFS	DADO	• Technical backstopping to IPs

Bilateral and multilateral development partners have an important role in providing the moral, political, financial and technical support for FSAP implementation. Many donors are already funding a number of relevant projects/programmes directly through PMUs or indirectly through IPs although with little harmonisation of approaches. Most of these projects still have a few years to go before being wound up. Donors have to agree to their reorientation in line with the FSAP priorities if these projects are to remain relevant to the

short-to-medium term priorities spelt out by Government in the FSAP. Such realignment may imply changing significantly or marginally the initial scope and budget of a particular intervention. It is anticipated that development partners will sign up to make FSAP the key instrument for harmonisation of approaches towards greater aid effectiveness in the area of food security. Not only will they ensure flexibility in funding mechanisms and policies to enable refocusing of projects/programmes but they are expected to update their country strategies as well in line with this new initiative by Government. This move may also affect pipeline activities as development partners gear themselves up towards increasing attention to the 8 strategies identified as the priorities for the next five years.

Development partners shall also harness their global experience, share information on best practices and provide direct technical assistance to implementing partners on how best to adjust on-going projects without losing gains already made in other necessary areas that have not been captured by the FSAP. Most importantly, they DPs will also be invited to participate in Joint Annual Reviews with Government to check on progress and outcomes of the FSAP.

IPs implementing food security projects will be expected to cooperate by adjusting their projects at the earliest opportunity. They will participate by re-configuring project design to include activities, outputs, outcomes and impacts that are consistent with the priorities highlighted in the FSAP. IPs will consult the FSAP (Volume I) to confirm the 8 priority strategies identified by Government. They will review each project to identify the corresponding FSAP strategies being addressed by the project. For each of the strategies, they will examine the activities spelt out in the Action Plan to identify the ones relevant to their projects. Once they have identified the activities, IPs will now turn to the Operational Guidelines for each activity (Volume II of FSAP) and confirm whether their projects satisfy the minimum requirements for each activity. If they do not meet the minimum requirements, they consult with their donors, implementing partners and beneficiaries on how best to adjust their projects so as to be in conformity with the minimum requirements set by the government.

It is recognised that substantial adjustment of projects/programmes is not easy unless the project is still at pilot testing stage or is now due for a major review at mid-term review stage. It would be easier also to adjust a project/programme when it has several phases and it has come to an end of one of the phases. It is also not easy to adjust substantially a project that is performing well otherwise some gains made could be lost in the process.

IPs will also be expected to adjust the design of pipeline projects to ensure they satisfy the minimum requirements spelt out in the Operational Guidelines of the FSAP. This will be done in consultation with their funding sources as well as potential partners and beneficiaries.

Finally, they will continue mobilizing resources for the 8 strategies of the FSAP. During project execution they will also regularly provide information to MoAFS and the MoLGRD M&E Officer on how the FSAP is working – highlighting major achievements and any constraints encountered. They will participate in Annual DEC Meetings as well as Joint Annual Reviews to assess progress in FSAP implementation.

The private sector (including producer organisations) shall realign their strategic business plans, priorities and resource allocations to take advantage of new opportunities and initiatives arising from the re-orientation of NGO/donor/government projects and programmes. They will supply where necessary some of the training services for the roll-out of the FSAP as well as take part in participatory monitoring and evaluation of FSAP (e.g., Joint Annual Review Meetings).

5.2 Implementation Plan

The envisaged implementation plan has 3 phases:

- Preparatory phase
- Implementation phase; and
- Monitoring and evaluation phase.

5.2.1 Preparation Phase

1) Approval of the Food Security Action Plan by the FNSJTF Plenary Session; which will be preceded by presentation to the Food Security Policy Committee of the Food and Nutrition Security Joint Task Force.

2) Dissemination of operational guidelines to the district governmental officers (DADOs, M/E MLGRD staff, District authorities) and to the implementing partners (PMUs, IPS, etc). This step should help MoAFS to get some additional inputs to improve the operational guidelines from the stakeholders that are implementing projects in the field. This should avoid having too many theoretical recommendations that at the end can not be implemented.

3) Trainings at district level to clarify the way to implement the FSAP. This activity will target district government officers (DADOs, M/E MLGRD staff, ADD M&E Officers, District authorities), farmer organizations, and implementing partners (PMUs, IPs, etc).

4) Developing an inventory of all food security projects in Malawi based on the MoAFS project database and additional projects proposed by district officials, donors and implementing partners (PMUs, IPS, etc).

5) Grading of food security projects based on the criteria proposed in the FSAP to generate baseline data on how well projects are compliant with the operational guidelines and the minimum requirements of the FSAP.

6) Identifying projects (on-going or pipeline) that are interested in participating in the alignment process.

7) Drafting, negotiation and signing of MoUs between MoAFS and implementing agencies and donors, detailing the projects to be realigned and the roles and responsibilities of the parties involved.

5.2.2 Implementation Phase

The implementation of the FSAP will be done by the DADOs, IPs and other implementing agencies. It is envisaged that this process will start in June 2008 after the signing of MOUs between MoAFS and the implementing partners.

FSAP implementation will take two forms: *centralised* and *decentralised* implementation. At the centralised level, responsibility for steering the course shall be vested in the Food Security Policy and Programmes Committee of the FNSJTF, whilst daily coordination and follow-up of the entire process shall be executed by the Planning Department of the Ministry of Agriculture and Food Security.

At the decentralised level (i.e., district or project level), the implementing partners once trained on the application of the OG will assess the compliance of their projects and re-orient them accordingly. This will be a continuous process of realignment and refinement and shall be technically backstopped by the DADO playing a lead role but supported by other relevant government officers working at the district level. Progress monitoring and evaluation will be the responsibility of the MoLGRD M&E Officer stationed at the district level. However, other members of the DEC will also participate to support and complement the M&E activities of the MoLGRD M&E Officer. Annually, the DEC will review implementation progress and advise IPs on necessary action to take.

The Table below summarises the steps involved in the implementation of the FSAP.

Table 6: Timetable for Operationalizing the FSAP

Action	Responsible Person/Agency	Time Frame	Indicators
Approval of Final Draft	FNSJTF/TS Plenary Session	January 2008	Approved FSAP document
Dissemination of Operational Guidelines (including training)	DAPS, all departments in MoAFS	Jan– Apr 2008	Progress report on dissemination of operational guidelines
Update inventory of all food security projects implemented at District level	DADO, Planning Department, M/E officers MLGRD, ADDM&E Officers	Jan-Apr 2008	Report on List of food security projects implemented in districts
Grade the food security projects at District Level	DADO, Planning Department, M/E officers MLGRD/ADD	From May 2008, continuous	List of graded projects List of areas for re-orientation
Meetings with Projects at national and district level for explaining scope of the action plan	Planning Department, M/E officers MLGRD/ADD, DADO, and District Authorities	June – Dec 2008	Reports of meetings
Sign MOUs with specific IPs/implementing agency to re-orient	DAPS, all Departments in MoAFS, NGO and Implementing Partners, M/E officers MLGRD/ADD	Jul – Dec 2008	No. of MOUs signed with implementing partners
Implementation (Compliance) of the	DADO, NGO and Implementing Partners	From July 2008	No. of projects that are re-orienting

Action	Responsible Person/Agency	Time Frame	Indicators
Operational Guidelines at District level			
Monitoring and Evaluation of implementation process	DADOs, MLGRD/IP M&E officers	At least once per year	• M and E reports, submitted every 6 months
Periodic review/updating of Operational Guidelines	DAPS, Implementing partners	At least once per year	• Updated guidelines

5.2.3 Monitoring and Evaluation of the FSAP

5.2.3.1 Overview

The Food Security Policy already has an M&E system that was set up at national level to monitor the outputs, outcomes and impacts of the policy strategies enunciated. The system has been in operation for 2 years and specifically monitors progress towards achievement of the food security policy objectives. The objectives of the policy are spelt out in both the policy statements (statements of intent) and the explicit objectives contained in the policy. For each policy statement a number of strategies were listed. Indicators for outputs were formulated by deduction from the policy strategies whilst the indicators for outcomes were linked to the policy statements. Indicators for impact were deduced from the specific policy objectives elaborated in the policy document. In addition, performance of macro-economic and environmental factors within and beyond government's control that affect achievement of intended outputs, outcomes and impacts is also being monitored and used to explain the trends in the indicators. In summary a total of 16 impact indicators, 27 output indicators and 14 macro/environmental indicators are being monitored and evaluated under this system. Data on these indicators is being collected analysed and discussed twice per by a multi-stakeholder Working Group that was established specifically for this purpose. The WG is comprised of government and non government agencies involved in monitoring the food and nutrition security situation in the country.

Since the FSAP is concentrating on 7 of the food security policy strategies that are already being monitored through the above system, FSAP 7 strategies could also be monitored at national level using some of the same indicators in the already established policy level M&E system or by setting new ones as appropriate that could be added to the existing system.

It should be noted that the national M&E system draws on national statistics that capture the aggregate impacts of several programme/project initiatives either at district, region or national level. The national M&E system therefore does not monitor performance of individual projects but the aggregate impact of a collection of projects nationwide that may be addressing a similar strategy (e.g. promotion of cash crop production).

To monitor individual projects, a second system already exists which harmonises the monitoring of NGO food security and nutrition projects. Under this system, projects are collecting project level Output and Impact indicator data for 23 indicators. Some of these indicators would apply for assessment of the progress being made at micro/project level in relation to 7 FSAP strategies.

5.2.3.2 Elaboration of the M&E system for the FSAP

The FSAP M&E is therefore expected to take place at two levels: centralised (national) level; and the decentralised (project level). At the national level shall be the monitoring of the FSAP contribution to policy level outcomes and impacts. This shall be seen from the pace of change in indicators already being monitored under the policy M&E system. At the decentralised level shall be two types of monitoring: (1) the extent to which projects comply with the minimum requirements set in the FSAP (i.e. compliance monitoring); and (2) the contribution made by projects to implementation of the FSAP. In summary therefore, 3 levels of monitoring are anticipated for the FSAP (summarised in the table below).

Table 7: Levels at which FSAP shall be monitored

Type of monitoring	Details
Compliance monitoring	Are projects scoring better under compliance – more A and less D projects (see Chapter 3)
Contribution to the implementation of FSAP	Projects will collect project level Output and Impact indicators based on the 23 indicators already agreed nationally
Policy level progress	Monitoring contribution of the FSAP to FSP objectives. This will be done using some indicators from the 57 already agreed nationally

Compliance monitoring

Compliance monitoring is a type of *process monitoring*. It shall involve visits to individual projects and the application of the grading system to assess the degree of alignment with the FSAP minimum guidelines. The first assessment has to be done immediately to establish the baseline scenario as a basis for monitoring progress towards full alignment. Compliance monitoring will be more regular at the *decentralised level*. ADD M&E Officers and MLGRD M&E Officers shall plan and regularly visit projects/programmes to assess the projects/programmes for compliance with the FSAP operational guidelines. The first level of compliance shall be with the minimum guidelines (partial compliance) after which interest will be on compliance with all guidelines (full compliance).

Each implementing partner will be expected to cooperate by providing relevant information and progress reports MoLGRD M&E Officer and ADD M&E Officer to

facilitate the execution of M&E. The role of the IPs will be spelt out in the MoU to be signed between MoAFS and individual IPs.

In addition, once a year, a progress monitoring report will be compiled by MoLGRD M&E Officer with the assistance of the DADO and presented to the District Executive Committee for wider review of the process and reach consensus on key action points for implementing partners to address or consolidate in the following year. A copy of the report will be sent to MoAFS.

From the central level, the M&E process at decentralised level will be monitored through random visits to districts and project sites by senior MoAFS and MLGRD staff. In addition, the need for a joint annual review exercise (review workshop) by the Food Security Policy and Programmes Committee is foreseen and will be coordinated by the MoAFS at central level whereby other key government ministries (EPD, OPC, etc), development partners involved in food security (e.g., EC, WB, NORAD, JICA, USAID, etc) and IPs may participate in the joint verification of progress and impact achieved vis-à-vis the food security action plan agenda and the associated development outcomes at local, regional and national levels.

Table 8: Monitoring indicators for the FSAP

Strategy	Output Indicator
1. Promote contract farming for agricultural production development	
2. Encourage domestic production of high quality improved varieties	• Proportion of cultivated area planted to high quality improved varieties (e.g., maize hybrid seed)
3. Encourage integration of livestock in smallholder farming systems	• Proportion of smallholder farmers owning different types of livestock by district and at national level • Average number of livestock units owned per smallholder farmer by district and nationally.
4. Create conducive environment for private sector investment and local community participation in irrigation development.	• Land under irrigation in the smallholder farming sector by (irrigation) technology per year • Land under irrigation in the estate sector by technology per year • Proportion of irrigable land under irrigation per year.
5. Promote environment, land and water management for sustainable agricultural development.	• Proportion of farmers practicing improved land, water, and environment management technologies
6. Promote off-farm employment opportunities through economic empowerment and IGA programmes	• Income per capita for low and medium income groups in rural and urban areas expressed in real terms
7. Improve market efficiencies to give the poor better prices for their products.	• Income per capita in rural areas expressed in real terms
8. Establish community grain banks.	

Monitoring projects' contribution to the implementation of FSAP

The main tool for this type of monitoring shall be the existing system to Harmonise M&E of NGO Food Security and Nutrition Programmes which was set up by Government with the collaboration of the IPs, and has been running for the past two years. The system is based on voluntary monitoring by IPs, of 23 project level indicators on outputs and impacts of their projects. The system standardises the types of indicators, their definitions, methodology for their calculation, data requirements and frequency of data collection and analysis when monitoring and evaluating NGO food security and nutrition projects. IPs update their indicators at agreed intervals and feed the information into a central Agriculture, Food Security, Nutrition and Natural Resources database kept by the Planning Department of the MoAFS. IPs and ADD M&E officers and MLGRD M&E Officers have been trained on how to implement the system.

To aid this type of monitoring, IPs may be required to submit to the DEC via the MoLGRD district M&E Officers, periodic reports summarising progress achieved in contributing to the implementation of the FSAP. They will collect information on indicators that are relevant to the 7 priority strategies highlighted in the FSAP, and regularly feed this information to DEC and to MoAFS at the central level as well so that it is entered into the database. This role to be played by the projects needs to be included in the criteria for project approval at the central and district level and incorporated into the MoUs that will be signed between the MoAFS and IPs.

Policy level monitoring

Outputs, outcomes and impacts of the FSP will be monitored through Planning Department of MoAFS at central level using the existing Food Security and Nutrition Policies Monitoring and Evaluation System already set up by Government in 2005 and has been operational. The system monitors the achievements of the two policies. The system monitors 16 impact indicators, 27 output indicators and 14 macro-economic and environmental indicators which are regularly updated by focal points who collect and analyse data and meet as a Working Group twice per year (March and September) to review the progress on the indicators. The Working Group, which is jointly chaired by Ministry of Economic Planning and Development and the Ministry of Health, and has a broad membership (from government and civil society), feeds its findings and recommendations to the Joint Food and Nutrition Security Task Force through the Information Committee of the Task Force. The system will also commission policy studies to inform decision-makers and implementers.

ANNEXES

ANNEX 1: RANKING OF PRIORITISED STRATEGIES

STRATEGIES	Production		Employment Creation	Institutional Capacity	Social Impact	
	Crop	Livestock				
Scoring: scale of 1 - 5: (1 = poor and 5 = excellent)						
	0.30	**0.20**	**0.20**	**0.20**	**0.10**	**Rank**
SUSTAINABLE FOOD AVAILABILITY						
1. Increase food availability to all household						
1.1. Promote contract faming for agricultural production development	5	5	4	3	1	**4.0**
	1.5	*1*	*0.8*	*0.6*	*0.1*	
1.2. Strengthen management of SGR and maintain adequate stocks of the SGR	1	1	1	4	3	**1.8**
	0.3	*0.2*	*0.2*	*0.8*	*0.3*	
1.3. Diversity the types of stored in SGR at community and national level to include all six groups	1	1	1	1	1	**1.0**
	0.3	*0.2*	*0.2*	*0.2*	*0.1*	
2. Promote Irrigation development and integrated water management						
2.1 Create conducive environment for private sector investment and local community participation in irrigation development	5	3	3	3	1	**3.4**
	1.5	*0.6*	*0.6*	*0.6*	*0.1*	
2.2 Facilitate investment in rainwater harvesting and water management	2	1	1	1	1	**1.3**
	0.6	*0.2*	*0.2*	*0.2*	*0.1*	
2.3 Encourage use of lakes, rivers, and underground water resources for irrigation	5	3	4	1	2	**3.3**
	1.5	*0.6*	*0.8*	*0.2*	*0.2*	
2.4 Encourage sustainable utilisation of wetlands for agricultural use (clarify, is it scheme)	5	3	3	2	1	**3.2**

	1.5	*0.6*	*0.6*	*0.4*	*0.1*	
3. Increase Access to Agricultural Inputs						
3.1 Ensure stability of fertiliser supply (buffer stock)	5	2	1	5	1	**3.2**
	1.5	*0.4*	*0.2*	*1*	*0.1*	
3.2 Encourage/promote domestic production oh high improved varieties	5	5	4	5	3	**4.6**
	1.5	*1*	*0.8*	*1*	*0.3*	
3.3 Promote community grain banks for easy access and sustainability	5	2	1	3	4	**3.1**
	1.5	0.4	0.2	0.6	0.4	
4. Promotion of Crop Protection						
4.1 Encourage farmers to follow appropriate cultural and management practices	5	3	1	3	3	**3.2**
	1.5	*0.6*	*0.2*	*0.6*	*0.3*	
4.2 Encourage Pest Management (IPM) for crop protection as a way of safeguarding farming and maintaining productive economy	5	4	2	2	1	**3.2**
	1.5	*0.8*	*0.4*	*0.4*	*0.1*	
4.3 Facilitate storage pest management	4	2	2	4	4	**3.2**
	1.2	0.4	0.4	0.8	0.4	
5. Promote Animal Power and farm mechanisation						
5.1 Increase access to drought animals and animal drawn implements	5	5	4	2	3	**4.0**
	1.5	*1*	*0.8*	*0.4*	*0.3*	
5.2 Expand training and utilisation of animal power	5	5	1	2	1	**3.2**
	1.5	*1*	*0.2*	*0.4*	*0.1*	
5.3 Facilitate access to tractors and tractor-mounted implements especially for farmer organisations and groups	5	4	2	1	1	**3.0**
	1.5	*0.8*	*0.4*	*0.2*	*0.1*	
6. Increase access to credit by female and male farmers						
6.1 Support and empower micro-finance institutions to provide financial services to farmers	5	5	5	3	4	**7.5**
	1.5	*1*	*4*	*0.6*	*0.4*	
6.2 Encourage the formation of farmer club, associations and cooperatives to benefit from financial services	5	5	4	3	4	**4.3**

	1.5	*1*	*0.8*	*0.6*	*0.4*	
6.3 Develop a legal and regulatory framework for the financial services sector and micro finance institutions	5	5	2	5	5	**4.4**
	1.5	*1*	*0.4*	*1*	*0.5*	
7. Promote environmental and land management for the sustainable agriculture development						
7.1 Guarantee security in land tenure and transparency in land transfer system	5	5	5	1	5	**4.2**
	1.5	*1*	*1*	*0.2*	*0.5*	
7.2 Ensure implementation of land re-distribution programme to relieve land pressure and encourage utilisation of arable land	5	5	5	1	5	**4.2**
	1.5	*1*	*1*	*0.2*	*0.5*	
7.3 Promote conservation of land and proper utilisation based on applicable instruments such as EIA, audits, and land use plans	5	5	3	1	4	**3.7**
	1.5	*1*	*0.6*	*0.2*	*0.4*	
7.4 Ensure the regulation that requires tobacco estates to allocate a proportion of their land for afforestration	1	1	1	2	1	**1.2**
	0.3	0.2	0.2	0.4	0.1	
7.5 Develop appropriate technology and extension methods aimed at improving and maintaining soil fertility	5	3	1	2	1	**2.8**
	1.5	*0.6*	*0.2*	*0.4*	*0.1*	
7.6 Prevent water, soil and air pollution from agro-chemicals	4	3	1	1	1	**1.0**
	0.30	*0.20*	*0.20*	*0.20*	*0.10*	
8. Develop and promote adoption of appropriate technologies						
8.1 Strengthen demand-driven research and research based extension system using participatory approaches	5	5	5	4	4	**4.7**
	1.5	*1*	*1*	*0.8*	*0.4*	
8.2 Facilitate capacity building in relevant fields researchers, extension workers, farmers and other stakeholders	5	5	5	4	4	**4.7**
	1.5	*1*	*1*	*0.8*	*0.4*	
8.3 Strengthen farmer based organisations to improve extension service delivery	5	5	5	4	4	**4.7**
	1.5	*1*	*1*	*0.8*	*0.4*	

8.4 Encourage research, manufacturing of products and marketing of appropriate technologies	5	5	5	3	5	**4.6**
	1.5	*1*	*1*	*0.6*	*0.5*	
9. Promote Animal Health and Livestock Development						
9.1 Develop capacity of livestock farmers & extension workers in production, pest & disease prevention, treatment & marketing	2	5	3	4	4	**3.4**
	0.6	*1*	*0.6*	*0.8*	*0.4*	
9.2 Develop mechanisms to ensure security of livestock in the country	1	5	1	1	1	**1.8**
	0.3	*1*	*0.2*	*0.2*	*0.1*	
9.3 Encourage/Promote integration of livestock into smallholder farming systems	5	5	4	4	4	**4.5**
	1.5	*1*	*0.8*	*0.8*	*0.4*	
9.4 Expand animal health service delivery (dip tanks etc)	1	5	2	1	1	**2.0**
	0.3	*1*	*0.4*	*0.2*	*0.1*	
9.5 Encourage/Promote adding value to produce meat and milk products	1	5	5	2	4	**3.1**
	0.3	*1*	*1*	*0.4*	*0.4*	
10. Promote Fisheries and aquaculture development						
10.1 Integrate fish farming/aquaculture into irrigation development programmes	3	2	3	2	2	**2.5**
	0.9	*0.4*	*0.6*	*0.4*	*0.2*	
10.2 Create a conducive investment climate for commercial fisheries and agriculture	3	2	2	2	1	**2.2**
	0.9	*0.4*	*0.4*	*0.4*	*0.1*	
10.3 Empower local communities to manage fisheries resources	2	2	2	1	2	**1.8**
	0.6	*0.4*	*0.4*	*0.2*	*0.2*	
11. Promote sustainable harvesting of natural food resources						
11.1 Ensure sustainable harvesting of foods in accordance with existing NR and Wildlife Management policies	2	1	1	1	1	**1.3**
	0.6	*0.2*	*0.2*	*0.2*	*0.1*	
11.2 Promote the production of indigenous foods	1	1	1	1	1	**1.0**
	0.3	*0.2*	*0.2*	*0.2*	*0.1*	
12. Improve the coordination and management of food aid and imports						

12.1 Promote a coordinated approach to planning and management of food aid and commercial imports	1	1	1	2	5	**1.3**
		0.2	*0.2*	*0.4*	*0.5*	
12.2 Ensure that food aid conforms to the bio-safety and other related legislations	1	1	1	2	5	**1.6**
	0.3	*0.2*	*0.2*	*0.4*	*0.5*	
13. Improve access to domestic, regional and international markets						
13.1 Strengthen private sector participation to ensure timely provision of inputs and purchase of sufficient produce	5	5	4	4	2	**4.3**
	1.5	*1*	*0.8*	*0.8*	*0.2*	
13.2 Regulate and facilities agricultural markets of inputs and outputs at national, regional & international levels	5	5	4	3	2	**4.1**
	1.5	*1*	*0.8*	*0.6*	*0.2*	
13. 3 Expand and strengthen the development and rehabilitation of rural infrastructure	5	5	5	4	5	**4.8**
	1.5	*1*	*1*	*0.8*	*0.5*	
13.4 Establish an operational integrated market information system	4	4	1	2	1	**2.7**
	1.2	0.8	0.2	0.4	0.1	
SUSTAINABLE FOOD ACCESS						
14. Promote sustainable access to adequate nutritious food and other resources at household and national level						
14.1 Formalise trade in foods and other economic products in line with bilateral, regional & international trade agreements	1	1	1	5	1	**1.8**
	0.3	*0.2*	*0.2*	*1*	*0.1*	
14.2 Promote traditional and cultural practices that improve food security for women, men, boys and girls	1	1	1	1	5	**1.4**
	0.3	*0.2*	*0.2*	*0.2*	*0.5*	
15. Increase the purchasing power/real income for all those who depend on market their source of food supply						
15.1 Improve market efficiencies to give the poor better prices for their products	5	5	5	2	5	**4.4**
	1.5	*1*	*1*	*0.4*	*0.5*	
15.2 Promote off-farm employment opportunities through econ. Programs and	5	5	5	3	5	**4.6**

IGAs						
	1.5	*1*	*1*	*0.6*	*0.5*	
15.3 Promote equitable income distribution, especially for women through improved market knowledge	4	4	4	1	4	**3.4**
	1.2	*0.8*	*0.8*	*0.2*	*0.4*	
16. Transform subsistence producers into commercial oriented producers						
16.1 maximise the potential for earnings from assets of subsistence producers through better markets?	5	5	5	3	1	**4.2**
	1.5	*1*	*1*	*0.6*	*0.1*	
16.2 Promote equitable distribution of assets within the household through clear assets ownership	2	2	2	1	4	**2.0**
	0.6	*0.4*	*0.4*	*0.2*	*0.4*	
16.3 Support producers to combat theft in rural areas through expansion of community policing	1	1	1	1	1	**1.0**
	0.3	*0.2*	*0.2*	*0.2*	*0.1*	
17. Improve delivery of social support to the poor and socio-economically vulnerable individuals						
17.1 Ensure transparent and cost effective delivery of social economic support functions	1	1	1	1	5	**1.4**
	0.3	*0.2*	*0.2*	*0.2*	*0.5*	
17.2 Improve targeting mechanisms for the delivery of safety net programmes including cash based transfer	1	1	1	1	5	**1.4**
	0.3	*0.2*	*0.2*	*0.2*	*0.5*	
17.3 Put in place mechanisms to remove all transient obstacles to ensuring access for people cut off from usual food access channels	1	1	1	2	5	**1.6**
	0.3	*0.2*	*0.2*	*0.4*	*0.5*	
FOOD STABILITY						
18. Improve the management of disasters						
18.1 promote a coordinated approach to disaster preparedness and management	1	1	1	1	5	**1.4**
	0.3	*0.2*	*0.2*	*0.2*	*0.5*	
18.2 Ensure allocation of adequate preparedness to disaster management	1	1	1	1	5	**1.4**

	0.3	*0.2*	*0.2*	*0.2*	*0.5*	
18.3 Improve system of assessing possibilities of a shock	1	1	1	1	5	**1.4**
	0.3	*0.2*	*0.2*	*0.2*	*0.5*	
19. Develop an Institutional Capacity to implement the food security policy and programmes	5	5	5	5	5	**5.0**
	1.5	*1*	*1*	*1*	*0.5*	
20. Develop a comprehensive Food and Nutrition Information systems, Monitoring and Evaluation	5	5	5	5	5	**5.0**
	1.5	*1*	*1*	*1*	*0.5*	

ANNEX 2: PROCESS OF DEVELOPING THE FOOD SECURITY ACTION PLAN

The FSP Action Plan was developed as follows:-

i. Establishing the criteria for prioritizing the key areas of the Food Security Policy to be implemented with the action plan. The criteria was discussed and agreed by the major stakeholders through a series of consultations and two meetings of the Food Security Policy and Programmes Committee of the Food Security and Nutrition Joint Task Force;

ii. Establishing the principles and technical approaches/modalities that would be used to guide re-orienting projects/programmes;

iii. Drafting the Action Plan and simultaneously networking with projects, implementing agencies and donors in order to establish partnerships for the implementation of the action plan;

iv. Liaising with the ADP focal area working groups to minimise overlaps, duplications and inconsistencies; and

v. Liaise with ADP focal area working groups to verify if the prioritised strategies are in line with the ADP result frame.

vi. Discuss the Action Plan with the Food Security Policy and Programmes Committee (in a meeting that was held on 21 August 2007); and

vii. Informing and presenting at district level the Action Plan

The process of action plan was conducted in a participatory, educational and interactive manner and involved the main professional actors in food security (NGOs, farmers organizations, traders, projects), the government services involved (i.e. Planning Division of the MoAFS) and donors.

