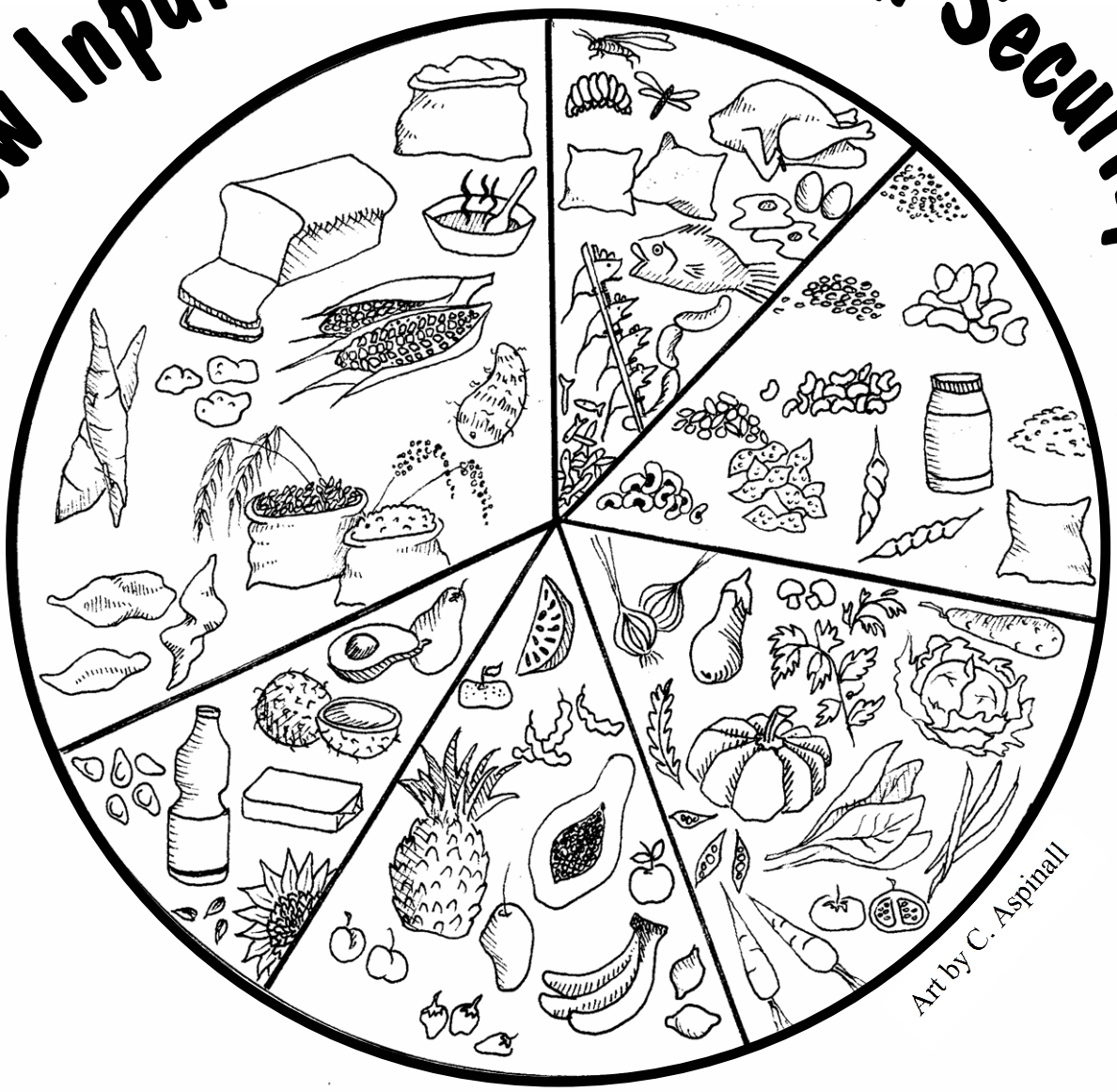
Low Input Food & Nutrition Security



Growing & Eating More Using Less

December 2005 First Edition

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World Food Programme Malawi with a Canadian Impact Grant

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Acknowledgements

This Model is the work of many people inside and outside of Malawi. It has been under development for centuries when you include the traditional knowledge that went into many of these pages! The Model as you read it today was made possible because of the following people and organizations:

- **Government of Malawi** Ministries of Agriculture, Health, Gender, Natural Resources and Local Government;
- **World Food Programme** / **Malawi** who wrote the proposal and provided general support;
- **Canadian Impact Grant** who provided the funding;
- **Participants** who put together and tested the Model over the 4 month period - each person is listed in the appendix of this manual as a resource for you to utilize;
- **The Model Sites** that tried the ideas and provided feedback to improve the Model in practice – they are also listed in the appendix of this manual as a resource;
- **Stakeholders** who provided feedback, encouragement and who excitedly awaited the compilation of this work – their support was overwhelming!;
- **Carmen Aspinall** who did many of the line drawings, including the one on the cover;
- **June Walker** who introduced us to the concepts of Permaculture, first through her booklet "Dimba La Kumpanda" (The Kitchen Garden), then through her example, and through co-founding the Permaculture Network in Malawi;
- **US Peace Corps** who taught me the importance of culture and sustainable development;
- **Nature** who provides us with all we need to live and the lessons we need to use its treasures. **My mom, grandparents**, and **church** introduced me to nature and taught me to love and be in awe of it all – people, cultures, plants, animals, water, rocks, etc.

A big thank you also needs to go to my colleague and husband, **Kristof Nordin,** who provides most of the artwork for the teaching posters, many of the line drawings in this manual, and guidance for interpreting lessons. Both he and our daughter **Khalidwe** have developed patience with me as I spend most time with other people and at my computer!

Zikomo nonse!

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Introduction from the WFP Country Director

Since January 2005 WFP Malawi made a major step towards transitioning from pure emergency to relief and recovery programming. The overriding goal is to enable vulnerable people, especially those affected and infected by HIV/AIDS, to prolong lives and enhance livelihoods. One key strategy is to promote food diversification in the areas affected by food insecurity. This is all in line with government policy for food diversification and nutrition.

As we all know, maize is still the dominant staple food in the country although it has little nutritional value once milled into refined maize flour. Production of other high value and nutritious crops like vegetables, fruits, legumes and animals is only to a limited extent. Even those farmers who grow these crops primarily sell them for money, not consume them.

To address the challenge of diet diversification inside our food security projects and overcome high maize dependency, I suggest we need two pronged approach:

1.) Encourage alternative crops, i.e., fruits, vegetables, legumes, animals, etc. (indigenous as well as those introduced) and medicinal plants (local varieties and introduced such as garlic, ginger, neem, etc.) throughout communities and around schools, health-centers and homes.

2.) Provide education to community members, students and patients (especially, but not limited to, the most vulnerable) on nutrition and alternative food preparations to improve diets.

With the support of the Canadian Government, WFP launched a nine months investigative study covering twenty pilot projects, to determine an appropriate model for introducing food diversification in food insecure communities, families with chronically ill members, and students (including young children).

This manual, *'Low Input Food and Nutrition Security: Growing and Eating More Using Less'*, is a product of this study. I am pleased to present this final manual to all of you, which was developed and reviewed by many stakeholders in Malawi. The manual presents step by step and hands-on approach to achieve food and nutrition security.

If you look at this manual critically, you will notice this model is about helping people to first understand issues and then to help people choose and adapt interventions that will work for their situation. This is where the mindset of farmers and implementers, including most of us, has failed and needs to change. I strongly encourage you to read and apply the ideas in your own food security projects, your own life, and any other sector. I hope this is an opportunity which you will take full advantage of.

I know some of you have been part and parcel in the development of this manual. Many of you also sent comments to the draft manual which have now been incorporated. I am grateful for all your contributions. I encourage you to use the manual because it is your own product. I also thank the Consultant, Stacia Nordin, who led the whole process in a very participatory manner.

Finally, I am Grateful to the Canadian Government for supporting this study. It is an added value to WFP and anyone else using the model. The model will go a long way in improving our food aid programming so we can improve our lives and our livelihoods.

Domenico Scalpelli
Country Director

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Why & How was this Model developed?

This Model has been under development for hundreds of years! This is close to the truth – many of the ideas in this Model have been handed down throughout many generations because of their success. The modern world still hands down traditional information verbally from person to person, but more commonly, computers and books are used. We felt that the information in this Model needed to be collected, tested and put together into a Model to share with others so that we all can achieve Low Input Food and Nutrition Security.

The idea for this Model started with World Food Programme (WFP) Malawi as they were moving from emergency activities to recovery activities. WFP wanted to develop and test a model that they could use in their own programmes and share with their partners to improve food and diet diversification. They wrote a proposal to Canada Fund and were awarded 38,000 US Dollars to develop and test the model.

Several programmes and projects within Malawi have attempted to introduce the concepts of food diversification, but experience from these projects report difficulty in sustaining the projects in the long-term because of high outside inputs, labour and water requirements. The failure of these projects primarily lies in their approach:

- Purchasing and distributing 'inputs' such as water pumps, seeds, chemicals, and farming implements instead of focusing on local resources the community has; and
- Providing 'incentives' for participating instead of focusing on those who are truly interested in learning and applying the information.

There are a few projects in Malawi that have been able to successfully sustain food security by using local resources and knowledge while using very little labour, water and outside inputs. Our goal is to share these nationally and globally by putting the information into a model.

Project objectives

The overall objective is to assist communities and government extension workers (and non-governmental organizations who support these two groups) to improve food diversification methods. Specific objectives of this project are:

1. To determine appropriate models for introducing crop/animal and diet diversification in food insecure communities, families with chronically ill members, and students of all ages, but especially in primary school.
2. To devise a monitoring system which will measure the impact of food and nutrition education sessions and gardening activities.

Process used to achieve the objectives

To give you an idea of how we developed the ideas that are in the manual, the following is an overview of the main activities which were used to develop and test this Model:

April:

- The consultant attempted to contact everyone in Malawi that works with food and nutrition security to collect any existing models. There is no need to "reinvent the wheel" and we wanted to get as much experience into the Model as possible.
- Next, we needed to decide who was going to be involved in developing and testing the Model. WFP's national and district level partners chose 4 districts to develop and test the model, based on a set of criteria that included climate, lifestyles, cultures, etc. – we wanted a model that had basic concepts that work in any setting. The districts were Mangochi, Mulanje, Kasungu and Nkhata Bay.

May:

- Within those districts, we worked with partners to select a variety of sites to develop and test the model to reinforce that the ideas work anywhere! The Model development included schools, churches, hospitals, community based groups, model agricultural villages, etc.
- To find the right participants, we used a set of criteria. The criteria focused on participants dedicated to the idea of the model and how it would help them and help Malawi. No one was paid to participate (no allowances or other bribes!) and everyone had to agree to take part fully in the process, including a low-input workshop that included a menu of local foods with lots of discussions, field trips, group work and mental energy expenditure.

June:

- During the next 4 months from June to September we set up over 20 model sites to test the ideas. About 75 participants worked in teams in each district, with about 18 participants per district. The team members included the Ministries of Health, Gender, Natural Resources, Agriculture, and Local Government; NGOs; CBOs; Churches; Networks, and individuals.
- We started with low input workshops in each district which covered the basic issues, reviewed all materials and projects available, visited a number of sites, and decided on the model's concepts in terms of technical and implementation approaches. The consultant pulled together each of the district's ideas to keep the project running as one big team.

July, August and part of September:

- After the workshop, the teams worked together in the 5 model sites for that district. The consultant returned to each model site 2 times to collect feedback on the Model concepts. Not only did we work with the 75 participants, we also worked with hundreds of other people who were at the model implementation sites. There were approximately 4,000 people from more than 70 organizations that tested (and are still using) the ideas.

October

- The consultant put all the Model concepts and ideas into a draft manual and sent it to about 350 Stakeholders for review.

November:

- Sixty stakeholder representatives from forty-five organizations provided feedback at a two-day review meeting.
- The consultant integrated all the feedback into this manual and WFP/Malawi distributed the manual to approximately 80 organizations within Malawi.

The impact of the model during the testing phase

The results of the Model have been incredible. One of the key concepts of the model is to help people understand each concept and technical methods so they can make their own decisions to improve food and nutrition security. People who participated understand so well that they've come up with their own creative designs better than I've seen in technical books! Model sites that already had 'typical' high-input gardens and farms have been able to:

- ✓ Reduce their work by over half;
- ✓ Reduce their watering by half;
- ✓ Double and triple their yields;
- ✓ Reduce their sweeping area by 25-75 percent;
- ✓ Start mulching instead of sweeping to hold water and make use of more soil;
- ✓ Use 'waste' to creatively design areas to improve soil and water health;
- ✓ Use all water instead of wasting it;
- ✓ Have healthier plants and animals;
- ✓ Improve their financial status by saving money previously spent on water, seed, food, and chemicals;
- ✓ Improve diets through eating less staple foods, diversifying staple and eating more of the other food groups.

Art by Intermediate Technology Publications

See resources in appendix

It was truly astounding at how much progress the model sites made in 3 months. I believe that we all have succeeded in putting together all the pieces that are needed to improve food and nutrition security now and for a lifetime!

Using this Manual

Target Audience

Art by C. Aspinall

- This manual is primarily written for facilitators who are working with households and communities in Malawi. It is aimed at people providing a tool to people who are planning, implementing and evaluating food and nutrition security projects or other sustainable livelihood projects.
- It can also be used to advocate with leaders in using a philosophy of sustainability when writing policies for a country, city, village, or organization (such as a school, aid-provider, or church, etc.).
- The ideas can be used anywhere around the home, in public areas around the community, at schools, churches, office buildings, road design, markets and other towns or city planning, and in commercial settings.
- It is aimed at Malawi, but is NOT only for people in Malawi as these issues are a worldwide problem! This model can very easily be adapted to other countries and situations.
- The manual is written for people who can speak English, but we aim to use simple wording that is easy-to-read and translate into Chichewa or other language.
- And probably most importantly, it can be your personal guidebook for improving your own life!
- The ideas in the Low Input Model can be applied by ANYONE, technical or non-technical, and that will be stressed throughout. Rich and poor alike can eat better for themselves and for the health of our planet!

Manual Style & Format

- We write the manual to you, as if we were discussing the ideas. Those developing the Model attributed a large part of our success to this personal, enthusiastic, yet professional style.
- We aim to create a manual that is easily reproduced through photocopying locally. For this reason the format is all blacks or grays with white backgrounds.
- We aim to use pictures and line drawings that are relevant to the text and the target audience and that can easily be photocopied or re-drawn locally with local artists. In subsequent editions of this manual additional computer photographs can be converted to locally produced line drawings.
- The text portion of the manual is all in this font. The text portions are aimed at both you and the target audience in the community. You can use much of the text portion directly with your

target audience. Where there are questions within the text you may choose to ask this to your audience and elicit a response from them.

- Sometimes there are reduced handouts within the text portion of the manual. All the full page handouts are all in the appendix of the manual. These reduced handouts make it easier to refer to what is in the handout without having to continually flip to the back to see what the handout contains.

> Handouts for reference within the text portion of the manual are surrounded by a box like this. At the bottom it will state:
> *Full page handout available in appendix*

- Throughout the model there are teaching notes that are specifically for you, the planner and facilitator. These teaching notes all look like this box:

> **Teaching Notes**
>
> - All notes to you, the planner and facilitator, are in boxes formatted just like this one.
> - **Purpose:** These boxes are meant to give you ideas on visual aids, activities, and connections to make to other parts of the model as you teach.

Manual Content & Flow

This manual is an overview of the main concepts in the Low Input Model; it is not a comprehensive teaching tool on its own. The manual should be used with reference and teaching materials that are listed in the appendix. These include:

- ✓ Malawi's Traditional and Modern Cooking
- ✓ Food and Nutrition for PLWHA
- ✓ Permaculture Design Booklets
- ✓ Eco-Sanitation Composting Toilets

In the future, additional resources need to be developed to support Low Input design such as:

- ✓ Field guide to Foods in Malawi
- ✓ Using Grey Water Irrigation
- ✓ Rainwater Harvesting systems
- ✓ Energy use: *Sun, Water, Wind, Animal, Humans*
- ✓ Integrated Fish & other Animals manual
- ✓ Low input posters & other teaching tools – ideas are given in this manual how to produce your own by copying the ideas for handouts and posters.

The manual is based on Permaculture principles, which is a sustainable way of living that includes agricultural designs, building and other infrastructure design, system design such as political structures and financial systems, energy and resource use, etc. *(see appendix for more additional resources on Permaculture).* The majority of this Low Input Model comes from the Permaculture Nutrition Training Manual 2000-2005[1] editions. Some of the text is taken word for word from that manual, other parts have been shortened.

The manual flows in the order that the material should be covered when you are explaining the ideas to others such as in a workshop training format, shorter sessions over time, or personal reading. The content starts with the most basic principles and leads into more complex ideas, planning, and design. Each idea builds on the previous ideas, becoming whole model by the end of the manual. See the Table of Contents for an overview of all topics and concepts:

Topics – The ideas are grouped into 9 topics, within each topic there are a number of concepts. Each topic ends with a few questions that you should be able to answer before going onto the next topic.

☑ **Concepts** all begin with a checkmark symbol. The concepts help you understand the reasons why each idea is important and then provides you with different ideas for implementing the ideas, along with teaching notes for sharing the ideas with others.

The Appendix has more detailed information such as food and medicine recipes for people, plants and animals; session plans; menus; handouts; and workshop schedules.

Providing Feedback on the Low Input Model and/or Manual

Please provide feedback on this model to World Food Programme Malawi. During 2006, World Food Programme / Malawi plans to evaluate this model and solicit feedback from those who received the manual. This feedback will be analyzed and used to adapt the model and to produce an updated manual along with a teaching packet for facilitators.

As you use the manual and the model, be sure to evaluate the impact of your work and to take notes to continually improve the ideas. Let us know what you use and develop on your own for activities and visual aids so that we can share your ideas in the next edition of this manual.

Manuals are our generation's way of passing around traditional knowledge – let's continue to 'hand-down' these important pieces of knowledge and skills and to improve them along the way to create a better to our future!

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Topic 1: Low Input Implementing

Before starting to learn about the low input technical topics and concepts, it is important to start with describing what low input means. Low input is a way of thinking and living that is used throughout every part of the model. It will be useful if you come back to read this topic again after finishing the manual, as you will understand the ideas even better.

Low *is not* specifically for the poor or the rich. It is for anyone who cares about the world's resources and leaving this world a better place for the next generation.

☑ What does 'Low Input' mean?

Low input refers to the use of just about any resource: money, labour, energy, water, soil, seeds, time, etc. There are two main points to consider as you decide what systems to design:

1.) Balancing inputs with outputs: The goal is to achieve the highest output from the lowest amount of inputs. It is a "business" mindset that reduces 'overhead' and utilizes all 'waste' materials produced from the system. Life requires input – without input there wouldn't be life! We must have 'inputs' of food, water and air or our body would provide us with no 'outputs'. The key question to ask is "Will the output I get from more input be worth it?"

2.) Consider all impacts: The low input method considers all impacts from each system including financial, social, environmental, psychological, sustainability, etc. In other words, the choices we make in life can affect other people, the soil, the water, the air, the local economy, etc. When you design a system (or develop a programme) aim for strengthening our world by empowering people, improving social and financial systems, and caring for our environment.

Examples of Low input thinking

- One example of this would be to consider the impact of additional watering of your plants – if you put the additional time, energy and water into the plant will they give you a higher yield? Is that higher yield worth your time, energy and water expenditures? Sometimes the answer will be yes, other times the answer will be no – it depends on your situation.
- Another example is that you may decide to divert a stream to build yourself a fishpond that will improve your income, your diet and your water supply. But if you divert the stream completely without allowing the water to continue to flow in its original direction to people downstream – the impact on their lives could be very negative and their reactions may not be worth your inputs. Or, instead you may think of changing the design to eliminate or reduce such negative impacts.

☑ Basic Principles of Low Input

Before you start implementing the model, you will need to get into the right mindset, if you are not already there. For those of you who generally sit in an office, you may need to get out of your office and interact with the types of people you want to work with in order to really grasp these ideas! These principles will surface in every topic that we discuss throughout the model:

1. **Focus on local resources –** Local resources often take less input (such as fuel, money, time, etc.). Resources such as local foods, trees, animals, and cultures are becoming lost and their importance being forgotten. This diversity in our local resources is exciting, unique, and important to the health and well-being of everything on our planet!
2. **Focus on solutions not problems –** It is easy to get bogged down with problems, but try to stay focused on helping people move toward creative solutions. This manual will give you many solution ideas for yourself and to share with others.
3. **Encourage creativity –** Help people think in new directions and develop common sense approaches. New solutions that are better than what we have today are just around the corner, and you or one of your target audience just may be the one to discover it.
4. **Help people choose method(s) from a wide range of ideas (or create their own!) –** There is an old saying that goes: "There is more than one way to skin a goat". The meaning of the saying is that there is more than one way to do things, and more than one way is 'correct'. This model will present a range of technical ideas to start people thinking.
5. **Consider local cultures –** Everything in this book needs to be adapted! To the situation, the culture, the time of year. There are many outside influences that will guide you.
6. **Integrate –** Make connections whenever possible. The connections may be to other parts of this Model, or it might be to a related topic, such as messages on gender or health, etc. This means you need to stay informed of what the current messages are in other fields.
7. **Be flexible and adapt –** There will be changes. Every situation is unique.
8. **Look to nature for lessons –** Nature can teach us a lot from its systems, its way of interacting, its way of staying healthy and strong without outside human inputs. We can gain ideas, understand issues better, and build inspiration from time spent in nature.
9. **Use uniform messages in all related sectors –** Advocate with the government to create uniform food and nutrition security messages that all sectors use. The messages need to start at the youngest level of education and continue to the highest levels; to be part of the Health system for hygiene, sanitation, nutrition therapy, and other disease prevention and treatment; to enhance the programs in Gender and Community Services for orphans, vulnerable children, women and gender equality; to support lives of those directly affected by HIV in their home; and to link together with civic education programs for effective mobilization and communication.

☑ Improved Low Input Training: Aim for Understanding

> "People will not preserve and protect a natural environment which they do not understand or respect. When people learn about the relationship of all forms of life to each other and to the earth, they begin to have a responsible attitude toward natural resources."
>
> --Author Unknown

Source: Permaculture Nutrition Manual, 2000 edition, Kristof & Stacia Nordin

Low input methods to help gain understanding

The quote just above is not limited to understanding the natural environment, it applies to all topics. The underlying key to success is to help people understand the concepts so that they can make their own choices for their lives. There are many ways to help people understand Food and Nutrition Security issues. Specific ideas will be included throughout the manual in the technical sections, but some more general overarching approaches that work well for achieving understanding are:

- ✓ Explanations using locally understood languages
- ✓ Interactive discussions, small groups, and other ways of sharing information. Farmer Field School-type activities are proving to be very effective when well-facilitated. Personal stories from your own life can be very motivational for others, but don't overdo it, it isn't about you!
- ✓ Pictures, posters, or videos if it is possible in your context – People tend to quickly connect with real-life pictures such as before and after photos or pictures of people that look like themselves doing the activity that you are proposing.
- ✓ Handouts, pamphlets, books, magazines – In simple terms for non-technical people. People who read really soak up the resource tables at workshops and in libraries.
- ✓ Visits, tours, field trips, walks – choose local, low input visits first! There is a lot to see right around us before putting together a proposal to use fuel and money to go far away!
- ✓ Demonstrations and displays – visually seeing something is a lot more effective than just hearing about it. Even more effective is to have someone do it with you!
- ✓ Listening, asking, probing, observing – these are all skills that can provide us with a lot of understanding. My mom always told me that I have two ears and one mouth for a reason!
- ✓ Dramas – a well-made drama can be very effective for integrating social issues into your teaching. (See Theatre for Development and Storybook Workshop in the appendix.)

One of the greatest benefits to using these methods is that everyone's understanding increases, meaning, both the 'teacher' and the 'student' gain a better understanding of the issues through their discussions.

Change the workshop allowance mentality

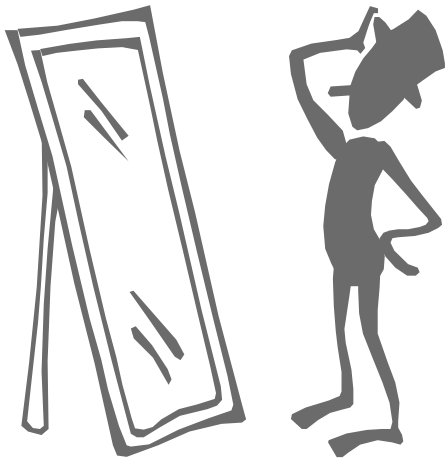
In addition to these general tools, there needs to be a big change in holding workshops and training. Why do people love to attend a workshop in Malawi? People love to attend a workshop because of the financial allowances that they receive.

The result of this habit is that thousands of trainings have been held in Malawi, millions of dollars have been spent, and we are getting nowhere. This must stop! As part of this model, low input training needs to aim to be a role model itself. This includes:

- ✓ NOT paying people to attend trainings. Allowances should NOT be an incentive to attend any workshop. In Malawi, most people cannot afford to pay for training workshops as is done in other countries, so you may need to support transport, food, lodging and trainers fees for participants, preferably through directly paying the hotel and restaurant, not providing cash incentives.
- ✓ All foods and activities should send a message of Food and Nutrition Security. This means that the menu should support the 6 food groups, local foods, and have limited amounts of expensive non-nutritious items. Activities should all follow the principles in the model.
- ✓ Clear communication is required to explain these low-input training principles to the participants before they choose to come, so people are prepared.
- ✓ Advocacy should take place so that all workshops in Malawi take place in this manner.

☑ Increasing Skills: Aim for Creativity

After you have started understanding the basic principles in this Low Input Model and gained an understanding of the technical issues in the following chapters, we challenge you to increase your skills in applying the information. You won't have to go far to find a group to apply the information with - the first person you will want to try the ideas out with is YOU!



That looks like a nice target audience!

Role Modelling – Start with Me!

There are many places that you will find to start thinking and acting differently in your own life with what you choose to eat, to buy, what products to use, what you do with your 'trash', how you travel, etc. The longer you use the ideas, the more your eyes will be open to a better way of living.

As you and your colleagues advance your skills in Low Input methods, two skills that you will need to work on are:

1. Improved 'designing' skills – "Putting all the information together" into a design is a skill that continues to improve over time. There are many different parts to consider in every design, and there are many different 'correct' design options. It will be important for anyone implementing these ideas to keep trying different designs and adapting them as needed over time.
2. Assessing ALL Resources – Food and nutrition assessments need to include a list of all food resources in the area; the season and amounts available based on the food groups; when seeds can be collected for multiplying the foods; organic waste resources for soil health; all natural resources so that income generation ideas can be brainstormed; human resources; all water resources including grey water and potential roof catchments; etc. Malawi is rich with overlooked resources. It is time that we put all our resources to their fullest use. The Malawi Food Guide is one tool to guide your assessments. Another tool is the Monitoring and Evaluation topic near the end of this manual which provides a sample assessment tool. As your skills increase you will see more and more resources around you which can be used!

Low input methods to improve other people's skills

Once you improve your low input skills, it is almost impossible not to share the ideas! It will start affecting both your work and social life. You will find yourself serving different foods to friends and co-workers for tea breaks, you will talk differently, you will look at how people are treating this earth differently, and you will want to help people see the resources that are currently wasted.

You can start by raising awareness and knowledge through using the methods on the previous pages, then when people are ready to advance their skills you can:

- ✓ Mentor, advise, and provide two-way learning and support – It is usually helpful for an experienced person to visit individuals or groups after initial training. Many people leave a workshop or session thinking that they understood a concept, but when they start to apply the concept on their own they find that they have questions or problems. The 'experienced person' needs to have good facilitation and mentoring skills to help people think through problems that arise, to focus on solutions, and to continually think about what local

resources they could be using. When we tested this model, we returned to all the model sites in small groups. We found this part of the process to be very effective for both the trainer and participants in order to see what areas weren't clear in the workshop and to see first hand the issues of implementation in that unique setting. It is helpful to have a network or group of people that are using the ideas to support each other and share skills.

- ✓ Provide advanced skills training – Reserve follow up training for those who are actually trying to apply the new skills – your follow up visits will help you identify who is ready for more advanced training.
- ✓ Increase spread of skills through additional trainers – This last step of training trainers is for people who show improved skills in the topic and have the potential to be a great facilitator. Not everyone has the personality to be a trainer – select trainers for this level carefully!

☑ Testing your understanding of Low Input Implementing

1. Define Low Input - What is the goal of Low Input living?
2. List at least 5 methods you can use to help others understand new concepts.
3. List at least 1 important advanced skill and at least 1 way you can support advanced skills development.

Teaching about Low Input

- **Defining Low Input** - The low input principles are usually covered on the first day of a workshop, or at the start of a project, or before starting to use the model personally. Low input is then reinforced throughout the workshop or project.
- **Barriers to Low Input:** Discuss with the group some of the barriers to reducing input, some barriers and solutions we've found include:

(1) Low input equals 'lazy' culturally and being lazy is looked down upon. Originally we actually thought of calling this the 'lazy person's farming' because of the amount of time and energy we saved and were able to use differently. But, it isn't so much 'lazy' as being creative - we often do a lot less physical work than our neighbors, but we do a lot of creative thinking and designing instead.

(2)There is a strong culture of high input, especially energy expenditure and money – sweeping, clearing, burning, hoeing, walking far, and buying instead of using free things. This is true in other cultures and in our development aid programmes, too. Our job is to open people's eyes to why this type of living and development is unsustainable and provide solutions on how we can use the world's resources more wisely.

(3) As with any new concept, it takes time to think in a new way and then to act in a new way – be patient, mentor when appropriate, advocate and be a good role model!

Topic 2: Understanding the Impact of Food Choices

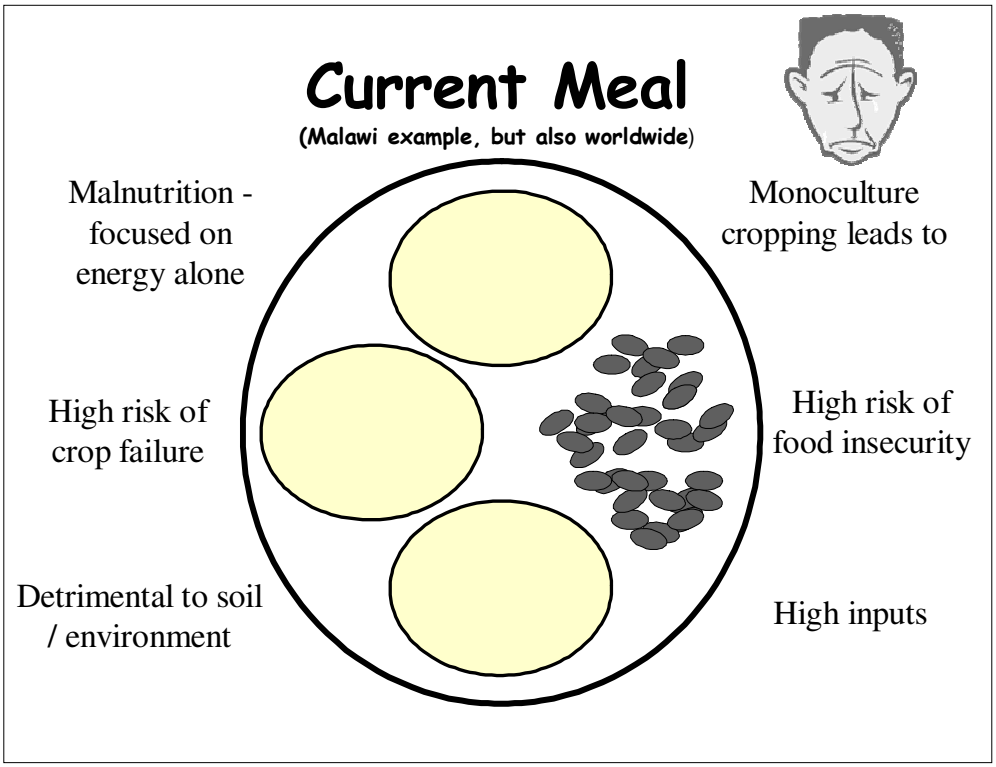
☑ Current meal

What did you (or the group you are talking with) eat for your last meal? What about the meal before that? In most cases, the answer will be *nsima* and *ndiwo*. How much *nsima* was on the plate? A mountain! How much *ndiwo*? Very little. There are several problems with choosing to eat this way. Firstly, this diet is unable to provide our bodies with all the nutrients that it needs for health, growth and energy. The diet might meet energy needs and make us feel full, but other forms of malnutrition are high in Malawi, mostly because of this eating pattern.

Next, if you choose to eat this way, a farmer must raise the plants and animals to supply it to you – this is true whether you buy or raise your own food. The natural diversity has to be cleared away to make room for mostly one food, maize, and another area cleared to provide the '*ndiwo'*. These monocultures are very risky – if the one crop that is raised is attacked by a disease, or an insect, or the weather is not favorable for that item, then the crop or animal suffers, resulting in a poor food supply. This puts households at a high risk for food insecurity.

Another harmful effect of monocultures is the impact on the environment. The soil becomes exhausted of its nutrients. The insects and diseases love these conditions and can easily attack the plant that is growing there. This leads to high use of 'inputs' to fight the insects and diseases and to possibly provide the plants and animals with 'treatments' in the form of fertilizer, antibiotics, or other chemicals.

It also means high labour and time input for the farmer that is raising the foods.



Source: Permaculture Nutrition Manual 2004 edition, Stacia & Kristof Nordin, nordin@eomw.net
Full page handout available in appendix

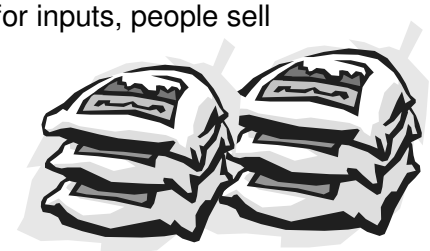
Cycle of Dependency

Unfortunately, the current lifestyle in Malawi is not strengthening the Cycle of Better Living; it is essentially doing the opposite. The method which people are using to produce maize is destroying the environment and many people are caught in a 'Cycle of Dependency' which they are finding it difficult to break away from. This dependency is a relatively recent change in Malawi's history:

- Change from a variety of traditional foods – Diets have evolved with humans and Malawi is no exception. Maize was first brought to Malawi with the Portuguese in about the 1790's and it took quite a long time for it to catch on as a food, probably around 1910. So just about 100 years ago, people in Malawi were eating primarily from the indigenous food supply: millets, sorghums, roots (like yam), vegetables, fruits, nuts, beans, oil seeds, animals, and insects. These foods were found at all different times in the year, not just during one harvest month. Ask some of the elders around you what foods were there back then, what life was like, and how many years people were living back then.
- Maize takes over – After maize was introduced it took about 120 years to take over. Why did people change? Maize was probably encouraged because of its higher yield compared to the millets, sorghums, and roots, but the maize was not as well-adapted to Malawi's climate and insect population as the traditional foods, so it was more susceptible to failure. In addition maize is not as high in nutrients as the millets and sorghums. Another reason it may have been encouraged is because it is what the foreign influences knew how to grow. Others might have wanted to copy the so-called "developed" countries instead of the "lower status" stigma that were given to the local foods. Whatever the reason, the governments during that time put policies and programmes in place favouring maize and established penalties if the policies were not followed.

- Hybrids and fertilizer – As people cleared more land of local plants, trees and animals (which were traditional foods, medicines and other needs) to make space for maize, they exhausted the land. In answer to this, seeds were changed (to hybrids) to be able to grow in the poor conditions humans created and chemical fertilizers were imported. At first the government paid part of the price for these new inputs so that people could afford to buy them, but eventually the government could not afford it so the inputs became too expensive for people to afford.

- Selling food and resources for money – To get the money for inputs, people sell their crops and animals – the very items that they spent so much time, money and energy to raise! Each year the soil becomes more unhealthy, so each year the farmer tries to buy even more fertilizer and seed.



- Loss of knowledge about local options – While people became so focused on maize, many lost the knowledge of other options for agriculture and eating. Most people are unsure how to care for the soil and do not know the foods around them or how to use them.
- Cycle of Dependency – As people lose knowledge of alternatives to the system of hybrid seed and fertilizer, they are stuck in the cycle of high input farming – a cycle of dependency. This cycle is producing the 'current meal' and affecting our health, the health of our environment, our social interactions, our self-esteem, and our economy.

This Cycle of Dependency can start being broken immediately by putting into practice the Cycle of Better Living which will be covered on the next pages. As the Cycle of Better Living strengthens, we can move away from chemicals, high labour and other high inputs.

As we move through the topics in this model, we will discuss small, simple steps that can be used to help us break this Cycle of Dependency in more detail.

1.) New Crop, Maize: Farmers are encouraged to abandon traditional food sources for higher yielding hybrids such as maize.

2.) Change in diet: Maize takes over as the crop of choice. Early yields, as promised, are extremely high.

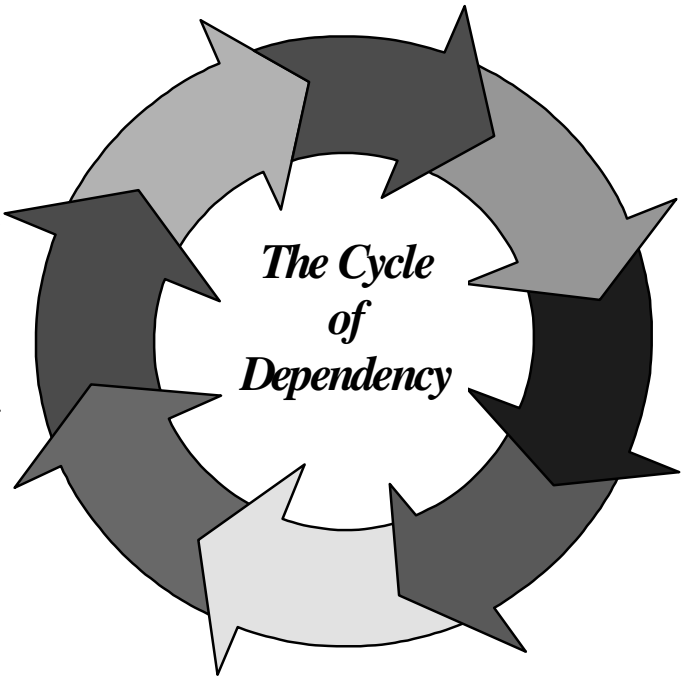
3.) Money Required: The higher yields, however, carry a price. Hybrid seeds are not self-replicating and therefore need to be repurchased each year. Maximum growth is encouraged through the use of expensive chemical fertilizers.

4.) Soil Destroyed Successive maize crops on the same soil combined with the "slash and burn" method of preparing for each year's planting begins to take its toll. As less organic matter is added back into the nature cycle, more chemical fertilizer is needed to maintain the yields.

5.) More fertilizer, less money: Local farmers are forced to sell off more and more of their yields in order to cover the costs of the increased demand for artificial fertilizer and new seed. Less food ends up being saved each year as more ends up being sold.

6.) Dependent on Inputs Farmers end up caught in a "cycle of dependency" where each year they are dependent on buying seed and chemical fertilizer to ensure a harvest. Many find that they can barely afford to produce enough maize to meet both their food needs and their expenses.

7.) Forgotten alternatives Over reliance on a single crop causes susceptibility to drought, pestilence, crop disease, and a poor diet—which in turn increases vulnerability to malnutrition and human diseases. As this dependency grows, alternatives disappear. The knowledge of indigenous plants that had once been used or grown as food crops slowly fades out of memory, and people become locked even deeper into this detrimental cycle.



Source: Permaculture Nutrition training manual, draft 2003, Stacia & Kristof Nordin, nordin@eomw.net
Full page handout available in appendix

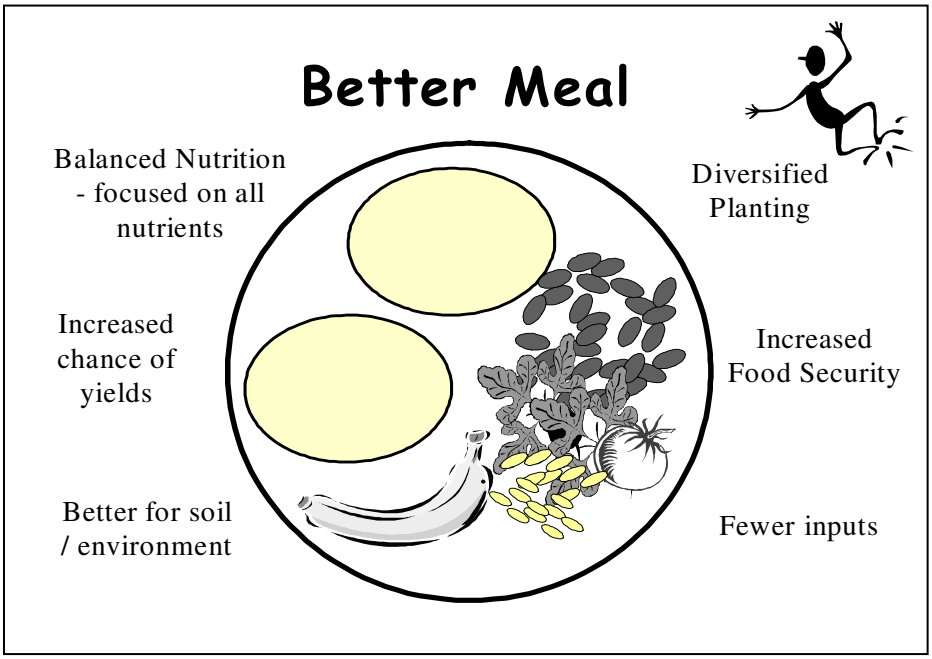
☑ Better Meal

There is a better choice than the current meal and the problems that come along with it! This better meal is the *same total amount of food* as the current meal. A better meal has a balance of different foods on the plate, and the foods change from time to time to include a wide variety of different foods. The main differences are:

1. There is *less nsima* or other 'staple' on the plate than the current meal has. And, instead of choosing maize *nsima* every meal, other grains, starchy roots or starchy fruits are included. There still may be *nsima* on the plate at every meal, but it will be made from different foods.
2. The *ndiwo* (vegetables or beans or nuts or animal foods) and *fruits* on the plate are increased, and the type of ndiwo and fruit changes from time to time to include a wide variety of different choices. These *ndiwo* provide more nutrients than the staple foods, making the nutrient content of the meals higher with less bulk.

The benefits of this meal are that it provides all the nutrients a person needs and it supports a farmer to produce a wide variety of different foods. This diversified planting and raising animals in an integrated way helps each part of the farmer's designs to support each other, to balance the insects, to naturally prevent diseases, and to be ready for any type of weather. There is an increased chance of harvesting many different foods *all year long*. Even if the maize does poorly, there will be legumes, animals, fruits, root crops, oilseeds, just as a few examples, that will do well. This can improve the food supply during the whole year.

Growing a variety of foods is also better for the environment, helping to create healthy plants and animals and taking away the need for chemical treatments and other high input treatments. Other inputs such as labour and water also decrease over time as the soil, plants and animals become healthy again.



Source: Permaculture Nutrition Manual 2004 edition, Stacia & Kristof Nordin, nordin@eomw.net
Full page handout available in appendix

Cycle of Better Living

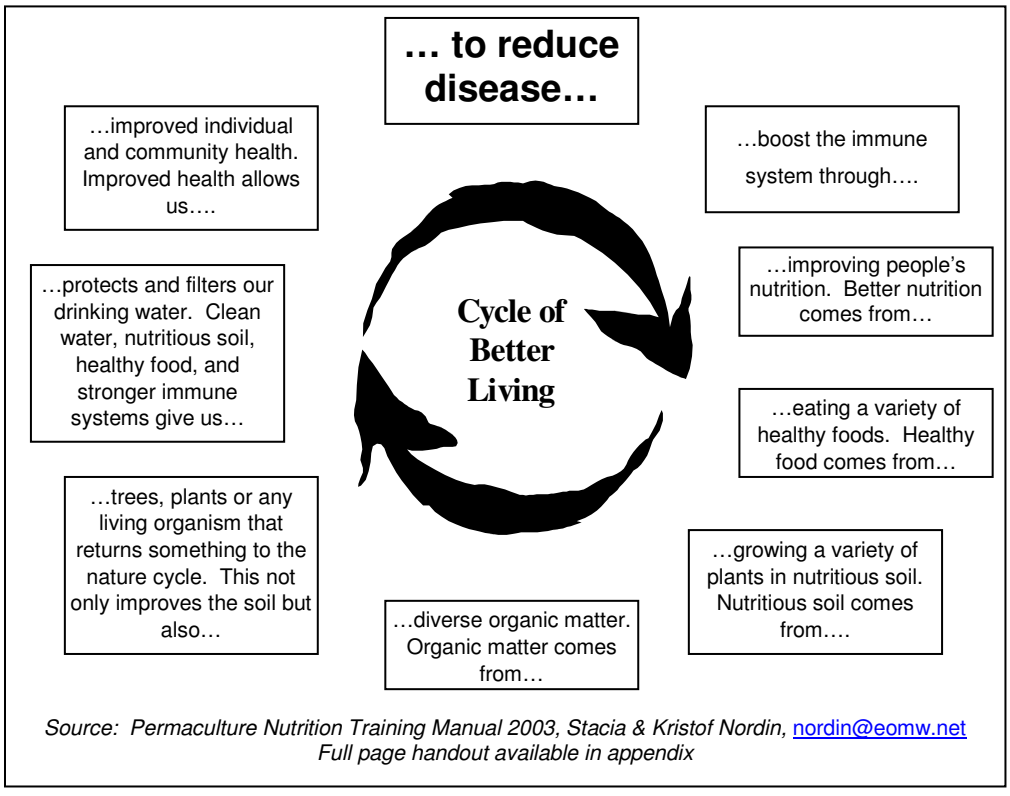
Another way to look at this better meal is through a Cycle of Better Living related to health and the environment. If we want to improve our health and our quality of living, we need to start seeing how everything is connected to everything else. This is what is meant by the saying,

"No problem or solution stands on its own"

When we look at the following cycle we will see that every part of it needs to be nourished and strengthened to achieve a healthy life.

- ✓ To prevent and fight diseases our bodies must have a strong immune system. Our immune systems work inside us like an army to keep out diseases and to fight off any disease that do make it inside.
- ✓ Part of strengthening the immune system is to provide the body with good nutrition. We also need clean air, exercise, rest, work, etc. to strengthen the immune system.
- ✓ Good nutrition requires a diverse variety of healthy foods.
- ✓ Healthy foods require nutritious soils in order to grow.
- ✓ Nutritious soils require diverse organic matter (the soil's 'diet').
- ✓ Diverse organic matter comes from having a wide variety of trees, plants, and animal life.
- ✓ When the soil is healthy it also protects, filters and purifies our water.
- ✓ Clean water and organically-rich soil lead to a healthy environment that provides us with nutritious foods and healthier living.

Healthier living means longer, stronger, quality lives with which we can dedicate towards strengthening this cycle even further! Each of these topics will be covered in this manual and we will share specific ideas for strengthening this cycle.



Source: Permaculture Nutrition Training Manual 2003, Stacia & Kristof Nordin, nordin@eomw.net
Full page handout available in appendix

Teaching about the Current Meal and Better Meal

- **Posters**: When using the model to teach others, it is helpful to have a poster with a picture of the current meal on one side of the page and a picture of the better meal on the other. Before showing the picture to the group, discuss with them about their current way of eating. After they tell you what they usually eat, ask if it looks similar to the picture you drew. Discuss the problems with the current meal, then show the picture of what we are aiming for. This Current Meal / Better Meal poster should go up on a wall so you can use it throughout your teaching sessions.
- **Discuss with a Flip chart or blackboard:** This is helpful, but not required for guiding discussions about the 2 cycles. The facilitator can ask leading questions for each point and as the participant give the answers, write key works around the cycles. Most people know this information, the facilitator can help make the connections and draw out lessons.
- **Meals and Snacks**: This is a good time to discuss the menu for the workshop or sessions. Be sure that the foods you serve are delicious, and then describe the meals and snacks with excitement (not over-excitement as they may think you are trying to fool them!).
- **Menu Hints:** There are menu ideas and recipes in the appendix of this manual to help guide you. In workshops, make the menu changes slowly throughout the week (or whatever timeframe you have).

Hint 1 - Start close to what people know: I generally start with a meal similar to what people are used to, but with a few small changes such as: 2 *chipande* of *nsima* made with a mixture of *mgaiwa* and *ufa woyera*, 1 *chipande* of beans with lots of herbs and flavours, half a *chipande* of lightly cooked greens and 1 fruit. If the reaction is ok, I then reduce the number of times maize is served each day and increase the variety more and more.

Hint 2 - Serve a favourite item with a new item: Another hint I use is to always serve a favourite food when a strange food is served – an example of this would be to serve grilled chicken with unpeeled fried potatoes, and a raw vegetable salad. People tend to love chicken, but aren't too sure about potato skins and raw vegetables. (This meal is an example of getting the most nutrients from your foods through edible skins and raw foods). The idea is to wean people onto the Better Meal, not to scare them off! There are a lot of other creative menu plans, including a few examples in the appendix. Try them yourself and have fun with it!

- **One Experience with the Cycle of Dependency:** One of the model reviewers, Katie Greenwood, wrote that in her experience, Malawian subsistence farmers are often aware of the changes that have taken place in regards to the Cycle of Dependency. She draws on the history-based approach to describe the changes in agriculture, and have found people respond well to it. She tries to bring people to their own conclusions by asking leading questions. One leading question she often uses to begin is asking older people in the group how agriculture has changed since the time they were children. She was very surprised how well most people could identify the progression and consequences of chemical fertilizer use. She also emphasizes in her discussions that this is not only a Malawian problem, but in fact it is exported from "developed" countries largely for their own benefit. And the high input agriculture and diet is causing problems there, too!

☑ Nature Cycle

Before talking about how to raise and eat our food, it is important to understand the soil, water, plants, trees, animals and insects around us. To do this we need to understand the Nature Cycle – this is how the earth has continued for thousands of years to maintain its own health.

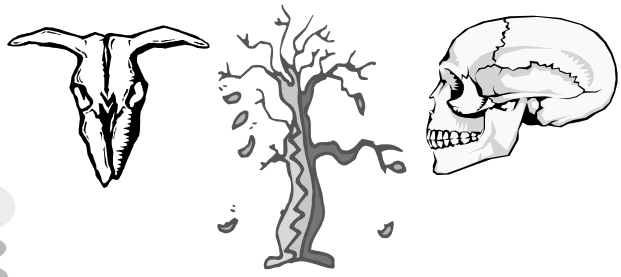
- Death: Everything in Nature dies. When it dies what happens to it? Think of a leaf or anything else that has died and dropped to the ground.
- Decomposition: It may be eaten by animals or insects (such as termites or earthworms) and made into manure, or it may be crushed under someone's foot or paw. After it is crushed up, it mixes with chemicals in the soil made by very small animals (micro-organisms).
- Nutrients: The nutrients from the leaf are now in the soil. Some nutrients can be used by the plants, other nutrients need to be changed before the plants and trees can use them.
- Sun, Water, Air: Nutrients mix with water, air, sun and/or other chemicals so that the roots of plants and trees can use the nutrients to grow.
- Plant & Tree Growth: When the plants have the nutrients, sun, water, and air they need, they can grow. Each species needs different amounts of nutrient, sun, water, and air.
- Use of Plants & Trees: Animals (such as humans) and insects use the plants and trees so that they can grow. Animals eat the plants and then another animal (such as a human) may eat the animal. Some animals and insects eat plants, others eat animals, and others eat both plants and animals. While the animals and insects are living they leave their manure and other waste (such as feathers, hair or fingernails) to feed the soil.
- Death: After some time, plants, trees, animals and insects die, all at different times. When each of them die they strengthen the soil. **This happens over and over and (repeat!).**

Now think about things around you that don't die – such as human made plastics and chemicals, what happens to these items when they enter the nature cycle? These items will block the cycle instead of assisting it. More will be said on waste in the Soil Health Topic.

Teaching about the Nature Cycle

- ***Go Outside!*** The best way to use the nature cycle is to go outside and look at it! Take a walk, look at things dying and living; at decomposition; at the effects of sun, water and air; at plants and trees growing; and at things using the plants and trees. Talk about non-organic trash and what happens to the nature cycle when plastics and chemicals are used.
- **Link to Religion:** Many people in Malawi quickly connect the Nature Cycle to their religious beliefs, such as creation, and bringing up this connection may catch the attention of many. This may not be appropriate in some cases, be sure to know something about your audience!
- **Posters / Flip Chart / Blackboard:** The following page shows an example of what the nature cycle looks like. This can be drawn with pictures and titles in the local language.

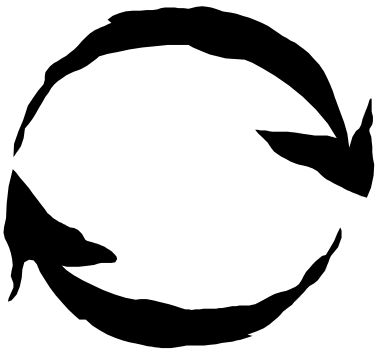
The Nature Cycle

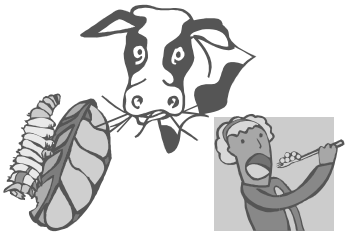


DEATH
All things in nature eventually die. This process of death is not the end of the cycle, it is only the beginning. Without death there would be no life. Humans are not exempt from this cycle, we are part of it.

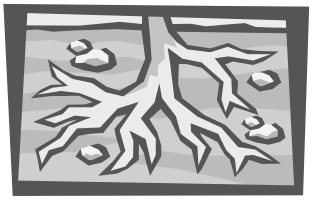
LIFE
As the cycle of nature is strengthened, life begins to sustain and renew itself. As life passes on to death, it not only continues the cycle, but enriches and nurtures it.

DECOMPOSITION
When organic matter dies, insects, animals and micro-organisms break it down into smaller parts. This decomposition releases nutrients into the soil.





PLANT USE
All living things use plants and trees for food, shelter, fuel, building supplies, medicines and more! Plants give nutrients back to the rest of the nature cycle.



NUTRIENTS
As decomposition releases nutrients they are changed into a form that can be used by plants. The plants absorb these nutrients through their root systems.

PLANT GROWTH
The healthier that the cycle of nature is, the healthier the plants will become. This allows them grow up strong, fight off pests and disease, and produce offspring with these same traits.

SUN, WATER, AIR
Some of the nutrients must combine with other things before they can be used. Plants use nature's gifts of sun, water, and air to convert their nutrients into energy. This energy allows plants to grow.

Source: Permaculture Nutrition Training Manual, Draft 2003. Kristof & Stacia Nordin nordin@eomw.net
Full page handout also available in appendix

☑ Testing your understanding of the impact of food choices

1. What is the Current Diet? How does it impact health, food security and environment?
2. What is the Cycle of Dependency and what are 3 ways it can be broken?
3. What are the main differences between the Current Meal and Better Meal?
4. What is the Cycle of Better Living and what are 3 ways it can be strengthened?
5. What is the Nature Cycle? What are 3 ways we can affect it positively and negatively?

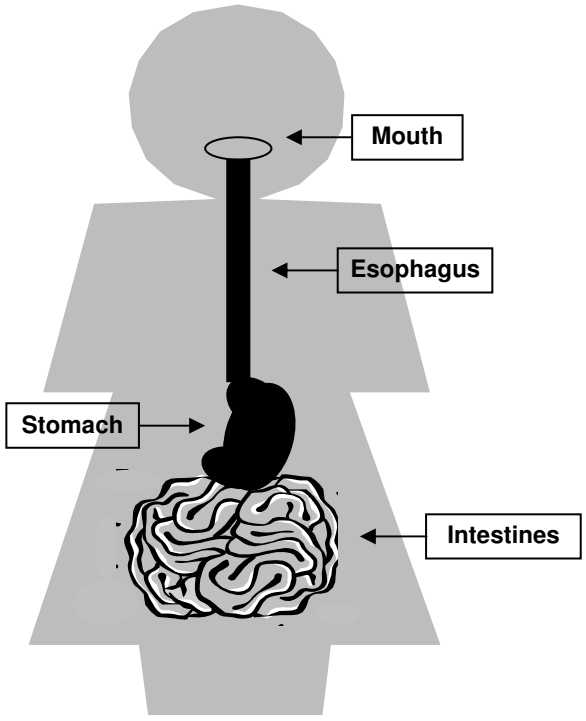
Topic 3: Diet Diversity

☑ Understanding Nutrition

Nutrition means "how any living organism changes and uses food for life". Anything that is living has its own specific nutrition needs—plants have their own nutrition needs, as do trees, animals, insects, and humans. Each of these living things satisfies their nutrition needs by using food and drink from other parts of the nature cycle. For example, plants mainly eat parts of the nature cycle that are decomposing, but there are also plants that eat insects. Animals eat both plants and smaller animals, but some animals eat just plants and others eat just animals. Even as humans we differ in what we eat, some of us eat just plants while others prefer both plants and animals.

It is from this food and drink that we get nutrients, the part of the food that the organism *must* have for life and health. So, when we have "Good Nutrition" it means that the foods and drinks you are eating are providing you with the nutrients you need for life and health. With poor nutrition our bodies have poor health, and with extremely poor nutrition, eventual death (and back to the nature cycle!).

Digestion: How our body changes food to nutrients



Source: Permaculture Nutrition Manual, draft 2003.
Similar hand drawn poster available in appendix

Before our body can use foods and drinks it must change them so that they can enter our body, it does this through digestion to break down the food to smaller parts, then uses absorption so the nutrients can enter the body.

- Mouth: When you give your body food the first thing you have to do is chew. This is the first part of digestion, and if we chew well, it makes the rest of the digestion process much easier.
- Esophagus: After the food or drink leaves our mouths, it enters our esophagus for swallowing. Both chewing and swallowing takes energy, which is one reason we give soft, easy to swallow foods to people who are sick.
- Stomach: the food mixes with liquids and

enzymes, which are chemicals that break down the food to very small pieces. These enzymes are sometimes part of the foods that we eat and they can also be made by the body. Now the food and drink is all mixed up and you can't even tell what it was to begin with! Now it is nutrients and other things and they are ready to be absorbed or removed from the body.

→ Absorption is how nutrients enter inside the body so that they can be used, which takes place mainly in the intestines. Some substances don't enter the body but instead continue on through the digestive system and leave at the end of the intestines. The nutrients that are absorbed pass through the wall of the intestines and enter the body's blood stream.

→ Blood: The blood carries the nutrients to where they are needed in the body, or if they aren't needed right away, the body will store them for later use. Some nutrients are stored very well in the body, but others are not and need to be a part of our daily diet, such as water.

Teaching about digestion

- **Poster:** A visual aid showing the key parts of the digestive system is helpful (mouth, esophagus, stomach, and intestines). You can also appropriately point to the own parts of your body to emphasize the areas that you are talking about
- **Connections**: Many connections can be made to digestion and absorption:

(1) You can connect to the way the soil works to chew organic matter and uses chemicals to breakdown the nutrients and the way plants absorb nutrients into their roots. You may wish to do this once you get to the section on soil instead of now, but you can mention that later there will be a connection to the soil.

(2) You can connect to disease prevention explaining that healthy intestines can prevent harmful bacteria from entering into the body. Healthy intestines are made by eating all the nutrients your body needs.

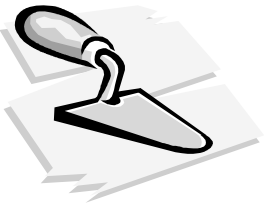
(3) You can talk about enzymes and can connect to the fact that eating raw plant foods provides enzymes for easier digestion (lemons are one food that is hailed in positive living manuals) - cooking plant foods destroys the enzymes.

(4) You can connect to times of illness and the importance of eating foods that are easy to swallow, digest and absorb.

6 Nutrient Groups

We now know of almost 50 nutrients that the human body must have to sustain life, although scientists are still finding and naming other substances in foods and drinks that can improve human health. One of the easiest ways to teach about the nutrients is to describe the nutrients in 6 groups instead of naming all of them individually. A simple way to learn about each nutrient group is to relate it to a home and the things that are used to keep that home in order:

To build a home in Malawi we first start with the *bricks*. Just like bricks build our home, **proteins** work to build the walls of all the structures in our body. Proteins are used to build hair, skin, muscles, etc. Just like bricks are made of many ingredients, protein is also made up of smaller parts, there are 8 types of protein that we must eat as adults; babies have 1 more they must have and it is found in breast milk.



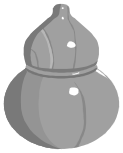
The **minerals** are required in many areas of our bodies where they join or connect parts of our body together. Just like *mud* connects the bricks our homes, minerals connect bones, blood, and other parts of our bodies. There are at least 14 different minerals that our bodies must have.

The **carbohydrates** are what our body burns for its daily fuel needs, much like *firewood* in Malawi that we burn on a daily basis for cooking and heating water. Carbohydrates give us energy for living, working, playing, thinking, etc. There are 2 types of carbohydrates commonly referred to as 'starch' and 'sugars'.

The **fats** in our body are also burned for energy, but they give more fuel than the carbohydrates and they are easy for our bodies to store for later use. This is much like *paraffin*—it is stored easily in our house and we burn it less often for fuel. There are 3 types of fat that we must eat, all come from plant sources.

The **vitamins** are important for protecting our body from intruders that are trying to cause disease or sickness in our bodies. This can be likened to a *watchdog*, which protects our home from unwanted guests. There are at least 16 vitamins that our bodies need for protection.

The last of the nutrients, but probably the most important as we would die very quickly without it, is water. **Water** has many cleaning jobs in the body, similar to the way that we use *water for cleaning* in our homes. Drinking water is forgotten in many food and nutrition programmes, and this is something that needs to change!



Nutrients are not the only thing that keeps our bodies healthy, strong and energetic, there are also other parts of our foods and drinks that work to fight against disease, such as medicines and fibers. **Fiber** is found only in plant foods and assists our bodies in removing waste and disease. It works with water in our bodies to sweep away waste much like a *broom* works in our homes to sweep away dust and other debris.

All these nutrients work together for 3 main purposes:

1. to **build** the body,
2. to give the body **energy**, and
3. to **protect and heal** the body from diseases.

It is important to remember that all the nutrients need each other to work properly. Eating a diverse diet that includes a wide variety of foods can provide all the nutrients that we need. In the next section we will look at how we can plan our diets to make sure we get everything that we need.

Teaching about Nutrients

- **Poster**: A creative poster showing a village that highlights the bricks, mud, firewood, paraffin, watchdog, water, and a broom is helpful for this lesson. Keep the poster up as you will refer back to it all the time.
- **Foods or pictures of foods:** Showing foods for each of the nutrient groups as you talk about them may help people to remember the nutrients.
- **Stress that foods are *mixtures* of nutrients:** Many people have a misconception that a food supplies one nutrient. By bringing foods into the session, you can also reinforce that foods are actually mixtures of many nutrients. When you are talking about protein you might use groundnuts as an example, and then when you move onto minerals, you will use groundnuts again, as you will again when talking about fats and vitamins! If you used ufa woyera (highly process maize flour) or other processed staple as an example, you can stress that it only supplies carbohydrate, without giving us other nutrients.
- **Reinforcement at meals and snacks:** Ask people what they are eating for nutrients over and over again. Use helpful hints if they aren't sure what the nutrients are, such as asking about the taste or feel of the food (generally a 'tart' or 'sour' taste indicates the vitamin C; another example is the 'feel' of fat in your mouth). There is a handout in this manual on food groups and nutrients that uses this approach. Just be careful not to go overboard with repetition or people might get irritated with you!
- **Technical figures:** For those that want more technical information about the nutrients in the current and better meal pictures, see the appendix. Both meals in the chart include 2 cups of food, but look at how many more nutrients are in the Better meal! This can also be shown in a chart or picture format, such as the Permaculture Nutrition training manual uses or the Ministry of Agriculture 6 Food Group Posters.

☑ Planning a better diet using Food Groups

Diet: Why Do We Eat the Way We Do?

The way we eat is called a diet. Diet comes from a Latin word that means 'way of life' and that is just what a diet is, the pattern of meals and snacks that a person typically eats and drinks.

We all have our own patterns of eating. What went into you learning your diet? The answers are numerous! Your parent's (or other caregiver's) choice of foods and when they made them available to you probably started your diet. Then, as you grew older and had more control over eating, other people and conditions influenced the diet that you chose—your community, culture, religion, friends, school, work, the foods that you had available because of season or cost—they can all affect the way you eat.

Because of all these reasons and more, each of us has our own diet. Many times people say they choose the foods and drinks just because they like or dislike that food. This is true in part, but taste is something that is learned and can change over time. We can each make changes in our diets so that it can provide us with good nutrition!

As was discussed in the 'Current Meal' discussion, often in Malawi a meal isn't a meal without nsima and ndiwo! The nsima is usually made from maize, and the ndiwo is usually greens or beans.

But there are also many foods and drinks that people consider as just snacks—cassava, sweet potatoes, green maize, minerals (sodas), fruits, ground nuts, breads, chikondamoyo, mandasi, chips, etc.—the list is quite extensive. What about these snacks? They are also foods and drinks. Some of them provide us with many nutrients and others very few, and that's just how our body sees it, it doesn't know that you've just fed it a meal or a snack, it just knows if you've given it any nutrients or not. Nutrients are vital for our bodies, so that it can do its work in maintaining our lives and keeping us healthy.

Diet

Parents, Religion, Taste, Money, Culture, Season, Time to Prepare, (…keep listing!)

↓

Meals & Snacks

Meals: Nsima & Ndiwo

Snacks: Scones, Breads, Nuts, Cassava, Chips, Crisps, Roasted Maize, Sweet Potato, Minerals (Fanta), Chikondamoyo, Popcorn, (…keep listing!)

