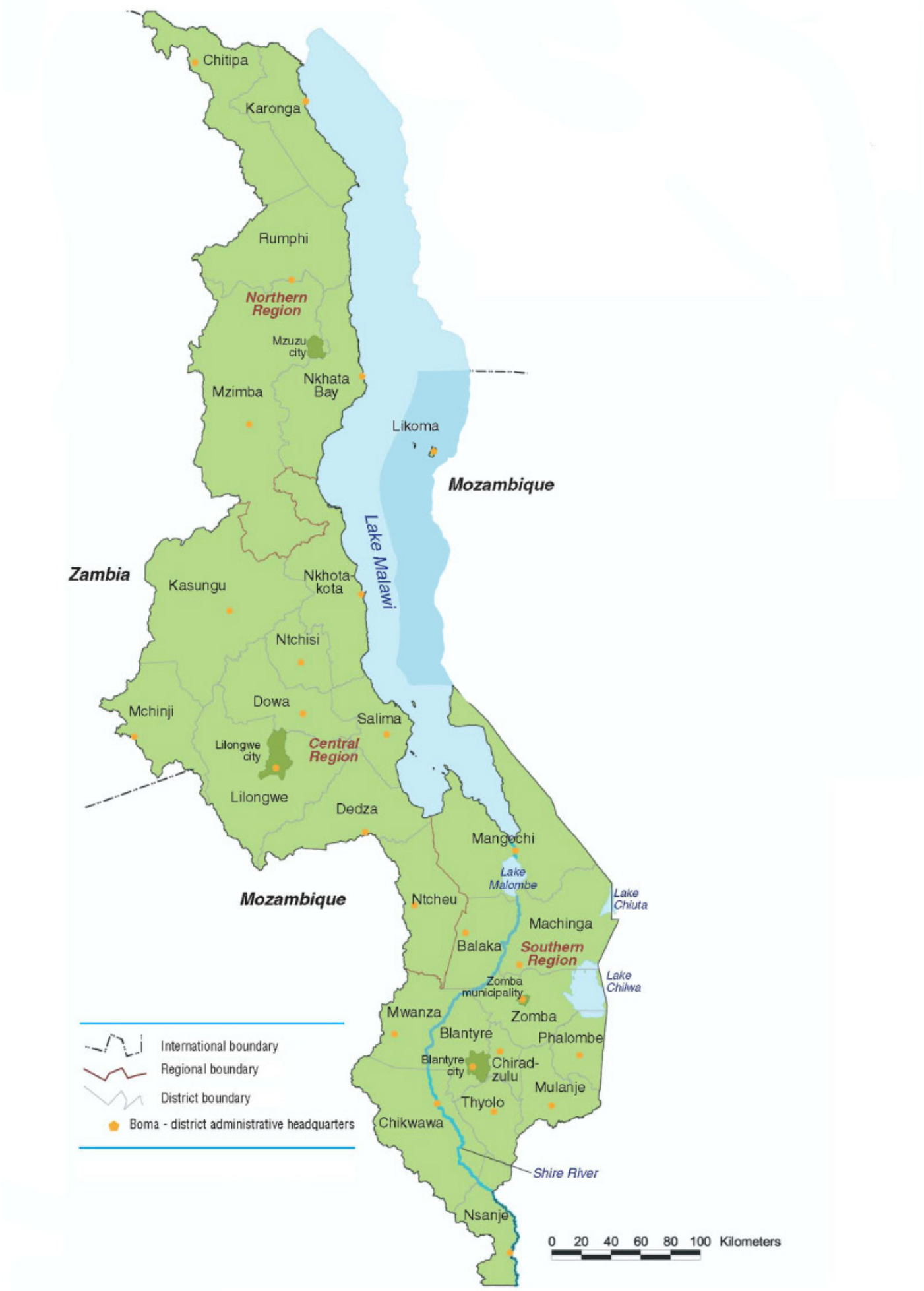
AGRICULTURE EXTENSION FIELD NOTEBOOK

MAP OF MALAWI SHOWING DISTRICT



AGRICULTURE EXTENSION FIELD NOTEBOOK

Ministry of Agriculture, Irrigation and Water Development

MALAWI

Government of Malawi

This Agriculture Extension Field Notebook was made possible by the generous support of the American people through USAID. The contents are the responsibility of the authors and do not necessarily reflect the views of USAID or the United States government.

Why is this Field Notebook Important?

As an agricultural extension worker, you have a critical role in development. You are the direct link to all agriculture stakeholders to help facilitate exchanges between farmers, researchers, vendors and input dealers.

This book is for all types of agriculture extension frontline workers whether you work with private sector, government or non-government organizations.

The **Agriculture Extension Field Notebook** will assist you in:

1. Planning:

In order to be effective, you need to plan your work by thinking ahead. Each organization has their own way for doing this. Most organizations create plans for a year, then reflect each month to adapt and create monthly plans, as well adjusting plans daily if needed. This Field Notebook will help you with planning through: the seasonal activity ideas, the personal notes you took the previous year, and the pocket guide of reference materials. There are other tools you'll use from your office and home as you make your plans, but this Field Notebook helps you to document and carry with you all the key points you think you'll need to make your work most effective.

2. Tracking your progress

Plans change. It is rare for a plan to be implemented in exactly the way you thought a few months ago when you wrote your annual plan. You will learn lessons and find better ways to improve agriculture in your area. New partners may enter your area. Weather may behave differently than you thought. Your colleagues may change and have new ideas. This Field Notebook will help you to track progress on your plans, capture your lessons and reflect on them to improve your future work. You'll be able to use your notes to remember ideas to discuss with other stakeholders and to write down their ideas. This will help make report writing easy and strengthen your future plans.

3. Supervisory Visits notes

Fieldwork Supervisory visits should be an opportunity to improve upon practices. Every supervisory visit should be followed by a debriefing session for the supervisor to provide feedback. Discussing your performance with your supervisors is an excellent opportunity for you and your supervisor to share observations and information that will support and enhance your daily field activities, and to talk about your strengths and capacity building needs. This field note book will help to properly document and maintain your supervisor's discussion notes for future reference. A summary of key issues action items, agreed solutions that were discussed and other critical conversations should be recorded by your supervisor. Include the name of supervisor, signature and date on each piece of documentation you created.

4. Pocket Guide of Reference Materials

Although you are not expected to know everything about everything, you are expected to know what information is available, for all forms of agriculture, from production to markets to consumption. There are a number of manuals that aide you in your work, but most of them are large and too heavy to carry with you. The pock guide of reference materials will assist you with key reminders about facts and technical guidance from all the subject matter specialists that support you in your work.

We welcome feedback through the District Agricultural Extension Services System (DAESS) to improve future books.

Erica Maganga

Secretary for Agriculture, Irrigation and Water Development

Acknowledgement

The Agricultural Extension workers play a very critical role in agricultural development to ensure that farmers have access to information and various technologies on crop and livestock enterprises for sustainability. They also play a key role as sources of information in the communities they work in. In order to be effective in their mandate agriculture extension workers need to be able to plan and review their work effectively. This Agriculture Extension Field Notebook is to provide templates to help the frontline extension workers to effectively plan, track and review plans, discuss progress with supervisors and also quick reference information about facts and technical guidance from some subjects. The best way to maximize its use is to always keep it with you.

The Agriculture extension field notebook has been developed through a collaborative work between the Department of Agricultura Extension Services (DAES) and the Feed the Future Strengthening Agricultural and Nutrition Extension (SANE) Project. Several people within the Ministry and others from outside the ministry contributed to the preparation of this field notebook. We acknowledge the following people for their effort in putting up this Field notebook; Steward Chinawa, Stacia Nordin, McLean Gerald Mafubza, Siliro Magomero, Matsimbe Nkambeni, MA Dazilone, Kondwani Mithi, Harriet Kamwambeni, Gregory Alinafe, Frank Chimbalu, Deliwe Mataka, Boaz Mandula, Bertha Kaweche, Annette Kasulo, Annett Mlenga and Noel Limbani.

Special recognition should go to Jan Henderson from University of Illinois INGENAES Project for providing overall guidance to review the previous Agriculture Extension Diary that led to the development of this field notebook.

Dr Jerome Nkhoma

Director of Agriculture Extension Services

Ministry of Agriculture, Irrigation and Water Development

Personal Infomation

Name:

Contact Address:

Telephone (home):

Telephone (work):

Mobile:

Fax:

Email:

Skype:

Duty Station

ADD

District

EPA

Section

Designation

Roles and responsibilities:

Special Projects Implementation:

Name of Project:

Thematic area:

Project site(s):

Duration:

Targeted Farmers:

Name of Project:

Thematic area:

Project site(s):

Duration:

Targeted Farmers:

Name of Project:

Thematic area:

Project site(s):

Duration:

Targeted Farmers:

Name of Project:

Thematic area:

Project site(s):

Duration:

Targeted Farmers:

Annual Planning

ID	Activities	Target

Annual Planning

ID	Activities	Target

July – August – September
Dry Season Possible Activities

Just after the rainy season families tend to have enough "food", but not always all the Food Groups. Food security requires that we each have all the Food Groups, every day. In most areas of Malawi the weather is cooler and the growth of plants and trees is slowing down. It is a great season to meet frequently with your agricultural stakeholder panels to plan and reflect on the last rains and share ideas on what can be done this season and in the future to improve.

Planning & Coordination	✓ Review previous season failures and successes ✓ Plan for next season ✓ Finalize plans and hold agricultural fairs to exchange ideas
Land Conservation	✓ Prepare gardens, peg marker ridges, realign ridges ✓ Compost manure making and application ✓ Continue conservation campaigns ✓ Prepare agroforestry nursery- collect seeds, seed treatments and sowing ✓ Gully reclamation ✓ Collect mulch, prevent burning & educate communities on damage that burning does to our resources
Inputs	✓ Procure inputs ✓ Seed collection and storage
Production	✓ Plant irrigated crops ✓ Irrigated crop management such as pest and disease control, weeding, watering ✓ Staking and desuckering in tomatoes
Harvest	✓ Harvest time for a variety of fruits ✓ Harvesting of irrigated crops
Livestock	✓ Collect manure and make compost ✓ Build or maintain kholas ✓ Continue rabies vaccination campaign ✓ Vaccinate for Newcastle disease ✓ Continue meat inspection ✓ Animal feed stocking and /gathering ✓ Castration of animals ✓ Do not allow animals animals to free range, if animals do range, they should be monitored, tethered and/or fenced.
Fish	✓ Repair, lime, and fertilize all ponds. ✓ Stock ponds in August or early September. ✓ Flood proof pond in readiness for the onset of the rainy season. ✓ Build a fence to keep predators away.
Marketing	✓ Grade and package produce ✓ Continuation of collective marketing ✓ Gross margin analysis
Preservation & Storage	✓ Food processing ✓ Prepare food together with communities based on the six food groups ✓ Preserving foods from all the food groups ✓ Food education and family household planning ✓ Pesticides application ✓ Management of storage facilities

Monthly Ulendo Programme for JULY

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for JULY

Date	Id	Activity	Place	Time

July

ACTIVITY TRACKER

ACTIVITY TRACKER

July

ACTIVITY TRACKER

ACTIVITY TRACKER

July

ACTIVITY TRACKER

ACTIVITY TRACKER

July

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

July

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

July

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Monthly Ulendo Programme for AUGUST

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for AUGUST

Date	Id	Activity	Place	Time

August

ACTIVITY TRACKER

ACTIVITY TRACKER

August

ACTIVITY TRACKER

ACTIVITY TRACKER

August

ACTIVITY TRACKER

ACTIVITY TRACKER

August

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

August

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

August

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Monthly Ulendo Programme for SEPTEMBER

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for SEPTEMBER

Date	Id	Activity	Place	Time

September

ACTIVITY TRACKER

ACTIVITY TRACKER

September

ACTIVITY TRACKER

ACTIVITY TRACKER

September

ACTIVITY TRACKER

ACTIVITY TRACKER

September

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

September

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

September

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

First Quarterly Review

What **progress** have you made in meeting your quarterly program?

What is the greatest **success** you had this quarter?

First Quarterly Review

What major **challenges** did you face this quarter?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have for the quarter?

First Quarterly Review

First Quarterly Review

October – November – December
Bloom Season Possible Activities

In this season many trees take turns to flower and as the rainy season approaches several species start to sprout their leaves or stems from the ground. It is very dry in most areas of Malawi, and often windy.

Planning & Coordination	✓ Plan and hold seed fairs ✓ Plan and hold field days/open days
Land Conservation	✓ Peg marker ridges and realign ridges ✓ Establish tree nursey ✓ Manage nursey ✓ Prepare vetiver nursery in dambos, near boreholes or other homestead water sources ✓ Transplant agroforestry trees when the first rains arrive ✓ Application of herbicides ✓ Continue adding a variety of mulch so all soil is covered ✓ Manure making and application ✓ Gully reclamation ✓ Prevent burning & educate communities on damage that burning does to our resources ✓ Trim trees
Inputs	✓ Procure inputs ✓ Seed collection
Production	✓ Irrigated activities continue ✓ Sowing of fruit trees ✓ Planting of field crops ✓ Seed treatment such as use of inoculants ✓ Grafting and budding of fruit trees
Livestock	✓ Deworm cattle, goats and sheeps ✓ Make hay and silage ✓ Dehorn cattle and goats ✓ Dip animals if necessary ✓ Vaccinate for foot and mouth disease ✓ Vaccinate for new castle disease ✓ Continue meat inspection ✓ Collect manure and make compost ✓ Build or maintain kholas
Fish	✓ Sample the fish monthly ✓ Increase the daily feed amount depending on how much the fish have grown ✓ Check water quality as the fish grow ✓ Stocking and harvesting ✓ Check and maintain leakages and any wall damages due to the rains
Harvest	✓ Harvest time for a variety of fruits ✓ Harvesting of irrigated crops ✓ Harvesting second round of honey in bee keeping
Marketing	✓ Gross margin analysis ✓ Conduct market research ✓ Marketing of irrigated crops
Preservation & Storage	✓ Prepare food together with communities based on the six food groups ✓ Preserving foods from all the food groups ✓ Seed Storage ✓ Food education and family household planning ✓ Management of storage facilities

Monthly Ulendo Programme for OCTOBER

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for OCTOBER

Date	Id	Activity	Place	Time

October

ACTIVITY TRACKER

You don't have to see the whole staircase, you just have to take the first step.

ACTIVITY TRACKER

October

ACTIVITY TRACKER

ACTIVITY TRACKER

October

ACTIVITY TRACKER

ACTIVITY TRACKER

October

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

October

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

October

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Monthly Ulendo Programme for NOVEMBER

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for NOVEMBER

Date	Id	Activity	Place	Time

November

ACTIVITY TRACKER

ACTIVITY TRACKER

November

ACTIVITY TRACKER

ACTIVITY TRACKER

November

ACTIVITY TRACKER

ACTIVITY TRACKER

November

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

November

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

November

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor	Post	Date

Monthly Ulendo Programme for DECEMBER

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for DECEMBER

Date	Id	Activity	Place	Time

December

ACTIVITY TRACKER

There are two ways of exerting one's strength. One is pushing down, the other is pulling up.

ACTIVITY TRACKER

December

ACTIVITY TRACKER

ACTIVITY TRACKER

December

ACTIVITY TRACKER

ACTIVITY TRACKER

December

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

December

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

December

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Semi-annual Review

What **progress** have you made in meeting your semi-annual program?

What is the greatest **success** you had during the past six months?

Semi Annual Review

What major **challenges** did you face during the past six months?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have for the past six months?

Semi Annual Review

January - February – March
Rainy Season Possible Activities

Rainfall throughout most of the country, heaviest in January tapering off in March.

Planning & Coordination	✓ Plan and hold field days.
Land Conservation	✓ Plant vetiver and agroforestry trees ✓ Under sow agroforestry trees like triphrosia in January ✓ Maintain marker ridges ✓ Control gully ✓ Check dam construction ✓ Manage trees
Inputs	✓ Procure seed for irrigation farming
Production	✓ Planting of fruit trees and other food trees (nuts, vegetables, etc) ✓ Continuation of grafting and budding ✓ Pests and disease control for summer crops ✓ Fertilizer application ✓ Add compost, liquid manure and mulches ✓ Field crop planting continues
Livestock	✓ Graze animals in designated areas away from crops and young edible trees. ✓ Feed hay and /or silage ✓ Sow pastures ✓ Dip cattle if necessary ✓ Vaccinate for foot and mouth disease ✓ Vaccinate for Newcastle disease ✓ Continue meat inspection
Fish	✓ Sample the fish monthly to monitor growth ✓ Increase the daily feed amount depending on how much the fish have grown ✓ Check water quality as the fish grow ✓ Stocking and harvesting ✓ Check and maintain leakages and any wall damages due to the rains
Harvest	✓ Green Vegetables are plentiful ✓ Fresh legumes ✓ Several insects are in season
Marketing	✓ Marketing of fruits like mangoes, green vegetables and green legumes
Preservation & Storage	✓ Preservation of vegetable ✓ Preservation of seasonal fruits like mangoes ✓ Preparation and education on foods in season

Monthly Ulendo Programme for JANUARY

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for JANUARY

Date	Id	Activity	Place	Time

January

ACTIVITY TRACKER

ACTIVITY TRACKER

January

ACTIVITY TRACKER

ACTIVITY TRACKER

January

ACTIVITY TRACKER

ACTIVITY TRACKER

January

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

January

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

January

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Monthly Ulendo Programme for FEBRUARY

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for FEBRUARY

Date	Id	Activity	Place	Time

February

ACTIVITY TRACKER

ACTIVITY TRACKER

February

ACTIVITY TRACKER

ACTIVITY TRACKER

February

ACTIVITY TRACKER

ACTIVITY TRACKER

February

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

February

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

February

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Monthly Ulendo Programme for MARCH

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for MARCH

Date	Id	Activity	Place	Time

March

ACTIVITY TRACKER

ACTIVITY TRACKER

March

ACTIVITY TRACKER

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March

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ACTIVITY TRACKER

March

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

March

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

March

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Third Quarterly Review

What **progress** have you made in meeting your quarterly program?

What is the greatest **success** you had this quarter?

Third Quarterly Review

What major **challenges** did you face this quarter?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have for the quarter?