GOVERNMENT OF MALAWI

FOOD SECURITY ACTION PLAN

VOLUME II

OPERATIONAL GUIDELINES

Ministry of Agriculture and Food Security

Lilongwe

January 2008

Table of Contents

ACRONYMS **1**
ABOUT THE OPERATIONAL GUIDELINES **3**

1. Promote Contract farming for agricultural production development **12**

1.1 Promote coordinated crop and livestock production **13**
1.2 Train farmer clubs/associations on different topics **14**
1.3 Link Farmers to sources of information.....Error! Bookmark not defined.
1.4 Promote adult literacy training targeting producers **15**
1.5 Link farmers to providers of legal services to prepare them for recourse in the event of breach of contract by agribusiness partners sponsoring CF **16**
1.6 Link farmers to public and private agribusiness partners **16**
1.7 Promote disaster risk insurance for crop and livestock commodities **16**

2. Encourage domestic production of high quality improved varieties **18**

Cereals 18
2.1 Maize [*Zea mays*] **18**
2.2 Rice [*Oryza sativa*] **23**
Root and Tuber Crops **26**
2.3 Cassava [*Manihot esculenta*] **26**
2.4 Sweet Potato [*Ipomoea batatas*] **28**
2.5 European Potato [*Solanum tuberosum*] **29**
Grain legumes **31**
2.6 Phaseolus Beans [*Phaseolus vulgaris*] **31**
2.7 Groundnuts [*Arachis hypogaea*] **33**
2.8 Soya Beans [*Glycine max*] **34**
2.9 Pigeon Peas [*Cajanas cajana*] **36**
Fruit Production **37**
2.10 Citrus Fruits **37**
2.11 Banana and Plantains [*Mussa spp*] **40**
2.12 Pineapples [Ananas comosus] **42**
2.13 Mangoes [*Mangifera indica*] **44**
2.14 Avocado Pears [*Persica merticana*] **47**
2.15 Paw Paws [*Carica papaya*] **48**
Vegetable Production **51**
2.16 Cabbage [*Brassicaraceavar capitata*] **51**
2.17 Tomatoes [*Lycopersicon esculentum*] **52**
2.18 Onions [*Allium sepa*] **53**
2.19 Leafy vegetables **54**
2.20 Lettuce [*Lastuca sativa*] **56**

3. Promote integration of livestock into smallholder farming systems **58**

3.1 Dairy cattle **58**
3.1.1 Provide technical assistance to increase dairy production **58**
3.2 Beef production **60**
3.2.1 Provide technical assistance to increase beef production through stall-feeding **60**

3.3 Goat Production 61
3.3.1 Provide technical assistance to improve goat production 61
3.4 Poultry Production 62
3.4.1 Provide technical assistance to increase poultry production 62

4. Create a conducive environment for private sector investment and local community participation in irrigation development 65

4.1 Provide guidelines for selection of irrigation sites 65
4.2 Provide guidance on selection of appropriate irrigation method 65
4.3 Building Capacity and Capabilities of Stakeholders 67
4.3.1 Ensure Participation, Ownership and Commitment to irrigation development 67
4.3.2 Provide Technical Assistance to irrigation schemes 68
4.3.3 Facilitate the formation of Water Users Association (WUA) 68
4.3.4 Facilitate Farmers' Access to Credit 69
4.3.5 Build Capacity of Farmers Groups 69
4.4 Provide guidance in selection of Recommended Water Harvesting Practices 70

5. Promote environmental, land and water management for sustainable agricultural development 73

5.1 Environmental awareness and conservation 73
5.1.1 Promote environmental awareness and conservation 73
5.2 Provide technical assistance to promote biological conservation 73
5.2.3 Promote agro-forestry farming technologies 74
5.3.2 Promote Tie/Box ridging 76
5.3.3 Encourage gully reclamation 77
5.3.4 Encourage stream bank protection 77
5.3.5 Encourage establishment of vetiver grass 77
5.3.6 Encourage protection of watershed areas 78
5.4 Promote water storage systems 78
5.4.1 Promote macro catchment techniques 78
5.4.2 Promote rain water storage systems 79
5.4.3 Facilitate the construction of separate drainage channels 79

6. Promote off-farm employment opportunities through economic empowerment and Income Generating Programmes 82

6.1 Rehabilitating, maintaining and upgrading of rural roads and small bridges 82
6.1.1 In consultation with DAs and ADCs and based on the District Development Plans, identify, prioritise and select the roads to be maintained, rehabilitated or upgraded. 82
6.1.2 Identify and select contractors through a competitive bidding process. . 82
6.1.3 In consultation with the DAs and ADCs facilitate the formation of village road maintenance clubs (the clubs should nominate chairman, secretary, treasurer, and other members). 82
6.1.4 Define approach, role of the club in the public works programme. 82
6.1.5 Set up a bank account for the programme. 82
6.1.6 Equip the clubs with necessary tools to carry out the work. 82

6.1.7 Train clubs in tools and stores management to minimize losses. 82
6.2 Developing productive local forestry activities (e.g. fuel wood, timber, and fruit tree production) 82
6.2.1 Create awareness and provide trainings on local forestry activities..... 82
6.2.2 Using PRA techniques facilitate the formation of village forestry clubs. 82
6.2.3 Train the clubs in the benefits of afforestration and reforestation, and fruit production. 82
6.2.5 Train the clubs in the forestry husbandry techniques such as: nursery development, planting out, management and maintenance of plantations. 83
6.2.2 Provide technical assistance in establishment and management of woodlot 83
6.3 Develop irrigation activities through improved access to inputs 85
6.3.4 Open a Bank Account 85
6.3.5 Encourage and promote gravity fed surface irrigation, water harvesting and storage, treadle pumps and other appropriate small scale technologies. 85
6.3.6 Provide necessary tools and equipment to the clubs 86
6.3.7 Provide necessary inputs for crop production 86
6.3.8 Provide training in irrigation techniques 86
6.3.9 Provide training in crop husbandry 86
6.4 Minimum Standards 86
6.5 Technical Information on Public Works Programmes 86

7. Establishment of Community Grain Banks 87

7.1 Conduct Needs Assessment 87
7.2 Mobilise and conduct awareness meetings on the need for a community grain bank in the area 88
7.2.1 Identify relevant stakeholders for the community grain banks project and determine resource availability 88
7.2.2 Facilitate community meetings for problem identification and clarification of constraints to food security as well as an assessment of the scope and seriousness of the problem 88
7.2.3 Through PRA, brainstorm and identify a strategy on how such an intervention could be implemented 88
7.2.4 Identify resource requirements, training needs and sources of same 88
7.2.5 Scale up campaigns to larger community spelling out the benefits of community grain banks 88
7.2.6 Agree on supervision and management arrangements and roles of various stakeholders 88
7.3 Facilitate the identification of a location of the community grain bank .. 88
7.4 Facilitate the election of a grain bank committee 89
7.5 Train grain bank committees in grain bank management 89
7.6 Select an appropriate storage facility 89
7.7 Construction of the storage facility 89
77.1 Define the resource requirements for the construction of the storage facility. Programme support may be required to fund the construction of the structure particularly cement, iron sheets, nails, planks, and skilled labour 89
7.7.2 Community should contribute in the construction of the grain bank in cash or in kind. 90

7.8 Facilitate the opening of a bank account 90
7.9 Support grain purchases 90
7.9.1 Identify start up-up fund (revolving fund) to enable the community grain bank committee purchase grain. 90
7.9.2 Identify 2 -3 people in the committee to be responsible for the purchase of grain. 90
7.9.3 Purchasing should be done during the harvest season when the price is low. 90
7.9.4 Offer the price that is slightly above that offered by competitors e.g. ADMARC and private traders to attract farmers that are selling grain. 90
7.10 Encourage pest control 90
7.11 Encourage the committee to sell grain during the lean period 90
7.12 Encourage Annual Review of grain bank operations and reconciliation of records 90

List of Tables

Table 1: Criteria for Categorizing Projects/Programmes 4
Table 2: An example of project grading using Operational Guidelines (for project promoting dairy production) 8
Table 3: Example of how to calculate an overall grade for a multi-component/activity project 9

ACRONYMS

ADCs	Area Development Committees
ADD	Agricultural Development Division
ADMARC	Agricultural Development and Marketing Corporation
ADP	Agricultural Development Programme
AI	Artificial Insemination
AIDS	Acquired Immune Deficiency Syndrome
CCP	Critical Control Points
CONGOMA	Council for Non-Governmental Organisations in Malawi
DADO	District Agricultural development Officer
DAES	District Agricultural Extension Services
DAHLP	Department of Animal Health and Livestock Development
DAPS	Department of Agricultural Planning Services
DARS	Department of Research Services
DAs	District Assemblies
DDPs	District Development Plans
DEC	District Executive Committee
EPA	Extension Planning Area
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FNSJTF	Food and Nutrition Security Joint Task Force
FRIM	Forest Research Institute of Malawi
FSAP	Food Security Action Plan
FSP	Food Security Policy
FSP&P	Food Security Policy and Programmes Committee of the Food and Nutrition Security Joint Task Force
FUM	Farmers' Union of Malawi
FV	Field Visit
GDP	Gross Domestic Product
GMP	Good Manufacturing Practices
GoM	Government of Malawi
HIV	Human Immune Deficiency Virus
HP	High Pressure
IDEAA	Initiative for Development and Equity in African Agriculture
IGA	Income Generating Activities
IP	Implementing Partner
IPM	Integrated Pest Management
LRCD	Land Resources Conservation Department
M&E	Monitoring and Evaluation
MAP	Modified Atmosphere Packaging
MASAF	Malawi Social Action Fund
MASIP	Malawi Agricultural Sector Investment Programme
MDG	Millennium Development Goals
MK	Malawi Kwacha
MLGRD	Ministry of Local Government and Rural Development
MoAFS	Ministry of Agriculture and Food Security
MoTPSD	Ministry of Trade and Private Sector Development
MPRS	Malawi Poverty Reduction Strategy
NADP	National Agriculture Development Programme
NAPF	National Agriculture Policy Framework

NASFAM	National Association of Smallholder Farmers in Malawi
NCD	Newcastle Disease
NEPAD	New Partnership for Africa's Development
NFRA	National Food Reserve Agency
NGO	Non-Governmental Organisation
NORAD	Norwegian Development Agency
NPC	National Project Coordinator
OG	Operation Guidelines
OGMR	Operational Guidelines Minimum Requirements
OPC	Office of the President and Cabinet
OPV	Open Pollinated Varieties
PBA	Project Based Approach
PCAG	Project Compliance Assessment Grid
PMU	Project Management Unit
PRSP	Poverty Reduction Strategy Paper
PSIP	Public Sector Investment Programme
SGR	Strategic Grain Reserve
SWAp	Sector Wide Approach
UNDP	United Nations Development Programme
VDCs	Village Development Committees
WHO	World Health Organization

ABOUT THE OPERATIONAL GUIDELINES

The Operational Guidelines have been developed initially for the **Eight** prioritized strategies. The Operational Guidelines provide 'Reference Standards' to enable the implementation of projects/programmes in a harmonized manner. The OGs have been developed to serve as a manual or technical resource to organisations designing and implementing food security interventions. To achieve this objective, a lot of literature has been reviewed and a number of specialists on the various subjects covered have been consulted. The OGs are technical in nature and hence much effort was to draw on already established guidelines or manuals for agronomic practice or recent lessons learnt from practical experience of IPs. For example much of the OGs on crop production are derived from the MoAFS manuals whilst much of the content on Grain Banks, which is a relatively new field has been taken from the documented experience of IPs working on that subject in Malawi and other regions in Africa. The OGs are an attempt to sufficiently cover various important aspects that would contribute to the achievement of the objectives of each strategy. They are therefore meant to serve as much as possible as a complete picture of activities that a project should undertake in order to be effective in this endeavour to contribute to achievement of food security objectives.

The Operational Guidelines have a dual purpose: a) to guide on-coming projects that target interventions in a particular sub-sector, and b) to enable existing projects/programmes align their interventions with the FSP that is in line with the ADP framework. It is envisaged that in future all projects/programmes will follow a unified approach in the implementation of activities in a particular sub-sector. The Operational Guidelines have been premised on documented best practices and consultations with the MoAFS and other project implementers.

The OGs have main points and sub-points. The sub-points provide additional information or additional guidance on what a specific activity as highlighted by the main heading entails. Some sub-points are meant to provide definitions of concepts or merely examples or further descriptions of particular concepts or themes covered by the OGs. To make the document user friendly, it has been formatted as follows;

- The strategies are numbered and are in large font but they do no count in the grading. It is the OGs that count.
- The OGs are outline numbered and are also in bold and they will be counted in the grading if they don't have suboperational guidelines. e.g. OG 1.1 is worth 3 points (i - iii) while OG1.4 is worth 1 point.
- The sub operational guidelines are numbered (in roman numerals), italicised and underlined and will be counted in the grading if they don't have sub-sub operational guidelines under them. If it there are sub- sub operational guidelines, it is the sub-sub operational guidelines that will be counted e.g. OG 3.1.1(ii) is worth one point while OG 3.1.1 (1) is worth two points
- Sub sub operational guidelines are numbered (a) to (z) and will be counted in the grading. e.g. OG3.1.1i (a) is worth 1 point. If a project is doing activity (a) it will score 1 point and if it is doing all the 4 (a&b) it will score 2 points.
- Bulleted points are just meant to provide definitions of concepts or merely examples or further descriptions of particular concepts or themes covered by the OGs and will therefore not be counted in the grading. eg if a project is being graded on compliance with contract farming, the bullet points under OG 2.1.1(vi) will just be used to provide guidance on Integrated Pest Management (IPM). The project doesn't necessarily have to do all the bulleted activities. OG 2.1.1(vi) is

worth 1 point and as long as a project demonstrates that it is doing any of the bulleted activities it will be awarded 1 point.

To make the grading process easy, the operational guidelines are summarised into a smaller document called compliance monitoring tables. The compliance monitoring table are designed in such a way that it is easy to mark those OGs that are being complied with and count them to come up with a total score. For each OG, Sub OG and sub sub OG there will be a question asked to either the project staff or beneficiaries depending on the means of verification required. The means of verification will be documents like training reports or physical existence of whatever is being verified. e.g. to check if a project is encouraging good storage facilities, there will be need to verify right in the field with the farmers, the kind of storage facilities that the project is encouraging the farmers to use. Note should however be taken that field verification is only possible for projects that are already operational on the ground. For pipeline projects the means of verification will be the project planning documents e.g. logical framework, workplans etc.

HOW TO GRADE PROJECTS COMPLIANCE WITH THE OPERATIONAL GUIDELINES

Together with these OG, a project grading system has been introduced. The ultimate aim is to: a) systematically categorise/grade individual food security projects/programmes at the district level to ascertain the degree of re-alignment required to comply with the Action Plan; and b) monitor the re-orientation process at district level to ensure the projects/programmes have a harmonised and synergetic approach to the implementation of food security activities at community level.

Projects/programmes will be required to meet *minimum requirements* as starting points in a targeted food security sub-sector. To determine the degree of reorientation required, the grading system rates projects/programmes according to the level of compliance with the minimum requirements as well as other technical requirements. A 4-point (A – D) rating scale is used using criteria summarised in the following table.

Table 1: Criteria for Categorizing Projects/Programmes

RATING	PERFORMANCE STANDARD ACHIEVED
Category **A**	Project meets *minimum requirements* and achieves Overall Score of at least 90% for compliance with the Technical Guidelines. **Requires minimum re-orientation.**
Category **B**	Project meets *minimum requirements* and achieves Overall Score of greater than or equal to 70% but less than 90% for compliance with the Technical Guidelines. **Requires some orientation in specified areas.**
Category **C**	Project meets *minimum requirements* and achieves Overall Score of greater than or equal to 40% but less than 70% for compliance with the Technical Guidelines. **Requires a higher degree of orientation than B.**
Category **D**	Project doesn't meet the *minimum requirements* or Overall Score is less than 40%. **This project requires fundamental adjustment.**

Each project is assessed and given points up to a maximum of 100 points (or 100%). The percentage is a simple summation of two scores: Score 1 (maximum 39 points) being earned by achieving the minimum requirements and Score 2 (maximum 61 points) being earned

according to the degree of compliance with the other Operational Guidelines. Scores 1 and 2 are calculated by simple algebra as follows:

*Score 1 = number of minimum requirements achieved /total number of minimum requirements * 39%.*

*Score 2=number of other guidelines achieved /total number of other guidelines * 61%.*

If a project meets all minimum requirements it automatically gets 39% for Score 1, if half of minimum requirements are achieved, then half of the maximum possible score (i.e., 19.5%) is also earned.

Similarly, if a project complies with all other guidelines it is awarded full points (61%) under Score 2. A project that meets minimum requirements (Score 1 = 39%) and also all other remaining operational guidelines (Score 2 = 61%) will get an Aggregate Score of 100%, (i.e., Score 1 + Score 2 = 39%+61%=100%).

This overall score is the one used to rate projects on the 4 point rating scale. The higher the overall score implies the higher the degree of congruence between the project design and the ideal design which is described in the Operational Guidelines. The lower the score the greater the variance between a project and the ideal project scope as defined by the FS Action Plan.

The degree of variance with the Operational Guidelines will determine the rating/categorization of a particular project, with those rated "A" being relatively well aligned with the FSAP whilst those in category "D" being far from meeting even the basic minimum requirements. For example, a project categorized as A would be in compliance with the minimum requirements and, in addition, would also be implementing other interventions identified in the Operational Guidelines for the sub-sector. Such a project would have earned a total score of 90% and above. The degree of re-orientation required would be minimal. A project that meets minimum requirements and some of the other technical guidelines and obtains an overall score between 70-89.9% is rated Category "B".

However, projects that do not comply with the minimum requirements set for the sub-sector will automatically be rated "D" as they are missing the most critical components and thus need substantial reorientation. They are automatically rated "D" regardless of the total score they achieve. The same applies to projects that comply with the minimum requirements (Score 1 = 39%) points) but miss all other operational guidelines (Score 2 = 0%). Their total score is 39% and are rated "D".

Projects will be required to comply with only those minimum requirements applicable to their core-business. The rating system is therefore not punitive of highly specialised projects which concentrate only on a few subjects within a given sub-sector. A good example is a project involved in the promotion of dairy production. The project may not be interested in promoting the processing of dairy products. Hence a project will not necessarily be graded D if it fails to satisfy minimum guidelines on dairy processing. However, over time, capacity building of IPs that will be carried out through the support and coordination of MoAFS may eventually see more IPs being interested to incorporate a component on dairy processing in their project design. Once the project starts implementing activities to promote dairy processing, the minimum requirements for dairy processing will then become applicable.

A project/programme that does not meet the minimum requirements, and therefore automatically downgraded to category D, will need substantial revision to align with the

operational guidelines. Such projects are likely to be under-performing in any case and the respective IPs will be looking for options to strengthen their interventions, including substantial revision to the mix of activities. This re-orientation will thus be in the interest of both the IP and funding agencies, on the one hand, and communities on the other, to achieve development results. However, some IPs may not be conversant with the other activities identified in the Operational Guidelines as these will be totally new areas where the organisation will be venturing into. For this reason, MoAFS will put up a comprehensive orientation programme to build capacities of IPs in new areas identified in the Operational Guidelines.

Pipeline projects will be encouraged to incorporate the minimum requirements at project design stage such that the costs associated, say, with training and exposure for activities that may be considered new territories can be incorporated into the budgets of the new programmes.

The grading system focuses on three critical elements of the FSAP: (1) the strategy being supported by the project (i.e., out of the 8 FSAP strategies, one or two or more strategies could be identified that are relevant to the project); (2) the activity or activities under the strategy which match the project type; and (3) the Operational Guidelines for that activity (or a number of activities) which spell out the minimum requirements in terms of project scope.

Accepting these as the three key elements guiding the grading system, the following generic steps are proposed to guide IPs when assessing compliance with the FSAP.

Step 1: Confirm the sector under which the project's activities belong

The first step would be to determine which sector (food security; nutrition; health; etc) a particular project falls under. This can be done by examining the statement of the "overall objective" of the project in its logical framework matrix. A fundamental assumption is that each project will have a well articulated log-frame with statements on "goal" or "overall objective" clearly spelt out.

Step 2: Confirm the FSP strategy to which the particular project is contributing

If the sector of the project is food security, the second step shall entail identifying the strategy out of the 8 identified in the FSAP, which the project concerned is supporting. As an example, the strategy could be to "promote contract farming". The strategy can easily be deduced from the wording of the "project purpose" again in the project's logical framework matrix.

Step 3: Identify the main activities sponsored by the project and the matching FSAP Operational Guidelines

The main activities of the project should be detailed in the log-frame or elsewhere in the main body of text of the project design document of the particular project. What is critical at this stage is to find out which activities identified in the FSAP under a particular strategy match those the project is undertaking. At this stage the objective is not to rate the extent of congruence. It is the subject of the grading system. At this stage, emphasis is on establishing activities and whether they correspond to the general areas emphasised by the FSAP. For example a project promoting Contract Farming, interest may be in establishing whether the project has a farmer training component; farmer training being one of the core activities identified by the FSAP and for which operational guidelines have been developed. The objective of stage 3 is not to rate how well the project articulates the strategies of the FSAP because this is the objective of Step 4 below. Step 3 is interested in identifying the main activities sponsored by the project and the matching FSAP Operational Guidelines.

Step 4: Rating the level of compliance of a project to FSAP minimum requirements

Having identified the main activities of the project, more in-depth scrutiny of each activity is made in step 4. A closer analysis of the content and type of interventions under a particular activity is done and this is contrasted with the minimum requirements as defined in the FSAP. For some guidelines, discussions with the project staff and verification through documents will be adequate . As explained ealier in some cases a field visit (FV) to verify the type of interventions and how they are being implemented will be necessary and this will involve discussions with the beneficiaries and even physical verification of existence of certain features..

As discussed above, projects that meet all the minimum requirements for their core activities are rated either A, B or C depending on the degree of alignment with other operational guidelines which may not be minimum requirements. Those rated A must meet the minimum requirements as well as attain an aggregate score of at least 90%. Those rated B meet the minimum requirements plus achieve an aggregate score of 70-89.9%. Projects that meet minimum requirements and achieve an overall score of 40-69.9% are rated "C". Those that meet minimum requirements but fail to reach an overall score of at least 40% are rated "D". Similarly, projects whose core activities miss any one of the minimum operational guidelines are automatically rated "D" irrespective of how well they cover other guidelines/sub-guidelines (that is irrespective of their overall score).

Dairy Farming has 11 OGs in total, 3 of which constitute the minimum requirements, namely:

i. Promote formation of milk bulking groups;
ii. Facilitate farmer' access to dairy animals of approved improved breeds; and
iii. Encourage farmers to construct a standard khola.

Despite achieving an overall score of 53%, Project 1 is automatically rated "D" for non-compliance with the minimum requirements. Project 2 is graded "A" for full compliance (all minimum requirements and all other guidelines), Overall Score is 100%. Project 3 is rated "C" for achieving minimum requirements (Score 1=39%) and for meeting 4 of the remaining 8 OGs (Score 2=4/8*61%=30.5%) thus yielding an overall score of 69.5%.

Project 4 is rated "B" for meeting all the minimum requirements (score 1=39%) and 46% for the other guidelines thus attaining an overall score of 85% (39%+46%). Project 5 although it meets all the minimum requirements (score 1=39%) it falls into category "D" because its Overall Score is below the 40% threshold to qualify into Category "C". Project 6 although it achieved a score of 56.5% (Score1 26% + Score2 30.5%) it is rated "D" for failure to fulfil one of the OGs which is a minimum standard.

Example 2: Grading a project addressing multiple strategies/themes

If a project is addressing more than one strategy or theme e.g. an integrated rural development project, usually the project activities will be divided into components or sub-projects each addressing a particular strategy or theme (e.g., promoting dairy farming; supporting village grain banks; and promoting horticulture production). First go through Stages 1 to 4 above. Then calculate Scores 1 and 2 for all components to get an Average Overall Score for the entire project. Give an overall rating (A-D) depending on the Average Overall Score. The minimum standard rule also applies to the Average Overall Score (projects that do not meet any of the minimum requirements for any of the activities will be rated D) regardless of the percentage point.

Example 1: Grading a project addressing a single theme

An example to illustrate how a project concentrating on one theme ("Dairy Production") can be graded using this systems is presented in Table 2.