↓

Food & Drink

↓

Nutrients!

Source: This may have been adapted originally from VSO's How to Group a Balanced Diet.
See Resources in Appendix

Nutrients are the most important part of food for your body!

Teaching about Diets

- **Diet discussion on a board:** Write diet on a blank board, then ask for a definition and then give the real one. Ask how people learned their diet and write down all the answers given. Say again that the definition of diet is a set of Meals and Snacks and write those words on the board. Ask what foods are a meal and list the foods given. Ask what foods are snacks and keep prompting for more! The list of foods considered a meal will probably be short, and the list of snacks will be quite long. Finally refer back to information they learned about digestion and remind them that whatever we have eaten is broken down into nutrients and this is what the body is most interested in for building, energy, and health.
- **Stress small diet changes:** An important part of changing our diets is understanding that taste is learned and can be changed over time. Stress that change doesn't take place overnight and that small steps toward a better diet are encouraged. One example of this is replacing nsima with another staple (rice, cassava, potatoes, yams, etc) at one meal to start with, then slowly increasing other staples until you have more variety. Another would be to add one more food group to your meals, then slowly add more food groups until you have at least 5 food groups every day.

The Food Groups

Nutritionists created food groups to help people select a healthy diet. We also use the food groups as a tool to teach others about good nutrition and meal planning. Each country around the world makes their own food group model depending on their culture and the nutritional needs of the people in their country. Food groups are just a guide to choosing a healthy diet, don't worry too much about getting a few foods in the wrong group, the most important thing to remember is that **variety is the key to good nutrition**.

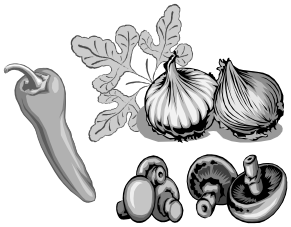
Malawi is now using a 6 Food Group model where as previously in Malawi we used only 3 food groups. The main reason for this change is to help people get more variety in their diets. The model which is included in this book is based upon the groups released by the Ministry of Agriculture in 2001. Each Agricultural Development Division (ADD) or Extension Planning Area (EPA) should have posters, a flip chart, and a community nutrition book.

It is helpful to start with what most people know for food groups and then to build from there. Most people in Malawi still know the 3 food groups, which were Protective Foods, Building Foods and Energy Foods. The new 6 Food groups just split each of these food groups into two groups as is show in this table.

Old Groups	Malawi 6 Food Groups
Protective	Vegetables
	Fruits
Building	Legumes & Nuts
	Animal Foods
Energy	Staples
	Fats and Oils

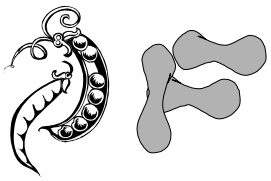
The foods in each of the 6 food groups are grouped together by the *nutrients* in the food. They are not grouped by how the food grows! For example, you will find some foods that grow in the form of a fruit but are actually a part of the vegetable or fat group. The *nutrients determine which food group* that the food will belong to. Almost all foods are a mixture of nutrients, but there are usually one or two nutrients that the food is really high in:

1. **Vegetables** – The foods in the vegetable group are primarily made up of *vitamins, minerals, and water.* Vegetables have very little of the energy nutrients, which is one thing that sets them apart from the fruits food group. Vegetables also contain fibre and many medicinal properties, especially in the herbs we use for flavor. Vegetables can include leaf crops, fungi, some root crops, and some fruit crops.

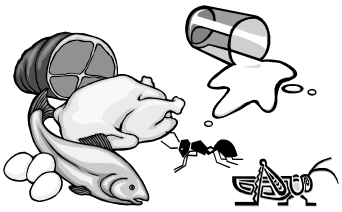


2. **Fruits** – The foods in the fruit group contain mostly *carbohydrates, vitamins & water.* All fruits grow as fruit crops, but all fruit crops are *not* part of fruit food group – some are put into the vegetables, legumes, or fats food groups. Fruits have an added benefit of fibre and other medicinal properties.

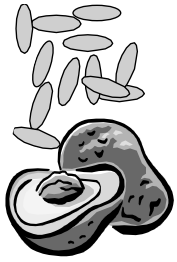
3. **Legumes & Nuts** – These are mostly *protein & carbohydrate*, but soybeans and nuts also contain a lot of fat, too. Legumes are seeds that are enclosed in a pod and may be root crops or fruit crops. Legumes are also useful for many vitamins, minerals and fibre.



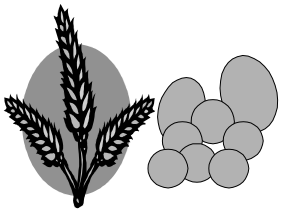
4. **Animal Foods** – The foods in this group contain *protein & fat.* Many of the foods in this group are also good sources of vitamins and minerals. All of the foods in this group are of animal origin including eggs, milk products, fish, and insects. Although this is a food group, nutritionally it is not necessary to include this food group as part of a healthy diet. Many vegetarians omit this food group.



5. **Fats** – The main nutrient is *fat* in the fats food group. Fats are easily identified by the way the food feels in your mouth when you eat it; they often feel smooth & creamy, like butter. Fats can come from oilseed crops, from animals such as lard or butter, and even some fruit crops. Oils can also be pressed out of a variety of different seeds from the other food groups.

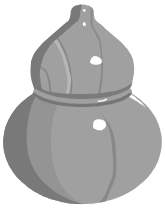


6. **Staples** – Staple foods include foods that are high in *carbohydrate*. There are many other nutrients that we can get from the staple foods group depending upon how we process the staple foods before we eat them. For example, whole grain maize flour (mgaiwa) has many more nutrients than white maize flour (ufa woyera). Staple foods include cereal grains, starchy roots, and starchy fruits.



There are some foods that do not fit into these food groups, two examples are:

- → foods made from processed sugars (minerals, candy, sobo, cakes, etc.)
- → drinking water.



Nutritionists generally recommend that people choose very little food that is made with processed sugar. Water, on the other hand, is a very important part of a healthy diet and it needs to be included every day in our diets.

Malawi Food Guide: The 6 Food Groups

This is a hand drawn and computer enhanced version of the Malawi Food Guide Poster. The real posters are available from the Ministry of Agriculture, Food & Nutrition Unit, Lilongwe, Area 4 at the Agricultural Communications Branch. Phone +265 (0) 1755522

Muzidya chakudya chamagulu onse tsiku lilionse kuti mukhale ndi thanzi

Chakudya Chokhutitsa

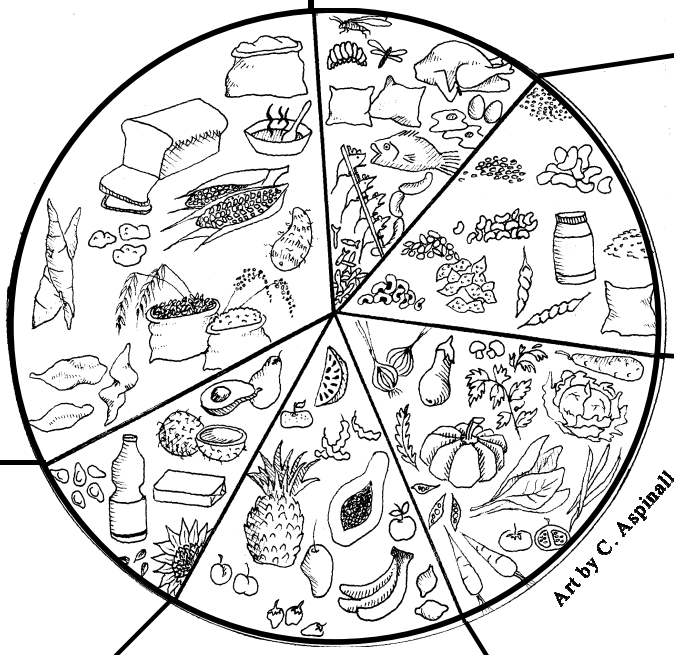
Buye, Mbatata, Nthochi osakwima
Chilazi Mpama,
Chinangwa, Coco
Magombo,
Mapila, Chinaka,
Mawere,
Mchewere,
Kachewere,
Kanjedza
Chinkhoma,
Chikolwa,
Chimanga,
Tirigu,
Mpunga, etc.

Zachokera Nyama

Chambiko, Mbewa, Ngumbi, Nyama, Nsomba, Mkaka, Mazira, Magazi, etc.

Nyemba & Mtedza

Khungudzu,
Chimbamba,
Mbula, Mtedza,
Nzama, Khobwe,
Nandolo, Kabaifa,
Kalongonda, etc.



Masamba

Msaka, Mlozi,
Chisoso, Bononge,
Maungu, Adyo,
Mabilinganya, Luni,
Zikanyanga, Chipwete,
Msaka, Zumba, Chewe,
Limanda, Kholowa,
Nkhwani, Mlambe masamba,
Mbilidzongwe, Mtambe,
Njerenjedza, Anyezi, Bowa,
Tsabola, Kambuzi, etc.

Zamafuta

Mbewu a maungu,
bononge,
kayimbe, etc.
Mafuta ophikira a
mbewu osiyanasiyana
Mpendedzuwa,
Mapeyala,
Nkoko, etc.

Zipatso

Bwemba, Masawo, Jamu, Mposa,
Matowo, Chinanzi, Mchisu, Mavwende,
Kayime, Chidede, Mkhyu, Nthudja,
Mvilo, Mbula, etc.

Artwork by C. Aspinall. Computer layout and design by S. Nordin.

Full page handout available in appendix.

Teaching the Food Groups

- **Posters**: Use the official Malawi Food Guide posters from the Ministry of Agriculture. One is included on the following page as an example of what it looks like. In the future it would be helpful to get a high quality handout of this, either in a photocopy or higher input color copies, to increase awareness of the food guide. The version of the poster used in this manual is a good start. It is a great take home reminder of the food and nutrition security discussions.
- **Foods and drinks**: Having examples for each of the food groups helps people remember what foods go into what groups. As you describe the groups, you can have a pile of foods that you put into food groups using handwritten titles. Show how much an adult should eat in one day from each of the food groups.
- **Connect Food Groups to Nutrients:** People tend to confuse the 6 groups of *nutrients* with the 6 groups of *foods*. Usually when you ask people what food group a food belongs to, they will name a nutrient instead of the food group. Repetition, practice and gentle reminders are helpful for people to remember. When I talk about the food groups I always ask, "What nutrients are in that group?" For example, pumpkin leaves are in the Vegetable food group. Vegetables have vitamins and minerals.
- **Reminders at Meals and Snacks**: All your meeting's menu should be based on the 6 food group model. You can put up a menu board or paper with the names of the 6 food groups and have the participants write the meals and snacks in the proper food group. There is a sample menu template in this manual that can assist you with this. By the end of the day, all 6 food groups should be filled in with foods.
- **Activity idea – Practice putting foods into groups / meals**: After the participants have listened to your description of the food groups, have a table full of foods that the participants have to sort into the 6 food groups. If you already did this during the presentation, put all the foods back into a pile and have them do it again to see how well they do on their own. This could be done with pictures of foods, food packages, real foods, clay food models if you had them made, or a combination of all of them. This could be made into a game as a competition. Now have people practice putting meals and snacks together for a whole day's meals for themselves.
- **Activity idea: Example Wako:** This is a common children's game in Malawi. Have the group stand in a circle and clap in a steady rhythm. As the song is sung, each person will have to fill in a correct food name that no one else has mentioned without missing a beat or they are out!

  * The leader will say: Everybody mention, *(name a food group - such as Staple Foods),*
  * For Example, For Example Wako, For Example Wako, *(name a food in that food group - buye*),
  * Wako, For Example Wako, *(next person name a food from that food group - mapira),*
  * Wako, For Example Wako, (*etc*.)
  * Go around the circle at least once, then start a new food group.
- **Activity idea Nyama! Nyama! (Meat! Meat!):** This is another popular game and I use it as an icebreaker mid-way through any very technical talk that needs to be broken up! Have the group stand in a circle and one person calls out "Nyama Nyama" then names an animal while jumping. If that animal is considered a food, the group responds by jumping and saying 'Nyama!", if that animal is not considered a food, the group remains quiet. The facilitator should jump at every Edible animal such as dog, cat, snake, spiders – many cultures eat these as a regular part of their diet and the facilitator should explain about those cultures. The facilitator should explain the lesson that there are many foods in the food supply that we could be eating, and that cultural definitions of what is 'food' should be challenged and changed.

Summary of the Malawi Food Guide: The 6 Food Groups

Food Group *(approximate adult servings per day)*	**Main Nutrients** *(other nutrients and helpful properties)*	**Examples of Foods:**
Vegetables *(3 mitanda)*	**Vitamins & Minerals** *(Protein, Carbohydrate & Fiber)*	→ **Greens**: Bononqwe, Chisoso, Luni → **Fruits**: Pumpkin, Tomatoes, Peppers, → **Roots**: Onion, garlic → **Mushrooms** → **Flowers**: Pumpkin flowers
Fruits *(3 mitanda)*	**Carbohydrate & Vitamins** *(Water & Fiber)*	Sweet or tangy fruits that are often eaten raw: → **Fruits** *(except for ones in the fat group or the vegetable group):* Papaya, Guava, Lemon, Tangerine, Banana, *Mchisu*, Grenedilla → **Honey & Sugar Cane? (These provide vitamins and carbohydrate)**
Legumes & Nuts *(1 mitanda)*	**Protein & Carbohydrate** *(Minerals, Vitamins, Fiber, Fat)*	Legumes are seeds in a pod: → **Beans & Peas**: Hyacinth bean (Khungudzu), Grounbeans (*Nzama*), Soybeans, Pigeon pea (*Nandolo*), Peas (*Nsawawa*), Mucuna (*Kalongonda*) → **Nuts**: Mtedza
Food from Animals *(None to 1 chipande)*	**Protein & Fat** *(Minerals & Vitamins)*	→ **Flesh, Blood**: Mice, Chicken, Pigeon, Pig, Goat, Fish, *Ngumbi* (termites), Caterpillars → **Eggs** → **Milk & Milk Products**: Milk, Chambiko, Cheese
Fats & Oils *(3 tablesoons oilseeds or 3 tsp. oil each day)*	**Fat** *(Minerals, Vitamins, Protein)*	Foods that feel "fatty" in your mouth: → **Oilseeds:** Pumpkin seed, Sesame seed, Sunflower seeds, Cooking Oils → **Fruits**: Avocado pear, Coconut flesh → **Animal Fats**: Butter, Lard
Staples *(5 mitanda)*	**Carbohydrate** *(Protein, Minerals, Vitamins)*	Seeds without a pod and starchy roots: → **Grains**: Rice, Wheat, Sorghum, Millet, Maize → **Starchy Roots**: Yams (*Chilazi, viyao*), Sweet Potatoes, Irish Potatoes, Cassava

** Source: Permaculture Nutrition training manual, Draft 2003, Stacia & Kristof Nordin, nordin@eomw.net*

Full page handout available in appendix.

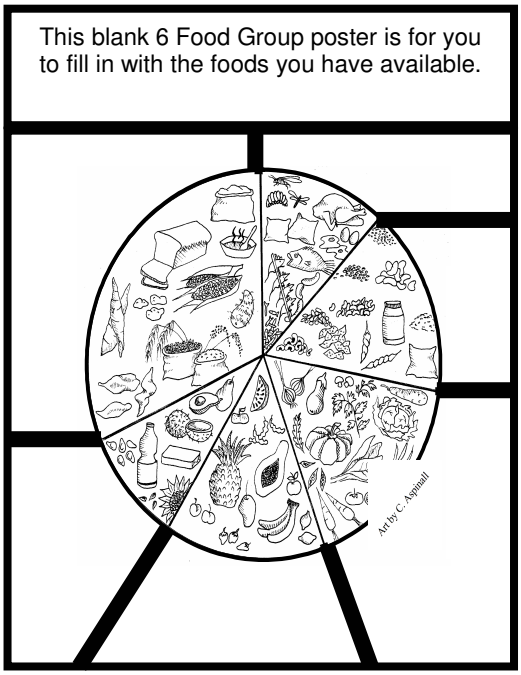
Today's Menu Plan:

Food Groups:	**Fruit**	**Veg**	**Legume / Nut**	**Animal Food**	**Staple**	**Fat**	**Other**
7.00 am Breakfast							
10.00 am Break							
12.00 noon Lunch							
3.00 pm Break							
6.00 pm Supper							

** Source: Permaculture Nutrition training manual, Draft 2003, Stacia & Kristof Nordin, nordin@eomw.net*
Full page handout available in appendix.

☑ Assess ALL foods available using Food Groups

What foods are available in Malawi to meet our needs using the Malawi Food Groups? You can practice using the food groups by listing the foods that you have available and deciding what food group they belong to. As you are doing this, try to include as many of the local or indigenous foods as you can. To take this exercise a step further you can divide the calendar year into seasons and check off when each food is available. When you are done with this exercise you will be able to see if you are able to have a healthy diet all year round. If there are gaps during any of the seasons you can begin by filling them in with foods that you can get and establish around your home.



Full page handout available in appendix.

You can do this exercise for yourself or with a group. It can be done on paper, on a flip chart, a black board, or on the ground. This exercise can take a lot of time with a big group, so only try to list 5 or 6 foods for each food group to begin with. If you are starting a project with a community you will want to create a complete listing of *all* the food resources that are available in every season. Here is a short example to get you going using only 3 foods for each food group:

Food Group	Foods	Hot & Wet Dec – Mar	Cool & Moist Apr – Jul	Hot & Dry Aug – Nov
1. Vegetables	Amaranth	X	X	
	Limanda (Hibiscus)	X	X	
	Cassava leaves	X	X	X
2. Fruits	Papaya	X	X	X
	Mbula fruit	X		X
	Mango	X		
3. Legumes	Cow Pea		X	
	Kamumpanda (lima bean)		X	X
	Mtedza Groundnut	X	X	
4. Animal Foods	Chicken Eggs	X	X	X
	Fish	X		X
	Termites	X		X
5. Staples	Green Banana	X	X	X
	Yams	X	X	X
	Millet		X	
6. Fats & Oils	Sunflower Seeds		X	X
	Pumpkin Seeds		X	X
	Avocado Pear	X		

** Source: Permaculture Nutrition training manual, Draft 2003, Stacia & Kristof Nordin, nordin@eomw.net*
Full page handout available in appendix.

Teaching about Food Assessments

- **Small Group Activity:** Assign one food group to each small group, depending on the size of your group. Have each group list as many (or set a number) foods as they can for their food group and when that food is available. * As the groups are listing foods for each food group, walk around the room and continually encourage them to list foods that are found locally. If you have a group with people from different districts just estimate when the food is usually available – don't get caught up too long on any one food, it is only an example! * After completing this exercise, discuss what you have come up with. If you don't know a food that is named and you have time to do so, have them describe it (how it grows, its color, its taste, etc.), usually you can tell what food group it belongs to using the explanations given in this chapter for each food group. * Does the list show that you can have a healthy diet all year long? If not, what foods could we add from the local resources that would fill in the missing spaces? What strategies could be used to extend the seasons, such as irrigation, food preservation, increased diversification, etc.?
- **Dried Display:** The Permaculture Nutrition project uses a dried food display that includes about 150 foods and product ideas for the 6 food groups. This display has a huge impact on the people that have seen it – they are amazed seeing all the foods available – much more so than just seeing the words on paper. It stimulates discussion about what the foods are and how they are used. It is best to have the food display set up but to keep it covered until after the presentation on food group and completing the small group activity.
- **Idea from a facilitator: Use a blank food guide**: Katie was working in Livingstonia and writes: I draw the food wheel on a blackboard, then I have participants list foods and I draw them as we don't have a poster. Following your lead, I try to emphasize that it's possible for a person to get foods from all 5/6 groups even without money. For each group I ask what foods we can eat without money. I talk about the high nutritional value of some of these foods (e.g. bonongwe). I link these free foods to nature's (or God's, depending on the group) gift to us!

☑ Access to foods available: Revive Local Food Resources!

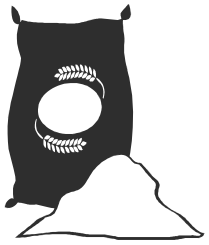
Every one of us has a right to food and nutrition security. This statement is supported worldwide as shown by many of the conventions that countries have signed onto in recent years. How do we make this 'right to food' a reality? First let's look at a bit of food history.

What is Happening to the Local Foods in Malawi?

As we said previously, many of the foods that we find in Malawi now are not the ones that were here a about a hundred years ago. The Portuguese introduced maize to Malawi in about 1800, but it actually is native to the Americas; Mangos were brought over from India; Cassava began in the Americas; Cabbage may have come to us from Asia. When people traveled, they brought their own foods with them, and then when they returned home they brought new foods back to their own country. As people began traveling further and further, foods also traveled longer distances.

Malawi has its own native foods, although many of these foods are becoming harder to find. In the previous exercise, you probably took enough time to list 5-10 foods for each group, but how many foods are actually available to us in Malawi? Take a look at the list of foods in the appendix. Not all these foods are native to Malawi, but many of them are. This list shows that there are almost 600 plant foods in Malawi including 46 Fats, 146 Fruits, 28 Legumes & Nuts, 283 Vegetables, and 52 Staples. In addition to plant foods, there are at least 22 different types of animals/insects that contribute meat, eggs and milk to the Animal Foods group.
So why are people complaining that they are hungry? What has happened to the wide variety of foods that Malawi used to have? It can help to starting thinking about and answering these questions through a brainstorm followed by a discussion of the answers. A few possible reasons for this are:

- **Maize as Food** – When people think of food today in Malawi, they think of maize. The push for maize began around 1900. Other forms of food were ignored to focus solely on maize. At first Malawians resisted the change, but eventually maize took over. Questions to ask include: Why did this happen? Why does it continue today? Think back to our discussion about the Cycle of Dependency.



- **Food (maize) Aid** – In the past, people knew of a wide variety of plant and animals that could be eaten in every season. If the weather during any one season created a low supply of one food, there were other foods available that thrived. People knew which of these plants were poisonous and which were edible. But these days if rainfall is inadequate in order to get a good maize yield then maize is brought in to make up for the shortfall. This system is allowing people to remain dependent upon maize to fill their stomachs and people aren't concerned about finding the local plants and animals that used to provide them with a variety of different nutrients.

- **Loss of Habitat** – As more and more land is cleared to grow maize, local plants are destroyed. Destroying the local plants also takes away the habitat of animals and insects that live there and were at one time an abundant food supply in Malawi.
- **Exploitation of Animals** – In the early years of the colonialists, animals were reportedly hunted and exported to the point that they are very difficult to find in Malawi now. Now poachers have taken over the job!

- **Burning** – Malawians have a habit of burning their land every dry season in order to clear more land for farming, to 'clean' the area, or to make it easier to hunt for mice or other small game. Often these fires don't limit themselves to one area and they end up destroying large areas of trees, plants, and animals that are trying to live there and that used to be used for food, medicine, building or thatching.

- **Influence of a 'Western' Diet and Status** – Humans often look at the foods of another culture as 'exotic' or 'better' than the foods that grow naturally around them. 'Wild' or locally produced foods are also often seen as only for people who cannot afford to buy other foods. In Malawi people strive to afford foods like meats, oils, packaged foods, minerals or other sugar drinks, and foreign vegetables such as cabbage. These foods are often lower in nutrients than local foods and some can be harmful to health if they make up a large part of the diet. Take a minute to consider the time and energy (human, fuel) that goes into producing, processing, packaging and transporting foods from other places and the impacts that has on the environment and the nutrients in the food. Eating local food, where ever you live, is better for your health and better for the environment.

- **Loss of Knowledge** – As less and less people rely on a variety of local foods around them, the knowledge about how to use the foods is also being lost. Even if the food can be found growing nearby, many people don't know that it is food or how to use it.

This list of changes is not unique to Malawi; it is happening all over the world with similar destruction taking place in the health of the environment, resulting in human health problems. You can probably think of more reasons why people are forgetting about local foods and relying on very few foods. The more important question is: What are some ways that we can preserve these local foods so that all people can have all the nutrients they need while protecting the health of the environment?

Increase awareness of Local Malawian Foods

Learn about local foods by asking people in your community (especially the older people), networking with other communities, and reading books available.

Collect & Plant Local Seeds

Collect seeds from nature or through the resources found in the appendix and plant them everywhere! Share these seeds with others who want to improve their environment and their diets. Start seed sharing networks and let others know that you are interested in collecting local seeds. You can also find creative ways to market local seeds for a reasonable price to make them available to others.

Use local foods in your meals, meetings & restaurants

Now that you have local foods established around your home, you can use them in your own meals and experiment with different tasty ways to prepare them. Brainstorm creative ways that you can market local foods for sale in local markets, urban centres, restaurants, or for export.

Teach others about local foods – become an Advocate!

You can teach others about these foods through schools, health clinics, meetings, school clubs, churches, politicians, friends, or with other groups. You can teach through classes, demonstrations on meal preparation, or by having a friend over to eat with you.

Creating products with local resources

Growing your own foods is not the only way to access your food, some people in Malawi purchase their foods, especially people with full time paid jobs outside the home. There are many ideas that could be used in Malawi to create quality indigenous products for our local market. Just about every product that you see imported could be copied with a local resource in Malawi. Part of the Permaculture Nutrition display shows some of these ideas. It is important to understand and have basic skills in business management – pricing the product to include all costs, energy and time input; setting up simple accounting systems; focusing on quality production; securing access to markets; and marketing the product creatively. There are many organizations in Malawi working in this area, and this model encourages relationships with those organizations to gain these skills.

Teaching about Reviving Local Food Knowledge

- **Field Guide to Foods in Malawi:** Pictures of the local foods need to be put into handbook and into posters so that people can see what they look like and how to use them.
- **Dramas about local foods available:** Katie from Livingstonia writes: One group I've worked with wrote a drama on this, showing a father and his child who eats a breakfast of avocadoes and bananas, and a rich mother who gives her son chips and soda for breakfast. The rich boy can't think in school, misses all the answers, and eventually gets sick (in classic melodramatic fashion), while the girl does well and then goes to help her dad in the market in the afternoon. There they meet the rich mother and son (who by now is very ill). The father explains why it is important to eat nutritious foods. The audience, of course loved it! And the best part is it was written by farmers themselves!
- **Song about all foods being food:** Another children's song in Malawi can be adapted to a variety of different foods, it goes:

  * **Line 1:** *(name of food, name of Food)* ndi *(food group)* nso
  * **Line 2:** Kumthirira *(to pour in, name a flavour such as pepper, etc.)* wakoma *(name the food)*
  * **Line 3:** Kweni kweni nsinjiro wankirankira *(with groundnut flour it just gets better and better).*

☑ Utilization, processing, preparation

Now that you understand the importance of nutrients, have seen that there are plenty of foods available, and have increased access to them, it is time to improve the way we use them. Some ideas have already been given such as creating local products to increase access and using local foods in your own meals – but how? First let's look at how much we should prepare to eat.

How much should I eat?

Each person's plate of food should look similar to the Malawi Food Guide Poster – this is generally true for an adult or child or chronically ill. The amounts will differ for different sizes of people, and the choices you make for food groups will differ when you are sick, or you may choose to prepare them differently. Each of the following examples has the same balance of food groups:

Food Group	Grams	Approximate servings of local spoon "*Chipande*"	
		Adult	Child
Fruits	300	3-4	1 ½
Vegetables	400	3-4	1 ½
Legumes & Nuts	100	2-3	1
Animal Foods	135	1	½
Fats & Oils	50	3-4 tsp	1 ½ tsp
Staples	500	5-6	3
Water	2-4 L	8-12 cups	5 cups

A more detailed table is in the appendix

- → **Adult Meal:** 2 spoons staple, 1 spoon legume, 1 piece fruit and 1 spoon vegetable
- → **Child Meal:** 1 spoon staple, ½ spoon legume, ½ piece fruit, and ½ spoon vegetable

Eating Less to get More energy: Children & Chronically Ill

One food group that might change in terms of balance on the plate is the Fats & Oils food group. The size of this serving will depend on your energy needs and the amount of food that you are able (or not able) to eat. Fats and oils are very concentrated in energy, so if you need to get more energy into your body, it is an easy way to do it. They also may need to take longer to eat, such as eating half now and half in an hour or so.

One way to get more Fats & Oils is to eat more servings from that group. Another way is to choose foods from other food groups that are also high in fat. From Legume and Nut group you might choose soybeans or groundnuts; or Foods from Animals you might choose milk products. Using the example from the child and adult

- → **chronically ill person** 1-2 spoons staple mashed, 1 spoon legume mashed, 1 piece of fruit made into juice, 1 spoon vegetable mashed, plus 1 tablespoon sunflower seed paste or groundnut paste (*chiponde*).

There are many different 'right' ways to eat! The most important thing is that there is a variety of different foods from all the food groups in your diet!

Reduce food wastage when preparing foods

There is a lot of food that gets wasted in Malawi, especially in the months right after the harvest season within the villages. But the practice also takes place all year at workshops and other meetings. Huge plates of food are piled on each person's plate that would be impossible for even the biggest person to eat! The menu planned for meetings and workshops should follow the Malawi Food Guide for both the types of foods served and the amounts on each person's plate. This will take some gentle guidance from the facilitator to work on getting the right balance of servings on each plate.

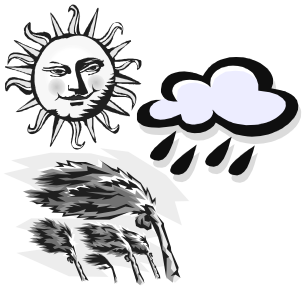
Preserve nutrients from plant foods

The current cooking demonstrations in Malawi mostly focus on porridges for children and a few other basic cooking skills. There is a lot more creativity that can be used in food preparation demonstrations! We need to help people create creative meals and snacks based on all the 6 food groups. Before beginning any food demonstration, basic knowledge and skills on preserving the nutrients in the while preparing is important.

- **Choosing high nutrient Foods:** Just by choosing certain foods over others will allow you to get more nutrients into your diet. By just looking at a food, you can tell something about its nutrition. Choosing *dark* and *bright colored* plant foods often means that you are choosing plants with lots of nutrients. Choosing foods that have *less processing* generally means there are more nutrients. The orange flesh of pumpkins are higher in nutrients than the pale green flesh of mphonda (a local type of gourd, or squash). The dark green leaves of limanda (a local hibiscus) are higher in nutrients than the pale green leaves of cabbage. The darker brown colour of whole grains and sugars ('brown' bread, 'brown' sugar', 'brown rice') have more nutrients that processed.
- **Seeds and Skins:** Often the nutrients are highest in the seeds, outer skins, bran, and germ of foods. These are NOT always edible, so make sure that you know what you are eating! When you eat the skins, make sure you wash the food well. Most people *CAN* eat: most potato skins (cooked), apple skins, mango skins, tomato skins, pumpkin seeds, melon seeds – there are more!
- **Use what you don't eat:** If you choose not to eat the skins and seeds, make sure you plant the seeds and compost whatever you don't want to eat! There are many seeds right in your kitchen that we could be putting in our gardens, flower beds, or pots:

Now that you have chosen the foods you want to eat, kept the most nutritious parts for our bodies, and have put the rest back into nature either as seed or compost, we are ready to think about how we will prepare the food to eat.

There are three energies that destroy nutrients in our plant foods, and they are easy to remember because it is the 3 things that plants have to have to grow!



- Sun or Heat – this 'kills' the nutrients so that they don't work.
- Water – water 'steals' some nutrients, so eat/drink/use any water left.
- Air – this 'steals' some nutrients and you can't get them back.

The longer time the foods are in sun (heat), water, or air, the more loss there is. Knowing this, we can look at ways to protect the nutrients while preparing them to eat or to store for later.

- Raw: The best way to get the most nutrients from plant foods is to harvest the food and then eat it immediately. Many foods like nuts, seeds, fruits, and vegetables are delicious this way. Another benefit to eating food raw is that we use no fuel energy to prepare them. *If you are eating plant foods raw, you want to make sure first of all that it can be eaten raw, and then make sure that it is clean before you eat it.* If you are not using pesticides or other chemicals on the plant you can just pick leaves or fruits, rinse them, and eat them. For root crops you can rinse them off with clean water. Just wash the foods enough to clean off any dirt, if you soak a plant food in water, the water will take some of the nutrients. Try not to soak the plant food too long, but if you do need to soak the food for some reason, be sure to utilize the water because there will be nutrients in it. If the food and soaking water is clean you can drink the water or use it in cooking, if it isn't clean you can feed the water to your plants.

- Cut pieces large – As you are preparing your plant foods, the more you cut it the more the food will come into contact with air, heat and sun / heat. Try to keep the pieces as large as you can while balancing the food preparation time and the size of the mouths (children vs. adults).
- Limit cooking time - If we decide to cook a food instead of eating it raw, it means that we usually add heat and water. Try to use as little water as possible for your recipe, using methods such as steaming or stir-frying. Try to get used to eating your vegetables so that they have a little 'crunch' to them. For example, it you are eating vegetables that were boiled in a lot of water for a long time, then sat around waiting for the nsima to finish cooking, you aren't going to get many nutrients from them!
- Avoid baking soda with fruits, vegetables and beans**.** Adding baking soda to these foods will kill the vitamins, minerals, and proteins in the food. Try to get used to these foods cooked without baking soda, or limit the number of times you use baking soda in these foods.
- Germinating and Fermenting to improve the nutrients. These are 2 food preparation methods used in Malawi that improve the nutrients in the foods. Malawians commonly germinate maize and millet, then pound it into flour to cook porridge, or with slight fermentation to make thobwa (a non-alcoholic drink). Milk is also allowed to ferment to make chambiko, which is similar to yogurt. These processes help to either create nutrients

or to assist with absorption for some nutrients. *(This is not referring to the longer fermentation process which coverts some of the nutrients into alcohol.)* Germinating and fermenting can be used with many foods – legumes, nuts, and practically <u>any edible</u> raw seed can be germinated and eaten. Do NOT use raw seeds that are NOT edible raw, such as some large beans (kalongonda or mucuna which are found in Malawi and are very poisonous!).

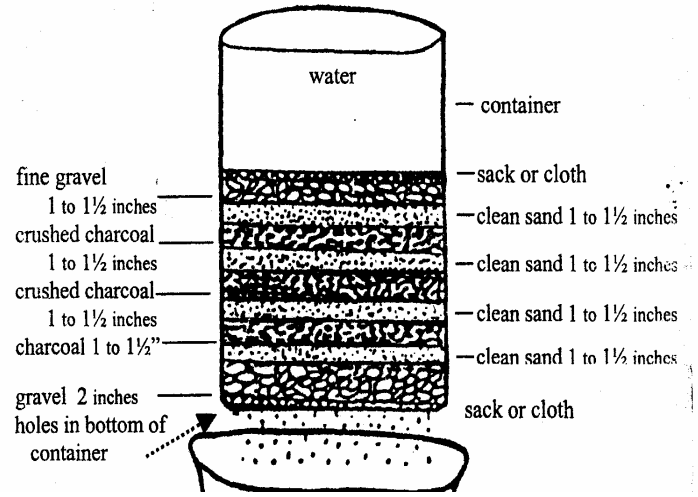
<u>Food & water safety</u>

In addition to protecting nutrients in plant foods, we need to make sure our food is safe to eat. This is especially important for people with reduced immune systems such as young children, the elderly and people living with HIV/AIDS.

- ✓ <u>For plant foods</u> this means making sure there are no poisonous chemicals on them and that they are free from bacteria such as found in fresh manure (human or animal). By not using pesticides, herbicides and other dangerous chemicals, and by washing our food with clean water (and soap if you are unsure of the cleanliness of the food) we can help reduce the risk of getting sick from plant foods. Growing your own food gives you more control over what is put on the food!
- ✓ <u>For animal foods</u> there is a higher risk of getting sick because bacteria live well in these foods (milk, fish, meats, poultry, etc.). It is important that these foods are handled safely and cooked and stored properly to reduce the risk of contaminating them.
- ✓ <u>For water</u> this means assuring the water is free from bacteria and other harmful organisms. Water should be naturally filtered when the rain falls and sinks slowly through the various layers under the earth. Unfortunately water is often contaminated from runoff and erosion which brings in manures and chemicals to the water supply. There are many simple ways to purify water, some that take low fuel and others that require fuel. These include:
  - boiling,
  - leaving clear plastic bottles filled with water in the sun for a day,
  - using a solar cooker at 1 litre per hour *(see solar cooking section)*
  - using water filters made from sand, and
  - using certain plants (such as Moringa (Chamwamba) seed) to bind harmful particles in the water.

HOME WATER FILTER

Materials: a plastic container of 5 gallons or more, cloth or sack, gravel, clean sand, and charcoal, crushed



Source: Central University of Venezuela in Solar Cookers International pamphlet adapted by Charles & Ruth Dow.

☑ Energy used in Food Preparation

Food preparation in Malawi currently takes a lot of time, human energy and fuel energy, but this does not have to be the case! There are improved stoves, briquettes from paper and/or leaves, food warmers or basket cookers that keep the food cooking by holding in heat, and there are many foods that can be eaten raw (after they have been washed). There are many other benefits for saving energy in food preparation such as reduced smoke, more time available for other activities, preservation of trees and electricity, and less waste of resources such as using waste paper for fuel. The following are short descriptions of a few types of energy saving options. Contacts for organizations working on efficient energy use are found in the appendix.

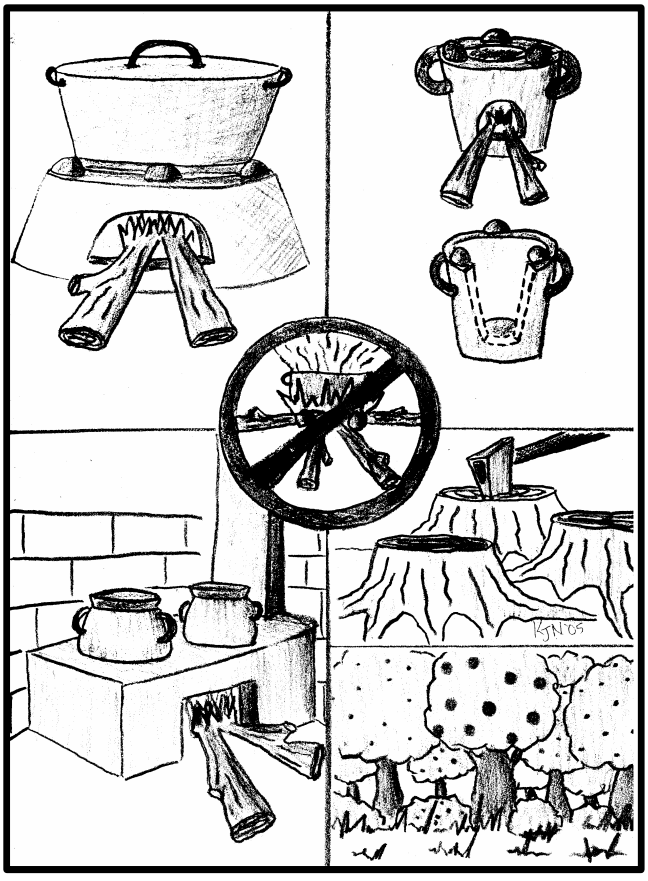
Fuel-efficient wood stoves

One problem in Malawi is the *way* that wood is burned – burning wood can be done sustainably if we are careful not to overuse the supply. Right now when people cook on a 3-stone fire, a lot of the heat is lost because of the amount of wind stealing the heat and pushing it away from the pot. When people cook, they often do not cover the pot which allows more heat loss.

There are many styles of improved wood stoves, the basic idea of any of the improved wood stoves are:

- ✓ to control the amount of air flowing toward the wood so the wind doesn't steal the heat. Some air is needed or the fire will go out, these stoves balance the amount of air just right;
- ✓ to guide the flames to the centre of the pot's base instead of beside or around the pot – this puts all the fire's energy right where you need it; and
- ✓ to hold the heat for as long as possible by insulating the walls of the stove.

To make a clay stove similar to the top two pictures, the same skills for making a clay pot is used except the sides are made thicker. See the appendix for more details and resource contacts.

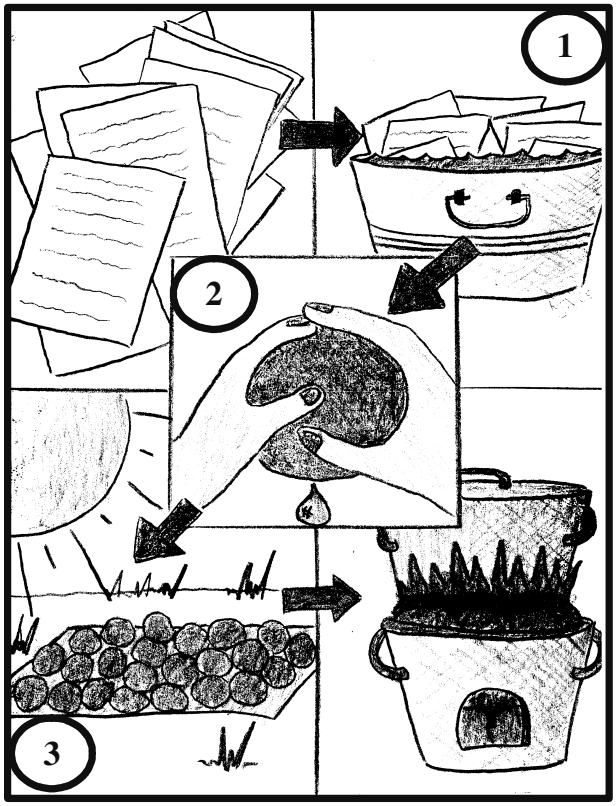


Art by K. Nordin. Full page handout in appendix

Paper Charcoal "Briquettes"

Another way to reduce the amount of wood that we use is to not use wood! You can use paper or a mixture of paper and dried leaves to make a charcoal-like products. The method we explain here is what we use at home, for workshop cooking, and demonstration. There are also commercial-size presses that are available in Malawi, see the appendix for resources.

1. Soak the paper in a bucket of water until they are soft, this usually takes a half day, we let them soak overnight. Thicker paper takes longer to soften.
2. When the paper is soft, pull out a large handful and squeeze the water out and form it into a ball or whatever form you want them in.
3. Let the paper balls dry in an airy place, preferably in the sun to speed up the drying time, but it doesn't have to be. We put ours on flat woven baskets *(lichero)* so that we can move them around easily in case of rain. After 1-3 days, depending on the drying conditions, the balls should be dry. They become very light weight when they are done. Store the paper charcoal in a dry are in an old bag or basket until you need them.



Art by K. Nordin. Full page handout in appendix

To use the paper charcoal, you can use an *mbaula* stove (metal frame with clay lining), or just on a typical 3-stone cook area. The paper charcoal produces more ash than cooking with wood, so using a type of stove that has holes for the ash to drop away from the fire is helpful. Start a small hot fire with small twigs, or break up one of the paper charcoal balls into smaller pieces, or any other method how you usually start a wood fire. Starting the charcoal burning will take some practice. About 10 paper charcoal balls about the size an adult will make with their two hands can burn for 30 minutes to an hour, depending on the conditions.

There are many things that you can cook with paper charcoal, but we recommend cooking things in a covered pot because of the amount of ash they produce. Do not use the paper charcoal for grilling food directly on the fire – there may be chemical inks on the paper. Enjoy!

Basket Cookers / Food Warmers / Food Coolers

T. Phiri's Basket cooker, Kasungu

One way to reduce the amount of wood we burn is to use less time for wood cooking. We can eat more foods raw, but not everything can be eaten raw. Basket cookers work by holding the temperature of an item for a long time, so you have to initially make the food the temperature that you want to keep it. This could be to keep hot food hot or to keep cold food cold – so these Food Warmers are also Food Coolers!

- ✓ **Cold Food 'Cooler':** If you want cold beer, you have to put cold beer in the basket.
- ✓ **Hot Food 'Cooker':** If you want hot food, you have to heat it first. The heat will keep cooking the food, so you generally put the food into the basket when it is partially cooked.

The basic idea is to put the item to cool or heat into an insulated basket or box. For the basket cooker shown in this picture, use a *dengu* (woven basket) and line the bottom and sides of the basket with clean, dry material – this could be dried banana leaves, clean used paper, dried grass, or scraps of cloth. Leave a space in the middle of the dry material for the pot or other item to sit. You can adjust the dry material to fit different sizes of pots.

Make an insulated cover, again using dry material. You can use an old sack, cloth, or anything that will hold the dry material. The cover will be tucked into the inside edges of the basket to trap as much heat as possible.

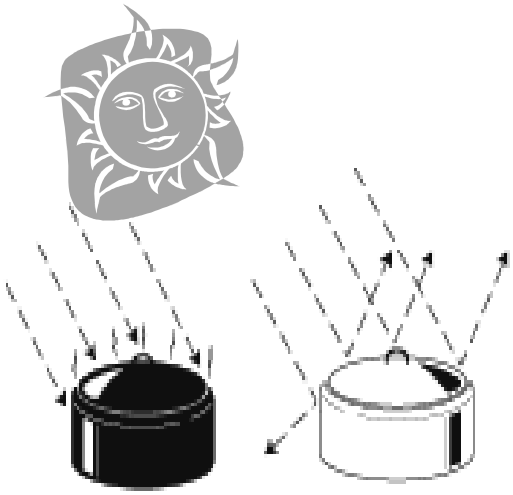
To use the basket for cooking, put your food on the fire until it is slightly cooked. For grains, cook the food on the stove for about 2-4 minutes. For beans, soak them overnight first, then cook them for about 15 minutes. Remove the pot of food from the stove and quickly put it in the basket and put the cover on. That's it! As with all new technologies you will just a little practice and you are set! The food will continue cooking and stay hot for several hours – we've kept hot food hot for up to 6 hours using the basket.

Solar Cookers

There is plenty of sun in Africa and much of it is under-utilized. Using the sun to cook is very simple and can be made from a wide range of materials. Solar Cookers International provides great information on their website (see contact details in the appendix) and provides permission to share their information. They explain that most solar cookers work on basic principles: sunlight is converted to heat energy that is retained for cooking.

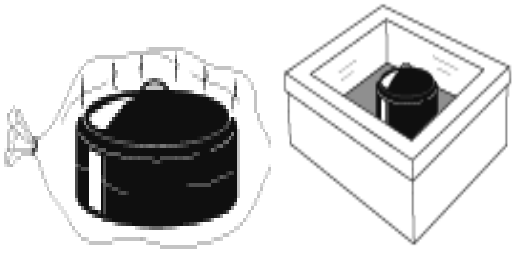
1. The sunlight is the "fuel". A solar cooker needs an outdoor spot that is sunny for several hours and protected from strong wind, and where food will be safe. Solar cookers don't work at night or on cloudy days.

2. Convert sunlight to heat energy: Dark surfaces get very hot in sunlight, whereas light surfaces don't. Food cooks best in dark, shallow, thin metal pots with dark, tight-fitting lids to hold in heat and moisture.



Converting sunlight to heat energy using a dark or black color. © Solar Cookers International 2005. http://solarcookers.org/basics/how.html

3. Retain heat: A transparent heat trap around the dark pot lets in sunlight, but keeps in the heat. This is a clear, heat-resistant plastic bag or large inverted glass bowl (in panel cookers) or an insulated box with a glass or plastic window (in box cookers).

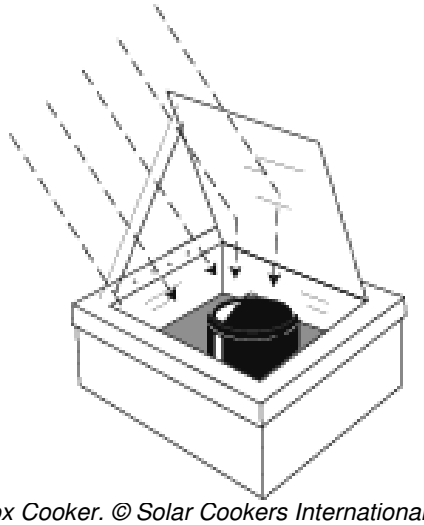


Retaining heat using a clear bag or insulated box with a clear lid. © Solar Cookers International 2005. http://solarcookers.org/basics/how.html

4. Capture extra sunlight with shiny silver: One or more shiny surfaces are used to reflect extra sunlight onto the pot, increasing the amount of sunlight hitting the pot. Shiny surfaces can be made from a sturdy support such as cardboard or tin sheet and covered with anything silver such as found on the inside many types of food packaging or aluminum foil. Attach the silver material with glue, tape, stapler or other creative local idea. Several design ideas are included below.

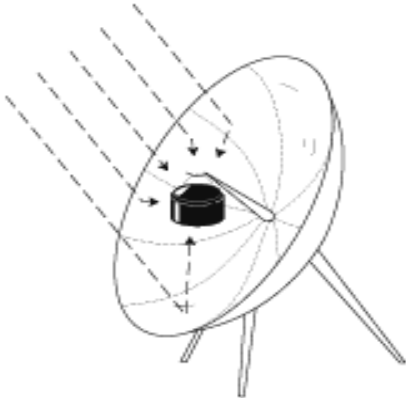
The three most common types of solar cookers are heat-trap boxes, curved concentrators (parabolics) and panel cookers. Hundreds — if not thousands — of variations on these basic types exist. Additionally, several large-scale solar cooking systems have been developed to meet the needs of institutions worldwide.

- ✓ Solar box cookers cook at moderate to high temperatures and often accommodate multiple pots. Worldwide, they are the most widespread. The bottom part of the cooker is made like the basket cooker (see previous topic). Cover the insulation material with a black cloth or other dark material if possible. The top of the box or basket will be covered with glass or other clear material. Add a reflector to the top to direct sun into your box / basket cooker.



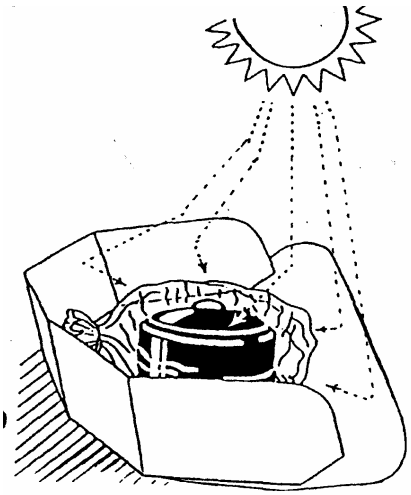
Box Cooker. © Solar Cookers International 2005. http://solarcookers.org/basics/how.html

- ✓ Curved concentrator cookers, or "parabolics," cook fast at high temperatures, but require frequent adjustment and supervision for safe operation. They are especially useful for large-scale institutional cooking. Several organizations in Malawi have this type of solar cooker such as Wildlife and Environmental Society and SOS Children's village in Lilongwe. They can be made out of local materials – generally some type of sturdy metal for the legs and pot holder, and shiny metal for the parabola.



Parabola Cooker. © Solar Cookers International 2005. http://solarcookers.org/basics/how.html

- ✓ Panel cookers incorporate elements of box and curved concentrator cookers. They are simple to make with many types of local materials. Use cardboard or other supportive material and cover it in a locally available silver material. Use a black or dark colored pot and if available, use a clear colored bag (something that won't melt though!) to hold even more heat. With a little practice, you can be cooking your foods very easily for free!



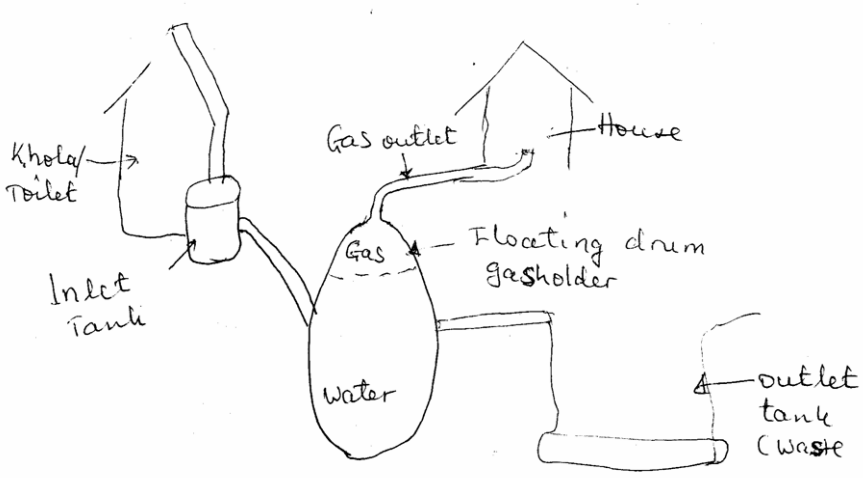
Source: Solar Cookers International, adapted by Charles and Ruth Dow

Using your cooker for food or water: Solar cookers can be used for many types of foods and also for purifying water for drinking.

Start practicing with your different recipes and see how easy it is. As a general guide, potatoes, rice, fresh beans, and some meats take about 2-3 hours. Dried beans soaked overnight take 3-5 hours. For purifying water, a general guide is about one hour in full sun per 1 Litre of water.

Biogas cooking

Just as there is plenty of sun in Africa, there is also plenty of manure, both human and from other animals! There are gases that are released from manure that can be captured and used for burning. This idea is a higher input that some of the other ideas discussed, but with all the latrine and animal pens being built by projects in Malawi, there is no reason that these could be designed with producing fuel energy for cooking at the same time.



Sketch provided by Renewable Energy Industries Association of Malawi. See appendix for contact information.

Teaching note: Creative Food Preparation Demonstrations

- **Recipes** are given in the back of this Model as ideas on what could be prepared as demonstrations. During the "Creative Cooking" sessions, always try to use locally available foods and cooking supplies. The more you adapt your cooking to what is locally available, the easier that people will be able to incorporate the ideas into their own lives.
- **Meal Planning:** Explain to people how the recipes can be put together into a meal, or just make a whole meal. Explain how the recipe can be adapted and encourage people to change the recipe around and be creative. Make as many linkages to other ideas as possible, without overdoing it!
- **Everyone can prepare food!** Men and women, adults and children should all be encouraged to participate. Often the men will sit on the sidelines, or take jobs that are 'least woman-ish', but encourage everyone to participate equally.
- **Creative Cooking:** For a more in depth guide at doing cooking demonstrations, such as planning the set up, preparing the location, and lesson plans, use the Creative Cooking manual listed in the appendix.
- **Energy efficient cooking - Use them yourself:** First you will need to become personally familiar with using improved energy methods. If you feel hesitant about trying these ideas out for yourself, contact one of the organizations in the appendix for support.
- **Energy efficient cooking - Use them with others:** After you feel comfortable with improved energy methods, then attempt to integrate the methods into all your cooking, workshops and meetings. Use them at field days and other opportunities to raise awareness.

☑ Preservation & storage

To understand preservation and storage, the concepts of protecting nutrients and food safety are important. Usually in Malawi plant foods are dried in the sun for a long time before they are put into storage. Many of these foods become contaminated with dust or animal waste and they also lose many of their nutrients during the long drying process. There are several ways to reduce how many nutrients are lost to get the most of your foods.

Store food in the environment through diversification

The lowest input way to save your foods is to keep them on the plant, tree, or in the khola (animal pen), until you are ready to use them! By spacing harvests throughout year with agricultural diversification, you don't have to dry or process anything. This is how our ancestors survived and we can revive this practice to eat different foods in different seasons, while at the same time preserving some foods for eating or for selling.

Improved Preservation

The goal with preservation is to create a food that bacteria, insects and moulds will not live in so that the foods will not spoil. Three common ways that are used to preserved foods are:

- drying (removing all the water from the food), or
- pickling or canning (making a water high in sugars, salts and/or acid), or
- freezing (decreasing the temperature).

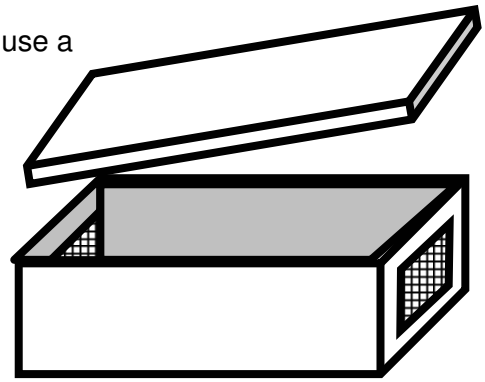
Drying foods is usually the most suitable choice in Malawi, but pickling with sugars and/or salts is also an option in some cases. With pickling and canning, food safety handling becomes very important and, unless you have your own vinegar and sugars, there will be some expense involved. Use the books Traditional and Modern Foods in Malawi and The Permaculture Nutrition training manual for detailed steps on pickling. This manual will focus on solar drying.

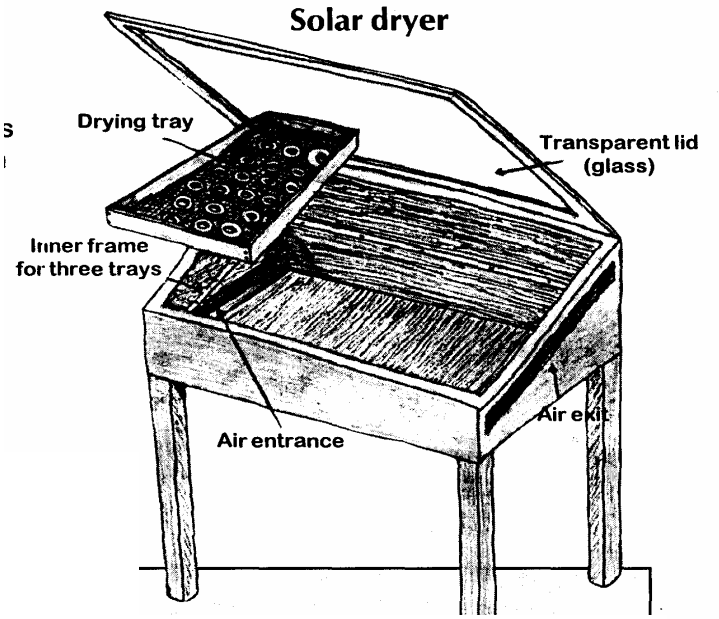
Solar Drying

The basic idea of a solar dryer is to trap the heat of the sun in a contained area while having some airflow to remove moisture. If there was no airflow the food would cook, like we discussed under solar cookers.

- Container. Some sort of container is used in to hold some of the heat.
- Black. Inside the container is covered with a non-poisonous black color to absorb heat.
- Air flow. There has to be some sort of ventilation to move the moist air out of the contained area and allow new dry air to move in.
- Food racks. Mats or screening are often used to hold the food in the dryer so that the air can move around as much of the drying food as possible.

Box or basket dryer: To make a one type of simple dryer use a container (wooden box, woven basket, or other) that is whatever size you would like. Cover the container with clear plastic or glass. Inside the container should be dark in colour (black is the best), and there should be two screened vents on each side of the container - one for letting cool air in and one for letting heated air out. On the inside walls of the container use small nails, wooden pegs or other local materials to hold the racks. Place your food on racks and set the food in the box to dry. This is great for home use and for moving around easily from place to place to avoid rain and shade.

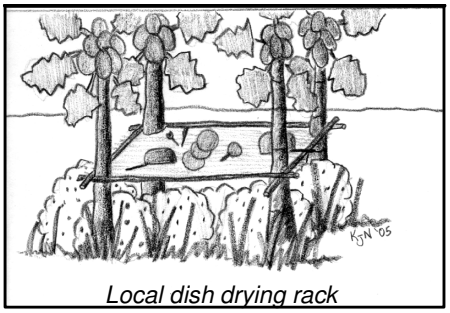




Source: How to process and preserve fruits through drying. A. Schomburg, SADC-ICRAF AF Project, Zomba, approximately done in 1999. See appendix for contact information.

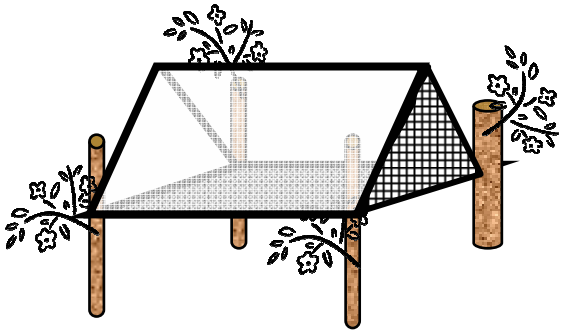
Another design shown here is similar to the one described above, but it is larger and harder to move around. It can also be made from local materials – the legs and walls can even be made with mud bricks, being sure to leave space for screened vents and using a clear lid.

Tandala – local drying rack. This adaptation builds on the local dish drying rack used in Malawi. A cover is made from the dryer in the shape of a tent. The tent's frame is covered with clear plastic, or in some cases a dark cloth is used if plastic is not available. Cloth won't let the sunlight in, but it can still trap some heat and keep the dust and animals off your foods. The rack where dishes usually sit is covered in dark material if possible – black plastic will capture the heat nicely or a reed mat will work to hold the food. Lastly, screening is used to cover the ends of the tent. If you don't have the screening, it can be left open, but this will allow dust and animals to enter. Integrated Food Security Project in Mulanje promotes this type of drier, see the appendix for their contact information.



Local dish drying rack

Art by K. Nordin



Dish drying rack converted to solar dryer.

Using your dryer: After getting used to your solar dryer, you can dry:

- → Vegetable and herb leaves in as little as 3 hours. Leaves will be crisp when they are dry and they will crumble easily.
- → Thicker foods, like mangoes take 1-3 days, depending on the conditions. You should still be able to bend the fruits when they are done. To test if they are done, put them in a plastic bag, if no water collects in the bag after sitting for a few hours, they are probably done.

The general process for using the dryer is:

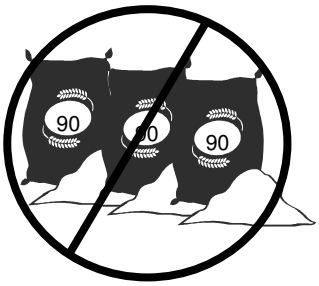
1. Wash your foods to assure that they are clean.
2. Some foods dry better when they are peeled, but remember that the peels have a lot of nutrients and decide it you can keep the peels on. You may want to try some both ways.
3. Slice the foods. The size of the food will depend on the food item and what you plan to use it for. Leafy items can be dried whole, then you can crumble them after they are dry, or crush them finely into a powder. Fruits and fruit vegetables are sliced 1-2 cm thick – they will dry to about half or more the size that you cut them, so cut them thick enough to allow for shrinkage. Most fruits are used when they are just ripe but firm.
4. Put the foods on the rack and dry them. It is easiest to put the same sized pieces of food on one tray so that all the food on each tray is finished at the same time.
5. After the food is dry, pack them in an airtight packaging so that moisture does not re-enter the food.
6. Save them to eat later or market them for sale.

Preserving for sale: income generating food products

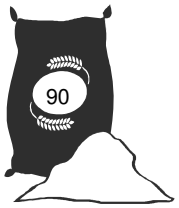
There is a lot of money that could be made from resources found in the Malawian landscape. Look in any grocery store for some ideas: herbal teas, spices, soup mix packets, dried fruits, dried or roasted pumpkin seeds, pickled mangoes and other savoury condiments, fruits juices – the list can go on an on! We need to start being creative with our products, concentrate on quality, and link to the local grocery stores so that nearly all the products on our shelves come from local producers!

Money doesn't really grow on trees or plants, but they can make us a lot of money!

Preserving foods for the year – how much should I save?



Based on the Malawi Food Guide, the following table shows how much food an adult should have for a year. This table differs from the messages that are being given on the ground. At the moment people are being told to grow and save too MUCH maize.



The current message is telling people to reserve 270 kg of maize per person per year, whereas what is really needed is about **90 kg of grains** per year (including millet, sorghum, maize, rice, etc.).

This message needs to be changed so that it is based on the Malawi 6 Food Groups!

Malawi Food Groups	Foods eaten throughout the year	Annual Total Kcal per adult	Annual Kg needs **per adult**	Annual Kg for **5 adults:**
1. Fruits	Fruits Fresh (all but a few)	54,750	109.5	548
2. Vegetables	Fresh Vegetables	46,720	146.0	730
3. Legumes & Nuts	Beans dried	35,770	9.1	46
	Beans fresh	20,258	9.1	46
	Nuts	85,410	21.9	110
4. Animal Foods	Meat, Fish, Eggs, fresh	12,921	21.9	110
	Milk, Yoghurt	15,878	18.3	91
	Dried fish or meat	24,820	9.1	46
5. Fats & Oils	Oilseeds (like pumpkin)	39,493	7.3	37
	Fatty Fruits	14,819	7.3	37
	Fats / Butter	15,567	1.8	9
	Oil	16,005	1.8	9
6. Staples	Cereals & Grains	305,688	91.3	456
	Tubers & Starchy Fruits	87,600	91.3	456
	TOTALS	775,698 needs = 766,500	545.7	**2,728**

☑ Testing your understanding of Diet Diversity

1. Define Nutrition. Explain the basic steps of Digestion & Absorption from food in the mouth to blood. Name the 6 groups of nutrients.
2. What are the 6 Food Groups? Name at least 5 foods from each food group that you have.
3. Name 3 ways you can increase yours and others knowledge of native foods.
4. How many servings should you eat from each of the food groups each day?
5. Name 3 ways you can reduce the energy you use in food preparation.
6. Name 3 things that reduce the nutrients in foods and 3 ways to keep more nutrients in food.
7. List 2 benefits of solar drying.
8. How much food should one adult have for the year from the grain group?

Topic 4: Soil Health Concepts

The groundwork has been laid so that, hopefully, you now want to know how to get these foods out of your soil. All food originally comes from soil whether you are harvesting a plant food directly from soil, or harvesting an animal food that eats the plants– soil is the basis of our food production. Take a step back to the Nature Cycle and to the Cycle of Better Living to remember what else goes into growing food. We have to have the sun, air, water, and nutrients. How do these work together with our soil to create a healthy diet for us?