Third Quarterly Review

Third Quarterly Review

April – May – June
Harvest Season Possible Activities

Rainy season results in an increase in harvests – this does not mean that the 'harvest season' is the only time for harvests. Harvesting in Malawi can happen in every month of the year!

Planning & Coordination	✓ Recording harvest ✓ Food budgeting ✓ Plan and hold field days/open days
Land Conservation	✓ Make compost ✓ Maintain marker ridges ✓ Maintain stream banks and catchments ✓ Keep animals away from edible agroforestry ✓ Fence agroforestry trees ✓ Make fire breaks while educating communities about preventing fires ✓ Digging pits for pit planting technology ✓ Trimming vetiver ✓ Construction of swales ✓ Incorporation and aying of crop residues to ensure maximum ground cover
Inputs	✓ Mobilizing resource for inputs ✓ Procure tubes for sowing agroforestry/fruit seeds ✓ Procure watering canes
Production	✓ Planting irrigated crops
Livestock	✓ Deworm goats, cattle and sheep ✓ Newcastle vaccination ✓ Continue meat inspection ✓ Food preservation and formulation
Fish	✓ Stocking and Harvesting ✓ Drain ponds ✓ Remove sludge (fertile mud) from the bottom and use in gardens ✓ Do the major maintenance work ✓ Gather materials for building fence to keep predators away
Harvest	✓ Recording harvest ✓ Harvesting field crops-grains, legumes, tubers ✓ Harvesting seasonal fruits and vegetables ✓ Harvesting seeds ✓ harvesting fish
Marketing	✓ Grade and package produce ✓ Aggregating produce and collective marketing ✓ Market surveys
Preservation and storage	✓ Construction of storage facilities ✓ Package and storage

Monthly Ulendo Programme for APRIL

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for APRIL

Date	Id	Activity	Place	Time

April

ACTIVITY TRACKER

ACTIVITY TRACKER

April

ACTIVITY TRACKER

ACTIVITY TRACKER

April

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ACTIVITY TRACKER

April

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

April

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

April

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Monthly Ulendo Programme for MAY

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for MAY

Date	Id	Activity	Place	Time

May

ACTIVITY TRACKER

ACTIVITY TRACKER

May

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May

ACTIVITY TRACKER

ACTIVITY TRACKER

May

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

May

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

May

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Monthly Ulendo Programme for JUNE

Date	Id	Activity	Place	Time

Monthly Ulendo Programme for JUNE

Date	Id	Activity	Place	Time

June

ACTIVITY TRACKER

ACTIVITY TRACKER

June

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June

ACTIVITY TRACKER

ACTIVITY TRACKER

June

ACTIVITY TRACKER

MONTHLY REVIEW

What **progress** have you made in meeting your monthly Ulendo program?

What is the greatest **success** you had this month?

June

MONTHLY REVIEW

What major **challenges** did you face this month?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have on the month?

MONTHLY REVIEW

June

MONTHLY REVIEW

SUPERVISOR NOTES

Name of Supervisor *Post* *Date*

Annual Review

What **progress** have you made in meeting your annual program?

What is the greatest **success** you had during the past year?

Annual Review

What major **challenges** did you face during the past year?

What are your proposed **solutions** for the above challenges?

What other **reflections** do you have for the past year?

IV. Pocket Guide of Reference Materials

This section of your field notebook is organized into the following topics:

1. About the Agricultural Sector & DAESS
2. Nutrition
3. Gender and HIV
4. Agribusiness
5. Soil & Water
6. Plants & Trees
7. Animals (Livestock & Fish)
8. Reference Data – statistics, contacts

Other key extension reference materials

There are several manuals to support agricultural extension workers, but they are often too large to carry with you when we go to the field. This section of your notebook is a 'pocket guide' of reminders of the key points around the theme "Farming for Resilient Livelihoods". Manuals that should be available to any agricultural extension worker within an Extension Planning area include:

1. Guide to Agricultural Production
2. Farmer Field School
3. Nutrition Handbook for Farmer Field Schools
4. Sustainable Nutrition Manual
5. Integrated Homestead Farming
6. Household Approach
7. Agricultural Production Estimates Survey
8. Agricultural Extension Development Officers' Handbook on Good Agricultural Practices

1. ABOUT THE AGRICULTURE SECTOR & DAESS

Agriculture is the mainstay of Malawi's economy contributing about one third of the Gross Domestic Products and nearly 80 percent of employment. Most households in Malawi depend wholly or partly on agriculture for their livelihood and well-being.

The agriculture sector is subdivided into estate and small-scale sub sectors. The small-scale sub-sector play key role in crop, livestock and fisheries production for national and household food, nutrition and income security. Provision of high quality agriculture extension services to farmers is important for increased production and productivity.

Vision:

All farmers demand and access high quality agricultural extension services.

Mission:

To provide demand-driven agricultural extension services in partnership with civil society organizations, non-governmental organizations, private sector and farmer organizations; and promote equalization and coordination in service provision at all levels in order to achieve food, nutrition and income security at the household level.

Agricultural Extension Services in Malawi

The Department of Agriculture Extension Services (DAES) coordinates the delivery of agricultural extension services. The overall objective of the department is to assist farmers in achieving and maintaining self-sufficiency in food production and income generation through promotion of technologies proven to improve productivity. Extension puts emphasis on assisting farmers to become aware of improved technologies in all crop and livestock enterprises. Farmers are encouraged to demand extension and advisory services to meet their needs. The following are the key features of the agriculture extension policy in Malawi:

Pluralistic extension service:

This ensures that several players, such as public/government, NGOs and private companies take part in the provision of extension services in a country and farmers have a greater choice of quality services.

Demand-driven extension services:

Extension services need to respond to farmer demands with consideration to resource they have. Extension service providers need to dialogue with farmers to support them with appropriate services to enhance learning.

Accountability:

Farmers are not looked upon only as beneficiaries of extension but also as clients, sponsors and stakeholders. This calls for mechanisms for great accountability of extension services to farmers and their representatives to bring high quality services. Where extension is by private providers, farmers must be given a chance to choose among extension deliverers, especially when the farmers are the ones paying for the services. For public extension services, farmers should have a voice in the way extension services are planned and implemented.

Those who benefit, pay (service at cost):

This recognizes that it is economically impossible for government to provide all extension services. Where possible, farmers and other private sector players must also provide resources to support for extension services.

Equalization:

This ensures that marginalized and vulnerable segments of the society such as women, youths and people with disabilities are not left out of the development process.

Decentralized Services:

This intends to transfer decision making powers to the lower level. In line with Malawi Decentralization Policy, Agricultural Extension Policy is implemented through the District Agriculture Extension Services System (DAESS). This seeks to improved coordination and collaboration of stakeholders to enable farmers access high quality agricultural extension and advisory services from those that are best able to provide them.

District Agriculture Extension Services System (DAESS)

The DAESS is a mechanism for enabling farmers to identify and organize their agricultural needs.

Objective of the District Agricultural Extension Services System

i) To provide platform for farmers to discuss and mutually agree on common agricultural needs to be addressed by themselves and those that may require assistance from elsewhere.

ii) To mobilise service providers as value chain players to collectively or individually respond to farmers' prioritised agricultural needs.

iii) To instil sense of ownership and self-reliance amongst farmers whilst undertaking agricultural programmes.

iv) To enhance coordination, collaboration and co-location amongst stakeholders in provision of agricultural extension and advisory services

Main Focal Areas of DAESS

Organisation of farmers demands:

Farmers in their wealth and gender categories together identify priority agriculture felt needs and decide course of action to undertake.

Organising service providers' response to farmers' needs:

Involves identifying and engaging service providers that would respond to farmers' needs as individual organisations or in collaboration with other organisations.

Stakeholders Coordination, collaboration and co-location:

Service providers identify issues, interventions and needs presented by farmers which they can support as individual organisations or in collaboration with other organisations.

Funding acquisition:

The district council should explore different financing mechanisms for agricultural projects.

DAESS linkages to District Council structures

The system is integrated into the District Council structures through District and Area Stakeholder Panels and District Agriculture Extension Coordination Committee. The committees of DAESS operate as sub committees of local government structures; VDC, ADC and DEC. The village is the entry, planning, and implementation base for all agricultural interventions.

At the village level:

The Village Agriculture Committee (VAC) discusses agricultural related development activities and reports to the VDC. Agricultural issues that cannot be addressed at village level are to the ASP.

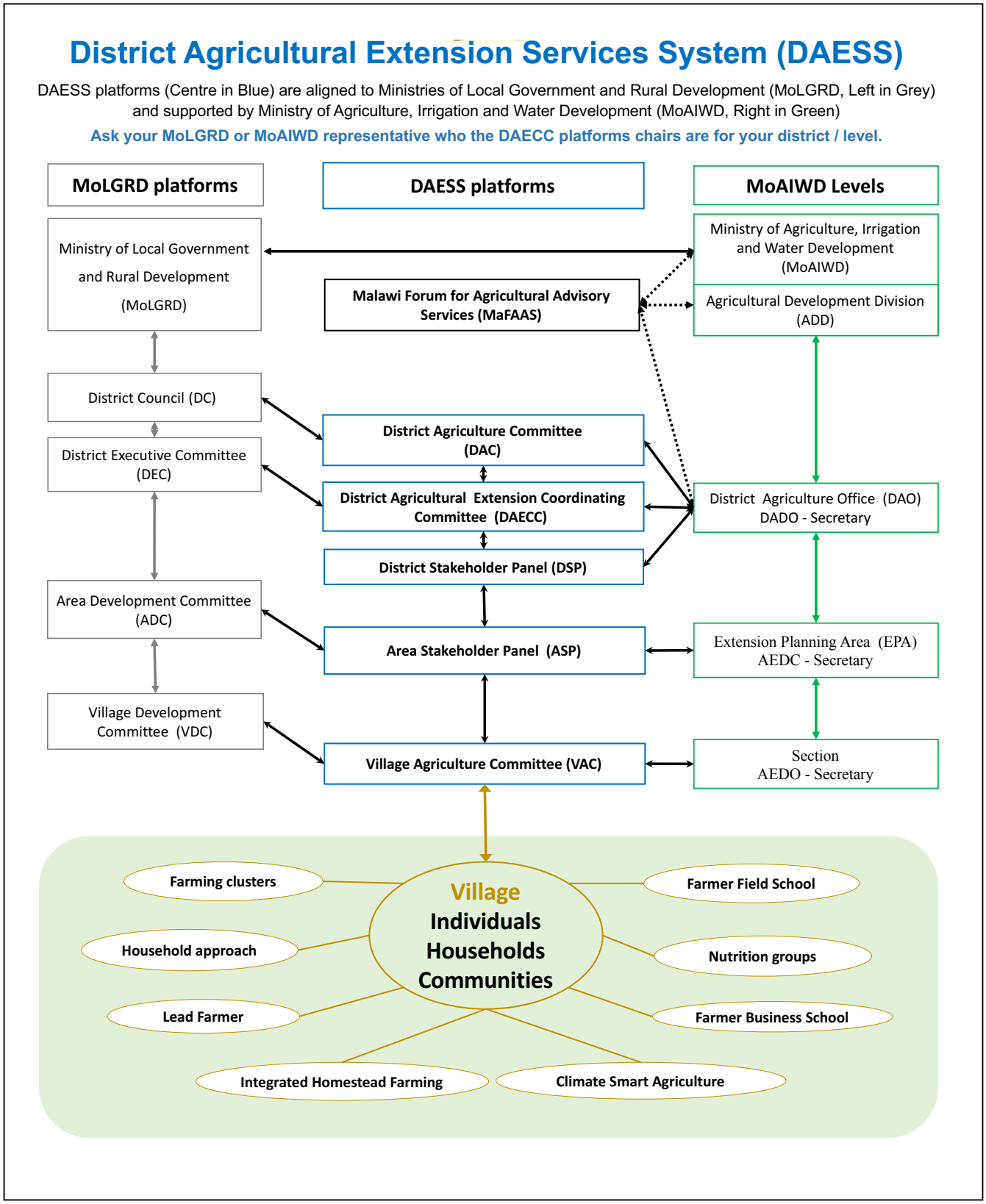
At ADC level:

The ASP is responsible for agricultural related development on behalf of the ADC and reports to the ADC. Any issues requiring attention of the council is sent through the DSP.

At district level:

Representatives from all ASPs in the district delegated by the ADCs meet with representatives of service providers at district level in platform known as the DSP to present and discuss their issues. Representative of the service providers meet in the DAECC to discuss what has been presented by farmers, make decisions on how to respond to the issues, as individual organizations or collectively. The DAECC also provides feedback to the DSP and advises the DAC on issues requiring the attention of the Council.

Figure 1: DAESS Structure



2. NUTRITION

Seasonal Food Availability Calendar (SFAC)

Access to diverse foods from all the food groups is one of the known constraints to successful nutrition for each family member. Staple foods often run low in the rainy season and people often decrease their food consumption, compromising their nutritional status. But this does not have to be the case if these shortages are identified and addressed in advance. One approach is to assess the food group situation using Seasonal Food Availability Calendar (SFAC). The SFAC can be completed and used at any level- by an individual, household, community, VAC, GAG, ASP, DAECC, region or even the whole nation.

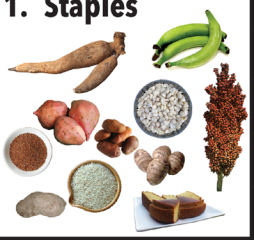
Seasonal Food Availability Calendar

- SFAC is a visual expression of year-round food availability organized by food group and by months and/or seasons in a year. When completed it shows periods of the year in which different foods and food groups are available.
- The SFAC is a planning tool that allows you to see periods where there are food group gaps. The SFAC often shows that there isn't a food group gap, but that there are many options to assure everyone eats all food groups every day.
- Food group gaps can be filled by:
  - ✓ diversifying agriculture (crops, orchards, gardens, livestock)
  - ✓ increasing access to high quality inputs either from self-saved or purchased inputs (fertilizers, seeds, seedlings, animal/fish stock, bees, etc.);
  - ✓ irrigation;
  - ✓ preserving foods,
  - ✓ working with coordination platforms to address community issues, etc.

Process for development of SFAC

1. Draw a chart in a book or flip chart or computer or any creative way that you can come up with (be sure to share your ideas in your coordination platforms!).
2. Draw 14 columns (see the examples on the next pages)
   - ✓ The 1st column titled "food groups"
   - ✓ The 2nd column titled "foods", and
   - ✓ And the next 12 columns for each month of the year.
3. There will be many rows for each food group, so 2 or more charts may be needed, or one chart for each food group, for example.
4. Write the first food groups in the first column, on the first row of the chart.
5. List all the types of foods commonly produced and/or available in the community (2nd column). At this step, really take time to think about every single food in that food group. Consult all household/community members – young and old as different people have different knowledge. There is often a lot of foods in a community that are not being utilized enough (mostly indigenous foods). Leave some blank lines as you learn and think further you will
6. Depict the availability of each of the foods by months
7. Discuss how to close the food gaps.
8. Use it in each month to discuss how to prepare foods available in that month

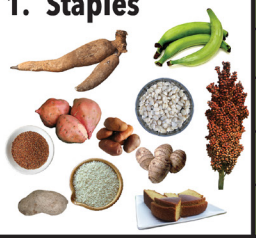
EXAMPLE OF FOOD AVAILABILITY CALENDAR BY FOOD GROUP AND MALAWI SEASON

Food Groups	Available Foods	October	November	December	January	February	March	April	May	June	July	August	September
1. Staples 													
2. Fruits 													
3. Vegetables 													
4. Legumes 													
5. Animal Foods 													
6. Fats and Oils 													

KEY:

✔ = Available Foods

EXAMPLE OF FOOD AVAILABILITY CALENDAR BY FOOD GROUP AND MALAWI SEASON

Food Groups	Available Foods	October	November	December	January	February	March	April	May	June	July	August	September
1. Staples 	*Green Banana*			✓	✓	✓	✓	✓	✓	✓	✓		
	Maize						✓	✓	✓	✓	✓		
	Sorghum						✓	✓	✓	✓	✓		
	Cassava	✓	✓					✓	✓	✓	✓	✓	✓
	Yams	✓	✓									✓	✓
2. Fruits 	*Bananas*							✓	✓	✓	✓		
	Pineapples	✓	✓										✓
	Pawpaws							✓	✓	✓	✓		
	Mangoes			✓	✓	✓	✓						
	Tangarines								✓	✓	✓		
3. Vegetables 	*Amaranthus*		✓	✓	✓	✓							
	Sweet potato leaves					✓	✓	✓	✓	✓			
	Rape	✓	✓					✓	✓	✓	✓	✓	✓
	Tomato						✓	✓	✓	✓	✓	✓	✓
	Pumpkin leaves			✓	✓	✓	✓	✓					
4. Legumes 	*Cow peas*						✓	✓	✓	✓	✓		
	Pigeon peas							✓	✓	✓	✓	✓	✓
	Groundnuts							✓	✓	✓	✓	✓	
	Beans					✓	✓	✓					
	Soya beans						✓	✓	✓	✓			
5. Animal Foods 	*Flying ants*			✓	✓	✓	✓	✓	✓				
	Eggs (Chicken, ducks etc)	✓	✓	✓	✓	✓	✓					✓	✓
	Milk				✓	✓	✓	✓	✓				
	Meat (Rabbits, Chicken etc)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Crabs			✓	✓	✓	✓						
	Small fish	✓	✓									✓	✓
6. Fats and Oils 	*Avocado*			✓	✓	✓	✓						
	Coconut							✓	✓	✓	✓		
	Sunflower seeds							✓	✓	✓	✓		
	Pumpkin seeds							✓	✓	✓	✓		
	Sesame seeds							✓	✓	✓	✓		

KEY:

✓ = Available Foods

Designed and Printed by Agriculture Communication Branch

Integrated Homestead Farming (IHF)

IHF is the combined diversified production of crops (vegetables, fruits and legumes) and rearing of small stock (poultry, rabbits, guinea pigs, etc.) and fish around the home for improved access to the food groups. It can assist households to:

- Improve access to food, income and manure.
- Promote sustainable utilization of household resources (land, family labour, water, organic matter, etc.)
- Maintain good sources of planting materials and seeds (e.g. sweet potato vines from IHF out planted during the rains or in irrigated dambos or fields).
- Trees provide fruits, shade, act as natural wind breaks, barriers to scavenging animals and can produce fencing and fuel wood.