Table 2: An example of project grading using Operational Guidelines (for project promoting dairy production)

Operational Guidelines Activities	**Operational Guidelines Minimum Requirements**	**Project 1 Missing all minimum requirements**	**Project 2 Meeting all requirements**	**Project 3 Meeting all minimum requirements**	**Project 4 Meeting all minimum requirements**	**Project 5 Meeting minimum requirements only**	**Project 6 Missing one of the minimum requirements**
1. Promote formation of milk bulking groups	√		√	√	√	√	
2. Facilitate farmer' access to dairy animals of approved improved breeds	√		√	√	√	√	√
3. Encourage farmers to keep a minimum of 2 dairy animals			√	√	√		√
4. Encourage farmers to construct a standard khola	√		√	√	√	√	√
5. Encourage farmers to establish pasture		√	√	√	√		√
6. Encourage farmers to feed the animals both roughage and concentrates		√	√	√	√		
7. Encourage farmers to milk the cows twice/day		√	√	√	√		√
8. Encourage farmers to clean utensils before milking and check for mastitis		√	√		√		√
9. Encourage farmers to apply acaricides regularly		√	√		√		
10. Promote milk processing		√	√				
11. Link farmers to markets		√	√				
Overall Score (=Score 1+Score 2)		(0%+53%) =**53%**	(39%+61%) =**100%**	(39%+30.5%) =**69.5%**	(39%+46%) =**85%**	(39%+0%) =**39%**	(26%+30.5%) =**56.5%**
Grading/Rating		D	A	C	B	D	D

Table 3 provides an example on how to calculate an overall grade for a project using Project 3 above and assuming that the project is, in additional to dairy production, promoting village grain banks and also promoting production of high quality tomatoes.

As already mentioned, to rate this multiple-theme project, first go through Steps 1- 4 for all the three project components. Calculate the average percentage for all the components. Determine the grade (A-D). If there is any component in which the project did not meet the minimum requirement the overall grade will be D regardless of the percentage.

Table 3: Example of how to calculate an overall grade for a multi-component/activity project

Operational Guidelines	Minimum Requirement	Project Performance
Project		
Diary production		
Promote formation of milk bulking groups	√	√
Facilitate farmer' access to dairy animals of approved improved breeds	√	√
Encourage farmers to keep a minimum of 2 dairy animals		√
Encourage farmers to construct a standard khola	√	√
Encourage farmers to establish pasture		√
Encourage farmers to feed the animals both roughage and concentrates		√
Encourage farmers to milk the cows twice/day		√
Encourage farmers to clean utensils before milking and check for mastitis		√
Encourage farmers to apply acaricides regularly		√
Promote milk processing		
Link farmers to markets		
Percentage		**(39%+45) 84%**
Rating		**B**
Village grain banks		
1. Conduct needs assessment		
2. Conduct awareness meetings on the need for a community grain bank in the area. Spell out the benefits of the community banks		√

Operational Guidelines	Minimum Requirement	Project Performance
3. Facilitate the identification of a location of community grain bank		√
4. Facilitate the election of a grain bank committee	√	√
5. Facilitate the election of a grain bank committee	√	√
6. Train grain bank committees in grain bank management	√	√
7. Select an appropriate storage facility		√
8. Construct the storage facility		√
9. Facilitate the opening of a bank account		
10. Support grain purchases		
11. Encourage pest control		
12. Encourage the committee to sell grain during the lean period		
13. Encourage Annual Review of grain bank operations and reconciliation of records		
Percentage		**(39%+22%) 61%**
Rating		**C**
Encourage domestic production of high quality tomatoes		
1. Encourage farmers to join vegetable producers clubs		√
2. Train farmers in nursery establishment		√
3. Promote early field preparation and timely planting.		√
4. Compost manure	√	
5. Encourage farmers to follow recommended planting technology to achieve optimum plant population.		
6. Promote use of improved and high quality varieties.	√	√
7. Encourage farmers to use fertilizer.		√
8. Encourage farmers to		√

Operational Guidelines	Minimum Requirement	Project Performance
control pests and promote IPM		
9. Encourage timely harvesting.		
10. Link farmers to markets	√	
Percentage		**52% (0%+52%)**
Rating		**D**
Overall grade/Rating		
Dairy production	84	B
Village grain Banks	61	C
Tomato production	52	D
Overall Score and Rating	**66%**	**D**

PART 1

1. Promote Contract farming for agricultural production development

Contract farming can be defined as an agreement between farmers and processing and/or marketing firms for the production and supply of agricultural products under forward agreements, frequently at predetermined prices (Eaton and Shepherd, 2001). The arrangement invariably involves the purchaser providing a degree of production support through, for example, the supply of inputs and the provision of technical advice. The basis of such arrangements is a commitment on the part of the farmer to provide a specific commodity in quantities and at quality standards determined by the purchaser and a commitment on the part of the company to support the farmer's production and to purchase the commodity.

The intensity of the contractual arrangement varies according to the depth and complexity of the provisions in each of the following three areas:

- Market provision: The grower and buyer agree to terms and conditions for the future sale and purchase of a crop or livestock product;
- Resource provision: In conjunction with the marketing arrangements the buyer agrees to supply selected inputs, including on occasions land preparation and technical advice;
- Management specifications: The grower agrees to follow recommended production methods, inputs regimes, and cultivation and harvesting specifications.

The objectives of Contract Farming are:

- to develop markets by coordinating the supply and demand of agricultural produce/commodities;
- facilitate decision-making on production and marketing through the transfer of skills and information;
- strengthen provision of value chain services by promoting strong public-public, private-private and public-private partnerships. These services include extension, training, credit, input/technology supply and product marketing services. Such stronger partnerships also protect farmers from exploitation.

Another critical service emerging from the advent of climate change is farm risk insurance.

On the one hand, farmers can face the risk of enterprise failure due to natural disasters such as floods; pest outbreaks or drought. They may end up with excessive borrowings. On the other hand, inefficient management, cash-flow problems or marketing constraints experienced by those contracting the farmers can result in manipulation of production quotas so that not all contracted production is purchased. In this event farmers would face the challenge of storing and marketing their production resulting in excessive post-harvest losses or distress sales at unviable prices. Such cases occur especially when sponsoring companies are in a monopoly position or when there is a glut in production and farmers lack good alternatives.

Projects/programmes promoting contract farming can therefore be involved in the following:

1.1 Promote coordinated crop and livestock production

[Activity 4.1.3.1]

i) ***Identify suitable production areas.*** This may be areas that provide easy access for the extension services and logistical support. Where possible farmers should be situated close to the company processing or packaging facility (to reduce transport and handling costs and to minimise losses especially for perishable crops). Where several areas are chosen they must all be able to provide sufficient quantities of production to ensure that services provided to farmers can be carried out in cost-effective manner.

ii) *Selection of Farmers***.** Decide how many farmers should be offered contracts and the criteria for their selection. Farmers can be approached individually through agricultural staff at EPA level, through community leaders, farmers associations (such as FUM and NASFAM), and through an open invitation to tender. The evaluation of the farmer's experience in producing the product, their past records, their desire to cooperate, and the extent of his/her family labour inputs is mandatory to consider this OG achieved.

iii) ***Facilitate the Formation of Farmers Associations/Clubs contract farming (FV).*** The roles of the associations must be clearly defined and may include:

- Supply of inputs to all farmers in the association,
- Collection of produce from all the farmers,
- Guarantee the contracted volume to the company,
- Provide infrastructure to store and grade the production,
- Arrange finance for the farmers from public or private institutions.

The following steps in group formation may serve as a guideline for farmers as well as facilitators in order to ensure good organisation and functioning of farmer groups proceeds in an orderly manner.

- Awareness meeting with leading smallholder farmers. This is usually an informal meeting with some of the leading farmers from the area to discuss the problems and needs farmers face and the possibility of a farmer organisation to address those needs.
- First smallholder farmer meeting. This is an extraordinary meeting with potential members. In case of a positive decision the Interim Steering Committee should be elected in order to guide the group through the further formation process.
- Feasibility study. Feasibility study is designed to provide an overview of the primary issues related to a business idea. It is determines whether the business idea would be economically worthwhile or not.
- Second smallholder farmer meeting. At this meeting the results of the feasibility will be presented and discussed. If the feasibility study is indicating a viable business but farmers support is questionable it is advisable to require farmers to make a token interest investment and sign a pre-membership agreement. There should be a vote to proceed with formation or not.

- Business Plan. There is need for a business plan for the group to be prepared. A business plan gives an opportunity to find any weakness or hidden problems ahead of time.
- Constitution and bye laws. Group members need to discuss and formulate the groups constitution and bye laws. They will be used for registration and in day to day activities of the group.
- Incorporation of the farmers' organisation. The legal environment, the kind of services envisaged, the feasibility study as well as the members preferences will determine which organisational form will be chosen.
- Election of office bearers. Officers should be selected carefully according to reputation and qualifications needed.
- Hire management and employees and acquire facilities and equipment. Employment of staff will depend on the size of business and qualifications needed to run it. Use and maintenance of facilities like storage rooms, office rooms and phones should be well regulated in the bye laws.
- Begin Operations. Open bank account, arrange for bookkeeping and record keeping, appoint members to the sub-committee, start implementing the business.

1.2 Train farmer clubs/associations on different topics

[Activity 4.1.3.2]

Train farmers/farmers associations on how to negotiate contracts in order to bargain more effectively and exercise some choice over the business with whom they contract. The training should cover the following topics:

i) Benefits of Contract Farming

Inputs and production services supplied by the sponsor.
Credit through advances from the sponsor
New technology and skills
Farmers' price risk is often reduced as many contracts specify prices in advance
New markets

ii) Establishing the terms of agreement (FV)

Understanding negotiation objectives
Identifying objectives
Determining variables: such as price, discount or rebate, bonuses, delivery time, financing arrangements, training, packaging, deposit arrangements, credit terms, and guarantee.
Understanding and establishing your requirements
Establishing requirements
Working with a negotiation team

iii) Researching the other party

Information gathering
Gathering information about the company
Gathering information about participants
Estimation of the other party's requirements
Estimating requirements

iv) Preparing for an agreement

Planning for an agreement
Establishing bartering boundaries

Formulating a plan
The negotiation environment
Choosing a location
Determining the who and what logistics

v) ***Conducting a negotiation (FV)***

Understanding the negotiation process
Identifying the steps in the negotiation process
Using guidelines in a negotiation
Communicating during a negotiation
Communicating effectively during a negotiation
Identifying and overcoming communication barriers
Using questions in a negotiation
Challenging negotiation situations
Identifying negotiation styles
Handling challenging negotiation situations
Control in negotiations
Gaining control in a negotiation
Identifying the types of questions
Negotiation tactics
Responding to various tactics
Negotiation ethics
Understanding legal considerations
Sourcing legal services
Handling unethical tactics
Responding to an unethical act

1.3 Promote adult literacy training targeting producers

[Activity 4.1.3.3]

The following actions could be conducted to promote adult literary:

- Design suitable curriculum based on government requirements.
- Set criteria for selection and procedure for recruitment of community based adult literacy tutors following government minimum standards and guided by objective of volunteerism and principle of cost-sharing for sustainability.
- Select the right adult literacy training approach (e.g., REFLECT method of instruction).
- Promote creation of literacy clubs/groups building on existing community groups (e.g., farmer associations/clubs).
- Identify easily accessible and suitable venues within communities for course delivery.
- Provide complementary resources for course delivery (e.g., stationery, instructional manuals, and tutor allowances) on cost-sharing basis with communities or with the Ministry of Education.
- Establish feedback to allow participants to regularly evaluate the literacy training provided.

- Link literacy classes to national system of examinations so that they can register and sit for national examinations and successfully graduate.

1.4 Link farmers to providers of legal services to prepare them for recourse in the event of breach of contract by agribusiness partners sponsoring CF

[Activity 4.1.3.4]

1.5 Link farmers to public and private agribusiness partners

[Activity 4.1.3.5]

i) ***Develop inventory of organisations (public and private) with interest in sponsoring contract farming.***

ii) ***Develop screening criteria for farming enterprises*** (crop or livestock) so as to select those suitable for the area.

iii) ***Develop screening criteria for agribusiness organisations to select the most beneficial to the category of farmers targeted***. Criteria should include (but not limited to) the following:

- type, quality and level of support given to the farmers (credit, extension, input supply; agro-economic potential of new technology being introduced and suitability to farmers' capacities, etc)
- adherence to ethical trading;
- popularity with farmers;
- previous experience elsewhere;
- market potential for the targeted crop/livestock commodities; etc.

iv) ***Organise exchange visits to allow farmers entering into CF to learn from peers with some experience in contract farming.***

v) ***Facilitate farmer organisation linkages with relevant information providers*** e.g. IDEAA, FUM, Agribusiness Officers, Chamber of Commerce, and NASFAM to share market information.

1.6 Promote disaster risk insurance for crop and livestock commodities

[Activity 4.1.3.6]

The following actions could be conducted to promote disaster risk insurance for crop and livestock commodities:

- Carryout an inventory of possible farm insurance products and services from insurance firms interested in providing crop and livestock insurance to farmers participating in CF.

- In consultation with farmers' associations/unions and insurance experts, establish screening criteria for insurance policies to safeguard farmers' interests and screen the products
- Raise awareness among farmers on the costs and benefits of different forms of seasonal farm insurance.
- Lobby insurance firms to develop tailored products for the different categories of farmers involved in CF.
- Link insurance service providers and brokers to farmers (individuals and associations) in order for the former to market their products/services.
- Assist farmers in choosing a qualified insurance broker to handle all their insurance needs.
- Provide any necessary insurance advice and support at the time of acquisition of insurance products/services as well as in the event of claims becoming necessary due to the advent of a natural disaster.

Minimum Requirements Promoting Contract farming

i. Facilitation of formation of farmer associations/clubs [OG 1.1(iii)]
ii. Train farmers on conducting a negotiation [OG 1.2(v)]
iii. Link farmers to public and private agribusiness partners [OG 15(v)]

Technical Information and Backstopping on Contract Farming

Technical information on Contract farming can be obtained from the Ministry of Agriculture and Food Security, Department of Agricultural Planning Services in Lilongwe.

Telephone : 1 789 033
Fax : 1 789 218

PART 2

2. Encourage domestic production of high quality improved varieties

Cereals	Maize, Rice and Sorghum
Roots and Tubers	Cassava, Sweet potatoes, European potatoes
Grain legumes	Phaseolus beans, groundnuts, Soya beans, Pigeon peas
Fruits	Citrus fruits (sweet oranges, sour oranges, tangerines and lemons), bananas and plantains, pineapples, mangoes, avocado pears, pawpaws,
Vegetables	Cabbage, tomatoes, onions, leafy vegetables, lettuce

Cereals

Cereals such as maize, rice, sorghum, millets, and wheat are a group of crops that form staple foods in Malawi. The aim is to increase production to ensure self-sufficiency and sustainable availability of food and surplus for sale. It is therefore important to improve domestic production of staple foods as follows: -

2.1 Maize [*Zea mays*]

2.1.1 Provide technical assistance to ensure high productivity of maize

[Activity 4.2.1.1.2.1]

i) *Encourage early field preparation and timely planting (FV)*.

- Encourage farmers to practice early field preparation and planting with the first rains.
- Planting rains should be up to 50mm and wetting the soil up to 15mm. One to two weeks delay in planting may cause up to 25% yield loss.

ii) *Encourage farmers to follow recommended planting technology to achieve optimal plant population (FV).* Optimum plant population can be achieved by proper ridge and plant spacing, and number of plants per station. Promote the S*akakawa* technology with ridges 75cm apart and 25cm between planting stations and one seed per station along the ridge to achieve high plant population and yield.

iii) *Promote use of improved and high quality seed* ***(FV).*** Improved and good quality seed include Hybrid seed (FV)such as MH 12, 16, 17, 18; DK 8071, 8051, 8040, 8031; Pan 6195, 6479, 6193, 6243, 6363; SC 709, 621, 627, 403, 407; and Open Pollinated Varieties (OPV) such as: Masika, Kafumbira, Mchotsanjala, Sundwe, Kakhomera, Chitibu, Matindiri, ZM 621, 521, 421. Food security projects/programmes should contact the District Agriculture offices for details on other recommended improved varieties. [Other details are in: MoAFS: Guide to Agricultural Production and Natural Resources Management (2004) Table 11 p 91].

iv) *Encourage farmers to use manure (FV).* Manure should be applied at least a month before planting and the recommended rate is 12.5 tones per Ha or 20 litre tin every 8 metres (2 handfuls per station).

v) *Encourage farmers to use fertilizer (FV).* Fertilizer: basal dressing: 100 kg per Ha of 23:21:0+4S. Apply at planting or soon after seed emergence. Top dressing: 150kg per ha of Urea and 250kg/Ha CAN. Apply not later than 3 – 4 weeks after planting. [Details are in: MoAFS: Guide to Agricultural Production and Natural Resources Management (2004) Table 13 p 93- 95].

vi) *Encourage farmers to control pests by promoting recommended agricultural practices and IPM (FV)*

Technical information on pest control should be obtained from the District Agriculture Offices and ADDs.

IPM is by crop type. The main objective is to minimize crop damage, which results in loss of yield and quality because of pests (insects, diseases, nematodes, mites, weeds, and vermins). There are several methods of reducing pest populations and these include: - cultural, biological, mechanical and physical control measures, use of crop resistant varieties, sanitation, plant quarantine and application of pesticides.

The emphasis is to promote the use of these techniques in the form of **Integrated Pest Management**. This approach employs a combination of two or more of the control methods and places emphasis on environmental protection and preservation of beneficial organisms. By using IPM the use of pesticides is minimized. Projects/programme should therefore promote a combination of the following:-

- Cultural control: Management of crops may affect the pests that live in the crop environment. Planting, growing, uprooting of infested plants and harvesting practices that may destroy these pests are cultural pest control methods. For example early maize planting reduces stalk borers and streak; timely weeding is important to reduce pests; and delayed harvesting may lead to crop damage by rodents, weevils, birds, and other pests. Farmers should therefore be encouraged to carry out timely cultural practices recommended for each crop. Following proper crop rotation, removal of volunteer plants and other crop hygiene practices will reduce the build up of weeds, insect pests, nematodes, and diseases.

- Biological control: Biological control results from the manipulation of parasitoids, predators, and pathogens in reducing the abundance of a pest species and maintaining its population at a level lower than it would have been in the absence of these organisms. It may also involve the release of the pest's natural enemy in the affected area. Examples of natural enemies are: - Trichogramma spp and Apanteles spp that parasitize eggs and larvae of stalk borers. Some pathogens such as fungi, bacteria, and viruses also contribute to reducing populations of insect pests and the spread of diseases. Where possible conditions should be created for their effectiveness. For this reason chemical

pesticides should be applied judiciously to maintain populations of the natural enemies.

- Mechanical control: These include setting up traps and barriers, which disrupt movement of pests in a particular area. Control may also be achieved by hand picking and crushing. These methods need to be promoted because they can be cheaper than other methods.

- Physical control: Changing moisture content, relative humidity, temperature and light conditions especially in storage can make living conditions unfavourable for pests. Cool and dry grain will have fewer pest problems than warm and moist grain. Sterilization of nursery beds by burning is another example of physical control. Farmers should therefore be encouraged to dry their produce thoroughly before storage and burn nursery beds before sowing.

- Use of resistant varieties: Some varieties of crops resist pest attack better than others and these are called resistant varieties. Planting them reduces yield loss e.g. flint maize suffers less pest damage in storage.

- Sanitation: Sanitation is the removal and disposal of infected or infested plant parts and wastes, and keeping crop fields and storage facilities as clean as possible as these would be sources of infection or infestation. Removal of volunteer crops, rouging and destruction of infested plants will reduce population of the pest for the next growing season.

- Some rodents such as rats and mice thrive on food wastes that are not properly disposed of. Removal of such wastes reduces chances of rodent problem developing. Other storage pests such as weevils may remain in storage structures and bags. Cleaning of such storage structures before putting in new harvests would reduce the pest load in storage.

- Plant quarantine and regulatory control measures: This is mainly done at national level and involves holding of imported plant material in isolation for a period to ensure freedom from diseases and insect pests. Within the country, other regulatory control measures are used to control the spread of insect pests and diseases by restricting movement of plant material from infected to clean areas. Field staff should be encouraged to advise farmers not to transfer plant material from one area to another.

- Use of pesticides: Pesticides offer quick pest control methods. However, they should only be used to supplement other pest control. Where it is difficult to control pests through use of other methods, the use of pesticides is recommended. Farmers should however be advised to use recommended pesticides for each type of pest and strictly follow instructions.

- Pesticide storage: Pesticides should be stored safely and properly to avoid poisoning accidents and enhanced deterioration. All types of

pesticides should be stored in their original labelled containers under lock and key, away from children and livestock. Pesticides should be stored under dry conditions and away from direct sunlight. They should not be stored or transported together with food, clothing and furniture. It is recommended that farmers should only use pesticides from registered dealers and agents and farmers should be encouraged to read the label and instructions before buying and using pesticides.

(Please note that as IPM is a critical component of crop production. The guidelines above apply to all crops.

Below are the IPM guidelines that are specific to maize:

- Weed control: maize suffers most from weed competition during the first 6 weeks after germination. At least two weedings are necessary for effective weed control. Farmers that can afford herbicides such as glyphosate should be encouraged to use them. Post-emergence herbicides can be applied after planting but before the crop has emerged and application should be done when the soil is wet. A post-emergence herbicide can be applied when the crop has emerged. Herbicides are available from agro-dealers and application rates are indicated on the container labels. Common weeds include: - *Witch weed*, which is the most serious weed for maize. Other weeds include grass weeds such as *wild finger millet*, *kapinga* and *wild oat.*

- Pest control*:* important insect pests include Army Worm, Maize Stock Borer, Red Locust, Large Short-Horned Grasshopper and Leaf roller. These insect pests can be controlled by application of pesticides. Earthworm control is mainly by hand picking from maize plants.

- Disease control: The important maize diseases in Malawi are *Turcicum* leaf blight, Maize streak virus, Cob rot, and Grey Leaf Spot (GLS). The diseases can be controlled through integrated pest management (IPM) approach, which include the following:
  - Observing good husbandry practices such as early land preparation, early planting, and burying all diseased plants.
  - Ensuring that crop residues are fully decomposed before planting.
  - Rotating maize with non-cereal crops, which are immune to GLS such as Soya beans.
  - Burning severely attacked plants.
  - Planting maize resistant varieties to GLS such as SC627, DK 8070, Pan 6193, SC 407, DK 8030, ZM 521, and ZM 421.

vii) *Encourage timely harvesting (FV)*. Maize harvesting should be done as soon as the maize is dry and stooking is recommended to complete the drying and facilitate harvesting. To avoid damage by rodents, termites, and weevils in the field, maize should be harvested and stored soon after stooking.

viii) *Encourage use of good storage facilities (FV)*. Maize should be stored in dry ventilated structures to control pests and diseases especially those that cause

rotting. Cribs (*Nkhokwe*) should be made rat proof by use of rat-guards and properly thatched to prevent leaking.

2.1.2 Improve access to high quality hybrid maize seed and fertilizer

[Activity 4.2.1.1.2.2]

Since affordability is the main constraint for accessing hybrid maize seed and fertilizer, activities that improve farmers' income are likely to improve their access to hybrid maize seed and fertilizer because maize is the staple food. The activities would include the following:

i) *Promote access to credit to finance purchase of OPV/Hybrid seeds (FV)*

The following sources of financing could be promoted:

- savings and credit clubs at community level (e.g Rotating Saving and Credit Association) to encourage farmers to mobilize group savings from which they can borrow to finance hybrid maize seed and fertilizer purchases, and Income Generating Activities especially during the marketing season. Benefits would include: - a) borrowing at low interest rate, b) simple and easy procedures to follow, c) no collateral but other group members would provide social security, c) reasonable interest rate, d) quick disbursement, and e) community managed.
- Grain/seed banks (see OG 8)
- Katapila (Informal Private Sector Lenders)
- Rural-focused Micro Finance Institutions (MRFC, CUMO, MARDEF, etc)
- Rural Projects with Micro-Finance components,
- Crop Buyers/Processors credit suppliers,
- Input Suppliers and Distributors credit suppliers.

ii) *Promote crop diversification into production of cash crops (FV)* (OG 2.6.2) including production of improved varieties of legumes which are also regarded as cash crops. Part of the cash realized from sale of e.g. groundnuts or Soya beans could be used to purchase improved hybrid maize seed directly or could be injected into savings or credit clubs for use later in the season to purchase improved hybrid maize seed and fertilizer.

iii) *Improve access to OPV seed through seed multiplication (OG 2.6.2)*

Minimum requirements for increasing maize production

i. Promote use of improved and high quality seed [OG 2.1.1(iii)]
ii. Encourage farmers to use manure [OG 2.1.1 (iv)]
iii. Encourage the use of good storage facilities [OG 2.1.1 (viii)]

2.2 Rice [*Oryza sativa*]

2.2.1 Provide technical assistance to ensure high productivity of rice

[Activity 4.2.1.2.2.1]

i) *Encourage early nursery preparation and sowing (FV).*

- Farmers should be encouraged to prepare their seedbeds to enable timely sowing and transplanting. Sowing in nurseries should be done between mid-December and mid-January during the wet season and between mid-June and mid-July during the dry season. The seed rate is 63 kg per Ha for the rainfed Faya 14-M-69 and other local cultivars, and 75 kg per Ha for all irrigated varieties.
- Rice should be sown on flat beds 20cm long 1m wide and 5cm high. Twenty beds would produce enough seedlings for one hectare.

ii) *Encourage early field preparation and timely planting (FV)*. Fields should be ploughed soon after harvest to facilitate root development and plant growth. Ploughing should be followed by breaking of clods, levelling, banding and puddling. Encourage farmers to dry plant before the first planting rains.

iii) *Encourage farmers to follow recommended planting technology to achieve optimal plant population (FV).*

- Rain fed rice: Faya and kilombero varieties should be sown directly in the field by dibbling or broadcasting. Dibbling: plant 6 seeds per station at a spacing of 23cm x 23cm with the first rains. Thin or supply to 4 seeds per station at 15 to 20 days after seedling emergence.
- Irrigated rice: irrigated rice varieties should be transplanted to ensure a vigorous initial plant growth. In the wet season, 15 – 25 days old seedlings should be transplanted between Mid-January and Mid- February and 20 – 30 days old between Mid-July and Mid-August in the dry season. Transplant 3 – 4 seedlings per station at 23cm x 15cm spacing.

iv) *Promote use of improved and high quality seed (FV).* *Faya* is the recommended improved variety for rain fed conditions. Other improved varieties recommended for irrigation farming include: *Nunkile (Pusa 33), Mtupatupa (TCG 10), Vyawo (ITA 302), Senga (IET 4094), Changu (IRI 1561-250-2-2).* However popular unimproved varieties such as *Singano, Kilombero, Kalulu, and Mwasungo* should also be promoted. *[Details are in: MoAFS: Guide to Agricultural Production and Natural Resources Management (2004) p 105].*

v) *Encourage efficient water use, control and management (FV)*. Water control and management is vital for optimum crop growth and productivity and ensures that the required amount of water is available throughout the crop growth period. Water control and management include practices such as levelling, bunding, making canals, siting inlets and outlets properly, which ensure efficient water supply and distribution. These, however, vary between irrigated and rainfed rice.

vi) *Encourage farmers to use fertilizer* (FV). The recommended nitrogen source in Malawi for rice has been Sulphate of Ammonia. However research has shown that Urea can also produce the same yield level. Urea would reduce the cost of production because farmers would buy half the number of bags of urea compared to Sulphate of Ammonia to meet the recommended rates. *[More details are in: MoAFS: Guide to Agricultural Production and Natural Resources Management (2004) p105].*

- Faya and Kilombero: Apply 100 kg 23:21:0+4S at 20 days after seedling emergence and 50kg Urea at 60 days after seedling emergence.
- Senga, Changu, Nunkile, Mtupatupa and Vyawo; Applying 100kg 23:21:0:4S and 25kg Urea at the time of transplanting. Apply each fertilizer separately to achieve good distribution in the field. This is followed by an application of 100kg Urea per Ha at 40 days after transplanting for all the varieties except Nunkile, which should be top, dressed at 25 days after seedling emergence.

vii) *Encourage farmers to control pests by promoting IPM (FV) [OG 2.1.1.(vi)]*
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- Weed control: Ploughing immediately after harvest helps reduce weed population and puddling helps further in the initial weed control operations. After dibbling or broadcasting hand weeding is the only recommended method of weed control in rainfed rice. Weed control during the first three weeks is crucial. In irrigated schemes hand weeding and use of chemicals are recommended. Hand weeding should be done at 2 and 4 weeks after transplanting. The herbicide Ronstar should be applied at the rate of 3 litres in 300 litres of water per Ha using a sprayer within 3 days of transplanting. The commonest weed is Nadanga (*Echinochloa crusgalli*), which is a serious problem in rice fields.