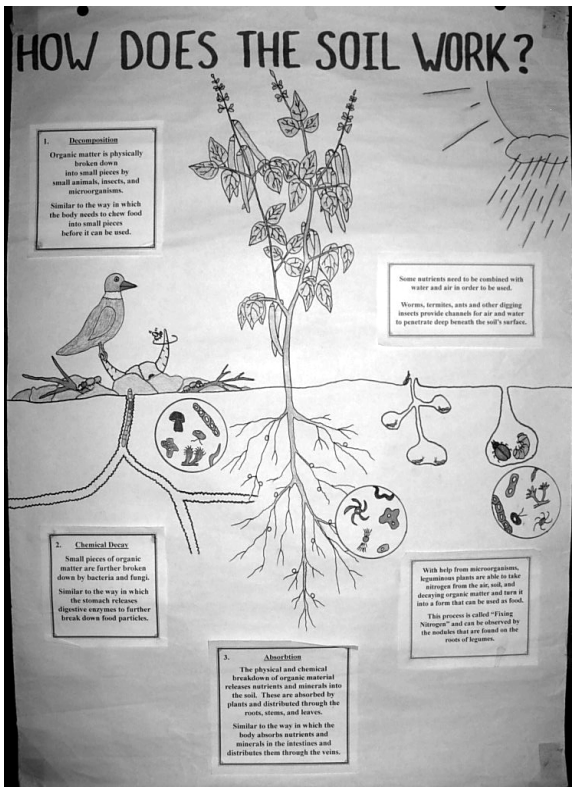
☑ Understand how soil works

Take care of your soil so you can get your 'money' out of it!

All living things rely on and eventually return to the soil. The health of our soil is directly connected to our own health. Whatever we do to the soil we are eventually doing to ourselves. If the soil becomes ruined, this will affect the nutritional value of our foods. If, on the other hand, we are able to learn from nature about methods that help the soil, we will have taken the first step towards making our lives better. In David Patient's Positive Health manual, he describes the soil like a savings account. The more we put into it, the wealthier we become. But if we continue to take from it without making any deposits, we will eventually end up broke.

How does nature keep soil healthy? Think of a natural area, does anyone go to natural areas to dig to keep the plants healthy? No! Nature uses roots of plants, animals that scratch the earth and decomposing organic matter to dig the soil at different depths.

Does anyone buy fertilizer and pour it near the wild plants and trees so that they have food? No! Nature returns everything back to the soil. The leaves fall to the ground along with every other living thing and this is what feeds the soil.



Full page poster available in appendix

Also think about what nature plants – is there just one type of tree in a natural area? No! Nature has a wide variety of different trees, plants, vines, roots, animals, insects, and very small creatures in the soil that our eyes can't even see. This variety helps to keep the soil healthy. The roots of the different plants and trees dig at different levels under the soil – some go deep to break up rocks far below and bring up minerals, others work to dig shallow, while others dig wide, like tubers. The animals and insects are working all the time to drop manure, to crush organic matter, to scratch the soil looking for insects to eat, and to keep a balance in nature.

Now take a minute to think what humans are doing to interfere with this. You should be able to come up with a long list! The soil is harmed by:

- ☹ paving the earth
- ☹ chemicals in the soil and/or killing insects
- ☹ burning the bush or any organic matter
- ☹ mono-cropping forests and agricultural areas
- ☹ overgrazing
- ☹ sweeping the earth
- ☹ digging into the soil disturbing insects
- ☹ compacting the soil by stepping on it too much
- ☹ clearing away plants and trees
- ☹ erosion from steep planting

The list is longer than this in real life, and it includes things that are happening in every part of the world, unfortunately. What can we do to care for our soil without a lot of work? Mimic Nature's lessons!

This model will focus on 2 concepts that are key for helping the soil maintain its health:

1.) Conserving the Soil 2.) Fertility and Structure

Teaching about how the soil works:

- **Nature Cycle**: Refer back to the Nature Cycle poster and discussions that you had with your group (see table of contents).
- **Soil structure**: Draw a picture of what is happening under the soil. The poster the Permaculture Nutrition project uses shows one large bean plant showing equally the top green part of the plant and the roots underground. See the appendix for a sample poster
- **Connect to Digestion**: The processes that happen under the soil are just like digestion Highlight decomposition happening at the surface with insects and small animals chewing up the organic matter; then show worms, termites and microorganisms breaking down the food further like enzymes in our mouth, stomach and intestines; and finally show the roots taking up the nutrients like how our intestines absorb food.
- **Go Outside!** : After discussions, go outside and look at different types of soil – healthy and unhealthy and discuss what is happening in each situation.

☑ Conserving the Soil

Mulching: Dead or Alive Nature is always covered!

Nature is always covered! Mulching is when there is a layer of leaves, grass, husks or other organic matter on the soil between the plants. Mulching can be alive or dead such as dried leaves, stones, sawdust, and /or live vines. This layer is similar to a 'blanket' or 'clothing' that we put on our body to protect it from the environment. Mulching has many benefits, it:

☺ Keeps the soil cool and moist, even when the weather is hot. This reduces the number of times that you need to water the plants in the dry season.

☺ Creates a soft layer of dirt that is easy to plant directly into during the rains or irrigation – no digging is needed! You might want to make a small hole for the seed or seedling, depending on the situation.

☺ Keeps the soil protected from rain and wind so that the soil isn't washed or blown away.

☺ Keeps the plants protected from being splashed with soil when it rains or during watering.

☺ Adjusts better to either very little water (drought) or a lot of water (flooding) than when organic matter is cleared away.

☺ A heavy layer of thick mulch prevents unwanted plants from growing between the plants. (These are commonly called 'weeds', but all plants have very useful purposes!). A light layer of thin mulch still allows small seeds to sprout.

☺ And best of all, this means less work each day!

Why doesn't everyone mulch with all these great benefits? As we developed this model, there were only two projects that were mulching their soil – myself and the Malindi Orphan Care Group. The Malindi group has another way of helping people understanding mulching. They ask us to think about the difference between a bald man standing in the sun and a man with hair. The man with no hair will be burned by the sun very quickly, whereas the man with the hair will be protected from the sun for much longer. This is just like mulching – it is 'hair' that covers the soil to protect it.

Most participants are very wary about mulching their soil for the following reasons:

- **A fear that mulch is dirty** – This depends on whose eyes are looking at it! Nature is always covered and this is the way the creator intended it to be. Uncovered soil is actually dirtier – it is dusty in the dry season and muddy in the rainy season – what a mess!

- **A fear that mulch will bring snakes** – But, where do snakes *really* like to live? Snakes don't want to be around humans, they prefer to be up in a tree, under a nice pile of rocks or sticks, or in a hole.
- **A fear that mulch will bring termites that will hurt our plants** – Think about a termite and what it does in nature. Their job is to decompose the dead or dying organic matter and make it back into soil. There job is not to eat live healthy plants. But, if we sweep away and burn all the termites food, they are going to look for the deadest things they can find and eat it! Most people in Malawi know that termite mud is full of nutrients and will collect the mud and put it in their gardens – yes, termites are a great thing!

Reduce sweeping the dirt!

In Malawi people are taught that sweeping the dirt is 'clean'. The sweeping lessons start for a young child at home and then are reinforced in our schools where our children spend hours of their lives sweeping dirt, and then just about every program reinforces it more. But is sweeping the dirt really clean and healthy? There are many projects now in Malawi, including over half of the people that took part in making this model, who are reducing or eliminating sweeping.

Art by C. Aspinall. Based on a photo of Ethel Kathumba of Chitedze demonstrating the harmful habit of sweeping.

Sweeping removes organic matter from the top of the soil, which removes the food and protection the soil needs to stay healthy. Sweeping makes the earth hard and doesn't allow water to sink into the soil, causing erosion through wind and rain. When large areas are swept, it reduces the amount of land that we can use for growing food and other useful items.

This model is just asking people to think about sweeping. The following issues are written in the form of questions so that you think about them and discuss them with others around you.

? What is dirty about the leaves and grass that is swept away causing the real dirt to be exposed? Leaves and grass do not cause disease or health problems, in fact they do just the opposite by feeding our soil, which can then feed us better and improve our health!

? Isn't uncovered dirt actually more exposed and therefore dirtier? It is definitely dustier and muddier! What about all the dust that sweeping causes, what does that do to our lung and eyes? It is very hard to breath and see with a lot of dust in our air.

? Woman, young girls and students put a lot of time into sweeping everyday. Men put much less time into slashing an area as it only needs to be slashed one or two times a month. It takes a lot less time for men or women to slash an area than it does to sweep. Just think about what we could do with all that extra time - and even less time is needed for slashing when most of the ground cover is edible plants instead of grass!

♦ Shouldn't we be concentrating on really unhealthy things such as animal manure that needs to be moved, plastics which are blocking the nature cycle, and food scraps that attract flies? Organic items should be picked up with a stick, a rake, or other simple tool and put into a compost pile with a layer of dried organic matter or dirt put on top. Food scraps shouldn't be thrown on the ground in the first place unless it is in a garden bed, but even then it should be covered with dry material to prevent flies. A system of reusing plastic should be developed for every household and community. One community uses clean plastics to use as a soft stuffing for dolls, cushions and pillows. They rip the plastic in to small pieces and stuff it into a cloth the shape of the item they want.

What are some ways that people can take steps to reduce sweeping the dirt?

✓ Mark out areas: Start by choosing areas not to sweep and instead start putting all organic matter in that area. Use rocks, or logs, or mound up the dirt, or any other way to mark out the area so that *looks nice* and people can tell that what you are doing is on purpose.

✓ Improve the non-swept areas: Start throwing all your waste water (from clothes, dishes, bathing, mopping, etc.) in the un-swept area and sprinkle some natural seeds from food plants. Over time you can move the rocks/logs further out, reducing the swept area and at the same time making the gardens bigger! Keep going!

✓ Rake instead of sweep: In areas that you still want to sweep, think about using a rake instead. To make a rake, use larger branches to make your 'broom' so that will just remove large things but not damage the soil or make dust. If you use raking, you can still make the area look neat but leave small pieces of organic matter that will allow plants to grow in your pathways. These plants can be slashed from time to time so people can walk or drive through. Most of the time the pressure of walking and driving keeps the plants low.

✓ Pardon our appearance: When you are changing from sweeping to not sweeping the area may look messy at first while you are establishing new plants and trees in the swept area. This is similar to any building construction project – it looks messy during the construction. Most construction sites put up a sign that reads "Please pardon our appearance as we are constructing". You may wish to create a similar sign!

✓ Education opportunity: The hardest part of reducing sweeping is to convince your neighbors why you are doing it. This is a great opportunity to explain about why you are caring for the soil and eating differently and that they could do it, too. Offer to work with them at their home to discuss ideas.

Eliminate bush burning

The next harmful practice that is not so difficult to convince people about is burning. Pretty much everyone will respond that burning is harmful to:

- the air;
- insects and micro-organisms who are trying to keep the soil healthy; and
- the foods, medicines, fuel trees and thatching that is trying to grow for us to use.

How would you like it if someone burned your home every year and you had to rebuild each time? Wouldn't you want to move?

The hardest part is to get people to stop! Everyone blames burning on everyone else, but no one is stopping it which is just as harmful. So from June through November every year, practically the whole country turns black and filled with smoke.

There are many ways to start reducing burning in Malawi. We need to start with ourselves, then next with the people who are closest around us. Help them understand the nature cycle, the importance of the things that are burning, the harm that the smoke is having on the birds and the bees and other things that breathe the air. Together you can work on the whole community, then the district, the region and the nation! It would be helpful to have the nation support these ideas now with a law against burning like some countries have. It is a simple, yet difficult thing to stop, but we do have the power to start working on it!

Reduce tilling

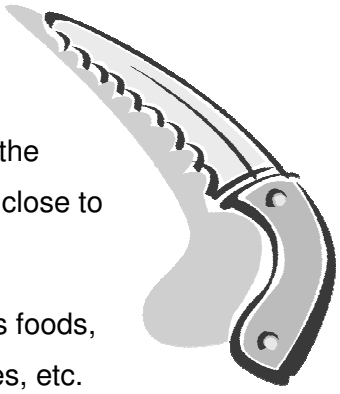
What does a hoe do to the nature cycle's decomposition stage? Disturbs it! All those insects, worms and micro-organisms are busy under the earth working for you, why would you want to cut into their work and disturb them? It is much better to feed the soil's creatures organic matter and disturb them as little as possible. It is helpful to look at nature and how it digs.

Nature has some deep roots to go down and break up rock and get minerals. There are wide roots that open up the soil to let water and air enter the earth. There are animals that scratch the surface and insects, worms and animals that make tunnels beneath the earth. All these methods combined means that nature doesn't use a hoe to till before it plants seed.

We can mimic this in our own lives by inter-planting trees and other deep rooted plants; inter-planting root crops such as yams or ground beans (*nzama*); allowing chickens to scratch around the mature plants; and keeping the soil covered with organic matter to protect and feed the insects and worms.

Clear the land carefully – use your eyes!

Clearing the land to make a garden always makes me cringe and have a vision of destruction because that is just what most people do when they 'clear the land'. They walk into an area, cut out everything, burn it all, then replant seeds in the area, all the while complaining about the heat and the amount of time and energy they have to put into their garden! Funny how we do things, isn't it?



A better way to clear the land is to do it carefully. When clearing an area try using these methods:

- ✓ Sickle: Use a tool that allows you to use your eyes to examine the area. A good choice is to use a short hand sickle that puts you close to the ground.
- ✓ Trim: Cut out and trim or just slash around useful items such as foods, medicines, leguminous plants that feed the soil, building supplies, etc.
- ✓ Keep the Roots: If you decide that you don't want a plant or tree don't 'weed' it out, cut the plants close to the ground and keep the roots in the soil so they can rot. The areas where the roots rot underground will create a pathway for water and air to pass through the soil.

- ✓ Mulch: Cover the area with a heavy layer of mulch. If you have enough mulch, this is a great way to start preparing the land for planting. Let the mulch sit on the ground for about a month then plant directly into the mulch, or as is proposed in the next bullet, starting planting some now, then some the next week, etc. If the area was heavily swept and very, very hard, there probably aren't that many worms and insects living there. In that case, you will probably want to dig into the dirt the first year to loosen it up, just to speed up the process, and then mulch. You should never need to dig there again and the worms and insects will come back to live there and assist you.
- ✓ Dig only where you have to: You may need to dig small holes here and there through your land to put in tree seedlings or to capture water, but really think about it before you do!
- ✓ Small sections: When you decide what land you want to carefully clear, just clear enough to start planting some foods, then move on and carefully clear more and plant another section, then move on and carefully clear more and plant another section! Using this method you will be able to start eating from the first section by the time you are finished clearing.

Consider landscape slope

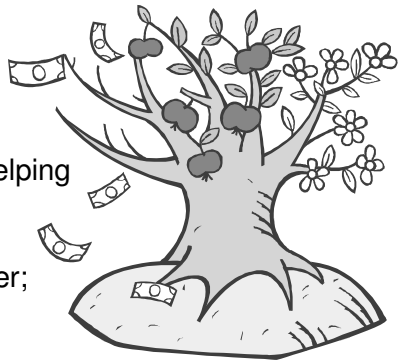
It is even more critical on slopes that you clear the land with care! Land that has a slope needs special attention to make sure you don't cause erosion. Using a mulch helps to hold soil in place, but with steeper slopes you will want to make sure that you have some permanent contours or terraces using rocks and strong rooted plants to keep the soil in place.

More detailed ideas for this topic will be covered in the sections on water and designs.

Long lasting roots – Perennials

Another way to conserve soil is to have some plants and trees that stay in the soil every year without replanting. These are known as perennials and they are great for many reasons:

- ✓ You only plant it one time but harvest for many years;
- ✓ They are usually very tolerant to a lot of rain and very little rains even to the levels of flooding and droughts;
- ✓ The roots help water go down deep into the water table helping to keep water in our soils throughout the dry season;
- ✓ Their roots hold the soil and their stems trap organic matter;
- ✓ The taller perennials can block the wind.



The appendix has a list of plants and trees which last for many years without replanting.

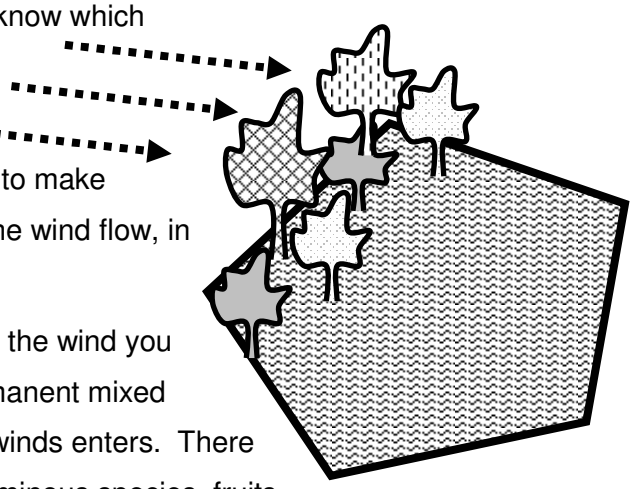
Windbreaks

It gets very windy in Malawi during the dry season, especially during the months of September through November. During this season you commonly see dirt being carried away by small wind storms; plants, trees, buildings, and clothing are covered with dust; and sometimes we even see roofs being blown away. Wind can negatively effect the growth of small plants and seedlings. Wind can be very destructive!

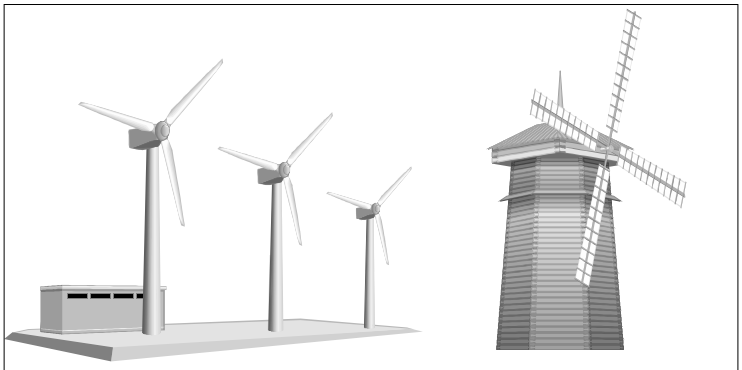
But, the wind is blowing at this time of year to help us, too. It:

- ✓ Helps to blow down the leaves from the trees to feed the soil in preparation for the rains;
- ✓ Helps spread seeds so that they are ready to grow during the rains;
- ✓ Knocks down fruits for us, like those nice mangos that are just coming into season; and
- ✓ Keeps us cool!

In our designs we will consider all of these factors to create windbreaks that help protect us from the problems of wind, yet helps us make the most out of the positive aspects of wind, such as keeping us cool. To decide where you might want to block the wind you need to answer:



1. Where is the wind? First you will need to know which direction the wind usually comes from.
2. Why? Next you want to know why you want to block wind – or how you want to make use of it. In some cases you might want the wind flow, in other cases you might not.
3. How to use the wind? If you want to block the wind you may want to intersperse an area with permanent mixed species at the edge of the plot where the winds enters. There are many species that can be used – leguminous species, fruits, animal fodder, species that attract birds, tall trees mixed with short shrubs, climbing species – the design options are endless!



These are two popular wind energy designs used around the world. The concept can be adapted using our local resource materials.

More advanced designers will want to capture their wind for energy production, a design that is popular in some places in Europe (like the Dutch who have used the technology for centuries), and the ideas are now spreading with concern about the shortage of energy taking place around the world. Wind energy can be used for pumping water so that we can drink or have additional irrigation sources, and it can be converted to fuel for cooking, lighting and all the other energy uses the same ways that we use our current sources of electricity. There are some renewable energy projects in Malawi that use the wind that are listed in the appendix under resources.

Teaching about Soil Conservation

- **Definitely the best place is outside.** Look at Mulching, Sweeping, Burning, Tilling, Clearing land carefully, Slopes, Perennials, and Wind. Before you speak with the group, walk around the area yourself and have some places picked out that you will go to. As a facilitator in this model, you always need to have all your senses open and alert to teaching lessons!
- **Dramas with thorough discussions**: Especially on the cultural habits of sweeping, burning and hoeing would be entertaining and enlightening.

☑ Fertility and Structure

Some of the methods listed above for soil conservation also can assist with soil fertility and structure, such as mulching, reduced tilling, reduced sweeping and reduced burning.

Assess Soil Type

Before doing anything to your land, you will need to study and assess the site, which will include looking at the types of soil you have. A single plot of land can vary a lot in soil type such as sandy, rocky, clay or loam. All types of soils were created for a reason and there are plants and animals that do well in all these natural conditions. Other times, humans have had a negative effect on an area causing an area to change – such as forested areas that had loam soil but have now become deserts covered in sand. There are different ways to work with whatever soil type you have:

1. **Keep the soil the way it is** and choose plants, trees, and animals that like that soil.
2. **Change the soil** and design to suit the plants, trees, and animals you want to raise. With this choice you can only do so much with, sometimes you are just stuck with what is there and it is better not to fight it!

Here are some ways for 'dealing' with your type of soil:

- ✓ **Sand**: Plant things that like sand such as jujube (masawo) or melons. You can help the sand hold water and nutrients by using a lot of compost and organic matter. You can also dig down about adult-knee-height-or-so under where you want to plant and put a layer of organic matter, rocks, or the like that will help trap the water from going deep into the earth.
- ✓ **Clay**: Plant things that like clay, sugar cane is one example. You can help loosen the clay by adding a lot of organic matter into the soil. You could also get some sand and mix it into the clay.
- ✓ **Rocks**: Plant things that like rocks, aloe or pineapples are two examples that will grow out of rocks. You can move some of the rocks from near the surface and use those same rocks for decorations, to line the pathways, to stop water from running down a slope, or other creative use.

In the appendix there is a start-up list of some of the species in Malawi and what conditions they tend to like.

Organic production

Why should we encourage organic production instead of using chemicals?

- ✓ Chemicals are expensive to make. They use up a lot of the earth's resources such as fuel.
- ✓ Chemical fertilizers do *not* feed the soil, they provide a treatment like 'medicine' for the plant or animal so it can survive in poor soil.
- ✓ Chemicals can be toxic to humans, especially children, the elderly and those with reduced immune systems such as with HIV infection.
- ✓ Special training is needed in how to handle chemicals without getting poisoned or burned.
- ✓ Chemicals can poison the environment, especially our water sources and soil.
- ✓ Chemicals can kill beneficial insects, worms and micro-organisms either directly or by the effect the chemicals have on their environment.
- ✓ Insects and disease can develop resistance to chemicals.
- ✓ There are better options for designing our agricultural systems and homes so there is no need for these chemicals in the first place!

Chemicals are generally promoted when the soil is degraded, or the plants, trees or animals are unhealthy. This model aims at restoring soil health and design an environment that creates healthy plants, trees and animals. In the section on design, the model provides specific ideas on reducing and eventually eliminating the use of chemical fertilizers, pesticides, herbicides, fungicides and the like. In this section we will look at how to heal the soil's fertility and structure to put nutrients back into the soil and give the soil the ability to manage different levels of water.

Including legumes in your design plans

One nutrient that most food plants need is nitrogen. Legumes are a type of plant or tree that help other plants use nitrogen (i.e., nitrogen fixing). Some legumes can be eaten and others cannot. You can tell a legume pretty easily because they have seeds inside a pod, such as:

- ✓ **Edible legumes**: beans, peas, ground nuts and ground beans (local names include *kamumpanda, kabaifa, nzama, mtedza*)
- ✓ **Non-edible legumes**: acacia species (*msangu, mtete, etc.),* tephrosia, leuceana, cassia (some can be eaten by animals)

Legumes can be inter-planted, rotated with other types of crops, or as a green manure (covered next as a separate method). Different types of plants and trees each have different nutrient needs, some need a lot of nutrients to grow and others need very little. Using inter-planting gives you more variety in your garden, farm, flower garden, and in your diet, too. Nature keeps itself healthy by inter-planting and planting things in different places over the years (rotating).

Inter-planting is quite simple (again, look at how nature plants), all you do is plant beans, peas, peanuts or a non-edible legume between the other foods. Legumes come in many different shapes and sizes so you will choose the legume that best fits in with the other crops and animals you are raising. You don't have to plant in rows or square beds (nature doesn't plant in rows or square beds), but you can if you prefer to. With row gardens insects and animals can find what they want to eat easier, with natural inter-planting these 'pests' have a harder time finding what they want. The design method used in this manual combines inter-planting and rotation and will be covered more under plant and animal health.

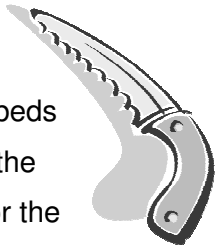
Eat more Legumes & Nuts for a Healthy body and Healthy Soil!

Green manures

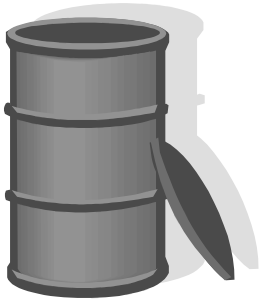
Green manure means adding fresh plant matter to the soil. You can use leguminous plants or other types of plants that provide other benefits. Some types of useful green materials are:

- Any legumes as we just reviewed, or
- Other greens such as tithonia, amaranthus *(bonongwe)*, comfrey or other green.

There are different methods you can use to get green manures around your plants and trees:



- ✓ Mulching: Fresh green material can be trimmed off of plants and trees at any time of the year and laid on the ground like mulch;
- ✓ Under-sowing: This involves planting leguminous species throughout your beds then chopping them down in the dry season while they are still green. Use the green material as mulch on your beds and they will help prepare the area for the next rainy season. The timing of planting will depend on the species you choose and when it is mature. Agro-forestry species can be planted with the rains and they will be ready to trim in the dry season. Medium sized legumes, such as mucuna *(kalongonda)* would be planted mid-way through the rains so they are ready for trimming out in the dry season. Small legumes, such as
- ✓ Cover-cropping: Instead of planting something that you will harvest and eat or sell, cover-cropping focuses on planting the whole area with a variety of green manure species that will all go back into the soil from where it grew. This can be a good option for people who have enough land to grow their food needs somewhere else that year.
- ✓ Green manure tea: The green material can be put in a bucket of water (about 1 handful of green material per litre of water) and allowed to sit until it ferments. You can stir it occasionally to assure the plant material mixes well with the water. After it is fermented (2-3 weeks) you can start using it by watering it down at about 250 ml of green manure tea to 10 litres of water.



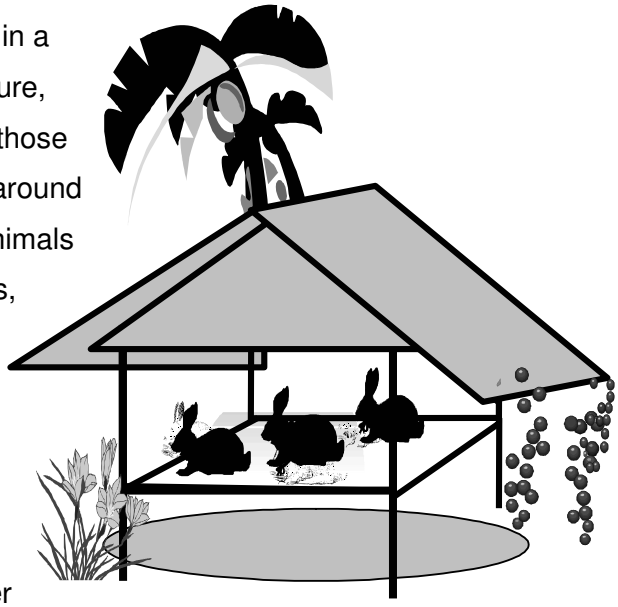
Animal manure – human and others

Integrating animals into designs has many benefits for food security, money, labour, and manure. Humans are also an animal that can provide manure. Whatever type of manure is used, care is always needed in handling fresh manure, as manure is made up of the waste products that the body did not want or need such as bacteria, worms, fibers, plus a lot of nutrients needed for the soil!

✓ EcoSan or composting toilets – Most of the current toilets in Malawi are missing out on a great opportunity of producing a wonderful fertilizer for us to feed to our plants and trees so that they can feed us. So-called modern toilets go one step further and waste a lot of precious water with every flush. There are several sites in Malawi teaching people to use human manure and make it into a rich compost (see the appendix for contact details). We personally have used different types of composting toilets for the past 10 years.

- The ideas is that each time the EcoSan (ecological sanitation) toilet is used, a handful of soil and a handful of organic matter is added. A large clay pot with soil and one with organic matter can be kept right inside the toilet. Over time there is a layer of human manure—soil—organic matter, then human manure—soil—organic matter, etc. This allows the micro-organisms to digest the food and to create a healthy soil. (Current outhouses in Malawi just have layer after layer of manure and urine which doesn't break down well.) Another benefit to layering with organic matter and soil is that the person generally scoops them up with their hands, providing a good reminder to wash them!
- With some designs, when the hole is almost full, you cover it with soil and plant around the hole so that the roots of the plants and trees tap into the nutrients. These designs use a privacy structure that is easy to more, such as a small grass house, or a woven mat. Some designs include a moveable sanitation platform (san plat), too.
- Other designs use the same concept but, in a permanent structure. The manure-soil-organic matter layers are captured in a container or hole, and when the container is full, it is covered and another container is used. After a specified time frame (6 months to a year), the compost is taken out of the container or hole, and used just like any other compost. When you hold this compost in your hand, you will never know that it came from a composting toilet – it just looks like the best rich compost that you've ever seen!

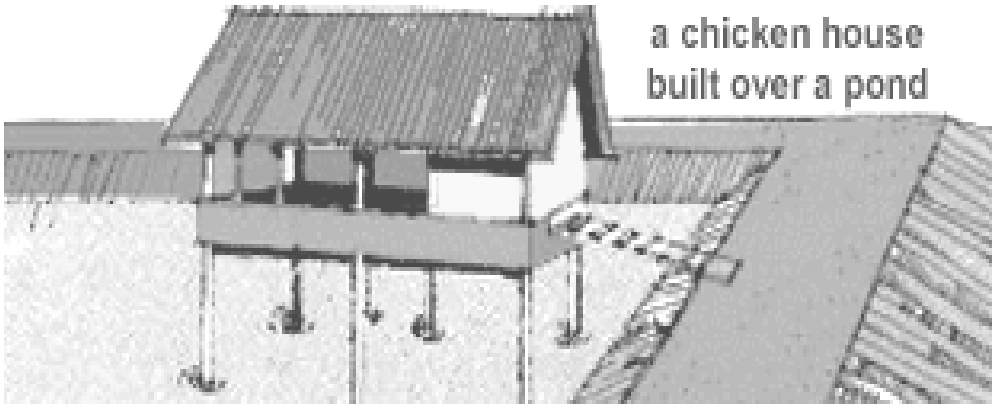
- ✓ Animal Pens "*Khola*" – keeping animals in a *khola* makes it easier to collect the manure, but it also means that you need to feed those animals instead of the animals walking around finding their own foods. Uncontrolled animals are a BIG problem in Malawi for vehicles, dropping manure in public places, and eating our plants and trees. There are creative designs for raised pens that make it easy to collect the manure, or allow the manure to drop right into a compost pile that you add organic matter layers to once and a while, or allow the manure to drop right into a fish pond to feed the fish, taking care not to over manure the pond. Live fence poles can be used – some people in Malawi already use live fencing to keep cattle and goats contained. These pens can be built with several separate areas so that the animals stay in one area for a few months and cropping takes place in the other pen, then switch the animals and crops. Bedding can be used inside the pen and changed from time to time as one way of collecting manure and urine.



This drawing shows one possibility for an integrated animal pen – there are many other shapes and sizes depending on the animal you are keeping and what that animal's needs are. Designs can be made with mud, bamboo, live trees, etc. and plants and trees can be put close to use the nutrients that are near the pen and at the same time to provide shade and food for the animals. They can be integrated with worm growing, fish farming, or other soil fertility design.

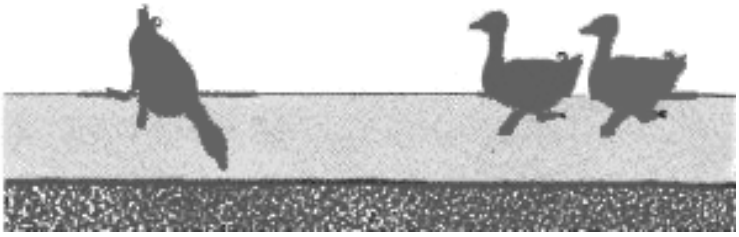
- ✓ Integrated Fish Farming - The following information on integrated fish ponds is adapted from FAO Training Series, Handbook on Small-scale Freshwater Fish Farming. Chapter 17: Your farm and your fish ponds[2]. See the resources in the appendix for information.

Today, many farmers have learned that they can manage their fish ponds together with their farm animals, gardens and fields so that they will all grow better and produce more. Fish, animals and plants live and grow in different ways and produce different things that can help all of them to live and grow better. You have already learned how to put animal maure into your ponds so that the water



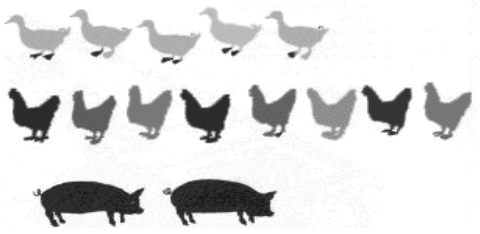
will be rich in the natural foods that your fish need to eat. In this way, the animals help the fish to live and grow better. Here are some other ways to manage your farm animals, gardens and fields so that they will help each other to grow better and produce more.

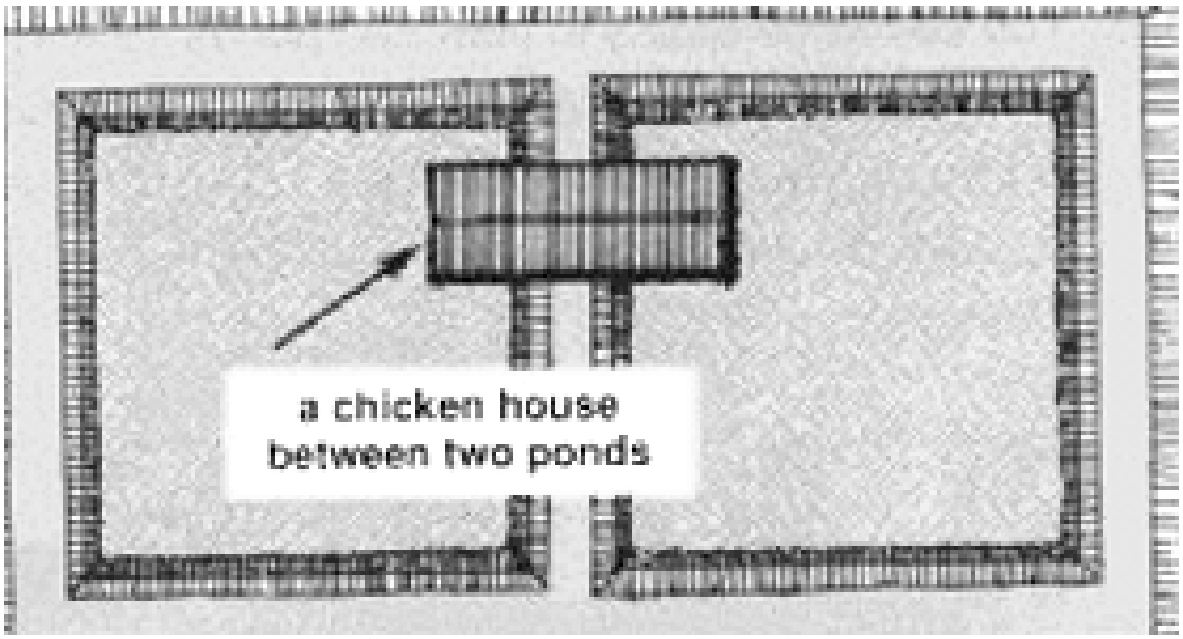
- ✓ **You can raise ducks** in your fish ponds so that much of their manure will go into the water. This will help your fish to grow. At the same time, the ducks will feed on the plants that grow in your ponds and help to keep your ponds free of plants, weeds and snails.



- ✓ **You can raise chickens or pigs** near your ponds. If you build chicken houses and pig pens on the banks or over the ponds, you can sweep the manure into the ponds. If you have built your ponds side by side, you can build a chicken house or pig pen on top of the bank between two ponds and sweep the manure into both ponds. Your ponds will supply water for the animals and the animals will supply fertilizer to help keep the water in your ponds rich. be careful not to put too much manure in your ponds, per 100 square metres of water use at most the manure of:

  - → 4 to 5 ducks or
  - → 5 to 8 chickens or
  - → 1 to 2 pigs

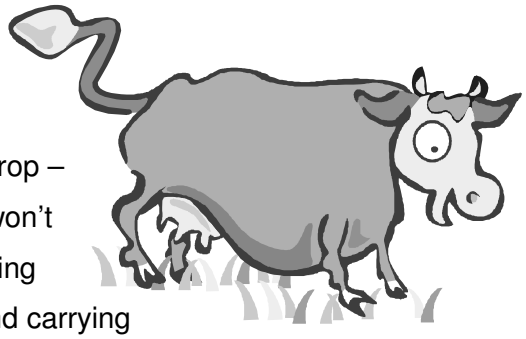




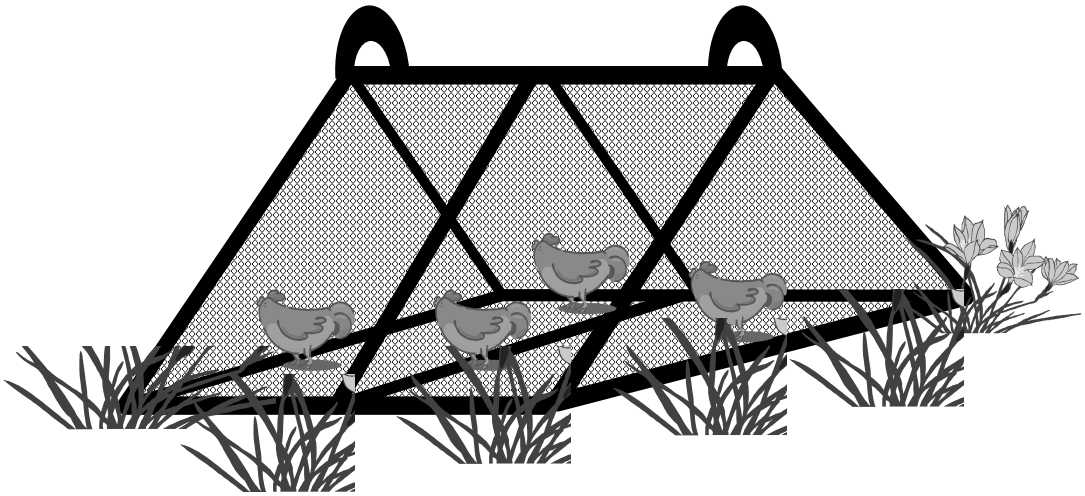
- ✓ **You can plant your guild** on the banks of your ponds. It will be easier to irrigate your plants and trees if they are close to a pond.

- ✓ **Pond mud, great fertilizer:** If you drain the water from your ponds to harvest the fish, you will find a layer of soft mud on the bottom. This soft mud is a very good fertilizer to put on your garden or fields, or on your pond banks if you are growing vegetables there.
- ✓ **Irrigation:** Any drain from the pond can be guided into your plants and trees.
- ✓ **Plant and tree wastes** such as plant leaves and stalks can be fed to your chickens, ducks or pigs or they can be put into your ponds for your fish to eat or made into compost to help keep the water green and rich.

So, you can see that with very little extra work you can manage your fish, ducks, chickens, pigs, farm fields and garden in such a way that they will help each other to produce more, meaning less work in the long run, a healthier balanced environment and more food and money!



- ✓ Free range animals. If you don't keep your animals in a pen, then you can encourage your animals to range where you want the manure to drop – such as in a field, an orchard, or other area they won't destroy. You can also collect the manure by walking around and scooping in up into a basket or pail and carrying it to where you want it, that's a job that will get people's attention!
- ✓ Animal tractors – this is a combination of using a *khola* and semi-free ranging. It uses a movable animal pen that allows the animals to graze in an area, then after the area is grazed, the pen is moved to another area. It works well with chickens, guinea fowl, ducks, rabbits, guinea pigs and other smaller livestock. An easy animal tractor to make is made like a tent frame, the covered in chicken wire or reeds. The bottom of the structure does not have to be covered as that is where the animals will graze, but if you have chicken wire you might choose to use it.



Using animal manures. If you are collecting a large amount of fresh animal manure, take care when handling it. Fresh manure can carry disease that can cause problems for your plants, trees, and you, so take care in handling any types of manure. It is important to let fresh manure decompose before putting it onto plants and trees. Using bedding inside of pens helps to breakdown the manure and to provide a mixture of nutrients.

- ✓ Include as a layer in compost piles. Composting is covered in the next topic. After your various layers of organic matter, you can include a layer of manure, then more organic matter. Fresh manure should never be the top layer of compost piles to avoid flies.
- ✓ Make liquid manure. The process is the same as for green manure plant teas.

Low Input Composting

Many projects and individuals jump to compost as an intervention as their first line of improving soil fertility and structure, but, as we just discussed, there are many other ways to improve fertility and structure. Before choosing composting as a method for your land, consider the options and choose what is best for the site. It may be better for you to combine mulching with a variety of materials, inter-planting leguminous plants and trees, integrating animals, and reducing tillage instead of composting. Most sites will have some level of composting integrated into them, but composting alone isn't the answer to most of the soil problems that we are having!

Composting is a way of copying natural decomposition. Nature mulches the soil with a variety of different dead plants, trees, animals, and insects and then when moisture is present from dew or rain, the organic matter disappears into the soil very quickly. There are many different ways to make compost, none are really right or wrong so choose the way that works best for your lifestyle – ***most importantly, just get all organic matter back into the soil!***

How does the soil work? Before talking about methods of composting, it is useful to review what happens inside the soil. This is a good review of the way we as humans digest and absorb our foods the processes are very similar!

- ✓ Chewing: Insects and animals 'chew' the organic matter into smaller pieces just like we use our teeth to chew.
- ✓ Digestion: The smaller pieces mix with chemicals in the soil and release the nutrients from the food. This is similar to the chemicals (enzymes) in our saliva and other juices in our stomach that mix with the foods.
- ✓ Absorption: The nutrients enter the plants and trees through the roots so that the plant can have energy to grow, breathe, and protect itself from disease. This is similar to how we absorb nutrients in our intestines.

Basic Principles for Making any type of Compost

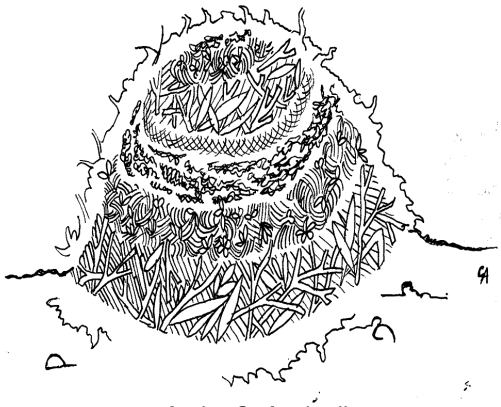
- ✓ Use a variety of different natural items – *anything* natural can go into compost. The key is variety and balance. The compost needs a variety of foods to be healthy just like we need to eat a variety of foods to be healthy!
- ✓ Balance the amount of air, water and heat to make the compost work quickly. With too much air or too little water the pieces will break down slowly, with too much water the pieces will become waterlogged and the compost will slow down. Luckily, it's easy to learn this balance with a little practice.
- ✓ Do not use plastic or other items made from chemicals, commonly referred to as 'man-made'. You will have to think about where the items came from – paper, leather, and cotton clothes all come from natural materials and will eventually be food for the soil (you'll also have to think what happened to the item along the way, such as whether it was painted or dyed with chemicals).
- ✓ Put the compost pile where it will be most useful. Do you have a tree you can put the pile near so the tree can protect the compost from sun and so the tree can benefit from the nutrients in the compost? Is it better for you to have your compost in your field or around your home? Or, better yet, have many compost piles/pits in many places! Get creative, compost can go anywhere and can be any size!

A few ideas of natural materials for a compost pile:

- ✓ Dry leaves or grass
- ✓ Sticks or twigs
- ✓ Dead "weeds" (unwanted plants)
- ✓ Torn paper or cardboard
- ✓ Tin cans or other metals that rust
- ✓ Kitchen scraps: peels, cobs, ANY inedible skins *(eat all edible skins!),* unwanted pieces of food
- ✓ Manure (ANY type)
- ✓ Bones
- ✓ Feathers, fur or hair
- ✓ *Anything from nature!*

Pile Compost: These usually take the least work as you just pile items on top of each other. But, to finish quickly they need a bucket or two of water every week in the dry season. You can just let them sit, but it will take longer and the process will slow down until there is moisture.

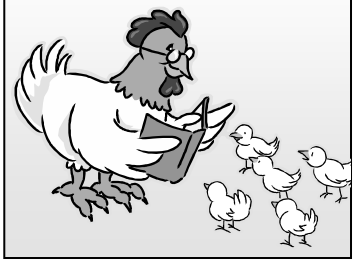
- ✓ Start with the largest pieces to allow air to enter the pile from the bottom.
- ✓ Layer different items changing from dry materials to wet materials *(like fresh food, fresh manure, freshly cut grass).* Always cover the wet materials well with dry materials so insects aren't attracted to the pile. *(Optional: Some people like to cut up items which will speed up the compost, but means more work for you. Decide how quickly you need your compost!)*
- ✓ Keep layering until about chest height then stop adding new materials *(start another pile with new materials).* You can add a pail of water in between layers if you have it (this can be 'grey' water, like from washing).

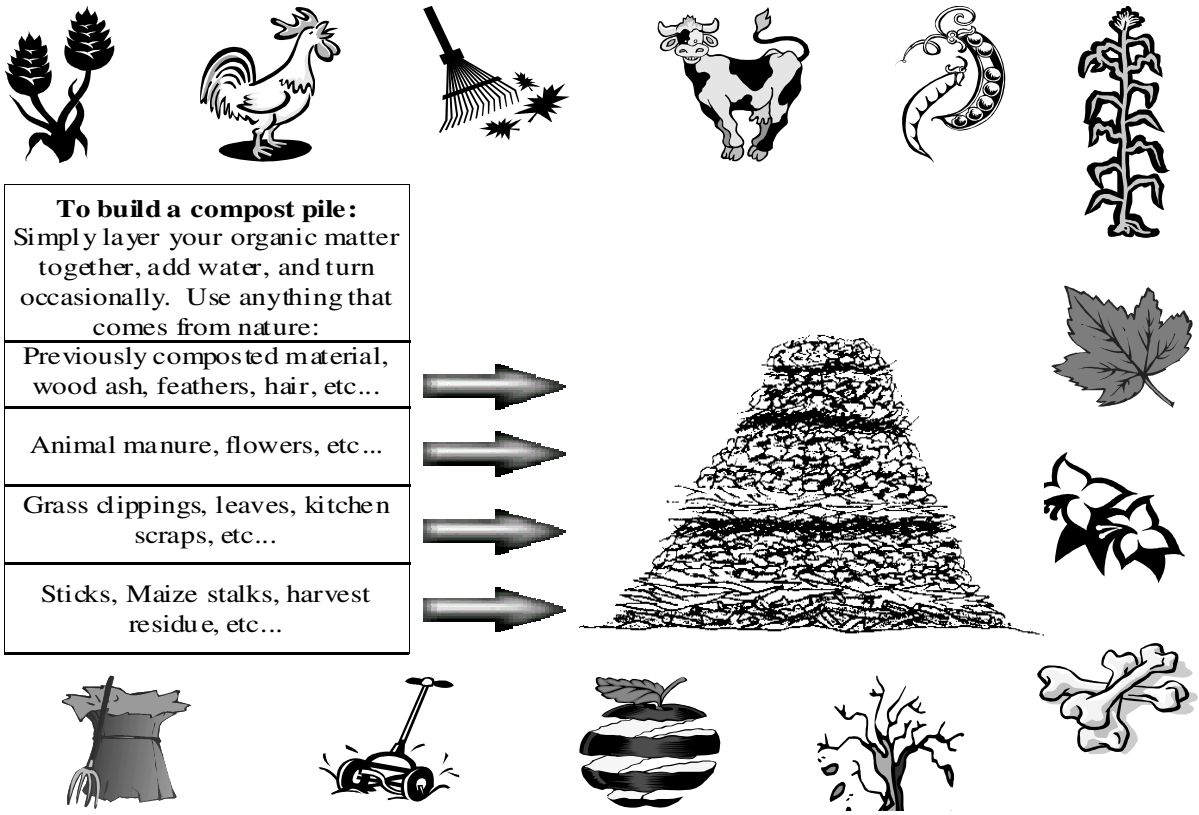


Art by C. Aspinall

- ✓ If it is a very dry area you can cover the pile with large fresh leaves *(like banana, palm or papaya),* or with mud to help keep moisture in the pile.
- ✓ Heat monitoring pole. The compost should get hot inside after a few days. You can put a pole in the middle of the pile then pull it out after a few days and the pole should be warm.
- ✓ After about 3 weeks turn the pile over and add water *(if you have it and if the pile needs it).* Observe the pile as you turn it. Use it after 1-2 turns (6-9 weeks). Allowing chickens or other animals to scratch through your pile will make a mess, but they also mix the materials up for you. Just pull together the pile with a rake, your hands, feet, or other tool.

If you have animals they will turn the compost for you!





Source: Permaculture Nutrition training manual, draft 2003, Kristof & Stacia Nordin, nordin@eomw.net
Full page handout available in the appendix.

Pit compost: These generally take more input than pile composts, but it is not always the case. These require digging a pit, or using a pit that is already dug, such as from where bricks were made, or an old burning pit *(since you are now making compost so you will burn a LOT less!).* A pit compost may be the right choice for you, depending on your situation, but a few points to consider before digging a pit are:

(1) These pits require reaching down and getting the compost back out of the pit when it is done, which is more work than using the pile compost.

(2) This compost isn't turned over; it just sits until it is done. It also doesn't need water added after it is made as the pit prevents water from escaping as quickly from the compost.

(3) It takes longer for the compost to finish.

(4) Many people find it most useful out in their fields so they just layer in organic matter at harvest time and cover it, then it is ready for use in the next planting season. People that use diversity in what they raise will have nice healthy compost!

If you do choose the pit-type of compost, use the same concepts as for pile composts, layering a variety of different natural materials. Adding a bucket or two of water while it is being made may be helpful, depending on how moist the area already is. When the pit is filled, cover it with a layer of dirt and then mulching to help trap moisture and protect from sun and wind.

Using compost: The nutrient levels in the compost will vary depending on what you used to make the compost. Compost can be used as:

- ✓ Food to fill planting stations for seeds, seedlings, pots, or planting tubes (or reused bags!).
- ✓ Top dressing for plants and trees *(then add mulch to protect and hold the compost nutrients)*
- ✓ Liquid compost using the same recipe as was discussed in green manures tea.
- ✓ Food for animals such as chickens or fish.

Avoid compacting the soil

Now that you've made fertile and well-structured soil, avoid disturbing it.

- ✓ Avoiding hoes, tractors and other things that disturb the soil is one way as was discussed in soil conservation.
- ✓ Another important thing is not to put heavy things on it – like yourself! Avoid stepping on places that you want plants or trees. Make pathways for people to walk on, and encourage their use. Think about a pathway that is walked on over and over, it gets really, really hard. You don't want this to happen to your gardens or farms. We will discuss permanent pathways and other methods under design.

☑ Testing your understanding of Soil Health

1. How does the soil maintain its fertility and structure?
2. Name 3 actions that negatively affect the soil's fertility and/or structure.
3. Describe at least 3 ways to conserve the soil and how you can use them in your own life.
4. Describe at least 3 ways to improve soil fertility and structure and how you can use them in your own life.

Teaching about Soil Fertility and Structure

- **Posters**: Refer back to nature cycle poster. Use simple drawings to show the structure of the soil under the ground – all the insects, organisms, roots, rocks, sand, clay and discuss how they interact. Draw a picture of compost and how it works.
- **Connect to human health and illness:** Refer back to nutrition and the food groups for humans and link it to the diverse food the soil needs to have 'good nutrition'. As nutrients are used up in the soil, they have to be replaced, just like we need to keep eating to replace the nutrients we use to live. In most places in Malawi, the soil nutrients have been 'used up' without replacing them, so people have become dependent on adding chemical 'nutrient pills' – similar to a very malnourished person who may need medicines and nutrient pills until they are healed. Once the person is healed, they can get all their nutrients from a balanced diet. It also takes time to heal and rebuild the soil using the techniques in this model – but the chemicals will be reduced every year. Specific guidelines should be developed to help people wean themselves off of fertilizers – such as how much compost, manure, and legumes are needed.
- **Or, another option – stop using fertilizer now!** People can immediately and completely stop using fertilizers if they choose to raise and interplant crops that don't take a lot of nutrients such as beans, nuts, sunflowers, root crops, millets, sorghums, fruits, melons, etc. Add some animals, such as ducks, chickens, or guinea fowl into the fields and have even better soil fertility and structure more quickly!
- **Connect to purchased NPK, CAN, etc.:** Malawi generally uses NPK 21:23:0 meaning 21 percent of the bag is Nitrogen, 23 percent is Phosphorus, and 0 percent is Potassium. The other 56 percent of the bag is nothing – just filler! Explain where these nutrients come from in nature and that there are many other nutrients that the soil, plants, trees, insects and micro-organisms need.
- **Activity or discussion:** Katie Greenwood shares this experience: At a 'health awareness' session, we looked at what strong soil needs and related it to what strong people need. Since we were also teaching about natural medicine, we said compost is like food and fertilizer is like medicine (tablets): food (compost) gives you a lot of different things every day and keeps you healthy most of the time, medicine (fertilizer) is for emergency use only because it is expensive, doesn't satisfy all needs, and dangerous if used for a long time. We had listed the requirements for "strong people" earlier, and then after listing the requirements for "strong soil" later in the workshop we listed parallels. The people in the training thought this was a good way to show the connections to subsistence farmers. Some of the other parallels we listed:

Strong soil	Strong people
Compost	Wide variety of food
Sunshine	Sunshine
Water	Water
Air	Air
Insect and disease control	Natural and emergency medicine
Diversity	Good relationships/diversity
Mulch/erosion control	Good house
Good gardener	Community health support

Topic 5: Water Management Concepts

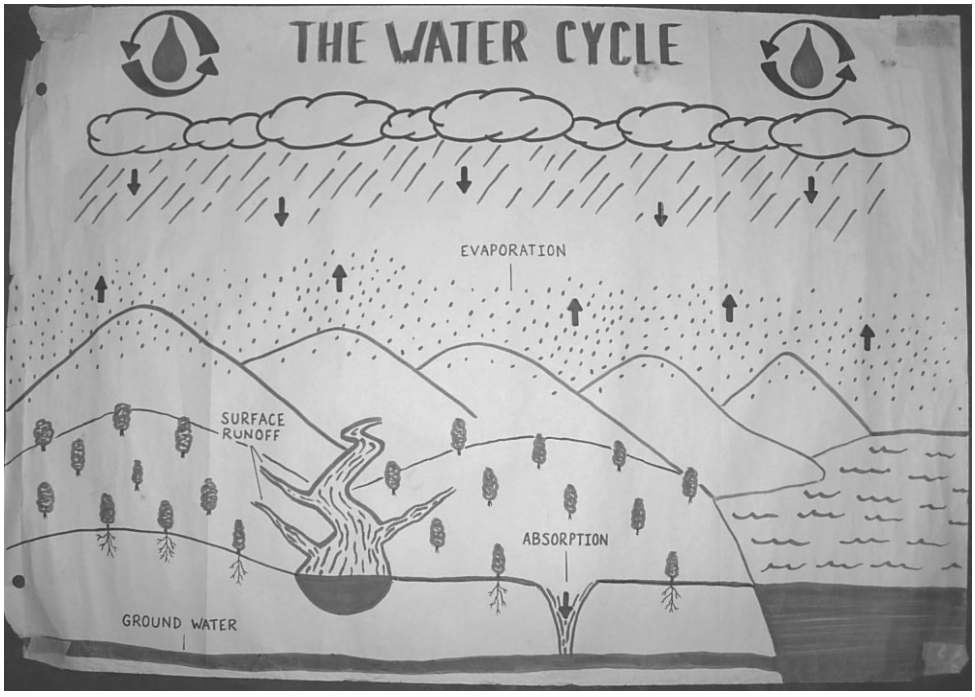
☑ Healing the soil for improved water management

Using the Soil Health Concepts begins the process of improved water management.

- Healthy Soil: Healthy soil helps water to sink into the earth instead of running across and eroding the earth. The roots of plants and trees 'drink' this water as they need it – the larger plants and trees even help to 'hold' the water and they give it back to the soil as needed.
- Mulching: Nature keeps water in the soil for a long time by putting a 'blanket' of mulch on the ground. It helps by both covering the area so that water can't escape into the air and like a sponge that soaks it up and lets water out slowly.
- Shade: Nature plants a variety of trees, bushes, climbing and crawling plants so that the soil is protected from the sun.

☑ Understanding the basic water cycle

Water has a cycle that it keeps going through over and over to maintain its health, all the time providing water for other parts of the nature cycle along the way. You can enter the cycle anywhere to follow and understand it. An easy place to start is where water falls as rain, hitting the leaves on trees and plants so it gently falls on the mulch, then filters into the soil, some absorbed by roots of plants, other drops continue filtering down into the ground water for roots to use later and for us to drink from our wells. Some water enters the rivers and flows to larger and larger bodies of water. Water slowly evaporates out of the mulch, leaves, rivers and lakes back up into the air where it later falls again as rain.



Source: Permaculture Nutrition Training Material 1999. Kristof & Stacia Nordin, nordin@eomw.net Full page handout in appendix.

What is happening to disturb this cycle of water?

- Poisoned air: As rain falls through the air it picks up particles along the way. If we poison our air with pollution, chemicals, burning (especially plastics), exhausts or smoke – rain picks it up along the way.
- Clearing the land: Removing all the ground cover by cutting trees and plants, sweeping, burning, not having roots in the soil, etc. means the rain can't fall slowly to the ground. If there is nothing for the rain to fall upon, it hits the soil, and it hits it hard, really hard. This compacts the soil, just as much as you walking on your soil as was discussed in soil structure. The rain isn't able to enter the soil when it is hard, it just runs right off. Water also can't evaporate back into the air properly without plants, trees and mulch. Hard soil isn't the only culprit, covering the earth with tar and cement surfaces also prevents the water from sinking into the soil as it should.

What are some of the results of this?

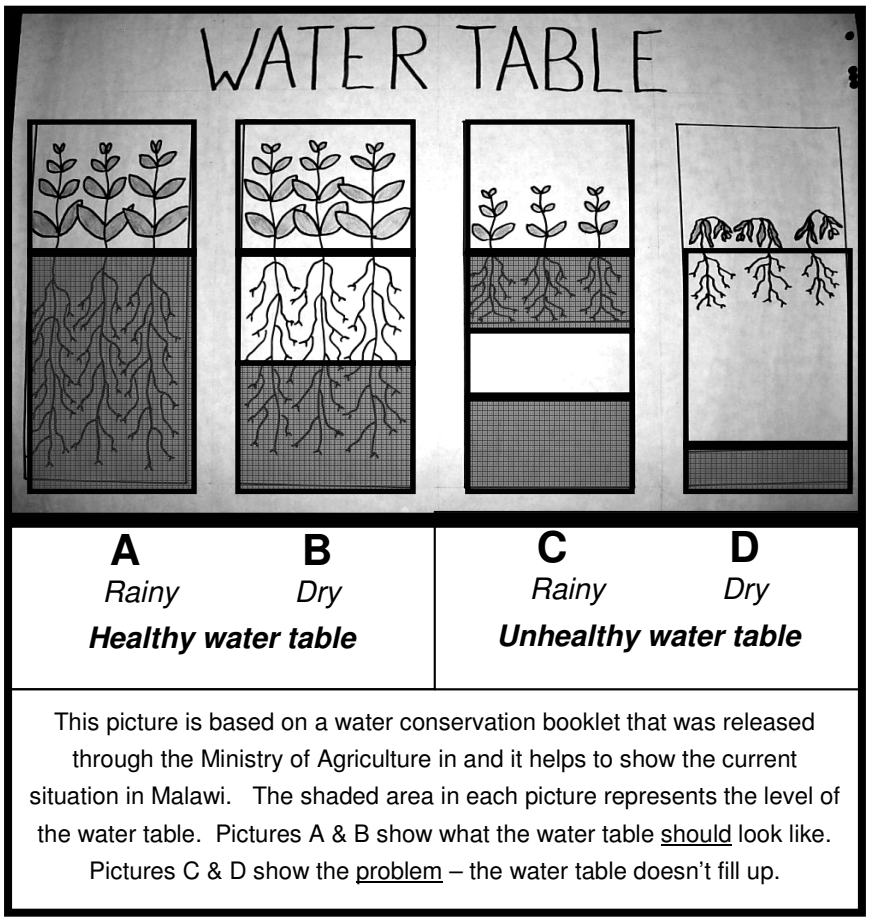
- Acid rain: This term is mostly used in 'industrial' countries that use a lot of fuel and chemicals, but acid rain caused by industrial countries also affects other countries as well.
- Erosion and floods: Water runs off the earth, taking with it the top layer of soil and whatever else is in its way. Some of this run-off blocks our roads, fills up our drainage ditches, causes dirt and chemicals to buildup in our rivers, blocks our hydro-electric production, wipes out our bridges, and poisons our un-protected wells.
- Low water table: The water table is defined as the highest level of damp earth.
    - Normal rainy season water table: In a country like Malawi that has a "rainy season", the soil should become completely saturated by the end of the rains. At this point, the water table would reach as high as the soil's surface.
    - Normal dry season water table: During the dry season, the water table eventually lowers as water is lost to evaporation and absorption. Many deep rooted plants and trees, such as perennials, are able to tap into the water table to keep living until the next rains.
    - Problem: Unfortunately in Malawi, water doesn't have time to sink into the soil because of human impact and designs. art of the result is that the ground water doesn't fill up, leaving us and the plants with nothing to drink. The following diagram is based on a water conservation booklet that was released through the Ministry of Agriculture[3] and it helps to show the current situation.

The shaded area in each box represents the level of the water table:

☺ Box A shows how the soil *should* look towards the end of the rainy season, the water table is fully saturated and the roots are able to go deep into the earth.

☺ Box B shows the dry season and the water table begins to lower, but deep rooted plants and trees can still survive.

☹ Box C shows Malawi's water table at the end of the rainy season. You can see that soil's surface has absorbed some moisture, but it has not become damp all the way through. Plants that try to establish themselves in this setting can only send their roots as deep as the moisture will allow. These plants and trees are very vulnerable to any dry spell.



Permaculture Nutrition Manual, 2003 edition, Kristof & Stacia Nordin, nordin@eomw.net . Full page handout available in appendix.

☹ Box D is the result. The plants and trees have not had a chance to reach the lower levels of the water table so they can't survive dry spells. In this situation the water table and ground water hasn't had a chance to fill up which will create problems such as wells drying up, rivers running dry, and making it more difficult to find useable sources of water.

Teaching about the water cycle & water table

- **Poster**: Draw a simple poster of the water cycle and the water table.
- **Best Lesson: Go Outside!** First, take the group to a natural area that is not being ruined by humans. Ask what is happening to the water in this area. Now, move the group to an area that humans are affecting and look at harmful practices and the results (sweeping, burning, erosion, unhealthy soil, water, plants, etc.). Being outside in the rain, or just after the rain is a great way to see what is happening to the rainfall.
- **Evaporation:** Tie a plastic bag around the leaves of a tree or plant and come back in an hour, the bag will have water in it. Discuss how it happens and what happens when there are no leaves. You can connect this idea to the job leaves have of making good air for us, and for making the air cool.

☑ Water Management: Mimic Nature!

When the water cycle is allowed to do its job, it does a great job of giving all of us the clean water that we need to live. One way to follow nature's lead and to manage water is to remember four S's:

- Slow or Stop – slowing down the speed of the water gives the water more time to enter the soil. Ways to slow water include using 'check dams' made from rocks, logs, sticks, old maize bags filled with dirt – again, be creative! Another way to slow down water is to catch it – from roofs, roads, or other surface the water is running off of. It can be caught into drums, clay pots, pits, or pond. You will want to consider if the water is free from chemicals or other harmful pollution or not, then make a decision how that water can be used.
- Spread – Now that the water is slowed down, you want it to spread out enough so that there isn't too much water in just one place. Spread the water out across the slope (along the contour) in preparation for the next step, sinking.
- Sink – If your soil is healthy with lots of insect tunnels, micro-organism activity, organic matter, and there are plenty of roots in the soil, the water will be able to sink into the soil. This sinking process helps to filter the water so that it is clean by the time it reaches our ground water table. Sinking will depend on the type of your soil – clay soil absorbs water slowly whereas sand absorbs it very quickly. Knowing where there is clay soil can be to your advantage if you want to create a pond or tank to collect the water.
- Shade – Now that the water has sunk into the soil, you want to keep it there by using mulch, ground covering plants, and bushes or trees that provide shade.

☑ Design for the site

Now that we understand the basics of how water works, we can use it to our advantage, while at the same time protecting the water cycle so it can do its work. Again, just like we did for dietary diversity and soil health, we will want to assess the site so that we can design to make the best use of what we have. First we need to tap into all our **sources of water**:

- Rain, lakes, rivers, marshy areas, and ground water are what most people think of first.
- Think again! Think about how we take this water and use it: washing dishes, clothes, our bodies, our homes, our cars – all this water can be used again if we use some creative thinking.

Once your mind and eyes open up to all these sources you will realize that we have a LOT of water that could be used to help us grow foods.