Benefits of Integration

Economically:

- Increases in yield and quality of both crops and livestock.
- Healthy soil through free fertilizers (animal and/or organic matter) results in increased profit margins and reduce production costs.
- Diversified production improves resilience- if one item does poorly that season, another one likely thrives.
- Diversified incomes to respond better to market demands.

In crop and livestock production:

- Helps in maintenance of the soil productive capacity while boosting and maintaining yields in crop production.
- Insect repellent crops reduce incidence of pests and diseases.
- Crop residues have an important role as feed as well as animal bedding.

Factors to consider in IHF

- Produce a variety of foods around the home in all seasons.
- Continuously make and use manure to produce more.
- Care for IHF by watering crops, managing your animals, mulching, applying manure and controlling pests and diseases.
- Provide good housing and feeding as well as control pests and diseases in livestock and fish.
- Provide nutrition education and demonstrations on processing and utilization of the products

IHF vegetable production

- Produce vegetables that are nutrient dense. Examples of vegetables are amaranthus (bonongwe), sweetpotato leaves (kholowa), pumpkin leaves (nkhwani), etc

  - Strong coloring indicates high micronutrients

  - Most indigenous are more nutrient dense

- Size of site or number of beds will depend on space available, water availability, types and amount of vegetables to be planted.

IHF Fruit Production

- Fruit tree to be planted depends on the space available but with creativity, most homes can include a few trees. Examples of fruits are pawpaw, mangoes, oranges, bananas, etc.
- Some fruits aren't trees! Be sure to include fruits like hibiscus (chidede) for both leaves and fruits, even the seeds can be processed and eaten, Cape Gooseberrry (Jamu), Passion fruit (magalagadeya)
- Other trees to c: avocado pears (from the fats group)
- Produce different types of fruits that produce in different seasons to ensure access all year round.
- Deliberate effort should be made to plant those that mature faster.

IFH Poultry Production

- Poultry species include; chickens, ducks, guinea fowls, quails and pigeons. They are commonly found and easy to rear.
- Assist in having assess to poultry products which include meat and eggs.

IFH Aquaculture

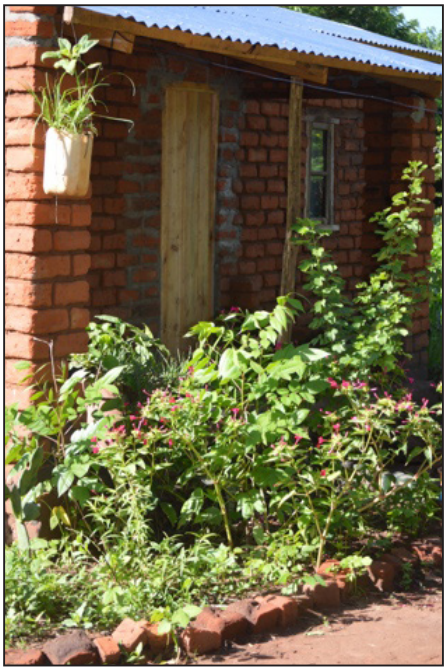
- Should be encouraged where possible because;

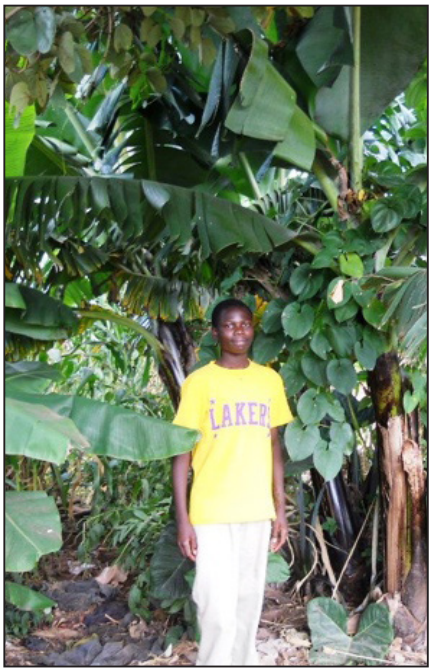
  - Provide cheap source of animal protein

  - Provide income and employment
- Water and fertile mud from pond can be used for production of crops.
- Natural propagated food as well as supplementary feed should be provided to fish.
- Measures should be put in place to prevent or control predators such as lizards, birds and thieves.

Role of frontline staff

- Train communities on integrated homestead farming.
- Explore with the communities what crops and livestock can be produced.
- Provide nutrition education on benefits of the different foods that can be produced.
- Provide trainings on production and management of different selected crops and livestock in liaison with different SMSs.
- Provide trainings and demonstrations on food utilization using different recipes.
- Collect data and results dissemination on number of households practicing IHF, experiences, benefits and access stories.





Unbalanced meal

Too much Staple, Too little Ndiwo & No Fruit

Better, Balanced meal

Staple balanced with other food groups

Foods Available in Malawi

There are wide a range of food options that are underutilized in Malawi. The foods below are just a few ideas taken from a larger list of 600 foods available in Malawi (See the Sustainable Nutrition manual for a complete list). Use these lists to improve:

- Your own gardens, farms, businesses and meals at home.
- Food assessments in your home, community or area.
- Food diversity you share with others (Food Basket or Ration)
- Agriculture Input diversity provided for Recovery

Learn more about the foods in your area and share the knowledge with as many people as you can. Talk to:

- Community Elders, Diverse community (males, females, different ages have different knowledge)
- Extension staff knowledgeable in: Agriculture, Forestry, Nutrition, Culture, Fisheries

1. Staples Food Group

✓ Daily eat about 250 g cereals plus 250 g starchy tubers/fruits.

✓ Always take care to know what you are eating. Almost every year people die in Malawi from eating the wrong tuber- Know your local foods!

STAPLES Food Group – Examples:		
Cereals	**Starchy Tubers / Fruits**	
1. Millets (Mawere, Lipoko, Machewere 2. Rice (Mpunga) 3. Sorghum (Mapila) 4. Wheat (Tirigu) 5. Maize (Chimanga)	6. Yam (Chilazi mpama) 7. Coco Yam (Coco) 8. Cassava (Chinangwa) 9. Banana/Plantain (Nthochi yayiwisi)	10. Air Potato (Chinkhowe) 11. Sweet Potato (Mbatata) 12. Water Lily (Chikolowa) 13. Potato, Irish (Kachewere) 14. Kaffir Potato (Buye)

2. Fruits Food Group

- ✓ Daily aim for 300 g of fruit.
- ✓ Fruit trees are often extremely resilient through disaster – especially the taller species, which unfortunately so many people ignore in agriculture because they take "so long" to bear fruits. But these are the same species that can bear for hundreds, sometimes thousands of years! So, look around your area for what is still available and in season.
- ✓ There are often more than just fruits on trees, other edible and delicious parts are sometimes vegetables, staples, legumes and nuts or even animal foods (insects, birds). So, there are often food benefits while you are awaiting the arrival of the fruiting stage.

FRUITS Food Group – Examples:		
Early Maturing	**Trees 2-9 years to maturity**	
1. Raspberry / Blackberry	11. Banana (Nthochi)	24. Monkey Orange
2. (Mpandankhuku, Mulunguzi)	12. Baobab (Mlambe)	25. (Mkaye, Maye, Mateme)
3. Gooseberry (Jamu)	13. Camel-foot (Chitimbe)	26. Mpsimpsya
4. Honey (Uchi)	14. Custard Apple (Mphosa, Mpoza)	27. Mulberry (Mabulosi)
5. Melon (Kayimbe)	15. Fig (Mkuyu Mkuyu-pasi)	28. Natal Mahogany (Msikidzi)
6. Passion Fruit (Magalagadeya)	16. Guava (Gwafa)	29. Orange (Malalanje
7. Pineapple (Nanasi)	17. Indian Almond (Mkungu, Bonifant)	30. Pawpaw (Papaya)
8. Roselle (Chidede)	18. Jujube (Masawo)	31. Plum, Hissing (Mbula, Muula)
9. Sorghum (Misale)	19. Lemon (Mandimu)	32. Plum, Indian (Nthudza)
10. Sugar Cane (Nzimbe)	20. Loquat (Masuku)	33. Sapote, white (Masuku a chizungu)
Watermelon (Vwende)	21. Low veld mangosteen (Mphimbi)	34. Snot Apple (Matowo)
	22. Mango (Mango okwima)	35. Tamarind (Bwemba)
	23. Mango (wild) (Mtondo)	36. Tangerine (Nachi)

3. Vegetables Food Groups

- ✓ Daily aim for 300 g of vegetables every day.
- ✓ There are just SO many vegetables – it is hard to believe that there aren't enough in peoples' diets with the variety of fungi, root vegetables, herbs, leaves, flowers and fruit vegetables that are available to us.
- ✓ Many of these species you'll see on other lists as well as sweet tangy fruits (chidede), fats (pumpkin seeds), legumes (Beans) or staples (coco yams). Nature is wonderful that it gives us so much!

VEGETABLES Food Group – Examples:		
Leaf / Flower Vegetables		**Fungi / Root / fruit Vegetables**
1. Amaranth (Bonongwe)	15. Mustard (Mpiru)	30. Mushroom (Bowa)
2. Bean leaves (many types)	16. Mwamuna aligone	31. Onion (Anyezi)
3. Blackjack (Chisoso)	17. Njerenjedza	32. Garlic (Adyo)
4. Cassava Leaves (Chigwada)	18. Ntedza wa kwangala	33. Okra (Thelele lobzyala)
5. Cassava, Tree Leaves (Mpira)	19. Mlozi	34. Eggplant, African (Mabilinganya)
6. Ceylon Spinach (Mdele)	20. Pumpkin Flowers & Leaves	35. Cucumber, Small Prickly (Chikanyanga
7. Cat's Whiskers (Luni)	21. (Chiluwe, Mnkhwani)	36. Cucumber (Minkhaka)
8. Chewe	22. Rape (rapu)	37. Prickly Cucumber (Chipwete)
9. Chinese Cabbage (Chinesi)	23. Rattlebox (Zumba)	38. Loofa & Leaves (Masponge)
10. Coco yam leaves	24. Roselle leaves (Chidede	39. Chayote (Ngowe, chocho)
11. Hibiscus (Limanda)	25. Spinach (Spinichi)	40. Melon (Kayimbe)
12. Horse Radish Tree,	26. Sweet Potato leaves (Kholowa)	41. Pumpkin (Dzungu)
13. Flowers & leaves (Chamwamba)	27. Watermelon leaves	42. Gourd (Mphonda)
14. Mbilidzongwe	28. (masamba Vwende)	43. Tomato (Matimati)
	29. Water Spinach (Lilowolowo)	44. Horse Radish Tree Young Pods

4. Legumes & Nuts Food Group

- ✓ Daily aim for 150 gm of Legumes & Nuts.
- ✓ It can be helpful to have a significant part, anywhere from 20-50%, of your area planted up to leguminous species so that there is plenty of protein harvest for you and a good contribution of nitrogen to the soil.
- ✓ There are a number of hardy species that are vines, trees and shrubs that are available.

LEGUMES & NUTS Food Group – Examples:		
Plants	**Hardy vines**	**Trees / Shrubs**
1. Groundnuts (Mtedza) 2. Bambara Groundnut (Nzama) 3. Bean, Common (Nyemba) 4. Field Peas (Sawawa) 5. Chick Pea (Nchana) 6. Soy Bean (Soya) 7. Lenti (Masar)	8. Mung Bean (Mphodza) 9. Cowpea (Khobwe, Nseula) 10. Hyacinth Bean Mkhunguzu 11. Lima Bean vine 12. (Kamumpanda, / chimbamba) 13. Velvet Bean (Kalongonda) – *Prepare with care*	14. Pigeon Pea (Nandolo) 15. Hissing Tree (Mbula) 16. Indian Almond (Mkungu, Bonifant)

5. Animal Foods Food Group

- ✓ Aim for about 75 g of animal foods every day.
- ✓ Animal foods are great addition to agricultural systems for their protein, both for people and for the earth.
- ✓ Many of the insects listed here are from “The Malawi Cookbook” and can be learned how to eat from, or from any of your local grandparents.

ANIMAL FOODS Food Group – Examples:			
Insects		**Small stock**	**Fowl (Nyama, Mazira)**
1. Bees (Njuchi, Uchi) 2. Crickets (Nkhululu, Ziboli) 3. Grasshoppers (Dziwala) 4. Red Locust (Dzombe)	5. Termites (Ngumbi, etc.) 6. Lake Flies (Nkhungu) 7. Caterpillars 8. (Mphalabungu, etc.) 9. Beetle (Chikumbu)	10. Guinea Pig (Mbira) 11. Rabbits (Kalulu) 12. Fish (Nsomba) 13. Goats (Mbuzi)	14. Pigeons, Doves (Nkhunda) 15. Chickens (Nkhuku) 16. Guinea Fowl (Nkhanga,) 17. Ducks, Geese (Bakha)

6. **Fats & Oils**

✓ Fats are needed in small amounts – about 50 g a day (3 Tablespoons). Fats are in some of the other food groups (Animals, Nuts) and in the seeds of many fruits & vegetables. Don't look just to oil for your fat!

FATS Food Group – Examples:			
Early Oil Seeds		**Fatty Fruits**	**Other groups**
Sunflower (Mpendadzuwa) Sesame (Chitowe) Pumpkin (Nyungu)	1. Gourd (Mphonda) 2. Seeds of: bononge, melons, 3. Luni, chided, mpiru, moringa, etc.	4. Coconut (Nkoko) 5. Avocado Pear (Mapeyala)	6. Animal foods 7. Nuts

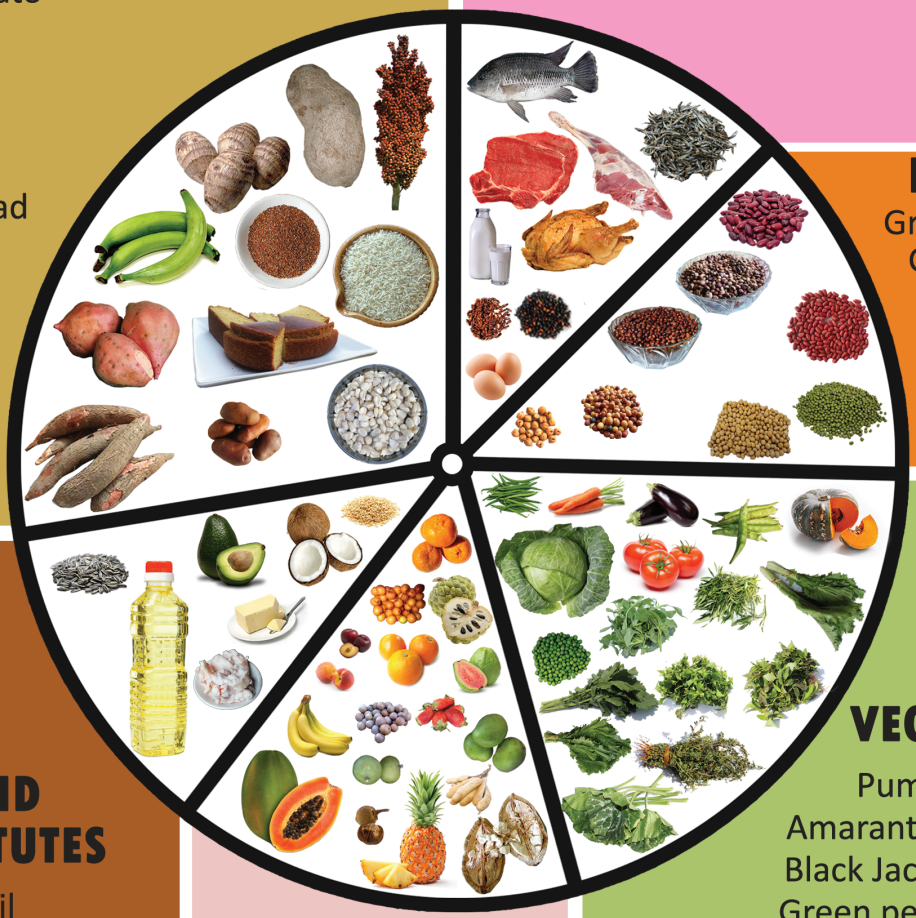
EAT A VARIETY OF FOODS DAILY FROM THE SIX FOOD GROUPS FOR GOOD NUTRITION

STAPLES

Cassava
Maize
Potatoes
Green banana
Sweet potato
Yam
Millet
Rice
Coco
Maize Bread

FOOD FROM ANIMALS

Meat
Fish
Eggs
Cow/Goat Milk
Chicken
Flying Ants



LEGUMES

Ground Beans
Ground nuts
Pigeon peas
Cow peas
Soya beans
Chick Peas
Beans, Grams

FATS AND SUBSTITUTES

Cooking Oil
Animal Fat
Margarine
Avocado
Coconut
Sesame
Sunflower seeds

FRUITS

Mango,Paw-paw,Guava, Banana, Chinese-Jujube, Orange,Tangerine,Peach, Strawberry, Custard Apple, Plum, Pineapple, Apple, Tamarind, Baobab Fruit

VEGETABLES

Pumpkin Leaves
Amaranthus, Carrots
Black Jack, Tomatoes
Green peas, Cabbage
Rape, Pumpkin
Chinese cabbage
Egg plant
Mustard, Okra
Green beans
Sweet potato leaves

3. GENDER AND HIV MAINSTREAMING IN AGRICULTURE

Gender disparities and HIV issues are among the major constraints that affect agricultural development in Malawi. For example, in terms of access to and control of agriculture resources and benefits, women are said to be more disadvantaged than men and are also more affected by HIV and AIDS impacts.

What is Gender?
Gender is what our society thinks the female and male sexes should be like, such as how they should behave, what jobs they should do or how they should dress, for example.

Impacts of gender disparities in agriculture

The following are some of the impacts of gender disparities affecting the agricultural sector:

- Limited access to, ownership, and control over productive resources such as land, labour, financial services, income and technology especially by women.
- Limited access to markets for women of all ages especially when the markets are located far away from the village.
- Low participation of women in decision making on issues related to agricultural production including community meetings.
- Unequal division of labour at the household where women tend to carry out most of the farm work on top of doing other chores such as fetching water, taking care of the children and cooking.