- Bird control: Birds are the most important pests of rice and substantially reduce yields. These should be controlled by scaring. The most common birds are Quelea and other Weaver birds.

- Insect pest control: Common pests are Green grasshoppers (*Bwanoni*), Shoot fly and Army worm. *Bwanoni* also attacks sorghum, millet, and wheat. In rice Bwanoni can reduce yield up to 80% and prefer feeding on the grain at milky stage. Control of *Bwanoni* is by spraying Fenitrothion. *Technical information on pest control should be obtained from the District Agriculture Offices and ADDs*

- Shoot fly and Army worm: Control is by spraying Carbaryl and Lebaycid (Fenthion).
- Disease control: Diseases of economic importance are Leaf blast and Brown spot. The control measure for both diseases is good crop husbandry practices such as correct plant spacing, fertilizer

application, water control, and use of certified seed. Burning of infected crop residues also reduces incidences of diseases.

viii) *Encourage timely harvesting (FV).*

- Harvesting: Paddy is ready for harvesting when the grains on the panicles are golden brown (straw coloured) and when three quarters of the panicles in the field are at this stage. To obtain the best whole grain rice yields, rice should be harvested at 8 to 12 days after maturity in wet season and 4 to 8 days after maturity in dry season. Water should be drained 7 – 10 days before the expected date of harvest to ensure uniformity of maturity and to enable the farmer to in drier fields.
- Drying: Spread winnowed rice on mats for 2 days to enable reach 14% moisture content which is recommended for storage.

ix) *Encourage use of good storage facilities (FV)* Proper storage facilities include sacks and cribs (nkhokwe). Well-dried rice should be stored in moist proof, well-aerated structures and guarded against insects and rodents. Dust with Actellic, Super Grain Dust, and Super Guard to control rice weevil. Farmers should use rat guards in cribs to control mice.

x) *Encourage rice processing/milling (FV).*

- Paddy, which is ready for sale, should be free of chaff, stones, dirt, and any other foreign material and be dried to 14% grain moisture content.
- Encourage rice milling, grading, and packaging to penetrate high value markets

xi) *Link farmers to markets (FV).*

- Facilitate the formation of a marketing committee among producers in the community.
- Build the capacity of the marketing committee to identify and analyze market opportunities. Market analysis to include:
  - Identification of new markets
  - What commodity types are in demand
  - What are the packaging requirements
  - What are the product prices and other consumer specifications
  - Undertaking visits to introduce the market committee to potential markets e.g. institutions that are utilizing the commodity to enable the market committee have hands-on experience in dealing with buyers.
- Evaluation of market opportunities in terms of location and types e.g. open markets, supermarkets, or specialty markets to determine the most appropriate market.
- Feeding back results to the producing community to inform them about the market opportunities, quantity in demand, prices, supply specifications, delivery schedules, and other consumer specifications.

Minimum requirements for increasing rice production

i. Promote use of improved and high quality seed [OG 2.2.1 (iv)]
ii. Encourage the use of good storage facilities [OG 2.2.1 (ix)]

iii. Link farmers to markets [(2.2.1(xi)].

Root and Tuber Crops

2.3 Cassava [*Manihot esculenta*]

2.3.1 Provide technical assistance to ensure high productivity of cassava

[Activity 4.2.1.3.2.1]

i) *Promote early field preparation and timely planting (FV).* Encourage establishment of community nurseries and use clean planting material. Field preparation: ridges should be spaced 90cm apart and 30cm high. Plant with the first rains.

ii) *Encourage farmers to follow recommended planting technology to achieve optimal plant population (FV).* Plant cassava on ridges 90cm apart and 90cm between plants where cassava is going to be processed into *kondowole*. For slender roots to be sold on the market use a spacing of 90cm x 45cm. Cuttings should be planted at an angle and two thirds of the stem should go into the soil.

iii) *Promote use of improved and high quality planting material (FV).* Three improved varieties are recommended: *Silira, Maunjili*, and *Mkondezi.* Planting materials should be free from insect pests and diseases. Cuttings should be obtained from well-matured plants of older than 9 months. Cuttings to be planted should be 25 – 30cm long. Local varieties that can also be promoted include: *Manyokola, Gomani*, and *Chitembwere.*

iv) *Encourage farmers to control pests and promote IPM (FV)* [OG 2.1.1 (vi)].

Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- Weed control: Critical weeding is during the first 3 months of establishment of the crop.
- Insect pest control: Cassava mealy bug: its impact may be reduced by use of clean planting materials, early planting, and restricting movement of cuttings from affected areas and biological control. White flies: control is by use of clean planting material. Cassava scales: control is by using clean planting materials and early planting. Cassava green spidermite is controlled by early planting, use of resistant varieties, and clean planting material.
- Disease Control: Cassava mosaic disease: is controlled by use of clean planting materials and by uprooting infected plants in the field. Uprooted plants should be burned. Cassava bacterial blight: control is by burying or burning infected plants and using clean planting materials

v) *Encourage timely harvesting (FV).* After maturity the quality of roots of most varieties deteriorate after 15 months of growth. Timely harvesting for cassava is therefore important.

vi) *Encourage cassava processing (FV).* Processing of cassava roots and leaves leads to reduction in toxicity, improves palatability, converts perishable roots into stable products, which can store for a considerable length of time. For *bitter varieties* processing should either be by heap fermentation as is done in Mulanje or submerged fermentation as is done in Nkhota-kota or Nkhata-Bay. Farmers should be encouraged to store the cassava in flour or chip form [*Gomani, Maunjiri, Mkondezi* varieties]. Farmers using ***sweet varieties*** should process cassava roots into cassava chip (*makak*a) if it is being processed for human consumption. [*Manyokola, / Mbundumali, Chitembwere, Silira* varieties]. Commercial processing should also be promoted where appropriate.

vii) *Encourage use of good storage facilities (FV)*. Farmers should store cassava chips (makaka) in cool dry places after packaging them in gunny bags, which should be stored in mudded cribs (*nkhokwe*).

viii) *Link farmers to markets for processed cassava (FV) [OG 2.2.1 (xi)]*

2.3.2 Increase access to improved cassava and sweet potato varieties

[Activity 4.2.1.3.2.2] cassava; [Activity 4.2.1.4.2.2] sweet potato

This process involves establishment of community cassava and sweet potato nurseries to multiply and sustain improved quality planting material at community level.

i) *Conduct community awareness meetings on the need for growing cassava and sweet potato as food security crops by establishing sustainable sources of planting material for the improved varieties at community level (FV).*

ii) *Facilitate the formation of farmers groups that have interest in cassava and sweet potato multiplication (FV).* A group should have an elected committee comprising the chairperson, treasurer, secretary and committee members.

- Groups should be self-organized with elected committee bearers comprising chairperson, secretary, treasurer, and ordinary committee members. Female participation in committees should be encouraged.
- Encourage groups to meet regularly e.g. once per month to review progress and develop action plans for the following month.
- Encourage clubs to keep records (minutes) of all meetings

iii) *Build the capacity of groups in nursery management including site selection, land preparation, out-planting, watering where necessary, and pest control (FV).*

iv) *Provide improved high quality, clean and disease-free planting material to the groups to establish community nurseries (FV).*

v) *Provide technical assistance during the development phase of community nurseries to ensure good nursery management (FV)* i.e. good husbandry practices.

vi) *Encourage the groups to distribute planting material to other community members for free and for sale when the planting material reaches maturity*

stage and ready for out-planting (FV). For example the first 50 cassava sticks could be provided free to a household and a charge may be imposed on any additional planting material. This will be an incentive to the group to maintain the nursery in good condition. The same principle of partly free distribution and sale should apply to sweet potato vines.

Minimum requirements for increasing cassava production

i. Promote use of improved and high quality planting material [OG 2.3.1 (iii)]
ii. Build the capacity of groups in nursery management including site selection, land preparation, out-planting, watering where necessary, and pest control. [OG 2.3.2 (iii)]
iii. Provide improved high quality, clean and disease-free planting material to the groups to establish community nurseries. [OG 2.3.2 (iv)]

2.4 Sweet Potato [*Ipomoea batatas*]

2.4.1 Provide technical assistance to ensure high productivity of sweet potato

[Activity 4.2.1.4.2.1]

i) *Promote early field preparation and timely planting (FV).* Encourage establishment of individual nurseries and use clean planting material. Field planting: ridges should be spaced at 90cm apart. Plant with the first rains and where rainfall is not reliable planting should be completed by mid-January.

ii) *Encourage farmers to follow recommended planting technology to achieve optimal plant population (FV).* Use cuttings 25 – 30 cm long and planting stations at 30cm apart. Farmers should be encouraged to establish nurseries in *dambos* and near any other water source. Avoid soils that are water logged.

iii) *Promote use of improved and high quality planting material (FV)*. The recommended varieties are: *Babache, Kenya, Kakoma, Lunyangwa, Semusa, Mugamba, Yoyera, Kamchiputu*, and *Tainon*. Encourage farmers to use clean and virus free varieties.

iv) *Encourage farmers to control pests and promote IPM (FV).* [2.1.1(vi)]
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- *Weed control*: Weeding should be done during the first 6 weeks of establishment. Weeding may not be necessary where the crop is fully established and has covered the whole ground. Where the crop cover is *poor, hand weeding should be used.*
- *Insect pest control*: Sweet potato weevil: This is the most destructive pest of sweet potato, even low populations reduce quality and its control is by practicing crop rotation and use of resistant varieties such as: Babache, Kenya, Kakoma, Semusa, Mugamba, and Tainon.
- *Diseases:* Sweet potato virus disease is transmitted by aphids and white flies and can be controlled by use of clean plant material,

rouging of infested plants and use of resistant varieties such as: Babache, Lunyangwa, kakaoma, Semusa, Mugamba, and Tainon. White grubs cause serious damage to roots and tubers of sweet potato and control is by avoiding planting sweet potato on soils rich in organic matter.

v) *Encourage timely harvesting (FV).* Harvest, *Kenya, Kakoma, Semusa, Mugamba, Kamchiputu, and Tainon* 4 months after planting and *Babache, Yoyera, and Lunyangwa* 5 months after.

vi) *Encourage use of good storage facilities (FV)*.

vii) *Link farmers to markets(FV)* [OG 2.2.1 xi]

2.4.2 Increase access to improved sweet potato varieties (OG 2.3.2 i-vii)

2.5 European Potato [*Solanum tuberosum*]

2.5.1 Provide technical assistance to ensure high productivity of European potato

[Activity 4.2.1.5.2.1]

i) *Promote early field preparation and timely planting (FV).* Plough deeply and break soil clods to make fine tilth. Prepare ridges at 75 – 90 cm apart. Soils should be free draining, deep and rich in organic matter. Before planting apply fertilizer and manure in the furrows

ii) *Encourage farmers to follow recommended planting technology to achieve optimal plant population (FV).* Tubers should be planted 30cm apart on ridges spaced 90cm apart.

iii) *Promote use of improved and high quality planting material (FV).* The recommended varieties are; Rosita, Cardinal, Desiree, and Pimperne. Plant well sprouted tubers. Potatoes meant for seed should be planted closer apart at 75cm of ridge spacing.

iv) *Promote use of manure (FV).* After ridging make a groove on top of ridges 15cm deep. Apply 12.5 – 25 tons of compost or khola manure per Ha.

v) *Promote use of fertilizer (FV).* Basal dressing: apply 100kg of 23:21:0:4S per Ha. Top dressing: apply 150kg CAN per ha.

vi) *Encourage farmers to control pests and promote IPM (FV).* [2.1.1(vi)]
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- *Weed control*: Weeding should be done twice during the growing season and when the crop is crowding occasional weeds should be uprooted by hand.
- *Insect pest control*: Aphids: control is by spraying Malathion or Dimethoate. Tuber moth: Can be avoided by earthing up and

spraying by Dipterex Seed tubers should be dusted with one satchet 40g of Actellic per 90kg sack of potatoes.

- *Disease control*: Late blight is the most serious fungal disease of potatoes in Malawi and is controlled through use of resistant or tolerant varieties such as Rosina and Cardinal among the recommended varieties. Spraying with Dithane and Daconil also controls late blight. Early blight: control is early planting with the first rains. Bacterial wilt: is a very destructive bacterial disease and can be avoided by crop rotation and use of disease free fields. There are no tolerant varieties for bacteria wilt. Potato virus and Potato leaf roll virus: - are transmitted by aphids and by farmers as they move into the crop. Control is by use of clean seed, use of tolerant potato varieties, and control of the aphid population.
- *Nematodes:* control is by crop rotation and use of chemical nematicides such as Furadan

vii) *Encourage timely harvesting (FV).* The European potato crop is mature when leaves turn naturally yellow or the top dies off. When harvesting dig tubers from the sides of the ridge and not from above to avoid the damage. After harvesting avoid exposing the tubers to rain or any moist conditions.

viii) *Encourage use of good storage facilities (FV).* Potato meant for consumption is known as ware potato. Shelf life of potatoes can be prolonged by keeping them at low temperatures less than 9 degrees C. Under smallholder conditions keep potatoes in double walled nkhokwes. There is a difference between storage of ware and seed potato, which should be stored in diffused light conditions to allow them to become green. Use rectangular stores (4m long x 2m wide x 2m high) with shelves on which potatoes are stored. Once green and under cool conditions potatoes can store for 3 or more months

ix) *Link farmers to markets(FV)* [2.2.1 (xi)]

Minimum requirements for increasing European potato

i. Promote use of improved and high quality planting material [OG 2.5.1 (iii)]
ii Promote use of manure [OG 2.5.1 (iv)]
iii. Link farmers to markets [2.2.1 (xi)]

Grain legumes

Grain legumes are an important source of vegetable protein. Farmers should therefore be encouraged to grow them wherever conditions are suitable basically for their own consumption, to improve their nutritional status and for cash. Where land holdings are small grain legumes should be planted with maize, cassava, sorghum and other suitable crops for the purpose of harvesting two or more crops per season and for improving soil fertility. Common grain legumes in Malawi are Phaseolus beans, groundnuts, Soya beans, pigeon peas, cow peas, ground beans, chickpeas, field peas, garden beans, grams, velvet beans, and dolicus beans. Only the first four are covered in the guidelines. The aim is therefore to increase production of grain legumes for local consumption improve the nutritional status of the rural and urban communities and increase surplus for sale.

2.6 Phaseolus Beans [*Phaseolus vulgaris*]

2.6.1 Provide technical assistance to ensure high productivity of Phaseolus beans

[Activity 4.2.1.6.2.1]

i) *Promote early field preparation and timely planting (FV*). Encourage farmers to prepare fields for the inter-planted crop before the onset of the first rains. For pure stands fields should be ready by the end of November (South) and December (centre, North). For the inter-planted crop planting should be done soon after planting the main crop or soon after crop emergence. For pure stand planting should be done mid-December to mid-January (South) and during January (Centre, North).

ii) *Encourage farmers to follow recommended planting technology to achieve optimal plant population (FV).* Ridges should be prepared at a spacing of 90cm or 75cm. for rainfed crop pure stands and relay crop. For Dwarf beans plant in 2 rows spaced at 30cm on the ridge one plant per station. Seed rate: 70 - 80 kg per Ha. Climbing beans: plant in 1 row, 1 seed per station spaced at 15cm. Seed rate 75 – 90 kg per Ha. Inter-planted crop with maize: seed rate: 50 – 60 kg per Ha. Dimba crop: Seed rate: 40 –50 kg/Ha dwarf and 35 – 45 kg/Ha climbing beans

iii) *Promote use of improved and high quality seed (FV).* The recommended varieties include the determinate (dwarf): Nasaka, Bwenzilaana, Sapelekedwa, Kamtsilo, Naliplira, Maluwa, Nagaga, Mkhalira, Kambidzi, Kalima, Sapasika, and Chimbamba. Indeterminate varieties (climbing) include:- Kanzama, Bunda 93, and Namajengo. These have different seed rates. Details can be obtained from the MoAFS Guide to Agricultural Production and Natural Resources Management page 115.

iv) *Promote use of fertilizer (FV).* Apply 23:21:0+4S at the rate of 100kg per Ha.

v) *Encourage farmers to control pests and promote IPM (FV).* [OG 2.1.1(vi)]
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- Weed control: crops should be weed free 6 – 8 weeks after planting. Weeding after flowering should not be practiced to avoid flower shedding.
- Disease control: use of disease tolerant varieties such as Naliplira, Maluwa, Nagaga, Mkhalira, and Kambidzi. Common diseases are: Anthracnose, Angular leaf spot, Web blight, Halo blight, bean mosaic virus, Common bacterial blight. Control is either by spaying, use of disease free seed, and crop rotation.
- Insect pest control: Bean Stem Maggot, Bean Beetle, Bean Aphids – control is by spraying with Daconil (Bean Aphids), delayed planting (Bean Beeetle), and spraying and earthing up ridges for Bean Stem maggots.

vi) *Promote timely harvesting (FV)*. Harvest when most of the pods on the plant have started drying.

vii) *Promote use of good storage facilities (FV)*. Store well dried beans in cool dry place. Use Actellic Super or Grain Dust to prevent Bruchid whose attack can be mistaken for weevils.

viii) *Link farmers to markets (FV)*[OG 2.2.1 (xi)].

2.6.2 Improve access to Open Pollinated Varieties through crop diversification / seed multiplication at community level [Grain legumes and OPV maize]

[Activity 4.2.1.6.2.2] beans; [Activity 4.2.1.7.2.2] Soya beans; [Activity 4.2.1.8.2.2] pigeon peas.

The aim should be to improve farmers' access to high quality improved seed varieties on sustainable basis through seed multiplication /crop diversification for crops such as OPV maize, Phaseoulus beans, Soya beans, groundnuts, pigeon peas and other legumes. This could be achieved through one-off injections of improved seed into the targeted communities in the form of 'seed multiplication and credit' for each seed type. The process of promoting seed multiplication/crop diversification is as follows:

i) *Create awareness among community members on the concept of improved seed multiplication/crop diversification through 'credit' (FV).*

ii) *Set up a revolving seed credit system (FV)*. Guidelines for setting up a correct credit system are as follows:

- mobilise farmers to form rotating savings and credit groups;
- provide training in group dynamics, business management and in savings and credit management, including record keeping;
- train them on establishment of seed banks at community level;
- support them with appropriate technology and financial resources to establish seed storage facilities;
- train the farmers in good seed production, seed selection and storage practices;
- assist them with start-up capital including start-up seed, i.e., good quality OPVs; and
- train the group leaders in leadership and loan recovery strategies.

iii) *Assess improved seed availability in the community as well as farmers' seed needs and prioritize the needs (FV).* Seed needs might include seed types for crops that farmers want to produce but are unable to do so due to lack of access to such seed types; improved seed (e.g. OPV) that is in short supply at community level to share; and seed that has potential for meeting an identified market niche.

iv) *Encourage farmers to organize into commodity associations(FV)* for bulk marketing of produce and inputs management. Once the associations become well established encourage them to register with FUM or any other apex so that they can go into production of high value crops depending on ecological suitability. As an association they may have access to contract farming opportunities.

v) *Encourage group members to meet regularly (FV).* e.g. once/month to share knowledge good crop husbandry practices and experience in agronomic performance of the selected crops. Encourage rotation of visits covering all farmer fields as a way of hands-on sharing of information on husbandry practices and pest and disease control using IPM.

vi) *Procure and distribute seed by commodity (FV)* based on the requirements for each commodity group of 15 – 20 people. Since the seed may not be adequate for the entire community a system of 'seed credit' should be introduced so that the farmers that do not access a particular seed type in the current year may do so the following year.

vii) *Promote community seed bank concept and infrastructure development and encourage communities to store repaid seed and other seeds in the seed bank (FV).*

Minimum requirements for increasing Phaseolus beans production

i. Promote use of improved high quality seed [OG 2.6.1 (iii)]
ii. Set up a revolving seed credit system [OG 2.6.2 (ii)]
iii. Encourage farmers to organize into commodity associations for bulk marketing of produce and inputs management [OG. 2.6.2 (iv)]

2.7 Groundnuts [*Arachis hypogaea*]

2.7.1 Provide technical assistance to ensure high productivity of groundnuts

[Activity 4.2.1.7.2.1]

i) *Promote early field preparation and timely planting (FV)*. Prepare land early before the onset of the first rains, and plant with the first rains around second half of November (South) and first half of December (Centre, South).

ii) *Encourage farmers to follow recommended planting technology to achieve optimal plant population (FV).* Prepare ridges at 90cm apart and seed spaced at 10cm or 15cm per station. Use recommended seed rates and range between 35kg/Ha e.g. for *Malimba* to 100kg/Ha for *Chitembana*

iii) Promote use of improved and high quality seed (FV). The recommended improved varieties include: - *Chalimbana, Chitembana, Malimba*, RG 1, *Mani-Pintar, Mawanga*, CG 7, *Nsinjiro, Kakoma* and *Baka*. These should be kept in shell until shortly before planting

iv) *Encourage farmers to control pests and promote IPM (FV).* [OG 2.1.1(vi)]
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- Weed control: weed twice during the growing season between 20 and 50 days after sowing. During pegging use hand weeding only.
- Disease control: Early leaf spot, Late Leaf Spot, Rust, Groundnut and Rossette. All can be controlled by Daconil spraying at fortnight intervals.
- Pests: several species of termites and aphids. Termite control is by avoiding fields that have a termite history. Control Aphids by early planting and correct spacing.

v) *Promote timely harvesting (FV).* The nuts are mature when the inside of the shell is spotted pale brown. Timely harvesting is necessary to avoid discoloration, germination, and pods remaining in the ground.

vi) *Promote use of good storage facilities (FV).* Store groundnuts in dry containers to avoid *Aspergilis flavus*, which leads to aflotoxin contamination.

vii) *Link farmers to markets(FV) [OG 2.2.1 (xi)]*

2.7.2 Improve access to OPV ground nut seed through community seed multiplication [Operational Guidelines 2.6.2]

Minimum Requirements for increasing groundnut production

i. Promote use of improved and high quality seed [OG 2.7.1 (iii)]
ii. Promote use of good storage facilities [OG 2.7.1 (vi)]
iii. Link farmers to markets [OG 2.7.1 (vii)]

2.8 Soya Beans [*Glycine max*]

2.8.1 Provide technical assistance to ensure high productivity of Soya beans

[Activity 4.2.1.8.2.1]

i) *Promote early field preparation and timely planting (FV).* Prepare fields with the first planting rains and plant in November or early December.

ii) *Encourage farmers to follow recommended planting technology to achieve optimal plant population (FV).* Prepare ridges at 90cm or 75cm apart. Plant on the ridge: 2 rows spaced at 30cm apart and plant one seed per station spaced at 5cm apart and 2.5cm deep. Seed rate is 90 to 110 kg/Ha.

iii) *Promote use of improved and high quality seed (FV).* Use recommended varieties and these include: Ocepara 4, 427/5/7, Santaroza, Davis, Bossier, Duocrop, Impala, 491/6/7, 501/6/12, Kudu, Hardee, and Geduld

iv) *Encourage seed inoculation and use of fertilizer (FV).*

a) *Inoculation*. Inoculate seed with Rhizobium for high grain yield. Rhizobium is available from Bvumbwe, Chitedze, and Lunyangwa Agricultural Research Stations.
b) *Fertilisers.* Nitrogen fertilizers can also be applied in place of Rhizobia. For high grain yields apply both Rhizobia and fertilizers. Apply fertilizers at the rate of 200 kg 23:21:0+4S fertilizer per Ha.

v) *Encourage farmers to control pests and promote IPM (FV)* [OG 2.1.1 (vi)]
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- *Weed control*: keep the crop weed free especially during the initial stages of crop development.
- *Insect Pest Control*: the important insect pests are semiloopers, flower and pod borers and pod sucking bugs. Control is by spraying the crop with Carbaryl (Sevin). Nematode control: growing of resistant varieties such as Ocepara 4 is recommended. The crop should be grown in rotation with crops that are alternative hosts to e.g. tobacco.

vi) *Promote timely harvesting (FV).* The crop is mature when pods have turned brown or grey in colour depending on variety. Harvest when leaves have fallen off the crop and when pods rattle when shaken normally from April to early May.

vii) *Promote use of good storage facilities (FV).* Store all soybeans in a cool dry place. For seed store Soya bean for not less than 6 months to prevent it from loosing viability.

viii) *Link farmers to markets(FV)* [OG 2.2.1 (xi)]

2.8.2 Improve access to OPV soya bean seed through community seed multiplication [Operational Guidelines 2.6.2]

Minimum Requirements for increasing Soya beans production

i. Promote use of improved and high quality seed [OG 2.8.1 (iii)]
ii. Promote use of good storage facilities [OG 2.8.1 (vii)]
iii. Link farmers to markets [OG 2.8.1 (viii)]

2.9 Pigeon Peas [*Cajanas cajana*]

2.9.1 Provide technical assistance to ensure high productivity of pigeon peas

[Activity 4.2.1.9.2.1]

i) *Promote early field preparation and timely planting (FV).* Prepare the field before the first planting rains. Plant with the first planting rains or soon after the main crop has emerged. Dress seed with fungicide before planting.

ii) *Encourage farmers to follow recommended planting technology to achieve optimal plant population (FV).* Prepare ridges 90cm or 75 cm apart. Seed rate varies: pure stand short duration 16 – 30 kg/ha; pure stand medium duration 6kg/ha, and inter-planted crop long duration 6kg/ha.

iii) *Promote use of improved and high quality seed (FV).* The recommended varieties are: Sauma (ICP9145) and Kachangu (ICEAP00040).
[Details are in: MoAFS: Guide to Agricultural Production and Natural Resources Management (2004) p 108]

iv) *Encourage farmers to control pests and promote IPM (FV)* [2.1.1(vi)]
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- *Weed control:* The field should be weed free especially in the initial stages of establishment.
- *Insect pest control*: Without exception all early maturing pigeon peas have to be sprayed twice between 50% and full pod to control insect pests. Lepidopteran larvae including cutworms, white grubs, elegant grasshopper, and aphids feed on young seedlings. Physical destruction is recommended. Pod sucking insects: Clavigralla spp and Nezara viridula feed on pigeon pea pods. Control by spraying Carbaryl.
- *Disease control*: the only major disease is the Fusarium wilt, which can be controlled by use of resistant varieties Sauma and kachangu.

v) *Promote timely harvesting (FV).* Harvest the dry pods and stack them to complete drying.

vi) *Encourage use of good storage facilities (FV).* Thresh and clean the grain and dust the grain with *Actellic Super* or *Grain Super Dust*. Store grain in bags or other clean containers and place in cool and dry place.

vii) *Link farmers to markets(FV). [OG 2..2.1 (xi)*

2.8.2 Improve access to OPV pigeon pea seed through community seed multiplication [Operational Guidelines 2.6.2]

Minimum Requirements for increasing pigeon peas production

i. Promote use of improved and high quality seed [OG 2.9.1 (iii)]
ii. Encourage use of good storage facilities [OG 2.9.1 (vi)]
iii. Link farmers to markets [(OG 2.3.4.1 (vii)]

Fruit Production

Malawi has a range of climatic conditions and soil types that enable a variety of fruits to be produced. Fruits are valuable sources of vitamins and mineral salts, which are essential for body protection against diseases. Some fruits also provide proteins, carbohydrates, and oils. They are also a source of income. Several factors such as cultural practices, insect pests and diseases incidence limit the yield and quality of fruits in the country.