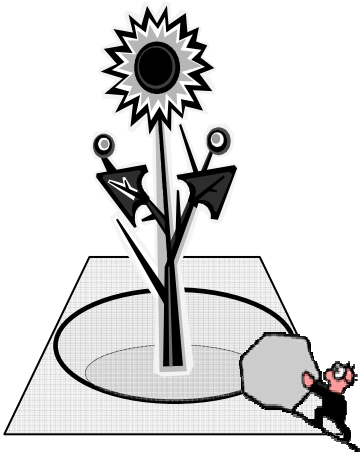
Select seeds and animals for water in area

As part of water management, it is important to learn what types of plants are suited for the area in which you are planting. Some plants prefer a lot of water; other plants prefer dry sandy areas. This takes some time to learn, look to nature for what is doing well around you as a good start! People often blame God (the weather) for drought, crop failures or poor animal health, but often times it is because people have selected a crop that won't do well in the local conditions. Refer to the table in the annex for a guide to more crops.

High water needs:	Low Water needs:
Most Maize	Many Indigenous Vegetables
Most Exotic Vegetables	Many Indigenous Trees
Most Cattle	Sorghum
	Millet
Likes marshy areas:	Peanuts
Bananas	Pigeon Peas
Sugar Cane	Kalongonda
Coco Yams	Mkhungudzu
Rice	Chimbamba
Fish	Indigenous Melons
Ducks	Pumpkins
	Tomatoes
	Chickens
See appendix for more ideas	

Types of planting stations: sunken, raised or level

Another part of your assessment will tell you what type of beds you should make for dry or wet areas. Preferably you will design and make your beds one time and never make them again, so some thought needs to go into what the area looks like in the dry and wet seasons. By healing the soil the water will generally be regulated well on its own, but here are some planting options to consider for very dry and very wet areas.



- ✓ Dry areas: Sunken Planting Stations. Basins help to collect water and guide it down to the roots of the plants. These can be big basins for larger trees and plants and small basins for smaller things. Some people like to have sunken beds for their whole garden, but make sure your soil can handle that as there is a lot of rain that will gather in the beds and it might flood and drown your plants!
  - ♦ After digging a hole the size you need for your tree, seed or seedling, plant the item low in the hole so that the earth you add back into the hole is less than you took out of the hole. Adding compost to your planting station means that even less of the hole's original soil goes back into the hole. Extra soil can be used to create a ridge around the basin, or you can use the dirt somewhere else.
  - ♦ You can help to strengthen the basin by placing stones, soil or other material in a circle around the hole (or semi-circle if you are on a slope), and/or using a stone mulch in the basin, which is very useful for when there are chickens around.
  - ♦ Always add mulch as the last step so that the soil is always covered! If you are using a stone mulch, you could also add a layer of organic matter before putting on the stones, just for a bit more nutrition for the plant or tree!

- ✓ Wet Areas: Raised Planting Stations. If your soil has a LOT of water, or the crop you've chosen doesn't like water, you would choose just the opposite of sunken stations. Raise the 'hole' above the surface so that water runs away from the plant.
- ✓ Level Planting Stations. You might not need raised or sunken beds or planting stations! Planting even with the earth so that the whole area gets about the same spread of water may be the best option for your land!

Desgin to capture rain and dew

A lot of water runs right by us in the rainy season, off our roofs and roads, down the drains that we spent a lot of time and money making, and building up the whole time until a lot of water comes out at the end. This water can be captured! We already mentioned some ways under Stop/Slow for getting the water into the soil, but we can also collect the rain water so that we can use it before putting it into the soil.

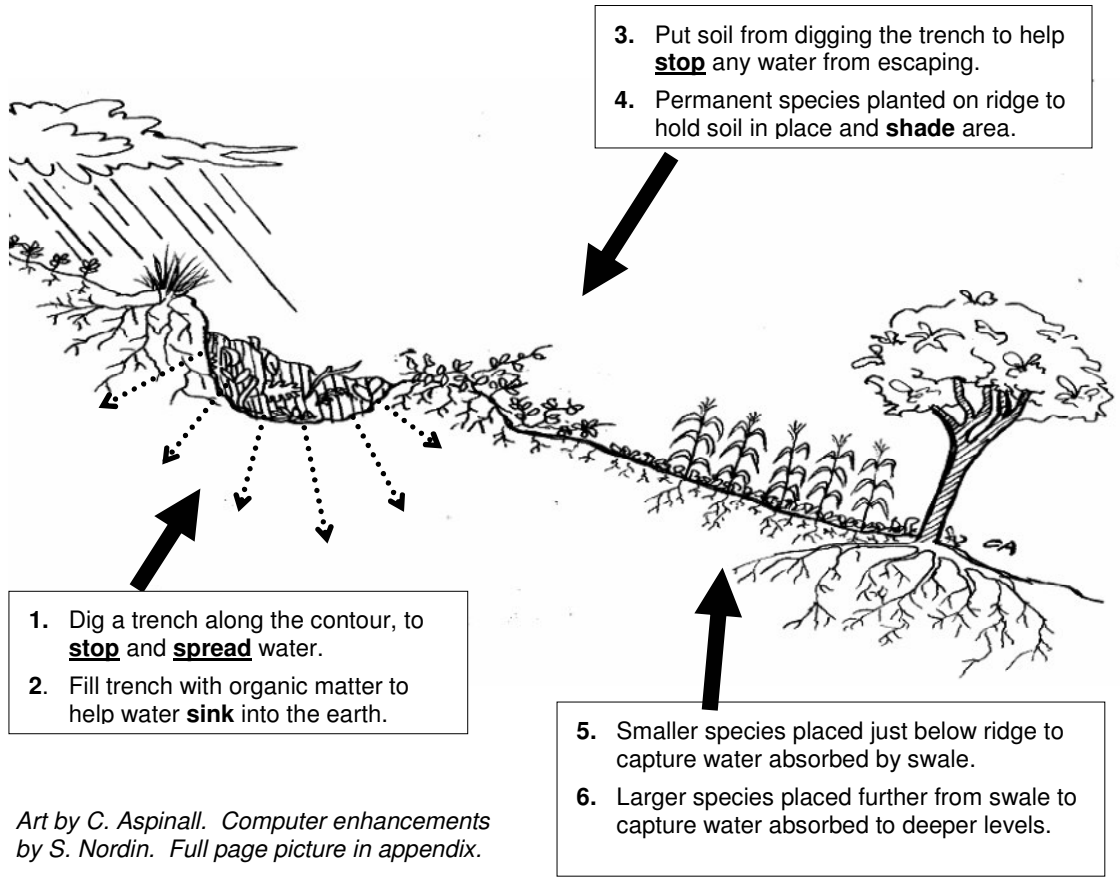
If you are designing a new building or road, you can plan in designs that harvests and uses this water. This is where we need to link up with people in public works and in architecture. All our schools, hospital, government housing, etc. could be built under a policy of harvesting water – but why wait for a policy? Do it anyway!

- Water Tanks: Buildings can be designed so that all water from the roof flows into water tanks. The tanks can have a tap so that people can use the water out of the tank. It is helpful to use roof gutters to catch the water off the roof and guide it into the tank.
- Other containers: If you can't build a tank, capture water into whatever you have – mtsuko (large clay pots), drums, or even sturdy perennial plants that are placed creatively where the water comes off the roof.
- Pits or banana circles: At the end of any drain, appropriate sized pits filled with organic matter and planted with bananas or other appropriate plants and trees around the edge will stop the water and create a wet, fertile area for plants.
- Frequent road drains: All roads should have check dams and drains at appropriate intervals to guide water into pits or trees or other area that can soak up the water. Removing water as it goes down the slope prevents it from building up and causing flooding at the bottom.
- Ground covers next to roads: Water can be captured at the side of the road into short grasses first, then taller plants far enough out so that people can walk down the sides of the roads and so that the plants to not prevent drivers from seeing well. A big mistake in Malawi is people hoeing up the grass growing alongside roads (and we even pay people money or food to do it!) This causes erosion and the road slowly washes away. This is true for earth roads and any pathway, too. The roots will hold the earth in place protecting your paths and roads from being washed away. It is better to slash than to hoe. People, cars,

bikes, and ox carts can pass through short grass and foot or vehicle traffic usually keeps the plants from growing too much.

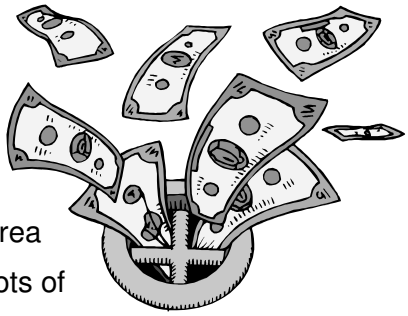
- Swales: Swales are another way to incorporate the four "S's" of water management. This method is similar to contour ridging or terracing except a swale is designed to be permanent. Once it is made, it is never made again, only maintained if needed. It is also a place where we provide ourselves with permanent food. **Not every site needs a swale.** Sites that have a bare, degraded slope might need a swale. Before digging a swale, think about other options that take less digging and decide if they will do the job, such as using rocks across the slope. If you decide that you do want to make a swale then:
  - → Dig a trench along the contour of the land. This trench size and length will depend on the slope of the land. You will dig deeper, longer trenches for steep places.
  - → Make a ridge along the downhill side of the trench using soil from the trench.
  - → Fill the trench with organic matter to help cover the soil and absorb rain water.
  - → Plant along the ridge with strong-rooted, permanent species, preferably food! Continue planting permanent species to fill about a metre below the ridge, using smaller plants close to the ridge and bigger things like trees or shrubs further down.

As rainwater flows down the slope it will enter the trench, spread out, and be allowed to sink into the soil. As this water is absorbed by the soil underground, it will provide the roots of the plants with the nourishment that they need without washing the soil away in the process.



Art by C. Aspinall. Computer enhancements by S. Nordin. Full page picture in appendix.

Design to capture 'used' water



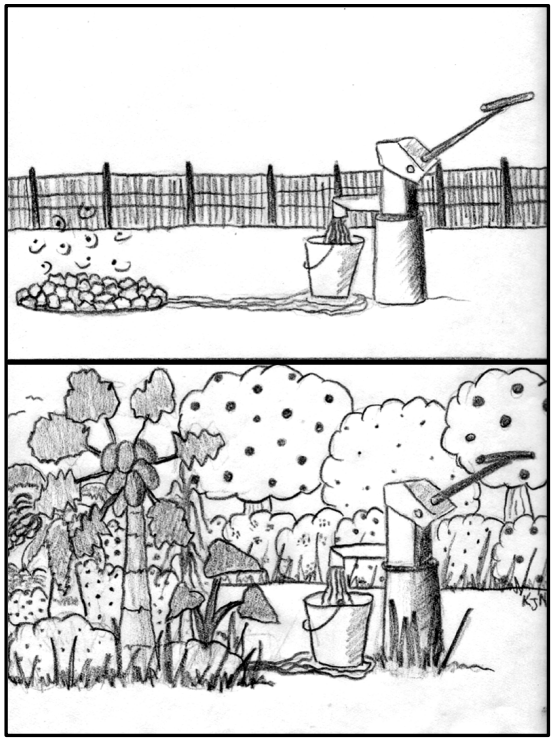
Take a look around your home, your place of work, and your community and ask: Is there any water that is being wasted? Is there standing water anywhere? Is there water that could be used more than once? Is there any water that could be run into a garden area or be used to water trees? Often the answer to this is yes! There is lots of water going down the drain or thrown on bare ground that we could be using to make food and money! Before you use your grey water consider at least these two things:

! Be sure to think about what might be in the water. If people are throwing dangerous chemicals down the drain, like chlorine beach or chemical cleaners, the used water might kill the plants and trees. In this case you can change to natural cleaners such as natural soaps and wood ash that works like a scrubbing powder (i.e., Vim), or sand, or other local remedy.

! Consider the type of plants and trees to include in your design**.** You won't want to plant short leafy greens in most types of grey water because the leaves might not be safe to eat. Your choice of plants for using most used water will be things like: climbing plants, small bushes or trees where the food is not very close to the ground. The soil will filter the water and the roots of the plant will drink up what it needs and will produce great food! Be creative and think about it!

Now you are ready to think about creative designs for using your grey water:

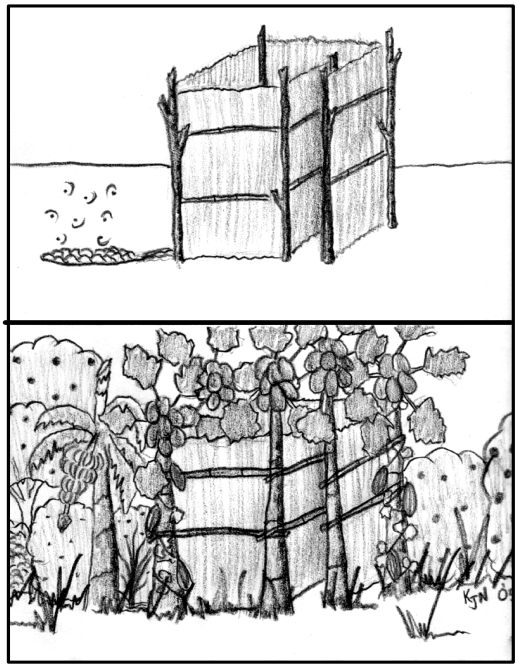
- Borehole / Wells / Taps – Areas where people draw water will often have standing water or wet areas that can be used to grow things. Standing water can breed malaria-carrying mosquitoes, so it is important to get this water to sink into the ground, by planting you not only soak up the water, you also can get food, medicine, building supplies and/or money!. Choose plants and trees that are suitable for moist conditions. If is a community water site and there is a question over whose food it will be, the community can sell it and put the proceeds towards the maintenance of the pump, or they can use all the foods for community projects, such as caring for orphans, widows, people will illnesses, and/or the elderly.



Art by K. Nordin

Full page handout available in the appendix.

- Bath areas: Drains from bathing areas are very easy to convert into small gardens. Simply direct the flow of where you want it, and plant! Even if people urinate in the bafa, this urine is full of urea, which is something that many people buy and add to their fields! If you plant things like vines or live-fencing around your outdoor bath structure, it will also help to improve your privacy while bathing. Plant a loofa sponge and you will have one whenever you need it!



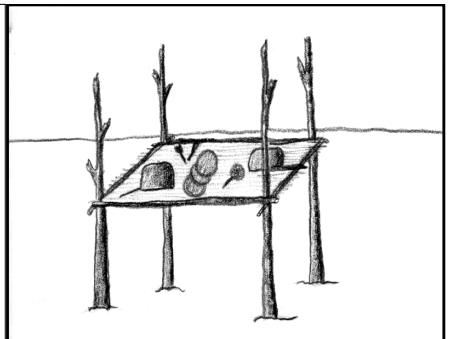
Art by K. Nordin

Full page handout available in the appendix.

- Reusing wash water: Many people in Malawi go long distances to get water, wash something with it once, and then throw it away onto the bare ground. Don't waste this water! It can be used to grow food, enhance the beauty of your home or community, or water trees that can give you fuel-wood and building supplies. It takes the same amount of work to throw water onto growing plants and trees as it does to throw it on the ground, but you will get so much more from it with just a little bit of thinking ahead.
- Sink Drains: If you have a house or office with piped in water, it may be possible to redirect the drain pipes into your plants or garden. Take a look at where the water exits the house to see if the pipes can be adapted – if it is not your house, ask the owners first! This is a great teaching opportunity and you can explain how it will benefit the owner. To adapt pipe you can cleverly use plastic bottles, bicycle tire tubes, bamboo, old garden hoses, and various other odds and ends that are often lying around.
- Dish Drying Racks: Most people in Malawi build a tall 'Tandala' rack to dry their dishes. The dishes are put on the rack soaking wet and the clean water drips onto the ground. This area is perfect for growing plants that like moisture and a bit of shade. Sweet potato vines are a great choice as you can eat vegetables while also keeping your stems healthy until the next rainy season!

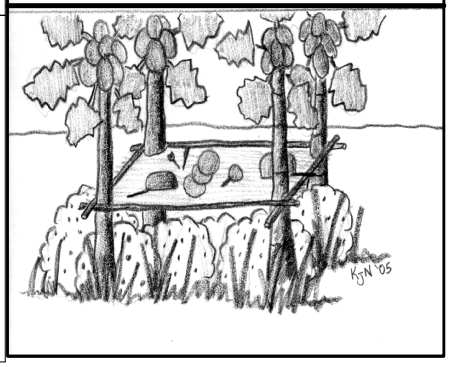
Typical Design:

Water and space wasted. Need to remake rack every few years.



Low Input Design:

Water & space completely used to last for many years while providing useful items.

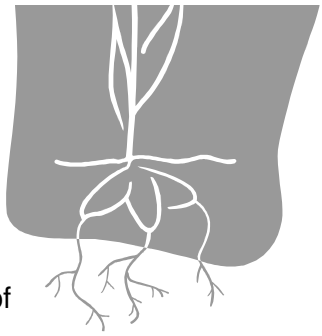


Art by K. Nordin

Art by K Nordin. Full page handout available in the appendix.

☑ Watering, i.e. Irrigation

When the word irrigation is used, most people think of systems that need money, labour and time to get fresh water to the plants. This might be an appropriate choice in some places, but for most places, you will first want to use the water harvesting methods listed above. In addition to these, there are many low-input irrigation methods that have been tested and shown to work well. Whatever method you choose for irrigation, you will want to keep the following guidance in mind:



Water Where it counts – the roots!

Understanding the water cycle is important, but also understanding how plants and trees use water from the cycle is just as important. Plants and tree mostly drink water from their roots – they can absorb some moisture from the air through their leaves, but the bulk of their drinking is done by roots. You wouldn't like it if you were really thirsty and someone dumped it on your head, would you? You want the water where you can drink it – in your mouth! Plants and trees want water where they can drink it too, in their roots!

Correct amount of water: Avoid over or under watering

Using the correct amount of water will depend on the type of soil, what design you've made, what types of plants and trees you've selected, and the age of the plants and trees. For animals, the same type of ideas apply as it would for you – where they live, how much exercise they get, and what type of animal they are. Fish, for example, need a lot of water!

- **Observe the Plants and Trees**: One way to judge how much a plant or tree needs is to watch it. The leaves will tell you when the plant or tree is thirsty by starting to wilt. Try to water just before wilting starts. It will take some practice to get it right.
- **Deep Watering**: You want to give the area enough water to that it goes down to the lowest part of the roots if possible to encourage the roots to grow down as deeply as possible. This will mean less often, long, deep watering compared to the usual practice of frequent, short, shallow watering.

Conserve Water - Irrigate Foods, Not Grass!

Think about what is being watered. Why are we watering grass and flower beds when water is so scarce and people are hungry? We all need to be thoughtful of our water use. This will take a change in thinking and new eyes to live with the natural 'look' for the season, such as:

- Allowing dry grass lawns in the dry season, or
- Edible landscaping with decorative edible plants, trees, and perennials.

Prevent the formation of salts

When using any irrigation method, you will want to prevent the water from evaporating into the air very quickly and leaving salts on the surface of the soil, or from over-saturating the area which also can leave salts behind. You can usually see the salts because of the white layer that it causes on the soil's surface. These salts make it difficult for many types of plants to grow. In very hot, bare areas this risk of quick evaporation and salt deposits is the greatest.

Through an Internet search, the best information I could find on practical ways to help prevent human-caused salinity comes from Water Wise and Salt Tolerant Plants, Wagga Wagga Region (Australia), printed in 1999[4].

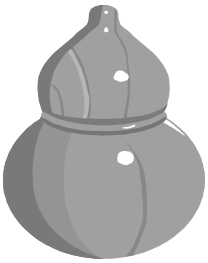
This list of ideas to prevent salting is primarily adapted from that manual:

- Mulch garden beds to reduce evaporation by up to 90 percent.
- Improve soil water holding ability by adding compost which will encourage worms.
- Plant the right trees in the right place to provide the garden with shade and wind protection.
- Do not over water the area – only give the area as much as it can absorb.
- Group plants according to water needs to prevent under or overwatering.
- Water in the morning or evening to reduce water loss through evaporation.
- Deep watering once or twice a week is much more efficient than sprinkling every day. This will also make plants more drought tolerant *(refer back to section on the water table)*
- Avoid watering on very windy days.
- Avoid fine mist sprays or any sprinkler that sends water high into the air.
- Set up sprinklers and sprays to water plants at their base, not paths, fences, or plant leaves.

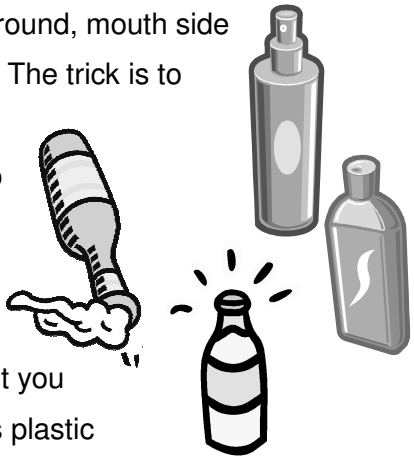
In a few of the model sites, especially in Mangochi around Lake Malawi, salty borehole water was a problem. I couldn't find anything on this topic other than this sometimes being a natural occurrence. The list of salt tolerant plants from an Australian list included: Lantana, Senna, Acacia, and Eucalyptus. With a further internet search I would hope that we could find a solution to this, and possibly discover a list of Malawian foods that we can plant in salty-borehole-water.

Low Input Drip Irrigation

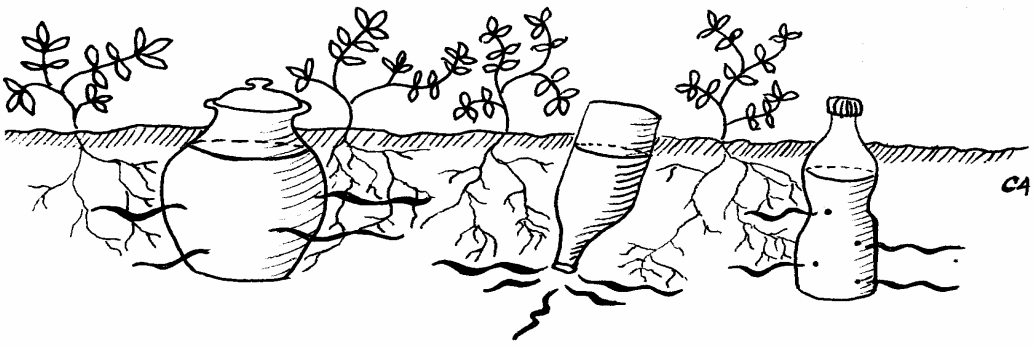
The following are some ideas for getting water to the roots of your plants, to reduce evaporation of the water into the air, and to reduce the amount of time, water, and energy spent on irrigating. Most of these drip irrigation methods can be used from time to time with the green manure teas, compost tea or animal manure teas as described in earlier sections to provide extra nutrients to the roots of your plants and trees.



- Unglazed clay pots buried in the ground up to their rim and then filled with water allows water to seep into the ground very slowly. The pots are place in the middle of 5 or 6 different plants so that the roots can drink the water underground. Put a lid on the pot to prevent evaporation. Only add more to the pot when the plants begin to wilt.



- Bottles without a lid, such as non-returnable beer, wine, or condiment bottles, can be filled with water and then pressed tightly into the ground, mouth side down. The water from the bottle will slowly enter the soil. The trick is to get the bottle pressed in without doing it too tight (the water leaves too slowly) or too loose (the water leaves too fast). It isn't hard to learn the trick though! Fill the bottles every week or so, depending on the conditions. Glass bottles work well because they are strong and can be pressed hard without bending. Plastic bottle work, too, but you might need to dig a hole where the bottle will be placed as plastic bottles will bend under pressure when you push them into the ground.
- Plastic bottles and tin cans can also be used in a similar way. For this method you make two or three very *tiny* holes in the bottom of a plastic bottle with a needle or thorn. For the tin, use a nail, but the holes need to be *small* or the water escapes too quickly. The top of the bottle or tin can will stick out of the soil so that you can fill them. You can put the cap on the bottle if you want to reduce evaporation, then remove the cap to fill the bottle again.

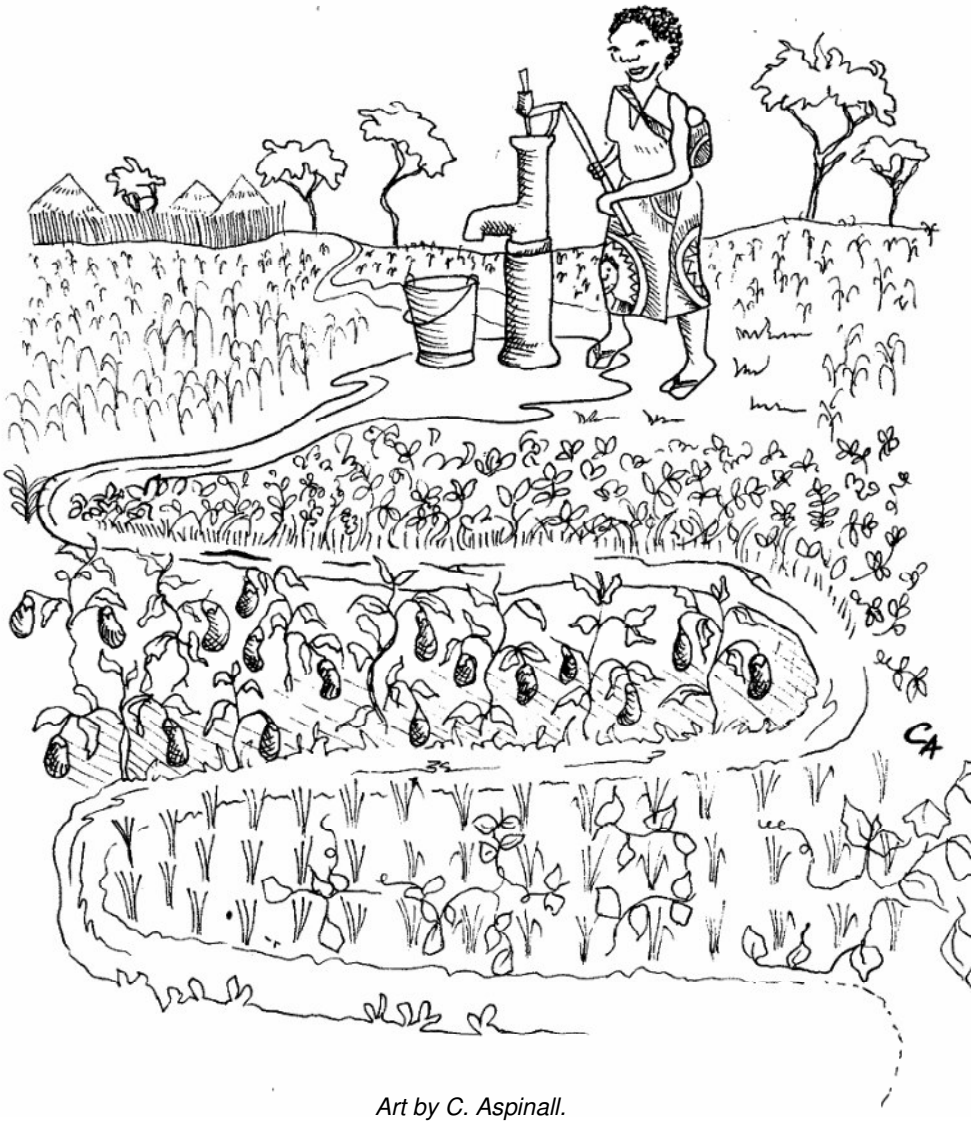


Art by C. Aspinall

Other Low Input irrigation methods

In addition to getting water down near the roots of your plants and trees, there are other strategies to help make the most of your water, time and resources:

- Spot watering**.** Get the water toward the roots not wasted on leaves & pathways. This may mean taking off the rose spout off your watering can and instead pouring the water slowly around the base of the plants, right onto the mulch.
- Gravity. When you have a water source uphill, you can use channels to guide the water throughout the area you want to irrigate. Using creativity, you should be able to get the channels to 'snake' their way back and forth at a slight angle to the slope. You shouldn't have to use any other watering if this is successful. If your water source is a steady stream or river, you might need a system for shutting the water off so that plants and trees don't get over-watered. This takes some practice and observation to learn how water follows down the slopes in the land, always working its way down the lowest points along the way.

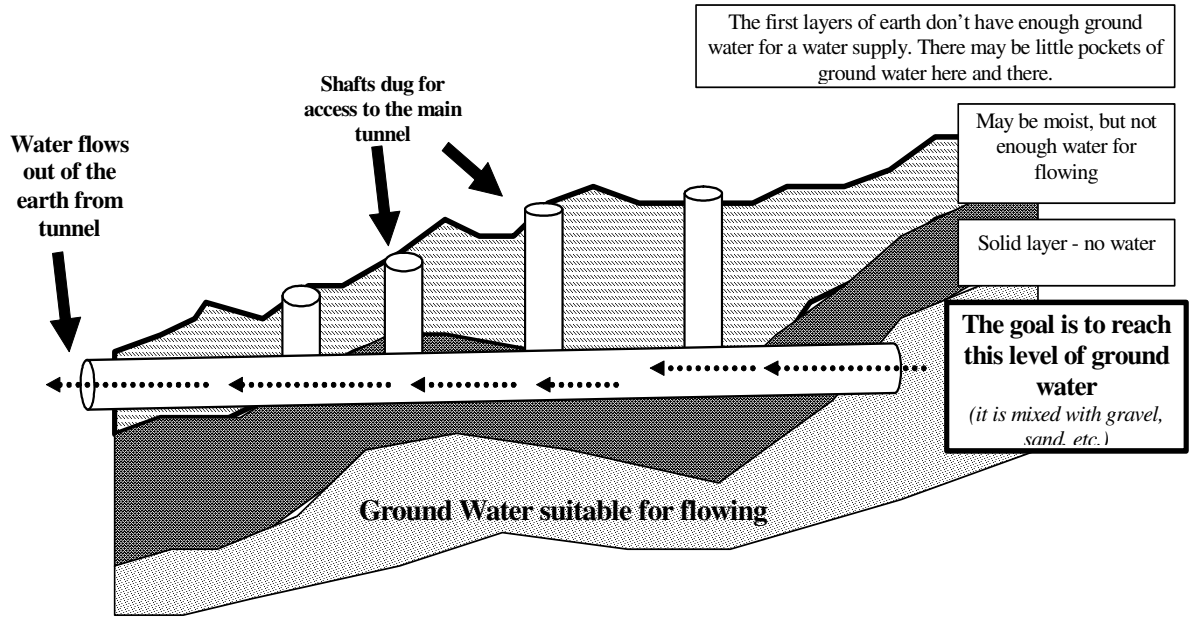


Art by C. Aspinall.

Higher input irrigation methods

Sometimes using a bit of input now means benefiting for a long time with very little input afterwards. The impact of each method needs to be considered.

- Treadle pumps[5]. Not every site is suited for a treadle pump. Treadle pumps are great if there is a lot of water at the bottom of a hill or slope and if your goal is to bring that water uphill. If you have water uphill, then it is better to let gravity do the work for you (see the previous bullet). The current types of treadle pumps have a very strong force of water and care needs to be taken not to damage or drown the plants and trees. Instead of pumping the water around the plants and trees, some people are preferring to pump the water uphill into a small pit, then use the gravity methods as described previously.
- Solar or wind pumps[6]. The sun and/or wind can be used to create energy that runs a water pump. There is an initial input to acquire and learn the technology and to do some maintenance, but then there is no pumping work as the sun or wind does the it for you!
- Artesian wells[7]. This form of irrigation tunnels horizontally into the ground water in a way that the ground water flows out by gravity. With this method you need more understanding of the different layers of earth and where water gets trapped in the layers. Malawi has had these systems since 1987 and they can be seen in Chitikkula, Kasungu and Dedza. The initial set up of most artesian well systems needs:
  - Locating the ground water - someone that knows how to find water sources (through knowing plants and trees, or by using divining with certain sticks, rods of other item).
  - Labour to dig into the ground to tap into the ground water and to dig shafts to allow for removal of dirt and maintenance of the system.



Artesian well designs computerized by S. Nordin based on sketch and description provided by F. Hakimi, Agro-In Farming. All errors are S. Nordin's! See appendix for F. Hakimi's contact information

Teaching about Water

- **Water flow** – This is a hard concept for many people to grasp. Observe water flow from any source and manipulate its flow and discuss it. Encourage people to keep practicing to learn the way water flows. Once it is learned the main tools you will use in making water harvesting designs are your eyes.
- **Water / Soil Erosion demonstration** – A simple demonstration can be set up to show people how water reacts with different types of landscapes:

- Three areas: We use a wooden box that has 3 sections, one for a bare area, one for a ridged area and one for a well-planted, natural-type area. It is important to make the areas as similar as possible except for the following. Bare area: This area should mimic a bare swept area. Pat down the dirt in this area so that it is hard on the surface. Ridged area: This area should mimic a typical farm field. Pat down the dirt, then make ridges across the contour, or for worse results in terms of erosion, straight down the box. Low input area: This area should mimic swales, mulching, composting, and all the good practices in this model for soil and water health.
- Box design: Three sides of the box have wooded sides, a wooden bottom and wooden dividers between the 3 sections. The front side of the box has screening that will allow the water from the demonstration to exit the box.
- Pour water, collect in container: The box will be propped at an angle and the same amount of water will be poured at the same rates to mimic rain or irrigation and to show what happens in each type of landscape. At the screening end of the box, a clear container will catch whatever water comes out, using a separate container for each of the 3 areas.
- Discussion: The container used bare area
- No box option: A box isn't necessary; a pile of dirt sectioned off into three areas also works, but you will just have to observe the erosion instead of collecting the water.

☑ Testing your understanding of water management

1. How does water cycle from rain to rain again? Describe the basic steps.
2. Name at least 3 things humans do to interfere with the water cycle.
3. Describe the water table and how perennials survive without water.
4. When managing water, what are four 'S' words that are helpful for planning a design?
5. Describe at least 3 ways you can harvest rain water at your home, work or surroundings.
6. Name at least 3 things you can do to reuse your 'grey' water at home, work or other place.
7. List at least 2 things that are important to remember in any irrigation system.
8. Describe at least 3 low input irrigation methods.

Topic 6: Plant, Tree & Animal Health Concepts

☑ Start by using soil health and water concepts

Just as well-fed and well-hydrated people are healthier and stronger than poorly-fed and poorly-hydrated people, well-fed and well-hydrated plants, trees and animals are healthier than poorly fed and poorly hydrated plant, trees and animals! A good indicator that your design is working well is if the plants, trees and animals are healthy. If you find you are having lots of disease, insect damage or other problem, you will need to re-assess your design to make changes.

☑ Considerations for planning the design (assessing and thinking)

Now that you understand the importance of a varied diet, healthy soil, and improved water use, you are ready to plan a design to add the right plants, trees and animals to the area around you. Design means where you put things – how you decorate or arrange things. A good design will take thinking before doing anything. After you put in the plants, trees and animals you will need to evaluate the design and adjust it as needed, which is covered later.

This section about design will focus on what resources we have in Malawi to put into our gardens, farms and general landscape (remember that there are MANY places to grow foods and other useful things!). The Malawi Food Guide's 6 Food Groups can help us plan the number and types of plants and animals to put in our designs. The 6 Food Groups are usually thought of as a tool for meal planning and budgeting, but it is also useful for food production.

This chapter is to introduce people to a new way of thinking about growing foods. After reading and thinking about these ideas, you should be able to plan a garden, farm, and landscaping around your home or office or school or church (etc.) in a way that helps each area grow more foods and medicines.

Consider how nature designs itself

Take some time to look at how nature designs itself:

? Diversity: Do you see just one type of plant, tree or animal in an area? Not usually. Nature puts different plants, trees, animals, and insects all in one area. How does nature keep its soil healthy? Nature keeps a variety of different legumes, animals and plenty of mulch. Nature digs by putting roots deep into the soil, while other things have big wide roots. Nature uses all its space by having plants climb other plants or rocks for support. Usually all spaces above and below the ground are taken.

? Many types of Foods: In natural areas you can usually find vegetables and fruits for humans very easily, look a bit harder and you'll find the rest of the Malawi 6 Food Groups - some legumes and nuts, animal foods, staples and even fats and oilseeds.

? Seeds replant themselves: Now look how nature plants itself – does nature need to go to a store to buy seed? No! Nature replants itself in many different ways, but every way strives to be ongoing. Permanent.

? Balance: Does the area look healthy? Usually. There is not much damage by disease or insects. With a variety of things planted, nature can stay healthy. Sometimes plants are dying during the dry season, but this is a natural part of life. These dead plants and trees fall to the ground to feed the soil and other plants, trees, insects, and animals that eat them.

Why? Who goes into a natural area and plants these things, feeds them and takes care of them? No one! There are:

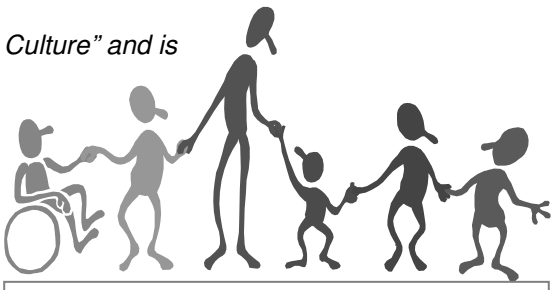
Nature is Amazing, Isn't It?

- ✓ No hoes *(the roots and mulching and animals do the digging),*
- ✓ No purchased seeds *(nature replants itself),*
- ✓ No chemical fertilizers *(the mulching and inter-planting takes care of the soil),*
- ✓ No chemical killer '-icides' such as pest-icides, fung-icides, and herb-icides. *(Nature has a balance of predators, flowers and smelly plants to keep 'pests' and 'weeds' in control).*

A guide to agricultural designs: Permaculture Guilds

We can mimic what nature does, but instead planting more foods for us by following the Malawi Food Guide (the 6 food groups). We can also choose to include local medicines, building materials and other useful things to assist us in staying healthy and prosperous.

A method used in Permaculture *(short for "Permanent Culture" and is a way of Sustainable Living)* is to use a guild. What is a guild in our society? It is a group of people that join together to work toward a similar goal. It could be a woman's guild at church who usually help the aged, orphans, widowed or others in need.



Guilds: Working together for a Purpose

Permaculture guilds also put things together that help each other together grow better and makes the are healthier, too. These 'things' could be plants, trees, animals, ponds, mulching, rocks, buildings, drains, pathways, roads – everything we use to create a community. We use the word 'design' to make a plan what items should go where considering the soil, wind, sun, and how people and animals use the area.

A Permaculture guild includes 7 types of things:

- ✓ The first is *food for us*, based on the 6 Food Groups, as that is the goal of the agricultural system most of the time. A guild could be food for animals if that is your goal (or whatever other goal you have!);
- ✓ 3 ways to keep the *soil healthy* and *make the most of our water* – without healthy soil we can't have food;
- ✓ 2 ways to *make the most of our space*;
- ✓ Last, include *things to protect the area* from any type of destruction.

The 7 parts of a Permaculture guild are:

1. Food for us. Based on the 6 food groups.
2. Food for the soil. We covered this in the chapter on soil. This includes legumes, decaying matter, compost, compost tea, mulch, manure, etc. One project in Malawi teaches how to use human manure and we've used it at our home for 7 years!
3. Diggers. Deep rooted plants, such as trees, will reach deep into the earth's soil and bring minerals up to the surface. Examples of diggers include: cassava, sweet potatoes, yams, trees and other deep rooted plants, etc.

4. Groundcover. These protect the soil from the sun, helps to hold moisture, and helps to keep "weeds" (good plants in the wrong place) down. There are many types of groundcovers available in Malawi. These include: sweet potato vines, pumpkin, cucumbers *(minkaka, zinkhananga, fwifwi, etc),* and anything else that will vine or spread across the soil. Mulch is also a form of groundcover.

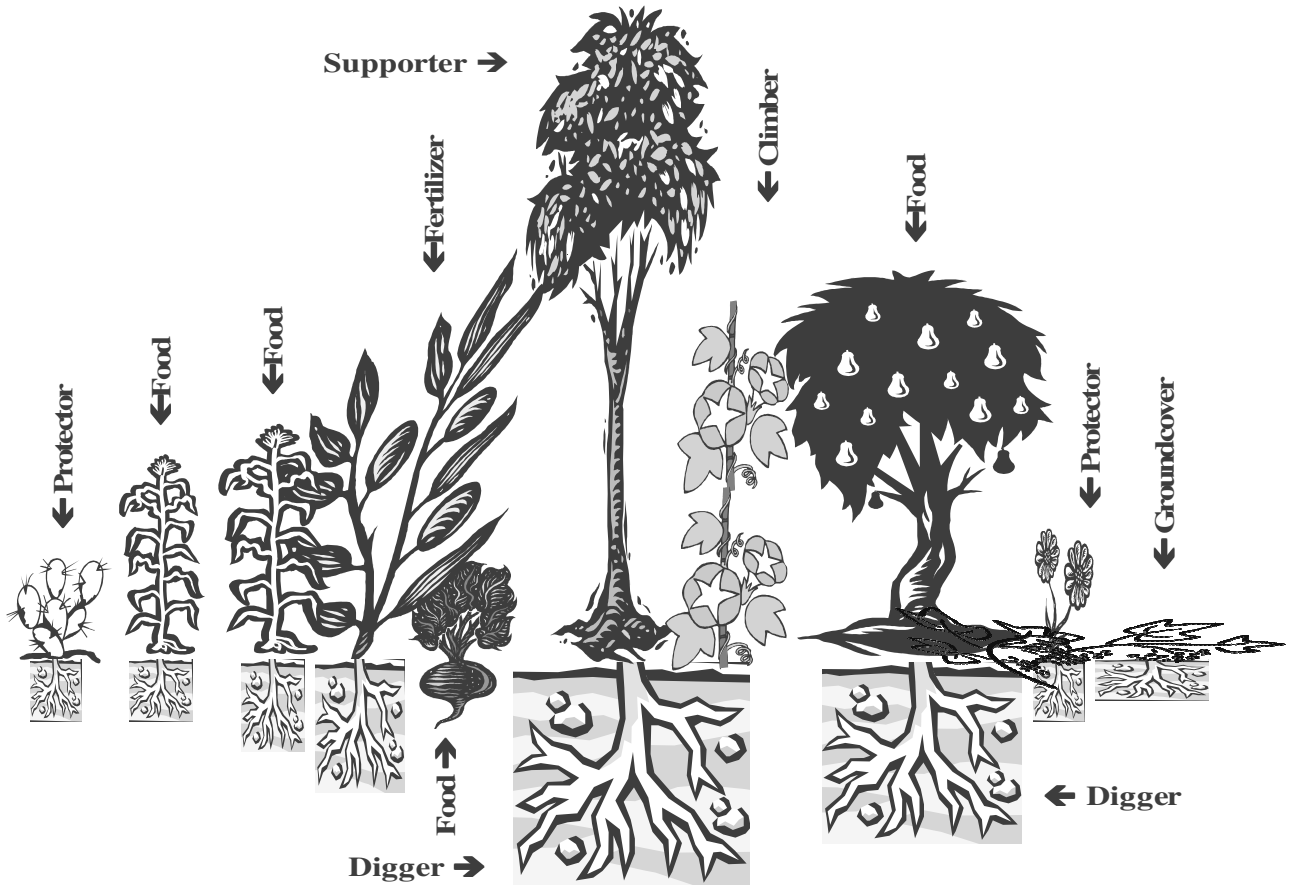
5. Climbers. These things grow up and provide us with another area of food production. Examples of climbers that you can use include: beans, passion fruit (*magalagadeya*), loofa (*chinkupule*), air potatoes, cucumbers (*zipwete, minkhaka*), etc.

6. Supporters. These are stronger items that support the climbers and make the most of our space. Could be a tree, bush, stalks (mapesi) such as a maize or sunflower, or it could be a house, bafa, wall, fence, etc.
7. Protectors. Any thing that helps to protect your guild is a protector, could be thorns, flowers, smelly plants, magical species that protect from thieves, etc. This could also include attracting predators like frogs, birds and lizards.

When you keep these 7 things in mind, you can practice putting them all together in one place or area to help each other grow better. After a little while, you won't even have to think about it, the ideas will come to you easily!

Any type of plant, tree or animal can fit into a guild. Every area will have a different type of guild depending on the conditions for that area including: what you like to eat, what seeds you have, the type of soil, the amount of water in the area, the weather, what animals live there, etc. Some guilds develop over time, for example, finishing the live fence, developing permanent pathways, establishing perennial plants and trees, and getting the soil healthy.

Here is one example of a Permaculture Guild:



Source: Permaculture Nutrition Training Manual, 2000 edition. Kristof & Stacia Nordin,
Full page handout available in appendix

Keeping in mind the way nature likes to design itself, here are some other things to consider before you start to design your guilds – these ideas are not necessarily in the order that you will think about them – it depends on the site and what YOU feel most comfortable starting with.

Consider your resources

It helps to organize your thoughts and start preparing for your plan by listing all of your resources. An easy way to organize is to use the 7 parts of a Permaculture guild.

- ✓ Food resources: In an earlier lesson you should have already listed your food resources by the 6 food group model, get that list out and add any new items that you've thought of, or maybe you've opened your mind and looked with new eyes and found seeds in nature, or your market, or at your friend's home.

- ✓ Other parts of the guild: Now list your resources for the other parts of the things that you need for a guild. It might be best to make a list on paper, such as an exercise book that you can keep for future reference and to add to as you have more resources available. You could use one page of the book for each type of thing needed (6 pages for foods available, 1 for feeding soil, 1 for diggers, 1 for groundcovers, 1 for climbers, 1 for supporters, and 1 for protectors). Here is one short example:

1-**Foods** *(see other list)*	2-**Food for Soil**	3-**Diggers**	4-**Ground covers**	5-**Climbers**	6-**Supporters**	7-**Protectors**
(Vegetables)	mtedza *groundnuts*	mbatata *sweet potato*	mbatata *sweet potato*	magalagadeya *passion fruit*	nandolo *pigeon peas*	mpungabwe *basil*
(Fruits)	kalongonda *mucuna*	chilazi *yams*	maungu *pumpkin*	kalongonda *mucuna*	mpendedzuwa *sunflower*	anyezi *onions*
(Legumes/Nuts)	*nsawawa* peas	*nandolo* pigeon pea	*kayimbe* melon	*matamati* tomato	*mitengo* trees	*adyo* garlic
(Animals)	*msangu* acacia?	*yazipatso* fruit trees	*udzu* grasses	*nsawawa* peas	*nyumba* house	*viwale* ginger
(Staples)	*nandolo* pigeon pea	*anyezi* onions	*vindikiro* mulching	*chinkapule* loofa sponge	*mpanda* fence	*kutawanjoka* snakes run
(Fats)	*chimbamba* lima bean	*coco* coco yams	*mavwende* watermelon	*chimbamba* lima bean	*mabilinganya* eggplant	*maluwa* flowers

Consider sourcing seeds

Many seeds can come ***free*** from right around you – just start opening your eyes to them! At the market, friends' yards, wild places, roadsides. Here are some hints to getting the best seeds for your Guilds:

- ✓ Use perennials and things that self-seed. The easiest choices of plants and trees are ones that live for many years and ones that spread their seeds on their own and keep growing (open pollinated and usually non-hybrid). Choose some permanent plants for each area so that you reduce the work (and other inputs) of re-planting new things. There are many plants and trees that keep going for many years; see the end of this booklet for a table that describes some choices in Malawi. Many people do not realize that there are many plants that can be 'trimmed' and they keep going with new shoots, this includes:

Sorghum	Okra	Cabbages
Cape Gooseberry	Hibiscus (many species)	Peppers
Pigeon Peas	Lablab (khungudzu)	Chimbamba

- ✓ Indigenous plants & animals are usually better adapted to conditions and easier to care for.
- ✓ Save seed from the healthiest: If you are collecting and saving your seed, select the seeds from the healthiest plants and trees. The same is true for breeding the healthiest animals.
- ✓ Seed Storage: Dry the seeds to save them. Store them in a shady, dry area. If the seeds get wet they will want to start growing.

- ✓ From your kitchen: If you cut off the root end of onions they can be re-planted to produce more onions, pineapple or carrot tops can be put in the soil and will grow, and seed from avocado, tomatoes, eggplants, garlic, and other foods that commonly pass through your kitchen can also be planted. You generally won't know the source and quality of these seeds until they grow and mature, but we've had very good luck with this method.
- ✓ Free seedlings! Always check the top of compost piles, sweeping piles, and other places that people discard foods that have seeds in it. Transplant these seedlings into your guilds.
- ✓ Share! Start seed sharing networks and let others know that you are interested in collecting local seeds.
- ✓ Make money! You can also find creative ways to market local seeds for a reasonable price to make them available to others.

Consider yields - how many plants, trees and animals you need

Your ultimate goal is to consider the number of people you need to feed, and/or how to make the money from what you grow so you can buy other foods or share with others. To decide how much you need, you can use the Malawi 6 Food Groups as a guide along with knowledge of approximately how much each food yields with the start up list in the appendix and with the help of local knowledge.

This table is just an approximate need, people may need more or less, or they may choose to balance the groups differently such as a vegetarian who doesn't eat the animal food group and instead eats a bit more from all the other groups.

Food Group	Adult needs approximately Grams/day	Adult Calories/day	Kilograms needed every month per Adult
Fruits	300	150	**9 kg**
Vegetables *(roots, fruits)*	400	128	**12 kg**
Legumes & Nuts	100	388	**3.4 kg**
Animal Foods *(milk, eggs, insects, flesh)*	135	147	**4.1 kg**
Staples *(grains & roots)*	500	1078	**15 kg**
Fats & Oilseeds	50	235	**1.6 kg**
Total:	**1485 gm**	**2126 Calories**	**45.1 kg**

*** This is just an estimate. Each food type within the food group varies as do all adults. Calculated by S. Nordin, RD*

To EAT the Malawi Food Guide,

we need to start GROWING it!

Consider the space needed for the Plant / Tree / Animal

With guilds, just like in other agricultural methods, the correct amount of spacing is needed for plants, trees, and animals. One big difference with Permaculture is you think about how different plants can go together to use all the space. Almost all designs will be mixed, not mono-species – this is true for plants, trees and animals. This will be covered more throughout the rest of the manual as we put together a design plan and then as we put it into action. Some of this you will just need to learn with practice to suit your own resources and conditions.

Consider saving labour

As you are designing, always think about how you can save your labour (or other resources) both today and in the future. This will include ideas such as using live fencing, using truncheons, protecting existing trees instead of just starting your own from seed, etc. It is a way of thinking that will start to spread to your whole life – go ahead, do a little less work and be a little 'lazy', but be more creative instead!

Consider lifestyle, habits and daily tasks

Another way to save labour on a daily basis is to consider the way people behave in the area. Instead of trying to get people to change their habits it can be easier sometimes to change the design. For example, at a school near us the children mop the floor every day and throw the waste water in the same bare spot every day. Instead of getting the kids to walk to an area with plants and trees to throw their water, bring the plants and trees to them! Plant that spot with a few sturdy things and add some mulch and something to protect people from walking on it. As the plant or tree grows you can expand to add more things. This lesson can be applied in many, many places.

Consider the weather - sun, shade, rain, wind

It is useful to know you North-South-East-West directions for your designing, for example:

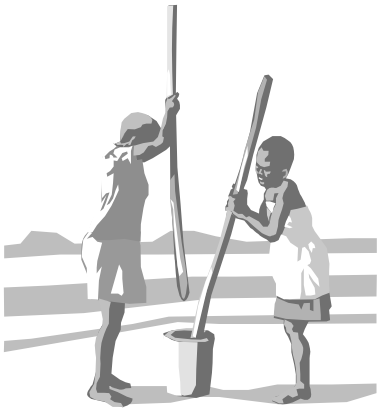
- ✓ Wind and rain usually follows a pattern in your area. By knowing which way the wind comes from you can put in wind breaks, or put windows on the side of the building that allows the best air flow, or plant some climbing vines to protect the open windows from rain.
- ✓ The sun always comes up in the East and sets in the West. This is pretty common knowledge, but most people do not take advantage of capturing the sun's ray, heat or shade where it is needed. Considering the sun will be needed for many types of designs including building, planting, and keeping animals. You'll want to think about the shadows made by "supporters" and other taller species and what the effect will be on the other plants, trees and animals. Some species like sun and some like shade. The appendix has a start-up list to help you get to know your plants, trees, and animals.

Consider where to start

Look for the easiest place to start that will use resources that are currently being wasted. Foods do NOT have to be in square little beds at the back of the house! Foods can be scattered around the home and throughout the community. In the end you may have a little guild here and a big guild there. These guilds could be where there are:

- ✓ Sweeping and/or 'trash' piles *(usually contains organic matter and 'real' trash)* – Market areas have a lot of these trash piles as does every home and restaurant. Any plastic or other item harmful to the soil will need to be removed and taken care of properly.
- ✓ Other forms of organic matter – This could be out in an agricultural field, in an animal pen, near a *chimbudzi* (toilet), etc.
- ✓ Water drains – Bath, sinks, rain water gutters, etc. *(when using bath or other 'dirty' water you will want to choose foods that you pick high off the plant/tree, not near the ground, review the section on water).*
- ✓ Washing clothes and/or dishes and the water can be poured around the guilds. A guild can even be design under the area where clothes are hung up to dry which drips a lot of water.

- ✓ Wells, boreholes or any other water source.
- ✓ People living and spending a lot of time such as around the house where people used to sweep but will now have guilds, or around a school, a playground, a restaurant, an office, a bar, etc.
- ✓ Kitchens or other food preparation area – there are usually a lot of organic scraps and water in this area that are easily recycled into a garden



- ✓ Plants and trees currently growing – DO NOT clear these away, until after you decide if they can fit into your new guild designs. You may wish trim them and work with them, or in other cases you may decide to clear them out (such as when there are too many of one thing). Think about how things that are there can be a part of your design – as a supporter for other plants to climb, as light shade for the young plants, as organic matter to feed or cover the soil, etc.

Consider land used for pathways

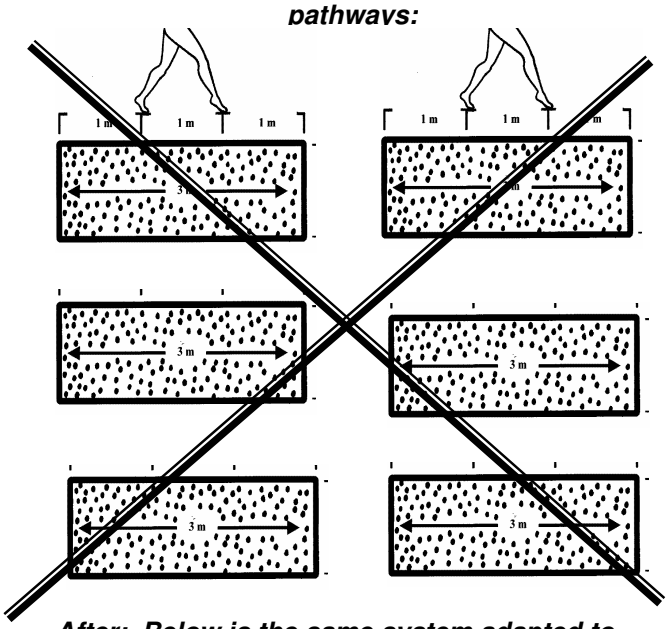
When you need to plan an area, you will need to decide the shape of your guild areas –

These do NOT have to be square bed areas!

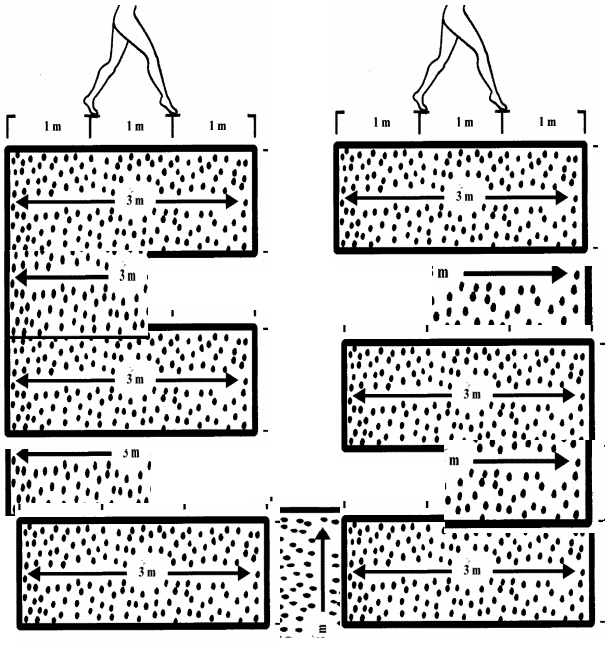
- ✓ The design should allow you to reach all the foods without stepping on the planting area.
- ✓ The designs should try to work around existing plants and trees – so be sure to know what you already have growing in the area, even the smallest sprouting plant or tree may be useful in your design.
- ✓ You may have many different guild shapes on the same plot of land.

Pathways are important for convenience and moving around the area, but they are also a wasted space that could be planted with something! Typical "garden beds" take up a small square plot with pathways on every side; this is too many pathways.

Before: This design uses too much land for pathways:



After: Below is the same system adapted to reduce paths so more land is used for food.



Instead of so many pathways you can fill in more space with food by linking the typical type of beds together – just look at all the spaces you can fill with plants!

- ✓ There are creative ways to put in stepping stones so that you reduce the number of pathways.
- ✓ In the space furthest from the path in each guild area you can put taller species such as a food or legume bush (such pigeon pea) or small trees where you pick food up high.
- ✓ The areas can wind around existing trees, plants, termite mounds, buildings, etc. giving the area a very exotic garden feel and look.
- ✓ Remember, there are hoes or weeding in this system so you won't have to stand in the beds.

The following pages show one example of putting your resources together into a guild, and planning the layout of the paths, plants and trees.

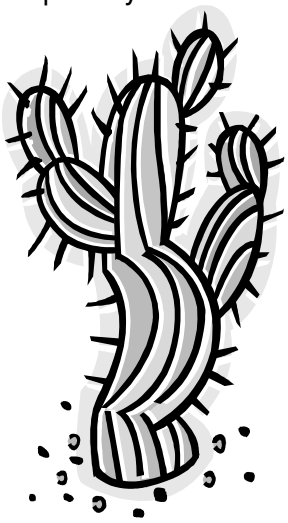
Consider if you need a fence

Some people immediately think that they have to have a fence to protect their plants. Fences are NOT always necessary, so be sure that you really need one before putting time, energy, resources and money into building one!

Use the shortest fence needed for the intruder – The work that you do using this model should be seen by as many people as possible! If you put up a high fence, no one can see it. Strategies you can use include:

- → Put the gardens where they can be seen, such as along a main path, road, or other community area)
- → Put up a sign to improve awareness
- → Invite people to come see

Living fences made of plants and trees placed closely together are the longest lasting choice. But, if you need something quickly you may have to construct something temporarily out of dead fence materials. Fences can be made out of many types of locally available materials such as:



- ✓ A live fence of thorny hedges planted closely together, or other spiky plants such sisal, or other hedges that prevent animals from passing through any gaps. While you are waiting for them to grow you can cut thorn branches and place them strategically or weave them around the garden's edge.
- ✓ Live poles and thatching grass or plant stems tied together to prevent any holes. Live poles include Bloodwood *(Mlombwa), Kobo,* Tree cassava (*Mpira*), Moringa *(Chamwamba)*, Cassava *(Chinangwa),* Jatropha *(Msatimanga)*, or other indigenous live poles; Other large tree trunks can be used as poles – just design your garden areas around existing trees!
- ✓ Scrap materials such as old wood, pieces of furniture, old appliances, etc. To keep your neighbor's happy you should be decorative in the way you recycle these 'trash' items!

Keep each of these considerations and all the information you've learned about low input, diet diversity, soil health and water management in mind as you create your design.

☑ Creating the design plan for your area

The design plan is your vision of where the plants, trees, and animals will each live (including you!). It will show where the pathways, driveways, buildings, water tanks, solar panels, toilets, and other structures will be placed in your area. Everything that you've learned about low input is considered in the design. Some key questions to continually ask are:

- ✓ Low Input – How can I make the best use of resources in the most efficient way?
- ✓ Diet Diversity – How can I get a diverse diet throughout the year?
- ✓ Soil Health – What do I need to include to make my soil healthy?
- ✓ Water Management – How can I make the best use of all my water?
- ✓ Guilds – What does each plant, tree, or animal need to live healthy? Where is the best place to put it and what should it go with it?
- ✓ Considerations – Resources, Yields, Space, Labour, Lifestyle, Weather

At first, as with any new skill or way of thinking, it will take some effort to remember all of these, but after a while, it becomes your way of thinking with very little effort at all. In this section we are going to create the design for your area. Design plans may change as you put the plan into action, and it may take years to complete the overall design plan.

Mapping the area

You might want to draw a sketch of your area – the buildings, the current layout of trees, the slopes, where North, South, East and West are, the direction of the usual winds (which may change at different times of the year), where there is erosion, organic matter, and a list of all your resources *(which we compiled on page 40 under assessing all foods available, and on page 98 considering your resources)* – include anything you think is important, you can add more later if you need to.

Draw your design plan

Now that you have a map of your area, and you have a list of your resources (there are at least two ways to think about making a design plan for your areas:

1.) Look at your area and choose the right plants/trees/animals/structure for that area.

2.) Look at your resources and then find the right area to put them.

Take a walk around your area, preferably with other people in your household, to look at the land, the current layout of the trees, plants, animals, buildings, lifestyles, the flow of water, direction of the air, the sun, etc. Discuss ideas about what resources there are to capture, and what might go well where and why. You will want to do this several times at different times of

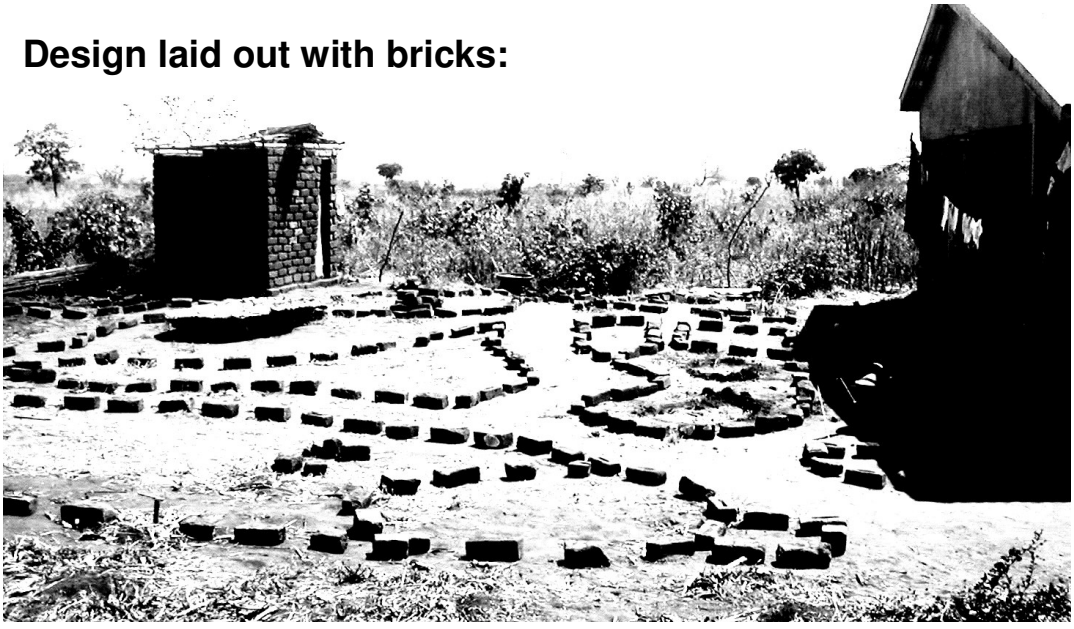
the day to really understand the area. After 10 years we still take what we call 'garden walks' to see how the designs are doing and to discuss what changes and additions we want to make.

There are several ways you can visualize or "draw" your plan:

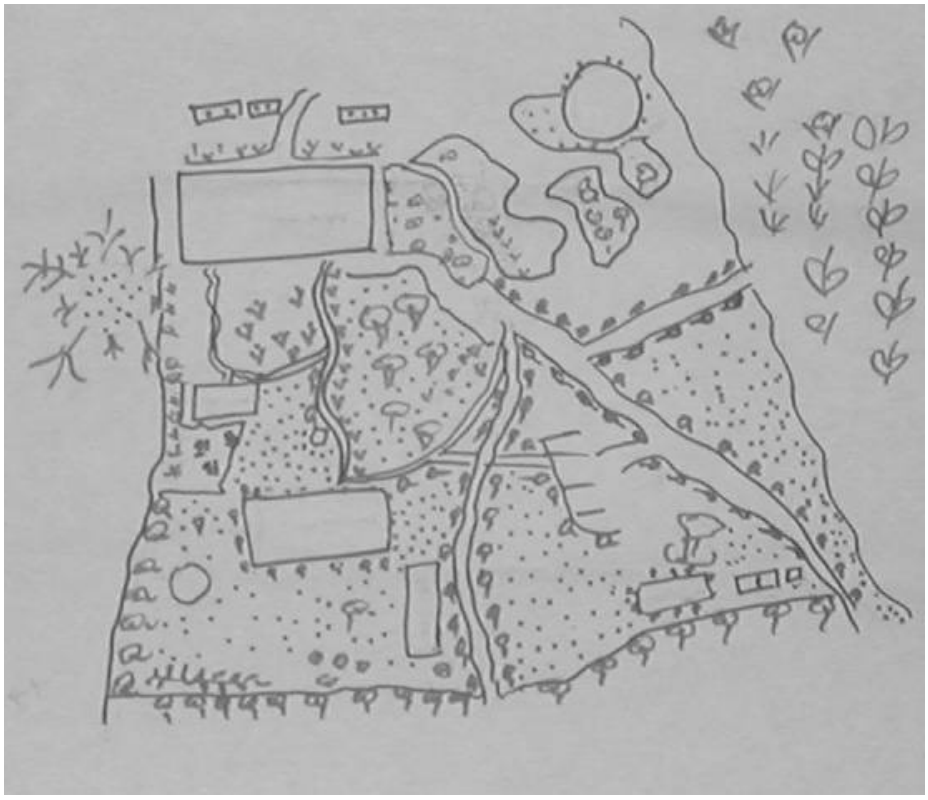
- ✓ In your head,
- ✓ On paper such as a notebook, flip chart, poster board, old cardboard or chalkboard,
- ✓ Outside in the actual area with rocks, broken bricks, sticks, or other markings to help you see your ideas and make changes by moving them around as you think through your plan.
- ✓ Or using all of these methods, which is the way I prefer to make my plans.