Impacts of HIV and AIDS on agriculture

HIV and AIDS, have devastating impacts on farming communities in Malawi, especially in the rural areas where agriculture is synonymous to livelihood security. Some of the impacts of HIV on the agricultural sector in Malawi include:

- Diversion of income meant for agricultural production to provision of from to care, treatment and support for sick family members.
- Reduction in available farm labour as a result of sickness of family members, which may delay farm operations.
- Grabbing of agricultural equipment and inputs by relatives of the deceased.
- Increase in workload especially for women who take the responsibility of caring for the sick and orphans.
- Increased morbidity and mortality of agricultural technical staff, which results in difficulties for farmers to access extension services.

How to mainstream gender and HIV/AIDS in Agriculture?

Gender and HIV/AIDS mainstreaming refers to a process of identifying, internalizing, integrating and institutionalizing gender and HIV/AIDS issues, concerns, needs and priorities so that they are part and parcel of all agricultural development activities.

Steps in Mainstreaming gender and HIV in Programs and Projects

The following steps should be followed when mainstreaming Gender and HIV in programmes and projects:

The 4 "I"s

Identification of Issues and Concerns

- Identification of gender and HIV/AIDS issues and concerns is done in collaboration with relevant stakeholders.
- Identification is done by using gender and HIV responsive participatory appraisal tools.
- It is essential that all girls, boys , women and men in a community should express the issues and concerns.
- The gender and HIV issues and concerns should be quantified based on their importance and urgency for resolve.
- Each project and program should indicate the gender and HIV issues or concerns it is addressing.

Internalization

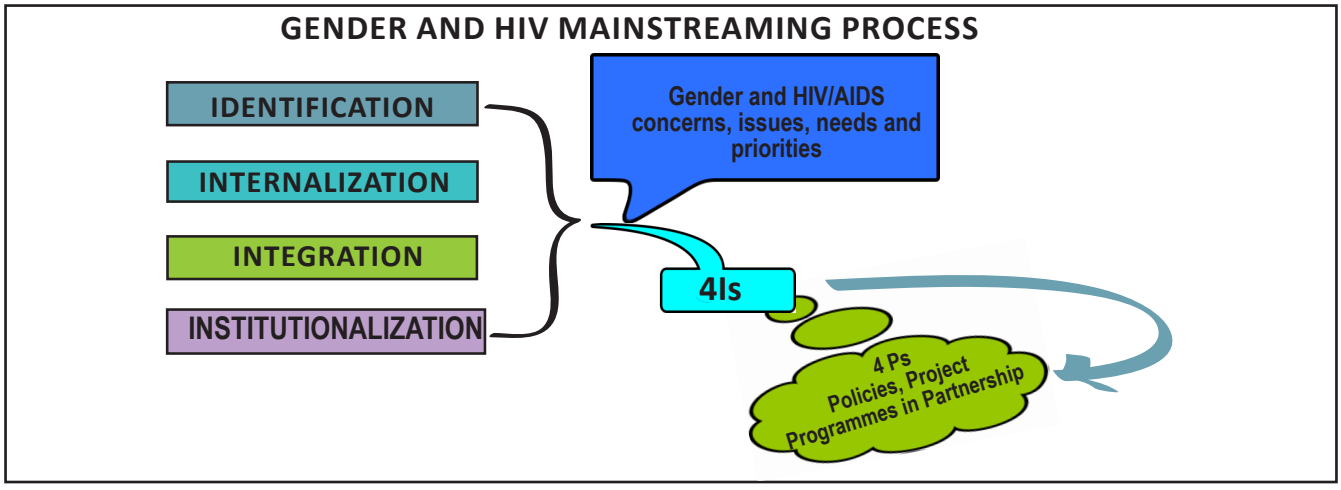
- Means to be convinced and committed to deal with the identified gender and HIV/AIDS issues and concerns.
- For farmers of to own the issues and concerns, practical and real life experiences should be used in terms of drama, role-plays, case studies, focus group discussions and other participatory tools.

Integration

- This means addressing gender and HIV/AIDS issues and concerns in the development of the core business (subject area), objectives and interventions with active participation of all gender categories.
- The interventions should be accompanied with use of relevant Information, Education Communication (IEC) materials.
- The issues that are outside the core business should be referred to other stakeholder and partners for assistance.

Institutionalization

- Institutionalization means enhancing and scaling up implementation of gender and HIV/AIDS responsive agricultural interventions, projects and programs.
- This can be done by organizing and strengthening support structures like gender and HIV/AIDS committees, focal points and desk officers.



Issues that should be mainstreamed

Gender Issues

This usually involves identification of practical and strategic gender needs through the use of participatory tools. These needs usually revolve around four variables linked to gender equality and women's empowerment. These variables include:

- Division of labor between male and female.
- This looks at who between female and male farmers does what type of work, who is already overburdened with work, who is paid for what type of work to ensure that the concerns of all gender categories are addressed.
- Access to resources and benefits and opportunities.
- This looks involves conducting a gender analysis to look at who has access to what resources and where there are imbalances, developing actions where there are imbalances to achieve equality.
- Control of resources and benefits.

  This involves developing strategies that empower vulnerable groups so that they have control over resources such as land for growing crops; choice of crops to grow; what farming systems to follow and how to use the income that accrues from the farming. In most households such decisions (related to strategic gender needs) are vested with men who are called heads of households.
- Participation in decision-making.
- This involves gender analysis to develop actions to promote equal participation of women and men in decision-making in agriculture activities at the household level as well as selection of women in decision-making positions in all institutions.

HIV/AIDS Issues

HIV/AIDS mainstreaming is a process that enables development actors to address the causes

& effects of HIV/AIDS in an effective manner both through their usual work and through their workplace.

This entails placing HIV/AIDS at the center of the development agenda or as a process whereby HIV/AIDS actions becomes part of the normal & routine functions of an organization.

Mainstreaming HIV/AIDS entails addressing the following issues:

- Prevention and behavior change.
- This involves implementing activities that do not promote HIV infection and transmission amongst farmers, or agriculture staff.
- This can also include actions aimed at addressing unequal power relations between men and women that cause women and girls to have limited access to agricultural resources thereby putting them at the risk of HIV infection.
- Access to treatment care and support.
- Under this component the goal is to provide and expand treatment for People Living with HIV and mitigate the health and nutritional impacts of HIV/AIDS.

- Impact mitigation.
- This involves designing activities aimed at assisting those that are suffering from AIDS and also those that have been affected by the epidemic so that HIV and AIDS does not have negative effects on their lives. People targeted under this component include People Living with HIV, Orphans and Vulnerable Children, widows, widowers, caregivers, and the elderly.

Things to be considered when mainstreaming gender and HIV/AIDS:

- Always ensure that vulnerable people are targeted with intervention.
- Always ensure equal participation of women and other vulnerable farmers in all activities.
- Always ensure that men and women are equitably represented in decision making positions in farmer-based organizations committees.
- Always ensure that extension meetings are organized during times when women and other vulnerable categories can be able to participate.
- Always ensure collection and presentation of gender disaggregated data to capture how interventions are impacting on various gender categories.

Benefits of gender and HIV mainstreaming?

Gender and HIV/AIDS mainstreaming assists in reducing gender disparities that exist among men, women, boys and girls in access to and control over agricultural resources and benefits.

- Promoting participation of all gender categories including the marginalized in agricultural development processes.
- Empowering the marginalized gender groups such as women, PLHIV, Child headed households through income generating and special projects.
- Reducing the impacts of gender disparities and AIDS on the project/program mandate and vice versa.
- Ensuring that programs or projects do not to perpetuate or introduce gender disparities or worsen vulnerability to HIV/AIDS.

4. AGRIBUSINESS MANAGEMENT

Gross Margin Budgeting/Analysis

Gross margin refers to the remaining income from an enterprise after the variable costs are deducted (Gross income less Variable costs). It is usually calculated before production and after production on unit basis such as per hectare or per herd. Gross margin budget is a fairly detailed estimate of the output, cost, and profitability of individual crop and livestock enterprises. The gross margin budget includes all costs involved in producing the enterprise. It is not profit because it does not include fixed costs which the enterprise shares with other enterprises.

Importance of Gross Margin Budgeting/Analysis

- It helps farmers to compare the performance of a single enterprise using different farming practices and technologies.
- It is used to calculate potential profitability of growing an entirely new crop if a farmer wishes to diversify the products.

Steps for Gross Margin Calculation

- Determine an average yield per hectare for the enterprise.
- Determine the average farm gate price for the enterprise.
- Calculate the gross income per hectare (i.e. the average yield per hectare multiplied by the price at the farm gate.)
- Calculate the non-labour variable cash costs of inputs and materials per hectare for the enterprise. These should include the costs of seeds, fertilizer, pesticides, machinery services etc.
- Estimate the labour costs per hectare per activity for each enterprise (e.g. land preparation, sowing, weeding, harvesting, etc.).
- Calculate the total variable costs by summing the cost of inputs and materials and labour.
- Calculate the gross margin per hectare by subtracting variable costs from the gross income.
- Repeat steps 1 to 7 for each enterprise on the farm.
- Compare the gross margins among enterprises and determine which is or are more profitable.

Gross Margin for One Hectare of Maize Enterprise

Income		
Quantity (Kg)	Price (MK/Kg)	Value (MK)
5000	100	5000 x 100
Total Income		500,000
Variable costs		
Item		Total Cost (MK)
Seeds		20,000
23:21:0+4S		30,000
UREA		30,000
Land preparation		5,000
Ploughing		10,000
Ridging		15,000
Planting		5,000
Fertilizer Application		5,000
Weeding		15,000
Harvesting		20,000
Bagging		5,000
Total Variable Costs		160,000
Enterprise Gross Margin per Ha		(500,000-160,000) =340,000
Actual Ha		2
Gross Margin per actual Ha		(340,000x 2) = 680,000

Gross margin for a livestock enterprise

	ITEM	Kwacha	
	Closing value of animals at end of the year	300,000	
LESS:	Opening value of animals at beginning of the year	200,000	
EQUALS:	Increase in value of stock	100,000	(A)
	Income from sales of animals	100,000	
	Income from sales of by-products such as manure	50,000	
	Value of products used for home consumption	50,000	
EQUALS:	Value of sales and consumption	200,000	
LESS:	Purchases of animals of during the year	100,000	
EQUALS:	Net Sales	100,000	(B)
A + B	GROSS INCOME	200,000	
	Variable Costs		
	Drugs	15,000	
	Feeds	50,000	
	Veterinary Services	5,000	
	Labour	30,000	
	Total Variable Cost	100,000	
	Gross margin	(200,000-100,000) = 100,000	

Break-Even Budgeting/Analysis

Break-even budgeting is a technique for studying the relationship between costs and income at different levels of production and different prices. A break-even budget estimates the point at which farm's gross income is equal to its total variable costs. It looks at the level of the activity where no profit (gross margin) is made. The break-even can be determined for yield and market price.

Importance of Break-Even Budgeting/Analysis

- It gives an indication of maximum acceptable level of cost—the point at which, if costs increase, the farm will not be profitable.
- It also gives the minimum acceptable level of a benefit given an estimated level of cost—the point at which if income decrease, the farm will not be profitable.
- It helps the farmer make a plan when considering making a change in production (yield), inputs or mechanization costs or market price. For example, when the farmer wants to substitute one variety of maize for another.

Break-Even Calculation

- Determining the Break-Even Yield.
- Break-even yield (BY) is the yield required to recover all the costs incurred in production at given prices of the product and given input costs.
- Determining the Break-Even Price.
- Break-even price of the product is the product price needed to recover all variable costs incurred in production at a given output level and cost of input.

Cash Flow Budgeting

Cash flow is the flow of money into the farm from sales, loans and donation or gifts and the flow of money out of the farm through purchases and other payments. The difference between the cash inflows and cash outflows gives net cash flow. Net cash flow is calculated by subtracting the money (cash) spent over the year from the money received.

Importance of a Cash Flow Budget

- The farmer uses it to develop the farm plan.
- It helps farmers choose between alternative farm enterprises.
- It helps farmers to arrange for loans.
- It helps the farmer to assess the overall effect of the enterprise on the household finances.
- It helps to assess whether the family will have enough money to carry out their plan or if they will be short of money in any month.
- It enables the farmer to find the time of the year where additional financial resources may be required.

Steps for Constructing a Cash Flow Budget

The steps involved in preparing the Cash Flow are as follows:

Step 1: Identify Inflow and Outflow by listing income and expenditure items and when they occur in the year. For example, sale of maize in July, buying of fertilizer in October.

Step 2: Prepare a Cash Flow Table by entering all of the information in a Cash Flow chart which is shown at the end of steps.

Step 3: Calculate the monthly net Cash Flow by subtracting the expenses from the income for each month. It will be positive if income is greater than expenses; and negative if income is less than expenses.

Step 4: Calculate the cumulative net Cash Flow by adding the monthly net Cash Flow with the cumulative net Cash Flow of the previous month in order to assess whether the family have enough cash over the year to finance activities.

Step 5: Analyze the net Cash Flow to determine period (months) when the family has a shortfall or surplus of cash.

Example of a Cash flow Budget

MONEY COMING IN	Jan (K ,000)	Feb (K ,000)	Mar (K ,000)	Apr (K ,000)	May (K ,000)	Jun (K ,000)	Jul (K ,000)	Aug (K ,000)	Sep (K ,000)	Oct (K ,000)	Nov (K ,000)	Dec (K ,000)
Sales of farm products:												
Maize	250		300						300	100	100	
Cassava				340				120				
Milk			60	60	60	60	60	60	60			
Chicken	130								60			
Beans							450					400
Total Cash Inflow	380	0	360	400	60	60	510	180	420	100	100	400
MONEY GOING OUT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Payments & Purchase of inputs:												
Maize inputs			300						300			
Cassava inputs				37								
Farm inputs livestock	30	50	50	50	50	50	50	50	50	30	30	30
Chicken feeding expenses									60			
Beans inputs				200	50		40			180		40
Household expenses:												
Living expenses	10	10	10	10	10	10	10	10	10	10	10	10
School fees		200			140				100			
Hospital Expenses	10	10	10	10	10	10	10	10	10	10	10	10
Total Cash Outflow	50	270	370	307	260	70	110	70	530	230	50	90
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total Cash Inflow	380	0	360	400	60	60	510	180	420	100	100	400
Total Cash Outflow	50	270	370	307	260	70	110	70	530	230	50	90
Monthly Net Cash Flow	350	-270	-10	83	-200	-10	400	110	-110	-130	50	310
Cumulative balance	350	80	70	153	-47	-57	343	453	343	213	263	573

Farm Business Records

Farm records are financial and physical details involved in the course of operating a farming business. There are two types of farm records namely: physical records and financial records. Physical records are records of actual quantities in form of kg, meters, litres, hectares, tonnes and other units of measures other than money. Examples include farm map, crop and livestock enterprise record. Financial records are all the data information that is kept for keeping track of the money coming in and going out of the farming business. Examples include farm inventory, cashbook, sales book, purchase book.

Importance of keeping farm business records

- Provides the farmer with a history of what has happened on the farm between seasons and years.
- Helps to assess the physical and financial performance of an enterprise or the whole farm business.
- Establishes a basis for budgeting and planning changes in the farm business.
- Tells a farmer how much she is earning.
- Facilitates advisory services to farmers wishing to borrow money for investment, sales and marketing of agricultural products.
- Records aid the producer in obtaining greater net returns and/or making savings in operating the farming business than would have been possible without such records.

Sample crop enterprise record

Crop	Ha	Seed used	Fertilizer Used	Manure	Sprays	Yield

Sample record of home consumed farm produce

Date	Details	Eggs	Meats	G/nuts	Beans	Veg.

Sample sales and receipts (Incomes-In Section) record

Date	Details	Receipt No.	Amount	
			Cash	Bank

Sample Purchases and expenses (Expenditures-Out Section) record

Date	Details	Receipt No.	Amount	
			Cash	Bank

Sample sales book record

Date	Description	Cash	Credit	Total
3/2/2014	Vegetables	50	70	120
	Eggs	120	60	180
	Green maize	200	0	200
	Milk	250	400	650
	Total sales (daily)	620	530	1150

5. SOIL & WATER

In Malawi, agricultural productivity is extremely low mainly due to: inappropriate soil management and excessive use of land which has considerably decreased soil fertility.

By following a few good land husbandry practices farmers can help keep and bring back soil fertility and allow for moisture retention in the soil.

How can I get enough food for my family during the whole year?

Ndingachulukitse bwanji zokolola zanga?

Early land preparation

Land preparation is not about "bush or residue burning" but a collection of activities to clear the land for easy operation. Land preparation should start as soon as possible after harvesting when the soil is moist and easy to work with. Collecting and laying mulch in good time to ensure that farmers plant with first rains. Early land preparation ensures deep ploughing and good decomposition of plant residues. It also improves soil structure and minimises surface run-off. Farmers plant crops with the first planting rains to take advantage of the full rainy season.

Intercropping

Intercropping is the practice of growing two or more different types of crops on a piece of land, such as maize and pigeon peas. Intercropping improves soil fertility, allows farmers to grow more than one crop per season, and repels some pests and diseases. Rotating the types of crops planted each year discourages the build-up of pests and diseases.

Story:

Mary Banda has been farming on a small piece of land for 3 years. Mary was told by her extension officer not to burn or sweep her soil before planting, so instead she collected and laid down crop residues and leaves to protect her soil. To increase the amount of food available for her family, Mary planted Sorghum and ground nuts one year followed by sweet potatoes and sweet beans the next year. Mary's extension officer asked if Mary would be willing to serve as a lead farmer and help other women farmers in her village learn how to provide food for their families by intercropping.

How can I improve the soil in my garden to get higher yields?

Ndingasamale bwanji nthaka kuti ndipeze zokolola zochuluka?

Apply organic matter

You are encouraged to make and use different types of compost material for maximum yields. Organic materials improve soil structure by increasing water holding capacity and supporting microorganisms, such as earthworms and fungi, which decompose the organic materials and recycle nutrients in the soil. Sources of organic matter include crop residues, farm-yard manure, compost manure, green manure, sweepings, and household wastes.