2.10 Citrus Fruits

These include sweet orange, sour orange, tangerine, grape fruit, and lemon. Citrus fruits can be grown in many areas depending on varieties and species. Commercial production of moat varieties should be in areas below 1000 sea level. Adequate moisture is essential especially during flowering and fruit development from August to November.

Sweet orange [*Citrus sinensis*]
Sour orange [*Citrus aurantium*]
Tangerine [*Citrus reticulata*]
Lemon [*Citrus limoni*]

2.10.1 Provide technical assistance to ensure high productivity for each fruit type

[Activity 4.2.2.1.2.1]

i) *Encourage farmers to form fruit producers clubs (FV)*
The following general principles should be encouraged in the formation and operation of farmer clubs/associations.

- Clubs should be self-organized with elected committee bearers comprising chairperson, secretary, treasurer, and ordinary committee members. Female participation in committees should be encouraged.
- Clubs should meet regularly e.g. once per month to review progress and develop action plans for the following month.
- Clubs should keep records (minutes) of all meetings.

ii) *Promote early field preparation and timely planting (FV).* Planting holes should be made two months in advance and should be 90 cm in diameter and 90 cm deep. Holes should be filled with top soil mixed with 5 – 10 kg of well-decomposed manure. Encourage farmers to make basins or box ridges 1m in diameter at planting and thereafter farmers should follow canopy diameter around each tree to trap water. Trees should be mulched to maintain moisture and suppress weeds. Plant with the first planting rains (rains of 50mm or wetting to a depth of 15cm).

iii) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV).* For orange, grape fruit and lemon spacing should be 6m x 6m and for tangerine and lime 5m x 5m.

iv) *Promote use of improved and high quality varieties (FV).*

Citrus fruit type	Recommended varieties
Sweet orange	Valencia late, Washington Naval, Jaffa and Premier.
Sour orange	Bitter Seville
Tangerine	Common Tangerine and Kwanza Mandarins.
Grape fruit	Marsh Seed Less and Duncan
Lemon	Eureka and Villa France
Lime	Tahiti and West Indian

v) *Encourage farmers to use manure (FV).* Apply 5 to 10 kg of well-decomposed manure per tree at the beginning of every rain season.

vi) *Encourage farmers to use fertilizer (FV).* Fertilizer application should be based on recommended rates by age of the fruit trees (Reference: MoAFS, Guide to Agriculture Production and Natural Resources Management Table 54 page 189).

vii) *Encourage farmers to control pests and promote IPM (FV)* [OG 2.1.1(vi)] *Technical information on pest control should be obtained from the District Agriculture Offices and ADDs*

- *Weed control*: The basin area should be kept weed free all the time and weeds outside the basin area should be kept short by slashing.
- *Insect pest control*: The important insect pests for citrus are: fruit flies, false codling moth, orange dog, aphids, and scales.
- *Disease control*: the important citrus diseases are: - Citrus greening disease, Armillaria root rot, Gummosis (Foot rot), and Citrus white fly. Encourage Integrated Pest Management .

viii) Build capacity of farmers in post-harvest handling and storage(FV).

- Advise farmers on Maturity Indices so that they can detect when it is optimal to harvest the fruit
  - Oranges should never be picked until they have fully matured on the tree and are completely ripe inside, regardless of exterior color.
  - Lemons for export are harvested as early as possible and are naturally "cured" in transit. Adopt the practice of picking lemons at any time after the fruits reach a 25 % juice content, and using rings to gauge the commercially acceptable size, and repeated spot-picking with clippers. Lemons under 2 1/8 in (5.4 cm) are too immature to attain proper quality for marketing and fruits over 2 1/2 in (6.25 cm) are too large.

- Advise farmers on Quality Indices. Undersized fruits should be discarded for marketing purposes. Oranges and lemons, after sorting according to color should be washed and coated with a fungicide and where possible a thin layer of wax (if for export) and then stored (cured) until ready for transportation to the market (domestic/export).

- Advice farmers on Prevention of Physiological & Physical Disorders. Fruit cracking can occur when dry periods are followed by heavy rains. Cracking can be largely avoided by frequent light irrigation during the dry period and early picking.

- Advice farmers on Controlling Pathological Disorders using the following strategies:
  - Stored lemons are subject to the stem-end rots and molds. The albedo may show small dark sunken areas even though this defect is not visible externally. Cultivars differ in their ability to resist decay. Farmers should chose the most resistant cultivars of lemons and store them in a cool place after harvesting.
  - The usable fruits can be treated with fungicide against stem-end rot and returned to the curing room.

Sources: (1) Morton, Julia F. 1987. Orange. p. 134–142. In: Fruits of warm climates. Miami, FL.; (2) Morton, J. 1987. Lemon. p. 160–168. In: Fruits of warm climates. Miami, FL

ix) *Build capacity of farmers in fruit processing(FV)*

Provide training on processing covering the following topics:

- Health aspects of fruits
  - the health benefits of increased fruit consumption
  - Antioxidants in fruits
  - Improving the nutritional quality of processed fruits and vegetables: the case of tomatoes
- Managing safety and quality in the supply chain
  - Modelling fruit production
  - HACCP systems for fruit cultivation
  - Maintaining the post-harvest quality of fresh fruits
  - Measuring fresh fruit quality: advanced optical methods
  - Maximizing the quality of thermally-processed fruits
  - The safety of cooked chilled foods containing fruits
- New technologies to maximize quality
  - Measuring and improving the natural resistance of fruit
  - Improving the shelf-life of fruits by genetic modification
  - Minimal processing of fresh fruit
  - New modified atmosphere packaging (MAP) techniques for fresh prepared fruits
  - Edible coatings for fruit
  - High pressure (HP) processing of fruit
  - The use of vacuum technology to improve processed fruits

Source: (1) http://www.woodheadpublishing.com/en/book.aspx?bookID=467
(2) W. Jongen, 2002. "Fruit and vegetable processing: Improving Quality". Wageningen University, the Netherlands

x) *Link farmers to sources of finance to purchase the fruit processing technology or provide start-up capital through the programme(FV).*

xi) *Link farmers to markets (FV). [OG 2.2.1 (xi)]*

Minimum requirements for citrus fruits production

i. Encourage farmers to use manure (FV) [OG 2.10.1 (iv)]
ii. Promote use of improved and high quality varieties [OG 2.10.1 (iv)]
iii. Link farmers to the market [OG 2.10.1 (xi)]

2.11 Banana and Plantains [*Mussa spp*]

2.11.1 Provide technical assistance to ensure high productivity of bananas and plantains

[Activity 4.2.2.2.2.1]

i) *Encourage farmers to join fruit producers clubs(FV) [OG 1.1.3)*

ii) *Encourage early field preparation and timely planting (FV).* Holes should be dug two months in advance 60cm deep x 60cm diameter. Box ridges or basins should be made around the cluster to conserve water. Bananas and plantains grow best in areas with well distributed rainfall of more than 1,200mm. Nematode free suckers should be planted with the first planting rains to a depth of 35 – 45 cm.

iii) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV)*. Plant dwarf varieties at 2m x 2m; plantain and giant bananas at 3m x 3m. Plant one sucker per hole. For dwarf varieties 1890 – 2500 suckers per hectare, and for giant bananas and for plantains 816 – 1111 suckers per hectare are required. Encourage farmers to thin bananas and maintain 3 to 4 well-spaced suckers per mat to get large bunches.

iv) *Promote use of improved and high quality varieties (FV).* The recommended varieties are: Dwarf: Cavenda (kabuthu) and Giant: Cavendish (Williams). However production of popular local cultivars such as Ngewo (Khazanga) and Ndoki (zeru) should also be encouraged.

v) *Encourage farmers to use manure (FV).* Apply 10kg of well decomposed manure per mat at the beginning of the rainy season.

vi) *Encourage farmers to use fertilizer (FV)*. Chemical fertilizers can be applied as follows: 75g Urea, 200g 23:21:0+4S and 175g Muriate of Potash per mat at the beginning of the rains followed by 125g Urea in March.

vii) *Encourage farmers to control pests and promote IPM (FV)* [OG 2.1.1 (vi)]
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- *Weed control:* cultivate lightly to avoid root damage.

- *Insect/pest control*: the banana weevil is the most important insect pest. Use biological control: plant clean material and keep the banana field weed free.
- *Nematode control*: use clean material by scraping off all roots from suckers before planting. A five-year rotation should be followed.
- *Disease control*: common diseases are: Black sigatoka, Leafspot, Fusarium wilt, Panama, Anthracnose, Cigar-end rot, Armillaria root rot, Banana Bunchy Virus Top.

viii) *Encourage timely harvesting (FV).* Encourage farmers to harvest when bananas are fully mature and when fingers on the upper hands are plump.

ix) *Build capacity of farmers in post-harvest handling and storage in order to maintain quality (FV)y*

- *Advise farmers on Maturity Indices* so that they can detect when it is optimal to harvest the fruit
  - Degree of fullness of the fingers, i.e., disappearance of angularity in a cross section is a sign that the banana is ripe.
  - Bananas are harvested mature-green and ripened upon arrival at destination markets since fruits ripened on the plant often split and have poor texture.

- *Advise farmers on Quality Indices*
  - Maturity (the more mature the better the quality when ripe); finger length (depending on intended use and demand for various sizes); freedom from defects, such as insect injury, physical damage, scars, and decay.
  - As bananas ripen their starch content is converted into sugars (increased sweetness). Other constituents that influence flavor include acids and volatiles.

- *Prevent Physiological & Physical Disorders*
  - Chilling injury. Symptoms include surface discoloration, dull or smokey anal color, subepidermal tissues reveal dark-brown streaks, failure to ripen, and, in severe cases, flesh browning. Chilling injury results from exposing bananas to temperatures below 13°C (56°F) for a few hours to a few days, depending on cultivar, maturity, and temperature.
  - Skin abrasions. Abrasions result from skin scuffing against other fruits or surfaces of handling equipment or shipping boxes. When exposed to low (<90%) relative humidity conditions, water loss from scuffed areas is accelerated and their color turns brown to black.
  - Impact bruising. Dropping of bananas may induce browning of the flesh without damage to the skin.

x) *Build capacity of farmers in fruit processing (FV) [OG 2.10.1(ix)]*

xi) *Link farmers to markets (FV) [OG 2.2.1 (xi)]*

Minimum requirements

i. Promote use of improved and high quality varieties [OG 2.11.1 (iv)]

ii. Encourage farmers to use manure [OG 2.11.1 (v)]
iii. Link farmers to markets [OG 2.11.1 (xi)]

2.12 Pineapples [Ananas comosus]

2.12.1 Provide technical assistance to ensure high productivity of Pineapples

[Activity 4.2.2.3.2.1]

i) *Encourage farmers to join fruit producers clubs [OG 1.1.3]*

ii) *Encourage early field preparation and timely planting (FV).* Prepare the field by ring-barking trees in the field two years in advance and completely uproot them. Dig the land deep and prepare holes 90cm wide, 25cm high and make 60cm pathways between them. Incorporate 5 to 10kg of well-decomposed manure per square metre. Establish pineapples from suckers, slips and tops. Leave slips and tops in the sun for two weeks to form a callus before planting to avoid rotting. Grade planting materials into several groups according to size and plant each group separately. Mulch the crop soon after planting to conserve moisture and control weeds.

iii) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV)*. Prepare beds and plant 2 rows on each bed spaced 60cm x 30cm between plants and 4cm deep with the first planting rains.

iv) *Promote use of improved and high quality varieties (FV).* There are two recommended varieties: *Smooth Cayenne* and *Local Queen*

v) *Encourage farmers to use manure (FV).* Apply 5 to 10 kg of well-decomposed manure per tree at the beginning of every rain season.

vi) *Encourage farmers to use fertilizer (FV).* Apply fertilizer soon after planting and repeat at 3 month intervals. The recommended rates of fertilizer are detailed in the *guide to agriculture production and natural resource management Table 55, Page 193*.

vii) *Encourage farmers to control pests and promote IPM (FV) [2.1.1 (vi)]*
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- *Weed control:* keep the field weed free by cultivating lightly to avoid root damage.
- *Insect pests:* important pests include mealybugs and scales, which are controlled by spraying dimethoate.
- *Nematode control:* can be prevented by ring-barking trees in the field before planting.

viii) *Encourage timely harvesting (FV).* For the fresh market, harvest pineapples when a quarter of the fruit turns yellow and harvest canning apples when half of the fruit has turned yellow.

ix) *Build capacity of farmers in post-harvest handling and storage in order to maintain quality (FV):*

- *Advise farmers on Maturity Indices* so that they can detect when it is optimal to harvest the fruit

  - The pineapple is harvested at peak ripeness because it does not contain starch that will turn to sugar to further sweeten the fruit. The fruits supply of sugar comes from the stem of the plant, which stores the starch that is converted to sugar and then passed on to the fruit as it ripens.
  - Once the fresh pineapple is cut from the plant, it will not ripen any further, so "forget about letting it ripen on the counter". Without any starch reserves to convert to sugar, it will simply begin to rot and ferment.
  - When the pineapple is ripe, it has a very distinct sweet aroma and its flesh is very juicy with a sweet, mildly acidic flavor.
  - When unripe, the pineapple is not only inedible but poisonous, irritating the throat and acting as a drastic purgative.
  - Excessive consumption of pineapple cores has caused the formation of fiber balls (bezoars) in the digestive tract.

- *Advise farmers on Quality Indices*

  - Pineapple is sorted by size.
  - Information on already established market grades/class should be sought from the prospective buyer
  - When frozen, pineapple has a tendency to loose some of its flavor.
  - The fruits are very perishable so are harvested when a buyer is available to purchase the crops (otherwise, harvesting is postponed until a buyer is available in order to avoid losses).
  - Fresh ripe pineapples should have green, fresh-looking leaves in a small, compact crown, and a leaf should be easy to remove if fully ripe. Once again, the nose proves to be a powerful tool in determining ripeness.
  - The fruit should be plump, feel heavy and have a strong sweet, but not fermented, pineapple aroma.
  - Coloring may be green or yellow-gold, depending on the variety.
  - Feel the bottom. It should yield to medium pressure, have no indication of mold, and the eyes should be bright, shiny and flat.
  - Avoid any that are dry or look old and wrinkly. Dark eyes, soft spots and yellowed leaves are all indicators of a pineapple way past its prime.

- *Prevent Physiological & Physical Disorders*

- Sunburn or sunscald develops when fruits fall over and expose one side to the sun, though 'Abacaxi' variety may sunburn even when erect. Affected fruits soon rot and become infested with pests. They must be cut as soon as noticed and safely disposed of where they will not contaminate other fruits. Dry grass, straw, excelsior or brown paper sleeves may be placed over fruits maturing in the summer to prevent sunburn.
- For mature pineapples cut at the base of with a sharp instrument to avoid damage to the fruit itself.
- Pineapples are harvested with their crowns. The crowns serve as protective cushion during transportation, and natural insulation during transporting or storing.
- It bruises easily in spite of its seemingly armoured exterior and will ferment if kept at room temperature for too long.

- *Control Pathological Disorders using the following strategies*
  -
  - Use of rodenticides; Fencing of perimeters to ward off rat infestation
  - Dipping in 2 % thiabendazole fungicide for 1 minute to disinfect the fruit. There is a possibility that storage life might be prolonged by dipping the fruits in a wax emulsion containing a suitable fungicide.
  - Fruits intended for storage are dipped in or sprayed with sodium orthophenylphenate (spray formulation of 1.0 kg of fungicide to 80 liters of water applied to the whole fruit and crown

x) *Build capacity of farmers in fruit processing(FV) [OG 2.10.1(ix)].*

xi) *Link farmers to markets [Operational Guidelines 2.2.1 (xi)(FV)].*

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Source: (1) http://homecooking.about.com/od/foodstorage/a/pineapplestor.htm;
(2) http://www.hort.purdue.edu/newcrop/morton/pineapple.html#Description;
(3) Morton, J., 1987. Pineapple. p. 18–28. In: Fruits of warm climates.Miami, FL.)

Minimum requirements for increasing pineapple production

i. Promote use of improved and high quality varieties [OG 2.12.1 (iv)]
ii. Encourage farmers to use manure OG 2.12.1 (v)]
iii. Link farmers to markets [OG 2.2.1 (xi)]

2.13 Mangoes [*Mangifera indica*]

2.13.1 Provide technical assistance to ensure high productivity of mangoes

[Activity 4.2.2.4.2.1]

i) *Encourage farmers to join fruit producers clubs(FV) [(OG 1.1.3)]*

ii) *Promote early field preparation and timely planting (FV).* Planting holes should be prepared two months in advance. The holes should be 90cm in diameter and 90cm deep. They should be filled with top soil mixed with 5 to 10 kg of well-decomposed manure. Plant in December or January for successful establishment.

iii) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV).* Trees should be spaced 9m x 9m, 10.5m x or 10.5m, 12m x 12m depending on variety, soil type and environmental conditions. Close spacing is recommended for marginal areas and wider spacing is for optimal area. Make basins around each tree as wide as the canopy and mulch to conserve moisture.

iv) *Promote use of improved and high quality varieties (FV).* Use of grafted varieties is recommended: *Hadden, Tommy Atkins, Kent, Keitt, Davis Hadden, Irwin, Boribo and Ngowe*. Also encourage local varieties such as *Waka, Nthulura, and kapantha*.

v) *Encourage farmers to use manure (FV)*. Apply 5 to 10kg of manure at the beginning of each rainy season.

vi) *Encourage farmers to use fertilizer (FV)*. Apply fertilizer at the recommended rates as detailed in the *Guide to Agriculture Production and Natural Resources Management Table 54 page 189*.

vii) *Encourage farmers to control pests and promote IPM (FV) [OG 2.1.1(vi)]*
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- *Weed control:* Keep the basin area weed free and regularly slash the area outside the basin.
- *Insect pest control*: mangoes have three main pests: *mango stone weevil*, *scales*, and *fruit fly*.
- *Disease control*: Anthracnose and Powdery mildew can be controlled by spraying chemicals. Encourage IPM (Activity 2.1.1 (vi)).

viii) *Encourage timely harvesting (FV).* Fruits of improved mango varieties should be harvested when they are physiologically mature (*kuyezuka* or *kudengula*). Pick the fruit and avoid bruising the fruit by preventing it from falling on the ground.

ix) *Build capacity of farmers in post-harvest handling and storage in order to maintain quality*

- *Advise farmers on Maturity Indices* so that they can detect when it is optimal to harvest the fruit
  - Change in fruit shape (fullness of the cheeks).
  - Change in skin color from dark-green to light-green to yellow (in some cultivars). Red color on the skin of some cultivars is not a dependable maturity index

- Change in flesh color from greenish-yellow to yellow to orange.

- *Advise farmers on Quality Indices*
  - Uniformity of shape and size; skin color (depending on cultivar); flesh firmness.
  - Freedom from decay and defects, including sunburn, sapburn, skin abrasions, stem-end cavity, hot water scald, chilling injury, and insect damage.
  - Changes associated with ripening include starch to sugar conversion (increased sweetness), decreased acidity and increased carotenoids and aroma volatiles.
  - There are large differences in flavor quality (sweetness, sourness, aroma) and textural quality (fiber content) among cultivars.

- *Prevent Physiological & Physical Disorders*
  - Sapburn. Dark-brown to black discoloration of mango skin due to chemical & Physiological injury from exudate (sap) from cut stem.
  - Skin abrasions. Abrasions due to fruit rubbing against rough surfaces or each other result in skin discoloration and accelerated water loss.
  - Chilling injury. Symptoms include uneven ripening, poor color and flavor, surface pitting, grayish scald-like skin discoloration, increased susceptibility to decay, and, in severe cases, flesh browning. Chilling injury incidence and severity depend on cultivar, ripeness stage (riper mangoes are less susceptible) and temperature and duration of exposure.
  - Heat injury. Exposure to temperatures above 30°C (86°F) for longer than 10 days results in uneven ripening, mottled skin and strong flavor. Exceeding the time and/or temperature combinations recommended for decay and/or insect control, such as 46.4°C (115.5°F) water dip for 65-90 minutes (depending on fruit size) causes heat injury (skin scald, blotchy coloration, uneven ripening).
  - Internal flesh breakdown (stem-end cavity). Flesh breakdown and development of internal cavities between seed and peduncle. This disorder is more prevalent in tree-ripened mangoes.
  - Jelly-seed (premature ripening). Disintegration of flesh around seed into a jelly-like mass.
  - Soft-nose. Softening of tissue at apex. Flesh appears over-ripe and may discolor and become spongy. This disorder may be related to calcium

- *Control Pathological Disorders using the following strategies:*

  - Anthracnose. Caused by Colletotrichum gloesporioides, begins as latent Disorders infections in unripe fruit and develops when

the mangoes begin to ripen. Lesions may remain limited to the skin or may invade and darken the flesh.

- Diplodia stem-end rot. Caused by Lasiodiplodia theobromae, affects mechanically-injured areas on the stem or skin. The fungus grows from the pedicel into a circular black lesion around the pedicel. Control is by careful handling to minimize mechanical injuries and hot water treatment: 5-10 minutes (depending on fruit size)

Source: Extract from Adel A. Kader, Department of Plant Sciences, University of California, Davis, CA 95616
http://www.postharvest.com.au/Produce_Information.htm

x) *Build capacity of farmers in fruit processing (FV) [OG 2.10.1(ix)].*

xi) *Link farmers to market (FV) [2.2.1 (ix)]*

Minimum requirements to increase mango production

i. Promote use of improved and high quality varieties [OG 2.13.1 (iv)]
ii. Encourage farmers to use manure [OG 2.13.1 (v)]
iii. Link farmers to markets [OG 2.13.1(xi)]

2.14 Avocado Pears [*Persica merticana*]

2.14.1 Provide technical assistance to ensure high productivity of Avocado Pears

[Activity 4.2.2.5.2.1]

i) *Encourage farmers to join fruit producers clubs [OG 1.1.3]*

ii) *Promote early field preparation and timely planting (FV).* Ring-bark trees in the field to be planted with Avocado pears two years in advance and completely uproot them. Dig planting holes 90cm wide and 90cm deep. Holes should be filled with top soil and mixed with 5 to 10kg of well-decomposed manure. Trees should be planted with the first planting rains when the soil is warm and moist.

iii) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV).* Trees should be spaced 9m x 9m under marginal conditions and 12m x 12m under optimum conditions. In area of heavy wind, wind breaks should be planted.

iv) *Promote use of improved and high quality varieties (FV).* Use recommended varieties such as: *Fuerte, Mayapan Hass, Collinson and Anaheim*. However the growing of local cultivars should be encouraged especially where farmers have no access to improved varieties.

v) *Encourage farmers to use manure (FV).* Apply 5 to 10kg of well-decomposed manure per tree at the beginning of the rainy season.

vi) *Encourage farmers to use fertilizer (FV).* Apply fertilizer at the recommended rates as detailed in the *Guide to Agriculture Production and Natural Resources Management Table 54 page 189.*

vii) *Encourage farmers to control pests and promote IPM (FV) [OG 2.1.1 (vi]*
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- Weed control: keep the basin area weed free and regularly slash the area outside the basin.
- Insect pest control: *Fruit flies and Thrips,* which can be controlled by by spraying collecting and burying of all dropped fruits and by spraying Fenthion.
- Disease control: *Foot rot* is a disease of economic importance and can be controlled by dusting Captain or copper oxychloride on the root collar.

viii) *Encourage timely harvesting (FV)*. Harvest fruits when they are physiologically mature and at this stage the seed inside the fruit rattles when shaken. If the fruits are going to be transported long distances, harvesting should be done before the rattling sound is detected.

ix) *Build capacity of farmers in post-harvest handling and storage in order to maintain quality:*

- *Advise farmers on Maturity Indices* so that they can detect when it is optimal to harvest the fruit
  - For ripe (harvest when fruit begins to soften).
  - For green (check size and maturity dates from flowering dates)

- *Prevent odors*
  - Can be absorbed by pineapples if stored together

Source: Extract from Adel A. Kader Department of Plant Sciences, University of California, Davis, CA 95616
http://www.postharvest.com.au/Produce_Information.htm

x) *Build capacity of farmers in fruit processing (FV) [OG 2.10.1(ix)]*

xi) *Link farmers to markets (FV)[OG 2.2.1 (xi)*].