Before Design:

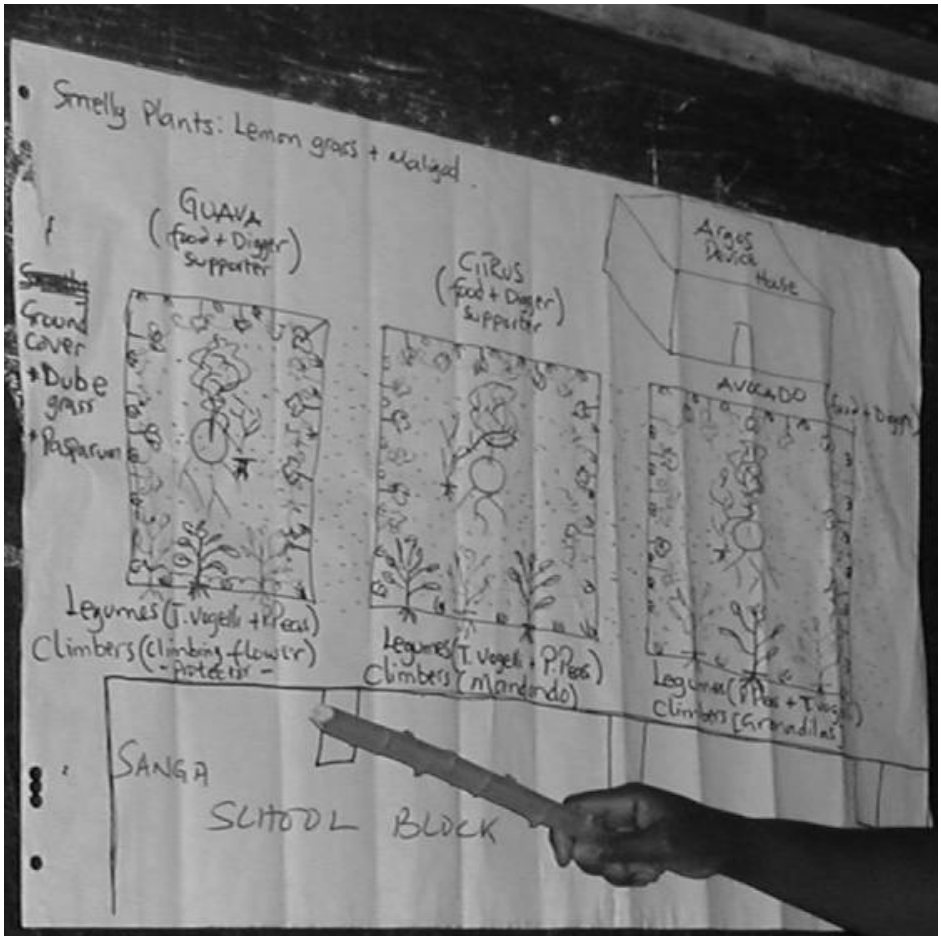
Design laid out with bricks:



This picture shows a design plan laid out in the area with bricks. The bricks can be moved very easily to change the sizes of the beds and pathway.



Example of a plan by Vision Bible Training and Accomodation Centre (VIBITAC), Nkhata Bay, Malawi



Example of a plan by Vision Bible Sanga Primary School Nkhata Bay, Malawi

Designing individual guilds

Every guild is different. Review page 96-97 on how nature designs itself and mimicking nature with guilds. The combination of plants, trees, and animals will depend on many different factors that were covered throughout this manual. Guilds will change in every season as you harvest some things, trim other things back, and replant other things in open spaces. Just as in nature, some plants, trees and animals in the guild will be permanent, long-lasting perennials or self seeding. The following table is just an example to show how the parts of the guild might go together in an area. See the appendix for several different design drawings.

	Guild example 1 Bathing house	Guild example 2 Field	Guild example 3 Porch (khonde)	Guild example 4 Office entryway
1. Food for us	Passion Fruit (magalagadeya)	Sorghum	Ndele (climbing spinach)	Cape Gooseberry (Jamu)
2. Food for soil	Khungudzu (lablab)	Cowpeas	Kamumpanda (climbing lima bean)	Nandolo (pigeon pea)
3. Ground cover	Mulching	Pumpkin	Rock mulch	Mint
4. Digger	Bath house live trees	Sweet Potatoes	Coco Yams	Cassava
5. Climber	Loofa (sponge)	Tomatoes	Passion Fruit	Peas
6. Supporter	Bath house structure	Cassava / Maize	House	Eggplant
7. Protector	Flowers	Mpungabwe	Flowers	Lemon Grass

Action Plan

After you map your area and create your design plan, you may also want to write an action plan for your area, but it is up to you and how you think and work. When you are working in a team or community situation, a written list helps to create clear communication. You can brainstorm all the activities that need to be done then put them in order into a plan. Remember, things may change when you get out there and start doing.

Example of an Action Plan	When?	By who?
Assess all resources	day 1	
Map the area	day 1	
Create design for area based on resources (may need several days)	day 2	
Source other resources if needed (seeds, mulch, other organic matter, etc.)	week 1	
Start marking out design (paths, planting areas, kholas, etc.)	week 1	
Plant first guild	week 2	
(et cetera)		

☑ Testing your understanding of plant and animal health

1. Describe how nature grows and keeps growing.
2. Name at least 4 things to consider as you develop your design.
3. Map out the area around your home, including all the resources you have available, then draw a design for your home area and discuss the ideas it with someone.

Teaching about Design:

- **Guilds:** This is best done outside as a discussion; you can almost always find a natural spot, or an area where nature is growing without too much disturbance from a human. Start with what foods you can find in that area, then look at how nature maintains healthy soil and water, then digging (through roots), then planting with climbers and supporters, and lastly protection. This naturally flows right into the 7 parts of a guild.
- **Group Activity:** After the group discusses how we can mimic nature with a guild, people are ready to put their ideas either on paper, or on the ground outside. Stress that every guild is different and that some guilds take time to develop into a permanent area.

1) *Divide the group* into equal groups trying to get different types of people and knowledge into each group. Give each group a type of area to design as their 'topic' in a pretend situation (unless you happen to have different areas available where you are, you can use real areas, even better!). Useful design areas are: around the kitchen, at the end of a borehole / well, on a khonde / porch, in a farmland area, near a khola, etc. Each group should have a different type of place to work on. Have the group design a guild for that area using either writing materials (markers or other dark ink that will show up well in a presentation) and paper; or using an area of the ground with whatever materials the group can find (bottle, cans, rocks, branches, flowers, etc.). While the groups are designing their area, be sure to walk around to each group and see if they have questions on the activity. Support them but don't tell them the answers, give them little hints to get them going in the right direction.

2) Presentation: After each group is finished (or time has run out) have each group present their design, explaining why they used the plants, trees, animals and other items, and why they put them where they did. After the presentation, ask for input from the rest of the group, encouraging people to complement good areas of design before adding ideas for improvement. You can be a part of this discussion, but your input should be minimal at this point. If you hear something that needs to be corrected immediately you might want to raise it now (in a positive manner) instead of waiting until the end, to let discussion about the point be made. It takes experience to gain the skills for guiding these discussions in a positive manner, but over time you can learn from each discussion and improve. After the group has exhausted their input, now it is your time to sum up the guild. Highlight the main good points and give the group encouragement for implementing the idea.

3) Wrap up: After all the groups have presented, wrap up the session highlighting the important lessons we can learn from nature if we observe and respect what it has to offer.

- **Make Changes in Steps:** Change can be gradual for those that need it. Most people are very used to straight rows and mono-crops. People rely on their agricultural systems for survival and may be scared to change. Help give people concrete ideas they can do.
- **Seed Starter Packs:** This can be helpful or it can be hindering, so care needs to be used in the approach and timing. People should first be encouraged to assess and collect their own seeds. Depending on the situation, handing out seeds may discourage someone to use their own resources and may encourage them to wait to be given inputs to start their own food supply. But, in areas that are completely devastated, or to help spread local varieties further, a start-up guild kit can get people going. Just make sure the seeds you provide can be saved and multiplied!

Topic 7: Putting your design plan into action

This topic will walk you through 5 steps of putting your design plan into action:

Step 1: Plan the design: observe, assess, think, discuss
Step 2: Helpful tools
Step 3: Prepare the areas
Step 4: Putting in the plants, trees & animals
Step 5: Caring for the plants, trees & animals

☑ Step 1: Plan the design: observe, assess, think, discuss

Before doing anything, you need to think about the area and find the best place to put your plants, trees and animals. This was covered under Topic 6 of Planning your design. Remember NOT to start anything without a design plan in mind!

☑ Step 2: Helpful tools

This depends on what your design plan is. You will need to think about what types of plants, trees and animals you are putting into your guilds. Here are a few materials that may be helpful when putting in your design:

- ✓ Mulch (dry leaves, dry grass or any other dry plant items, feathers, wood shavings, etc.)
- ✓ Seeds, seedlings, and animals for the guild
- ✓ Something to make planting stations or swales – a strong sharp stick or bone, an old metal rod, a hoe, a machete, a hand shovel, etc.
- ✓ Water – it can be left over from washing dishes or clothes – and a method to pour it gently on the soil – drip irrigating, watering can rose, etc.
- ✓ Materials for constructing animal pens or fencing if needed
- ✓ Be creative and find uses for your resources – make do with what you have!

☑ Step 3: Prepare the areas

Now you've made you plan, you have the tools you need to put your design plan into action, so it is time to prepare each area for its plants, trees and animals. Guilds can be any size, but it is often works the best to start small until you learn, and then to increase the area steadily.

Even if you don't prepare and plant a large area now, there are things you can do improve those non-planted areas such as mulching, composting, allowing natural species to grow, outlining pathways so people aren't walking on future planting sites, etc.

Preparing seeds for planting

Picture from Positive Health, 2003, Neil Orr

Decide if you need a nursery bed for your seeds or not. Many seeds can be grown without a nursery bed. Some seeds do best scattered directly on the surface, such as very small seeds. Other seeds prefer to be under the ground. Other seeds prefer to grow in the rotting fruit that it came from. If you are using open pollinated seeds the plants or trees will reproduce and spread on their own. If you don't like where the new seedling is growing, you can either move it to another spot, move it to a pot to share with someone, or cut it out for mulch if you have a lot of them. Here are a few guidelines for starting seeds, the appendix has hints for specific varieties:

- ✓ Mimic nature: Think about the way that particular seed reproduces itself in nature and mimic it. In general, seeds need to be planted to a depth of 3 times of its size.
- ✓ Moisture: New seeds will need to be moist every day to sprout well, so be sure to put your seeds somewhere that will naturally have water, or that you can irrigate easily every day.
- ✓ Identification: If you don't know what a seed looks like as a seedling, you will probably want to start it somewhere with a label so you can identify it and move it to the right place when it gets older.

Here are some simple ideas to start new plants or trees:

- ✓ Use truncheons or suckers;
- ✓ Move 'volunteer' seedlings from compost piles, mulch, or other area;
- ✓ Use direct planting or broadcasting in the place you want it to grow, you may need to protect the area to keep birds from eating or scratching up the seeds;
- ✓ Sprinkle some seed in a small corner of your garden for future transplanting, label the area if you need to and protect it;
- ✓ Use a clay pot, or any other container that it will be easy to move the seedlings out of. These containers can be placed anywhere convenient such as on a porch, wall, near a kitchen or anywhere that it will be easy to remember to water them.

Clear the areas carefully

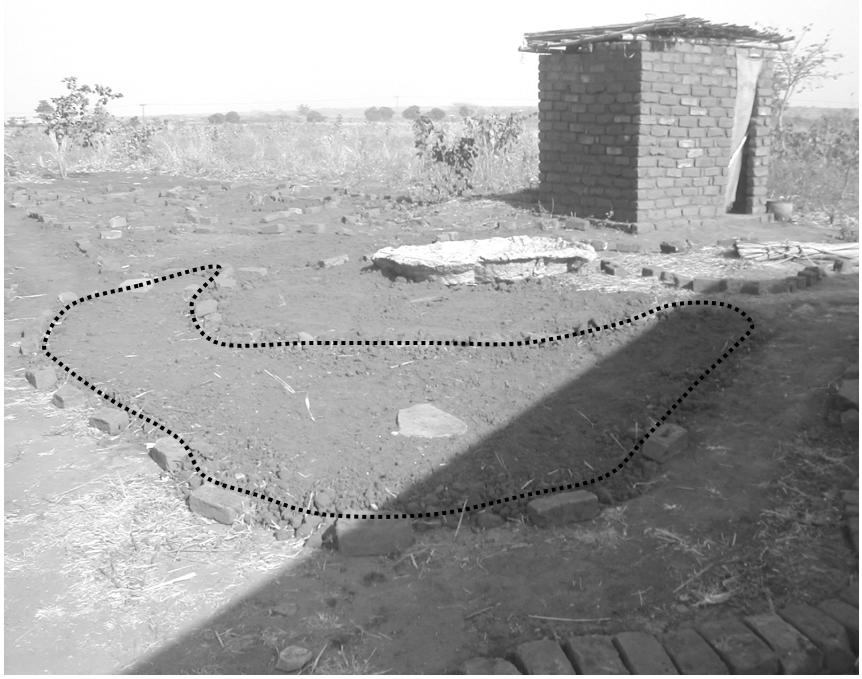
Review topic four's Soil Health concepts on clearing the land carefully. A few key points for preparing your area are:

- ✓ Start new areas in stages: Make a rough plan for the whole area, but you do *not* have to start the whole area at once! Start with a small area and put in the plants and animals, then move on to the next area. This way you will be eating very quickly! In areas you are not preparing to establish now, you could still layout rough pathway areas add your mulch or make compost piles on the future planting areas. This way people won't walk all over your future beds (hopefully!) and the planting areas will start having improved fertility and structure from the mulch and nutrients under the compost pile.

- ✓ Trim, don't 'clear'. Use a hand slashers to trim plants and trees back or, if necessary to cut them out completely. Keep the roots in the ground to rot, cover the stem area with lots soil and mulch to help it rot. When doing this try NOT cut out everything in the area! Look at the plants and trees that are already growing and work around them whenever possible.
- ✓ **DO NOT BURN** the area or the things that you cut out. Burning is harmful to the soil, air and humans. Use all the organic matter by putting it under the soil or on top of the soil. This even means thick branches, they will rot slowly. Review composting if needed.
- ✓ *Do not dig if you don't have to!* Do you need to dig the whole planting area? Probably not, but it depends on how degraded the soil is. Remember, in nature seeds just get thrown on the ground and then they grow. We can mimic this when we plant, BUT to do this we also have to get our soil as good as nature keeps hers. Also remember that digging into the soil exposes the soil to erosion and disturbs the work of the insects and microorganisms that are trying to maintain healthy soil; so don't disturb the soil if you don't have to. The idea is to just think before you dig.
  - ➔ Don't' Dig: If you are planting in an area where the soil is already soft, such as in a sweeping pile, or where water is currently being thrown, or where you already have a guild, you probably don't have to dig much, it at all.
  - ➔ Dig a little: If the ground is very hard, you may need to loosen it before planting, or you might choose to just dig small holes for the size of the plant or tree you are putting in, or another choice might be to put and animal khola there for a while to improve the area and to start somewhere else. If you choose to dig, be sure to put in enough diggers and ground cover so that you don't ever have to dig again!

The first area is done!

Cover it up & don't walk on it! Now you have your design laid out and you've dug where you need to dig for planting. Cover the area with mulching (see earlier chapter on soil for ideas). Avoid walking inside the guild beds, stay on the pathways. Once you've planted the first bed (which will be covered in the next section), you can move onto the next area.



This bed was dug because the soil had been swept for many years. The bed was covered in mulch after the soil was loosened. The side beds were only dug in the direct spot a plant or tree was planted and the pathway was not dug at all. *A dotted line was drawn around the edge of the bed to help see the bed in print.*

☑ Step 4: Putting in the plants, trees and animals

Now you need to put the plants, trees and animals in the right places to match your design plan. Your design plan may change as you start to implement your plan.

Hints for having food every day

- ✓ Start as soon as possible so that you can start having food as soon as possible.
- ✓ Plant in stages such as planting 10 amaranth today, then 10 amaranth plants next month, etc. so you always have new amaranth to eat. Or, start a guild this week, then another next week, then another the next week, again so that there is always a staggered harvest.
- ✓ Plant things with varying harvest times – For example there are pigeon peas that are ready in 3 months, 6 months or 9 months, and there are different varieties of beans with different harvest times. See the appendix on getting to know your plants for harvest times.

Transplanting Seedlings

If you want to move something to a different spot, here are some general guidelines:

- ✓ Three leaves: it is best to wait until the plant has at least 3 leaves on it before moving it. If the plant is an older plant or truncheon, trim off most of the leaves except for 1 so that the plant uses all its energy and water to re-root itself instead of feeding the leaves.
- ✓ Protect the roots: Try to scoop out the dirt around the roots. Use a small spoon, your fingers or a stick to loosen the area around the seedling's roots, then scoop down deep enough to try to take all the roots without damaging anything.
- ✓ Hole a bit bigger than the roots: The hole for the new seedling should be just a bit bigger than the ball of soil and roots on the seedling. If the soil is very degraded, add a handful of mature compost manure to help the feed the seedling as it re-roots itself in its new home.
- ✓ Remove plastic: If you started your seeds in a plastic tube – remove the tube before planting the seedling as it will interfere with proper root growth. Reuse the plastic if possible.

Spacing for plants, trees and animals

In your plan you considered this, now that you are actually putting items in, think about it again.

- ✓ New discovery: Maybe you will find something already growing and want to work around it instead – go ahead and be flexible and change you design plan.
- ✓ Enough space: Did you leave enough space for each item or do you need to alter your design plan? Items can just touch each other when fully grown, or they might take up different parts of the 'space' in terms of roots or plant height. Some may even touch each other a lot, such as with climbers and supporters.
- ✓ Thin out later: Another approach is to put in a lot of seeds or seedlings and then cut some out when they grow taller. This approach is not appropriate for all species, but can work well for leaf vegetables, legumes that are used as green manure, shrubs, fast growing species, and other similar cases.

☑ Step 5: Caring for the plants, trees and animals

Guilds are much easier to care for than other types of agricultural systems. The guild system holds moisture, adds to soil fertility, digs, suppresses weeds, and works to balance itself overall. Plus, your creative design aims at capturing resources that were previously wasted, so you may not be adding to your work load, you might actually be reducing it!

Watering

Listen to your plants and trees and let them "tell" you when it needs water! Plants and trees primarily drink through their roots, so try to get the water into the soil, not scattered all over the place – review topic five's Water Management concepts for details. Here are some other hints:

- ✓ Small seeds will need to be kept lightly moist until they start to grow. This type of watering will be about once a day with just enough water to keep the area around the seed wet.
- ✓ Young seedlings will need a bit less water than new seeds and as they grow bigger they will generally need even less water. They may only get water 1 time in the evening, or even every other day, but a little bit larger amount of water to sink down to their roots.
- ✓ Plants and trees will tell you when they need water by their leaves. They may get watered three times a week, or monthly, depending on their size, species and time of the year. They will get a larger amount of water to reach even deeper root depths. If their leaves start drooping (i.e., sagging, folding up) without returning to healthy looking again, give your plants water. Not all drooping leaves are a sign that water is needed. For example, at the hottest part of the day some types of leaves droop just to conserve water, but then by the end of the day when the sun goes down they return to a healthy looking. Another example is right after transplanting, some plants may droop for a day or so.
- ✓ Animals almost all need clean water available very frequently, again, it depends on the species and variety.

Weeding – not needed ! Trim instead

With a guild system you shouldn't ever have to weed a large area. Weeding is replaced with 'trimming' back plants and trees and putting those trimmings on the ground as mulch or in the compost pile. Most "weeds" are actually a food, medicine, protector, attractor for predators, digger, or some other use, so be careful as you trim the area. You might want to always keep at least one plant and tree of every species, even if you don't know its use yet. Someone will come along someday that does know!

Digging – not needed!

The guild area isn't dug ever again. The pathways are permanent. By including diggers and mulch the soil is dug for you. You might dig a small spot for a new seedling, but you should only have to make the hole big enough for that plant or seed.

Adding new plants, trees and animals

Hopefully most of the species you've chosen will self-seed and/or be perennial species. Self-seeding varieties will mature, go to seed, drop to the ground in the area or be carried by the wind or animal, then grow a new plant. Keep your eyes open for where there are new seedlings growing and either leave them where they are and design around it, or, move it to a spot where you want it.

In the guild system, rotation happens naturally. Species get mixed around differently over time and the same species hardly ever grows in exactly the same spot as it was previously.

Continue feeding with mixed mulches

You will need to continue adding mulch to the area as the insects and animals in the soil eat up your mulch and turn it into rich compost (insects are great, aren't they!). You can also use compost for this feeding if you like.

Problems with diseases and insects? Re-assess your design.

If you design your landscape with a mixture of natural protectors (flowers, smelly herbs, and variety in general) you usually won't need to resort to any other treatments.

If you are getting a lot of damage, you need to re-assess your design and make changes.

Still having trouble with Insects? This topic deserves some attention because most people are currently struggling with protecting their plants, although the primary reason for this is the current design plans used in traditional plots that don't care for the soil, have inappropriate water, and put all one thing in one area. Many plots have problems at first until the area is healed again, so it may take time, even a year, to achieve a healthy balance again.

The following section on insects was adapted from Food Gardens Foundation in Johannesburg[8]. They give some ideas for dealing with insects which can be useful for a new garden that hasn't established a healthy variety of plants and trees yet.

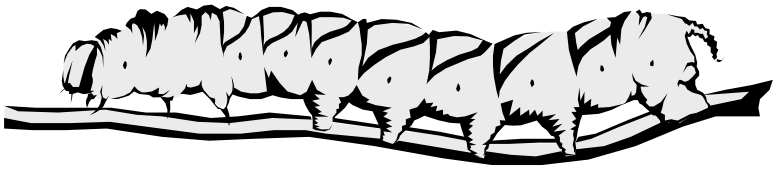
First, most insects are *GOOD* for your garden! Be sure not to harm them!

☺ Insects such as ladybirds and praying mantis kill other insects, such as aphids. So do not harm them as they are working for you!

☺ If you find earthworms in your soil, this is great! Do not remove them or kill them. They help the soil with their manure and the tunnel through the ground digging channels for water and air to move through. Some people even make earthworm farms either for the manure or to sell the worms so other people can improve their soil, too.

Next, some insect damage is natural; A few bites out of your plants and trees here and there is completely acceptable!

Some insects like to eat the foods you like to eat, (remember they were created with a purpose, just like you!). And some insects are great meat, too.



Many are insects are also edible and are a good meat!

- ✓ Share a little with insects.
  Asses how badly the insect is damaging your harvest and decide if you are willing to share.
- ✓ Grow something Different. Some insects (like worms in the soil that damage the roots of plants) will live in the soil only for as long as you grow the same type of plant. If you stop growing that type of plant for a while in that place – and grow something different – that insect won't want to live there any more. In a few months you can plant that plant again.

Still having insect and disease problems? Try these treatment ideas:

The following recipes were adapted from FAO Malawi's Principles of Home Gardening booklet, 2004 Pilot Manual[9]. It is a compilation of local knowledge from a variety of sources.

Smelly and/or soapy water:

- ✓ Use local smelly plants like mpungabwe, chanzi (both types of basil), kuthawa njoka (makes snakes run), or introduced species such as Delia, Tephrosia, marigolds or other flowers, lemon grass, garlic, hot peppers, etc. Pound a few handfuls of the plant's green or flower parts and mix with a full watering can of water (about 10 litres of water). Take care to wash your hands after crushing the plant as some of them are very strong (such as hot pepers!). Another option is to use more crushed plant material with grated soap pieces to make a thicker mixture that will stick onto the plants when brushed onto the affected area.
- ✓ Leave the mixture overnight or (longer) and then sprinkle the water onto and around the affected plants using a watering can with a rose or by dipping a bunch of leafy branches into the mixture and sprinkling on the affected area.
- ✓ Continue using the mixture for a number of days until the insect damage stops.
- ✓ Avoid watering the leaves with other water during the treatment or the treatment will just wash right off. You can use the smelly water for watering purposes.

Smelly Mulching:

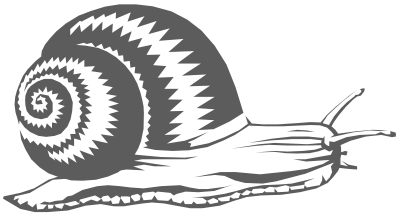
- ✓ Use any of the smelly plants as a mulch and sprinkle it through your affected beds.

Smelly Diet:

Including smelly plants in your gardens is *NOT* a waste of space, in fact, many of the protectors for your garden are also protectors for your body! For example hot pepper, garlic and lemon grass, all have nutritional and medicinal value. Here are some uses for these plants:

- ✓ Hot pepper: usually cooked with other foods, or made into hot sauces or powders. It can also be eaten raw fresh if you can tolerate it. It has medicinal value such as prevention of ulcers in humans; relief from colds, coughs and flu; provides warmth to the body either applied on the skin or by drinking as a tea or soup.
- ✓ Garlic: can either be eaten raw or cooked, and is good for coughing and general improvement of body immunity. Garlic is a natural antibiotic and can be used externally on wounds or eaten.
- ✓ Lemon grass: Good flavor for drinking tea for spicing foods (rice, potatoes, meats, salads etc). Can be used as a cough remedy when boiled in hot water to make tea.

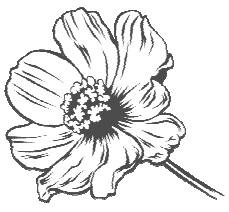
Snails and Slugs:



Drawing from Positive Health, 2003, Neil Orr. See appendix for contact details.

- ✓ Pick them off by hand: Check early in the morning for snails and slugs as they come out to eat your plants at night. Remove them and feed them to your chickens, ducks, fish, or other animals.
- ✓ Shallow dishes of stale beer: Use old saucers or broken pieces of pot and fill with stale beer. Put these in the areas that the snails are eating. Snails like beer, and will climb into the dishes and drown.
- ✓ Sharp mulch: Sprinkle broken egg shells, or other sharp things like rough stones, or crush an old broken clay pot around your plants. Snails and slugs don't like this, as the sharp edges hurt their 'feet'.
- ✓ Attractors: Snails like to eat certain flowers, Marigolds are one example. Interplant flowers snails like to eat so they eat the flowers instead of your food.

Other worms (like eelworms) and insects damaging roots:



Drawing from Positive Health, 2003, Neil Orr. See appendix for contact details.

- ✓ Flowers and other smelly plants: To discourage these types, plant marigold flowers, nasturtium, garlic, or onions throughout your gardens if you already haven't. Try using the smelly mulches or smelly water.

Cutworms:

These worms eat the stem of the plant near the soil. The worms hide in the soil near the plant.

- ✓ Find by hand: Dig with your fingers, find the worm, and feed it to your chickens.
- ✓ Protect the stem with collars: You can also make small round 'collars' in the shape of a circle from stiff paper or cardboard from food packages. Place these around the plant's stem to protect it from this worm.

Aphids (Plant lice):

Usually you will see ants around as well. Sometimes aphids are seasonal and will go away themselves after the season is over. If you feel like the aphids are damaging your plants, you can discourage them by:

- ✓ Encouraging ladybirds (ladybugs) who love to eat aphids!
- ✓ Smelly soapy water (see first treatment idea above): Use a soft cloth or sponge dipped in the smelly soapy mixture (garlic, hot peppers and soap recipe works particularly well) and gently wipe the aphids off. Repeat this three days later, and again three days after that.

Drawing from Positive Health, 2004, David Patient and Neil Orr. See appendix for contact details

Cabbage Worms & Moths:

The moth lays eggs on the cabbage leaves, and the worms emerge later to eat the leaves.

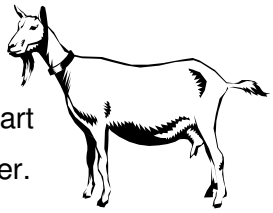
- ✓ Instead of Cabbage, grow Mlozi (the local perennial vegetable that tastes just like cabbage)!
- ✓ Mix flour and salt, and place it in an old sock. Shake the sock over the leaves – top and bottom of leaves – lightly.
- ✓ Cut tomato leaves into small pieces. Place these on the leaves being eaten, as well as around the plants.
- ✓ Mix one teaspoon of salt in 2 litres of water. Mix well. Spray or sprinkle over the leaves.

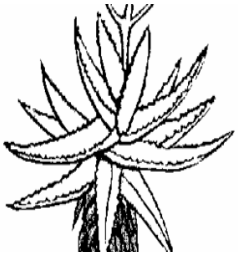
Animal management (protection from thieves, goats, etc.)

In some situations, you may need to protect your plants from chickens, dogs, pigs, cattle, goats, monkeys and other animals, such as humans! Some of these problems actually stop people from planting – but this does *not* have to be the case! Here are some ideas for dealing with these pests.

- ✓ Having your plants near the house may help, as you can see what is happening as people at home can easily chase animals away.
- ✓ Certain spiritual plants are believed to prevent thieves from stealing. Including these plants may assist while at the same time adding roots and organic matter to the soil.
- ✓ The power of people! Community policing and rules for keeping animals controlled can also be very effective and has been proven to work in parts of Malawi.

Goats seem to eat anything and everything!





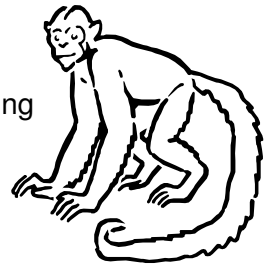
Drawings from Positive Health, 2003. Neil Orr. See appendix for contact details.

- ✓ One idea is to collect some aloe leaves and wipe the bitter green part of the aloe leaf on your hedge or stick fence as the aloe is very bitter.
- ✓ People also report that goats do not like the taste of their own manure. Getting the smell of goats manure on the plants and trees may help prevent them being eaten by goats (be sure to wash your foods well before you eat them of course!). You can either add the goats manure to a bucket of water and let is sit for a few days before applying to the plants, or rub fresh manure on the trees and plants (be sure to wash your hands or to use plastic bags on your hands!).

Chickens usually only harm small seedlings and newly planted seeds. Chickens can be *helpful* around mature plants because they eat insects and they dig the top of the soil. To prevent chickens from hurting small seedling you can:

- ✓ You can strategically place rocks, broken bricks, thorny branches, or other item around the place where new seeds and seedlings are. Place the items so that chickens will have a hard time scratching the young seeds.
- ✓ Another idea is to make a wire basket or frame using the same skills children make their 'galimoto' (car) toys by taking scrap pieces of wire and tying the wires together. Put the wire basket over your small seedlings until they are large enough to withstand a chicken scratching around it, then move the basket to a new seedling.

Monkeys are clever animals. Some strategies for dealing with them include hiding the food by inter-planting things closely together and including all sizes and types of plants. Another idea is to spray plants with hot peppers so when monkeys eat the foods it burns their mouth and learn that your food is hot. If you find other strategies that work spread the word so we all can learn!



Drawing from Positive Health, 2003, Neil Orr.

☑ Testing your understanding of caring for plant and animals

1. State 3 reasons why is there less watering in a guild than a typical system.

2. Why will there be less weeding, digging, replanting and fertilizer use in a guild system?

3. Name 4 ways to work with insect damage, diseases, and animal interference.

Topic 8: Monitoring and Evaluating the Model

It is important to know if the Model is working or not and what needs to be done to make our impact more effective. This tool is a guide for the types of questions to ask, who to ask, and what to look at during your baseline and subsequent evaluations.

The baseline evaluation should be done after selecting the sites and before implementing any of the model, this will give you a picture of what the area is like now, prior to your interventions.

After working with the communities, their representatives, or extension workers, an evaluation should take place about 3 months after implementation to see what progress is being made, to identify what is working well and what is not, to see what is getting better in people's lives and their environment and what is getting worse – and why. During the follow up evaluation, focus on asking the target audience your questions, i.e. whomever it is that you were aiming for seeing behaviour changes. If you trained the people that were working with the target audience, they may want to answer all your questions instead of letting the target answer them.

For a project that looks at Food and Nutrition Security, interventions and evaluations should be allowed to continue for a minimum period of 3-5 years, depending on how closely you are able to work with each household. If you are relying on a trickle down information and skills effect, expect longer to really impact a whole community – this may take as long as 15 years.

We worked directly on the ground with communities and we found changes very quickly using the model (see page 11 "The impact of the model during the testing phase"), but for people to really take hold of the ideas, to work through implementation barriers and allow the environment and people to return to health, one-, two- and three-year evaluations are needed.

On the following pages there are suggested topics, questions, and format to follow for your own evaluations. The form could be used with a household or community site. "Site" on the form refers to whatever you list on the form as 'Type of Site". The evaluation needs to be tailored to your programme. All evaluators need to be trained on how to collect the information for each question such as measuring or estimating yields, water usage, dietary intakes, etc.

Sample Assessment Form – filled in

Instructions to the Evaluator: You should have been previously trained in using this form so that you understand why the information is being collected and what the objectives of the project are. Please be as accurate as possible in your information collection.

Site Name:	*Nordin Family*
Site Location: *(brief directions)*	*Chitedze Trading Centre* *15 km west on Mchinji Road, continue 1 km west of Chitedze Agricultural Research station* *Take a right on gravel road, the Kasungu S123* *Travel 1.5 km and ask at market.*
Type of site: *(Community school, hospital, individual, etc.)*	*Individual home*
Date started using model:	*2003 August*
Number of people at site:	*3: one wife, one husband, one child*
Primary contact names / positions:	*Kristof & Stacia Nordin, owners* *01-707-213 home phone*

Questions		Baseline evaluation	6 month evaluation	12 month evaluation	18 month evaluation
Date of Evaluation:		*2003 Aug*	*2004 Feb*	*2004 Aug*	*2005 Feb*
Notes about time of evaluation:		*Dry*	*Rains*	*Dry*	*Rains*
1. Size of total Site (acres)		*1 acre*	*2 acres*	*2 acres*	*3 acres*
2. Size of the Site using the model		*0*	*1 acres*	*2 acres*	*2.5 acres*
Notes:			*added land*		*added land*
Impacts on Labour, Time, Money, Health					
3. How many people are working on the model concepts at the Site, including hired labour?		*2*	*3* *1 hired*	*3* *1 hired*	*3* *1 hired*
4. Total time used by all people caring for the Site area per day		*0*	*2 hours per day*	*1 hour per day*	*30 min per day*
5. How many people are benefiting from the outputs at the site? List other beneficiary types.		*3*	*15 neighbors, market*	*30 neighbors, market*	*60 neighbors, market*
6. Have the ideas spread to other sites in the area? If so, list them		*no*	*no*	*yes – 1 church*	*yes – 2 neighbors*
7. Illness frequency at site in *past 6 months*, include all people at Site.	Diarrhea	*2*	*1*	*0*	*0*
	Malaria	*1*	*0*	*0*	*0*
	Respiratory	*2*	*1*	*0*	*0*
	Malnutrition	*0*	*0*	*0*	*0*
	Other:				

Questions		Baseline evaluation	6 month evaluation	12 month evaluation	18 month evaluation
8. Money *spent* per month	on all model inputs *(cost of water, labour, seed, etc.)*	*0*	*-2,000 mk*	*-1,000 mk*	*-500 mk*
	on food per month	*-2,000 mk*	*-1,000 mk*	*-500 mk*	*-500 mk*
	on other Site needs	*-2,000 mk*	*-1,000 mk*	*-1,000 mk*	*-1,000 mk*
	TOTAL spent:	***-4,000 mk***	***-4,000 mk***	***-2,500 mk***	***-2,000 mk***
9. Money *received* per month	from model outputs *(food, water, building supplies, etc)*	*0*	*+1,000 mk*	*+2,000 mk*	*+5,000 mk*
	from other places	*+5,000 mk*	*+5,000 mk*	*+5,000 mk*	*+5,000 mk*
	TOTAL received:	***+5,000 mk***	***+6,000 mk***	***+7,000 mk***	***+10,000 mk***
Money Net		***+1,000 mk***	***+2,000 mk***	***+4,500 mk***	***+8,000 mk***
Notes:		*purchasing all food and living needs* *wife works outside home*	*hired labour* *starting to eat harvests* *reduced h/h costs from using local resources* *sold 1,000mk of harvests*	*reduced labour* *less water for irrigation* *eating more harvests & buying less food* *selling more harvests*	*reduced labour costs again* *selling additional harvests and seeds*
Diet Diversity Concepts: You may wish to have an additional sheet listing all the names of foods available at the site.					
10. Food <u>*types available*</u> at Site right now, including wild supply: ***(number of types ready for eating)***	Fruits	*1*	*2*	*5*	*7*
	Vegetables	*2*	*10*	*15*	*20*
	Legumes / nuts	*2*	*4*	*6*	*6*
	Animals	*0*	*2*	*3*	*3*
	Staples	*1*	*3*	*5*	*6*
	Fats / Oils	*1*	*2*	*3*	*3*
11. Food <u>*types eaten*</u> at Site right now: ***(number of types being eaten)***	Fruits	*1*	*2*	*3*	*5*
	Vegetables	*2*	*9*	*10*	*15*
	Legumes / nuts	*2*	*3*	*5*	*6*
	Animals	*0*	*1*	*2*	*3*
	Staples	*1*	*2*	*3*	*5*
	Fats / Oils	*1*	*2*	*3*	*3*
12. Food <u>*amounts available*</u> at Site now, including wild supply: ***(kg)***	Fruits	*1 kg*	*2 kg*	*3 kg*	*15 kg*
	Vegetables	*1 kg*	*2 kg*	*5 kg*	*10 kg*
	Legumes / nuts	*3 kg*	*5 kg*	*50 kg*	*100 kg*
	Animals	*0*	*1 kg*	*10 kg*	*100 kg*
	Staples	*50 kg*	*200 kg*	*400 kg*	*600 kg*
	Fats / Oils	*1 kg*	*1 kg*	*2 kg*	*5 kg*

Questions		Baseline evaluation	6 month evaluation	12 month evaluation	18 month evaluation
13. Food *amounts eaten* at Site per day per adult: ***(chipande spoons per day per adult except fats = teaspoons)***	Fruits	*1 spoon*	*2 spoon*	*3 spoon*	*3 spoon*
	Vegetables	*1 spoon*	*2 spoon*	*3 spoon*	*3 spoon*
	Legumes / nuts	*.5 spoon*	*1 spoon*	*1 spoon*	*2 spoon*
	Animals	*0*	*1 spoon*	*1 spoon*	*1 spoon*
	Staples	*8 spoon*	*7 spoon*	*6 spoon*	*5 spoon*
	Fats / Oils	*1 teaspoon*	*2 teaspoon*	*3 teaspoon*	*3 teaspoon*
14. Clean drinking water available (either purified or clean source)		*yes*	*yes*	*yes*	*yes*
Soil Health Concepts:					
15. Site area conserved by:	Mulching	*0*	*.5 acre*	*1.5 acre*	*2.5 acre*
	Reduced Sweeping	*0*	*1.5 acre*	*2 acre*	*2.5 acre*
	No burning organic matter	*0*	*2 acre*	*2 acre*	*2.5 acre*
	Reduced tillage	*0*	*.75 acre*	*1 acre*	*2 acre*
	Swales or other permanent structures	*0*	*.25 acre*	*.5 acre*	*1 acre*
	Trees / Plants *(non-legume)*	*0*	*.5 acre*	*1 acre*	*1.5 acre*
	Other:				
16. Site area using soil fertility and structure concepts:	Legumes (plants/trees)	*0*	*.5 acre*	*1 acre*	*1.5 acre*
	Compost	*0*	*.25 acre*	*.5 acre*	*.5 acre*
	Animal manure	*0*	*0*	*.25 acre*	*.25 acre*
	Manure teas	*0*	*0*	*.25 acre*	*.5 acre*
	Other:				
17. Are synthetic chemicals being used for soil fertility? If yes, list why.		*yes maize*	*no*	*no*	*no*
18. Is there any soil erosion on the site? If yes, list types of soil erosion.		*yes – wind, sun & water*	*yes – water but very little*	*no*	*no*
Water Management					
19. Is all waste water harvested? *(i.e., all grey water should be used)* If no, where?		*yes*	*yes*	*yes*	*yes*
20. Is all rainwater harvested? *(i.e., no rainwater should leave the area)* If no, where?		*no – roof run off*	*yes*	*yes*	*yes*
21. Is irrigation used? If so, what methods?		*yes watering can*	*no (rains)*	*yes watering can & drip*	*no (rains)*
22. Water amount used at site for plants / trees / animals per day *(look at the watering method and help estimate litres)*		*100 L (20 cans)*	*0 (rains)*	*50 L (5 cans)*	*0 (rains)*
23. Water input, when applied *(am, noon, pm)*		*am, pm*	-	*am*	-

Questions		Baseline evaluation	6 month evaluation	12 month evaluation	18 month evaluation
Plant and Animal Health (On a separate sheet of paper you may wish to list all foods grown and yields, then put totals here)					
24. Number of varieties grown over past 6 months ***(number of types)***	Fruits	*0*	*5*	*10*	*15*
	Vegetables	*2*	*10*	*15*	*30*
	Legumes / nuts	*1*	*5*	*10*	*15*
	Animals	*0*	*1*	*2*	*5*
	Staples	*1*	*3*	*5*	*8*
	Fats / Oils	*0*	*1*	*3*	*5*
	non-food items	*0*	*1*	*2*	*4*
25. Yields over past 6 months ***(kg)***	Fruits	*0*	*5 kg*	*10 kg*	*15 kg*
	Vegetables	*18 kg*	*30 kg*	*200 kg*	*300 kg*
	Legumes / nuts	*10 kg*	*20 kg*	*200 kg*	*250 kg*
	Animals	*0*	*0*	*50 kg*	*100 kg*
	Staples	*500 kg*	*0*	*2,000 kg*	*100 kg*
	Fats / Oils	*0*	*0*	*50 kg*	*30 kg*
	non-food items (list)	*0*	*0*	*firewood*	*thatch*
26. Is there crop damage or animal illnesses that are seriously affecting yields? If yes, what?		*yes, maize insect & fungus*	*yes, vegetable insect*	*no*	*no*
27. Are synthetic chemicals / antibiotics, etc used on plants or animals? If yes, why?		*yes, fungus, pests*	*no*	*no*	*no*
28. Are local, natural remedies for crop / animal damage being used? What and is it working?		*no*	*yes, smelly herbs on vegetables it is working*	*no*	*no*
Walk through the area					
29. List Resources found that are <u>not</u> being used *(organic matter, seeds, foods, water, etc.)*		*grey water at well, sweepings, men playing bawo*	*men playing bawo*	*none*	*none*
30. Note any differences seen during walk compared to answers provided:		*none*	*none*	*none*	*none*

Sample Assessment Form – Blank

Instructions to the Evaluator:

Site Name:	
Site Location: *(brief directions)*	
Type of site: *(Community school, hospital, individual, etc.)*	
Date started using model:	
Number of people at site:	
Primary contact names / positions:	

Questions		Baseline evaluation	6 month evaluation	12 month evaluation	18 month evaluation
Date of Evaluation: **Notes about time of evaluation:**					
31. Size of total Site (acres)					
32. Size of the Site using the model					
Notes:					
Impacts on Labour, Time, Money, Health					
33. How many people are working on the model concepts at the Site, including hired labour?					
34. Total time used by all people caring for the Site area per day					
35. How many people are benefiting from the outputs at the site? List other beneficiary types.					
36. Have the ideas spread to other sites in the area? If so, list them					
37. Illness frequency at site in *past 6 months*, include all people at Site.	Diarrhea				
	Malaria				
	Respiratory				
	Malnutrition				
	Other				

Questions		Baseline evaluation	6 month evaluation	12 month evaluation	18 month evaluation
38. Money *spent* per month	on all model inputs *(cost of water, labour, seed, etc.)*				
	on food per month				
	on other Site needs				
	TOTAL spent:				
39. Money *received* per month	from model outputs *(food, water, building supplies, etc)*				
	from other places				
	TOTAL received:				
Money Net					
Notes:					
Diet Diversity Concepts: You may wish to have an additional sheet listing all the names of foods available at the site.					
40. Food <u>*types available*</u> at Site right now, including wild supply: ***(number of types ready for eating)***	Fruits				
	Vegetables				
	Legumes / nuts				
	Animals				
	Staples				
	Fats / Oils				
41. Food <u>*types eaten*</u> at Site right now: ***(number of types being eaten)***	Fruits				
	Vegetables				
	Legumes / nuts				
	Animals				
	Staples				
	Fats / Oils				
42. Food <u>*amounts available*</u> at Site now, including wild supply: ***(kg)***	Fruits				
	Vegetables				
	Legumes / nuts				
	Animals				
	Staples				
	Fats / Oils				
43. Food <u>*amounts eaten*</u> at Site per day per adult: ***(chipande spoons per day per adult except fats = teaspoons)***	Fruits				
	Vegetables				
	Legumes / nuts				
	Animals				
	Staples				
	Fats / Oils				

Questions		Baseline evaluation	6 month evaluation	12 month evaluation	18 month evaluation
44. Clean drinking water available (either purified or clean source)					
Soil Health Concepts:					
45. Site area conserved by:	Mulching				
	Reduced Sweeping				
	No burning organic matter				
	Reduced tillage				
	Swales or other permanent structures				
	Trees / Plants *(non-legume)*				
	Other:				
46. Site area using soil fertility and structure concepts:	Legumes (plants/trees)				
	Compost				
	Animal manure				
	Manure teas				
	Other:				
47. Are synthetic chemicals being used for soil fertility? If yes, list why.					
48. Is there any soil erosion on the site? If yes, list types of soil erosion.					
Water Management					
49. Is all waste water harvested? *(i.e., all grey water should be used)* If no, what is not harvested?					
50. Is all rainwater harvested? *(i.e., no rainwater should leave the area),* If no, what is not harvested?					
51. Is irrigation used? If so, what methods?					
52. Water amount used at site for plants / trees / animals per day *(look at the watering method and help estimate litres)*					
53. Water input, when applied *(am, noon, pm)*					

Questions		Baseline evaluation	6 month evaluation	12 month evaluation	18 month evaluation
Plant and Animal Health (On a separate sheet of paper you may wish to list all foods grown and yields, then put totals here)					
54. Number of varieties grown over past 6 months ***(number of types)***	Fruits				
	Vegetables				
	Legumes / nuts				
	Animals				
	Staples				
	Fats / Oils				
	non-food items				
55. Yields over past 6 months ***(kg)***	Fruits				
	Vegetables				
	Legumes / nuts				
	Animals				
	Staples				
	Fats / Oils				
	non-food items (list)				
56. Is there crop damage or animal illnesses that are seriously affecting yields? If yes, what?					
57. Are synthetic chemicals / antibiotics, etc used on plants or animals? If yes, why?					
58. Are local, natural remedies for crop / animal damage being used? What and is it working?					
Walk through the area					
59. List Resources found that are <u>not</u> being used *(organic matter, seeds, foods, water, etc.)*					
60. Note any differences seen during walk compared to answers provided:					

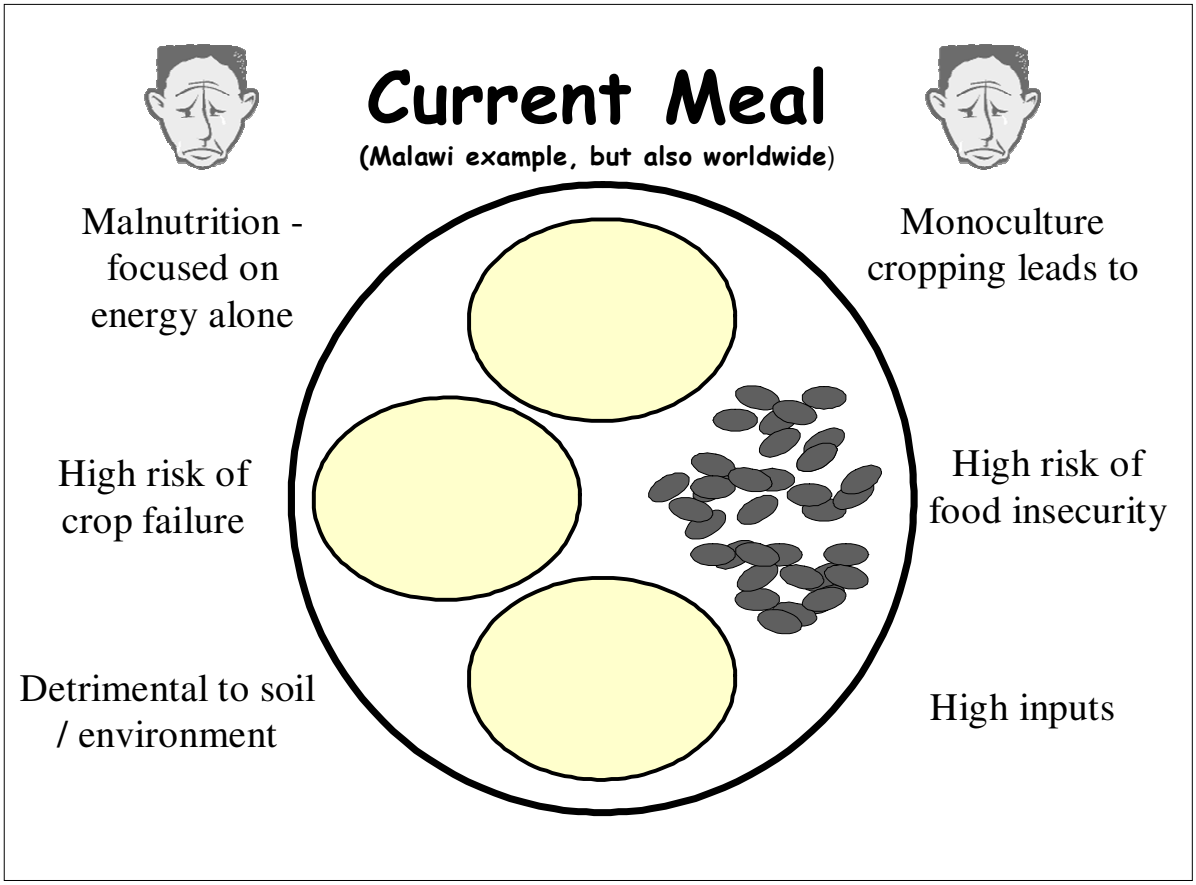
Appendix

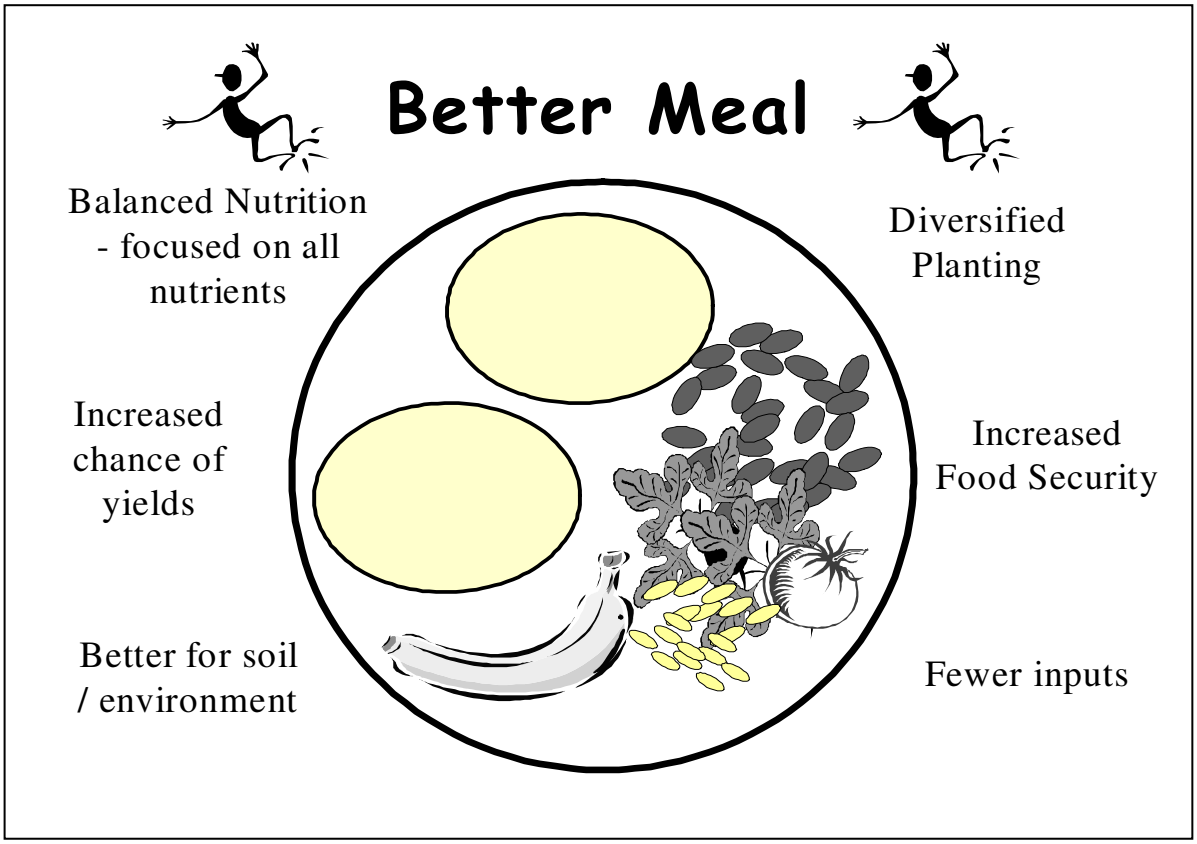
☑ Handouts and Posters

All the handouts and poster provided on the following pages are free to be used and adapted for non-profit purposes. Please give credit to this manual and/or the original authors and artists as appropriate.

The order of the handouts is roughly the order they were covered in the manual.

Current Meal vs. Better Meal Handout





Source: Permaculture Nutrition Manual 2004 edition, Stacia & Kristof Nordin, nordin@eomw.net

Cycle of Dependency Handout

1.) New Crop, Maize: Farmers are encouraged to abandon traditional food sources for higher yielding hybrids such as maize.

2.) Change in diet: Maize takes over as the crop of choice. Early yields, as promised, are extremely high.

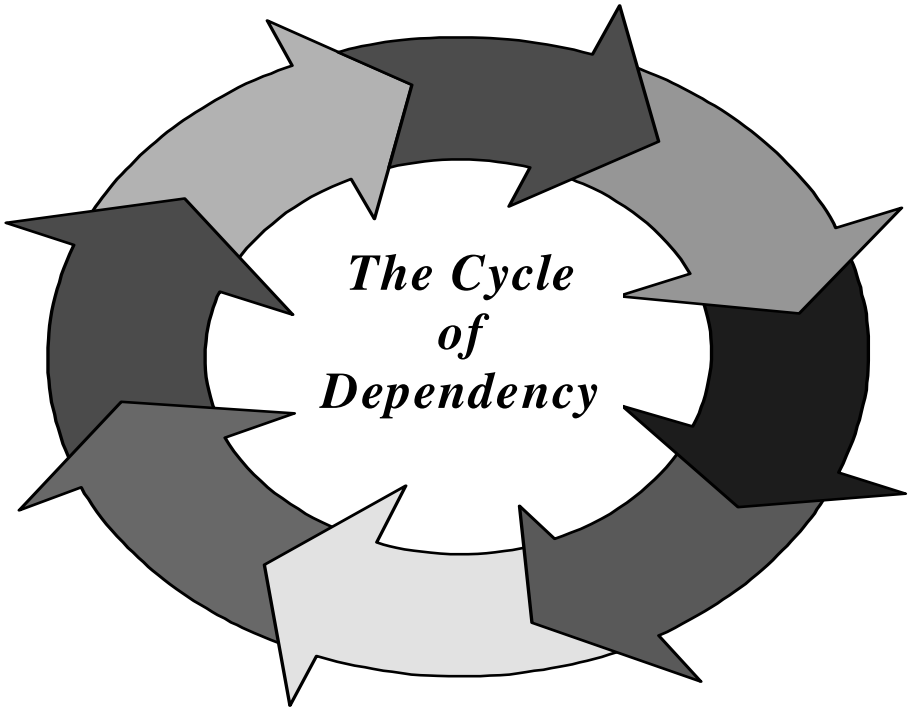
3.) Money Required: The higher yields, however, carry a price. Hybrid seeds are not self-replicating and therefore need to be repurchased each year. Maximum growth is encouraged through the use of expensive chemical fertilizers.

4.) Soil Destroyed Successive maize crops on the same soil combined with the "slash and burn" method of preparing for each year's planting begins to take its toll. As less organic matter is added back into the nature cycle, more chemical fertilizer is needed to maintain the yields.

5.) More fertilizer, less money: Local farmers are forced to sell off more and more of their yields in order to cover the costs of the increased demand for artificial fertilizer and new seed. Less food ends up being saved each year as more ends up being sold.

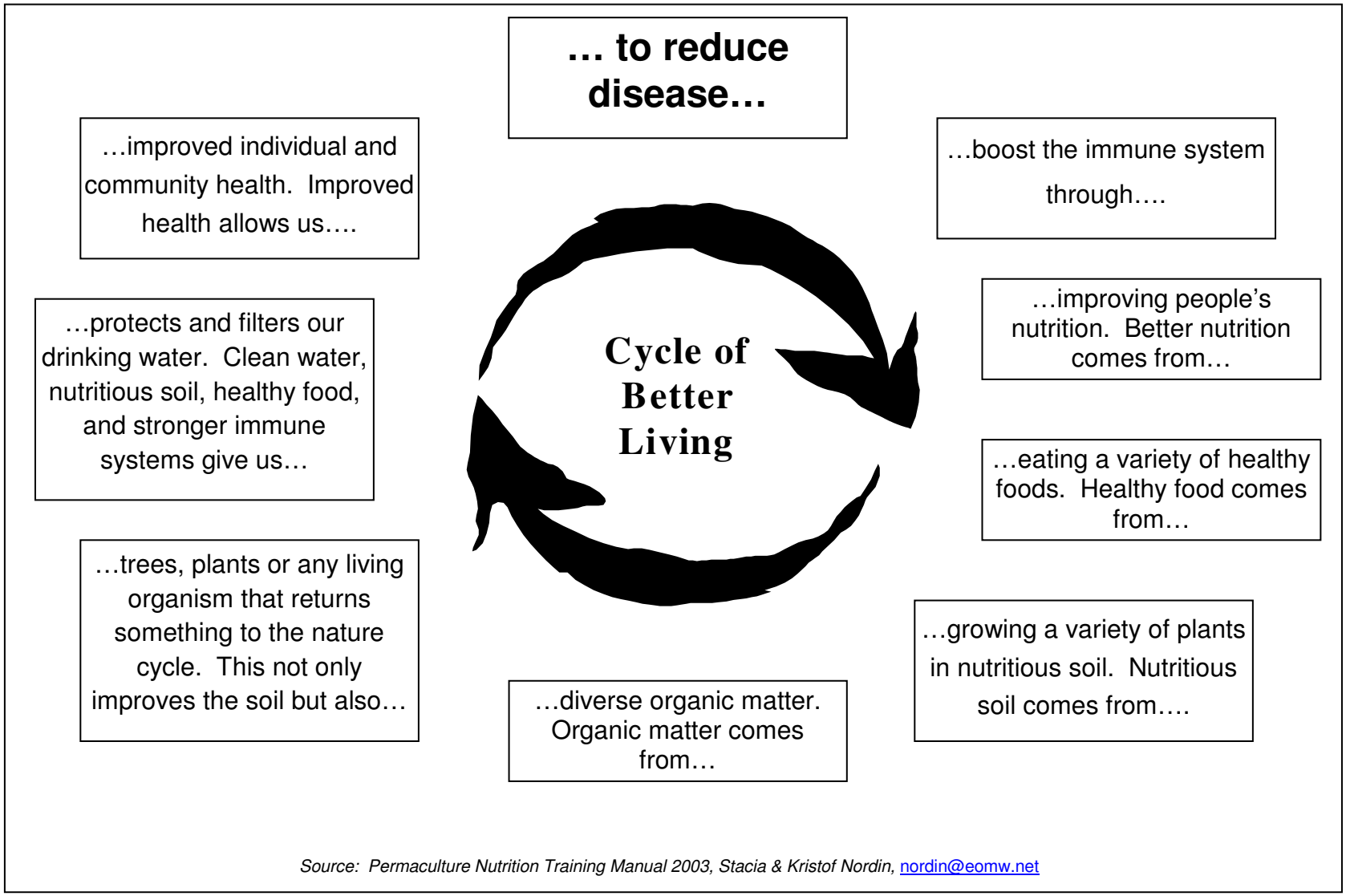
6.) Dependent on Inputs Farmers end up caught in a "cycle of dependency" where each year they are dependent on buying seed and chemical fertilizer to ensure a harvest. Many find that they can barely afford to produce enough maize to meet both their food needs and their expenses.

7.) Forgotten alternatives Over reliance on a single crop causes susceptibility to drought, pestilence, crop disease, and a poor diet—which in turn increases vulnerability to malnutrition and human diseases. As this dependency grows, alternatives disappear. The knowledge of indigenous plants that had once been used or grown as food crops slowly fades out of memory, and people become locked even deeper into this detrimental cycle.