Plant trees

Agroforestry is the deliberate practice of growing crops together with trees and animals on the same land. Agroforestry species tap nutrients from the soil for plant use, leaves from the trees add organic matter to the soil and some of the leaves are fodder for livestock. Trees help to control runoff through interception of rain drops by the leaves. Runoff washes away nutrients and soil particles that are useful to growing plants. Recommended tree species to plant on the farm include: Msangu (F. albida), Gricidia sepium, Lucaena and Tephrosia candida, and Tephrosia vogeli. Seeds can be sourced locally from trees that have been established or bought at a land resource centre or Forestry Institute of Malawi (FRIM). Some recommended agroforestry practices include:

- Establish agroforestry tree nurseries between July and September to catch up with the start of rains.
- Transplant tree seedlings from December to March.
- Use locally available materials for sowing seeds, such as clay pots, banana leaves, plastic bags, or chibuku packs.
- Manage tree seedlings after transplanting making sure to keep away from livestock.

Here are two photographs of tree seedlings planted in plastic containers:

My field is always dry even during the rainy season. How can I keep the little moisture that is available in my field?

Chingandithandize kusunga chinyezi mnthaka ndi chiyani?

Rain Water Harvesting (RWH) techniques have been used throughout time as irrigation methods.

Today rain water harvesting technologies are used to adapt to the prevailing dry spells facing many countries. Rain Water Harvesting collects runoff for productive use either for domestic purposes in homes or water harvested to be used in the field. Runoff may be harvested from roofs as well as ground surfaces.

The techniques include above and below ground tanks, box and tied ridges, swales, planting pits, and infiltration ponds. Some other Rain Water Harvesting structures can serve multiple purposes, such as fish ponds and livestock drinking ponds.

Planting pits

one of the methods to harvest rain water in the field. The aim is to increase moisture availability in areas prone to drought or where rainfall is low or predicted to be low. Pits should not be used in areas of higher rainfall amounts. Use of pits enable easy application of organic fertilizer and manure in the planting stations for easy nutrient uptake by the plant. Here is a picture of planting pits ready to capture rainwater.

Box/tied ridges

are recommended in areas of low rainfall and where erratic rains are experienced. The aim is to catch and conserve rainwater to ensure adequate soil moisture for crop development. Build box ridges across planting ridges to create "micro catchments "to increase water infiltration and to reduce erosion. The steps for constructing box/tied ridging:

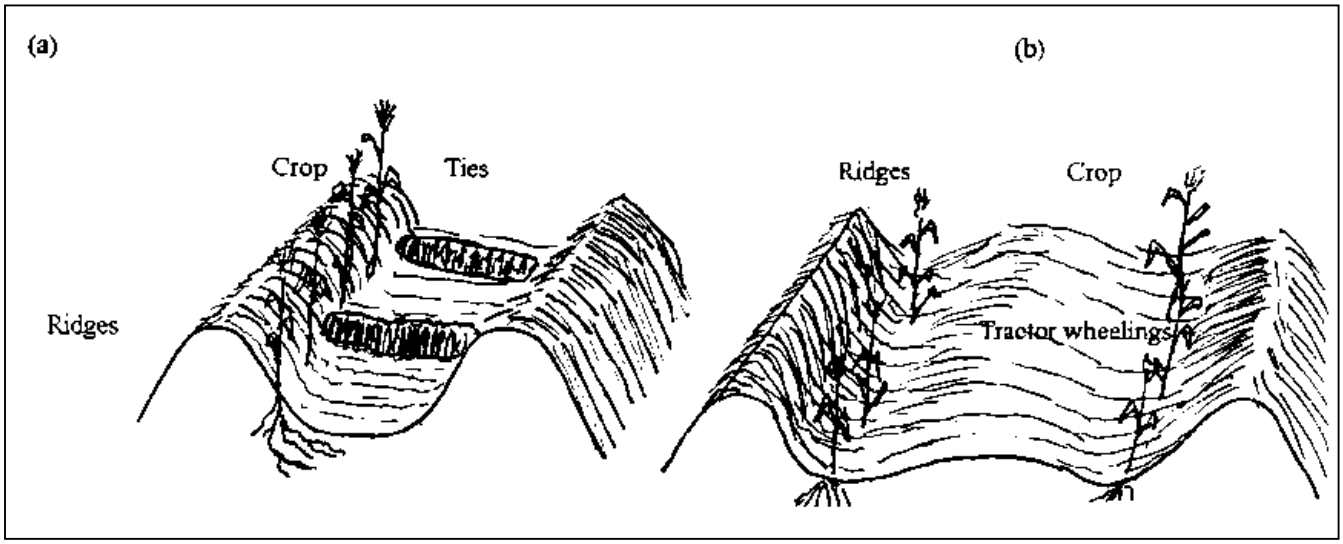
1. Construct across the entire furrow perpendicular to planting ridges.

2. Space the box/tied ridges 1-3m apart depending on the terrain and rate of flow of water within the field. The steeper the terrain the closer the box ridges.

3. Make the box/tied ridges slightly lower than the planting ridges to allow spill over.

4. Move to the next furrow and locate the box/tied ridges half way between those in the previous furrow.

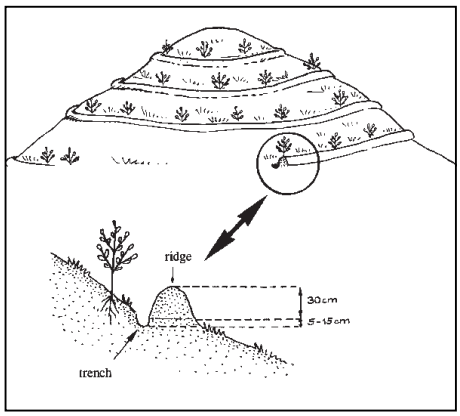
Here are two illustrations of box/tied ridges:



Contour ridging

Is also promoted to enhance water retention in hilly areas. Contour ridges, sometimes called contour furrows or micro watersheds, are used for crop production. Ridges follow the contour at a spacing of usually 1 to 2 meters. Runoff is collected from the uncultivated strip between ridges and stored in a furrow just above the ridges. Crops are planted on both sides of the furrow.

Here are two illustrations of contour ridges:



Mulching

is also important for retaining soil moisture, controlling weeds, and adding soil organic matter to the soil. Different types of crop residues can be used as mulch. Soya and groundnut residues, maize stalks and dry grass that was used for thatching are some of the materials for mulching. Cover crops such as creeping beans as well as mucuna can be used as mulch as well to reduce the intensity of rain drops hitting the ground and washing away soil particles as well as nutrients required for plant growth. Collect mulch as soon as possible preferably after harvest in May to July. Encourage crop diversity to have different types of mulch. Here is a photo of farmers mulching a field with maize stalks:

Good crop husbandry practices

Combinations of the following husbandry practices are recommended for farmers to realize significant increase in yields with minimum extra cost. Extension workers are encouraged to promote these good agriculture practices.

Early Field Preparation

Field preparation should be carried out soon after harvest, when the soil is still moist and therefore easy to till. This ensures deep ploughing and good decomposition of the incorporated crop residues. It also improves soil structure and minimizes surface run-off. Where this is not practicable, farmers should aim at having fields ready by the end of September so that they can plant with the first planting rains.

Use of Manure

Most farmers are aware of the advantages of animal manures and crop residues incorporated into the soil. The ever-increasing cost of chemical fertilizers makes proper use of manures even more important. Manure not only supply plant nutrients to the soil but also improve its structure, thus increasing water and nutrient-holding capacity. Where manure is used in combination with chemical fertilizers, crops grow vigorously. Yields and quality are also improved. Extension staff members should provide technical advice on how to incorporate crop residues and make manure.

Use of Good Seed or Planting Material

It is important that farmers use seed and planting material that will germinate, establish well and grow into a healthy crop. For example, in maize, farmers can select good seed from open-pollinated varieties for two to three successive seasons. With hybrid varieties, however, recycled seed gives poor performance.

Early Planting

Crops need to be planted early as recommended to take advantage of the full rainy season. Late planted crops risk insufficient moisture stress at critical periods as well as increased pest and disease attack, reduced growing period and nutrient uptake.

Farmers should therefore plant all crops early, as recommended.

Optimum Plant Population Density

Optimum plant population leads to high yields due to sufficient plants per unit area and minimal competition for nutrients, moisture and sunlight. In addition, optimum plant populations suppress weed growth, minimize soil erosion and may in some instances reduce pest severity. The right plant population is achieved by:

Correct spacing between ridges or planting rows.

Correct spacing between planting stations on the ridge or row.

Correct number of seeds or seedlings planted or sown per planting station or bed.

Timely Weeding

Weeds deprive crops of plant nutrients, moisture and sunlight. They may also harbor pests and diseases that cause yield reductions. To reduce competition, it is important that farmers weed their crops frequently.

Intercropping

Intercropping enables farmers to harvest more than one crop in the same season from the same plot, thereby obtaining maximum benefit from it. Other benefits include moisture retention, crop support, soil fertility improvement, soil erosion control, and pest and disease control.

Crop Rotation

Crop rotation is a practice of growing different crops on a piece of land in successive years. In rotation, deep-rooted crops and crops of the same family should not follow each other. For example, maize grown after tobacco, cotton and groundnuts has shown high yields. Growing the same crop on the same piece of land year after year results in poor yields and quality unless expensive management practices are employed because certain diseases and insect pests build up in the field and some important plant nutrients get depleted in the soil. For instance, continued mono cropping in maize fields results in witch-weed infestation. It is therefore important that agricultural staff members help farmers to work out rotation plan so that crops of the same family do not follow each other.

Crop Hygiene

Insect pests and diseases can severely reduce yields and lower the quality of produce. The incidence of pests and diseases can be reduced without necessarily using pesticides, for example, observe during the closed season in tobacco and cotton; burning or burying infested materials away from the field, and destroy volunteer crops.

Farm Planning and Management

To make proper use of available resources, any farm requires planning. Agricultural staff members should assist farmers in formulating an appropriate farm plan so that there is efficient use of land, water, labour, time, money and other resources.

6. PLANTS & TREES

Planting drought tolerant crops

What types of varieties do we have in Malawi?

There are billions of different kinds of living things on our earth. To make it easier to learn about them we organise them into groups of different **species**.

A species is a group of similar things that can breed together and produce fertile offspring. For example: all dogs are the same species, even though there are different breeds. Dogs breed with other dogs and they produce puppies (baby dogs) that can grow up and produce their own puppies.

Horses breed with horses and make foals, which are baby horses. But if a donkey breeds with a horse they make a mule. Mules are very strong animals but a mule cannot have its own babies. Donkeys are not the same species as horses, even though they are quite similar. Maize breeds with maize, but not with wheat or oats or tomatoes or fish.

Any species, any kind of living thing, can be healthy or unhealthy, just like any other part of the Nature Cycle. We have already discussed the health of human beings, soil health, water table health and environmental health. Now let us look at the health of the species that we eat; plants, trees, fungi, animals, birds, insects and fish.

If the plants, trees and animals in your area are healthy, strong and productive the Natural System is probably working well. If there is a lot of disease, insect damage and low yields, something is not right. The system needs to be looked at carefully and changes need to be made. People often just look at the symptoms and try to fix problems with medical and chemical treatments, but pills and powders do not usually solve the actual problem. We must think harder and make changes to the system itself and the mind-sets and behaviours of people.

Reserving adequate seed for replanting

As an agriculture extension officer, one of the most common requests we hear is for seed. We can assist our farmers by helping them to think through what types of seeds they already have. Then we can help them use this information to share seeds that they don't have.

What types of seeds do we have?

OPV seeds work with natural systems and provide us with extensive genetic diversity tailored to local eco-systems. OPV seeds can be found in many places, from wild natural areas to local markets. Most gardeners, farmers and naturalists are often happy to share and exchange seeds with others.

It is not difficult to keep your eyes open and ask around. You will build up your supply of OPV seeds very quickly and, if you exchange seeds with others, it will increase genetic diversity in Malawi for the benefit of everyone.

Selecting OPV seeds to save

Careful observation will help you decide which seeds to save. The best seeds come from the best plants or animals and the best plants or animals come from the best seeds. The highest quality plants or animals are grown in the best conditions for that species.

- Examine the parents as they grow to choose seeds from the healthiest and strongest sources. Save the seeds from several healthy parents, not just one. This increases the genetic diversity of your own personal seed bank, and increases resilience.

- Examine the seeds (the offspring) to select the best ones, in your opinion. Select the seeds that suit your needs in terms of taste, size, productivity, health, water needs or tolerance to drought, etc.

When to harvest seeds

Each species has its own way of multiplying and this can guide you in how to harvest its seed. It is easy but, as with anything new, you will have to learn as you read, discuss and try things out, and, as always, be guided by Nature.

Processing seed for storage

Seeds usually need to be separated from their plant, pod and / or fruit and dried out before storage so that they do not grow too soon, rot or attract pests. Here are some hints for different types of seeds:

- Matured grain and legume seeds like maize, beans or other plants with seedpods, like chidede, or un-covered seeds, like blackjack, are usually easy to separate and dry.
- For seeds that are covered in moist flesh, such as guava, tomato or egg plant:
  - Leave some fruit on the plant until it is mature (it may shrivel). Separate the seed out, dry and store it. This can work well for many fruits.
  - For fleshy fruits you can also put the fruit in a container, add water and mash gently without breaking the seeds, but just to loosen the fruit. Let it sit in the water for a day or two. Healthy seeds will sink to the bottom and unhealthy seeds will float. Scoop away the unhealthy seed and the pulp (put them in the worm farm, on the compost heap, or in the garden just in case there are some good seed). Rinse, dry and store the healthy seeds.
  - A traditional way of saving seeds is to smear the fruit on a wall. The fruit juices keep the seeds stuck to the wall as the fruit and seeds dry together. Carefully scrape the dried fruit and seed off the wall when you are ready to plant.
  - Squash fruit onto a sheet of paper / tissue and let the seeds dry there. At planting time the paper is torn and planted along with the seed. (The paper will decompose).
- Roots, tubers or bulbs, like potatoes and garlic, need to be harvested at their peak maturity and stored in a cool, dry, dark place. The traditional method of digging a pit in the earth and smearing it with clay works well.
- Some species can be grown from stems, like cassava, sweet potato and some trees. The stems need to be kept alive and must not dry out. (There will be more information on growing from stems on page 112).
- Some species can reproduce using more than one method. Garlic flowers make seeds, but garlic also can be multiplied by planting the individual cloves of the whole bulb.

Storing seeds for future use

Harvested seeds need to be protected from pests, moisture, heat or light, just like harvested food. Your seed storage method needs to protect the seed's viability – its ability to germinate. Some seeds can be stored for more than a year but others need to be used up quite quickly.

Many different types of recycled containers (bags, jars, clay pots, etc.) can be used to store your seeds.

Mix dried ‘protectors’ with the seed (like strong smelling plants) to protect the seeds from insects. Certain plants are known to have pest protection properties, like seed from chisoso (blackjack) or leaves from tephrosia. These can be crushed into a powder and mixed in with your stored seed. Wood ash mixed with the seeds is also a good protection against insects.

Label your seeds well so that you know what species and variety it is and when you harvested it (what month and year).

You are ready now to share or sell your seeds or just save them until you need them. Always save a bit more than you need, just in case you lose some are ruined by accident, or you need extra for sharing, selling or planting.

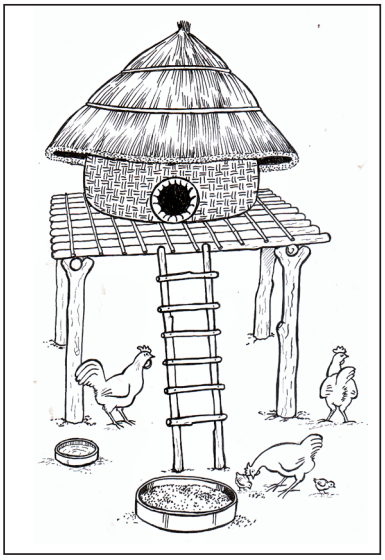
7. ANIMALS (LIVESTOCK & FISH)

Indigenous Chickens

Indigenous chickens are the most common form of poultry found in rural parts of Malawi. Indigenous chickens are an important source of income, animal protein, and can be used to fulfill cultural obligations. Performance of chickens is currently poor as a result of poor housing, poor disease control, poor feeding, and general lack of skills in management of the chickens.

What kind of khola should I build for my chickens?

Kodi ndingamange khola lotani la nkhuku zanga?



- Provide decent housing to protect the chickens from rain, heat, cold, wind, thieves and predators.
- The chickens must be provided with perches for comfort.
- There are two types of chicken houses: the pigeon type and the deep litter system. The pigeon type is recommended because it keeps the floor clean as chicken manure falls to the ground instead of piling up inside the house. The pigeon type also allows for easy collection of manure.
- An adult chicken needs an average of 30cm X 30 cm floor space plus space for smaller birds.

How do I feed my chickens?

Kodi nkhuku zanga ndizizidyetsa motani?

- Indigenous chickens should be provided with clean water all times.
- Indigenous chickens need supplementary feed in order to grow faster and produce more meat and eggs.
- You can use ingredients such as: maize, madeya, soya bean and salt to make your supplement feed.

How can I make supplement feed for my chickens?

Kodi Chakudya Choonjezela Cha Nkhuku zanga ndingachipange bwanji?

Gather the feed ingredients: maize grain, madeya, soya bean and salt.

- Roast the soya until it is brown to make it easily digestible.
- Grind the maize, roasted soya bean and maize bran separately at the maize mill. Ask the miller to remove the sieve when grinding to produce a meal of marsh form and not flour or powder.
- Grind the salt in a mortar for easy mixing.
- Mix the ingredients as follows:
  - 2 parts maize meal
  - 2 parts madeya
  - 1 part soya bean meal
  - 1 percent salt
- When feed is limited give priority to young chicks.

What are the most common diseases in indigenous chickens?

Kodi ndi matenda ati amene amagwila nkhuku za chikuda kawilikawili?

Newcastle disease (NCD) is the most deadly disease in indigenous chickens.

- The incubation period is from 2-15 days (that is time from infection to the appearance of clinical signs).
- Clinical signs:
  - Coughing, sneezing
  - Twisting of the head and neck, drooping wings, dragging legs, rotating, paralysis
  - Watery greenish diarrhea, swelling of the head
  - Birds die at different times and in large numbers.
- How do I prevent NCD?
  - There is no treatment for NCD, but it can be prevented through vaccination.
  - Available vaccines are I-2 and Lasota.
  - These vaccines can be administered through eye drops, drinking water or by injection
  - The vaccines must always be kept cold in refrigerators for them to be effective.