Minimum requirements for increasing avocado pears production

i. Promote use of improved and high quality varieties [(2.14.1 (iv)].
ii. Encourage farmers to use manure [(2.14.1 (v)].
iii. Link farmers to markets [OG 2.14.1(xi)]

2.15 Paw Paws [*Carica papaya*]

2.15.1 Provide technical assistance to ensure high productivity of Paw Paws

[Activity 4.2.2.6.2.1]

i) *Encourage farmers to join fruit producers clubs(FV) [OG 1.1.3]*

ii) *Promote early field preparation and timely planting (FV).* Ring-bark trees in the field to be planted with Pawpaw two years in advance and completely uproot them. Dig planting holes 2 months in advance and make the holes 90cm wide and 90cm deep. Paw paws are grown from seed, and seed emergence in the nursery or pots may take 3 to 5 weeks. Transplant seedlings at 6 weeks old or 30cm tall.

iii) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV).* Plant Paw paws 1.8m x 1.8m or 2.4m x 2.4m. Fill the holes with top soil mixed with 5 to 10kg of well decomposed manure. Heavy organic mulching is required to conserve moisture, control weeds, and keep the soil cool.

iv) *Promote use of improved and high quality varieties (FV).* The recommended improved varieties are: *Solo, Waimanaio, and Sunrise*. However there are also several local varieties, which need to be selected, and their production encouraged.

v) *Encourage farmers to use manure (FV).*

vi) *Encourage farmers to control pests and promote IPM (FV) [OG 2.1.1 (vi)]*
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

Armillaria root rot disease is controlled by ring-barking all unwanted trees in the field and *Damping-off disease* can be controlled by chemical application and by avoiding dense sowing.

vii) *Encourage timely harvestin(FV)..* Harvest when 80% of the fruit is yellow coloured. Paw paws for sale should be picked at the first indication of the yellow colour to facilitate transportation and storage in the market.

viii) *Build capacity of farmers in post-harvest handling and storage in order to maintain quality.*

- *Advise farmers on Maturity Indices* so that they can detect when it is optimal to harvest the fruit
  - When Papaya is ripe it changes of skin color from dark-green to light-green with some yellow at the blossom end (color break). Papayas are usually harvested at color break to ¼ yellow for export or at ½ to ¾ yellow for local markets.
  - Flesh color changes from green to yellow or red (depending on cultivar) as the papayas ripen.

- *Advise farmers on Quality Indices*
  - Papayas picked ¼ to full yellow taste better than those picked mature- green to ¼ yellow because they do not increase in sweetness after harvest.

- Uniformity of size and color; firmness; freedom from defects such as sunburn, skin abrasions, pitting, insect injury, and blotchy coloration; freedom from decay.

- *Prevent Physiological & Physical Disorders*
  - Skin abrasions result in blotchy coloration such as green islands (areas of skin that remain green and sunken when the fruit is fully-ripe) and accelerate water loss. Abrasion and puncture injuries are more important than impact injury for papayas.
  - Chilling injury symptoms include pitting, blotchy coloration, uneven ripening, skin scald, hard core (hard areas in the flesh around the vascular bundles), water soaking of tissues, and increased susceptibility to decay.
  - Heat injury. Exposure of papayas to temperatures above 30°C for longer than 10 days or to temperature-time combinations beyond those needed for decay and/or insect control result in heat injury (uneven ripening, blotchy ripening, poor color, abnormal softening, surface pitting, accelerated decay). Quick cooling to 13°C after heat treatments minimizes heat injury.

- *Control Pathological Disorders* using the following strategies:
  - Careful handling to minimize mechanical injuries.
  - Prompt cooling and maintenance of optimum temperature and relative humidity throughout post-harvest handling operations.
  - Application of fungicides, such as thiabendazole (TBZ).
  - Dipping in hot water at 49°C for 20 minutes.

Source: Extract from Adel A. Kader Department of Plant Sciences, University of California, Davis, CA 95616
http://www.postharvest.com.au/Produce_Information.htm

ix) *Build capacity of farmers in fruit processing(FV)* *[OG 2.10.1(ix)].*

x) *Link farmers to markets(FV)* *[OG 2.2.1 (xi)].*

Minimum requirements for increasing pawpaw production

i. Promote use of improved and high quality varieties [OG 2.15.1 (iv)]
ii. Promote use of manure [OG 2.15.1 (v)]
iii. Link farmers to markets [OG 2.15.1 (x)]

Vegetable Production

2.16 Cabbage [*Brassicaraceavar capitata*]

2.16.1 Provide technical assistance to ensure high productivity of Cabbages

[Activity 4.2.2.7.2.1]

i) *Encourage farmers to join vegetable producers clubs (FV)* *[OG 1.1.3.]*

ii) *Train farmers in nursery establishment (FV)*

- Nurseries should be located near permanent water supply and located on new land every year so as to reduce the build up of insect pests, nematodes and diseases. Soils should be well drained and the site should be away from shaded areas.
- Construct beds 20 – 25cm high 1m wide. Separate beds by paths 45 – 60cm wide.
- Apply 3 to 5 kg of well-decomposed manure per sq m and mix thoroughly with the soil.
- To reduce damping-off disease and nematodes, sterilize seed beds by burning maize stalks heaped at least 1m high and this should be done in the morning or afternoon in calm weather. Alternatively fumigate the seed bed with Basamid.
- Sow seeds 0.5 – 1 cm deep in rows 15cm apart. Seeds should be mulched lightly and watered immediately.
- Apply a solution of Sulphate of Ammonia (5g dissolved in 1 litre of water) when seedlings are 2 weeks old to promote faster establishment.
- Damping-off disease should be controlled with Benlate, Captain or Thiran. Use Ripcord for cutworms or Carbaryl for Aphids, Thrips, or Jassids.

iii) *Promote early field preparation and timely planting (FV).* Prepare nursery beds and sow the seed in drills 15cm apart on the seed bed. In cool areas sowing can be done throughout the year but in hot dry areas sowing can only be done in rainy and cool months. Transplant well-hardened seedlings when they are 10cm tall or 3 to 4 weeks after sowing.

iv) *Encourage farmers to follow recommended planting technology (FV)* to achieve optimum plant population. For large headed varieties, transplant at 60cm x 60cm and for small headed varieties transplant at 50cm x 45cm.

v) *Promote use of improved high quality varieties (FV)*. The recommended improved cabbage varieties are: -

- Large headed varieties: *Giant Drum Head, Drumhead, Sugarloaf, Hercules, Chogo, Gloria, F. Maracanta, and Glory of Enchuizen*.
- Small headed varieties: *Copenhagen Market, Ventura, Golden Acre, Stonehead and Gloria Osena*.

vi) *Encourage farmers to use manure (FV).*

vii) *Encourage farmers to use fertilizer (FV)*. Apply a basal dressing of 90g of "S" compound per square metre before transplanting. Top dress with 20g of CAN or SA. Water plants regularly as required.

viii) *Encourage farmers to control pests and promote IPM (FV)[OG 2.1.1 (vi)*

- Weed control**:** loosen the soil by shallow cultivation.
- Insect pests: *Aphids*, which are controlled by spraying with Diamethoate and Diamond-back moth, which has no effective chemical control.
- Disease control: Black rot and soft rot can be controlled by crop rotation, rouging and removal of all debris and growing of tolerant varieties such as *Hercules*, particularly for *black rot*.

ix) *Encourage timely harvesting (FV).* Observe safety periods of chemicals before harvesting. Harvest by cutting off the heads when they are firm and uproot the stumps.

x) *Build capacity of farmers in vegetable processing (FV)[OG 2.10.1(ix)].*

xi) *Link farmers to markets(FV) [OG 2.2.1 (xi)].*

Minimum requirements for increasing cabbage production

i. Promote use of improved and high quality varieties [OG 2.16.1(v)]
ii. Encourage farmers to use manure [OG 2.16.1(vi)]
iii. Link farmers to markets [OG 2.16.1 (xi)]

2.17 Tomatoes [*Lycopersicon esculentum*]

2.17.1 Provide technical assistance to ensure high productivity of Tomatoes

[Activity 4.2.2.8.2.1]

i) *Encourage farmers to join vegetable producers clubs [OG 1.1.3]*

ii) *Train farmers in nursery establishment (FV)[OG 2.16.1 (ii)]*

iii) *Promote early field preparation and timely planting (FV).* Plough deep and incorporate 5 to 10kg of compost or *khola* manure per square metre. Make beds 120cm wide and to a convenient length and make the beds 20 to 25cm high.

iv) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV).* Transplant seedlings at 90cm x 60cm when seedlings are 10 to 15cm tall or 4 weeks after sowing. Stack plants and remove side shoots to improve the fruit size and fruit quality.

v) *Promote use of improved and high quality varieties (VF).* The recommended varieties are:- *Money Maker, Maglobe, Rodade, Heinz, Homestead* and *Roma*

vi) *Encourage farmers to use manure (FV).*

vii) *Encourage farmers to use fertilizer (FV).* Two to three days before planting apply 100g of "B" Compound per square metre and top dress 5 weeks after transplanting with 20g of CAN per square metre.

viii) *Encourage farmers to control pests and promote IPM (FV)[OG 2.1.1 (vi)]*

Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- Weed control: Weed regularly to reduce competition for plant nutrients and moisture.
- Insect pests: Aphids can be controlled by spraying with Diamethoate while caterpillars can be controlled by spraying carbaryl.
- Nematodes can be controlled by using a 5-year rotation with maize.
- Disease control: *Early bli*ght can be controlled by spraying Mancozeb while *bacterial wilt* can be controlled through crop rotation and rouging of infested plants.

ix) *Encourage timely harvesting (FV).* Observe safety period of chemicals before harvesting. Harvest when the fruits have just started ripening to reduce damage during long distance transportation.

x) *Build capacity of farmers in vegetable processing (FV)[OG 2.10.1(ix)].*

xi) *Link farmers to markets (FV) [OG 2.2.1 (xi)].*

Minimum requirements for increasing tomato production

i. Promote use of improved and high quality varieties [OG 2.17.1 (v)]
ii. Encourage farmers to use manure [OG 2.17.1 (vi)]
iii. Link farmers to markets [OG 2.17.1 (xi)]

2.18 Onions [*Allium sepa*]

2.18.1 Provide technical assistance to ensure high productivity of Onions

[Activity 4.2.2.9.2.1]

i) *Encourage farmers to join vegetable producers clubs [OG.1.1.3 (i)]*

ii) *Train farmers in nursery establishment (FV)[OG 2.16.1 (ii)]*

iii) *Promote early field preparation and timely planting (FV).* Plough deeply and incorporate well decomposed or khola manure at the rate of 3 to 5kg per square metre. Make beds 120cm wide and 20 to 25 cm high and to a convenient length. Transplant when their bases are of pencil size, 6 to 8 weeks after sowing.

iv) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV).* Spacing should be 30cm x 10cm. Water regularly as required and stop watering inn the 5th month to allow bulbs to dry.

v) *Promote use of improved and high quality varieties (FV).* The recommended varieties are: - *Early Texas Grano, De Wildt, Pyramid, and Red Creole*.

iv) *Encourage farmers to use manure (FV).*

vii) *Encourage farmers to use fertilizer (FV).* Apply 60g of "S" Compound fertilizer per square metre as basal application and top dress with 30g of CAN or SA square metre.

viii) *Encourage farmers to control pests and promote IPM (FV) [OG 2.1.1 (vi)]*

Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- Weed control: Keep the field weed free all the time.
- Insect pest control: *Thrips* are controlled by spraying with Pirimiphos.
- Disease control: *Purple blotch* is controlled by spraying with Maznco zeb.

ix) *Encourage timely harvesting (FV.)* As the bulb matures, the neck of the stem shrivels and falls over. Lift the bulbs when they are matured at about six months after sowing.

x) *Build capacity of farmers in vegetable processing(FV) [OG 2.10.1(ix)].*

xi) *Link farmers to markets (FV) [OG 2.2.1 (xi)].*

Minimum requirements for increasing onion production

i. Promote use of improved and high quality varieties [OG 2.18.1 (v)]
ii. Encourage farmers to use manure [OG 2.18.1 (vi)]
iii. Link farmers to markets [OG 2.18.1 (xi)]

2.19 Leafy vegetables

2.19.1 Provide technical assistance to ensure high productivity of Leafy Vegetables

[Activity 4.2.2.10.2.1]

i) *Encourage farmers to join vegetable producers clubs [OG 1.1.3)]*

ii) *Train farmers in nursery establishment (FV)[OG 2.16.1 (ii)]*

iii) *Promote early field preparation and timely planting (FV).* Plough deeply and incorporate 5 to 10kg of well decomposed compost or khola manure. Make beds 120cm wide and to a convenient length. Rape and mustard: sow seeds in the nursery in rows 15cm apart between February and March. Chinese cabbage is best established by direct sowing by placing 3 to 5 seeds at 45cm x 45cm. Seedlings should be thinned leaving only one when they have 4 to 5 true leaves.

iv) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV)*. Transplant seedlings in rows 45cm apart and 45cm between plants after about 4 weeks or when seedlings are 10cm high.

v) *Promote use of improved and high quality varieties (FV).* The recommended varieties are:

Rape: *Giant Essex, and local cultivars*
Mustard: *Local cultivars*
Chinese cabbage: *Wong Bok, Pse-Tsai and Chihili*.

vi) *Encourage farmers to use manure (FV).*

vii) *Encourage farmers to use fertilizer (FV)***.** Being leafy vegetables, rape, mustard, and Chinese cabbage require adequate nitrogen supply. Basal dressing 70g of "S" Compound and top dress with 70g of CAN per square metre.

viii) *Encourage farmers to control pests and promote IPM (FV)[OG 2.1.1 (vi)]*
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

- Weed control: Weed regularly to loosen the soil and reduce competition for plant nutrients, sunlight and soil moisture.
- Insect/pest control: Aphids and cutworms are controlled by spraying with Pirimophos.
- Disease control: Black rot can be controlled by crop rotation, field hygiene and avoiding physical damage to the plant; *Alternaria* leaf spot can be controlled by using clean seed, crop rotation, and burying all infected plant materials, and spraying with *Daconil*; Damping-off disease can be controlled by avoiding dense sowing and over-watering; *Dowry mildew* can be controlled by spraying with *Mancozeb*.

ix) *Encourage timely harvesting (FV)*. Observe safety periods of chemicals before harvesting. Harvest by stripping leaves from plants beginning 50 days from transplanting. Wash all leafy vegetables before use.

ix) *Build capacity of farmers in vegetable processing (FV)[OG 2.10.1(ix)].*

xi) *Link farmers to markets (FV)* [*OG 2.2.1 (xi)*].

Minimum requirements for increasing leafy vegetables production

i. Promote use of improved and high quality varieties [OG 2.19.1 (v)]
ii. Encourage farmers to use manure [OG 2.19.1 (vi)]
iii. Link farmers to markets [OG 2.19.1 (xi)].

2.20 Lettuce [*Lastuca sativa*]

2.20.1 Provide technical assistance to ensure high productivity of Leafy Vegetables

[Activity 4.2.2.11.2.1]

i) *Encourage farmers to join vegetable producers clubs* [Activity 3.1.1]

ii) *Train farmers in nursery establishment (FV)* [OG 2.16.1 (ii)]

iii) *Promote early field preparation and timely planting (FV).* Prepare beds or seed boxes and sow seeds thinly in drills 0.5 to 1 cm deep. Alternatively sow directly on beds.

iv) *Encourage farmers to follow recommended planting technology to achieve optimum plant population (FV).* About 500g of seed is required per hectare or 2g per 30 of row length. In both cases thin to 30 to 40 cm between rows after seed emergence. Transplant when seedlings are 7cm tall and space them at 30cm between plants and 30cm between rolls.

v) *Promote use of improved and high quality varieties (FV).* The recommended varieties are: *London White, Cos (Cos), Butterrunch, New York, Webbs. Wonderful and Great Lakes*

vi) *Encourage farmers to use manure (FV)*

vii) *Encourage farmers to use fertilizer (FV)***.** Before transplanting apply Compound 'S" at the rate of 90kg per square metre and top dress with 50kg CAN.

viii) *Encourage farmers to control pests and promote IPM (FV)[OG 2.1.1 (vi)]*
Technical information on pest control should be obtained from the District Agriculture Offices and ADDs

Weed regularly to reduce competition for plant nutrients, soil moisture and light. Insect pests: aphids are controlled by spraying Pirimophos. Disease control: heart rot is reduced by wider spacing.

ix) *Encourage timely harvesting (FV).* Harvest when the heads are fully developed cutting off heads at ground level.

x) *Build capacity of farmers in vegetable processing (FV)[OG 2.1.1(ix)]*.

xi) *Link farmers to markets [OG 2.2.1 (xi)].*

Minimum requirements for increasing lettuce production

i. Promote use of improved and high quality varieties [OG 2.20.1 (v)]
ii. Encourage farmers to use manure [OG 2.20.1 (vi)]
iii. Link farmers to markets [OG 2.20.1 (xi)]

Technical Information and Backstopping Services

Technical information on crop development can be obtained from the District Agriculture Office, Agricultural Development Division (ADD) and the Ministry of Agriculture, Department of Crops in Lilongwe.

Telephone : 01 789 052
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PART 3

3. Promote integration of livestock into smallholder farming systems

The overall policy objective is to increase availability of quality livestock and livestock products by promoting local production through enhancement of service delivery.

3.1 Dairy cattle

3.1.1 Provide technical assistance to increase dairy production

[Activity 4.3.2]

Milk is important for human nutrition and as a source of income for smallholder farmers. As mentioned in Volume I of this document, the overall production of milk is low in Malawi because of low genetic potential, lack of breeder stock, and poor management such as housing, nutrition, and disease control. The national aim is to be self-reliant in milk and milk products to meet national demand. The objective should be to expand dairy schemes in suitable areas (e.g. peri-urban areas) to increase milk production and income.

i) *Promote formation of milk bulking* groups (*FV)* within areas with readily available market such as peri-urban centres. The milk bulking group should also be located within a permanent water source.

- *Encourage formation of self-organized groups with elected committee members* comprising chairperson, secretary, treasurer, and ordinary committee members. Total committee membership should be 8 – 10 people.

- *Encourage clubs to meet regularly* e.g. once per month, and to keep records of all the meetings including agenda, main issues discussed, and planned actions/activities and follow-up steps based on the discussions. Committees should also keep records of all major events and what they have learnt such as in the demonstrations of a particular activity e.g. heat detection, visits to other farmers engaged in similar activities, discussions with officials from the District Agriculture Office, ADD or any other organization.

ii) *Facilitate farmers' access to dairy animals of approved breeds and their crosses with Malawi Zebu (FV).* Recommended dairy breeds are: Friesian, Holstein Friesian, Ayrshire, Jersey, and Guernsey.

iii) *Encourage small-scale dairy farmers to keep a minimum of two dairy animals (FV).* Two animals are economical to maintain and it is easier for a farmer to detect heat.

iv) *Encourage farmers to construct a standard khola for smallholder dairy animals(FV)* approved by the Department of Animal Health and Livestock Development before getting the animals (FV). A standard *khola* has a milking parlour with concrete floor, exercise yard, a handling crush and a calf pen sited on land with a slight slope to enable effective drainage. Encourage farmers to provide animal bedding in the khola such as maize stover.

v) *Encourage dairy farmers to establish at least 1.2 Ha of pasture (FV)* e.g. Napier or Rhodes grass sufficient for two dairy cows. Encourage farmers to seek technical information on foliage establishment from veterinary or extension staff from the EPA, District Agriculture Office, or ADD.

vi) *Encourage farmers to feed roughage and concentrates for high milk yield (FV)*. Hay and silage should provide the bulk of the roughage and these should be supplemented with concentrate rations. Farmers should be trained in hay and silage making. The rule of thumb is to give 1 kg of concentrate ration for every 2kg milk the cow produces.

vii) *Encourage farmers to produce a locally compounded ration (FV)* composed of 65 parts *madeya* (maize bran), 34 parts dry *leucaena* or *sesbania* leaves and 1 part salt and feed to animals at the rate of 4kg per day split equally at milking times. Other feeds for dairy animals include groundnut haulms, maize stover, banana leaves and pseudostems.

viii) *Encourage farmers to milk the animals twice per day at 8 hours interval, and one teat (quarter) should be reserved for the calf (FV).* The calf should suckle for 30 minutes and separated from the cow thereafter.

ix) *Encourage farmers to clean milk utensils before milking (FV)* to ensure good quality milk and encourage farmers to check for mastitis (inflammation of the udder) before milking. Udders should be cleaned with warm water and a separate clean cloth for each animal.

x) *Train farmer groups in heat detection and AI techniques and if possible provide them with necessary equipment such as AI kits and cool storage facilities(FV).* An animal on heat shows a tendency to ride and to be ridden

xi) *Encourage farmers to apply recommended acaricides regularly(FV)* to control tick and tick-borne diseases as these reduce animal productivity

xii) *Promote milk processing into different milk products (FV)* where appropriate, by providing mini-dairy plants to the milk bulking groups and build their capacity in milk processing and marketing

xiii) *Link farmers to markets(FV) [OG 2.2.1 (xi*)].

Minimum requirements for dairy production

i. Promote formation of milk bulking groups [OG 3.1.1(i)]
ii. Facilitate farmers' access to dairy animals of approved breeds [OG 3.1.1 (ii)]
iii. Encourage farmers to construct a standard *khola* [OG 3.1.1(iv)]
iv. Encourage dairy farmers to establish pasture [OG 3.1.1(v)]

3.2 Beef production

3.2.1 Provide technical assistance to increase beef production through stall-feeding

[Activity 4.3.3]

Beef production is important in Malawi for improved nutrition and increased income. However production of beef is constrained by low cattle population, inadequate animal nutrition, poor management and parasites and diseases. The aim is to increase meat production to meet national demand.

i) *Encourage farmers to form cattle fattening groups (FV)[OG 3.1.1 (i)]].*

ii) Encourage rearing of improved breeds and cross breeding(FV).

iii) *Encourage farmers to construct pole and thatch kholas using locally available materials (FV)*. One steer requires a *khola* space of 2.1 m long, 2.1 m wide, and 2.4 m high. The *khola* should have a feeding rack for roughage, and the farmer should provide feed and water troughs. Each animal should be confined to its own pen for better management.

iv) Encourage farmers to stall feed animals from April/May (FV) when there are plenty of crop residues and encourage them to fatten steers, culls, unproductive cows, bulls and old work oxen before marketing them

v) *Encourage farmers to feed steers weighing 250kg with 4 to 6 permanent teeth in the stall for 150 days before marketing(FV)*.

vi) Encourage farmers to grow pastures (FV) such as Napier grass, forage legumes, and leucaena or sesbania, and other forage crops. Potato vines and banana pseudostems can be cut and fed to animals as roughage. Encourage farmers to collect and store crop residues including maize stover, rice straw, and groundnut and bean haulms. Use dry maize bran, sesbania leaves and salt to make concentrates. Home made concentrates can be made of 75 parts dry madeya, 24 parts dry leucaena or sesbania leaves and 1 part salt by weight. Give animals enough drinking water each day.

vii) *Train farmers to produce home made rations (FV).* When feeding maize stover with groundnut tops the best combination is 50 parts of maize stover to 50 parts groundnut tops supplemented with 5kg of maize bran. This give an expected weight gain of 0.75kg per animal per day and the higher the proportion of groundnut tops in the roughage, the higher the expected live weight gains by the steers. Cross-bred steers from Brahmans or Friesians should be given 1 to 2kg more supplement than Malawi Zebu steers because of the higher maintenance requirements due to their large body size.

viii) Encourage farmers to de-worm animals against both round worms and liver flukes and dip or spray against ticks before stall-feeding (FV). Tick grease should be sprayed to animal parts affected by ticks.

ix) *Link farmers to markets (FV)[OG 2.2.1 (xi)].*

x) *Advice farmers to get valid livestock movement permits for animals they are selling (FV).* The permit system ensures proper ownership of the cattle being sold, checks the spread of diseases and slaughter of young breed stock.

Minimum requirements for stall-feeding

i. Encourage farmers to form cattle fattening groups [OG 3.2.1 (i)]
ii. Encourage rearing of improved breeds and cross breeding [OG 3.2.1 (ii)]
iii. Encourage farmers to construct pole and thatch *kholas* [OG 3.2.1 (iii)]
iv. Encourage farmers to stall feed animals from April/May [OG 3.2.1 (iv)]

3.3 Goat Production

3.3.1 Provide technical assistance to improve goat production

[Activity 4.3.4.1]

Goats are a source of protein and income for the rural population. They also supply manure that may be used in crop production. Local goats are prolific but also suffer from diseases like other species of livestock. The aim is therefore to improve production (growth rate and body size) and utilization (goat meat and milk consumption). The following husbandry practices are recommended for goat production: -

i) *Encourage farmers to form goat rearing groups(FV). [OG 3.1.1(i)]*

ii) *Promote cross-breeding (FV)* between the indigenous goat and the improved breeds such as the large South African Boer buck in order to increase both size and growth rates.

iii) *Encourage farmers to construct well-ventilated kholas from mud, pole and thatch (FV)*. Improved khola designs can be obtained from the Department of Animal Health and Livestock Development.

iv) *Encourage farmers to feed confined goats on supplements (FV).* It is recommended to feed 230g (2 handfuls) of *madeya* per day to the *Does* during suckling stage and water should always be made available to the goats. Other rations include maize meals, bean meal, cotton seed cake, groundnut cake, salt, and dried *lucaena* or s*esbania* leaves.

v) *Encourage farmers to graze herded goats away from dambos during the rainy season and encourage tethering during this period (FV).* When tethered they should be rotated 2 to 3 times per day and the length of the tether should be long enough (about 4.5m).

vi) *Encourage farmers to deworm goats routinely at the beginning and end of the rainy season every year (FV).* Goats are tolerant to parasites and diseases but when managed intensively they are susceptible to worms and respiratory

diseases. Additional doses of *antihelmintic* may be required for animals restricted in paddocks.

vii) *Promote pass-on-the gift concept to broaden goat ownership (FV).* The small farmer groups provide the basic foundation for increasing small stock ownership in a community. There should be other groups in the waiting to receive first generation offsprings, especially female animals. The following actions:

- Encourage farmers to prepare improved kholas in advance before they get the small stock [OG 3.3.1 (iii)].
- Distribute each small livestock type to the first group as agreed among clubs in a community. One community khola can be used for the initial stock as an alternative but this has sometimes led to poor management as no farmer takes full responsibility looking after the animals, otherwise distribute to individual households. The minimum number is one female per household while the males e.g. for goats can be used to service a number of females in different households if they bring the females to the same khola.
- Encourage farmers to follow good husbandry practices [OG 3.3.1 (iv) to (vi)].
- Encourage farmers to pass-on the first offspring to the next farmer in-the-waiting, particularly female offsprings. This is repeatedly done until the community is well endowed with the desirable small stock type.
- Encourage local leaders to ensure compliance with passing-on-the-gift concept by holding regular meetings with the beneficiary groups and spot-checking on some beneficiary farmers.

viii) *Link farmers to markets (FV)[OGs 2.2.1 (xi)].*

Minimum requirements for goat production

i. Encourage farmers to form goat rearing groups [OG 3.3.1 (i)]
ii. Encourage farmers to use locally adapted breeds [OG 3.3.1 (ii)]
iii. Encourage farmers to construct well-ventilated *kholas* [OG 3.3.1 (iii)]

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3.4 Poultry Production

3.4.1 Provide technical assistance to increase poultry production

[Activity 4.3.5.1.]