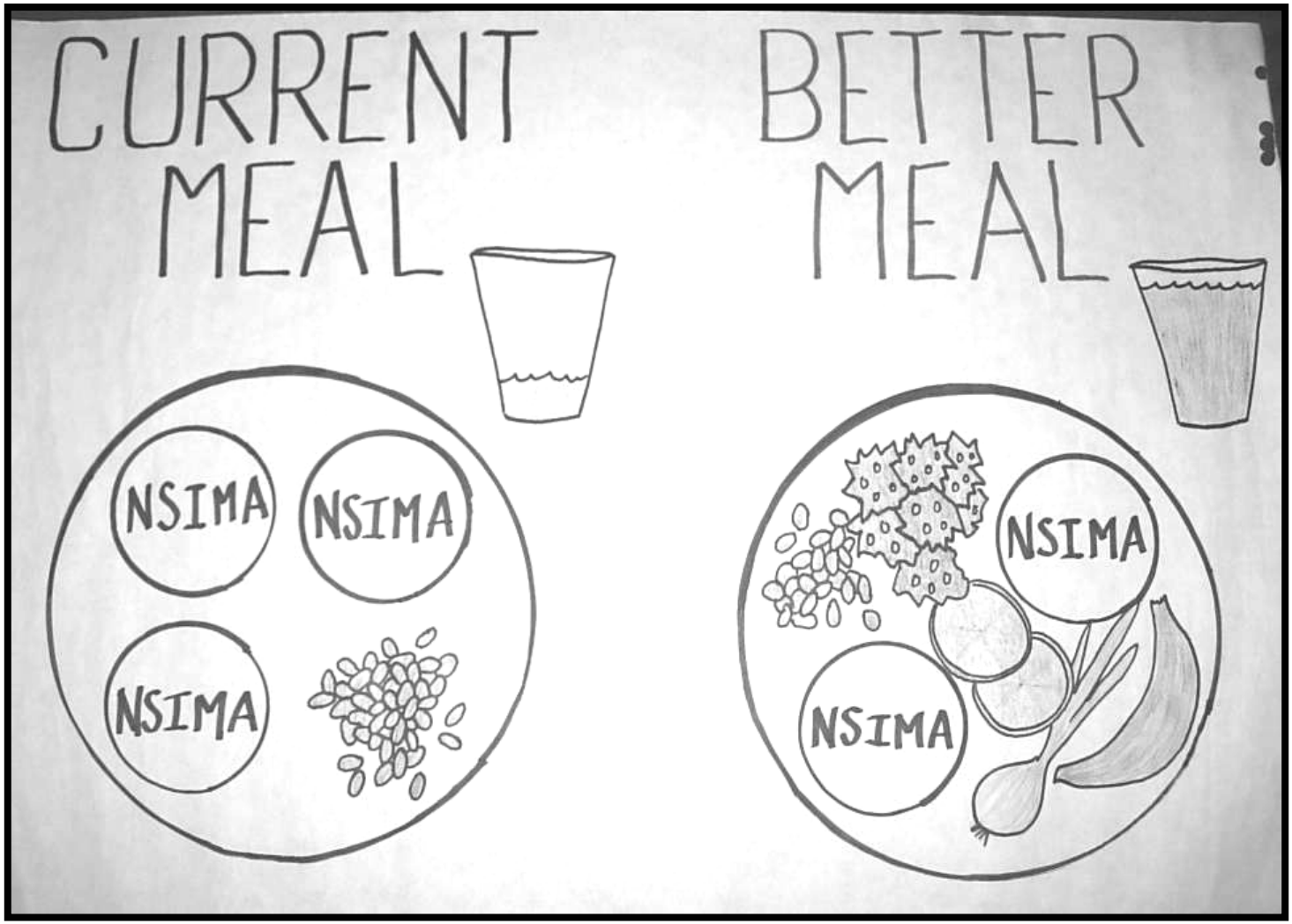
Source: Permaculture Nutrition training manual, draft 2003, Stacia & Kristof Nordin, nordin@eomw.net

Cycle of Better Living Handout



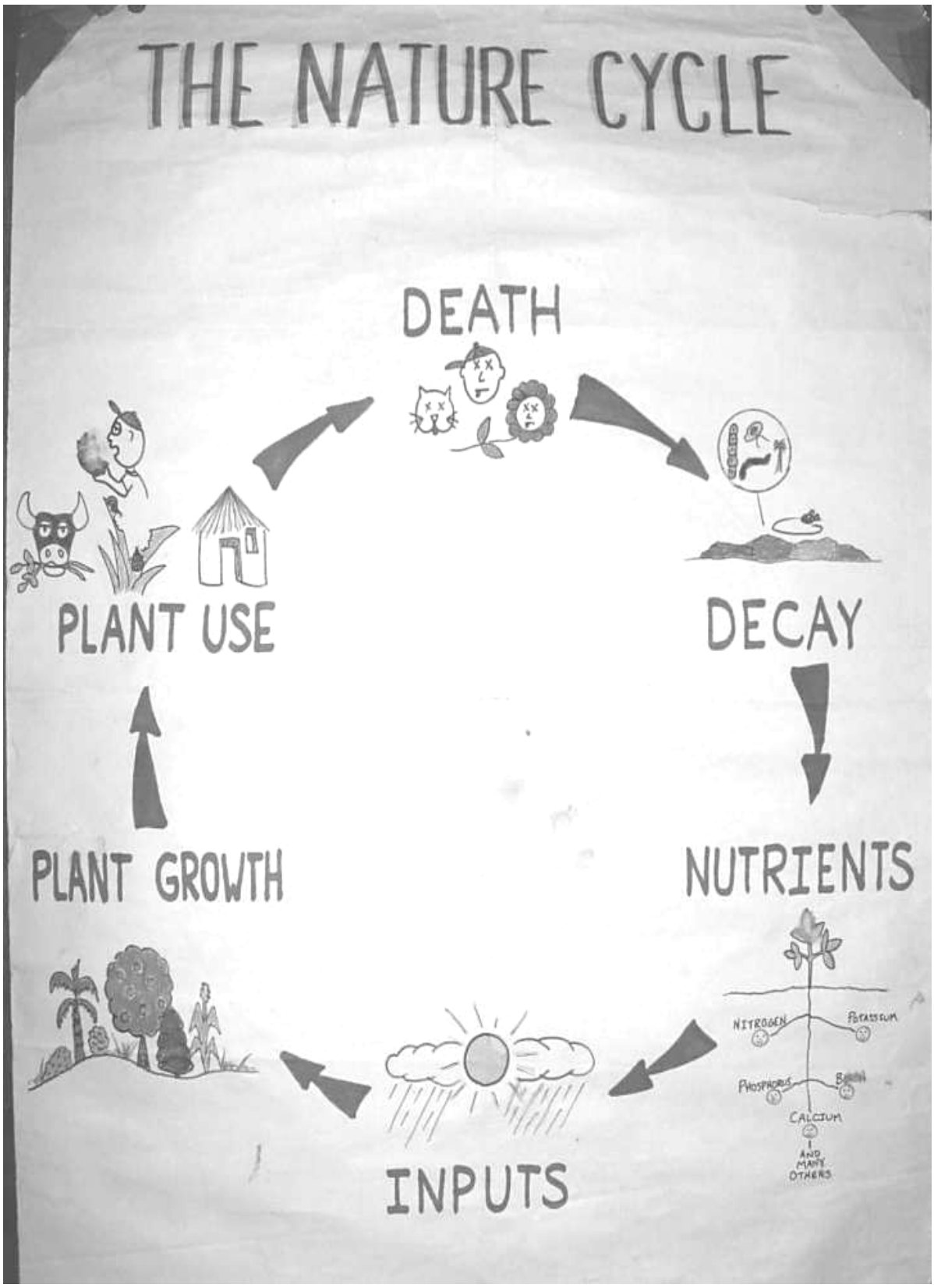
Source: Permaculture Nutrition Training Manual 2003, Stacia & Kristof Nordin, nordin@eomw.net

Current Meal Better Meal Poster



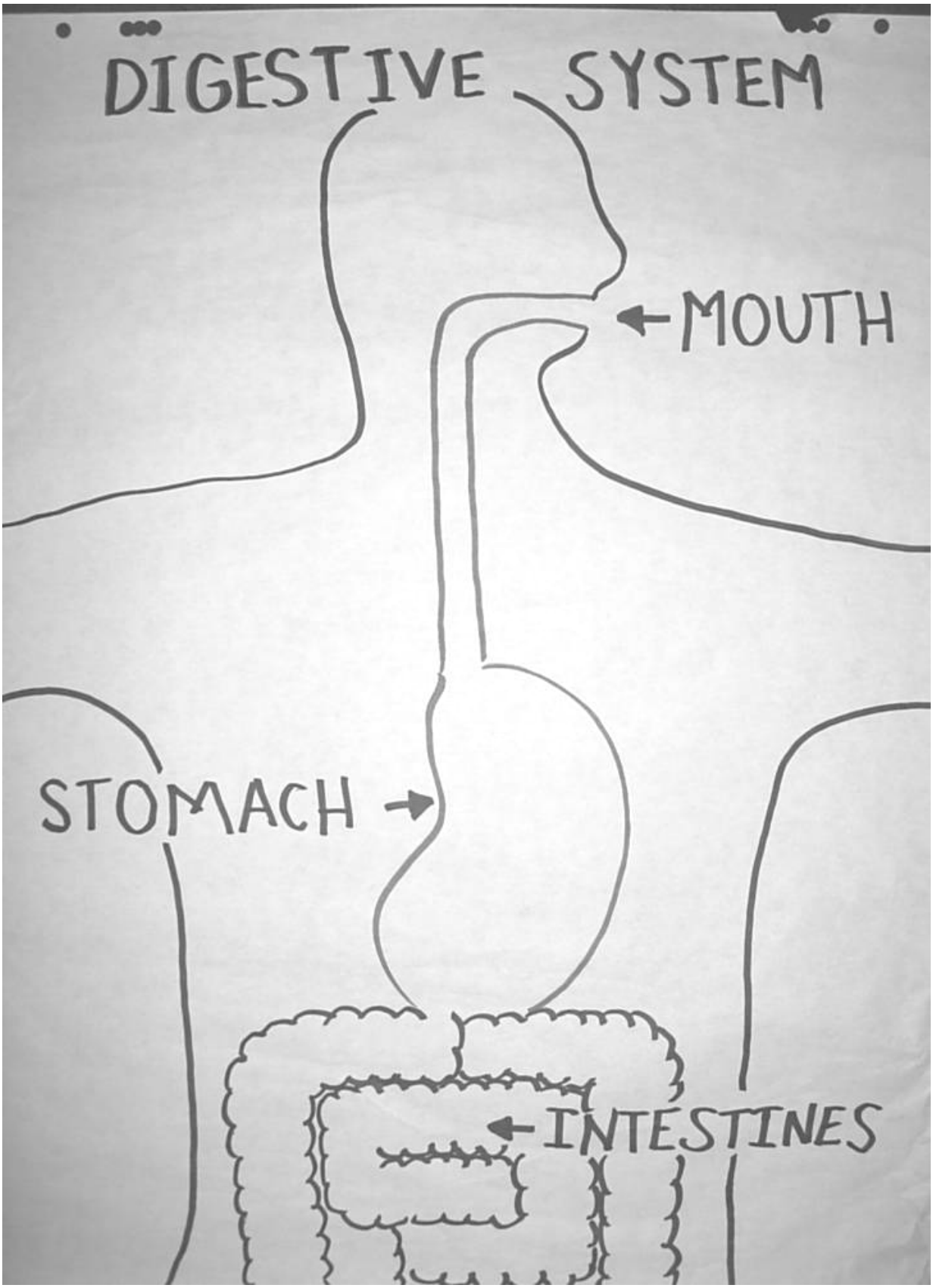
Source: Permaculture Nutrition Training Material 1999. Kristof & Stacia Nordin, nordin@eomw.net

The Nature Cycle Poster



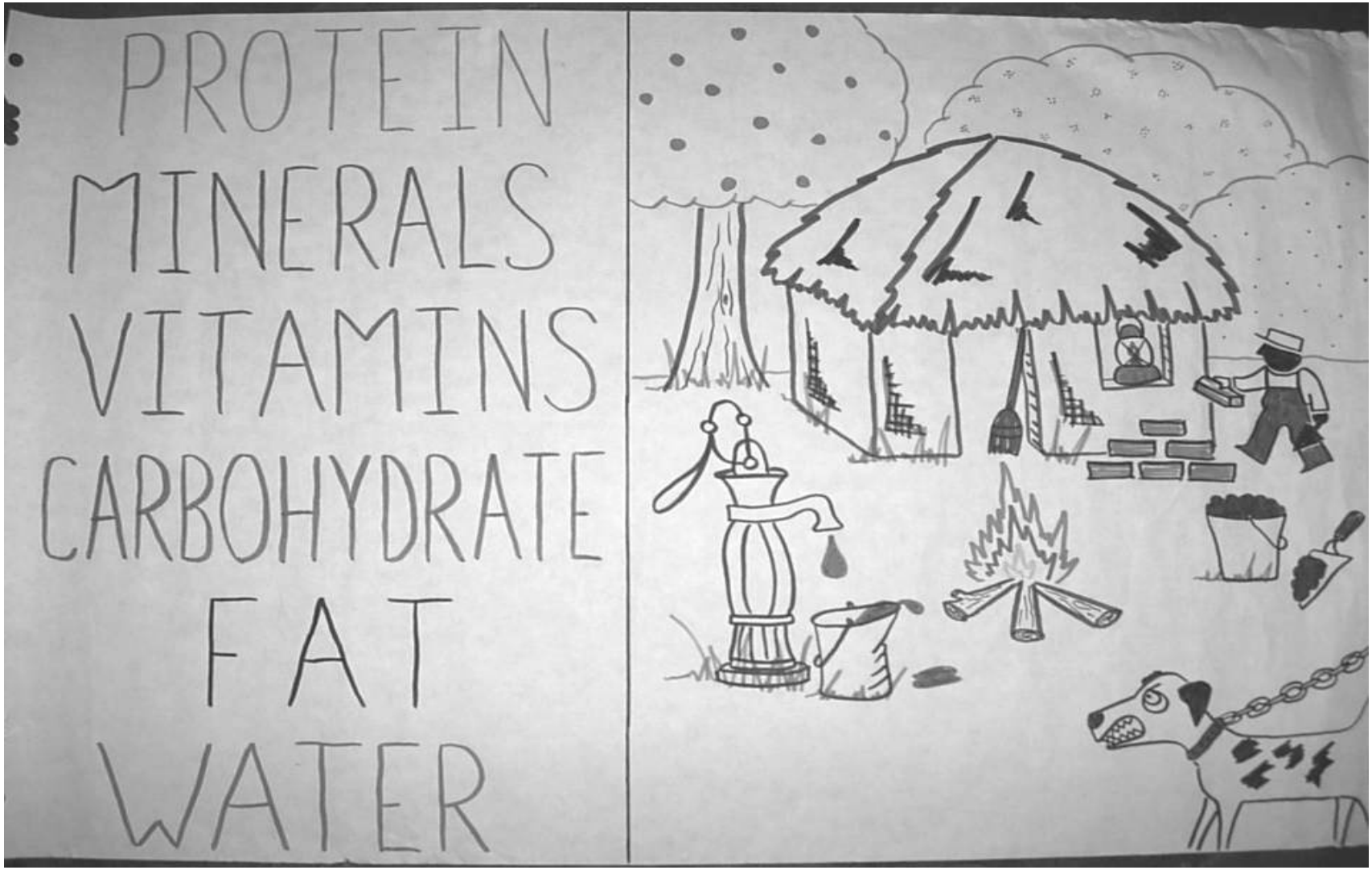
Source: Permaculture Nutrition Training Material 1999. Kristof & Stacia Nordin, nordin@eomw.net

Digestive System Poster



Source: Permaculture Nutrition Training Material 1999. Kristof & Stacia Nordin, nordin@eomw.net

Nutrient Village Poster



Source: Permaculture Nutrition Training Material 1999. Kristof & Stacia Nordin, nordin@eomw.net

Malawi Food Guide Drawn Handout

Malawi Food Guide: The 6 Food Groups

This is a hand drawn and computer enhanced version of the Malawi Food Guide Poster.
The real posters are available from the Ministry of Agriculture, Food & Nutrition Unit, Lilongwe, Area 4 at the Agricultural Communications Branch. Phone +265 (0) 1755522

Muzidya chakudya chamagulu onse tsiku lilionse kuti mukhale ndi thanzi

Chakudya Chokhutitsa

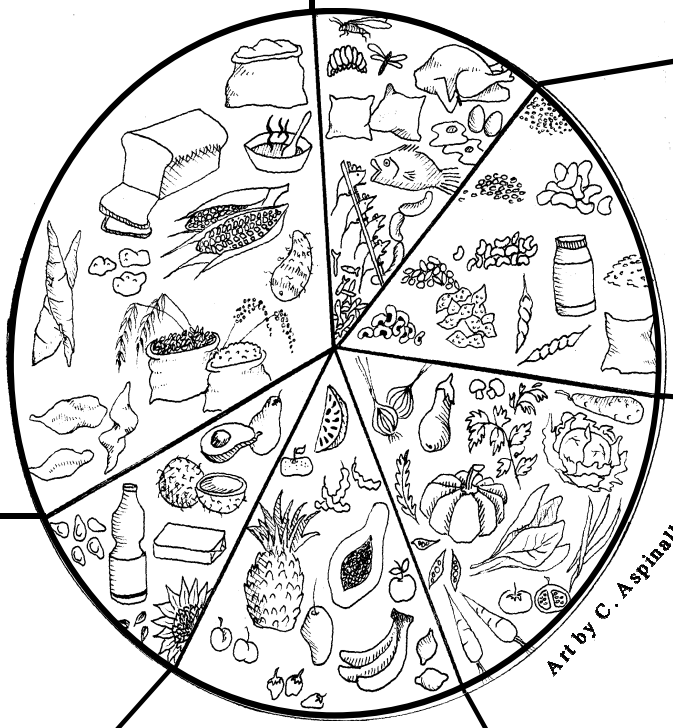
Buye, Mbatata, Nthochi osakwima
Chilazi Mpama,
Chinangwa, Coco
Magombo,
Mapila, Chinaka,
Mawere,
Mchewere,
Kachewere,
Kanjedza
Chinkhoma,
Chikolwa,
Chimanga,
Tirigu,
Mpunga, etc.

Zachokera Nyama

Chambiko, Mbewa, Ngumbi, Nyama, Nsomba, Mkaka, Mazira, Magazi, etc.

Nyemba & Mtedza

Khungudzu,
Chimbamba,
Mbula, Mtedza,
Nzama, Khobwe,
Nandolo, Kabaifa,
Kalongonda, etc.



Masamba

Msaka, Mlozi,
Chisoso, Bonongwe,
Maungu, Adyo,
Mabilinganya, Luni,
Zikanyanga, Chipwete,
Msaka, Zumba, Chewe,
Limanda, Kholowa,
Nkhwani, Mlambe masamba,
Mbilidzongwe, Mtambe,
Njerenjedza, Anyezi, Bowa,
Tsabola, Kambuzi, etc.

Zamafuta

Mbewu a maungu,
bonongwe,
kayimbe, etc.
Mafuta ophikira a
mbewu osiyanasiyana
Mpendedzuwa,
Mapeyala,
Nkoko, etc.

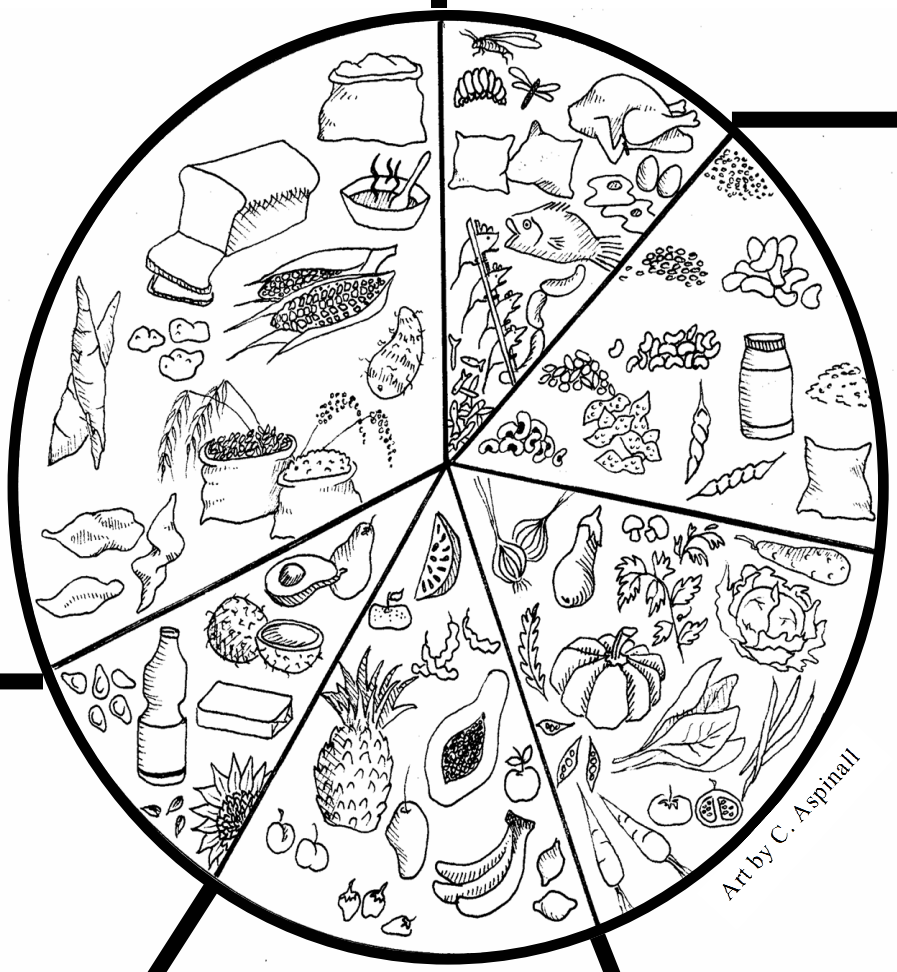
Zipatso

Bwemba, Masawo, Jamu, Mposa, Matowo, Chinanzi, Mchisu, Mavwende, Kayime, Chidede, Mkhyu, Nthudja, Mvilo, Mbula, etc.

Artwork by C. Aspinall. Computer layout and design by S. Nordin.

Malawi Food Guide Blank for Activity Handout

This blank 6 Food Group poster is for you to fill in with the foods you have available.



Artwork by C. Aspinall. Computer work by S. Nordin

Food Availability Activity Handout

Malawi 6 Food Groups	Foods	Hot & Wet Dec – Mar	Cool & Moist Apr – Jul	Hot & Dry Aug – Nov
1.) Vegetables				
2.) Fruits				
3.) Legumes				
4.) Animal Foods				
5.) Staples				
6.) Fats & Oils				

** Source: Permaculture Nutrition training manual, 2000, Stacia & Kristof Nordin, nordin@eomw.net*

Malawi Food Guide Summary Handout

Summary of the Malawi Food Guide: The 6 Food Groups

Food Group *(adult servings per day approximate)*	Main Nutrients *(other nutrients and helpful properties)*	Examples of Foods:
1.) **Vegetables** *(3 mitanda)*	**Vitamins & Minerals** *(Protein, Carbohydrate & Fiber)*	→ **Greens**: Bononqwe, Chisoso, Luni → **Fruits**: Pumpkin, Tomatoes, Peppers, → **Roots**: Onion, garlic → **Mushrooms** → **Flowers**: Pumpkin flowers
2.) **Fruits** *(3 mitanda)*	**Carbohydrate & Vitamins** *(Water & Fiber)*	Sweet or tangy fruits that are often eaten raw: → **Fruits** *(except for ones in the fat group or the vegetable group):* Papaya, Guava, Lemon, Tangerine, Banana, *Mchisu*, Grenedilla → **Honey & Sugar Cane? (These provide vitamins and carbohydrate)**
3.) **Legumes & Nuts** *(1 mitanda)*	**Protein & Carbohydrate** *(Minerals, Vitamins, Fiber, Fat)*	Legumes are seeds in a pod: → **Beans & Peas**: Hyacinth bean (Khungudzu), Grounbeans (*Nzama*), Soybeans, Pigeon pea (*Nandolo*), Peas (*Nsawawa*), Mucuna (*Kalongonda*) → **Nuts**: Mtedza
4.) **Food from Animals** *(None to 1 chipande)*	**Protein & Fat** *(Minerals & Vitamins)*	→ **Flesh, Blood**: Mice, Chicken, Pigeon, Pig, Goat, Fish, *Ngumbi* (termites), Caterpillars → **Eggs** → **Milk & Milk Products**: Milk, Chambiko, Cheese
5.) **Fats & Oils** *(3 tablesoons oilseeds or 3 tsp. oil each day)*	**Fat** *(Minerals, Vitamins, Protein)*	Foods that feel "fatty" in your mouth: → **Oilseeds:** Pumpkin seed, Sesame seed, Sunflower seeds, Cooking Oils → **Fruits**: Avocado pear, Coconut flesh → **Animal Fats**: Butter, Lard
6.) **Staples** *(5 mitanda)*	**Carbohydrate** *(Protein, Minerals, Vitamins)*	Seeds without a pod and starchy roots: → **Grains**: Rice, Wheat, Sorghum, Millet, Maize → **Starchy Roots**: Yams (*Chilazi, viyao*), Sweet Potatoes, Irish Potatoes, Cassava

** Source: Permaculture Nutrition training manual, 2000, Stacia & Kristof Nordin, nordin@eomw.net*

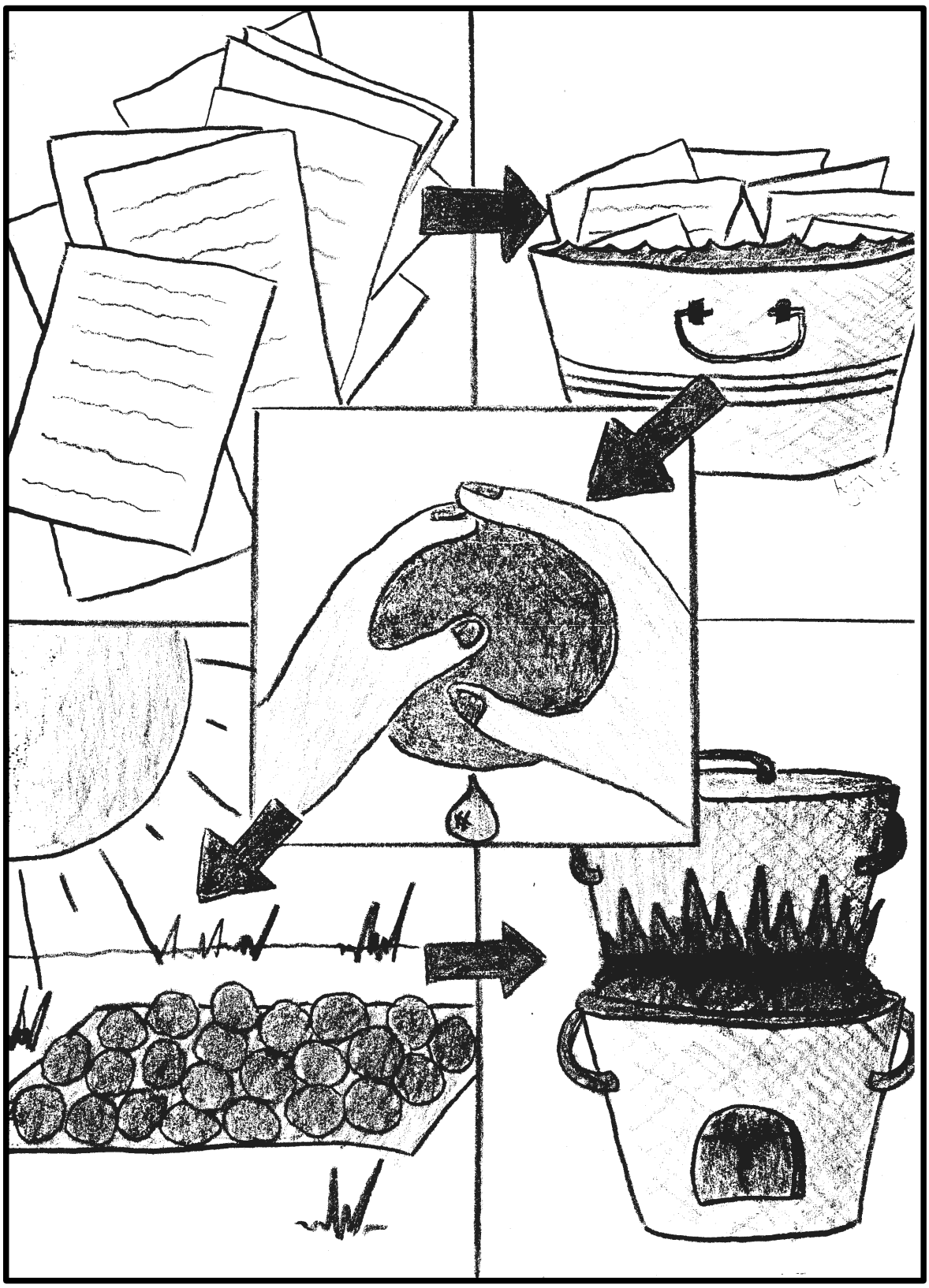
Menu Sheet Blank Handout

Today's Menu Plan:

Food Groups:	Fruit	Vegetable	Legume / Nut	Animal Food	Staple	Fat	Other
7.00 am Breakfast							
10.00 am Break							
12.00 noon Lunch							
3.00 pm Break							
6.00 pm Supper							

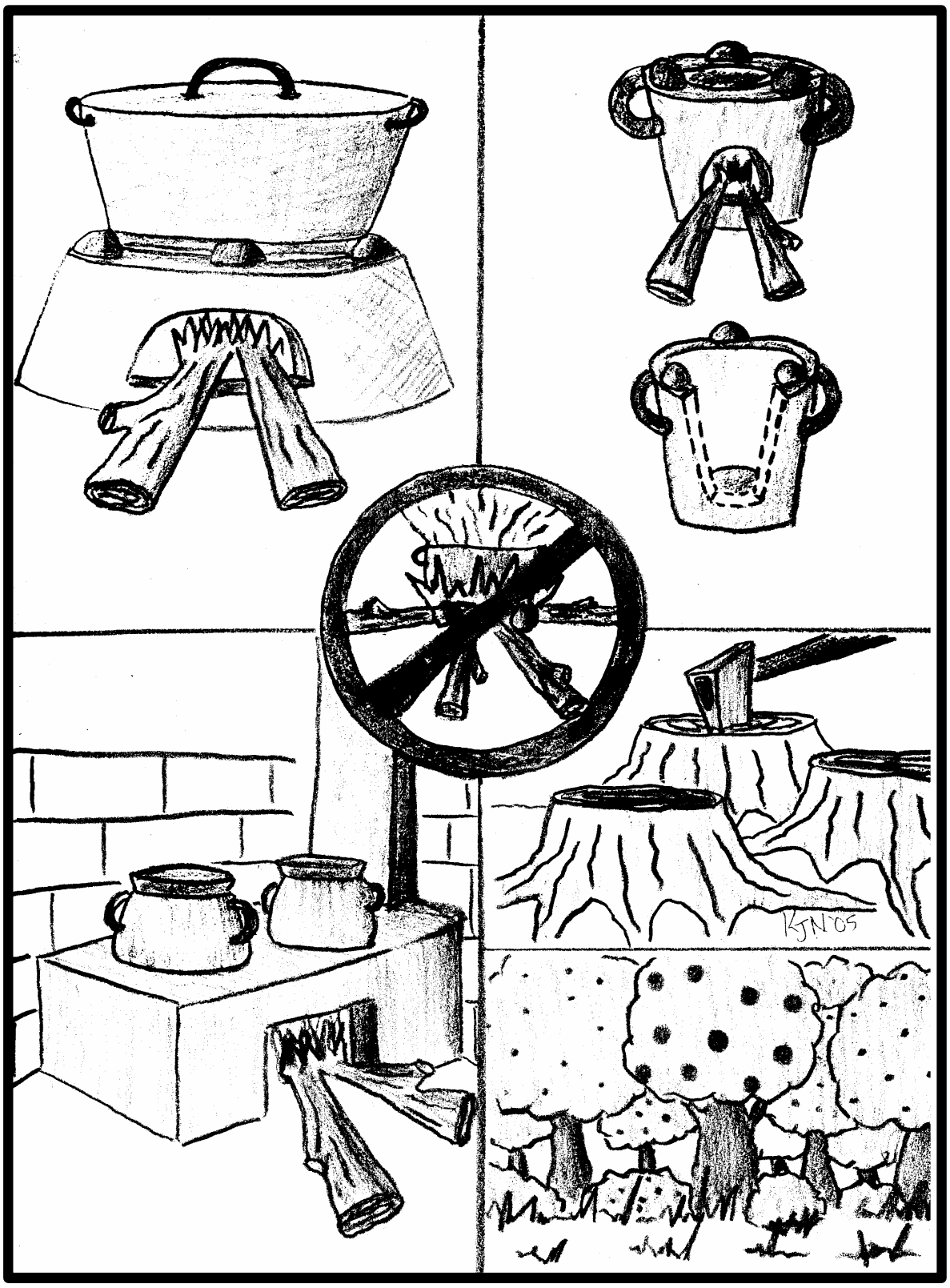
** Source: Permaculture Nutrition training manual, 2000, Stacia & Kristof Nordin, nordin@eomw.net*

Fuel efficiency: Making Paper Charcoal Poster



Art by K. Nordin

Fuel efficiency: Clay stove poster

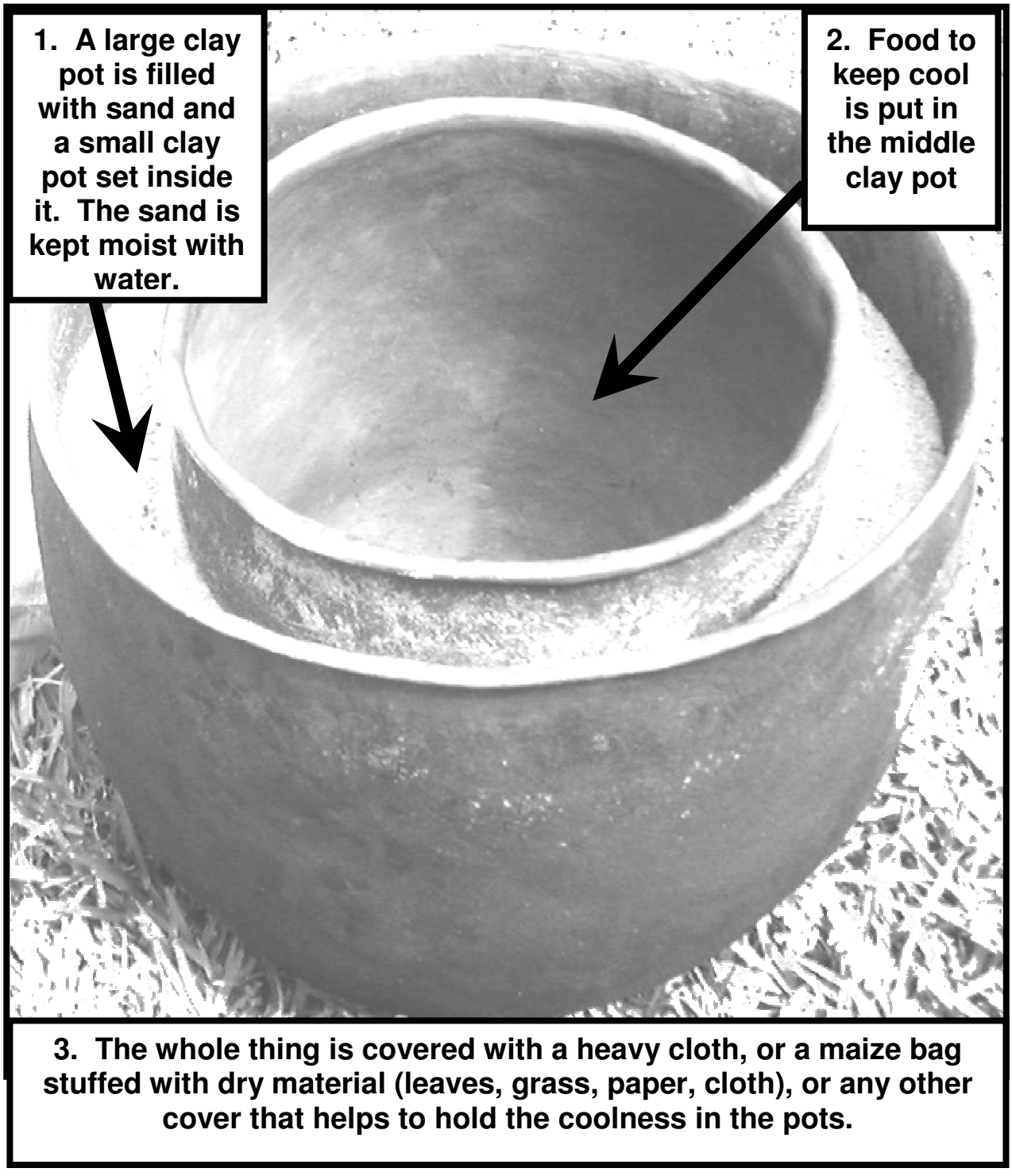


Art by K. Nordin. Full page handout in appendix

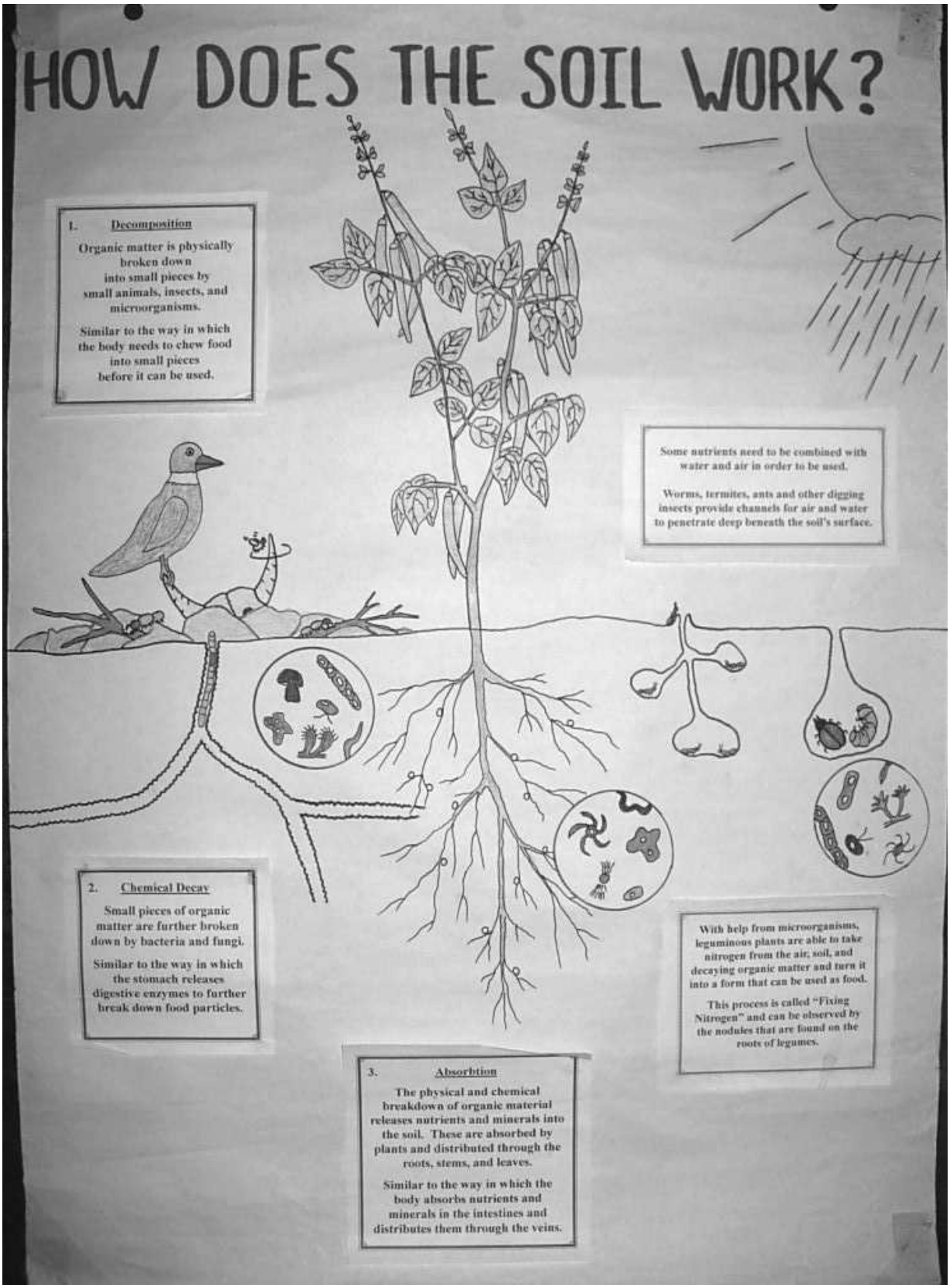
Fuel efficiency: Clay Pot Cooler (local refrigerator)

This picture shows a clay pot cooler (i.e., local refrigerator for produce) made and used by June Walker, Permaculture Network in Malawi founder, Thanthwe, Box 46, Monkey Bay.

The principle is to use water condensation which cools the pots and the air around the pots. To make the cooler you need a large clay pot, a smaller clay pot that will fit inside the large pot, sand, water, and a cover.

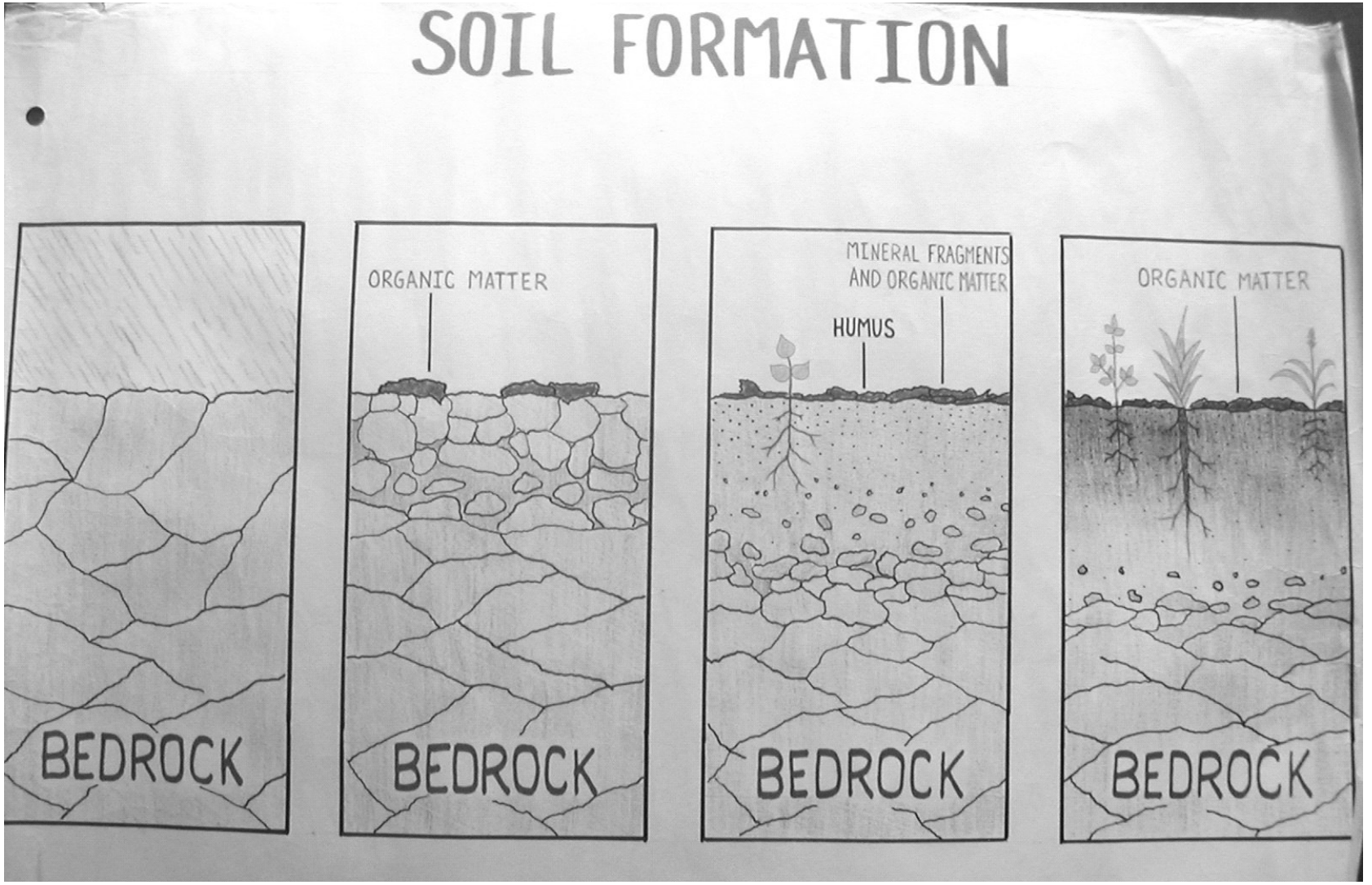


Soil Decomposition and Absorption Poster



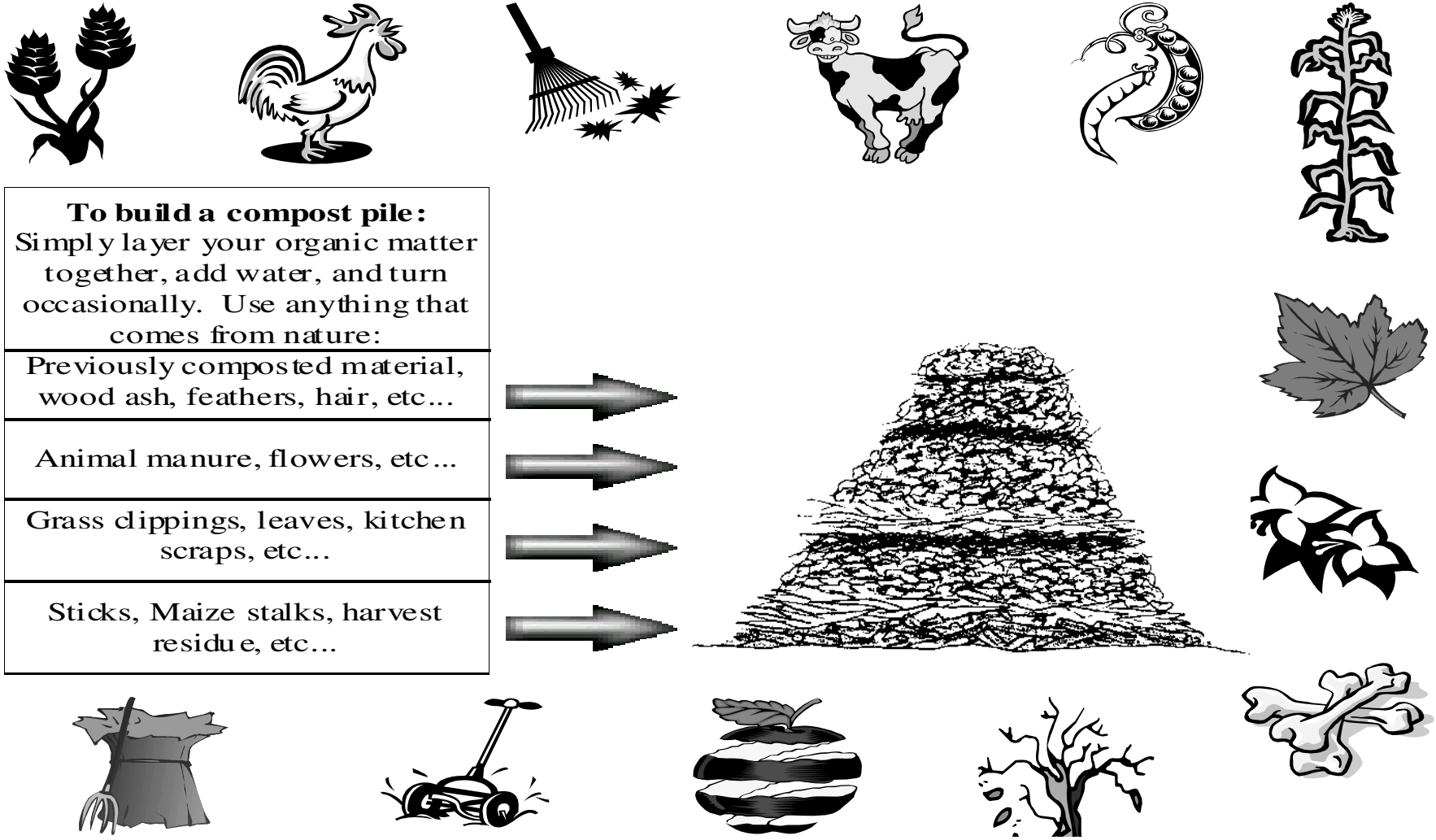
Source: Permaculture Nutrition Training Material 1999. Kristof & Stacia Nordin, nordin@eomw.net

Soil Formation Poster



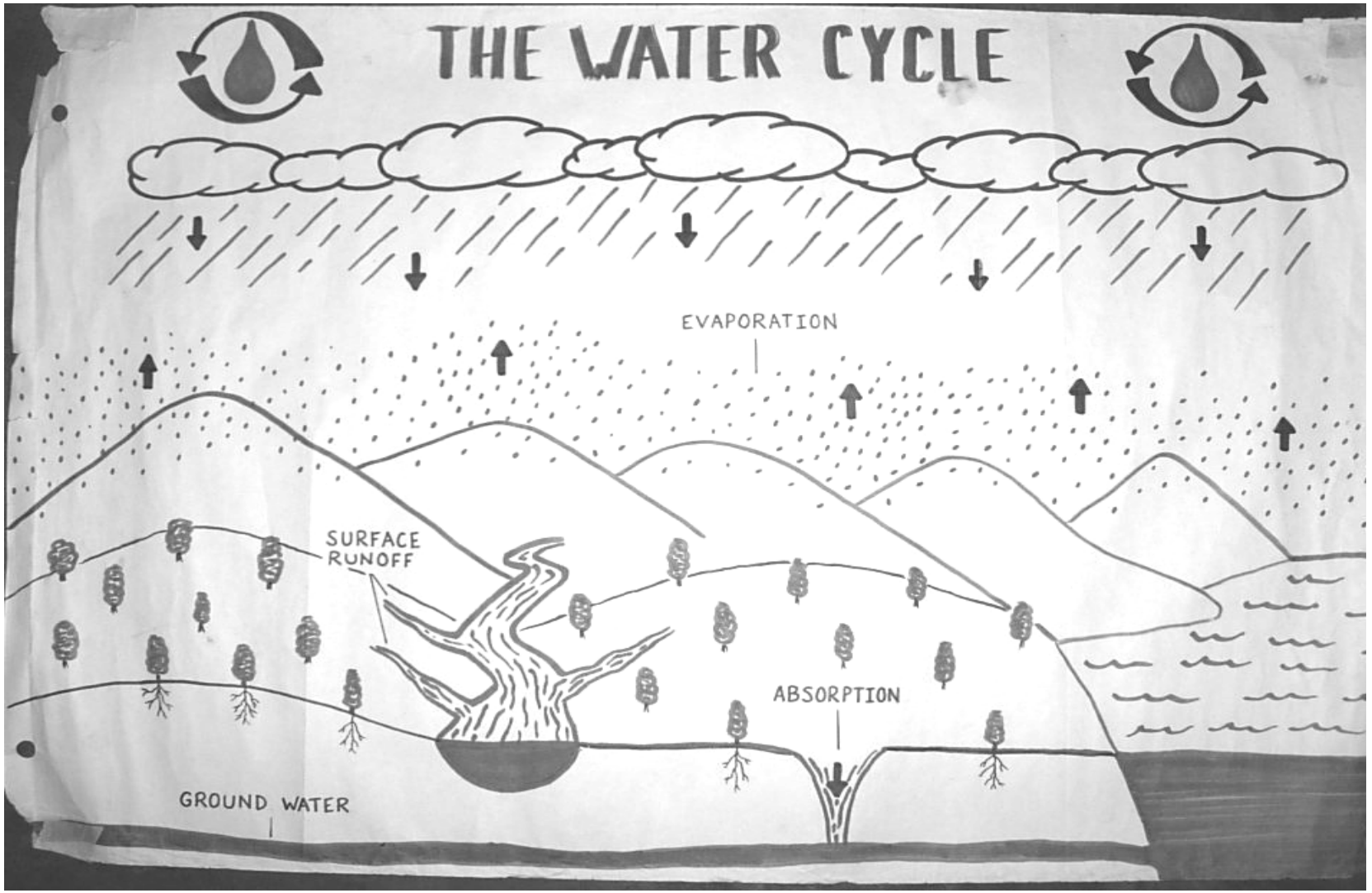
Source: Permaculture Nutrition Training Material 1999. Kristof & Stacia Nordin, nordin@eomw.net

Compost Handout



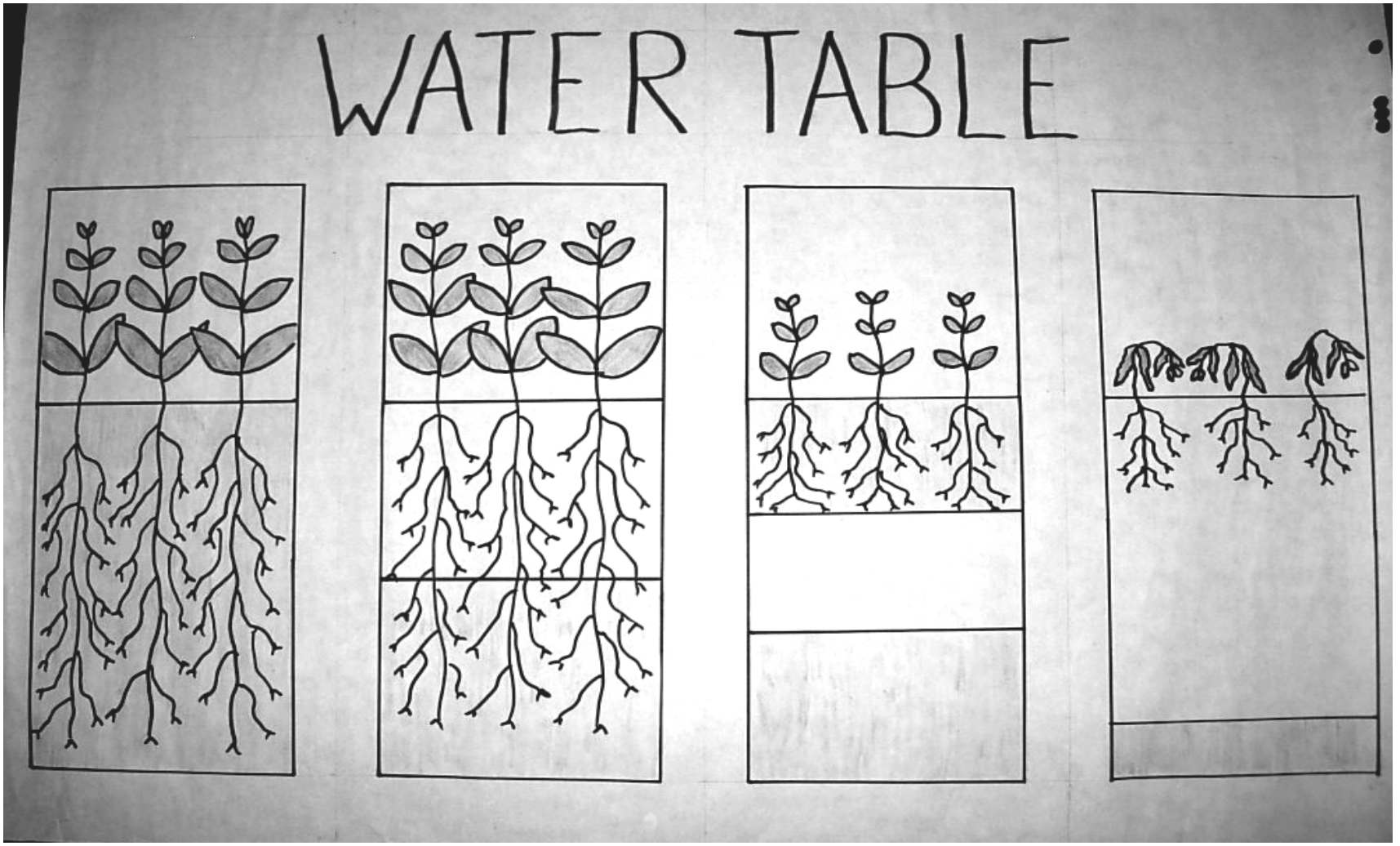
Source: Permaculture Nutrition training manual, draft 2003, Kristof & Stacia Nordin, nordin@eomw.net

Water Cycle Poster



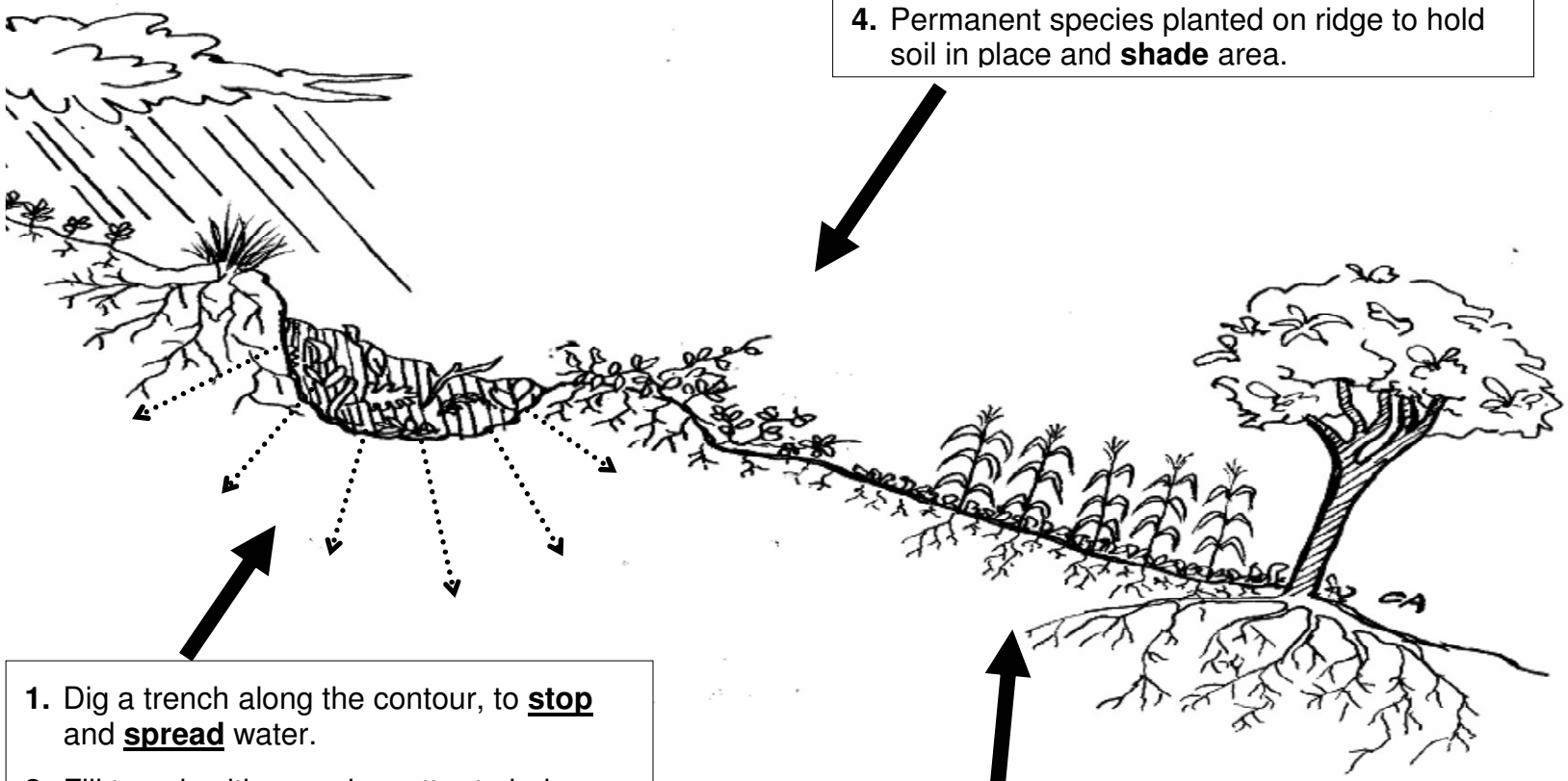
Source: Permaculture Nutrition Training Material 1999. Kristof & Stacia Nordin, nordin@eomw.net

Water Table Poster



Source: Permaculture Nutrition Training Material 1999. Kristof & Stacia Nordin, nordin@eomw.net

Swale Handout or Poster



3. Put soil from digging the trench to help **stop** any water from escaping.

4. Permanent species planted on ridge to hold soil in place and **shade** area.

1. Dig a trench along the contour, to **stop** and **spread** water.

2. Fill trench with organic matter to help water **sink** into the earth.

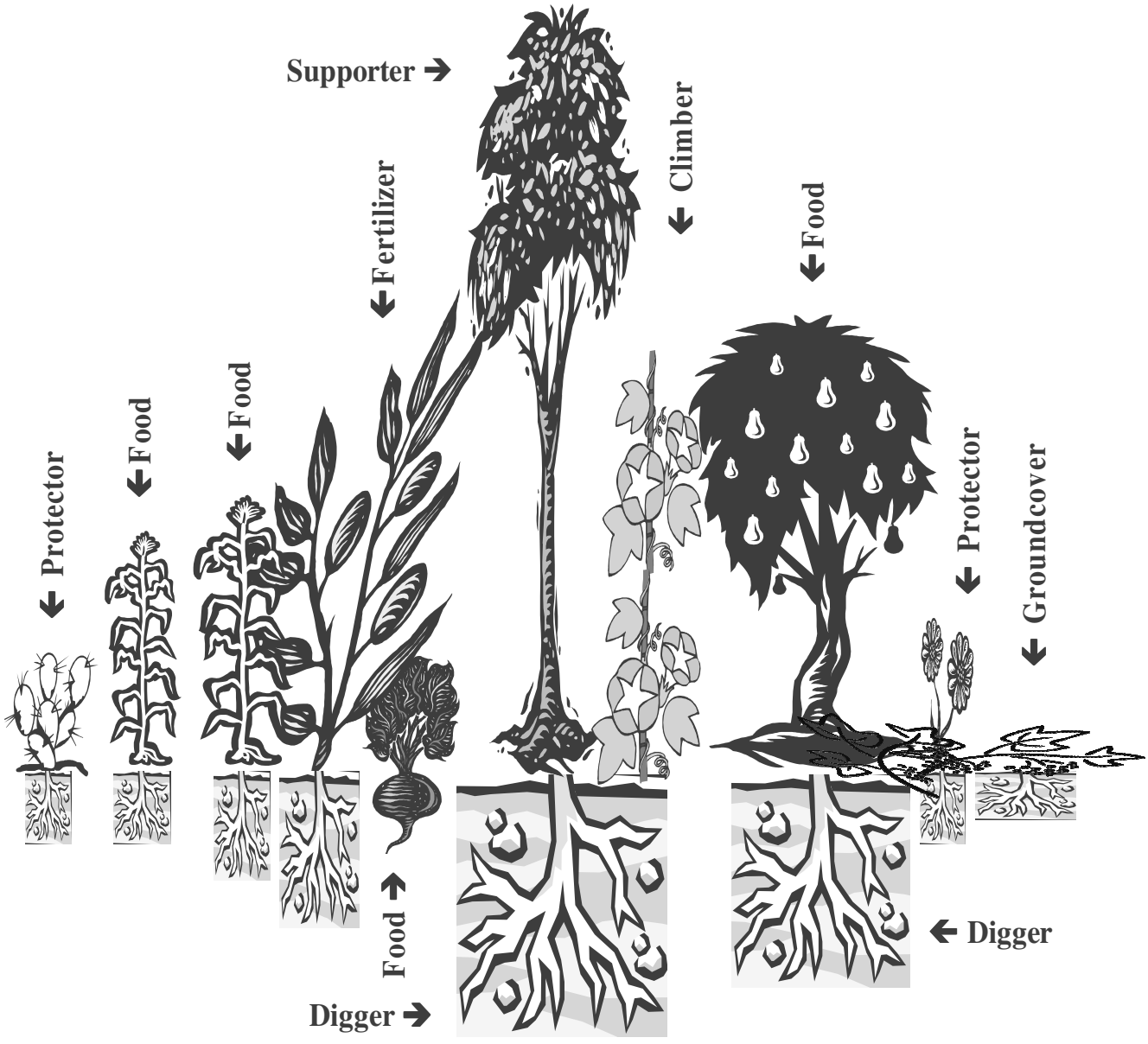
5. Smaller species placed just below ridge to capture water absorbed by swale.

6. Larger species placed further from swale to capture water absorbed to deeper levels.

Art by C. Aspinall. Computer enhancements by S. Nordin.

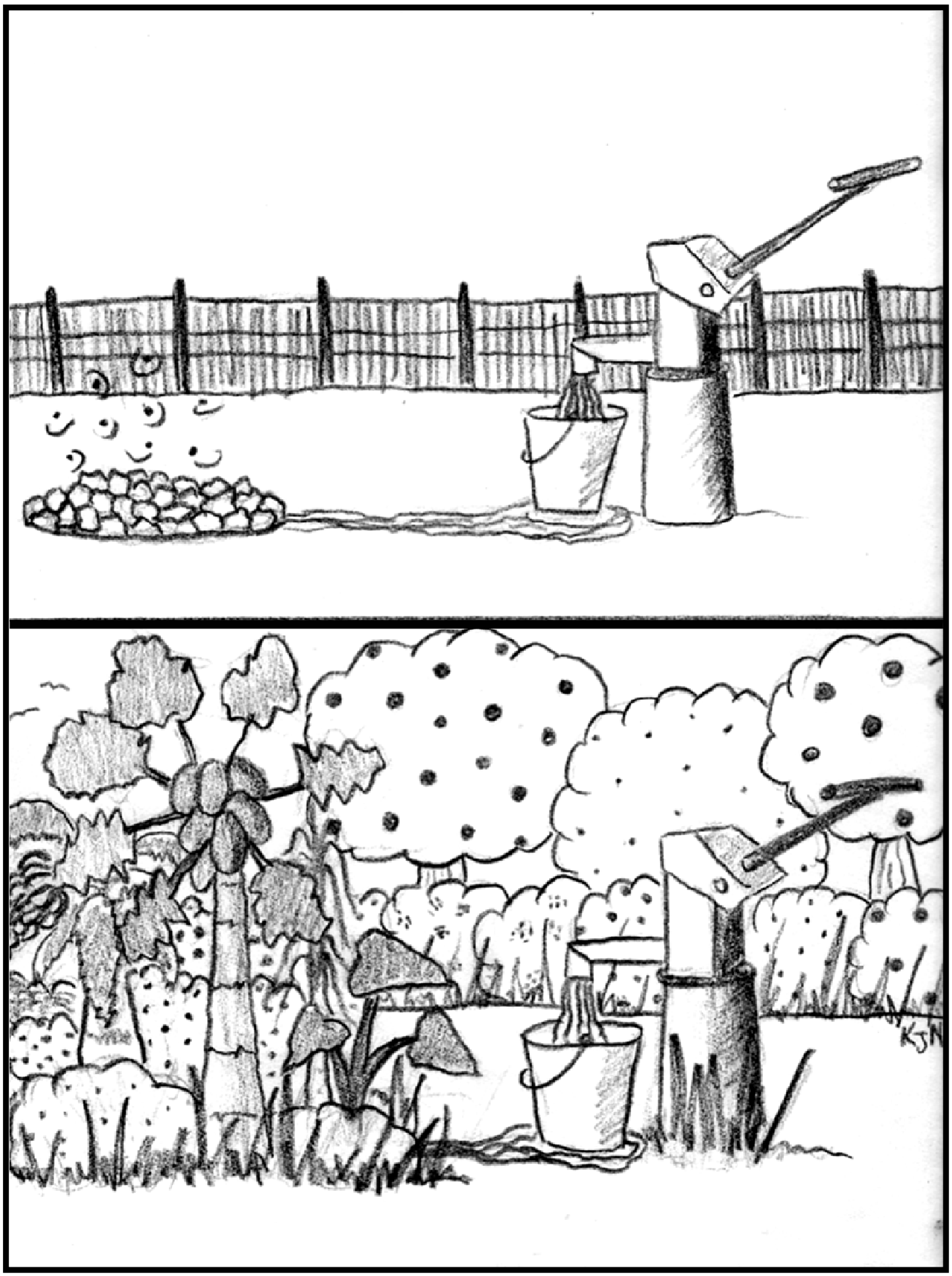
Design: Using a Permaculture guild

1.) **Food for us**	Based on the 6 food groups
2.) **Food for the Soil**	This includes legumes, decaying matter, compost, compost tea, mulch, manure, etc.
3.) **Diggers**	Deep or wide rooted plants, or animals that dig.
4.) **Groundcover**	Anything that covers the ground to protect soil, possibly feed it, and reduce evaporation.
5.) **Climbers**	These plants grow up other things.
6.) **Supporters**	These are stronger items that support the climbers.
7.) **Protectors**	Any thing that helps to protect your guild.