Goats

- Goats are a source of protein and income to the rural population. They also supply manure, which may be used in crop production. Local goats in Malawi are resilient as far as feeding is concerned. They are productive but do suffer from diseases just like other species of livestock.
- They are small to medium sized and have slow to medium growth rates. This calls for improvement. The aim is therefore to improve the productivity and profitability. In order for this to be possible it is important to follow the correct husbandry practices.

What are the major types of goats found in Malawi?

Kodi ndi mitundu iti ikuluikulu ya mbuzi zomwe zimapezeka mu Malawi?

- The main goat breed in Malawi is the indigenous goat, but these can be improved through cross-breeding with other improved breeds.
- Such breeds include the South African Boer goat, the Torgenburg and the Alpine

Where can I buy these improved goats?

Mbuzi zamakonozi ndingazigule kuti?

- The improved goats can be bought from government farms: Mikolongwe and Dwambadzi livestock centers.
- They can also be bought from stud/expert breeders

Does the type of khola I build for my goats affect their productivity?

Kodi mtundu wa khola lomwe ndamangila mbuzi zanga umakhudza bwanji phindu lomwe ndingapeze?

Before Esmie Zimba knew about the raised khola system, she would keep her goats in one of the rooms inside her two-bedroom house. She did not sweep this part of the house because she thought it was not important. Some of her goats started to lose weight and would have their fur standing. In addition, when the goats were being herded into the house they would knock things down and run off into different parts of the house causing chaos.

After asking her extension officer, she was told that her goats were having intestinal worms due to the dirty conditions they were living in and she should try building a raised khola to house them instead. The extension officer treated her goats, and after following the officer's advice, her goats stopped having worms. Moreover, she found collecting manure was easier and she could use the manure in her gardens which experienced a bumper harvest that year.

Additional Information

- The recommended khola for goats is the raised/slated khola.
- The raised/slated khola can be made from mud, poles and thatch grass.
- The floor should be raised 1m-1.5m above ground level to allow for easy collection of manure and passage of urine.
- The side that gets hit by wind should be covered to minimize respiratory diseases e.g. pneumonia *(chibayo).*
- Space requirements are 1.8 sq.m for a mature female goat, 0.3 sq.m for a young goat, and 2.8 sq.m for a mature male goat.
- If a dirt floor is used, make pallets or lay poles on the ground so that urine and manure can easily collect between them.
- The poles must be removed and the ground cleaned every 2 weeks or once a month to reduce worm infestation.
- This way your goat will be more productive because it is pest and disease free
- Manure collected from the kholas can then be directly applied to our fields, or used to make compost for our gardens.

How do I feed my goats and what can I feed them?

Kodi mbuzi zanga ndizizidyetsa chakudya chanji komanso motani?

- Goats are not very selective about what they eat, they mostly like to browse (eat from tree branches and shrubs).
- Goats are either herded, tied to a tree/pole or kept indoors.
- When they are herded, they should be grazed away from the dambos in the rainy season to prevent worms.
- When they are tied to a tree or pole, the length of the rope should be 5m to allow the goat a wider area of grazing.
- Supplementary feed has to be provided whenever the goats are kept indoors or tied to a tree/pole. Such feeds include sweet potato vines, cassava and banana leaves, groundnut haulms and madeya.

My goats keep getting worms, how do I prevent this?

Kodi mbuzi zanga ndingaziteteze beanji ku matenda a njoka zammimba?

- When goats are kept indoors they can easily catch worms.
- They should therefore always be dewormed at the beginning and end of every rainy season.
- These dewormers include Abendazole, Ivomec and Velbazine and can be bought from veterinary pharmacies.

What other plants can I feed to my goats, sheep and cattle?

Kodi ndi zakudya zantundu wanji zomera zomwe ndingadyetse mbuzi, nkhosa ndi ng'ombe?

- Star grass
- Nsenjere
- Leucaena
- Sesbania
- Nsangu
- Mtutu
- Silver leaf
- Rhodes grass

How can I keep feed for times of scarcity?

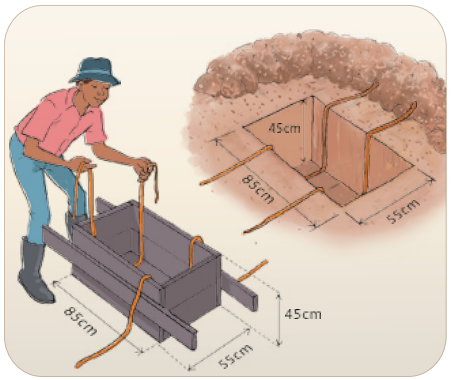
Kodi nthawi imene chakudya cha ziweto chikupezeka chambira, ndingasunge bwanji chakudya china pokonzekela nthawi imene chakudyachi chimasowa?

- You can either make hay or silage

HAY MAKING
Manual Baling

Step 1 Plan to harvest the fodder during dry weather to allow proper drying. The harvest occurs in the"boot" or pre-flower stage.

Step 2 Turn the fodder using a fork to ensure it is evenly dry.



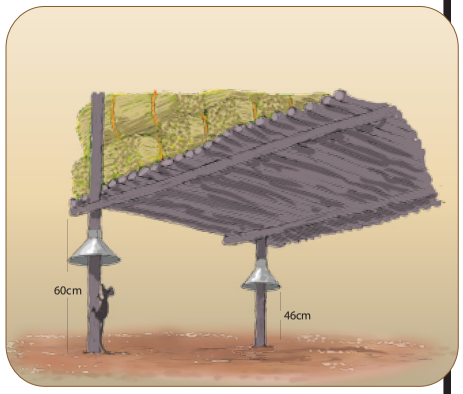
Step 3 Make a box measuring; 85cm long X 55 cm wide X 45cm deep. Or dig a hole of same measurement. Take two pieces of sisal twine and place them across the box or hole.

Step 4 Place the dry and well cured fodder into the box or the hole horizontally.

Step 5 Compress after every addition until the box or hole is filled up.

Step 6 Take the two ends of the string and tie them tightly then while holding the tied strings; pull out the compressed material.

Step 7 Store your bales in a dry enclosure away from sunlight and rainfall.



Step 8 Ensure to control rats and other rodents in your hay store.

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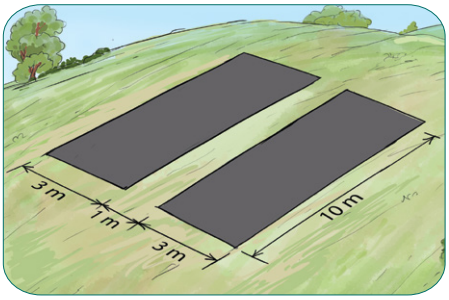
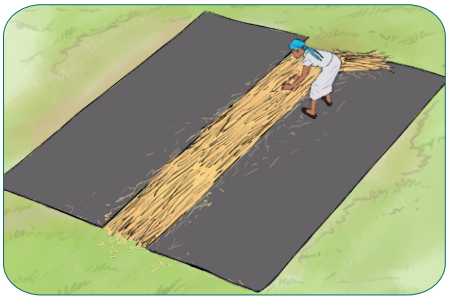
World Agroforestry Centre

SILAGE MAKING
ABOVE GROUND

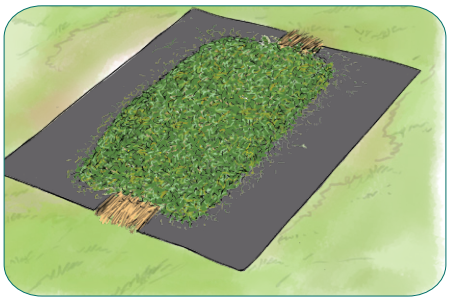
Step 1 Chop forage to about 5cm or less.



Step 2 Place two pieces of plastic (polythene) sheeting (each about 10m long, 3 m wide, 500 gauge) beside each other on flat ground, leaving a space of 1m in between. A gentle slope is useful, but not necessary.



Step 3 Place straws between the sheeting to allow water effluent to drain away from the silage during and after compacting.



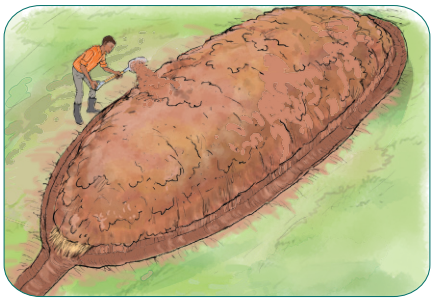
Step 4 Spread 10-15cm layer of chopped forage from one end of the plastic, towards the center. If the plastic is on sloping ground, the material should be placed on the lower side of the slope.

Step 5 Compact material by rolling over it with a 200 litre drum filled with water, a tractor, or any heavy object. Ensure that the edges of the material are well compacted and free from oxygen. Forage that falls outside the heap should be returned to the top of the pile after each round of compacting.

Step 6 Dilute molasses using water. For every 1 litre of molasses, dilute with 3 litres of water. Sprinkle the dilution evenly onto the material. Molasses adds sugars that speed up the fermentation process. (Do not use molasses in maize or sorghum silage).

Step 7 Add another 10-15cm layer of chopped material. Compact and add molasses. Repeat this process until all material is used. Remove oxygen by spreading well.

Step 8 Fold the plastic sheets over the material to cover it completely, starting with the longer sides. If needed, add extra plastic. The shorter side, when closed, should allow for easy opening while feeding.



Step 9 Dig a trench around the heap to ensure water and effluent drains away from the silage. Use the dug up soil to cover the heap with about 15cm of soil. Silalge is ready after 21 days. When feeding open from lower side of the slope to get the required ration for the day and cover well to avoid air entry.

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Can I use my animals to manage my farm land?

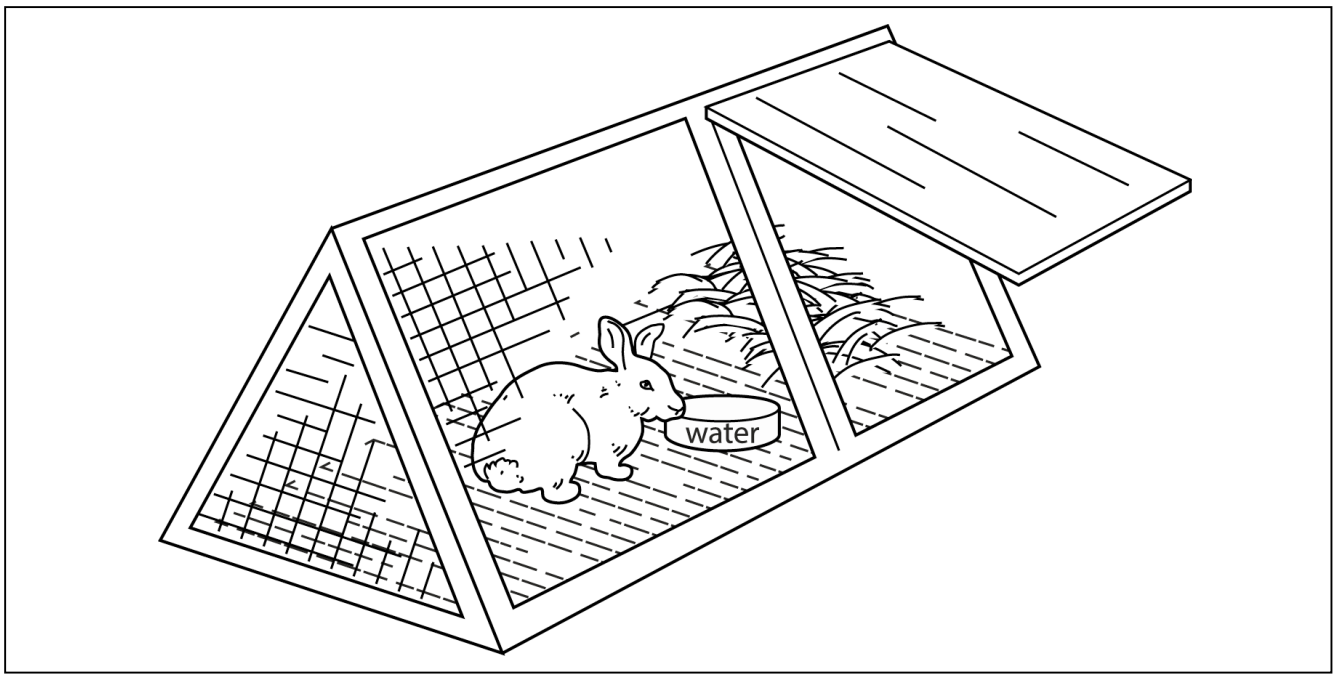
Kodi ziweto zanga ndingazigwilitse ncthito kumunda?

Yes you can. There are different ways that different animals can be used to manage farmlands of different scales. Some of these include the animal tractor, and the movable kraals/kholas.

What is an animal tractor and how do I use it?

Kodi thilakitale ya ziweto ndi chani nanga ndingayigwilitse ncthito bwanji?

An animal tractor is a moveable cage that is open on the bottom to allow the animals to graze. It is ideal for small animals such as chickens, guinea fowl, ducks, guinea pigs, and rabbits. The animals can scratch the surface of the soil to allow air circulation, and they leave behind manure, urine, fur, and feathers to feed the soil.



After grazing in an area for a while, the cage is moved to another area. Tractors can be large or small, any shape or size that suits your purposes, made of whatever is available locally (chicken wire, bamboo, wood etc.) and with handles or wheels to move them around, making sure the animals can't crawl out through the bottom. Here is an illustration of a portable rabbit tractor.

What is a movable khola and how do I use it with my goats and or sheep?

Kodi khola loyenda kapena losunthika ndi chani nanga ndingaligwilitse ntchito bwanji pamodzi ndi mbuzi kapena nkhosa?

A movable khola is simply a khola built to be moved from time to time. A movable khola can be built from wooden poles and nails if available; ropes may be used instead of nails. Animals are confined in the khola overnight after grazing because at this time they produce more urine and manure. The animals also dig the soil using their feet and leave saliva and fur in the soil as they do so, this improves the soil fertility and allows air to circulate more freely in the soil and water penetrates easily into the soil.

A khola of the size 2m by 2m can accommodate as many as 20 goats/sheep. The more animals you have in the khola the better results you are going to have. Depending on the number of animals that you have, you may decide to make the khola smaller or you could share with someone else in your community who has goats/sheep to get better results.

The khola is moved every 2 weeks to other sections of the field, improving the soils while doing so.

Fish Farming

Fish is the most eaten animal protein in Malawi. We have depended much on fish from lakes and rivers. With low fish catches due to overfishing and other factors, Malawi's per capita fish consumption is as low as 8.2kg. Malawi Fisheries and Aquaculture policy 2016-2021 aims at increasing the per capita fish consumption to 10kg. The gap between what is being supplied and what is required can be filled by practicing fish farming. Fish farming can be done almost anywhere and in various rearing facilities. Fish farming in earthen ponds provides a reliable source of additional fish protein and a promising way to earn a livelihood to help households remain resilient.

Summary of what needs to be known on fish farming:

If you are considering fish farming you need to think about:

Where to dig your fish pond How to construct your fish pond How to prepare your pond for stocking
Where to get your fish fry or fingerlings (fish seed) How to transport your seed to your farm How to introduce your fish into their new home
How to feed your fish How do I know if the water in my pond is good for my fish How to sample your fish and analyze their growth
When to harvest your fish How to keep your fish from spoiling How to sell your fish

▸ Where do I dig my fish pond?

Kodi ndingakumbe damu langa la nsomba pa malo otani?

Water is the first factor to consider when looking for a site to dig your pond. Ask yourself two questions: Is there enough water to fill my pond so my fish can grow to a harvestable size? Is the quality of the water good enough to allow my fish to survive and grow? Having your fish ponds dry before you harvest is bad. And finding out that the quality of the water you wanted to use is not good is also bad.

The second factor to consider is the soil. The soil of your piece of land for your fish pond should not be sandy. The soil should be more clay to have strong pond walls. Clay soils also help to keep the water from draining from the pond. Very acidic soils are not ideal either. But if soil acidity levels are not very high, they can be controlled by adding liming or ash.

The third factor to consider is the slope of your piece of land. You need a gentle slope and not a steep one for your fish pond

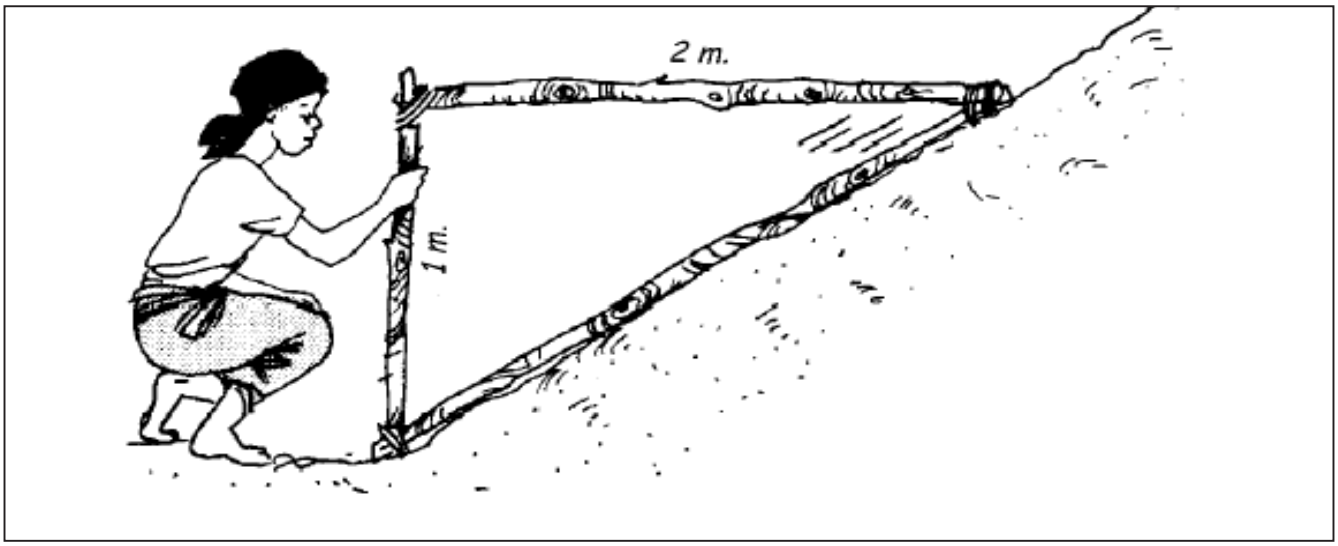


Diagram showing slopping of a fish pond wall

How do I construct my fish pond?