It is estimated that the smallholder sub-sector accounts for 90% of the chickens produced in Malawi, largely local breeds. The national aim is to increase production of chicken meat and eggs to improve protein intake. In order to achieve this, the following husbandry practices are recommended:

i) *Encourage farmers to form poultry production groups (FV)[OG 3.1.1(i)].*

ii) *Encourage rearing of improved breeds and cross breeding between exotic and local breeds (FV)* particularly the Black Australorp (Mikolongwe chickens) to improve the size of the local chickens, eggs and the number of eggs laid. The Black Australop is recommended for meat and egg production at household level; Hyline and Shaver for commercial egg production; and Ross and Indian River for commercial broiler production. The Black Australorp (*Mikolongwe chickens*): the average weight for an adult bird is 1.5 to 2.5kg and hens lay between 180 to 200 eggs per year under good management. The Black Astralorp can be used as a table chicken after 50 weeks of age or more. Hyline and Shaver are normally supplied by commercial hatcheries at day old for commercial egg producers. These breeds have high genetic egg production potential up to 285 eggs per year or more with good management. They have small body size and eat less than Black Australorp. Ross and Indian River: are also supplied by commercial hatcheries for commercial broiler producers. Broilers are ready for table meat after 7 to 8 weeks with an average weight between 1.5 to 2kg.

iii) *Encourage semi-intensive and intensive systems of poultry production Systems (FV)* of poultry keeping Semi-intensive: chickens are let out of the *khola* into a fenced yard with less risk from predators. This system is recommended for farmers with limited resources. Green leafy vegetables should be given to the chickens to supply nutrients such as carotene and minerals. In the absence of commercial feed encourage farmers should provide a ration comprising of 1 part pigeon peas or bean flour meal, 1 part maize meal (*mgaiwa*), and 1 part *madeya* (maize bran) by weight as a maintenance ration. Intensive [deep litter]: under this system chickens are kept inside the house all the time and given balanced feed and clean water. Intensive [battery cage – laying cages]: under this system chickens are confined to cages 45cm long, 45cm deep, and 23cm wide, which have a sloping floor so that laid eggs roll away from them and stopped against a soft bar. Balanced feeds and fresh clean water are provided to chickens all the time. Under this system unproductive hens are easily identified and culled.

iv) *Encourage farmers to practice good husbandry practices for egg production (layers (FV)).*

a) *Brooding*: Chickens should be kept warm and dry from day old up to 2 –3 weeks of age. A charcoal stove may be used as an artificial brooder to provide warmth. It is recommended to cover a brooding house with a hersian sack for the first 3 weeks to conserve warmth.
b) *Housing*: Chicks (day old to 8 weeks) and growers (9 weeks to point of lay at 18 – 22 weeks) each require 450 sq m of floor space. The chicken pen should be well thatched and ventilated to let in fresh air and light. Materials such as wood shavings/saw dust or chopped maize cobs should be placed on the floor to a depth of 15 – 20 cm so that droppings are absorbed by the litter. Layers from point of lay to 50 weeks of laying may be housed in a pigeon-type house, brick house or laying cages.
c) *Feeding*: Encourage farmers to provide appropriate feeds. Chicks should be fed chick mash and feeding troughs should be shallow during the first 2 weeks and after 2 weeks these should be placed by deep feeding troughs. Growers (9 weeks to the point of lay) should be fed on

growers mash and thereafter on layers mash. Ensure that feed is available all the time.

d) *Water:* Several small water troughs for both layers and broilers should be used during the first few weeks. As the chickens grow older and more accustomed to drinking, reduce the number of troughs by using larger troughs. Provide at least 6mm drinking space per chick scattered in the pen. All troughs should be cleaned every morning.

v) *Encourage farmers to practice good husbandry practices for meat production (broilers (FV)).*

a) *Brooding and housing* is the same as in the management of layers.

b) *Feeding*: From day old to 2 weeks chickens should be fed on broiler starter mash and 5th – 8th week on broiler finisher mash. As a guide 150g of feed per bird per day should be provided.

c) *Water* requirements are the same as in egg production.

vi) *Encourage farmers to protect poultry from diseases (FV)* such as Newcastle, Gumboro, and Coccidiosis. For the control of diseases farmers should contact veterinary or extension staff in their areas.

vii) *Link farmers to markets (FV)* [OG 2. 2.1 (xi)].

viii) *Promote pass-on-the gift (FV)* for broadening ownership of the Black Australorp (OG 3.3.1 viii).

Minimum requirements for poultry production

i. Encourage farmers to form poultry production groups [OG 3.4.1(i)]
ii. Encourage rearing of improved breeds and cross breeding especially with the Black Australorp which easily adapts to local conditions [OG 3.4.1 (ii)].

Technical Information and Backstopping Services

Technical information on livestock can be obtained from veterinary staff at the District Agriculture Office, Agricultural Development Division (ADD) and the Ministry of Agriculture and Food Security, Department of Animal Health and Livestock Development in Lilongwe.

Telephone : 01 756 460 / 01 756 389
Fax : 01 751 349
E-mail : agric-dahi@sdnp.org.mw

PART 4

4. Create a conducive environment for private sector investment and local community participation in irrigation development

Irrigation in Malawi is important in order to assist to address the challenges of food insecurity and poverty which have been brought about by consistent occurrence of droughts and high population growth rate. The irrigation policy aims at managing and developing water and land resources for diversified, economically sound and sustainable irrigation and drainage systems.

In these guidelines the term small-scale irrigation refers to a wide range of approaches by which soil-water can be increased and soil-water management improved. These approaches include techniques for catching, storing and using rainfall at or near the place where it falls (usually called rainwater harvesting); diverting flowing water by gravity; using stone/earth/brushwood or concrete structures (run-of-river or spate irrigation systems); lifting water by human or motor power (lift irrigation); conveying water by canal or pipe; and applying water to land by controlled or uncontrolled flooding (gravity), overhead sprinklers (pressurized), or drip irrigation. The definition of irrigation is broad, encompassing all approaches to improved management of soil-water for enhanced crop production. These guidelines are primarily designed for appraisal of small-scale irrigation projects. While the document has been drawn up primarily for the assessment of new developments, with only minor adaptation it may be applied to extension or rehabilitation of existing schemes.

4.1 Provide guidelines for selection of irrigation sites

[Activity 4.4.3 (i)]

Consider the following factors when choosing a site that has a good irrigation potential:

- Reliability and closeness to the water supply
- Land slope and soil characteristics
- Risk of flooding
- Protection of the crop and equipment from theft and damage by livestock
- Ease of vehicle assess if surveying and engineering work is required
- Ease of access to markets for supply of inputs and produce
- Land and water rights constitute clarification of land tenure issues as well as the rights of irrigators to both land and water.

4.2 Provide guidance on selection of appropriate irrigation method

[Activity 4.4.3 (ii)]

The following factors must be considered when choosing an irrigation method:

i) *Previous experience with irrigation.*

The choice of irrigation method should take into consideration of any irrigation traditions within the area.

ii) *Costs / benefits analysis of irrigation scheme*

- Calculate the start-up and running (operating) costs to see the long term benefits of irrigation schemes. An irrigation method may have high start-up costs, but low running costs and vice versa.
- Labour and energy (fuel and electricity) requirements must also be considered when selecting an irrigation system.

In addition, the following factors should also be considered when choosing an irrigation method:

- **Natural conditions**
  - Soil type: sandy soils require frequent but small irrigation applications. In such cases sprinkler may be better than surface irrigation. Clay soils, with low infiltration rates are better suited for surface irrigation.
  - Land slope: where the land slope is uneven or steeply sloping, sprinkler or drip irrigation may be better than surface irrigation as the require little or no land levelling. Consider operational costs of these methods before decision is taken to use them.
  - Climate: sprinkler irrigation should not be selected in areas where there are frequent periods of high winds during the dry season.
  - Water resources: where water is limited, consider using sprinkler and drip irrigation.
  - Water quality: if the water contains too much sediments, it is better to use surface irrigation since sediments may clog sprinkler irrigation systems. If the water contains high levels of salts, it is better not to develop irrigated cropping as yields may be reduced and soil structure may be damaged over time.

- **Type of crop**
  - Surface irrigation can be used for all types of crops.
  - As they are expensive to install per hectare, sprinkler and drip irrigation methods are mostly used for high value crops for sale.
  - Drip irrigation is best for individual plants such as trees or widely spaced crops like vegetables.

- **Types of technology**
  - Consider more advanced technologies where there is a good reason to reject surface irrigation.
  - Small scale surface irrigation systems usually need less sophisticated equipment for both construction and maintenance except in the case of pump purchase and installation. The equipment is often cheap and easy to maintain.
  - The following methods are the commonest methods of irrigating crops:
    - Watering can/bucket irrigation. This is the simplest form of overhead irrigation and is widely used by smallholder farmers. Consider this method for small

plots of land such as vegetable gardens which are close to the water source.

- Basin irrigation
  A basin is a levelled area of land, surrounded by earth embankments, which is totally flooded during irrigation. Basin irrigation is best suitable for many crops. The advantages are: The right amount of water can be given with minimum amount of labour if the beds are well levelled. Water losses can be kept low by minimal run-off. Basins last for a long time once they are constructed.
- Furrow irrigation
  Furrows are generally used on farms having large uniform fields. They are not appropriate in plots which are irregular in shape. Sprinkler irrigation. Sprinkler irrigation is a way of applying irrigation water to the soil that is similar to natural rainfall. It can be used on many crops, soils and geographical conditions.
- Micro (drip) irrigation
  Micro irrigation includes a number of technologies where filtered water is supplied directly on to or into the soil. Water is carried through an extensive pipe network to each plant through outlets known as emitters.
- Treadle pumps

- **Environmental Protection**
  To protect the environment from the impacts from of unplanned irrigation development the following measures should be taken:
  - Drainage of irrigated lands should be well planned during the initial phase of irrigation development/
  - Encourage developers to conduct Environmental Impact Assessment on their irrigation development projects.
  - Preservation and conservation of the catchment area of the irrigation systems for instance through afforestation and construction of soil conservation structures.

4.3 Building Capacities and Capabilities of Stakeholders

[Activity 4.4.3 (iii)]

Ensure there is a sustainable irrigation development by building capacity in the irrigation sub sector. This should involve the public sector, the private sector, and the farmers themselves. Irrigation providers need to be equipped with knowledge on modern methods of irrigation and exposing them to the challenges of irrigation. Capacity building initiatives should include:

i) *Ensure Participation, Ownership and Commitment to irrigation development*

- Promote community participation in the construction of irrigation infrastructures to ensure sustainability of interventions.
- Encourage communities to make cash or in kind contributions towards the construction of the irrigation infrastructure. In kind contributions could be in form of materials (sand, bricks, stones, timber etc) and labour.

ii) *Provide Technical Assistance to irrigation schemes*

- Link farmers' groups/associations with buyers/potential markets
- Provide extension services in crop husbandry (See Operational Guidelines 2.1 - 2.20)

4.4 Facilitate the formation of Water Users Association (WUA)

i) *Promote formation of WUAs which should be formed as private, non-profit judicial self supporting independent entities,* whose main functions would be:

- operations and maintenance of irrigation and drainage systems,
- collection of water charges, and
- resolution of water related conflicts among members, arising from water usage.

ii) *Promote concepts of improved water management, farmer empowerment and advantages of formation of farmer-managed self sustained WUAs*. Disseminate basic information about concepts in (a) above to local leaders and all interested parties in the scheme through group discussion, audio-video presentation, and the media.

iii) *Invite WUAs from other irrigation schemes to meetings with the community to discuss overall concepts of irrigation schemes, cost recovery, role and responsibilities of WUAs*.

iv) *Arrange field trips to schemes where WUAs are operating efficiently*.

v) *Assist community in development of a draft constitution for WUA in which the basic rules and procedures for its operation would be explained to the community.*

vi) *Widely circulate the draft constitution and have it discussed at a general meeting of the water users for approval*.

vii) *Upon formation, facilitate registration of WUA with relevant authorities as a legal entity in accordance with the Law.*

viii) *Encourage election of WUA leaders in democratic manner*

ix) *Train WUA leadership in :*

- Their roles and responsibilities
- Monitoring the construction/rehabilitation of works
- Identifying and assisting in resolving of problems which may arise between private contractors and water users

- Understanding the process and procedures for construction scheduling
- Assessment of damages to private land or property during construction
- Irrigation scheduling
- Operation and maintenance
- Record keeping
- Financial management
- Accounting systems
- Procedures for collecting water charges
- Credit and marketing skills
- Gender and HIV and AIDS
- Train communities in leadership skills

4.5 Facilitate Farmers' Access to Credit

The following sources of financing could be promoted:

- savings and credit clubs at community level (e.g. Rotating Saving and Credit Association) to encourage farmers to mobilize group savings from which they can borrow to finance hybrid maize seed and fertilizer purchases, and Income Generating Activities especially during the marketing season. Benefits would include: - a) borrowing at low interest rate, b) simple and easy procedures to follow, c) no collateral but other group members would provide social security, c) reasonable interest rate, d) quick disbursement, and e) community managed
- Grain banks (see OG 8)
- Katapila (Informal Private Sector Lenders)
- Rural-focused Micro Finance Institutions (MRFC, CUMO, MARDEF, etc)
- Rural Projects with Micro-Finance components
- Crop Buyers/Processors credit suppliers
- Input Suppliers and Distributors credit suppliers

4.6 Build Capacity of Farmers Groups

Farmers unfamiliar with irrigated agriculture will require training in its techniques. Training will also be necessary where proposed development introduces new concepts, such as new cash crop in the area. The training should cover the following areas:

i) *Water management* (water application methods, Irrigation scheduling, control and monitoring of water in the system, strategies to avoid crisis, maintenance requirements).

ii) *Crop husbandry* (see Operational Guidelines 2.1-2.20)

iii) *Basic Business Skills*

- Identification of potential IGA opportunities including those suited to the needs of resource-poor and vulnerable households
- Developing business idea
- Conducting market analysis
- Outlining business plan
- Identifying members' contributions

- Preparing a work plan
- Preparing a budget and cash flow
- Basic record keeping
- Assessment of Contracts (See Operational Guidelines on Contract Farming)

4.7 Provide guidance in selection of Recommended Water Harvesting Practices

[Activity 4.4.3 (iv)]

Depending on the water resources available, the terrain covered and the size of land to be irrigated collect runoff using the best method suitable for the site to be irrigated. The following guidelines apply. Technical assistance in the selection of the appropriate water harvesting practice and techniques should be sought from the nearest Area Agricultural Extension Officer.

- Defining runoff. Runoff harvesting is a term used interchangeably with term water harvesting. It is a term which defines the collection of runoff from different sources such as roofs and ground water surfaces as well as flowing rivers for productive use. Run off farming is a term used to describe the technique of runoff harvesting from an uncropped catchment area and diverting it to the cropped area mainly for growing crops. Runoff harvesting is based on the principle of depriving part of the land of its share of rainwater (which is usually small and non-productive) and adding it to the share of another part. This brings the amount of water available to the target area closer to the crop water requirements so that economical agricultural production can be achieved and thus improving the water productivity.

- Small runoff basins (Negarims). These are small diamond shaped closed structures made of low earth bunds. They are oriented to have the maximum land slope parallel to the diagonal so that the runoff flows to the lowest corner, where the plant is planted. The usual dimensions are: 5 – 10 metres in width and 10 – 25 metres in length. Small run off basins can be constructed on almost any gradient including plains with 1- 2 % slopes. However, on slopes above 5%, soil erosions may occur and the bund height should be increased. Negraims are more suitable for growing tree crops and the soil should be deep enough to hold sufficient water for the whole season. Soil conservation is a positive side effect of Negraims. Once system established, it lasts long with little maintenance.

- Semi-circular/trapezoid bunds. These are earthen bunds in the shape of semicircle, a crescent, an eyebrow or trapezoid facing directly up the slope. They are placed at a spacing that allows sufficient catchments to provide the required runoff water, which accumulates in front of a bund, where the plants are grown. Usually they are placed in staggered rows. The diameter between the two ends of each bund varies between 1 and 8 metres and the buds are 30 – 50 metres high. Cutting the soil form the bund immediately upstream creates a slight depression. Run

off is intercepted here and stored in the plant zone. If the soil is cut upstream, the slope is increased and this raises the runoff coefficient. In this way, the technique can be used on level land, but it can also be used on slopes up to 15%. The bunds are mainly used for rangeland or fodder production but may also be used for growing tress, shrubs and in some cases field crops such as sorghum and vegetables. This system is labour intensive.

- Runoff strips. These are rain water harvesting techniques used on gentle slopes for supporting field crops in drier environments. The farm is divided into strips along contour. An upstream is used as a catchment while downstream strip supports crops. An upstream is used a catchment while downstream strip supports crops. The same cropping fields are cultivated every year. Clearing and compacting could be required to direct runoff to cropped strip to even out the distribution of water across the strip. Proper layout of the strip is required.

- Contour ridges. These are bunds or ridges constructed on a wide range of slopes (1 – 50%) along contour line, usually spaced between 5 and 20 metres apart. The first 1 – 2 metres above the ridge is for cultivation, whereas the rest is catchment. The height of each varies according to the slope's gradient and the expected depth of the runoff water retained behind it. Stones may reinforce bunds if necessary. Ridging is a simple technique that can be carried out b farmers manually or with animal driven implements. The key to the success of these techniques is to locate the ridge as precisely as possible along the contour. The direction of dominant slope of the field will be determined first, using levelling equipment such as water-tube-level or A-frame, farm level contour ridges/strips are laid and each structure based on specific dimension are constructed.

Minimum Requirements

i. Promote community participation in the construction of the irrigation infrastructure [OG 4.3.1 (i)].
ii. Link farmers' groups/associations with buyers/potential markets [OG 4.3.2 (i)].
iii. Promote formation of WUAs [OG 4.3.3 (i)].
iv. Train the WUA leadership in monitoring the construction/rehabilitation of works [OG 4.3.3(ix.b)].

Technical Information and backstopping services

Technical information on irrigation can be obtained from:
Irrigation staff at ADD, the Ministry of Agriculture and Food Security, and Ministry of Water and Irrigation Development at the following numbers:

Ministry of Agriculture and Food Security
Box 301134

Lilongwe 3

Telephone : 1 789 033
Fax : 1 789 218

Ministry of Water and Irrigation Development
Tikwele House Private Bag 390
Lilongwe 3
Tel. : 01 770 238/01 770 344
Fax. : 01 773 737
E-mail : secretary@irriwater.org

PART 5

5. Promote environmental, land and water management for sustainable agricultural development

Malawi's agricultural production is currently threatened by an expanding human population and increased demand on its natural resource base. Soil erosion and declining soil fertility under continuous cultivation are increasingly becoming serious land degradation problems. The aim is to promote efficient, diversified and sustainable use of land based resources. The interventions should therefore focus on the following: -

5.1 Environmental awareness and conservation

5.1.1 Promote environmental awareness and conservation

[Activity 4.5.3.1]

i) *Facilitate the formation of community conservation committees* to rehabilitate degraded areas at community level through self-help work [as in 5.1.1 (i) above].

ii) *Build the capacity of farmers to carryout conservation activities* including:

- Physical soil conservation (marker and contour ridging).
- Agro-forestry farming technologies.
- Vetiver grass planting.
- Gully control.
- Protection of stream banks, steep slopes, watershed areas, swaps, and dambos.

5.2 Provide technical assistance to promote biological conservation

[Activity 4.5.3.2]

5.2.1 Promote good agronomic practices to prevent soil erosion.

Encourage early land preparation, timely planting with the first rains and recommended plant population of improved high yielding crop varieties to increase land productivity and achieve optimal crop cover to prevent soil loss.

5.2.2 Encourage farmers to use soil fertility improvement technologies.

i) *Encourage use of manure and incorporation of crop residues to improve soil fertility, structure, and water holding capacity.*

ii) *Conduct on-farm demonstrations on compost manure making, field application of manure, and incorporation of crop residues.*

5.2.3 Promote agro-forestry farming technologies

- *Promote disperse systematic tree planting.* This practice entails planting trees with crops at a wide spacing to improve soil fertility. The recommended tree species are: Faidherbia albida (Msangu), Acacia polycarnia (Mthethe) and A. galpinii (nkunkhu).
  - Train farmers in nursery management including land preparation, sowing, watering, and thinning. Prepare nurseries between August – November and out-plant seedlings when soils are moist between November and January.
  - Plant spacing: pits 60cm deep and 60 m in diameter with spacing of 10m x 5m between pits. From January onwards keep seedlings well weeded and at the start of the next season prune cover branches.

- *Promote regeneration of natural trees.* Farmers should choose what type of trees they want. Natural trees need protection from fires and animals and need to be kept weeds free. As they grow in size they also need management to minimize shed effects on crops, and to supply wood and other products desired by the household. Soil improving leguminous trees are recommended but non-leguminous trees can also be used.

  - Leguminous trees include: Acacia galpinii, A. nigrescens, A. polycanthra, A. tortilis, Albiza adanthifolia, A. harveyi, Bauhinia thonningi, Branchystegia speciformis, Erythrina abyssinica, Faldhebia albida, Lonchocarpus capassa, Pericopsi angolensis and Pterocarpuangolesis.
  - Non-leguminous trees include: Annona senegalesis, Azanza garnkeka, Combretum spp, Ficas natalesis, Kigelia africana, Melia azaderack, Sclerocarya birrea, Terminalia sericea, Uapaca kirkiana, and Ziziphus Mauritania.

- *Encourage annual under-sowing*. This technology aims to restore crop productivity by improving the chemical, physical, and biological properties of the soil with fast growing nitrogen fixing shrubs. It entails intercropping the shrub with maize when the rains start.

  - Recommended species for undersowing are *Tephrosia vogaelli, Sesbania sesban*, and *Cajanas.*
  - Time and method of sowing: Sow seed directly into the top of every ridge at the onset of the rains on the same day as crop planting. The recommended species do not compete with crops because of the slow initial growth. Failure to plant early limits growth and makes the shrubs less tolerant to pests and diseases.
  - Seed rates for the recommended species *Tephrosia* 5 Kg/ha; *Sesnabia* 2 Kg/ha; *Cajanas* 7.5 Kg/ha.
  - Seed depth and number of seed per station. Germination will be poor for all species if planted too deep. Tephrosia and Cajanas 1.5 to 2 cm deep and 3 seeds per station. Sesbania 1 cm deep and 5 to 8 seeds per station.

- Spacing for direct sowing: Plant with maize on ridges 75 – 90 cm apart and 90 cm within the row, sow in 2 stations 30 cm apart between maize stations on every ridge. However undersowing is not recommended for closer spacing of maize (e.g. 75 cm apart ridges and 25 cm apart planting stations) as the high maize population will have shading effect and shrubs may not survive.
- Harvesting the biomass from the shrubs: Crop responses will be poor without adequate biomass from the shrubs. Harvesting of the biomass can be done either in the first or second year of sowing. An indicator of a good biomass is the dense, vigorous stand with at least 75% survival rate and shrubs averaging 1.5 m tall.
- Harvesting time and using the biomass from shrubs
  - Harvesting is best done at the time of land preparation or before the start of the rains in October or November.
  - Cut down the shrub at ground level with a sharp panga knife.
  - Lay cut materials uniformly over the soil surface.
  - After a few days of sun drying, shake the leaves off and remove woody stems for fuel.
  - Burry leaf biomass into the ridges, or lightly cover with soil to minimize loss of quality from exposure to hot and dry conditions.
  - Do not bury wood stems as they immobilize nitrogen, making it unavailable to the crop.
  - To help break the nematode cycle and to reduce nutrient depletion, grow groundnuts every 3rd year in rotation with maize.
- Facilitate establishment of seed banks: Encourage farmers to establish seed banks in the form of hedges around their homestead or other plots to meet future seed needs and possibly for sale to others. Alternatively farmers should maintain plants on the perimeter of the undersown plots for seed production. The initial seed can be obtained through contact with the Department of Land Resources Conservation in the Ministry of Agriculture.

- Calendar of key activities for annual under sowing

  November – December
  - Undersow (intercrop) shrubs at the start of the rains before 2 weeks elapse after planting the main crop.

  May – September
  - Leave the shrubs to continue growing after the crop harvest.

  October – November
  - Cut shrubs at ground level. Burry leaf biomass in the ridges or lightly cover with soil to avoid loss of quality and always remove woody stems.

5.2.4 Promote alley cropping and mixed tree intercropping

- They are similar technologies in terms of establishment and management and the difference is only in spacing. Alley cropping involves planting hedges 4 – 5 cm apart with an interspacing of rows

45 – 90 cm, while mixed tree intercropping has rows 1.8 m apart and interplant spacing of 0.9 cm.