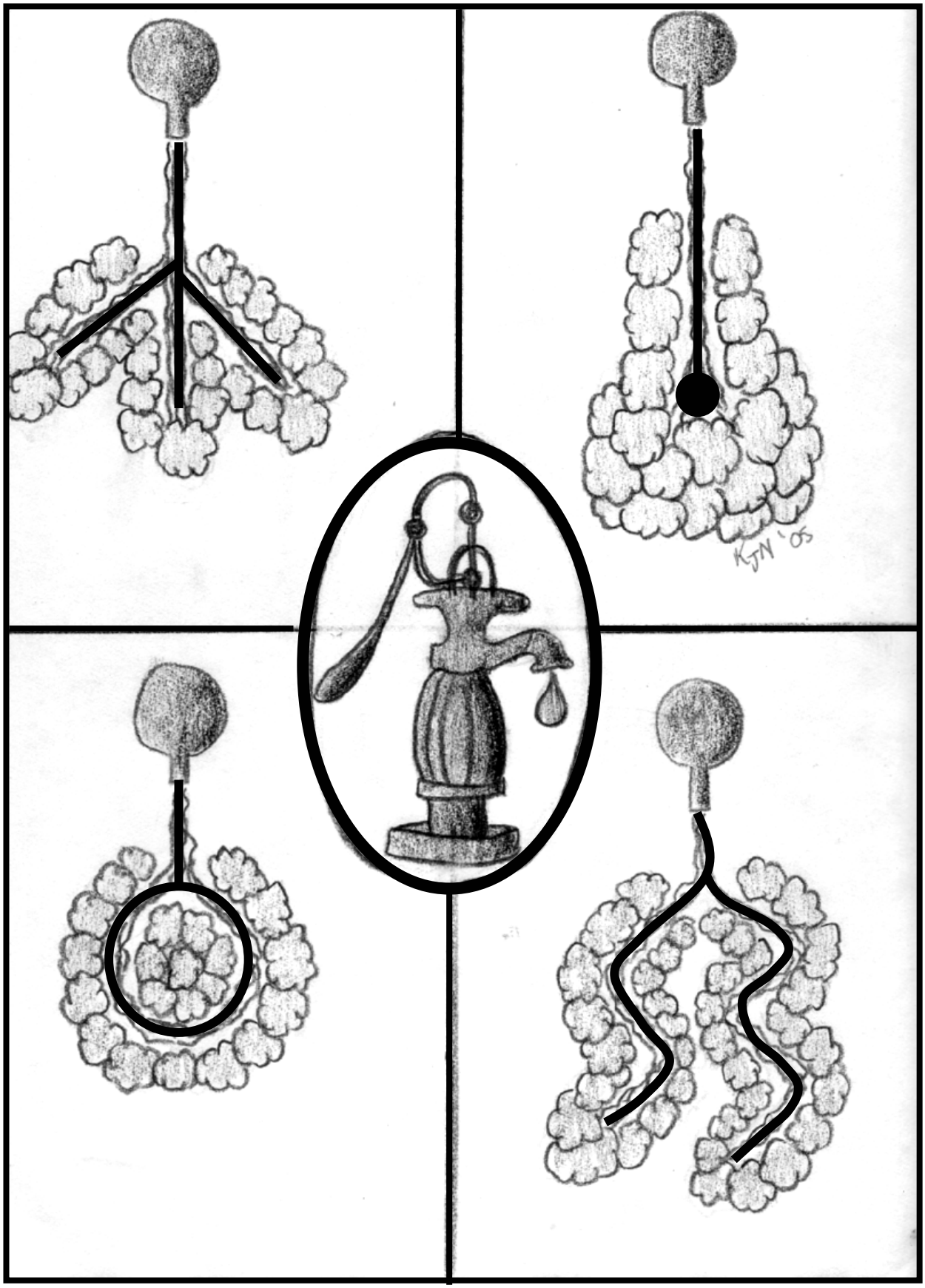
Source: Permaculture Nutrition Training Manual, 2000 edition. Kristof & Stacia Nordin, nordin@eomw.net

Design: Borehole Before & After



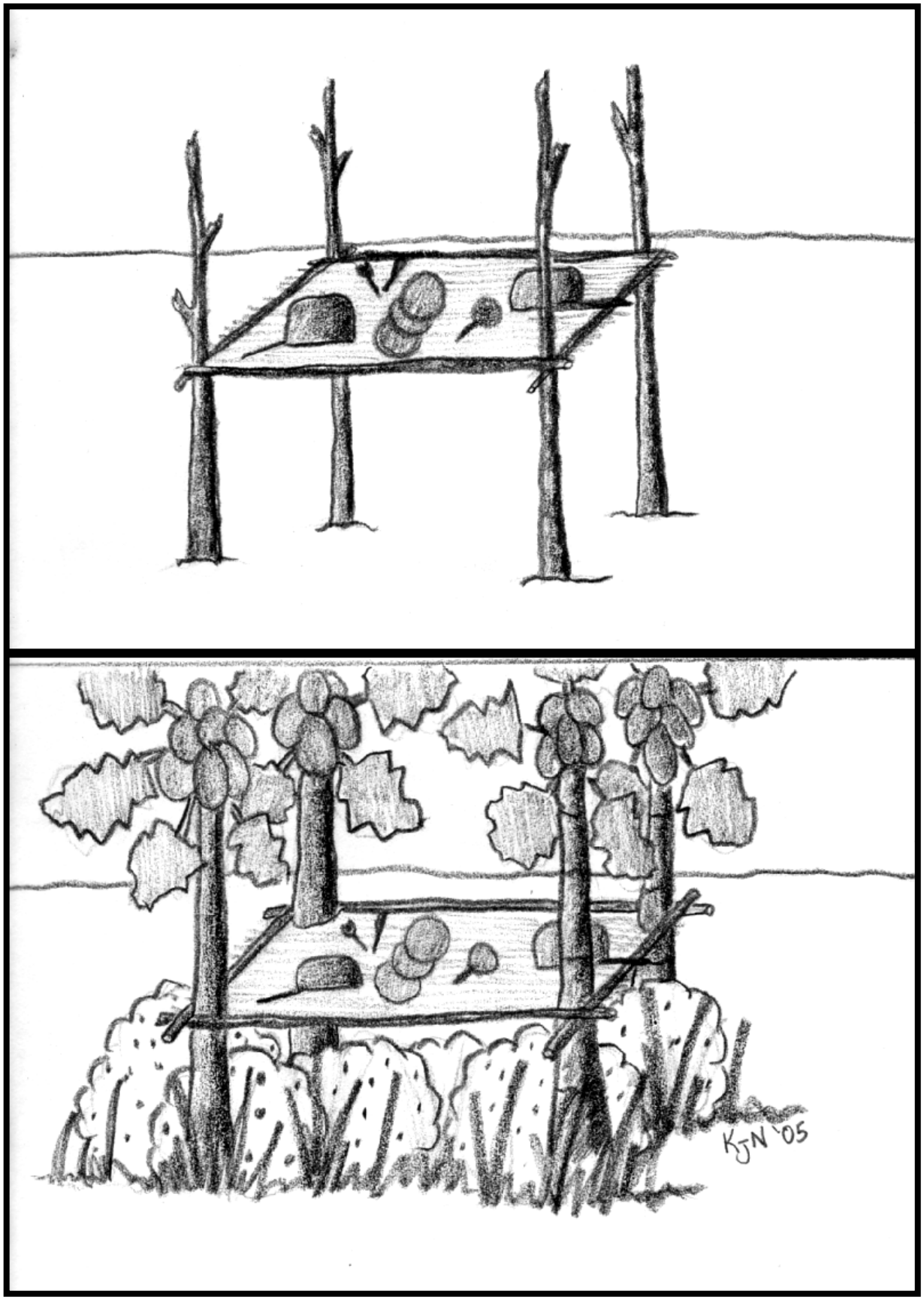
Art by K. Nordin

Design: Borehole Ideas



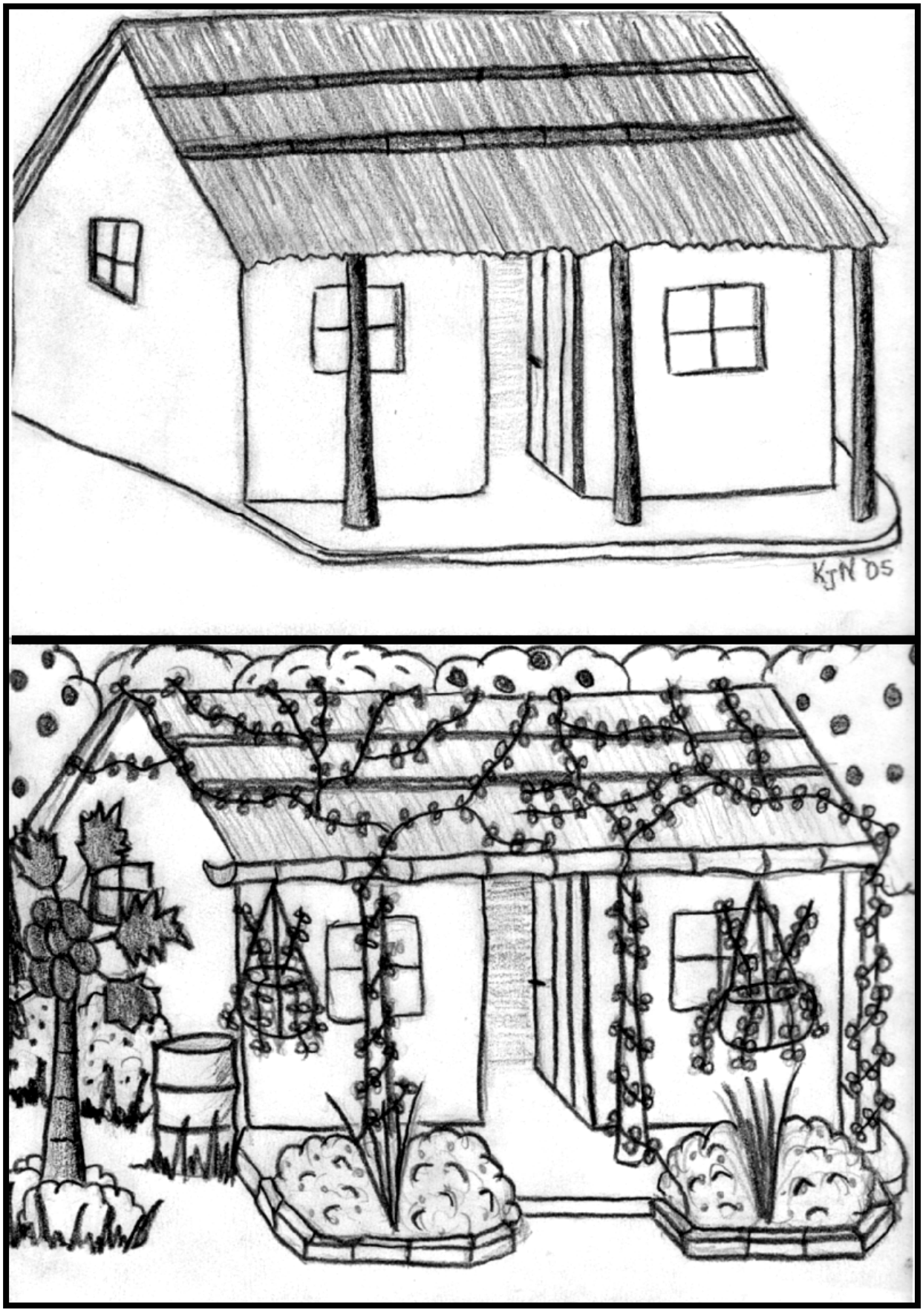
Art by K. Nordin

Design: Dish Drying Rack Before & After



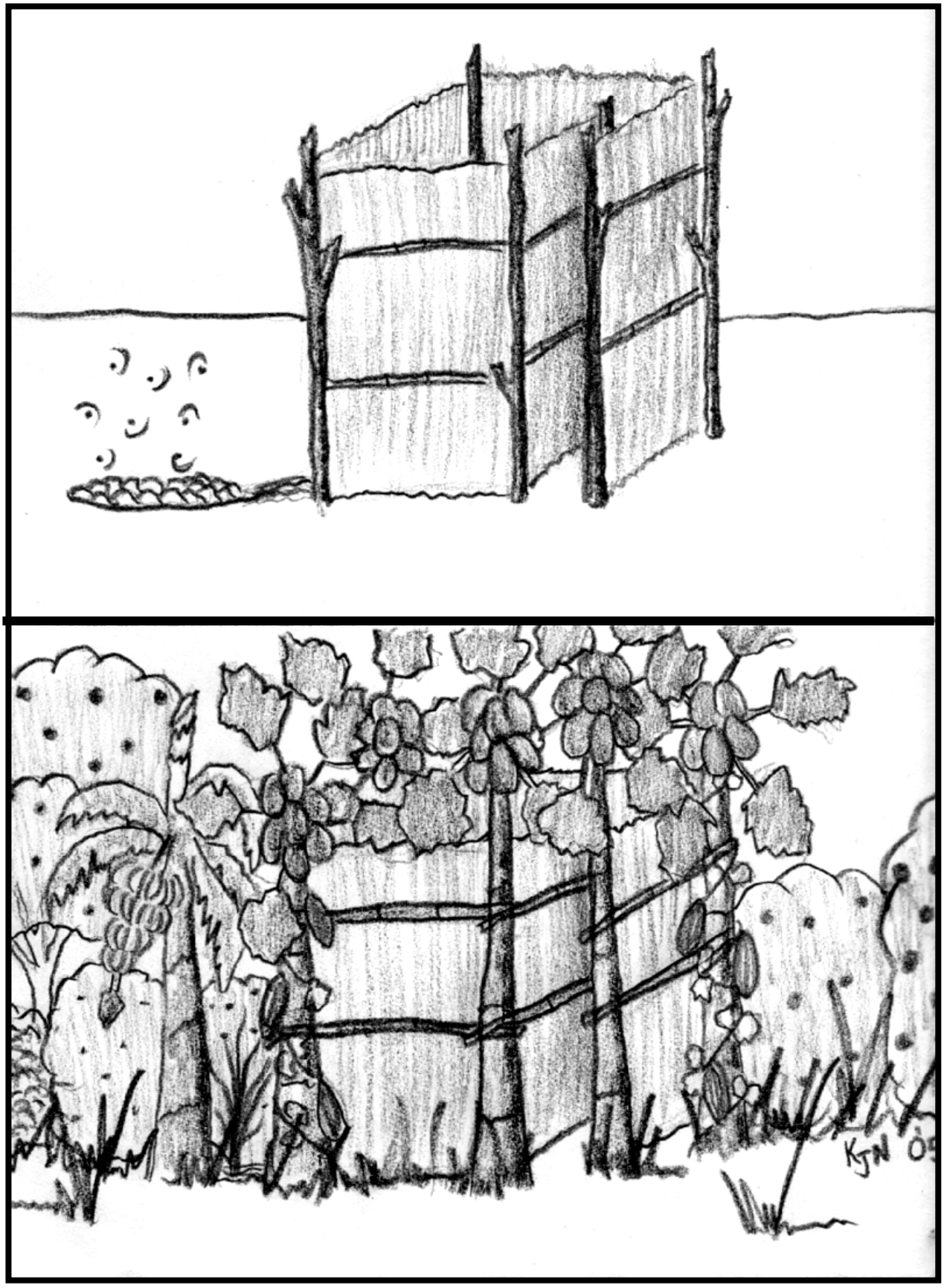
Art by K. Nordin

Design: House Before & After



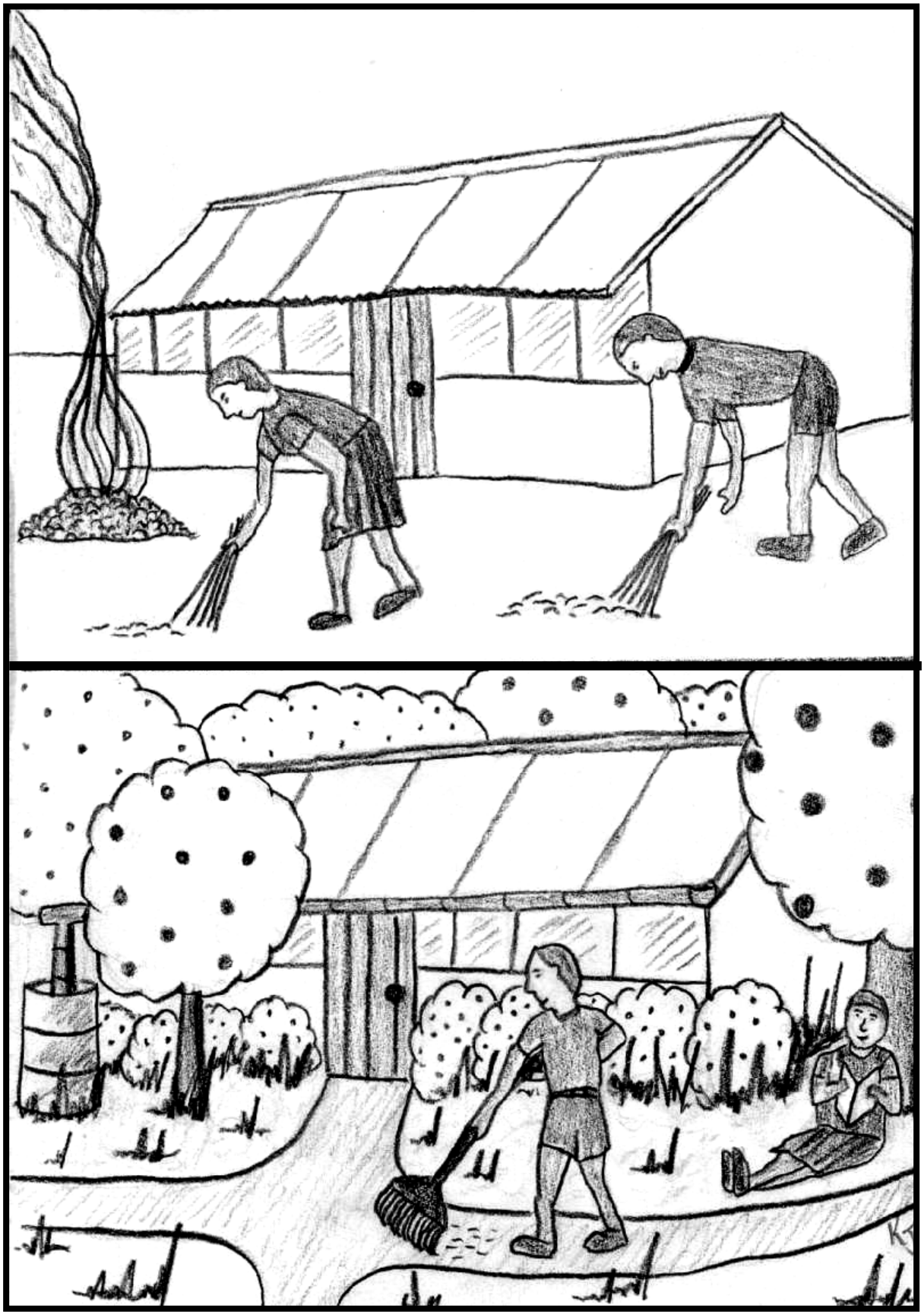
Art by K. Nordin

Design: Bathing Area Before & After



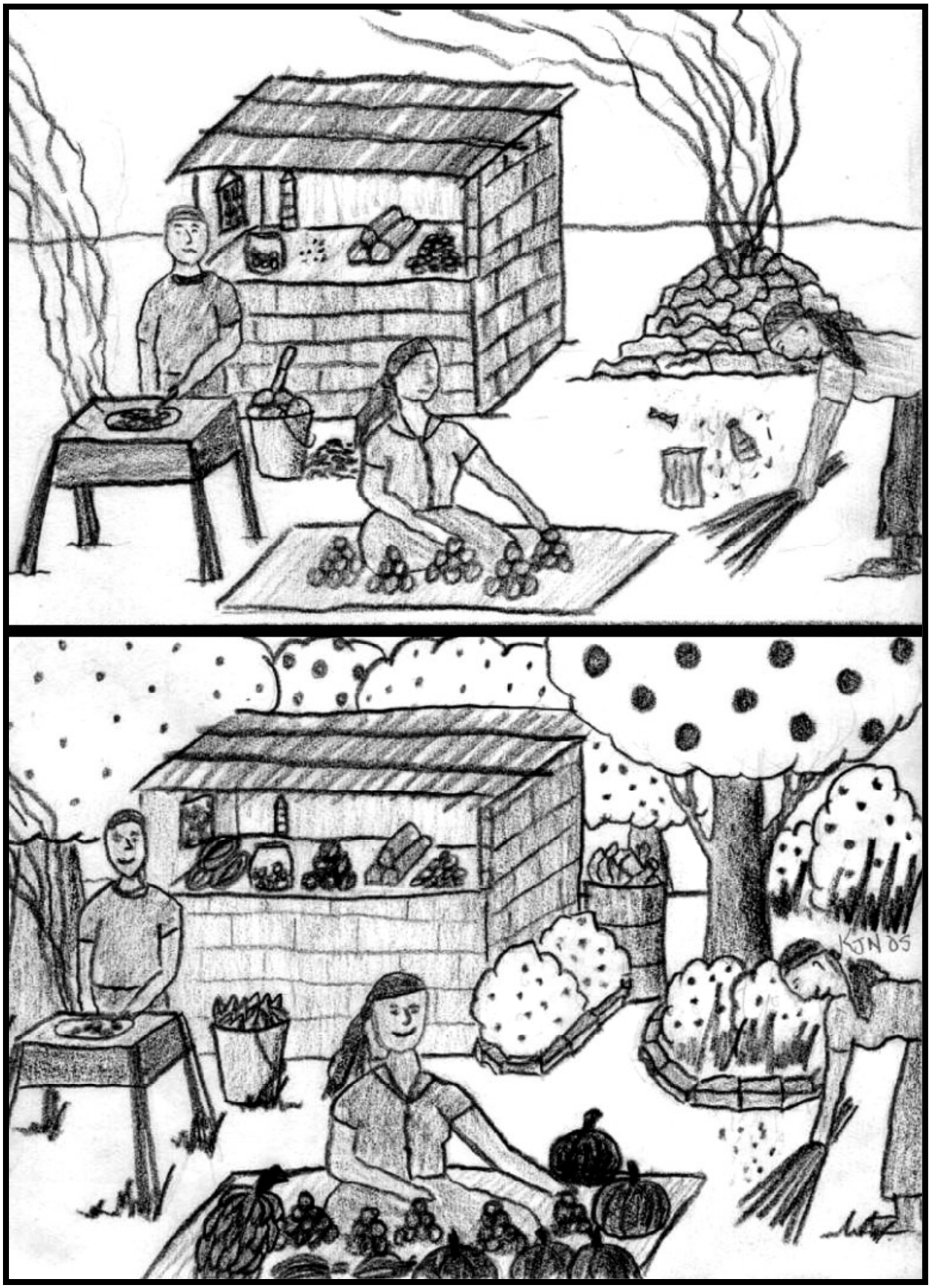
Art by K. Nordin

Design: School or Health Centre or Office Before & After



Art by K. Nordin

Design: Market Before & After



Art by K. Nordin

☑ Tools for holding a low input training

The following pages provide some guides for implementing your own low input trainings. To start, here are a few general notes about planning a low input workshop or training session:

* Venue: The best venue is simple, has a place for sessions and posters, has places around it for practical demonstrations, an area to do creative cooking session with all participants, and reasonable, safe, secure and sanitary housing for the participants if needed.
* It is helpful to have 3 people to run the workshop: 1 logistician to work with the kitchen, food, money, and other facility issues and 2 to facilitate all the sessions.
* Meals: you can arrange special meals at a local restaurant or hire cooks to work just for your workshop. Both ways can work well depending on the situation.
* On Sunday, the logistician needs to arrive early to work with the cooks to finalize the menu and do any training needed. If the cooks are not very experienced, this could happen on Saturday and Sunday.
* Participants will arrive on Sunday if it is a workshop setting. An evening session to introduce the participants and the week's schedule helps everyone feel more at ease and ready.
* Budget – A full local workshop with local participants like the sample below, costs about 20-25 USD per person per day for accommodation, supplies and all meals. The cost does not include facilitator fees and transport costs for field trips.
* FOLLOW UP – After the workshop, try to arrange going to see the participants at their own sites with small groups of participants to each site. During these field vistis, your role is to guide, brainstorm, problem solve and clarify where people have questions. It is a learning experience for all. After the site visits, bring the group back together for a day of summarizing and way forward. If you can do this twice or even three times, even better!

Sample Workshop Schedule

This schedule could be done in the format of a week-long workshop, or, each session or pair of sessions could be done closer to people's homes for half day workshops.

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8.00-10.00	Introduction What is Low input?	Food Utilization Energy use	Water Management	Local Area mapping Field Trip	Implementing Design
10.00-10.30	***Small Nutrition Break (read resources)***				
10.30-12.00	Current Meal vs. Better Meal Nature Cycle	Food Use & Creative Cooking	Water Practice	Field Trip	Mapping own area & Action plans
12.00–1.30	***Large Nutrition Break (read resources)***				
1.30– 3.00	Nutrition Basics & The Food Groups	Soil Health	Plant/Tree and Animal Health	Creative Cooking	Wrap up
3.00– 3.30	***Small Nutrition Break (read resources)***				
3.30–5.00	Is there Food in Malawi? Assessing all Foods	Soil Health Practice	Planning Designs	Designing Local Area	*Return to homes*

Sample Training Outline

Title:	Low Input Food and Nutrition Security (Growing and Eating More Using Less)	
Trainer's contacts	Stacia Nordin, RD, nordin@eomw.net, 09-333-073, 01-707-213 Post Dot Net X124 Crossroads, Lilongwe, Malawi (Africa)	
Outcome Objectives:	By the end of the program the participants will be able to: • Improve Food and Nutrition Security for themselves by using local resources and be able to share the knowledge and skills with others. • See individual session for specific objectives.	
Time frame:	30 hours of sessions and activities: ➔ 5 days 6 hours of sessions per day (generally extension staff from different places) OR ➔ 10 days 3 hours per day (generally joint community training in the same general area) ➔ 20 days 1.5 hours per day (generally one village)	
Participants:	15-20 people (include what type of people they are so you know how to gear the training.)	
Activities:	• discussions / brainstorming • group work • nature observations	• view food display • food preparation • design practicing
Supplies presenter will bring	• Posters: personal food and nutrition visual aids and Malawi Food Groups • Food Display • Food and Nutrition resource books for viewing only • Some seeds for planting and some foods for preparation • Improved energy Stoves & briquettes, Fireless cooker, Solar Cooker, Solar Dryer, other cooking ideas	
Supplies needed from Site	• Nutritious snacks and lunches based on the 6 food groups (see attached sample menu and foods available planning sheet). • 2 large tables (1m x 2m) for the food display • Creative Cooking session items see list below *These are nice if possible:* • Stapler or hole punch and folder: for participants to organize all the handouts at the end of the day. • Handouts provided from Presenter, enough for each participant. Please DO not give to the participants, Presenter will hand them out during sessions. • Flip Chart with markers or Chalkboard with chalk and eraser • Pre-Stick (Sticky goop to hang up posters)	
Creative Cooking Supplies:	Preparation of very simple meals based on foods available in area. The foods will be eaten as part of some of the breaks. • Provide list of foods and then make do with what is available, participants can bring local Malawi foods. • Variety of local pots, containers, cooking spoons, and knives for every group of 5 people. • Plus plates, cups for each participants.	

DAY ONE Training Outline

8:30 – 10:00 Introduction: What is Low Input?

Session Objectives:

- *Define Low Input - What is the goal of Low Input living?*
- *List at least 5 methods you can use to help others understand new concepts.*
- *List at least 1 important advanced skill and at least 1 way you can support advanced skills development.*

I. Introduction of presenter & participants
   a. Pre-Test if applicable
II. Overview of training program, purpose & objectives
III. What is Low Input:
   a. Basic Principles
   b. Gaining understanding
   c. Advancing Skills

10:30 – 12:00 Current Meal vs. Better Meal

Session Objectives:

- *What is the Current Diet? How does it impact health, food security and environment?*
- *What is the Cycle of Dependency and what are 3 ways it can be broken?*
- *What are the main differences between the Current Meal and Better Meal?*
- *What is the Cycle of Better Living and what are 3 ways it can be strengthened?*
- *What is the Nature Cycle? What are 3 ways we can affect it positively and negatively?*

I. Current meal
   a. Cover each point, including Cycle of dependency
II. Better meal (handout)
   a. Cover each point including Cycle of better living
III. Nature Cycle use poster and discuss human effects
   c. Walk outside and look at the nature cycle and human effects

1:30 – 3:00 Nutrition & The Food Group Basics

Session Objectives:

- *Define Nutrition. Explain the basic steps of Digestion & Absorption from the mouth to blood. Name the 6 groups of nutrients.*
- *What are the 6 Food Groups?*

I. Nutrition is: How any living thing changes/uses food for life.

II. Digestive System: Follow poster

a. Digestion (breaking down) & Absorption (entering body) & Use / Storage

III. Nutrients: about 45 Nutrients, put into 6 groups. Use house as nutrients poster (handout)

a. Define Nutrient (what you have to have to live)
b. Relate each nutrient to village: 8 Proteins, 14 Minerals, Carbohydrate, 3 Fats, 13 Vitamins, Water
c. Three goals of Nutrients: Building & Repairing, Energy, Protection & Healing

I. What does Diet mean?

a. Diet: A way of eating – why do we eat the way we do?
b. Diet – meals & snacks (list) – food – nutrients

II. Malawi 6 Food Groups – use the food group poster (handout)

a. Start with shat groups they know (3), Show how 3 changed to 6, cover each group and the primary nutrients in each (see handout)

3:30 – 5:00 Is there food in Malawi? Assessing all Foods.

Session Objectives:

* *Name at least 5 foods from each food group that you have*
* *Name 3 ways you can increase knowledge of native foods.*

I. Group Activity: Food Availability Exercise

a. marker and ½ sheet flip chart paper for each food group
b. 6 groups of people (or 3 groups each doing 2 food groups, or whatever!), list 10 foods and the seasons they are available in 20 minutes
c. Review, discuss results, are there enough foods? What can we do to fill gaps?
d. Repeat process at home/work (handouts)
e. Food List (handout)

II. Food /Resource Display: Show as many local foods and products made from local resources as possible. The Permaculture Nutrition project has a display with 150+ items.

III. Discussion: What is happening to local foods

a. Brainstorm the focus on maize and why
b. Brainstorm solutions to diversify into what was seen in this session

DAY TWO Training Outline

8:30 – 10:00 Using Food

Session Objectives:

- *How much should you eat from each of the food groups each day?*
- *How much food should one adult have for the year from the grain group?*
- *Name 3 things that reduce the nutrients in foods and 3 ways to keep more nutrients in food.*
- *Name 3 ways you can reduce the energy you use in food preparation.*
- *List 2 benefits of solar drying.*

I. Meal Planning

a. Display one day's meals / snacks for an adult based on the balance of the 6 food group.
b. Mix the foods back into one pile and have others try

II. Preserving Nutrients and Food Safety

a. Protecting nutrients (selecting produce, cutting, cooking)
b. Improving nutrients (germinating, fermenting) (handout)
c. Safety (sanitation, cook meat well, leftovers)

III. Energy used in food preparation

a. wood fuel improved stoves
b. paper or other briquettes
c. Solar cooking & drying

10:30 – 12:00 Creative Cooking: Preserving nutrients in food

Session objective: - *To practice preparing foods based on nutrition and food groups.*

I. Creative Cooking: Preserving nutrients in food

Very simple small meal for the whole group to make based on foods available, the food will be tasted with lunch. Choose something from your recipes that won't interfere with kitchen lunch activities. Could be:

- ➔ Avocado with herbs, lemon and vegetables; cucumber with skins on; brown bread; roasted pumpkin seed, fruit juice or herbal tea
- ➔ Sir Fried vegetables with nuts or seeds; Rice with millet or sorghum with spices

1:30 – 3:00 Soil Health

Session Objectives:

- *How does the soil maintain its fertility and structure?*
- *Name 3 actions that negatively affect the soil's fertility and/or structure.*
- *Describe at least 3 ways to conserve the soil and how you can use them in your own life.*
- *Describe at least 3 ways to improve soil fertility and structure and how you can use them in your own life.*

I. How does the soil work?

a. Connect to Nature Cycle, use soil posters, go outside

b. Discuss what people do to harm soil structure & fertility while outside point out negative and positives

II. Conserving soil

a. Brainstorm how soil can be conserved

b. Discuss each method, demonstrate in afternoon

III. Fertility and Structure

a. Soil types

b. Discuss Organic vs. Synthetic production

c. Brainstorm and discuss how to keep fertility and structure

3:30 – 5:00 Soil Health Practice

Session Objectives: - *Practice soil health methods*

Practice mulching, composting, manure teas, etc.

DAY THREE Training Outline

8:30 – 10:00 Water Management

Session Objectives:

- *How does water cycle from rain to rain again? Describe the basic steps.*
- *Name at least 3 things humans do to interfere with the water cycle.*
- *Describe the water table and how perennials survive without water.*
- *When managing water, what are four 'S' words that are helpful for planning a design?*
- *Describe at least 3 ways you can harvest rain water at your home, work or surroundings.*
- *Name at least 3 things you can do to reuse your 'grey' water at home, work or other place.*
- *List at least 2 things that are important to remember in any irrigation system.*
- *Describe at least 3 low input irrigation methods.*

I. How does the water work?

a. Tie a plastic bag on a tree for evaporation demo, let people get curious about what you are doing, but don't give the answer!

b. Start session by connecting to Nature Cycle and soil health

c. Discuss water cycle and water table

d. Brainstorm what humans do to interfere with with – link to soil health as they are about the same.

II. Water Management & Designs

a. Introduce 4 S's of Permaculture water management

b. Brainstorm ways to assist the water cycle

c. Discuss each method – do a soil erosion demo – go outside and look at positive and negative examples.

III. Irrigation

a. Using grey water

b. Using other water

10:30 – 12:00 Water Management Practice

Session Objectives: - *Practice Water Management methods*

Practice the 4 S's, grey water designs, water harvesting, etc.

1:30 – 3:00 Plant, Tree & Animal Health

Session Objectives:
- *Describe how nature grows and keeps growing.*
- *Name at least 4 things to consider as you develop your design.*

I. How do plants / trees / animals stay healthy?

a. connect to nature cycle, soil and water health

b. connect to human health and cycle of better living

II. How nature grows - guilds

a. Discuss how things grow in nature (link to better meal)

b. Compare with how 'modern' agriculture grows (link to current meal)

c. Describe Permaculture Guilds (handout)

d. Go out side and look at guilds.

II. Considerations for designs

a. Cover each of the considerations: resources, seeds, yields needed, space needed, labour, lifestyle, weather, where to start, pathways, fences.

III. Creating the design plan for your area

a. Mapping, drawing design plans and individual guilds

b. Making an action plan

3:30 – 5:00 Planning Designs

Session Objectives:
- *Map out the area around your home, including all the resources you have available, then draw a design for your home area and discuss the ideas it with someone.*

I. Guild activity & Action Plan

a. 4-5 Groups of 4 people each draw a simple design plan for different small areas (bathing house, dish drying rack, porch, kitchen, borehole, etc.). Allow 40 minutes.

b. 4-5 Groups 5 min present 5 min feedback (40-50 min)

c. Summarize the session

d. Homework: Have each participant map their own area, including a list of al their resources. This will be used on Friday to create a design and action plan.

DAY FOUR Training Outline

30-60 minutes Morning Mapping and Design Walk

➔ This could be done before breakfast or after to give the group practice as mapping out an area. Use the venue where you are and have each person individually sketch the area in their note book. Discuss different ideas with them.

8:30 – 12:00	**Field Trip** *(snacks and drinks brought along, with enough for any community members at the site)*
Session Objectives:	∗ *To observe Low Input Food & Nutrition Security in action.*

➔ Use the list in the manual or talk with local informants to identify a site or two or more to take the participants to see and discuss.

➔ The most important part of any field trip is a good facilitator to make connections, and guide discussion when it is needed. The facilitator helps to make the field trip a learning experience instead of just a nice visit!

1:30 – 3:00	**Creative Cooking**
Session Objectives:	∗ *To practice using nutrition and food group information*

➔ Refresh minds about food preparation by asking questions

➔ Prepare a more complicated recipe that will be eaten at snack time.

3:30 – 5:00	**Designing local area**
Session Objectives:	∗ *To practice designing*

Group Activity: Divide the local area map into smaller parts and have each group design an area, starting with listing their resources, then drawing a design that will be implemented the next day. Each group should present their ideas to the rest of the group for feedback to be ready for implementation.

DAY FIVE Training Outline

8:30 – 10:00 Implementing the Designs

Session Objectives: * *To practice implementing designs*

➔ Each group will implement the design they made.

➔ Walk around to the different groups and participate or advise if needed as they put their designs into practices.

10:30 – 12:00 Personal Design and Action Plans

Session Objectives: * *To create a design and action plan for their own area.*

➔ Using their mapping homework, participants will now create their own designs and action plans.

➔ Encourage the use of the print and people resources and guide each participant as needed.

12:30 – 3:00 Wrap up

Session Objectives: *To take the information home and use it personally, then share it.*

I. Taking it Home

a. Summarize the week's activities and personal thoughts

b. Communication activity – Have a volunteer describe a simple drawing to the group and see if the rest of the group can do it without seeing the picture. There are many lessons to drawn from the activity.

c. Brainstorm - think back over all the teaching tools used in this workshop, allow a brainstorm and write them all down. Review the many ways of learning. .

II. Post Test & Evaluations

III. Certificates – everyone loves them, indulge yourselves and make them fancy!

a. Give a nice take away packet such as travel snacks, local seed packets, locally made products, etc.

b. Give a final flowery speech on applying the information and sharing it.

Menu planning & Sample menus

This can be provided to the logistician or cooks to help in planning the meals. It doesn't have to be done in advance, but it is nice if it is.

The goal of this project is in part to develop a model for diet diversification; in support of this goal, the meals and snacks that we eat during our time together will be a model. Please help me in planning for the workshop by telling me what we can find in your area for food diversity. I'm thrilled when someone teaches me a new food or a new way to prepare a food!

- Please tick off which ones you can source locally during the time of your workshop and what the cost is.
- I prefer to get as much bought locally, especially quality items from the village level. This helps to support the local economy (versus making South Africa, the UK or the USA richer!)
- If you can't get enough variety from each food group locally then I will buy it and bring it.
- I will contact each of you after getting this back from you about what items I will bring and what I will buy locally from your district

Mealtime	Example One	Example Two
Breakfast	1 Nut 1 Fruit 1 Staple 0.5 Animal Food 1 Herb Tea / Honey	1 Fruit 1 Staple 1 Vegetable 1.5 Animal Food 1 Herb Tea / Honey
am break	*1 Staple (sweet)* *1 Fruit* *0.5 Animal Food* *1 Herb Tea / Honey*	*1 Nut* *1 Fruit* *1 Staple* *0.5 Animal Food* *1 Herb Tea / Honey*
Lunch	1 Legume 1 Fruit 1 Vegetable 2 Staple 1 fat	1 Animal Food 1 Fruit 1 Vegetable 2 Staple
pm break	*1 Staple* *1 fat* *1 Vegetable* *0.5 Animal Food* *1 Herb Tea / Honey*	*1 Nut* *1 Fruit* *1 Staple* *0.5 Animal Food* *1 Herb Tea / Honey*
Supper	1 Animal Food 1 Fruit 1 Vegetable 1.5 Staple 1 fat	1 Legume 1 Fruit 1 Vegetable 1.5 Staple

Staples: *(5 mitande / person / day)*	**Available?**	**Know how to Cook?**	**Cost**
Yams – Coco or other local edible yam			
Buye, air potatoes, other local potatoes			
Cassava			
Sweet Potato			
Rice – whole with husk (unmilled)			
Maize – whole grain			
Sorghum			
Millet			
Green Bananas			
Thobwa			
Chikondamoyo / Chigumo			
Wheat Breads – preferably whole wheat			
Other Staples:			
Legumes & Nuts: *(1 chipande /person / day)*	**Available?**	**Know how to Cook?**	**Cost**
Kakumpanda / chimbamba			
Khungudzu			
Kabifa			
Soya			
Soya meat pieces			
Soya milk or other soy products			
Nzama			
Kalongonda			
Nseula / Khobwe			
Common beans various colours			
Muula / Mbula / Maula / Mfula Nuts			
Groundnuts			
Chiponde from nuts			
Other local nuts or nuts			

Fruits: *(3 chipande / person / day)*	**Available?**	**Know how to Cook?**	**Cost**
Leaves List ALL types available, za Malawi best (matowo, mazimezime, baobab, tamarind, masuku, mvilo, magalagadeya, jamu, etc.)			
Chidede fruits (red part for making tea)			
Sugar Cane			
Honey			
Vegetables: *(3 chipande / person / day)*	**Available?**	**Know how to Cook?**	**Cost**
Leaves List ALL types available, za Malawi best (luni, denje, mwmuna aligone, etc.)			
Peppers – any hot peppers			
Onions			
Tomatoes, small pwerekete best			
Garlic			
Ginger – local thungula best			
Eggplants, local types mabunzo / zimphwa best			
Sponge / Loofa			
Okra			
Chipwete			
Khanyanga (prickly cucumber)			
Cucumber foreign			
Pumpkin			
Mphonda (gourd)			
Mushrooms			
Flowers (pumpkin, nasturtium, etc.)			
Lemon grass for tea			
Avocado leaves for tea			
Magalagadeya leaves for tea			
Other Local Tea Leaves (medicinal or for pleasure drinking)			
Other Vegetables			
Animal Foods: *(1/2 chipande / person / day)*	**Available?**	**Know how to Cook?**	**Cost**
Chicken eggs			
Duck or other eggs			
Cow's milk			
Goat's milk			
Insects			
Wild meats (legal only please!)			
Fish			
Chicken			
Goat or Beef			
Rabbit or Guinea Pig			
Chambiko			
Other			
Fats & Oilseeds: *(3 tablespoons/person /day)*	**Available?**	**Know how to Cook?**	**Cost**
Pumpkin seeds			
Sesame			
Sunflower			
Coconut			
Avocado			

Menu ideas

A list like this can get your mind going on different choices for the food groups. This doesn't list all the choice, just some possibilities.

Food Group	Breakfast	Break Times	Lunch and Supper
Staples	Phala (rice, mgaiwa, oats, etc.) Thobwa, Bread, Cassava, Sweet potato, Chikhande, Futali, Chapati	Cassava, Sweet potato, Chikondomoyo, Dowe, Sugar Cane, Crackers, Bread, Chapati	Futali, Mgaiwa, Ufa woyera, Irish potatoes, Sweet potatoes, Rice, Cassava, Pasta, Bread, Millet, Sorghum, Green bananas, Yam, Chikhande, Cocoyam, Chapati
Legumes	Nsinjiro added to Phala, Groundnuts, Roasted soya, Cashews, Macademia, Almonds	Any nuts OR roasted soya, chiponde, chipere	Nzama, Nandolo, Soya Pieces, Nyemba, Nsinjiro, Kabaifa, Nseula, Khobwe, Chipere
Animal Foods	Milk, Eggs, Breakfast meats, Cheese	Milk, Ngumbi, Other insects, Cheese	Eggs, Beef, Fish, Chicken, Duck, Goat, Pork, Birds, Cheese, Insects
Vegetables	Bononqwe, Asparagus, Nkwanya, Chisoso, Cabbage, Chinese cabbage, Chigwada, Luni, Chillies, Green peppers, Cukecumber, Chipwete, Eggplant, Mphonda, Lettuce, Chinkhupule (young), Mushrooms, Mpiru, Okra, Tomato, Pumpkin, Chidede, Kholowa, Mdele, Chamalawi, Chewe, Denje, Limanda, Kalokola, Amunaligone, Mbilidsongwe, Mlozi, Mtambe, Zumba, Impwa, Garlic		
Fruits	Apple, Banana, Baobab, Chitimbe, Kayimbe, Cashew fruit, Masau, Mposa, Mkuyu, Lemon, Lime, Oranges, Nachis, Papaya, Peaches, Pineapple, Nthudza, Masuku, Maso ang'ombe, Matowo, Mpungulira, Jamu, Magalagadya, Guava, Mbula, Mkungu, Chidede fruit, Tamarind, Watermelon		
Fats	Margarine or butter, Oils, Oil seeds, Avodado, Coconut	Mlambe seed, Sunflower seed, Pumpkin seed, Avocado, Kayimbe seed	Avocado, Bononqwe seed, Pumpkin seed, Sesame seeds, Oils, Margarine or butter
Notes:	Estimate 1 tbsp (15 ml) of oil for each person when used (so for 30 people use 450ml) this is a very generous portion! Spices are nice, too: Curries, Herbs, etc.		

Example of a Menu Plan for the Week

Food Group:	Arrival	Day 1	Day 2	Day 3	Day 4	Day 5
6:30 Breakfast						
Staple		Chips with Skins	Mgaiwa phala Brown Bread	Sweet Potato Futali	Likuni Phala	Brown Bread
Fruit		Banana	Papaya	Tangerine	Papaya	Fruit Salad
Legume or Animal		Boiled Egg Milk	NutButter Milk	Peanut flour Milk	Soy/Peanut Flour Milk	Fried Egg, NutButter, Sausages, Milk
Fat		Avocado	Avocado	Coconut pieces		Stork, Avocado
Other		Teas, Sugar & Honey	Teas, Sugar & Honey	Teas, Sugar & Honey	Teas, Sugar & Honey	Teas, Sugar & Honey
10:00 Break						
Staple, Fruit, Vegetable		Banana in Chikondamoyo	Sugar cane	Thobwa Cucumber	Banana Brown Bread	Sweet Biscuits
Legume, Oilseed, Animal		Peanut Butter Milk	Groundnuts Milk	Pumpkin seeds Milk	Boiled Eggs Milk	Groundnuts
Other		Teas, Sugar & Honey	Teas, Sugar & Honey	Teas, Sugar & Honey	Teas, Sugar & Honey	Soft Drinks
12:00 Lunch						
Staple		Mixed flour nsima cassava in stew	Mixed flour nsima	Rice/Millet	Chips with skins	Nsima, Rice
Legume or Animal		Beef Stew	Nzama Stew	Fried Fish	Nyama ya soya (soy meat)	Fried Chicken
Vegetable		Greens tomato, onion, garlic, etc.	Greens tomato, onion, garlic, etc.	Pumpkin tomato, onion, garlic, etc.	Okra tomato, onion, garlic, etc.	Cucumber tomatoe, onion, etc.
Fruit		Tangerine	Pineapple	Baobab	Custard Apple	Pineapple
Fat		Roasted sesame seeds in greeen	Oil	Oil	Oil	Chocolate treat
3:00 Break						
Staple, Fruit, Vegetable	Participants Arrive	Fruit Juice Popcorn	Cassava Futali Tamarind	Papaya	banana in chikondamoyo	Participants Leave
Legume, Oilseed, Animal	Fruit Juice, Water, fruit,	Soy nuts Milk	Milk	Chambiko Milk	Milk	Popcorn & Peanuts for the trip
Other	Groundnuts	Teas, Sugar & Honey	Teas, Sugar & Honey	Teas, Sugar & Honey	Teas, Sugar & Honey	
6:30 Supper						
Staple	Nsima, potatoes in stew	Rice & Sorghum	Nsima	Cassava Stew	Nisma, Green Banana futali	
Legume or Animal	Chicken Stew	Beans stew	Nyama ya soy (Soy meat)	Grilled Beef, pigeon pea in stew	Eggs Stew peanut flour	
Vegetable	Greens tomato, onion, garlic, etc.	Salad tomato, onion, garlic, etc.	Eggplant tomato, onion, garlic, etc.	Mushrooms tomato, onion, garlic, etc.	Greens tomato, onion, garlic, etc.	
Fruit	Papaya	Banana		Banana	Tangerine	
Fat	little oil	Avocado	little oil	little oil	Avocado	

Creative Cooking Recipes

This booklet contains recipes from the Introduction to Permaculture Nutrition Course. This first page describes how to read the recipes. Page 2 gives a review of the food groups. Pages 3 to 8 are the recipes. Each recipe is in the following format:

Recipe Name *Serves*		Food Group *Vegetable, Fruit, Legume, Animal Food, Fat, Staple*
First Ingredients…		First Methods…
Second Ingredients…		Second Methods…
Variation		
Uses		
Taken	From	

* Each recipe begins with its name, how many people it serves, and the food groups that are used in the recipe.
* Next is the list of ingredients and the cooking methods.
* Teaspoon has been shortened to "tsp."
* Tablespoon has been shortened to "T"
* Some recipes include just one box of ingredients and methods, other list several.
* After the methods there are ideas for varying the recipe
* Suggestions on how to use the recipe at a meal or snack time
* Last is the source of the recipe

The Recipes included in this booklet:

Food Group Review

Vegetables	
Leafy, fruit or root vegetables	✓ Local leaves (Bonongwe, Luni, Denje, Thelele, etc.) Pumpkin leaves, Bean Leaves, Sweet Potato Leaves. ✓ Pumpkin, Tomato, Eggplant, Cucumber, local gourds ✓ Onion, Carrot, Garlic, local root vegetables.
Nutrients	Vitamins, Minerals, fiber in all vegetables. There is a lot of Protein in dark leafy greens, little in other vegetables, a lot of carbohydrate in pumpkin, very little in other vegetables.
Nutrients lost by:	Sun (heat), Water & Air steals nutrients! Baking Soda, and throwing away edible parts (like seeds and skins) also steals your nutrients. Any part that you don't eat should be given back to feed the soil.
Fruits	
Fruits	✓ Papaya, Citrus, Melons, Berries, Many many local fruits.
Nutrients	Vitamins A & C, Carbohydrate, Minerals in the edible skins. Fiber also.
Nutrients lost by:	Sun (heat), Water & Air steals nutrients! Any part that you don't eat should be given back to feed the soil.
Legumes & Nuts	
Beans & Nuts	✓ Nzama, Pigeon Pea (Nandolo), Cow Pea (Khobwe), Soy, Local Beans and nuts, Ground Nut, Cashew Nut
Nutrients	Incomplete Protein, Vitamins, Minerals, Carbohydrate, and fiber. In soy beans and nuts there is Fat.
Nutrients lost by:	Not many nutrients are lost with processing. Fermenting or sprouting legumes actually increases nutrients.
Animal Foods	
Flesh & Products	✓ Eggs, Milk & Milk products, Animal Flesh, Fish, Birds, insects, etc.
Nutrients	Complete protein, Vitamins, Minerals, Fat
Nutrients lost by:	Not many nutrients are lost with processing, a bigger concern is food safety to prevent food bourne illness.
Fats	
Seeds & avocado	✓ Avocado, Sesame (chitowe), Sunflower, Local Seeds (Bonongwe, Mpiru, etc.) cooking oils, margarine, butter
Nutrients	Fat. Seeds, fruit fats contain minerals, vitamins & protein. Processed fats lack almost all other nutrients.
Nutrients lost by:	Pressing the oil out of seeds and robs your body of minerals, vitamins & protein..
Staples	
Grains & Roots	✓ Rice, Maize, Sorghum, Millet, Wheat, Local Grains, Potatoes, Cassava, Yam, Coco yam, Local Starchy Roots
Nutrients	Carbohydrate (in the form of starch), Incomplete protein, Vitamins (especially B vitamins), and Minerals
Nutrients lost by:	The protein, vitamins & minerals are found in the bran (gaga or madeya) & germ (mtima) of grains, and the skins of starchy roots. If you remove these you rob your body of these additional nutrients. Germinating grains improves the nutrition.

Pasta *Serves 2 people*		**Food Groups** (depending on toppings) *Staple, Animal Food*
1 Cup ½ tsp.	Flour Salt	Mix dry ingredients in a bowl. Make a well in the center of the dry mixture.
1 2 T	Egg Milk	Beat the egg and milk. Pour the wet ingredients into the well of the dry mixture. Slowly mix the dry and wet ingredients together. As the dough gets stiffer use your hands to continue to mix. Place the dough on a floured surface and roll the dough into a thin sheet. Lightly flour the top surface of the dough and let it stand for a few minutes. Roll up the sheet of dough like a poster and slice pieces off the roll in the noodle width that you prefer. Unroll the noodles and cook in boiling water.
Variation	Flour	Flour from wheat is mostly used in this recipe. You can try other flours though.
	Milk	Water can be used instead of milk.
	Spices	Black pepper, basil, garlic, onion or other such spices may be added to the wet ingredients and mixed right into the dough.
Uses	Hot	Serve in many ways: top with tomato sauce or a white sauce and spices or just stir fry some vegetables and mix with hot pasta.
	Cool	Add a little oil, vinegar or lime juice, chopped up fresh vegetables and spices for a nice pasta salad. Sesame, garlic, onions, and basil are good (see next recipe)
Adapted	From	The Peace Corps Malawi Cookbook, 95

Pasta Salad *Serves 2 people*		**Food Groups** (depending on toppings) *Staple, Animal Food, Vegetable, Fat*
1 Recipe	Pasta	Drain pasta and cool by rinsing it in clean water. Put in a large bowl.
½ cup ¼ cup ½ cup 1 T	Onion Green pepper Tomato Fresh garlic	Chop up Onion, Green Pepper, Tomato, and Garlic and add to pasta. Amounts can be varied according to your tastes.
1 T	Sesame seeds	Add Sesame seeds if available.
1	Lime	Squeeze juice from the lime into the bowl.
1-2 T ¼ cup ½ tsp.	Oil Vinegar Salt	Add according to your taste & calorie needs.
Variation	Spices & Vegetable	Many variations. Any vegetables like fresh greens, young okra, or green beans. Any spices like chillies, black pepper, or basil.
	Seeds	Any small edible seed: mpiru (mustard), bonongwe (aramanth), etc.
	Animal Foods	Boiled eggs chopped up and mixed in or sliced and place on top of the salad. Cheese cut or broken up into salad.
Uses	Serve with	Fresh fruit, fruit salad, nuts, eggs or cheese for a balanced meal.
Taken	From	Stacia Nordin

Roasted Soy Beans *Serves 1 person*		**Food Groups** *Legume*
¼ to ½ cup	Soy beans	Use ¼ to ½ cup cleaned soy beans for each person. Add to frying pan. Clay pots work best to keep the beans from burning, but any pan may be used. Fry the soy beans (NO oil is needed!) but stir frequently to avoid burning. The soy beans will turn light brown and crack open when ready to eat (about 15 minutes). Cool slightly before eating.
Variation	Cooking	Can be boiled first, then fried
	Spices	Salt, periperi, or other spices can be added, similar to ground nuts.
Uses	Meals	With stir fry, pasta salad or sandwiches.
	Snacks	Take on trips, to school or work.
Taken	From	Various friends

Rice & Millet *Serves 4-5 people*		**Food Groups** *Staple*
1 cup ½ cup 3 cup	Rice Millet Water	Put whole grain Rice, Millet & water into a pot. Bring to a boil on high heat with cover on. Lower heat and simmer for 15 with cover on. Remove from heat. Let sit 10 minutes before serving.
Variation	Spices	Can be added to the pot at any time. Basil, Onions, Garlic, Salt, Peppers, etc.
	Grains	The amount of grain can be varied as long as there is 1 ½ cups grain and 3 cups liquid. Sorghum can also be used.
Uses	Serve with	Stir fry, beans, meat, vegetables
Taken	From	Various friends

Stir-Fry Serves 3-4 people		**Food Groups** *Vegetable, Fat depends on ingredients*
1 cup ½ cup 1 cup 1 cup 2 cups 2 cups 2 T	Green pepper Okra Onion Tomato Greens Cabbage Fresh Garlic	Cut up all vegetables into desired pieces. Larger pieces will keep more nutrients.
1-2 T	Oil	Heat oil in frying pan. Add slower cooking vegetables first (green pepper & okra). Allow to cook 2-3 minutes, stirring occasionally. Add onion & cook 2-3 minutes more until browning begins. Browning will add flavor. Add tomatoes, greens & garlic. Cover and cook for 2-3 minutes. The water in the tomatoes will steam the greens. Cook as little as possible to keep the most nutrients. Vegetables should keep their color & some crispness.
Variation	Vegetable	Any! Local greens, eggplant, carrots, loofa (sponge or chinkupule), cucumber
	Spices	Any! Basil, corriander (cilantro), pepper, periperi, etc.
	Add	Nsinjiro, roasted nuts, edible seeds, meat, scrambled eggs, chicken, fish, etc.
Uses	Serve with	Rice, rice & millet, pasta
Made up	By	Stacia Nordin

Sprouts	**Food Groups** *Vegetable, Legume*

- Sprouts can be made from grains or legumes. Sprouting improves their nutritional value. Vitamins A, B, E, and K all increase and Vitamin C is created even though there is none in the dry seed. Small bean seeds like mung bean (mphodza) work well.
- There are different ways to sprout seeds, either way soak the seeds overnight. Fresh beans don't need to be soaked. The next day pour off the water (use the water for cooking, it is loaded with minerals, vitamins, and amino acids). Then do one of the following:
  1. The traditional way is to pile them in a lichero (winnowing basket) and cover them with large thick leaves such as coco yam leaves or banana leaves. Leave them covered for a few days until they sprout. Uncover them when the sprouts are 1-2 inches long. Place the lichero in the sun so the sprouts turn a nice bright green color.
  2. Or another way: After draining the seeds, put them in a container and cover it with a clean cloth (something like cotton is best). Put the container in a dark place. Rinse the seeds 2-3 times a day or more. Small seeds begin to sprout in 2-3 days. When the sprouts have reached a desired length, bring the container out into a sunny spot and they will turn bright green. Rinse them again and eat.

Uses	Raw	To get the most nutrients from your sprouts eat them raw with a salad, or alone.
	Hot	They can be added to a stir fry or other vegetable stews.
Adapted	From	The Malawian & Expatriate communities

Pickled Eggs *Makes 12 eggs*		**Food Groups** *Animal Foods (vegetables, fruits)*
2 cup ½ cup 1 cup 1 T	Vinegar Water Sugar Salt	These are the basic ingredients. Any spices can be added. Add to saucepan. Cover pan and heat until boiling. Then simmer for 10 minutes. Allow to cool before pouring over eggs.
2 12	Medium Onions Hard Boiled Eggs	Slice Onions. Put onions and hard-boiled eggs into the container that you will store the pickled eggs in.
Variation	Spices	The sugar, salt, water, and vinegar needs to stay as is to keep the eggs safe. Any combination of spices can be added: garlic, periperi, corriander, basil, etc.
	Foods	Many foods can be pickled: cucumbers, green peppers, carrots, okra, etc.
Uses	Time	It is best to leave the eggs a few days before eating them so that they absorb the flavor of the spices. They can store for quite a while this way—a few weeks at least to a few months.
Adapted	From	Lillian Nordin, my mother-in-law

Pumpkin Patties *Serves 3-4 people*		**Food Groups** *Vegetable, Staple, Animal Food, Fat*
2 cup 1	Pumpkin Egg	Cook and mash 2 cups of pumpkin. Beat egg and add to pumpkin, mix well.
½ cup ½ T ½ tsp.	Flour Baking Powder Salt	Mix together dry ingredients, then add to pumpkin & egg.
	Frying Oil	Fry spoonfuls in hot oil, turning once until browned on both sides. Serve hot.
Variation	Savory Patties	In a little oil, fry diced onion, green pepper, minced garlic, salt, and pepper to taste. Add to the pumpkin mixture.
	Sweet Patties	Add sugar, cinnamon, nutmeg (available at PTC), and 2 T peanut flour.
	Pumpkin	Mashed beans, or any mashed food.
	Spices	Any including more vegetables like carrots, tomatoes, local greens, etc.
	Flour	Flour from soy bean, mgaiwa, millet, sorghum, cassava, etc. can be used.
	B. Powder	You don't have to add baking powder.
Adapted	From	The Peace Corps Malawi Cookbook, 95

Pumpkin Seeds *Serves 4-5 people*		**Food Groups** *Vegetable, Fat*
Pumpkin	Seeds	¼ cup pumpkin seeds for each person. Add to frying pan (NO oil is needed!). Add salt if desired. Roast slowly until browned. Other spices like periperi can also be added if desired.
Adapted	From	American Tradition

Mixed Ndiwo/Soup		**Food Groups** *From one up to all*
This recipe can be any mixture of foods you like. It can be made with more water for a soup, or less water for any ndiwo.		
2 or 3 cup 1 cup 1 cup	Water Staple Vegetable	Put water in a pot. Add 1 cup of any staple food and 1 cup of any vegetable food. Can be one type of food or a mixture.
2 or 3 ½ cup ½ cup	Garlic Onion Cooked beans	Add chopped garlic, onion & cooked beans. Cook until the staple is soft. Add more water if needed, or to make it thicker, add a little flour and stir.
Variation	Staples	Roots, Rice, Maize, Millet, Sorghum…
	Vegetable ideas	Greens, Eggplant, Tomato, Pumpkin, Carrots, local vegetables, etc
	Spices	Basil, salt, pepper, chili, local spices.
Uses	With	If watery, serve with bread and a salad. If thick, with a staple like nsima or rice.
Made up	By	Stacia Nordin, Anabanda

Bean Salad *Serves 4-5*		**Food Groups** *Legumes, Vegetables*
2 cups 1 medium 1 medium ¼ cup ½ cup 1-5 cloves	Cooked beans Onion Pepper Oil Vinegar Garlic	Slice onions & green pepper thinly. Mix everything together in a bowl. Add ingredients according to taste. Add salt, black pepper, or sugar if desired. A little lemon juice is nice, too. Allow to sit before eating for the best flavor.
Variation	Beans	Any type
Uses	With	Sandwiches, other salads or hot meals
Adapted	From	Various friends

Chitipa Cheese *Makes about 1 cup*		**Food Groups** *Animal Foods*
4 cup	Milk	Heat milk while stirring constantly to almost boiling. Remove from heat and wait 5 minutes.
2 ½ T 2 tsp.	Vinegar Salt	Stir vinegar until milk completely curdles, producing a fluffy white solid and a pale yellow liquid. Allow curds to settle for 30 minutes. Pour through a cotton cloth to drain off the liquid. Mix in salt. Wring the cloth containing the cheese to remove all excess water.
Variation	Spices	Add any spices: garlic, onions, Italian spices, garlic chives, peri-peri, etc.
	Vinegar	Lime juice or other acidic fruit juice
Uses	Cold	Salads, Sandwiches,
	Hot	Pasta, Soups
Adapted	From	The Peace Corps Malawi Cookbook, 95

Guacamole *Serves 3-4 people*		**Food Groups** *Fat, Vegetable*
1 large 1 large 2 cloves 2 T 2 tsp. 1 tsp. 1	Avocado Tomato Garlic Onion Lemon Juice Salt Red Chili	Mash avocado. Chop the rest of the ingredients and mix with the avocado. The herb cilantro is a great addition to this if it is available.
Variation	Spices	Any spices of your choice
Uses	With	Tortillas, sandwiches, bread
Adapted	From	The Peace Corps Malawi Cookbook, 95

Tortillas *Serves 2-4 people*		**Food Groups** (depending on toppings) *Staple & Fat*
2 Cups 1 tsp.	Flour Salt	Mix dry ingredients in a bowl
¾ cup ¼ cup	Water Oil	Add wet ingredients and mix well. Take about 2 tablespoons of the dough and form into a ball. Roll it out thinly onto a floured surface. Fry the tortilla in a hot pan (do NOT add oil to the pan).
Variation	Flour	You can use most starchy flours that you have (maize, wheat, millet, cassava, etc.), or more than one type of flour can be used to make up the 2 cups. Different types of flour have different amounts of moisture in them, so you may need to add a little more or less flour.
	Oil & Water	If you are trying to cut back on fat, you can use more water and less oil. Use approximately 1 cup of wet ingredient in total.
	Other	Adding about 1 tsp. of baking powder to the recipe creates a softer tortilla.
Uses	Main meal	Beans, ground beef, salad, and avocado mashed with tomatoes, onions & spices is a common topping for a tortilla. Add cheese when it is available.
	Snack or Dessert	Put something sweet on a tortilla like fruit, syrup, jam, sugar or cinnamon and sugar.
Adapted	From	The Peace Corps Malawi Cookbook, 95

Mango Chutney *Serves 10*		**Food Groups** *Fruit, vegetable*
½ cup ½ cup 1/3 cup ¼ cup ¼ tsp.	Sugar Raisins Vinegar Onion Crushed red pepper	Chop onions. Combine all ingredients medium saucepan. Bring to boiling. Reduce heat. Simmer uncovered for 15 minutes stirring occasionally.
3 cups	Chopped mangoes	Stir in mangoes. Heat through. Let cool and serve.
Variation	Raisins	Other fruit
Uses	With	Tortillas, sandwiches, meats
Adapted	From	Better Homes & Gardens Magazine

Mango Salsa *Serves 5*		**Food Groups** *Fruit, Vegetable*
1 ½ cup 1 medium ¼ cup 1	Chopped mangoes Pepper Onions Chilli	Thinly slice mangoes, peppers, onions, and hot peppers
½ tsp. ½ tsp. 3 T 1 T ¼ tsp. ¼ tsp.	Lime peel Lime juice Oil Vinegar Salt Pepper	Shred the lime peel, combine all ingredients together with the chopped mango and vegetables. Makes 2 cups
Variation	Spices	Any spices of your choice
Uses	With	Tortillas, sandwiches, meats, beans
Adapted	From	Better Homes & Gardens Magazine

Eggs & Vegetables *Varies 1 to whatever*		**Food Groups** *Animal Foods, Vegetables, Fat*
2 eggs ½ ½ 1 or 2 ½ cup 1 or 2 tsp. 1 or 2 tsp.	Per person Onion Green pepper Garlic cloves Greens Spices Oil	This dish can be made in several ways: Beat the eggs in a bowl. Set aside. Chop vegetables into the desired size (larger pieces will keep more nutrients). Use approximately the amount of vegetables and spices listed for each person you are serving. Then use any of the following methods…
1. This method should create a fluffy, fresh-tasting egg dish. It works well when you are serving a large group. Mix the beaten eggs, vegetables, and spices together. Heat a frying pan on low heat. Add oil to the pan and then the egg mixture. Cover the pan and cook until done. If this is allowed to cook slowly enough while remaining covered it should not have to be turned. Serve Hot. 2. This method will produce omelets that are better for just a few people. Heat frying pan and oil. Add Onion & green pepper and fry until golden brown stirring occasionally. Add garlic, greens & spices. Cook 2-3 minutes. Remove vegetables from the pan and set aside. Add a little more oil to the pan. Add 2 beaten eggs to the pan and fry until light brown. Flip the egg and fry it on the other side. Serve each person a fried egg with vegetables. The egg can be wrapped around the vegetables.		
Variation	Vegetable	Tomatoes, chillies, okra, eggplant, etc.
	Spices	Basil, salt, pepper, local spices.
Uses	Serve with	Bread, Potatoes, Rice, Nsima, and then to balance the meal add a Fruit
Adapted	From	The Peace Corps Malawi Cookbook, 95

A few bonus recipes

Jams:

(From Malawi's Traditional and Modern Cooking Book)

- Choose firm fruit, discard any brown parts. Wash, peel, and deseed the fruit. Cut into small pieces. Cut roughly. Put the cut up fruit into the pan, cover with water.
- Leave to stand for a few hours or overnight if possible to extract the juice from the fruit.
- Bring to a boil and cook gently till the fruit is tender. Measure by cupfuls the fruit and liquor.
- To each cupful add 1 cup of sugar and the juice of ½ lemon. If there is time to leave the pan overnight, the jam will set better and have better flavour.
- Stir the jam over a gentle heat till the sugar is dissolved then bring to a fast boil and continue boiling, uncovered, on the fastest boil possible until the jam is set. To test for setting, stir the jam well, then let the last drop from the spoon fall on a cold plate. As it cools, push the drop gently with a finger. If it crinkles, setting point is reached.
- Set the pan aside to cool slightly, to prevent the fruit from rising in the jam as it cools.
- Bottle in clean hot jars, cover with an airtight layer of thin plastic, cut from a clean sugar bag perhaps, or a layer of candle wax, then seal the bottles. Cool, wipe the bottles clean, label them and store in a cool place. If jams are made as a small scale income generating activity, ask the customers to bring their own clean containers and sell them the jam by the cupful. This keeps costs down when food containers are not readily available.