Kodi ndingakumbe motani damu la nsomba

The steps to follow when constructing a fish include:

- Designing your pond,
- Clearing your piece of land,
- Removing the top layer soil material,
- Pegging,
- Digging,
- Making dykes,
- Slopping of the pond wall,
- Installing bottom and inlet and outlet.

Feel free to contact the District Fisheries Office for additional information on pond construction.

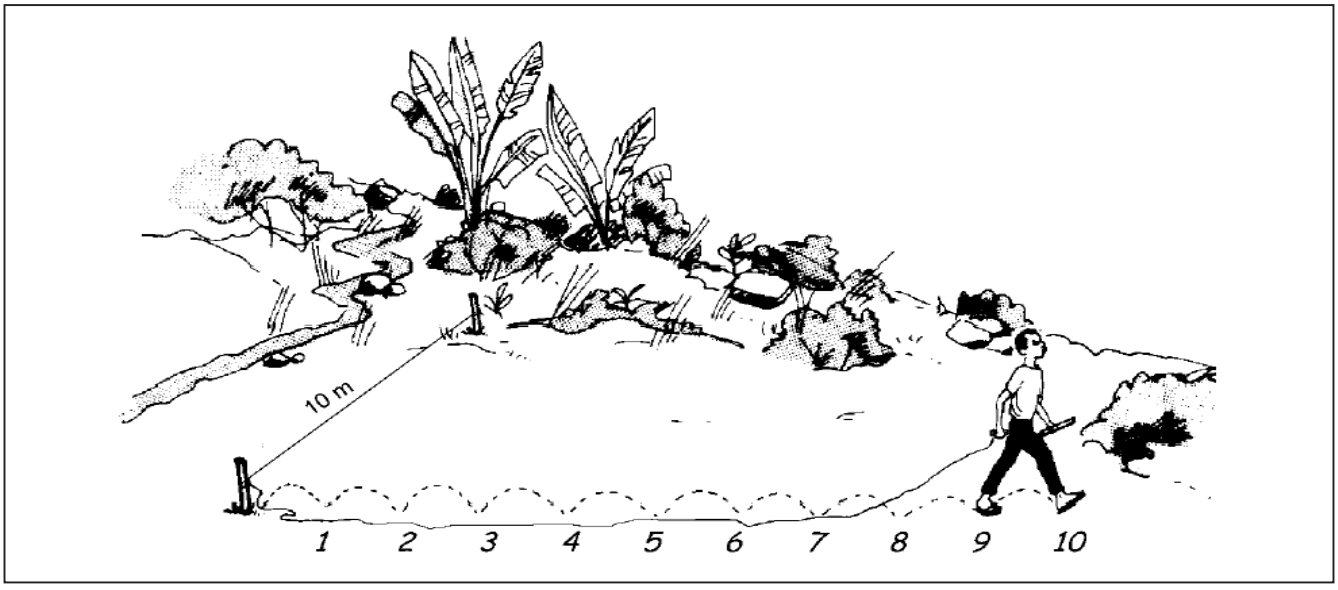


Diagram of pond pegging, one stage in fish pond construction

Tip 1. Ponds should not be constructed inside a stream or river. The pond in Figure 1 gets ruined when the river is flooded. The pond in Figure 2 would escape effects of flooding.

Tip 2. Inlet and outlet pipes should be on opposite sides; they should be along the length of the pond; and they should be two meters away from the corner.

Tip 3. Where you would like to have 2 or more ponds at the same site, you will need to have a main inlet canal and a main outlet canal.

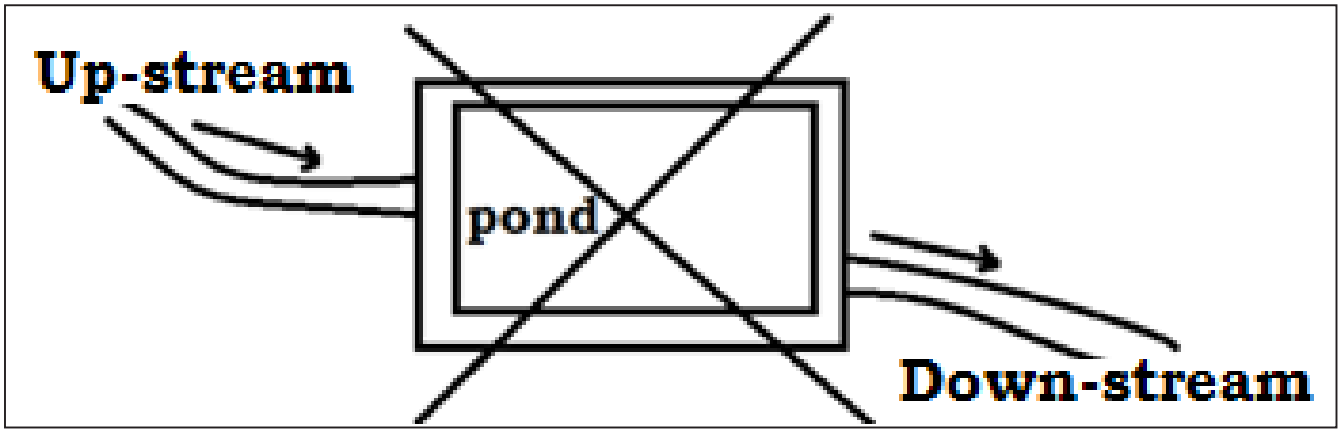


Figure 1: Wrong way of locating a pond along the river

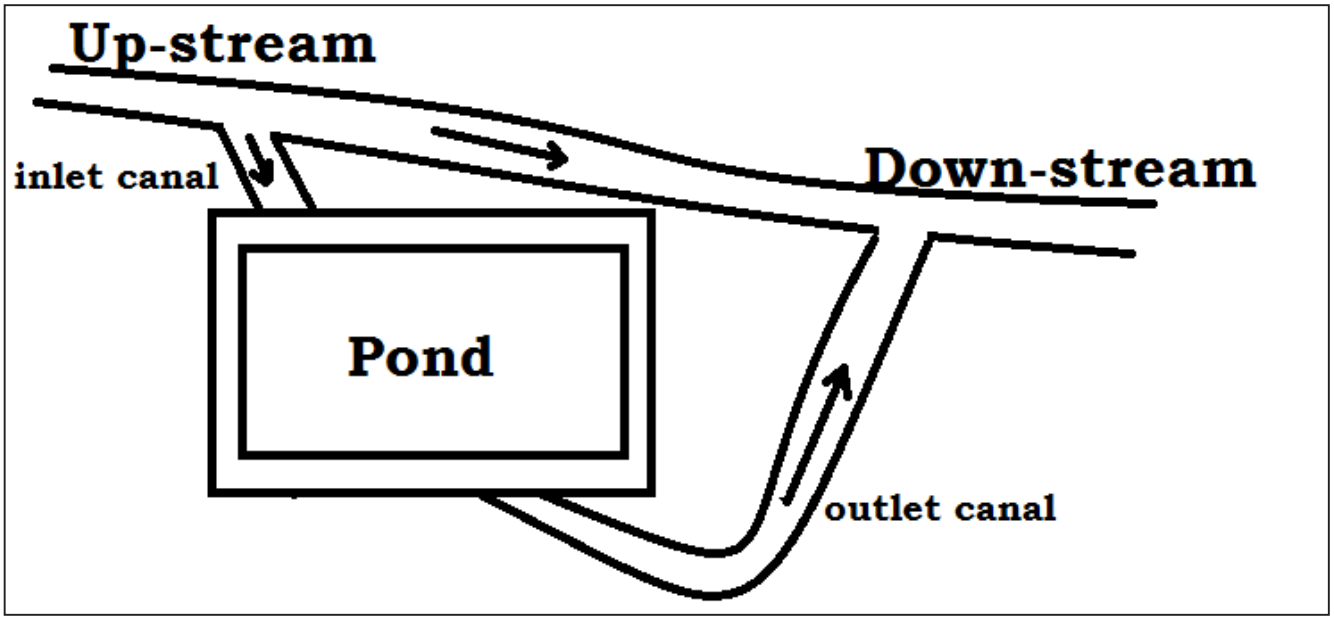


Figure 2: Right way of locating a pond along a river

Mr. Mofolo had his two ponds constructed at one site. With no proper advice, he used the water from the first pond to fill into the second one. Signs of a viral disease showed up in the first pond when his fish were just one month to harvesting.

He had already spent a lot of money to see his fish grow up to that date. He looked for assistance but he couldn't find any in time. He lost the first pond. He hoped to save the fish in the second pond. But alas! The second pond had been infected too. He lost all what he had worked for in 6 months. Make sure that water from one pond does not drain into another pond.

Figure 3: A pond being fed from a main canal

Your pond should be 1m deep on the shallowest side. The deepest side may range from 2m to 3m deep. Currently deeper ponds are being promoted for their ability to hold water longer than shallower ponds.

While constructing the dykes, remember to compact the walls after every 20cm layer of soil. Be sure to further strengthen the dykes of your pond by planting vertiver grass on the dykes.

- **How do I prepare my pond for stocking?**

(Kodi ndingakonze damu langa motani kuti ndiyikemo nsomba?)

When we are preparing for stocking our fish, we want to produce an environment that resembles the fish's natural home as much as possible. To achieve that, we start preparing our pond even before filling it with water. To reduce acidity levels and kill some unwanted animals, lime is applied in the pond. Apply lime 2 weeks before stocking. Apply fertilizer or chicken, goat, or cow manure to increase the growth of micro plant-based and micro animal-based feed in the water. Inlet and outlet pipes should be screened with small meshed netting materials. Two weeks after filling your pond, you should have a pond with greenish looking water and that would mean your pond is ready for stocking.

- **Can I grow any kind of fish?**

Kodi ndi mtundu uti wa nsomba womwe ndingalime?

The fish that are being farmed in Malawi are mlamba, chambo, makumba, makakana and chilunguni. They grow well in fresh warm waters. The ideal water temperature range for growth of these fish is between 24 and 28°C.

- **When should I stock my fish?**

(Kodi ndi mwezi uti wabwino kuyika nsomba zanga mu damu?)

At the onset of the hot season, in the months of August or September, is the best time to stock your fish pond. During these months, water temperatures are normally within the optimal range for growth of the fish and by January, or February, you should have your fish ready for harvesting.

- **Where can I get fish fry or fingerlings (seed) for stocking?**

Kodi ndi kuti komwe ndingapezeko mbewu ya nsomba yabwino?

This is a very important question to think about. The source of your fish seed determines whether your fish will grow at all.

*****Leticia Kachoka had fish ponds. She got her seed from the National Aquaculture Center in Domasi, a very good source. A year later she harvested many fish and made MK400,000 from the sales. Her neighbour Arnie Matipa admired Leticia. She remembered how useless that piece of land was and now Leticia just got MK400,000 from the land within 6 months.*

Arnie adopted the practice right away. Arnie had her ponds ready for stocking. She went to Leticia to ask if she could get some seed fish. Leticia gave Arine some young offspring from her first harvest. Arnie was thankful. She did all she was advised by Leticia: feeding rigthtly, checking water quality, everything, but the fish did not grow.

They both did not know that the young offspring Leticia gave to Arnie were stunted. The fish would not grow no matter what they did. Until an AEDO came and advised Arnie to try fresh seed from the National Aquaculture Center. Six months later, there was dancing and ululations at Arnie's ponds. Four years later, their village received a prize from Department of Fisheries for being a model village in fish farming.

In some places, there are farmers who are trained to produce fish fry and fingerlings. You can buy seed from them if they are in your area. In every district, there are District Fisheries Offices. In this notebook you have addresses and contact numbers of people that work in the Department of Fisheries. You may contact them and they will tell you where you can get fish seed near your home. Use all male fingerling (seed) from the National Aquaculture Center, Domasi.

- **How much fish seed do I need to stock in my pond?**

Kodi damu langa lingasunge nsomba zoculuka bwanji?

If you will be feeding your fish with supplementary feed, you can stock 4 fish per square meter. That means if your pond is 400m2, then you need 400x4 (1,600) fish. Otherwise, you are advised to have 2 or 3 fish per square meter if your feeding will be inconsistent.

- **How do I transport my fish seed from where I bought them to my fish ponds?**

Kodi ndikonzekere motani pokatenga nsomba zanga kuzibweretsa mu damu langa?

Good question again. First, consider transporting the fish when temperatures are low. In advance, remind your supplier to avoid feeding your fish seed a day before you pick them up. If it is long distance to where you would get the seed, consider adding more oxygen to the container for transporting your fish seed. You can change the water on the way. If needed. Fish may be transported in plastic bags or in plastic tanks.

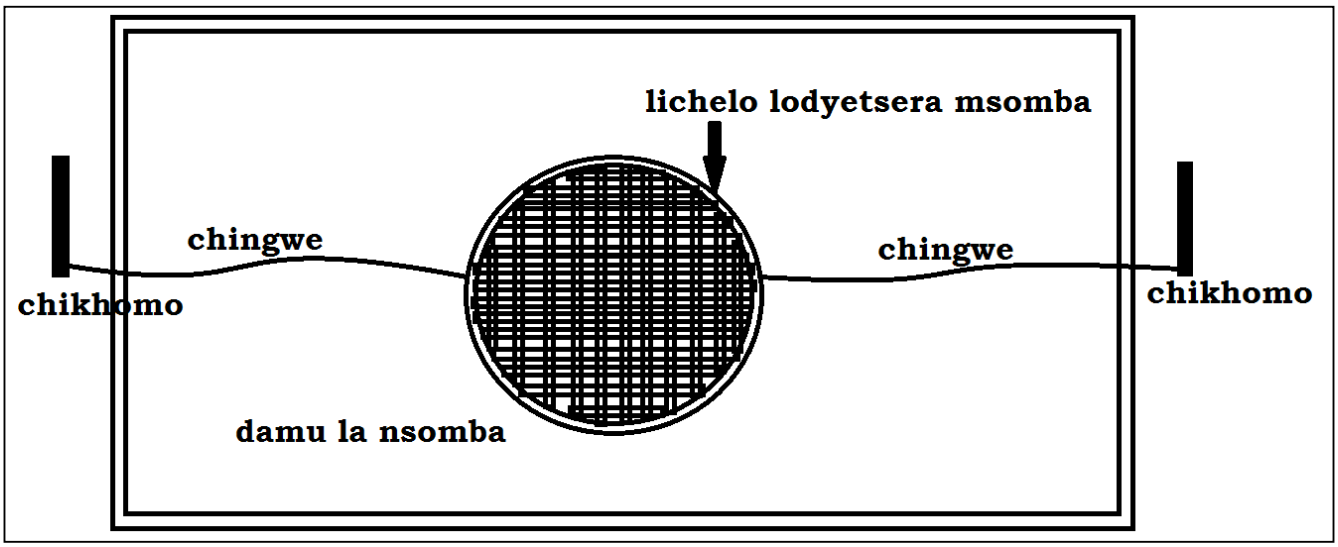
How do I introduce the fish into my fish pond?

Kodi ndichite motani pamene ndikuika mbewu ya nsomba zanga mu damu nditabwera nazo kuchokera kogula?

When you reach to your ponds with your fish seed, get you tank or bucket with fish or the plastics into the pond. Do not release them immediately. Wait for the water temperature inside the bucket to be equal to the temperature of the water in the pond. You can quicken that process by adding water from the pond into your bucket little by little.

How do I feed my fish?

Kodi ndingadyetsere nsonmba zanga motani?



Let's start with what fish would eat in their natural environment. The fish that we are going to grow eat very small plants called phytoplankton and very small animals called zooplanktons. These planktons should be there in the pond when your pond has the green colored water. However, your fish will grow faster when supplementary feed is given. Fish feed can be bought from companies that produce animal feed, such as CP Feeds, Maldeco or at their outlets. Any fisheries officer from within your area can teach you how to make your own feed. You can feed your fish with remains of food from your family. You can feed fish with some single ingredient feed like maize madeya. Do not feed rotten feed to your fish.

Secondly let's look at how much feed you should give your fish? The best way is to observe how much of the feed you give your fish is being eaten. That would be easy if you see the remaining feed. It would be possible to see the remaining feed if you feed the fish in a tray like in the diagram here.

When the fish are small they require more food. So it is recommended that until they reach 20g, they should be fed 10 % of their total body weight (biomass). After this stage, reduce your feeding percentage to 5%. After five months of rearing, reduce further to 3% of total biomass. For example if you have 2,000 fingerlings weighing 10g on average, then you have total biomass of 20kg ((2000x10)/1000). Therefore, you need ((10/100) x 20kg), which equals 2kg of feed daily.

You also have to know the frequency of feeding your fish. Imagine you have 2kg of food to feed your fish daily. You need to divide that feed into two 1kg parts. You should feed the first 1kg in the morning around 8AM and the other 1kg in the afternoon around 3PM.

How do I know if the water in my pond is good for my fish?

Kodi ndingadziwe bwanji kuti madzi amene ali mu damu langa akadali abwino kwa nsomba zangazo?

Look out for the following factors: dissolved oxygen, water transparency, temperature, ammonia, acidity, and salinity. The most important ones to look out for in case of semi intensive fish farming include water transparency, ammonia and dissolved oxygen.

Ideally, dissolved oxygen should not go below 4g/l of water. If you see a lot of fish at the water surface gasping for air, know that dissolved oxygen is critically low in your water. Add some new water to your pond or use a stick to create waves in the water to increase the amount of dissolved oxygen. The most critical time to check for amount of dissolved oxygen is at 4AM. This is because during the night, oxygen is depleted by respiration. Oxygen is not replenished by photosynthesis since there is no light at night. 4AM is the critical time because this is the longest time from sunset.

Transparency shows how fertile your pond is. You can use a secchi disk to measure transparency. If there is no secchi disk, you can use your hand as shown in Figure 5. The recommended transparency range is 15-35cm. Below 40cm means your pond is too fertile and you need to stop adding fertilizer or manure. Above 40cm means your ponds have poor fertility and it needs adding fertilizer or manure.