- Both practices involve cultivating annual crops between rows of woody plants. However the technologies need high labour and management costs. The technologies should only be targeted at farmers with the interest and ability to manage the practice properly.
- Recommended species are fast growing, high yielding leguminous shrubs and trees with nutrient rich foliage. The species are: - *Gliricidia sepium, Leucanaena diversfolia, Senna spectabilis, and Tephrosia vogelli*. Establishment is by direct sowing.

5.3 Provide technical assistance to promote physical conservation

[Activity 4.5.3.3]

Soil and water conservation means the protection, maintenance, rehabilitation, restoration, and enhancement of soil resources and includes the management and sustainable use of soil resources.

5.3.1 Promote contour ridging

Annual ridging using the hand hoe is the commonest method of land preparation in Malawi. Because most farmers do not cultivate on the contour, normal ridges channel water and aggravate surface run-off and erosion. Contour ridging is a simple practice to reduce surface run-off and erosion.

- Make contour ridges by pegging and constructing contour marker ridges as guides to re-align planting ridges. Instruments that are used in marking contour lines are: - A-Frame and line level. These instruments can easily be used by smallholder farmers while other instruments such as dumpy, quickset and abney require advanced skills.
- Make marker ridges during the dry season to allow time for re-aligning ridges before the next season. After marker ridges are built align crop ridges parallel to them. Align two marker ridges to align planting ridges between them. Align the top half of the area to the top marker ridge and the bottom half to the lower marker ridge.

- Ensure marker ridges/contour ridging covers a catchment area involving the entire community to avoid run-off and erosion if they are only partially done with a few farmers.

5.3.2 Promote Tie/Box ridging

- Construct tie/box ridges across planting ridges to create 'micro catchments' to increase water infiltration and reduce erosion. Tie/box ridges are more effective on land with contour ridges.
- Construct tie/box ridges across the entire furrow perpendicular to crop ridges but slightly lower to allow spill over. Space them 1 – 3 m apart depending on the terrain and rate of water flow within the field. Where the terrain is steep the box ridges should be closer.
- Move to the next furrow and repeat the above step but locate the tie/box ridges halfway between those in the previous furrow. Repeat the pattern until the whole field is covered.

5.3.3 Encourage gully reclamation

Gullies are among the most severe forms of erosion in Malawi. They affect settlements, farmland, grazing land, streams, rivers, wetlands, roads, and bridges. Gully formation is aggravated by cultivating steep slopes and stream banks, use of un-raised footpaths and field boundaries, overgrazing around water points and dip tanks, land clearing and deforestation, poorly constructed roads, and dam spill ways.

- Recommended measures to prevent gully formation include: - contour and tie/box ridges, raised footpaths and field boundaries, vegetative barriers on contour, and tree planting.
- Gully reclamation measures include:
  - Check dams of brushwood: check dams of brushwood and bamboo provide first line of defence before planted vegetation becomes fully established.
  - Stone check dams: where stones are in abundance they should be used to build check dams by pitching. Stone pitching extends to the gully walls with the centre lower than the end to serve as a spillway.
  - Sediments accumulated behind a check could be planted with trees, shrubs or crops.
  - Vegetative barriers: Vetiver grass and trees may be established as permanent vegetative barriers in the bed of the gulley to slow down run-off. Plant Vetiver grass in dense hedges across the entire width of the gully and above the check dam to make use of sediment deposits.

5.3.4 Encourage stream bank protection

Stream bank soils typically have low cohesion and hence are prone to degradation due to cultivation. Protection is vital to stabilize stream flow and to reduce the risk of flooding, Siltation, landslides, and loss of arable land.

i) Discourage farmers from cultivating stream banks and encourage natural vegetation to grow, which provides more permanent and reliable protection than physical structures.

ii) Encourage establishment of vegetation along stream banks:

- Demarcate a strip along the stream bank about 5m wide either side for small streams and 10 – 20m for rivers.

- Plant vetiver, Napier, or bamboo along the strip at spacing as follows:- a) Vetiver 0.45m x 0.45m, Napier 0.2m x 0.2m, and bamboo 1m x 1m.
- Plant shrubs e.g. Sesbania seban at a spacing of 0.45m x 0.45m.
- Plant trees in strips of 2m x 2m and tree species include: *Acacia galpini, A. polycantha, A. siberena, Faidhebia albida, Ficus natalensis, F. capensis, F. tycomorus, Khanya nyasika, Parkia filicoidea, Rauvolfia caffra, Syzygium cordatum, S. guineense, Trichilia emetica, Ziziphus abyssinica, Z. Mauritania,* and *Z. mucronata.*

5.3.5 Encourage establishment of vetiver grass

Vetiver is a fast growing deep-rooted perennial grass well adapted to all agro-ecological zones in Malawi and is not competitive with crops. It is easy to establish and maintain and it makes a good barrier against soil erosion and run-off when planted on the contour. Two types of vetiver grass are found in Malawi: *V. nigritana* abundant in the Shire Valley and *V. zizanoids*, which is available in many parts of the country.

i) *Encourage communities and individuals to establish vetiver grass nurseries before establishing hedges in the field*. Dambos are the best nursery sites as moisture is readily available. Alternatively sites can be established under rainfed conditions.

- Collect enough clumps for the planned nursery: a 7-ton truck will plant 0.5 Ha. Plant strips 45cm x 45cm. Trim vetiver to 30cm tall in May/June and at the start of the next season.
- Collect vetiver planting material (select healthy well established clumps) after the onset of rains and plant in the field within 48 hours..
- Encourage communities to plant vetiver on the contour at 5m intervals on steep slopes, 10m on medium slopes, and 15m intervals on gentle slopes.

5.3.6 Encourage protection of watershed areas

Encourage communities to refrain from bushfires, deforestation, and cultivating in the watershed area. The messages should be disseminated continuously during project and community meetings.

5.4 Promote water storage systems

5.4.1 Promote macro catchment techniques

The techniques comprises of large outside catchments producing floods that is diverted from gullies, and ephemeral streams and spread into cropland. They are much larger the area where water is used and considerable distance away. The most important macro catchment techniques are below.

i) *Promote Flood diversion and spreading technique*

- Train farmers to divert runoff and floodwater from a river to cultivated areas to supplement the rainfall directly received in an area.
- Encourage farmers to use diverted water for growing crops like maize, rice, beans and vegetables.

ii) *Encourage the construction of permeable rock dams*

This technique involves spreading of runoff water in valley bottoms of ephemeral riverbeds and large gullies using a long, low structure made from loose stones. The central part of the dam is perpendicular to the water course whereas the extension walls to either sides curve back down approximately following the contour. The dam wall can spread 30-1000m across the widest valley beds. It can mostly be practiced in areas with a lot of stones. The technique has a high potential in the production of both food and cash crops.

5.4.2 Promote rain water storage systems

Water storage systems offer land users a tool for water stress control and dry spell mitigation hence there is need for low cost water harvesting technologies that store water for domestic use and agricultural use. Example of such technologies is harvesting and storing water in storage structures.

i) *Assist communities to construct earth dams*. Earth dams consist of raised retaining wall formed by compacted earth that contains water in a reservoir upstream. Factors to consider when constructing earth dams are:

- Should be constructed during the dry season from May to October.
- Should be located where maximum amount of water can be collected with minimum excavation or earth fill.
- Low porous soils are suitable for earth dams.
- Should have a designed height that does not allow overtopping at any time.
- The provided freeboard should vary between 3-5 m.
- Should have adequate mechanical and flood spillway facilities to maintain a uniform water depth during normal conditions and safely manage flood run off.
- Should have all design specifications to protect damage against erosion, wave action, burrowing animals, livestock, farm equipment and careless recreational use.
- The catchment area should have soil and water conservation structures to prevent sedimentation of the dam.

ii) *Assist communities with information and skills to construct rock catchments*

Rock catchments are located on bare rock surface with sufficient catchment area to capture enough rainwater during the rainy season for use during the dry season. Factors to consider when constructing rock catchments are:

- Gutters are constructed on the rock surface at slope direct water to a storage facility.
- Reservoirs made of masonry walls are constructed on the rock itself.
- Rocks of low permeability and high resistance to weathering such as granite and gneiss are suitable.

iii) *Encourage the construction of sand dams***.** Sand dams are masonry wall constructed across seasonal streams. Sand bags can also be used as low cost materials. The reinforced wall traps a lot of sand upstream, which retain water. The main key points to consider when constructing the sand dams are:

- The dam wall is constructed in successive steps in order to permit deposition of high porosity coarse sand, which stores more water.
- Low dams are constructed across streams.
- After a few flood seasons the dam elevation should be raised.

5.4.3 Facilitate the construction of separate drainage channels

Drainage is as important as irrigation in agricultural production. Drainage continues to be a vital and necessary component of agricultural production system as it is complementary and is viewed as an essential component of irrigated agriculture.

Drainage is therefore defined as the conversion of wetlands as well as the improvement of naturally inadequately drained cropland. The main objective of having drainage systems are either to control salinity or to water table and aeration in some cases a combination of salinity and water table control which consequently reduces degradation of water quality and occurrence of floods.

i) *Promote the use of surface drainage system*

- Form the land and smoothen to remove isolated depressions, or by constructing parallel ditches.
- Gently grade ditches and furrow bottoms, and discharge into main drains at the farm boundary.
- In humid areas on flat land with limited hydraulic gradients to near by rivers or other disposal points use surface drainage system.
- The diameter of pipe collectors is directly proportional to area to be drained.
- Drain spacing is dependent upon soil hydraulic conductivity.

ii) *Promote use of subsurface drainage system*

- In this type deep ditches or subsurface pipe drainage systems allow more rapid water table drawdown.
- Horizontal laterals are often used to control water logging and soil salinity.
- The downstream ends of the laterals are normally connected to a collector drain.
- The system is required where more saline irrigation water is used.
- System is usually installed on high value crops which are sensitive to water logging and salinity.

iii) *Promote the use of other types of drainage systems*

In addition to the aforementioned drainage systems, encourage adoption of secondary drainage treatments. There are both physical and biological practices.

The physical practices include: sub soiling; deep tillage; and mole drainage. The biological practices include; cropping with deep rooted legumes and crop rotations.

Minimum requirements for addressing land degradation

i. Encourage use of manure and incorporation of crop residues to improve soil fertility, structure, and water holding capacity. [OG 5.2.2 (i)].
ii. Promote contour ridging [OG 5.3.1].

Technical Information on Land Resources Management

Technical information on land conservation and management can be obtained from Land Resources Conservation staff at ADD, and the Ministry of Agriculture, Land Resources Conservation Department in Lilongwe.

Telephone : 01 755 048
Fax : 01 755 354

E-mail : landconserve@malawi.net

PART 6

6. Promote off-farm employment opportunities through economic empowerment and Income Generating Programmes

The objective of the Income Generating and Public Works Programme is to create employment opportunities for income transfer and in the process build economic infrastructure through labour intensive activities. Activities under the programme would include construction, rehabilitation and maintenance of economic infrastructure such as rural roads and small irrigation systems and improved natural resource management through afforestation, terracing and rainwater harvesting in targeted districts and extension planning areas per ADD. These works would be geared to generate significant employment opportunities.

6.1 Rehabilitating, maintaining and upgrading of rural roads and small bridges

[Activity 4.6.3.1]

i) *In consultation with DAs and ADCs and based on the District Development Plans, identify, prioritise and select the roads to be maintained, rehabilitated or upgraded.*

ii) *Identify and select contractors through a competitive bidding process.*

iii) *In consultation with the DAs and ADCs facilitate the formation of village road maintenance clubs (the clubs should nominate chairman, secretary, treasurer, and other members).*

iv) *Define approach, role of the club in the public works programme.*

v) *Set up a bank account for the programme.*

vi) *Equip the clubs with necessary tools to carry out the work.*

vii) *Train clubs in tools and stores management to minimize losses.*

6.2 Developing productive local forestry activities (e.g. fuel wood, timber, and fruit tree production)

[Activity 4.6.3.2]

i) *Create awareness and provide trainings on local forestry activities*

ii) *Using PRA techniques facilitate the formation of village forestry clubs.*

iii) *Train the clubs in the benefits of afforestration and reforestation, and fruit production.*

iv) *Provide the clubs with necessary inputs for the establishment of tree and fruit nurseries.*

v) *Train the clubs in the forestry husbandry techniques such as: nursery development, planting out, management and maintenance of plantations.*

vi) *Provide technical assistance in establishment and management of woodlot*

- Species selection. Farmers may plant trees of their choice. This will however depend on the purpose for which the farmers wish to grow them and the tree recommended by forestry or agricultural staff for their areas. Generally, the following tree species grow better in high altitude areas: *Pinus patula (Mkungudza), Eucalyptus grandis (Bulugamu), E. saligna (Bulugama), Cupressus lusitania, Widdringtonia nodiflora (Mulanje Cedar).* The following are recommended for lowland areas: *Luaceana leucophala (Lukina) ,Pinus kesiya (Kesiyala), Pinus oocarpa, Senna siamea (Kesha), E. teresticornis (Bulugama), E. camaldulensis (Bulugama), Melia azederach (Indiya),Toona ciliate (Sendelera), Azaderachta indica (Nimu), Afzelia quanzesis (Msambafumu), Gmelina arborea (Malayina), Oxytenathexa abyssinica (Nsungwi), Khaya anthotheca (Mbawa), Faidhebia albida (Msangu)* and *Pterocarpus angolensis (Mlombwa).*

- Nursery site selection and preparation. Farmers should be advised to choose a tree nursery site which is near a permanent and salt free water supply, preferably on drained loamy clay soils. The nursery should be fenced to protect tree seedlings from damage by livestock. The site should be tilled before seedbed preparation. Seedbed should be 90 cm wide and 15 cm high and of convenient length depending on quantity of seedlings to be raised. The soil should be worked to a fine tilth. Seedbeds for Eucalyptus species should be sterilised by burning as in tobacco nursery management.

- Pot Filling. Soil used in filling the pots should be collected from natural woodlands, however, for pines; the soil should be collected from near the surface under pine trees. The soil under pine tress contains *mychorrizae* fungi which are essential for pines to grow successfully. This soil should be mixed with that collected from natural woodlands in the ration of one *mychorrizae* to three natural woodland soil.

- Seed supply. Forest Research Institute of Malawi (FRIM) in Zomba stocks various types of the seeds of both exotic and indigenous tree species. The seed can be ordered directly from FRIM or through the nearest District Forestry Office.

- Seed sowing.
  - For small seeds of trees such as *Eucalyptus* a total of 1,600 seeds should be sown per square metre of seed bed in July or August (Guide to Agricultural Production and Natural Resources management). The seed should be mixed with fine sand and broadcasted evenly before sowing. Later the seed should be covered with fine sand to a depth of one millimetre. After the seed has been

sown, the seed bed should be covered with a combined grass mat raised to about 60 cm above the bed. Watering should be done regularly to keep the seedbed or pots moist. Over watering should be avoided as it may create favourable conditions for damping off disease.

- For medium seed, such as pines and cypress a total of 2,200 seeds should be sown per square metre of seed bed in March or April. The seed should be pressed down with a flat board or base of a plate, and should be covered to a depth of about 6 mm. Seedlings normally emerge after 14 to 21 days.
- For large seeds of tress such as *Gmelina arborea, Cassia siamea, Pterocarpus angolensis (Mlomba*) and *Khaya anthotheca (Mbawa*) are sown in pots in July or August. Emergency period for indigenous seeds vary from species to species within 21 days being maximum.

Seed for tree species such as *Faidhebia albida, Senna siamea* and *Leucena leucocephala* need to be scarified before sown.

- Pricking out or transplanting into pots. Seedlings should be pricked out when they have 2 to 3 pairs of true leaves for *Eucalyptus* and before the seed coat sheds off for pines.

- Supply of seedlings. All institutions should be encouraged to raise tree seedlings for their own planting and they may sell or issue surplus seedlings to others who may need them.

- Site selection. Trees can be planted on any selected sites such as around homes, along garden boundaries, rivers or stream banks, along roads, bare hills and other grades areas.

- Tree planting. After identifying the tree planting site, farmers should dig pits 30 cm wide by 30 cm deep in July or August. The spacing of planting pits depends on the species to plant, and the end use. Trees planted for poles and firewood are usually closely spaced compared with timber. To have a well established woodlot the following general guidelines should be observed:
  - All pits should be filled in after first rains
  - Plant strong and healthy seedlings;
  - Each site should be planted with the right tree species;
  - Plant early with first the first rains to enable good tree establishment.
  - After transplanting the seedling into the pit it should be filled with soil to the root collar and should be pressed firmly around the seedling to get rid of air while ensuring that the soil is in contact with the roots.

- Wood tendering. After seedlings are established, one may apply Compound D (8:18:15) fertiliser, 50 g per tree using 2 cupfuls of No. 22 . Woodlot should be weeded 2 to 3 times a season till good canopy is achieved. Woodlot intended for firewood do not require pruning. However, Eucalyptus species even if intended for other uses other than firewood do not require pruning because they are self pruning.

- **Woodlot protection**

Fire protection. Farmers should protect woodlot by making a firebreak of 3 to 5 metres wide around it. If the woodlot area is large, farmers should make internal firebreaks as well. These operations should be done before the onset of the season. Farmers should be advised to slash the grass outside the firebreak and conduct early burning on its perimeters as soon as rains tail off.

Animal Control. Farmers should protect their woodlot from animals by live fencing using sisal or any hedge tree species found locally. The individual tree can be protected by basket type of fencing using dry grass and thorny shrubs or scaring the animals away. Where wild animals cause damage, assistance can be sought from the nearest office of the Department of National parks and Wild Life.

Disease control. Diseases particularly fungal diseases can kill trees. The early attack may not easily be noticeable and it is this early stage of attack that damage can be caused. The damage could be rotting of root, dying of the bark or dying of leaves. Where these are observed farmers should immediately report to the nearest Forestry Office for advice.

Insect pest control. Pests such as termites, weevils, grasshoppers, beetles, caterpillars and aphids can damage the woodlot and should therefore be controlled. Farmers should periodically inspect their woodlot for presence of pests.

Harvesting. Plan to harvest is such a manner that there is continuous supply of wood throughout the year. Trees should be cut at 15 cm above the ground. This enables easy transportation of the harvest out of the woodlot. It also enables and facilities better development of coppice shoots. For tress which coppice, the cut should be slopping to prevent rain water collecting on the stamp which results in rotting.

6.3 Develop irrigation activities through improved access to inputs

[Activity 4.6.3.3]

i) *Create awareness in the communities about the benefits of irrigation activities that use efficient water harvesting and storage, compatible with sustainable water resource management.*

ii) *Encouraged and facilitate the formation of village irrigation clubs*

iii) *Train the committee in leadership skills, financial management, marketing skills, group dynamics, team building, training for transformation, before operations begin*

iv) *Open a Bank Account*

v) *Encourage and promote gravity fed surface irrigation, water harvesting and storage, treadle pumps and other appropriate small scale technologies.*

vi) *Provide necessary tools and equipment to the clubs*

vii) *Provide necessary inputs for crop production*

viii) *Provide training in irrigation techniques*

ix) *Provide training in crop husbandry (See Operational Guidelines on Crop Production).*

6.4 Minimum Standards

i. In consultation with the DAs and ADCs facilitate the formation of village road maintenance clubs [OG 6.1.1]
ii. Using PRA techniques facilitate the formation of village forestry clubs [OG 6.2.2].
iii. Encouraged and facilitate the formation of village irrigation clubs [OG 6.3.2].

6.5 Technical Information on Public Works Programmes

Technical information on Public Works programmes can be obtained from the Ministry of Transport and Public Works, Lilongwe.
Private Bag 322
Lilongwe 3

Tel. : 01 789 377
Fax. : 01 789 238

PART 7

7. Establishment of Community Grain Banks

Community grain banks are established with an aim of enhancing household food security, especially during the most food insecure months, by strengthening village level capacity to purchase and store grain for resale to the community later during the hunger season. The scheme thus allows farmers within and beyond the village, to sell 'surplus' production at harvest time to the grain bank and those with limited or no stocks later in the dry season, to purchase these grains. Although informal grain markets exist in most villages, this strategy cushions the community from high grain prices later in the year as scarcity value of grain increases and has the advantage of providing favourable prices to both the farmers selling grain and the consumers buying it. Community grain banks are thus social in function, pursuing social protection of food insecure households through improved distribution and access to grain ahead of commercial gains. The village community grain bank committee only thrives to break even, retaining the initial capital invested in purchasing grain to enable sourcing of grain in the following season.

Considering that post-harvest grain loss due to poor storage practices, establishment of grain banks by being participatory in approach, impacts knowledge on good practices in grain storage to the communities involved. Grain banks as a food security enhancing intervention have the following objectives:

- To provide improved accessibility of grain at reasonable prices during periods of constrained food security
- To provide an efficient and effective grain marketing service for farmers and consumers at the community level through price stabilisation that benefits the selling farmer and the consumer while discouraging over-selling of grain
- To reduce post-harvest losses due to poor storage practices
- To promote and strengthen community level organisational capacity
- To establish, at community level, a disaster preparedness strategy that cushions members from such as shocks as droughts, floods and cyclones

7.1 Conduct Needs Assessment

[Activity 4.7.3.1]

The establishment of a community grain bank should be based on a decision made by members of that community. Outside agencies should only facilitate this process through participatory needs assessments which consider the following:

- Obtain a wider base of views from members of the community
- Determine current staple grain (maize) output levels per unit area under production in targeted areas
- Establish per capita consumption of staple grain and an indication of how long harvested grain lasts

- Assess proportion of households achieving excess grain or deficiency coupled with determination of underlying causes for either
- Investigate reasons for selling 'excess' grain
- Assess income levels to determine the purchasing power of the community
- Identify current sources of extra grain, opportunities and constraints faced with these systems
- Quantify distance and cost of accessing grain at the current nearest food market
- Measure incidence of child malnutrition in the area

7.2 Mobilise and conduct awareness meetings on the need for a community grain bank in the area

[Activity 4.7.3.2]

Below are the activities that can be undertaken to mobilise communities and raise awareness:

i) *Identify relevant stakeholders for the community grain banks project and determine resource availability*

ii) *Facilitate community meetings for problem identification and clarification of constraints to food security as well as an assessment of the scope and seriousness of the problem*

iii) *Through PRA, brainstorm and identify a strategy on how such an intervention could be implemented*

iv) *Identify resource requirements, training needs and sources of same*

v) *Scale up campaigns to larger community spelling out the benefits of community grain banks*

vi) *Agree on supervision and management arrangements and roles of various stakeholders*

7.3 Facilitate the identification of a location of the community grain bank

[Activity 4.7.3.3]

Consider the following identifying a location for the community grain bank:

- Agree on criterion for selection of site for location of community grain bank, based on technical minimum standards for grain storage establishment
- Determine the distances walked by community members to get to the proposed site and reach consensus on ideal location based on security, accessibility and convenience
- Identify location and acquire the site through engagement of local government

7.4 Facilitate the election of a grain bank committee

[Activity 4.7.3.4]

Below are some guidelines for election of committees:

i) *Assist the communities to come up with constitution to guide the committee in its operations*

ii) *Ensure that at least some of the committee members are literate people since they will be required to keep various written records*

- Establish rules and procedures for election process- encourage gender balance in election of committee.
- Remind community to set the criteria for selection of members into the committee, e.g. honesty, reliability and availability
- Sensitise on positions that must be filled: the committee should have a chairperson, treasurer, secretary, and ordinary committee members.
- Clarify the roles of the committee and members of that committee
- Advise on how to make the election process should be transparent and fair and how to make the re-election democratic

7.5 Train grain bank committees in grain bank management

[Activity 4.7.3.5]

i) *Relevant extension department to train committee on grain quality management. Training should cover such topics as financial management: bookkeeping, cashbooks, stock management, payment vouchers, reconciliation of different records, and cash flow budgets.*

ii) *Improve committee's understanding and knowledge of how markets function, selection of quality grain (to exclude pests and extraneous material from storage facilities), negotiating prices and general marketing of the concept to neighbouring communities*

7.6 Select an appropriate storage facility

[Activity 4.7.3.6]

- Using figures of per capita grain consumption and average deficit per capita, determine the capacity of the grain store to meet given village population
- Based on the assessment of needs and technical advice from District Agriculture Office, identify a suitable storage facility structure
- Analyse resource availability and identify feasible options if necessary

7.7 Construction of the storage facility

[Activity 4.7.3.7]

i) *Define the resource requirements for the construction of the storage facility. Programme support may be required to fund the construction of the structure particularly cement, iron sheets, nails, planks, and skilled labour*

ii) *Community should contribute in the construction of the grain bank in cash or in kind.*

7.8 Facilitate the opening of a bank account

[Activity 4.7.3.8]

i) *A bank account needs to be opened to a) deposit revolving fund, b) to deposit all proceeds from sale of grain.*

ii) *The committee should identify signatories to the account including 1 or 2 non-grain bank committee members for transparency. These could be people with high regard in the community e.g. priest, or school headmaster.*

7.9 Support grain purchases

[Activity 4.7.3.9]

i) *Identify start up-up fund (revolving fund) to enable the community grain bank committee purchase grain.*

ii) *Identify 2 -3 people in the committee to be responsible for the purchase of grain.*

iii) *Purchasing should be done during the harvest season when the price is low.*

iv) *Offer the price that is slightly above that offered by competitors e.g. ADMARC and private traders to attract farmers that are selling grain.*

7.10 Encourage pest control

[Activity 4.7.3.10]

Ensure that stored grain is fumigated by a reputable organisation.

7.11 Encourage the committee to sell grain during the lean period

[Activity 4.7.3.11]

- Sell grain to the community during the lean period when there is scarcity.
- Offer a price lower than that offered by private trader and ADMARC but high enough to cover the cost of fumigation, storage and security.

7.12 Encourage Annual Review of grain bank operations and reconciliation of records

[Activity 4.7.3.12]

- Once a year conduct a review session with the participation of representatives from project/programme and grain bank committee members.

- The grain review should focus on purchases and sales, reconciliation of stocks records, and bank records.
- The meeting should plan activities for the following season.
- After the session conduct a feed back meeting with the community informing them on progress with regard to grain operations.

Minimum Requirements

i. Facilitate election of grain bank committee (OG 8.4)
ii. Train grain bank committees in grain bank management (OG 8.5)
iii. Identify start up-up fund (revolving fund) to enable the community grain bank committee purchase grain (OG 8.9.1)

Technical Information on Community Grain Banks

Technical information on Agricultural Marketing can be obtained from the Ministry of Agriculture, Fisheries and Food Security, Department of Crop Production in Lilongwe.
Box 30145
Lilongwe 3
Telephone : 1 789 033
Fax : 1 789 218

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