Figure 4: Secchi disk for measuring transparency

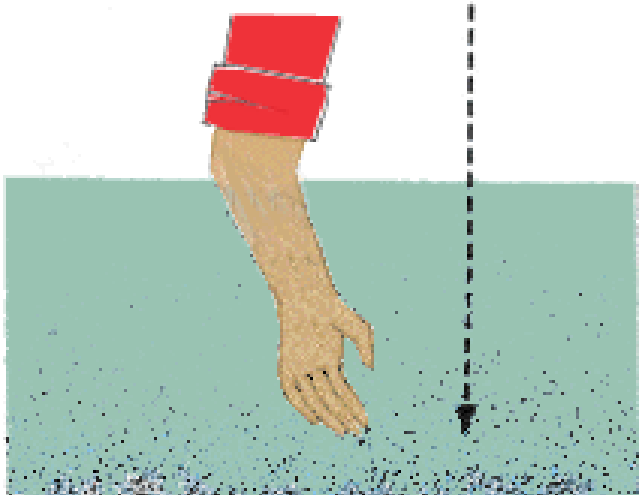


Figure 5: Using a hand to measure transparence

Ammonia is a poisonous gas that results from the breaking down of proteins. Ammonia levels should not be more than 0.2g/l. Unfortunately, instruments used to measure ammonia are expensive. Avoid overfeeding the fish and exchange water regularly to avoid build up of ammonia.

How do I go about sampling my fish to analyze growth?

Kodi ndingapange bwanji posankha nsomba zina kuti zindipatse chithunzithunzi cha momwe nsomba zanga zikukulira?

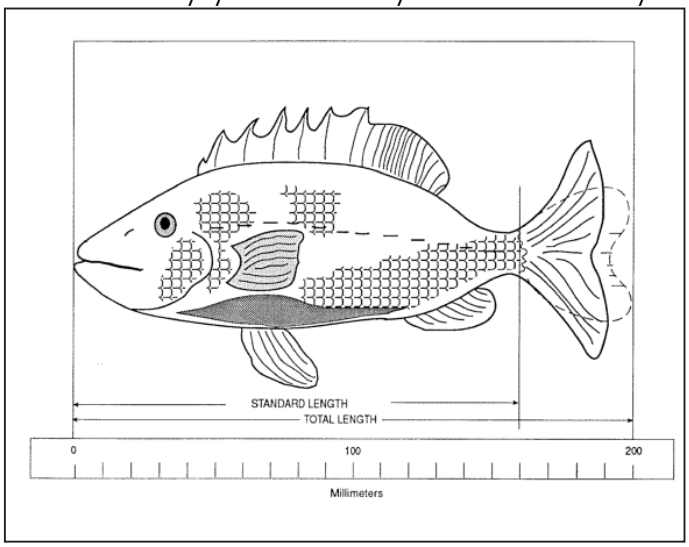
Feeding your fish at same location in your fish pond makes fish sampling easy. You need a small fish net that can encircle a point where your fish gather to feed. You need to be with someone to

help you sample the fish. You need a scale to weigh the fish. Where scales are uncommon, get a ruler and measure the standard length of the fish. Thirty to 100 fish are enough to sample.

When and how should I harvest my fish?

Kodi makololedwe a nsomba zangazi adzakhala otani?

Your fish should reach table size or market size in six months. Depending on your preference for size, you can wait until the eighth month from the day you stocked your fish. When you are harvesting your fish, total harvesting is recommended. Do not leave any fish in the pond no matter how small that fish is. You should drain all the water from the pond to help catch all fish. Get a harvesting net a day before your harvesting. Repair the fish harvesting net by mending it where there are broken strings. After the water level in your pond is not more than 50cm at the deepest end, catch your fish using your net. The longer your fish stays alive even after catching the longer it will stay before getting rotten.



How should I sell my harvested fish?

Kodi ndingagulitse nsomba zanga motani?

If you advertised your fish harvesting activity very well, you will not have problems selling your fish.

*****There is Lumbira fish farming club in Chilomoni. If you passed by their farm on a day when they are harvesting, you would probably confuse the gathering for a political rally of a minister. With good advertising, people flock to Lumbira Fish Farm to get the freshest fish they can. It does not take an hour after harvesting and all 300+kgs of fish are sold.*

******A story is told of one fish farmer in Nkhata-bay district. When he had set to harvest his fish tomorrow, he would sample several fish from his pond, get them into a bucket and cycle the whole village telling people like; "you see these fish, you may come to my ponds tomorrow, I will be harvesting them. It will be only MK2000/kg…!" And with that visual of the fish in the bucket, people would flock to his farm on harvesting day.*

You can sell to restaurants and hotels that are nearby. If you have an agreement with them, then, soon after harvesting, you would pack all your harvest and take it there. You can sell your fish at the local village market if they are reliable. You may also speak to middlemen who sell their fish in town. They may buy your fish at a bit low price, but you would still make some profit.

How should I keep my fish longer before spoilage?

Ndidzachite chain kuti nsomba zanga ziszdzayambe kuonongeka mwachangu?

It would be ideal to advertise in your village when you are about to harvest your fish. Fresh fish is scarce especially in places far from lakes and big rivers. That makes fresh fish a commodity with a ready market when well advertised. Make sure to keep some flaked ice (or any form of ice if flaked

is scarce). Soon after harvesting, you should place your fish in buckets of clean water where you will clean them up. Store them in cooler boxes or any other basket. Add ice on top of each layer of fish in your carriage.

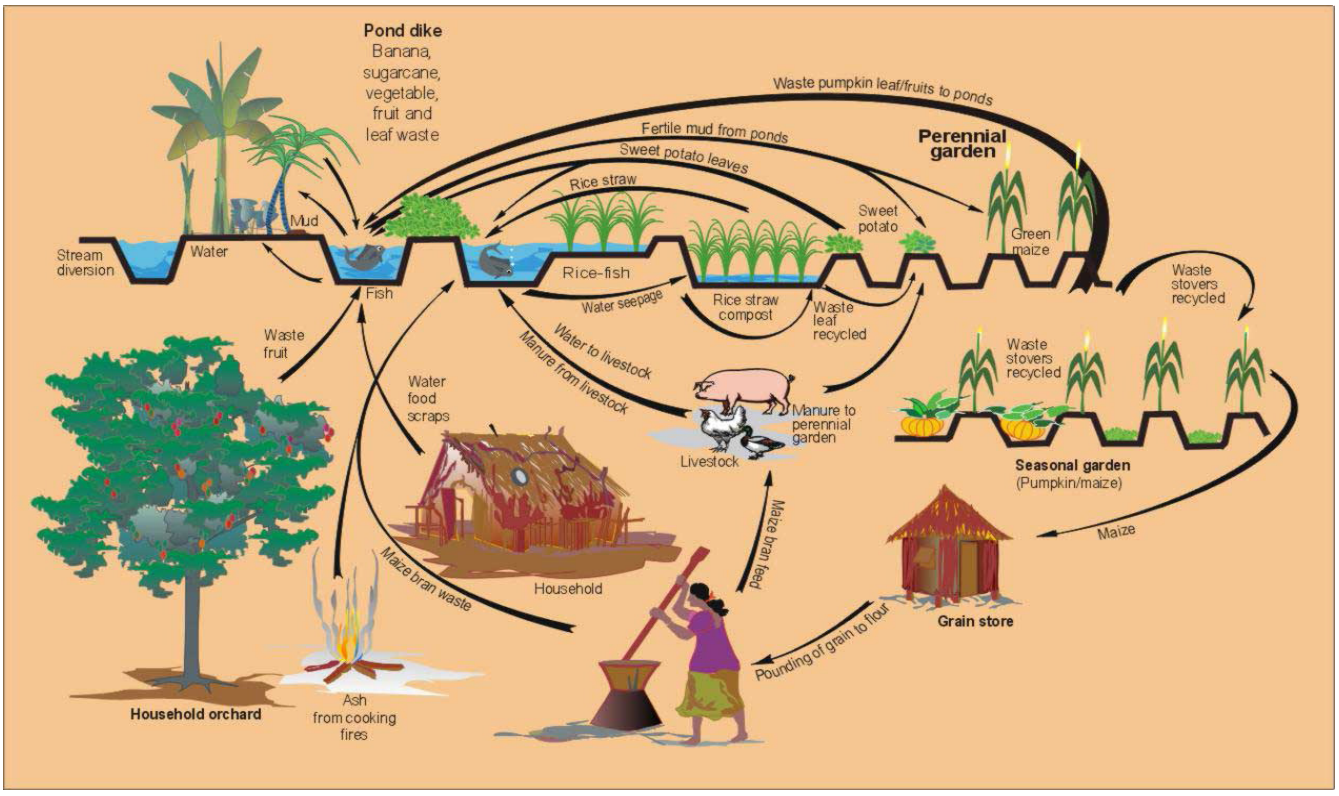
If you do not have ice, prepare to smoke or dry your fish in the sun. Make sure you know how to smoke or sundry your fish before harvesting. If it is your first harvesting, you can call for a Fisheries Technical Assistant or an extension officer in your area to provide you with some help.

How can fish farming be integrated in my other farming activities?

Kodi ulimi wa nsomba ndingauphatikize bwanji ndi ulimi wina?

Fish farming can be done along with other agricultural activities. Integrating fish with crops, vegetables and livestock is one way of increasing resilience of farming households from climate change impacts.

Farmers who practice integrated fish farming are able to diversify sources of income by selling crops, livestock and fish. The figure below summarizes integrated fish farming with other agricultural activities.



8. REFERENCE DATA – STATISTICS, CONTACTS

Useful Malawi statistics

Position	Latitude	1330 S
	Longitude	3400 E
Total Area		118,484 sq km
Land-Use	Agricultural Land	59.2%
	Arable Land	38.2%
	Permanent crops	1.4%
	Permanent pasture	19.6%
	Forest	34%
	Irrigated area	735 sq km
Water area		24,404 sq km
GDP contribution	Agriculture	30.1%
	Industry	18.5%
	Services	51.3%
Population		17,964,697
Population density		139 people per sq km
Population growth rate		3.32%
Birth rate		41.56 births per thousand
Death rate:		8.41 deaths per thousand

Nutrition statistics

Children under five:[1] 60% vitamin A deficient 30% anaemic 47% stunted 13% low birth weight 8% overweight School aged children:[1] 58% of school age children between 6 and 10 years	Women 15-49:[1] 29% anaemic 17% overweight (Urban 28%, Rural 14%) 9% underweight 2% short Men:- 38% vitamin A deficient[3] 17% anaemic[2] 17% overweight[2]	Food supply:[4] 22% of population with low food energy (2014) 29% of calories available from non-staples (2009) 230 grams of fruits & vegetables available per day (2011) Water, Sanitation & Hygiene:[5] 15% with no access to clean water 8% with access to piped water 77% with access to another clean water source 7% open defecation 77% of homes with unhealthy toilets
Sources: [1] 2010 DHS [2] 2014 WHO [3] 2009 Micronutrient Survey [4] FAOSTAT [5] WHO/UNICEF monitoring in 2014		

National Production Figures for the past 3 years

Group	Product	2013/14		2014/15		2015/16	
		HA	MT	HA	MT	HA	MT
Staples	Cassava	211,089	4,813,699	216,405	5,102,692	207,342	4,776,715
	S.Potatoes	212,940	3,846,930	224,259	4,209,699	305,337	5,732,915
	Maize	1,676,758	3,639,866	1,704,528	3,978,123	1,712,798	3,220,712
	Rice	65,275	125,156	67,400	132,002	64,457	118,328
Legumes & Nuts	Groundnuts	362,824	380,800	375,991	397,503	389,562	335,972
	Beans	307,158	189,417	316,686	195,048	326,774	181,365
	Pigeon Peas	217,068	287,983	223,207	318,885	268,133	444,069
	Cow Peas	75,504	36,119	78,472	38,445	95,794	45,006
	Field Peas	4,473	3,118	4,596	3,139	4,356	2,909
	Grams	1,849	1,193	1,806	1,161	1,236	817
	Soya Beans	114,369	116,977	121,913	132,185	188,542	184,685
	Dolichus Beans	5,005	3,292	4,702	3,226	4,601	3,402
	Velvet Beans	10,699	11,647	10,353	12,832	10,908	15,403
	Ground Beans	12,953	8,939	13,249	9,322	11,081	6,892
	Chick Peas	2,390	1,970	2,295	1,920	2,218	1,804
Non-Food	Tobacco	120,172	132,849,214	132,738	154,946,681	71,885	76,575,764
	Cotton	184,513	158,826	149,259	132,337	44,961	33,826
Livestock	Cattle		1,316,799		1,398,376		1,440,675
	Goats		5,882,106		6,545,306		6,990,349
	Sheep		269,830		275,537		276,434
	Pigs		3,128,599		3,645,626		4,075,125
	Chickens		68,177,602		78,121,449		88,465,443
	Rabbits		1,330,252		1,408,506		1,453,617
	Guinea Fowls		1,732,488		1,816,517		1,844,956
	Turkey		215,238		225,407		238,228
	Guinea Pigs		323,011		330,335		329,620
	Doves/Pigeon		3,798,968		4,329,299		4,521,303
	Ducks		1,504,155		1,764,117		1,913,833

Agriculture Development Divisions, District Agriculture Offices, Extension Planning Areas and Frontline staff

ADD	District Ag Office	No of EPAs	No of Sections	No of Farm Families	No of AEDOs	No of AVOs
Karonga	Karonga	6	53	67,001		
	Chitipa	6	51	57,481		
	KRADD Total	**12**	**104**			
Mzuzu	Rumphi	7	53	50,380		
	Mzimba South	13	100	160,670		
	Mzimba North	9	65	113,672		
	Nkhatabay	9	53	60,025		
	Likoma	1	2	2,667		
	Mzuzu Total	**39**	**273**			
Kasungu	Ntchisi	4	70	97,642		
	Dowa	9	127	235,646		
	Mchinji	6	90	173,520		
	Kasungu	8	105	236,690		
	KADD Total	**27**	**392**			
Salima ADD	Salima	7	80	107,590		
	Nkhotakota	7	77	93,159		
	SLADD total	**14**	**157**			
Lilongwe ADD	Ntcheu	7	107	158,314		
	Dedza	10	169	242,519		
	Lilongwe West	12	197	269,554		
	Lilongwe East	7	123	128,216		
	LADD Total	**36**	**590**			
Machinga ADD	Balaka	6	83	116,807		
	Machinga	8	140	167,492		
	Mangochi	11	187	281,508		
	Zomba	9	162			
	MADD Total	**34**	**572**			
Blantyre ADD	Mwanza	2	24	30,318		
	Neno	2	37	32,989		
	Blantyre	5	83	190,095		
	Chiradzulu	3	62	106,163		
	Thyolo	6	143	165,721		
	Mulanje	5	57	185,251		
	Phalombe	6	70	106,377		
	BLADD Total	**29**	**476**			
Shire Valley	Chikwawa	6	124	134,775		
	Nsanje	5	58	83,889		
	SVADD Total	**11**	**182**			
NATIONAL TOTAL						

CONTACTS FOR KEY AGRICULTURE OFFICES

Contact	Mailing Address	Land Line
The Secretary for Agriculture irrigation and Water Development	P.O Box 30134, Lilongwe 3	01 789 033
The Director, Department of Agriculture Extension Services	P.O Box 30134. Lilongwe 3	01 755 522 01754 049
The Director, Department of Animal health and Livestock Development	P.O Box 2096, Lilongwe 3	01 756 389 01 750 455
The Director, Department of Crop production	Private Bag 30145, Lilongwe 3	01 789 252
The Director, department of Land Resources Conservation	P.O box 30291, Lilongwe 3	01 755 352
The Director Department of Fisheries	P.O Box 593, Lilongwe	01 788 511 01 788 716
The Station Manager, Bvumbwe Agriculture Research Station	P.O Box 5748, Limbe	01 471 206 01 471 527
The Station Manager, Makoka Agricultural Research Station	Private Bag 3, Thondwe	01 534 254 01 534 283 01 534 249
The Station Manager, Kasinthula Research Station	P.O Box 28, Chikwawa	01 420 207 01 420 439
The Station Manager, Chitedze Research Station	P.O Box 158, Chitedze	01 707 041 01 707 224 01 707 398 01 707 023
The Station Manager, Chitala Agricultura research Station	P.O Box 315, Salima	01 262 850
The Station Manager, Lunyangwa Research Station	P.O Box 59, Mzuzu	01 332 687 01 332 961
The Station Manager, Mkondezi Research Station	P.O Box 133, Nkhatabay	01 353 317 01 353 227
The Station Manager, Lifuwu Research Station	P.O Box 102, Salima	01 857 385
Domasi Fisheries	P.O Box 44, Domasi	
The Programme Manager, Karonga Agriculture Development Division	Private Bag 4, Karonga.	01 362 382 01 362 244
The Programme Manager, Mzuzu Agriculture Development Division	P.O Box 131, Mzuzu	01 334 056
The Programme Manager, Kasungu Agriculture Development Division	P.O. Box 28, Kasungu	01 253 744
The Programme Manager, Salima Agriculture Development Division	Private Bag 1, Salima	01 622 13
The Programme Manager, Lilongwe Agriculture Development Division	P.O. Box 379, Lilongwe	01 753 171 01 754 577
The Programme Manager, Machinga Agriculture Development Division	Private Bag 3, Liwonde	01 542 410
The Programme Manager, Blantyre Agriculture Development Division	P.O. Box 379, Blantyre	01 824300
The Programme Manager, Shire Valley Agriculture Development Division	Private Bag 1 Ngabu	01 427 211 01 427 204

Key Calendar Events

Month	Events	Holidays
January		New Year's Day 1st
January		John Chilembwe's day 15th
March	World water day: 22 March	Martyrs Day 3rd
March		Good Friday
March		Easter Monday
April		Labour Day 1st
May		Kamuzu Day 14th
June	World Environmental Day: 5	
July		Independence day 6th
October	World Food Day: 16	Mother's Day
November	World Fisheries Day: 21	
December	World Aids Day: 1	Christmas Day 25th

Metrics conversion

Length 1 centimetre (cm) = 10 milimetre 1 metre (m) = 100 centimetre 1 kilometre(km) =1000 metre	Surface or area 1 square centimeter = 100 square millimeter 1 square metre= 10000 square centimeter 1 square Kilometre= 100 Hectare
Weight 1 gram (g) = 1000 milligram 1 kilogram (kg) = 1000 gram 1 tonne (t) = 1000 kilogram	Volume and capacity 1 millilitre = 1 cubic centimetre 1 litre = 1000millilitre= 1000 cubic centimetre 1 kilolitre= 1000 litre= 1 cubic metre