Cream Soups

(not sure of source, text by Grace Sagawa, nutritionist Concern Universal Dedza 2004, adapted slightly by Stacia Nordin)

Soup is the 'gravy' of vegetables, meat, fish or bones, It is usually drunk before eating the main dish, but can be the main dish alone, too! It is great for someone who is sick. Some people use a thick soup as part of the main dish with a staple food, or over bean, vegetables or meat. Get creative with this basic recipe!

• 2 small onions and other herbs: mpungabwe (basil), garlic, hot peppers, etc.	• 6 medium: potatoes, or tomatoes, or carrots, or handfuls of local greens, or 1 small pumpkin
• 2 T flour, any type preferably whole grain	• 1 T oil, optional
• 4 cups boiling water	• little salt, optional

Cut up all veggies and herbs. Onions and other herbs can be fried a little if desired, but do not brown them. Add the veggies and cook until tender, stirring from time to time. When veggies are tender, separate from water and mash the veggies into a paste. Mix flour and with a little water or milk to a thin paste, then mix with water and add the mashed veggies. Put on the stove and cook until thick. Eat!

Rice in a fireless cooker

(Learned this from the Integrated Food Security Project, Mulanje, 2003. Any errors in explanation are my own as I describe the process from what I remember and my own experiences using my fireless cooker.)

Instead of boiling rice for 20 or 30 minutes and using a lot of firewood, and possibly forgetting it and burning it….You can use a fireless cooker and only boil the rice for 2 minutes, have perfect rice and no chance or burning it!

- A fireless cooker is simply anything that holds heat very well. A maize basket stuffed tightly with dried banana leaves works very well. Another idea is a box stuffed with paper. You will need to cover the basket / box with more dried leaves / papers to hold heat in from the top. A clean, old cloth stuffed with the leaves / paper works well.
- In the end, you will have a place to set a hot pot of food that is completely wrapped with a lot of leaves or paper to hold the heat of the hot pot.
- Before heating your food that is going to go into the fireless cooker, put the pot into the middle of banana leaves that were stuffed into a maize basket. Make the same size hole in the middle of the leaves so that the pot will fit in when you are ready.
- Measure the number of cups of rice that you want to cook and set it aside in a dish.
- Put exactly double the amount of water as rice into the pot. So make sure you measure the water with the same cup that you measured the rice.
- Put the water on any type of stove (briquettes, improved wood-burning, electric, etc).
- When the water boils, add the rice (and a little salt if desired).
- Also add other nutrients such as spices, vegetables, nuts, seeds, or other grains at this time. You will have to become experienced at the different cooking times for other foods. (For example, I cooked rice and sorghum together and found that sorghum takes a little longer; sorghum should be added to the pot before the rice.)
- Allow to boil 2 minutes at a full boil.
- Remove the pot of rice / other food from the stove and put in the fireless cooker. Seal it tightly with the lid, allow to sit 30 minutes (or longer as it won't burn!).
- Eat whenever you are ready! It can sit several hours and still stay warm.

☑ Technical Details

Nutrient Composition of the Current Meal versus Better Meal

Current Meal

(2 cups of food)

- 1 ½ cups mgaiwa *(whole grain maize flour)*
- ½ cup Beans

Nutrient	*% of needs*	*Amount supplied*
Protein	**23 %**	***14.8 g***
Carbohydrate	**34 %**	***86 g***
Fat	**3 %**	***1.2 g***
Vitamins	**23 %**	
Vitamin A	0 %	*.5 RE*
Vitamin C	0 %	*0 mg*
Vitamin E	52 %	*4.2 mg*
Thiamine	64 %	*.64 mg*
Riboflavin	33 %	*.4 mg*
Niacin	34 %	*4.4 mg*
Vitamin B6	10 %	*.16 mg*
Folate	38 %	*68 mcg*
Minerals	**19 %**	
Calcium	5 %	*43 mg*
Magnesium	27 %	*76 mg*
Potassium	13 %	*252 mg*
Iron	57 %	*5.7 mg*
Zinc	13 %	*1.52 mg*

Better Meal

(2 cups of food)

- 1 cup mgaiwa *(whole grain maize flour)*
- ¼ cup beans
- ½ cup greens made with onion, tomato, sunflower seeds and millet
- ¼ cup (1 medium) banana

Nutrient	*% of needs*	*Amount supplied*
Protein	**28 %**	***17.6 g***
Carbohydrate	**41 %**	***104 g***
Fat	**19 %**	***9.1 g***
Vitamins	**68 %**	
Vitamin A	98 %	*781 RE*
Vitamin C	45 %	*27 mg*
Vitamin E	149 %	*12 mg*
Thiamine	78 %	*.78 mg*
Riboflavin	58 %	*.7 mg*
Niacin	44 %	*5.7 mg*
Vitamin B6	71 %	*1.13 mg*
Folate	132 %	*237 mcg*
Minerals	**49 %**	
Calcium	21 %	*170 mg*
Magnesium	72 %	*200 mg*
Potassium	69 %	*1291 mg*
Iron	89 %	*8.9 mg*
Zinc	25 %	*3 mg*

Nutrient Analysis of one day's diet from the 6 Food Groups for an adult

Malawi Food Groups	Foods eaten throughout the year	Average grams per adult per day	Average kcal per 100 grams	Average kcal per day	**Total grams per group per day**	**Total kcal per group per day**
1. Fruits	Fruits Fresh (all but a few)	300	50	150	300	150
	Fruits Dried & Honey	0	287	0		
2. Vegetables	Fresh Vegetables	400	32	128	400	128
	Dried Vegetables	0	243	0		
3. Legumes & Nuts	Beans dried	25	392	98	110	388
	Beans fresh	25	222	56		
	Nuts	60	390	234		
4. Animal Foods	Meat, Fish, Eggs, fresh	60	59	35	135	147
	Milk, Yoghurt	50	87	44		
	Dried fish or meat	25	272	68		
5. Fats & Oils	Oilseeds (like pumpkin)	20	541	108	50	235
	Fatty Fruits	20	203	41		
	Fats / Butter	5	853	43		
	Oil	5	877	44		
6. Staples	Cereals & Grains	250	335	838	500	1,078
	Tubers & Starchy Fruits	250	96	240		
			TOTALS:		**1,495 grams**	**2,125 kcal**

Note: Calculations and estimates by Stacia Nordin, RD using a Nutrient Composition spreadsheet which measured Malawian Foods in the 1990s. There are MANY different calculations that could meet the needs of an adult; this is only one balanced example! This diet shown contains about 14% protein, 23% fat and 63% carbohydrate.

Lists of Foods in Malawi

The foods on these lists have come from various sources--through studying books, research papers, magazine articles, and through people with whom I live and work. I have NOT tried all the foods on these lists. Use these lists to start you off in the communities and see what you can find. Local knowledge on food plants, especially from the older generations is usually the best source. They can show you the foods and teach you how to identify and use them. When you learn new foods, share your new information with others through informal discussions, meetings, or writing to newsletters or local newspapers. The following books and papers were valuable in compiling these food lists:

Useful Plants of Malawi
Jessie Williamson, Published by the University of Malawi, Revised 1975.

Traditional Food Plants
Food and Agriculture Organization of the United Nations (FAO) Rome, 1988.
ISBN 92-5-102557-6

The Composition of Foods Commonly Eaten in Eastern Africa
CTA (Technical Centre for Agricultural and Rural Cooperation), ISBN 90 72407 10 5. Copies available through -Department of Human Nutrition, Wageningen Agricultural University, De Creijen 12, 6703 BC Wageningen, The Netherlands- OR -Tanzania Food and Nutrition Centre, Box 977, Dar es Salaam, Tanzania.

Workshop to Promote Indigenous Foods
Centre for Social Research, Zomba

Number of Foods on these lists to date: 595			
Fats	48	Vegetables	278
Fruits	151	Staples	52
Legumes & Nuts	29	Foods from Animals	37

Scientific	English	Malawi Names	Edible Parts
Fats Food Group			
Abrus precatorius	Crab's Eyes	Ntimbua	Seeds, CARE
Adansonia digitata	Baobab Oil	Mlambe Mafuta	Seed Oil
Aleurites moluccana	Candle Nut Tree		Seed kernel
Amaranthus hybridus	Amaranth Seed	Bonongwe Mbewu	Seeds
Amaranthus sp.4	Wild Blite Seed	Bonongwe Mbewu	Seeds
Amaranthus spinosus	Spiny Pigweed Seed	Bonongwe wa minga Mbewu	Seeds
Amaranthus thunbergii	Poor Man's Spinach Seed	Mberekete Mbewu	Seeds
Balanites aegyptiaca	Desert Date	? Malawi	Seed Oil
Boscia salicifolia		Mtakataka (Yao)	Seeds

Scientific	English	Malawi Names	Edible Parts
Boscia senegalensis	Aisen	Mpetu	Seeds
Brassica juncea	Mustard Mbewu	Mpiru Mbewu	Seeds
Cajanus cajan	Pea, Pigeon Oil	Nandolo Mafuta	Seed Oil
Ceiba pentandra	Kapok	Usufu	Seeds
Celosia Argentea	Cock's Comb	Ndangale	Seed Oil
Celosia trigyna		Kaphikaulesi	Seeds
Citrullus lanatus	Watermelon	Vwende	Seeds
Cleome gynandra	Cat's Whiskers	Luni	Seed Oil
Cocos nucifera	Coconut	Nkoko	Fruit
Cucumis anguria	Cucumber, Small Prickly	Chikanyanga	Seeds
Cucumis melo	Melon	Kayimbe	Seeds
Cucumis sativus	Cucumber	Mankhaka	Seeds
Cucurbita species	Pumpkin	Mthanga za msungu	Seeds
Cyperus esculentus	Tiger nut	Kauju	Root Oil
Diospyros mespiliformis	Monkey Guava	Msumwa	Seeds
Elaeis guineensis	Wild Oil Palm	Kanjindo (To)	Seed Oil
Foeniculum vulgare	Fennel		Seed / Oil
Guizotia abyssinica	Niger Seed		Seed Oil
Helianthus annus	Sunflower	Sanifulawa	Seeds
Hibiscus sabdariffa	Roselle	Chidede	Seed / Oil
Hyphaene species	Palm, Doum	Mgwalangwa	Seeds
Lagenaria siceraria	Gourd	Mphonda	Seeds
Mangifera indica	Mango	Mango	Seeds
Momordica charantla	Gourd, Bitter	Karela	Seeds
Moringa oleifera	Horse Radish Tree	Chamwamba	Seed / Oil
Nymphaea caerulea	Water Lily	Chikolwa	Seeds
Oxytenanthera abyssinica	Bamboo, Common	Nsungwi	Seeds
Papaver somniferum	Poppy Seed		Seed / Oil
Persea americans	Avacado Pear	Mapeyala	Fruit
Persea americans	Avacado Pear	Mapeyala	Seed Oil
Portulaca oleracea	Purslane	Matakoatsanu	Seeds
Salvadora persica	Toothbrush Tree	Mswache (Y)	Seed Oil
Sclerocarya caffra		Mufula	Seed / Oil
Sechium edule	Chayote	Ngowe	Seed Kernel
Sesamum indicum	Sesame	Chitowe	Seed / Oil
Tamarindus indicus	Tamarind	Bwemba	Seeds
Treculia africana	African Breadfruit	Njayi	Seeds
Trichilia emetica	Natal Mahogany	Msikitsi	Seed / Oil
Trigonella foenum-graecum	Fenugreek	Methi	Seed / Oil
Ziziphus mauritiana	Jujube	Masawo	Seed Kernel
Total Fats	**48**		

Fruits Food Group			
?	Honey	Uchi	Sap
?		Mpinjipinji	Fruit
Acacia albida	White Thorn	Nsangu	Fruit
Acacia karroo	Sweet Thorn	Mfungu	Gum
Acacia polyacantha	African Cachechu Tree	Mtete	Gum

Scientific	English	Malawi Names	Edible Parts
Adansonia digitata	Baobab	Mlambe	Fruit
Aframomum angustifolium	Cardamom, Wild	Nthungula	Fruit
Allophylus africanus		Kandula	Fruit
Ampelocissus sp.		Mbeleshya (Y)	Fruit
Anacardium occidentale	Cashew Fruit	Mbibu Zipatso	Fruit
Ananas comosus	Pineapple	Nanasi	Fruit
Anisophyllea pomifera		Machilikiti	Fruit
Annona senegalensis	Custard Apple, Wild	Mposa	Fruit
Annona sp.	Custard Apple	Mphosa	Fruit
Antidesma venosum		Mpungulira	Fruit
Azanza garkeana		Matowo	Fruit
Balanites aegyptiaca	Desert Date	? Malawi	Fruit
Berchemia discolor	Plum, Bird	Mtata	Fruit
Borassus aethiopum	Palm, Fan	Magwede, Ngwanlangwa	Sap
Borassus aethiopum	Palm, Fan	Magwede, Ngwanlangwa	Fruit
Boscia salicifolia		Mtakataka (Yao)	Fruit, Young
Boscia senegalensis	Aisen	Mpetu	Fruit, Young
Bridelia micrantha		Mpasa	Fruit
Cadaba kirkii		Nswadji	Fruit
Canthium crassum		Mnonga	Fruit
Carica papaya	Pawpaw	Papaya	Fruit
Carissa edulis	Plum, Wild	Mpambulu	Fruit
Ceiba pentandra	Kapok	Usufu	Fruit
Chrysophyllum magalismontanum	Wild Plum	Chiyera	Fruit
Cissus cornifolia	Water Root	Mbulunbunji	Fruit
Cissus integrifolia		Mtambe	Fruit
Citrullus lanatus	Watermelon	Vwende	Fruit
Citrus aurantifolia	Lime	Ndimu	Fruit
Citrus aurantium	Sour Orange		Fruit
Citrus limon	Lemon	Mandimu	Fruit
Citrus paradisi	Grapefruit		Fruit
Citrus reticullata	Tangarine	Nachi	Fruit
Citrus sinensis	Orange	Malalanje	Fruit
Cleistochlamys kirkii		Nkalango (Y)	Fruit
Coccinia adoensis		Fwifwi	Fruit
Conopharyngia elegans	Toad Tree	Kakope	Fruit
Cordia abyssinica		Mwabwa	Fruit
Cordyla africana	Plum, African	Mtondo	Fruit
Cucumis hirsutus		Mkuwikuwi	Fruit
Cucumis melo	Melon	Kayimbe	Fruit
Cucumis metuliferus		Kangamkhwani	Fruit
Cussonia kirkii	Deadman's Fingers	Mbwabwa	Fruit
Cussonia spicata	Umbrella Tree	Chandimbo (Y)	Fruit
Cyphostemma buchananii		Namwalicheche	Sap
Cyphostemma buchananii		Namwalicheche	Fruit
Detarium senegalense	Sweet Dattock		Fruit
Diospyros mespiliformis	Monkey Guava	Msumwa	Fruit

Scientific	English	Malawi Names	Edible Parts
Dombeya rotundifolia	Wild Pear Tree	Naduwa	Fruit
Dovyalis abyssinica	Key Apple	? Malawi	Fruit
Dovyalis caffra	Wild Apricot	Ng'amba	Fruit
Ehretia species	Cape Lilac	Ng'amba	Fruit
Ekebergia benguelensis		Mabere ya ng'nombe	Fruit
Fadogia odorata		Mlumbakumba	Fruit
Fagara sp	Fagara	Mlunguchulu	Fruit
Ficus carica	Fig, Common	Mkuyu	Fruit
Ficus sp.4	Fig, Wild	Nkhuvu	Fruit
Ficus sur	Fig, Cape	Mkuyu-pasi	Fruit
Ficus sycomorus	Fig, Sycamore	Chikujumba	Fruit
Flacourtia indica	Plum, Indian	Nthudja	Fruit
Fragaria ananassa	Strawberry	Sitobele	Fruit
Friesodielsis obovata		Mfulafula	Fruit
Garcinia livingstonei	Low veld mangosteen	Mphimbi	Fruit
Grewia inaequilatera	Bastard Silver Raisin		Fruit
Grewia micrantha	Golden Raisin	Tensa	Fruit
Hibiscus sabdariffa	Roselle	Chidede	Fruit
Hirtella bangweolensis		Mphungumutu	Fruit
Hoslundia opposita		Chanzi	Fruit
Hyphaene species	Palm, Doum	Mgwalangwa	Sap
Landolphia kirkii	Rubber Vine	Mpila	Fruit
Landolphia parvifolia		Kapwati	Fruit
Landolphia petersiana		Matutungwa	Fruit
Landolphia sp.		Makombe	Fruit
Lannea discolor	Livelong	Sidyatungo	Fruit
Lannea edulis	Grape, Wild	Mdyakamba	Fruit
Lannea sp.		Kitongomilo	Fruit
Lannea stuhlmanni		Chirusa	Fruit
Lantana trifolia		Nakasonde (Y)	Fruit
Litchi chinensis	Litchi		Fruit
Maclura africana		Mkolonsato	Fruit
Malus dom./Pyrus mal.	Apple	Apulo	Fruit
Mangifera indica	Mango	Mango okwima	Fruit
Mimusops zeyhera	Red Milkwood	Mterekezi	Fruit
Morus alba	Mulberry, Wild	Mabulosi	Fruit
Morus nigra	Mulberry	Mapulesi	Fruit
Musa paradisiaca	Banana	Nthochi	Fruit
Myianthus hostii		Chiwele	Fruit
Olea africana	Wild Olive	Nakatimba (Mg)	Fruit
Opuntia ficus-indica	Prickly Pear	Kaloga	Fruit
Oxalis acetosella	Sorrel	Katakula	Fruit
Pachystela brevipes		Mpimbi	Fruit
Pappea capenisis	Plum, Wild	Mkungula	Fruit
Parinari capensis	Plum, Wild	Mungungajati	Fruit
Parinari curatellifolia	Hissing Tree	Mbula	Fruit
Parinari excelsa	Plum, Rough-skinned	Muula	Fruit
Parkia filicoidea	Bean, African Locust	Mkundi	Fruit

Scientific	English	Malawi Names	Edible Parts
Pasiflora edulis	Passion Fruit	Magalagadeya	Fruit
Phoenix dactylifera	Palm, Date		Fruit
Physalia peruviana	Gooseberry	Jamu	Fruit
Piliostigma thonningii	Camel-foot	Chitimbe	Fruit
Prunus armeniaca	Apricot	Epulokoti	Fruit
Prunus persica	Peach	Pichesi	Fruit
Pseudolachnostylis maprouneifolia		Msolo	Fruit
Psidium guajava	Guava	Gwafa	Fruit
Punica granatum	Pomegranate	Chimanga chachizungu	Fruit
Pyrenacantha sp.		Mchende	Fruit
Rhoicissus tridentata		Mpeza	Fruit
Rhus natalensis		Mapirankukute	Fruit
Rothmannia manganjae		Mfukula	Fruit
Rubus spp.	Blackberry	Mpandankhuku, Mulunguzi	Fruit
Saccharum officinarum	Sugar Cane	Mzimbe	Stem
Salvadora persica	Toothbrush Tree	Mswache (Y)	Fruit
Sclerocarya caffra		Mufula	Fruit
Securinega virosa		Mpombona	Fruit
Solanum scabrum	Sunberry		?e Fruit Wild
Sorghum bicolor	Sorghum	Misale	Stem, Shoot
Sorindeia madagascariensis		Sasola	Fruit
Strychnos innocua	Monkey Orange	Mkaye, Maye	Fruit
Strychnos spinosa	Kaffir Orange	Mateme	Fruit
Syzygium cordatum	Water Boom	Nyowe	Fruit
Syzygium guineense	Water Berry	Mbunguzi	Fruit
Syzygium owariense		Mafuwa	Fruit
Tacca leontopetaloides	African Arrowroot	Dinde	Fruit
Tamarindus indicus	Tamarind	Bwemba	Fruit
Temnocalyx obovatus		Maso a ng'ombe	Fruit
Terminalia catappa	Indian Almond	Mkungu	Fruit
Toddalia asiatica	Cockspur Orange	Msangalusi (Y)	Fruit
Tribulus terrestris	Devil's Thorn	Ncheso	?e Fruit Wild
Trichilia emetica	Natal Mahogany	Msikitsi	?e Fruit
Turraea nilotica		Msindila	Fruit
Uapaca kirkiana	Loquat, local	Msuku	Fruit
Uapaca kirkiana	Loquat, foreign	Msuku cha chizungu	Fruit
Uapaca nitida		Kasokolowe	Fruit
Uapaca sansibarica		Mtoto	Fruit
Uvaria sp.		Ukonde	Fruit
Vangueria infausta	Wild Medlar	Msilu	Fruit
Vangueria sp.		Matembela	Fruit
Vitex doniana		Mpindimbi	Fruit
Vitex mombassae		Mpyimpya	Fruit
Vitex sp.3		Msungututu	Fruit
Ximenia americanna	Sour Plum	Mtengere	Fruit
Ximenia caffra	Sour Plum	Mpinji	Fruit
Xymalos monospora	Lemon Wood	Nakaswaga (Y)	Fruit

Scientific	English	Malawi Names	Edible Parts
Zanha golungensis		Mkwidio	Fruit
Ziziphus mauritiana	Jujube	Masawo	Fruit
Ziziphus mucronata	Buffalo Thorn	Kankhande	Fruit
Total Fruits	**151**		
Legumes & Nuts Food Group			
Acacia albida	White Thorn	Nsangu	Seeds, CARE
Adansonia digitata	Baobab	Mlambe	Seed
Anacardium occidentale	Cashew Nut	Mbibu	Seed Nut
Arachis hypogaea	Groundnuts	Mtedza	Seed Nut
Borassus aethiopum	Palm, Fan	Magwede, Ngwanlangwa	Seed Nut
Cajanus cajan	Pea, Pigeon	Nandolo	Legumes
Canavalia ensiformis	Bean, Jack	Kalongdoda ??	Legumes
Cicer arietinum	Chick Pea	Nchana	Seed
Glycine max	Bean, Soy	Soya	Legumes
Lablab purpureus	Bean, Hyacinth	Mkhunguzu	Legumes
Lens culinaris	Lentil	Masar	Legumes
Macadamia	Queensland Nut		Seed Nut
Mucuna pruriens	Bean, Buffalo	Kalongonda	Seeds, CARE
Parinari curatellifolia	Hissing Tree	Mbula	Seed Nut
Parkia filicoidea	Bean, African Locust	Mkundi	Legumes
Phaseolus aconitifolia	Bean, Tepary		Legumes
Phaseolus lunatus ?	Bean, Lima, local	Kabaifa?	Legumes
Phaseolus spp	Bean, Common	Nyemba	Legumes
Pisum sativum	Peas, Mature	Sawawa	Legumes
Prunus dulcis	Almond		Seed Nut
Sphenostylis marginate		Nkhunga	Legumes
Stizolobium aterrimum	Bean, Velvet	Kalongonda ??	Legumes
Telfaria pedata	Oysternut	Matandu	Seed Nut
Terminalia catappa	Indian Almond	Mkungu	Seed Nut
Vigna radiata	Bean, Mung	Mphodza	Legumes
Vigna unguiculata	Pea, Cowpea	Khobwe	Legumes
Vigna subterranea	Bambara Groundnut	Nzama	Legumes
Lupinus sp.	Lupinus	Kantedza	Seeds, CARE
Total Legumes & Nuts	**29**		

Staples Food Group			
Ensete ventricosum	False Banana	Chizuzu	Root
Eragrostis tef	Tef	Chimanganga	Cereal Grain
Abrus precatorius	Crab's Eyes	Ntimbua	Roots
Adansonia digitata	Baobab	Mlambe	Bark
Adansonia digitata	Baobab	Mlambe	Roots
Anthericum		Sawawa	Roots
Carica papaya	Pawpaw	Papaya	Roots
Carissa edulis	Plum, Wild	Mpambulu	Roots
Coccinia adoensis		Fwifwi	Roots, CARE
Colocasia esculenta	Coco Yam	Coco	Roots
Cyperus esculentus	Tiger nut	Kauju	Roots

Scientific	English	Malawi Names	Edible Parts
Cyphostemma buchananii		Namwalicheche	Roots
Dioscorea bulbifera	Air Potato	Fikengere (Nk)	Roots
Dioscorea sp.2		Chilazi mpama	Roots
Dioscorea sp.3		Mpama wam'thengo	Roots
Dioscorea sp.4		Dzinyanya	Roots
Disa sp.		Chinaka	Roots, CARE
Eleusine coracana	Millet, Finger	Mawere, Lipoko	Cereal Grain
Eriosema nutans		Chinkwisi	Roots
Eriosema shirense		Kabomola	Roots
Eriosema sp.3		Kambumkire	Roots
Euphorbia sp		Chikhawo	Roots
Ficus sur	Fig, Cape	Mkuyu-pasi	Roots
Habenaria walleri		Chinaka	Roots, CARE
Ipomoea batatas	Sweet Potato	Mbatata	Roots
Lightfootia abyssinica			Roots
Lotus sp.		Mpeta	Roots
Mangifera indica	Mango	Mango awisi	Fruit, young
Manihot esculenta	Cassava	Chinangwa	Roots
Manihot spp	Cassava, Tree	Mpira	Roots
Margaretta rosea		Nchenche	Roots
Musa paradisiaca	Banana	Nthochi	Fruit, young
Nymphaea caerulea	Water Lily	Chikolwa	Roots
Oryza sativa	Rice	Mpunga	Cereal Grain
Oxalis sp.		Shawawa	Roots
Panicum miliaceum	Millet, Common		Cereal Grain
Pennisetum americanum	Millet, Pearl	Machewere	Cereal Grain
Plectranthus esculentus	Kaffir Potato	Buye	Roots
Polygonum senegalense		Nkonkho (Tu)	Roots
Ranunculus multifidus	Buttercup	Khobedi	Roots
Satyrium sp.		Chinaka chikande	Roots
Sechium edule	Chayote	Ngowe	Roots
Solanum tuberosum	Potato, Irish	Kachewere	Roots
Sorghum bicolor	Sorghum	Mapila	Cereal Grain
Sphenostylis stenocarpa	Yam Bean	Chinkhoma	Roots
Tacca leontopetaloides	African Arrowroot	Dinde	Roots, CARE
Thylachium africanum		Mkalachulu	Roots, CARE
Triticum aestivum	Wheat	Tirigu	Cereal Grain
Typha sp.	Bulrush	Kanjeza	Pollen
Vigna fischeri		Mukho	Roots
Zea mays	Maize	Chimanga	Cereal Grain
Total Staples	**52**		

Vegetables Food Group			
*various scientific names	Mushroom	Bowa	Fungus
Abrus precatorius	Crab's Eyes	Ntimbua	Leaves
Acacia macrothyrsa		Nafungwe	Leaves
Achyranthes aspera	Rough Chaff Flower	Ngwirisi ndi kakose	Leaves

Scientific	English	Malawi Names	Edible Parts
Adansonia digitata	Baobab	Mlambe	Flowers
Adansonia digitata	Baobab	Mlambe	Leaves Shoots
Adenia gummifera		Mlozi	Leaves
Aeolanthus myrianthus		Ninde	Leaves
Aerva leucura		Chidyonko	Leaves
Aframomum angustifolium	Cardamom, Wild	Nthungula	Spice
Afzelia quanzensis	Pod Mahogany	Msambamfumu	Leaves
Allium cepa	Onion / Shallot	Anyezi	Shoot, Root
Allium porum	Leek		Shoot, Root
Allium sativum	Garlic	Adyo	Shoot, Root
Allium schoenoprasum	Chives / garlic chives		Shoot
Alternanthera sessilis		Kandudwa	Leaves
Amaranthus hybridus	Amaranth	Bonongwe	Leaves
Amaranthus sp.4	Wild Blite	Bonongwe	Leaves
Amaranthus spinosus	Spiny Pigweed	Bonongwe wa minga	Leaves
Amaranthus thunbergii	Poor Man's Spinach	Mberekete	Leaves
Annona senegalensis	Custard Apple, Wild	Mpoza	Flowers
Annona senegalensis	Custard Apple, Wild	Mposa	Leaves
Annona sp.	Custard Apple	Mpoza	Flowers
Annona sp.	Custard Apple	Mphosa	Leaves
Anthericum		Kaluwatete	Flowers
Arachis hypogaea	Groundnuts	Mtedza	Leaves
Argemone mexicana	Mexican Poppy	Doza	Leaves
Asparagus officinalis	Asparagus	Katsitsimzukwa	Shoots
Asparagus sp.2	Asparagus, Wild	Katsitsimzukwa	Shoots
Astragalus atropilosulus		Nachilare	Leaves
Asystasia gangetica		Nasungwi	Leaves
Balanites aegyptiaca	Desert Date	? Malawi	Flowers
Balanites aegyptiaca	Desert Date	? Malawi	Leaves
Basella alba	Spinach, Ceylon	Mdele	Leaf, shoot
Bidens pilosa	Blackjack	Chisoso	Leaf, shoot
Bidens schimperi		Mbilidzongwe	Leaves
Bixa orellana	Annatto	Kari	Dye
Borassus aethiopum	Palm, Fan	Magwede, Ngwanlangwa	Leaves
Boscia salicifolia		Mtakataka (Yao)	Leaves
Boscia senegalensis	Aisen	Mpetu	Leaves
Brassica chinensis	Chinese Cabbage	Chinesi	Leaves
Brassica juncea	Mustard, Indian	Mpiru	Flowers
Brassica juncea	Mustard, Indian	Mpiru	Leaf, shoot
Brassica napus var. oleifera	Rape	Mpiru wotuwa	Leaves
Brassica oleracea var. acephala	Kale	Kale	Leaves
Byrsocarpus orientalis		Ntandanyerere	Leaves
Cajanus cajan	Pea, Pigeon	Nandolo	Leaves
Cajanus cajan	Pea, Pigeon	Nandolo	Pods
Canavalia ensiformis	Bean, Jack	Kalongdoda ?	Pods
Canna bidentata Bertol.	Canna, Wild	Gontha	Spice
Canthium sp. ?C. huilense		Chisunkunthu	Leaves

Scientific	English	Malawi Names	Edible Parts
Capsicum annuum	Chillies	Tsobola	Fruit
Cardiospermum halicacabum	Heart Seed	Msendechere	Leaves
Carica papaya	Pawpaw	Papaya	Flowers
Carica papaya	Pawpaw	Papaya	Fruit Immature
Carica papaya	Pawpaw	Papaya	Leaf, shoot
Cassia mimosoides L.	Tea senna	Ngwalangwalate	Leaf, shoot
Cassia occidentalis L.	Coffee senna	Mjoka	Flowers
Cassia occidentalis L.	Coffee senna	Mjoka	Leaves
Cassia occidentalis L.	Coffee senna	Mjoka	Pods
Cassia petersiana	Monkey Pod	Mpatsachokolo	Pods
Cassia petersiana	Monkey Pod	Mpatsachokolo	Leaves
Cassia singueana		Mpatsachokolo/Kadete	Leaves
Cassia singueana		Mpatsachokolo/Kadete	Pods
Ceiba pentandra	Kapok	Usufu	Leaves
Ceiba pentandra	Kapok	Usufu	Pods
Celosia Argentea	Cock's Comb	Ndangale	Leaf, shoot
Celosia trigyna		Kaphikaulesi	Leaf, shoot
Ceratotheca sesamoides		Chewe	Leaves
Ceratotheca sp.		Tilingane	Leaves
Ceropegia papillata		Fwafwalingo	Leaves
Ceropegia sp.		Chang'ombe	Leaves
Cicer arietinum	Chick Pea	Nchana	Leaves
Cicer arietinum	Chick Pea	Nchana	Pods Young
Cissus bucanii		Namwalicheche	Leaves
Cissus cornifolia	Water Root	Mbulunbunji	Leaves
Cissus cornifolia	Water Root	Mbulunbunji	Fruit Immature
Cissus integrifolia		Mtambe	Leaves
Cissus jatrophoides		Mnuwakemunda	Leaves
Cissus rubiginosa		Mpelesi (Yao)	Leaves
Citrullus lanatus	Watermelon	Vwende	Flowers
Citrullus lanatus	Watermelon	Vwende	Leaves
Cleome gynandra	Cat's Whiskers	Luni	Leaf, Shoot
Cleome gynandra	Cat's Whiskers	Luni	Flowers
Cleome gynandra	Cat's Whiskers	Luni	Pods
Cleome monophylla L.		Njerenjedza	Leaf, shoot
Cleome monophylla L.		Njerenjedza	Flowers
Coccinia adoensis		Fwifwi	Leaves
Coccinia grandis	Ivy Gourd	Fwifwi	Leaves
Coccinia grandis	Ivy Gourd	Fwifwi	Fruit
Colocasia esculenta	Coco Yam Leaves	Ntembe Masamba	Leaves
Commelinia species	Spiderwort	Kasungwi	Leaf, shoot
Commiphora africana		Khobo	Leaves
Corchorus aestuans		Chamalawi	Leaves
Corchorus olitorius	Jute	Chilenzi	Leaf, shoot
Corchorus trilocularis		Denje	Leaves
Cordeauxia edulis	Ye-be	Denje	Leaves

Scientific	English	Malawi Names	Edible Parts
Coriandrum sativum	Cilantro	Masala	Spice-leaves
Coriandrum sativum	Coriander	Masala	Spice-seed
Crassocephalum rubens		Chinusi	Leaf, shoot
Crotalaria anthyllopsis		Chiwasa	Leaves
Crotalaria cephalotes		Chisunkhuthu	Leaves
Crotalaria natalitia		Thusya	Flowers
Crotalaria natalitia		Thusya	Leaves
Crotalaria ochroleuca		Zumba	Leaves
Crotalaria sp.5		Bwayaya	Leaves
Crotalaria sp.6		Mdyakanjobvu	Leaves
Crotalaria sp.7		Kapuka	Leaves
Crotalaria sp.8		Chimphako	Leaves
Cucumis anguria	Cucumber, Small Prickly	Chikanyanga	Fruit
Cucumis anguria	Cucumber, Small Prickly	Chikanyanga	Leaves
Cucumis hirsutus		Mkuwikuwi	Leaves
Cucumis melo	Melon	Kayimbe	Leaves
Cucumis metuliferus		Kangamkhwani	Leaves
Cucumis sativus	Cucumber	Minkhaka	Fruit
Cucumis sp.	Cucumber, Prickly	Chipwete	Fruit
Cucurbita species	Pumpkin	Dzungu	Fruit
Cucurbita species	Pumpkin Flowers	Chiluwe	Flowers
Cucurbita species	Pumpkin Leaves	Mnkhwani	Leaf, shoot
Curcuma domestica	Tumeric	Manjanu, Kari	Roots
Cymbopogon citratus	Lemon Grass		Leaves
Cynanchum schistoglossum		Mpuludwa	Leaves
Cyphomandra betacea	Tree Tomato;Tamarillo		Fruit
Dolichos buchananii	Bully Beef Plant	Nthupa	Flowers
Dolichos sp.		Chiluwe cha chitimbwisi	Flowers
Dolichos sp.		Chitimbwisi	Leaves
Dombeya tanganyikensis		Mnyangale	Shoot/Stem
Ectadiopsis oblongifolia		Bwazi	Leaves
Eleusine coracana	Millet, Finger	Mawere	Shoots/Plant
Emilia coccinea		Chinguwo	Leaves
Ensete ventricosum	False Banana	Chizuzu	Flowers
Ensete ventricosum	False Banana	Chizuzu	Shoot/Stem
Ensete ventricosum	False Banana	Chizuzu	Corm/Rhizo
Fagara sp	Fagara	Mlunguchulu	Leaves
Ficus sp.4	Fig, Wild	Nkhuvu	Leaves
Ficus sur	Fig, Cape	Mkuyu-pasi	Leaves
Ficus sycomorus	Fig, Sycamore	Chikujumba	Leaves
Foeniculum vulgare	Fennel		Leaves/Stems
Foeniculum vulgare	Fennel		Bulb
Galinsoga parviflora		Mwamuna aligone	Leaves
Glycine wightii		Yembe	Leaves
Gnidia chrysantha		Kazinda	Leaves
Hibiscus acetosella		Limanda	Leaves
Hibiscus articulatus		Chamakande	Leaves
Hibiscus cannabinus	Hemp, Bombay	Sonkhwe	Flowers

Scientific	English	Malawi Names	Edible Parts
Hibiscus cannabinus	Hemp, Bombay	Sonkhwe	Leaves
Hibiscus diversifolius		Chatata ?Kathamphwi?	Flowers
Hibiscus esculentus	Okra	Thelele lobzyala	Fruit
Hibiscus esculentus	Okra Leaves	Chithanda	Leaves
Hibiscus physaloides		Thelele thengo	Flowers
Hibiscus rosa-sinensis	Rose of China	Losi	Leaves
Hibiscus rosa-sinensis	Rose of China	Losi	Flowers
Hibiscus sabdariffa	Roselle	Chidede	Leaves
Hibiscus sp.		Chimkakala	Leaves
Hyphaene species	Palm, Doum	Mgwalangwa	Seed Sprout
Indigofera		Denje	Leaves
Ipomoea aquatica	Spinach, Water, Wild	Lilowolowo	Leaves
Ipomoea aquatica	Spinach, Water	Kholowa	Leaves
Ipomoea batatas	Sweet Potato	Kholowa	Leaves
Ipomoea eriocarpa		Kholowa thengo	Leaves
Ipomoea sp.		Chikalandembe (Lo)	Leaves
Jussiaea abyssinica			Leaves
Justicia sp.1		Kalokola	Flowers
Justicia sp.1		Kalokola	Leaf, Shoot
Justicia sp.2		Kangena	Leaves
Justicia sp.3		Kanyelenyezi	Leaves
Kaempferia aethiopica		Manjanu	Roots
Lablab purpureus	Bean, Hyacinth	Mkhunguzu	Pods
Lablab purpureus	Bean, Hyacinth	Mkhunguzu	Flowers
Lablab purpureus	Bean, Hyacinth	Mkhunguzu	Leaf, Shoot
Lablab purpureus	Bean, Wild Hyacinth	Nkhusa	Leaves
Lactuca sativa	Lettuce	Letesi	Leaves
Lagenaria siceraria	Gourd	Mphonda	Fruit
Lagenaria siceraria	Gourd	Mphonda	Leaf, Shoot
Lagenaria sphaerica		Chipuzi	Leaves
Lens culinaris	Lentil	Masar	Pods
Lightfootia sp.2		Chisiso	Leaves
Luffa aegyptiaca	Loofa	Masponge	Fruit
Luffa aegyptiaca	Loofa Leaves	Masponge	Leaves
Lupinus		Kantedza	Leaves
Lycopersican esculentum	Tomato	Matimati	Fruit
Mangifera indica	Mango Leaves	Mango	Leaf, Shoot
Mangifera indica	Mango Skin young	Mango Khungu Osakwima	Skin young
Manihot esculenta	Cassava Leaves	Chigwada	Leaves
Manihot spp	Cassava, Tree Leaves	Chigwada	Leaves
Melochia corchorifolia		Chipondavu (Y)	Leaves
Mentha sp.	Mint		Leaves
Momordica charantia	Gourd, Bitter	Karela	Fruit
Momordica charantla	Gourd, Bitter Leaves	Karela	Leaves
Momordica foelida		Tungwi (Mi)	Shoots
Moringa oleifera	Horse Radish Tree, Flowers	Chamwamba Maluwa	Flowers

Scientific	English	Malawi Names	Edible Parts
Moringa oleifera	Horse Radish Tree, Leaves	Chamwamba Masamba	Leaves
Moringa oleifera	Horse Radish Tree, Pods	Chamwamba	Pods
Morus nigra	Mulberry, Leaves	Mapulesi	Leaves
Nesaea sp.		Kwete	Leaves
Nidorella resdifolia		Sungubuwa (Tu)	Leaves
Nymphaea caerulea	Water Lily, Flowers	Chikolwa	Flowers
Ocimum canum Sims	Basil, Local	Mpungabwe	Leaf, Seed
Origanum majorana	Marjoram		Leaves
Ormocarpum		Phuluphulu	Leaves
Oxalis sp.		Ntedza wa kwangala	Leaves
Oxygonum sinuatum		Kalasaweni	Leaves
Pavonia urens		Chatata, Thoni	Flowers
Pentanisia schweinfurthii	Rhodesian Forget-me-not	Ngulungundi	Leaves
Pentarrhinum insipidum		Chindewe (He)	Leaves
Pentarrhinum insipidum		Chindewe (He)	Fruits
Pentarrhinum sp.		Kafungo	Leaves
Phaseolus aconitifolia	Bean, Tepary Leaves		Leaves
Phaseolus aconitifolia	Bean, Tepary young pods		Pods
Phaseolus lunatus	Bean, Lima Leaves	Kamumpanda Leaves	Leaves
Phaseolus spp	Bean, Common Leaves	Khwanya	Leaves
Phaseolus vulgaris	Bean, French pods	Mbwanda	Pods
Phaseolus vulgaris	Bean, French leaves	Mbwanda	Leaves
Physalia peruviana	Gooseberry Leaves	Jamu Masamba	Leaves
Pisum sativum	Peas, Green young	Sawawa osakwima	Legumes
Polygonum plebeium		Kasabwe	Leaves
Polygonum salicifolium		Nsendeka (Y)	Leaves
Polygonum setosulum		Chikungu ufa	Leaves
Portulaca olerncea	Purslane	Matakoatsanu	Leaf shoot stem
Psychotria eminiana		Chisunkunthu	Leaves
Ranunculus multifidus	Buttercup	Khobedi	Leaves
Rumex bequaertii	?Sorrel, Dock	Gakazea	Leaves
Salvadora persica	Toothbrush Tree	Mswache (Y)	Leaves
Secamone sp.		Bwazi	Leaves
Sechium edule	Chayote	Ngowe	Fruit
Sechium edule	Chayote	Ngowe	Shoots
Securidace longepedunculata	Tree Violet	Bwazi	Leaves
Sesamum angolense		Chewe	Leaves
Sesamum indicum	Sesame	Chitowe	Leaf, Shoot
Sida alba			Leaves
Smithia elliotii		Kadzulo	Leaves
Solanum americanum	Nightshade	Knadzi, Mnadzi	Leaves
Solanum americanum	Nightshade	Msaka	Fruit
Solanum macrocarpon	Eggplant, African	Mabilingani	Fruit
Solanum melongena /	Eggplant, Foreign	Mabilingani	Fruit

Scientific	English	Malawi Names	Edible Parts
aethiopicum			
Solanum sp. 07		Nthula	Fruit
Solanum sp. 08		Madwanzi	Fruit
Solanum sp. 09		Imphwa, Nthula	Fruit
Solanum sp. 10		Mbwanyanya, Zimphwa	Fruit
Solanum sp. 11		Matungwi, Nthulazazikulu	Fruit
Solanum sp. 12		Mtungwi, Nthulazazing'ono	Fruit
Solanum sp. 12		Malanza	Leaves
Solanum sp. 13		Makwenda, Malanza	Fruit
Sonchus oleraceus	Sow Thistle	Chinguwo	Leaves
Sphenostylis marginate		Mlali	Flowers
Sphenostylis marginate		Nkhunga	Leaves
Spinacia oleracea	Spinach	Spinichi	Leaves
Sterculia appendiculata		Njale	Leaves
Sterculia sp.2		Chiwawani (Lo)	Leaves
Strychnos spinosa	Kaffir Orange	Mteme (masamba)	Leaves
Talinum caffrum		Mlelamvula	Leaves
Tamarindus indicus	Tamarind	Bwemba	Flowers
Tamarindus indicus	Tamarind	Bwemba	Leaves
Tamarindus indicus	Tamarind	Bwemba	Pods
Tetragonia expansa	Spinach, New Zeland	Spinichi	Leaves
Thunbergia lancifolia		Mwanaluni	Leaves
Thunbergia oblongifolia		Mwanakazi	Leaves
Trichodesma zeylanicum		Dungumwamba	Leaves
Trigonella foenum-graecum	Fenugreek	Methi	Leaf, Shoot
Triumfetta annua		Khatambuzi	Leaves
Tulbaghia cameronii		Katsopi	Flowers
Tulbaghia cameronii		Katsopi	Leaves
Tylosema fassoglensis		Mphandwapansi	Pods
Urena lobata	Bun Ochra	Msapatonje (Y)	Flowers
Vernonia sp.		Dambwe	Leaves
Vigna radiata	Bean, Mung	Mphodza	Pods
Vigna reticulata		Chamaweya (Tu)	Leaves
Vigna sp.6		Mtambe thengo	Leaves
Vigna subterranea	Bambara Groundnut	Nzama	Leaves
Vigna unguiculata	Pea, Cowpea	Khobwe	Pods
Vigna unguiculata	Pea, Cowpea	Mtambe	Leaves
Viola abyssinica		Katongolola	Leaves
Vitex doniana		Mpindimbi	Leaf, Shoot
Wormskioldia longepedunculata	Rhodesian Pimpernel	Katambala	Leaves
Zea mays	Maize, Green	Dowe	Cereal Grain
Zingiber officinale	Ginger		Roots
Ziziphus mauritiana	Jujube	Masawo	Leaves
Zornia pratensis		Kandudwa	Leaves
Total Vegetables	**278**		

Scientific	English	Malawi Names	Edible Parts
Animal Foods Food Group			
	Antelope	Nyiska	Meat
	Black noisy flying insect	Nkhululu	Insect
	Birds	Mblame	Meat
	Bird's egg	Mazira	Eggs
	Buffalo	Njati	Meat
	Caterpillar 1	Dzinthondo	Insect
	Caterpillar 2	Mphalabungu	Insect
	Caterpillar 3	Mapala	Insect
	Chickens	Nkuku	Meat
	Chicken's Eggs	Mazira	Eggs
	Cow	N'gombe	Meat
	Cow's Milk	Mkaka	Milk
	Crickets	Nzerenzere	Insect
	Ducks	Baka	Meat
	Duck's eggs	Mazira	Eggs
	Goat	Mbuzi	Meat
	Goat's Milk	Mkaka	Milk
	Grasshopper 1	Tsokonombwe	Insect
	Grasshopper 2	Sadyamchere	Insect
	Grasshopper 3	Gomphanthiko	Insect
	Grasshopper 4	Mkhwiyo	Insect
	Guinea Fowl	Nkanga	Meat
	Guinea Fowl Eggs	Mazira	Eggs
	Guinea Pig	Mbira	Meat
	Hippopotamus	Mvuu	Meat
	Lake Flies	Chikumbu	Insect
	Mice	Mbewa	Meat
	Pig	Nkhumba	Meat
	Pigeons	Nkunda	Meat
	Pigeon Eggs	Mazira	Eggs
	Porcupines	Nungu or Kanungu	Meat
	Rabbits	Kalulu	Meat
	Rats	Mbira	Meat
	Sheep	Nkosa	Meat
	Termite 1	Ngumbi	Insect
	Termite 2	Mafurufute	Insect
	Wild Pig	Ngulube	Meat
Total Animal Foods	**37**		

- end of list -

Getting to know your plant, trees and animals

This table is a combination of information from the Permaculture Nutrition Manual (2004 version) by Kristof & Stacia Nordin, the Positive Living materials (2004 version) by David Patient, the FAO Home Gardening Manual (2004 pilot) by FAO Malawi, and personal experience. This is only a general guide and should be updated in the future. Getting to know your plants and trees is fun! Don't get too caught up in measuring exact distances – remember to let nature guide you! The table lists Each group is listed with the fastest bearers first, but don't let this fool you, look at how long the perennial varieties last.

Food	Food Group	Soil Food	Groundcover	Climber	Supporter	Digger	Protector	sun	shade	wet	dry	Planting choices	*Seed Depth	Space needed	Starts to sprout in:	Ready to use in:	Single plant bears for:	Perennial	Number to include per adult	Hints
VEGETABLES																				
Amaranthus, many types (Bonongwe)	veg				sup			sun	sha	wet	dry	direct	scatter 1 cm	30 cm	7 days	30 days	1-2 months		1	Keep trimming for more leaf growth. Some grow over 2 meters tall.
Eggplant (mabilinganya)	veg				sup			sun		wet		direct or Nursery	1 cm	50 cm	14 days	80 days	many years	per	2	Small bush. Lasts many years if roots aren't disturbed, other creepers can grow under/on it.
Herbs such as lemon grass, mints, local basil (mpnugabwe)	veg		gc				pro	sun	sha	wet	dry	direct or nursery	scatter, cuttings	10-30 cm	14 days	30 days	many years	per	2	Many different types of herbs available. Great for inter-planting everywhere!
Hibiscus leaves (Limanda or thelele)	veg				sup			sun		wet	dry	direct, nursery or cuttings	scatter 1 cm	90 cm	14 days	30 days	many years	per	1	Large bush that light climbers can use for support.
Leaves, edible (masamba)	veg							sun	sha	wet	dry	scatter, direct or nursery	scatter 1 cm	25 cm	7 days	30 days	4-6 months		5	Many indigenous leaf vegetables. Keep trimming and they produce leaves longer.
Onions (Anyezi)	veg					dig	pro	sun		wet		direct or nursery	1 cm	10 cm	14 days	30 days leaves 180 days bulbs	1-3 months leaves, once bulbs		70	Good insect repellent to protect leafy vegetables and fruits.

Food	Food Group	Soil Food	Groundcover	Climber	Supporter	Digger	Protector	sun	shade	wet	dry	Planting choices	*Seed Depth	Space needed	Starts to sprout in:	Ready to use in:	Single plant bears for:	Perennial	Number to include per adult	Hints
Peppers (Tsabola)	veg				sup			sun	sha		dry	direct or nursery	scatter 1 cm	35 cm	21 days	90 days	many years	per	2-5	Grows into a small bush, other creepers can grow under/on it.
Pumpkin (maungu)	veg		gc					sun		wet	dry	direct	2.5 cm	10 m crawls around	10 days	30 days leaves 120 days fruits	leaf 1-2 months, fruit once		2-3	Plant around things that the pumpkins can't crush. Likes to cover 10 m area!
Tomato (matimati)	veg			clim				sun			dry	scatter, direct or nursery	1 cm	30 cm	14 days	120 days	1 month		5	Trim side shoots to encourage fruit growth

Food	Food Group	Soil Food	Groundcover	Climber	Supporter	Digger	Protector	sun	shade	wet	dry	Planting choices	*Seed Depth	Space needed	Starts to sprout in:	Ready to use in:	Single plant bears for:	Perennial	Number to include per adult	Hints
FRUITS																				
Banana (Ntochi)	fru				sup	dig		sun	sha	wet		suckers	30 cm	2 m	immediate	1 year	1 year but plant multiplies!	per	5	Nice to make a banana circle around a compost pit.
Cape Gooseberry (Jamu)	fru				sup			sun	sha	wet	dry	scatter, cuttings or nursery	scatter 1cm	90 cm	30 days	90 days	1-5 years	per	4	Grows into a bush that will re-sprout every year. You can trim the dead parts off in the dry season if you wish.
Citrus (Ndimu)	fru				sup	dig		sun		wet		direct or nursery	4 cm	5 m	30 days	4-6 years	Many!	per	1 for 5 people	Other things can be planted underneath these trees to use the space (pineapples, coco, climbers, etc)
Custard Apple (mphoza)	fru				sup	dig		sun		wet	dry	direct or nursery	3 cm	5 m	21 days	2-3 years	Many!	per	1 for 5 people	
Guava (gwafa)	fru				sup	dig		sun		wet	dry	direct or nursery	scatter 1 cm	5 m	21 days	2-3 years	Many!	per	1 for 5 people	
Loquat (Masuku)	fru				sup	dig		sun	sha	wet	dry	direct or nursery	5 cm	5 m	30 days	4-6 years	Many!	per	1 for 5 people	
Mango	fru				sup	dig		sun		wet	dry	direct or nursery	10 cm	10 m	30 days	5-7 years	Many!	per	1 for 5 people	
Monkey Orange (maye, mateme)	fru				sup	dig		sun	sha	wet	dry	direct or nursery	5 cm	10 m	30 days	3-5 years	Many!	per	1 for 5 people	
Mulberry (mulbulosi)	fru				sup	dig		sun		wet	dry	direct or nursery	cuttings	1 m	14 days	1 year	3-5 years or more	per	2	Makes a great supporter
Papaya	fru				sup	dig		sun		wet	dry	direct or nursery	scatter 1 cm	1 m	21 days	1 year	3-5 years or more	per	2	Makes a great supporter
Passion Fruit (Magalagadeya)	fru			clim		dig		sun	sha	wet	dry	direct or nursery	scatter 1cm	30 cm	21 days	1-2 years	3-5 years or more	per	2	Excellent climber for walls, fences and other strong supporters
Snot Apple (Matowo, African bubble gum)	fru				sup	dig		sun	sha	wet	dry	direct or nursery	5 cm	5 m	21 days	1-3 years	Many!	per	1	Other things can be planted underneath the tree to use the space (pineapples, coco, climbers, etc)

Food	Food Group	Soil Food	Groundcover	Climber	Supporter	Digger	Protector	sun	shade	wet	dry	Planting choices	*Seed Depth	Space needed	Starts to sprout in:	Ready to use in:	Single plant bears for:	Perennial	Number to include per adult	Hints
Sorrel (Chidede)	fru				sup			sun		wet	dry	scatter or nursery	scatter 1cm	60 cm	21 days	90 days	1-5 years	per	10	These easily spread themselves by seed. Don't remove the stem and root, it will grow again.
Melon, watermelon (mavwende)	fru		gc					sun		wet	dry	direct			14 days					
Melon, local (kayimbe)	fru		gc					sun												

Food	Food Group	Soil Food	Groundcover	Climber	Supporter	Digger	Protector	sun	shade	wet	dry	Planting choices	*Seed Depth	Space needed	Starts to sprout in:	Ready to use in:	Single plant bears for:	Perennial	Number to include per adult	Hints
BEANS & NUTS																				
Beans, bush types (nyemba)	leg veg	soil						sun		wet		Direct	4 cm	10 cm	10 days	70 days	30 days		10-15	These interplant well with other plants.
Beans, climbing types (khungudzu, chimbamba, kalongonda, etc.)	leg veg	soil	gc	clim				sun	sha	wet	dry	Direct	3 cm	15 cm	10 days	90 days	30 days	per	3-10	Plant near a supporter. There is a lot of variation in yield, some bear a lot like khungudzu or chimbamba and you need less plants.
Soybeans (soya)	leg	soil						sun		wet		Direct	2.5 cm	20 cm	10 days	70 days	30 days		20	Good as an interplanted legume
Pigeon Pea	leg veg	soil			sup			sun			dry	Direct	3 cm	60 cm	21 days	120 days	1-5 years	per	5	Great support for other plants.
Nsawawa (Peas)	leg veg	soil						sun		wet		Direct	3.5 cm	45 cm	21 days	130 days (leaves 30)	30 days		10	Plant some each month if you water.
Mtedza (Peanuts)	leg	soil						sun	sha	wet	dry	Direct	3 cm	50 cm	7 days	140 days	once		20	Planting on a 'mound' of soil encourages nut growth.

Food	Food Group	Soil Food	Groundcover	Climber	Supporter	Digger	Protector	sun	shade	wet	dry	Planting choices	*Seed Depth	Space needed	Starts to sprout in:	Ready to use in:	Single plant bears for:	Perennial	Number to include per adult	Hints
STAPLES																				
Cassava (Chinangwa)	sta veg				sup	dig		sun	sha	wet	dry	direct cuttings	20 cm	60 cm	14 days	365 days roots 30 days leaves	30 days		20	Plant in a place you can dig up the roots
Maize / Corn (Chimanga)	sta				sup			sun		wet		direct or nursery	4 cm	30 cm	10 days	85 days	30 days		20	Don't plant too many!
Millet (mawere, mchewere)	sta							sun		wet	dry		scatter 2cm		7-14 days	80-100 days	30 days			Very hardy plants.
Potato, irish type (kachewere)	sta					dig		sun	sha			direct	10 cm	30 cm	10 days	100 days	60 days			Tends to like cooler elevations
Potato, local type (buye)	sta					dig		sun	sha			direct	10 cm	30 cm	10 days	100 days	60 days			Tends to like cooler elevations
Potato, sweetpotato (Mbatata)	sta veg		gc			dig		sun	sha	wet	dry	direct cuttings	10 cm	30 cm	7 days	150 days roots 14 days leaves	many if managed well		20	Don't put in too much manure – the leaves and stems will grow a lot, with little root growth.
Sorghum (Mapila)	sta				sup			sun		wet	dry	direct or nursery	scatter 2 cm	30 cm	10 days	85 days	1-3 years or more	per		Don't remove roots, will keep growing for years.
Yams, air potato (chikowa)	sta			clim				sun	sha	wet	dry	direct	10 cm	10 cm	10 days	100 days	years	per		Under-utilized but fairly well-known
Yams, climbing (clilazi mpama)	sta			clim		dig		sun	sha	wet	dry	direct	10 cm	60 cm	10 days	100 days	years	per		Under-utilized but fairly well-known
Yams, cocoyams (coco)	sta veg					dig		sun	sha	wet		direct or suckers	10 cm	60 cm	10 days	100 days	years			Under-utilized but fairly well-known

Food	Food Group	Soil Food	Groundcover	Climber	Supporter	Digger	Protector	sun	shade	wet	dry	Planting choices	*Seed Depth	Space needed	Starts to sprout in:	Ready to use in:	Single plant bears for:	Perennial	Number to include per adult	Hints
FATS																				
Avocado (mapeyala)	fat				sup	dig		sun		wet	dry	Direct	10 cm	10 m	21 days	7-10 years	many years!	per	1 tree for 10	Leave can be used within 60 days of planting as medicinal tea to add iron and folate to the diet.
Sesame (Chitowe)	fat	soil			sup			sun		wet	dry	Direct	1.2 cm	60 cm	7 days	140 days	once		20	Great supporter for light climbers (tomatoes, beans, climbing spinaches)
Sunflower (Mpendedzuwa)	fat				sup			sun		wet	dry	Direct	1.2 cm	60 cm	7 days	140 days	once		20	Great supporter for light climbers (tomatoes, beans, climbing spinaches)
Vegetable oilseeds: * Pumpkin seeds * Bonongwe seed *	fat																			
Fruit oilseeds: * Sorrel * Melons, water * Melons, local	fat																			

Food	Food Group	Soil Food	Groundcover	Climber	Supporter	Digger	Protector	sun	shade	wet	dry	Planting choices	*Seed Depth	Space needed	Starts to sprout in:	Ready to use in:	Single plant bears for:	Perennial	Number to include per adult	Hints
ANIMALS																				
Fish	ani	soil						sun	sh	wet		in a pond								
Chickens	ani	soil					prot	sun	sh	wet	dry	cage / roam								
Rabbits	ani	soil						sun	sh	wet	dry	cage / roam								
Bees	fru						prot					hive								
Pig	ani	aoil				dig						cage / roam								
NON-EDIBLE																				
Thatch																				
Flowers																				

-- end of list --

Model development sites & Potential trainers

The following organizations and individuals took part in developing and testing this model. The table aims to give you a brief description of each model, their level of implementing the ideas, who are potential advanced trainers, and how to find each site for field visits. All sites can be found via World Food Programme Food Aid Monitors in the model districts, or through the respective government support offices. During the project, the consultant collected all contact details for every organization and support staff in each of the districts – it is 20 pages long and too detailed to be a part of this manual. Contact World Food Programme Country Office for a complete contact list of phone numbers and e-mails. (see contact information for WFP at the front of this manual).

Model Development sites & Potential trainers						
Models	**Organization**	**Contact info & location**	**Participants**	*number using the model*	*Model Rating*	**Rating Description**
				4098	***TOTAL***	**estimation of those using model during development and testing**
	KASUNGU	all sites are 20 mk from Nkhamenya		*0*		
Model	1. James Munthali Model Village	15 km west of Nkham. Find via MoA Nkhamenya office. Box 261, Nkhamenya	1. Abinery T. Munthali (group's secretary)	*50*	***high***	• Highly supportive environment with reduced sweeping and increase use of local resources spreading to most households very quickly. • Yields much improved with better designs both around village and in community dambo area using less input. Using mulching, inter-planting and use of animal resources. • Very skilled at diet diversification concepts (at least when we are there!). Area is full of indigenous food diversity that they prepare. • Changed from treadle pumps to integrating low input irrigation channels, and fish ponds. *** **Potential Trainers: Several Chichewa trainers & training site.**
Model & Personal Model (Ndowera)	2. MoH Nkhamenya Mission Hospital	1 km west of Nkham. trading centre Box 2, Nkhamenya	2. Martha Mandalazi (Nurse) 3. Evaristo Garbriel Ndowera (Garden)	*10*	***high***	• 2-year site now greatly improved, breaking free from high input. • Implementing concepts in garden, and around the hospital (grey water, reduced sweeping, using more waste). Hospital seems supportive – great potential for using wasted resources. Site has the potential to be amazing! Many resources still unused. *** **Potential Trainer – Ndowera already training, potential to advance**
Personal Model	3. Plan International	Chisemphere at the sec. school. P/Bag 98, Kasungu 09-245-181 (t.p.)	4. Theresa J.K. Phiri (CDP)	*30*	***high***	• Incredible changes around home, moved garden to borehole, reduced sweeping, recruited relative to learn ideas and applying, mulching and protecting area. • Also using food preparation and diversification in home and in work. *** **Potential Trainer: Already a trainer, potential to advance**

Model Development sites & Potential trainers						
Models	**Organization**	**Contact info & location**	**Participants**	*number using the model*	*Model Rating*	**Rating Description**
Personal Model	4. Staff of COOPI / MALEZA	In MoA Nkhamenya staff house COOPI KU 01-253-463 kasungu@coopi.org 08-346-227 / 09-415-593 (c.s)	5. Christopher Singini (Coor. Nkhamenya)	*1*	***high***	• Superb applications around home, capturing all wasted resources, including human! • Met with some adverse reaction by community at first, but near the end of the project as yields improved neighbors were grasping ideas. *** **Potential Trainer: Already a trainer, potential to advance**
Model	5. Kavikula Shool	15 km west of Nkham. Find via Kasungu Education office or ask in Nkhamenya. Box 79, Nkhamenya	6. Osphin Nyirenda (Vol. Teacher) 7. Clement Mwalizuku Mnyayi (school comm.)	*100*	*medium*	• Applying ideas to borehole area and starting to spread to other resource-rich areas around the schoo. Yields have highly improved with less input. • Mixed support with some community organization issues that will need to be worked on. Head teacher and several other teachers very supportive of the ideas. Potential to be great!
Model	6. Khakulajino HBC	5 km east of Nkham. Find via Kaluluma Health Centre or mission hosp. Box 66, Nkhamenya	8. Wellington Lutepo (group member)	*50*	*medium*	• Active group with varying level of understanding. Needs more work on design, site assessment and using resources in dambo and around homes. • Site is full of water with lots of potential, has supportive mentors from mission hospital and resources
Model & Personal Model	7. Yesaya irrigation	7 km east of Nkham. Find via MoA Nkhamenya office. Box 27, Nkhamenya	9. Griffin J. Mapala (group vice secr.)	*100*	*medium*	• Community starting to grasp ideas and slowly changing from very high input project to inter-planting, mulching, water management. • Started implementing ideas personally around homes and a bit beyond • A lot more resources to capture!
Personal Model	8. Chimoorfai (Chidumula Model Organic Farming Initiative)	20 km East of Nkham. in Empheni, Mzimba. Find via MoA Nkhamenya office. Box 199, Nkhamenya	10. K.J. Chidumula (director)	*1*	*medium*	• Started using organic farming in 1999, primarily maize. • Uses masses amounts of compost through using all organic matter available in area – not low input yet, but excellent all the same! • Working on reducing labour and using all wasted resources. • Has at least 6 organic farming clubs *** **Potential Trainer: Already trains in compost / organics, potential to advance**
Working towards Model	9. CCAP Livingstonia	10 km north of Nkham. in Lojwa. Find via CCAP Livingstonia Box 137, Champhira	11. Anderson E. Palikena (Zone Dev Officer)	*20*	-	• Attended Kasunug workshop, starting to integrate ideas into work • Group vistit toLowja, a currently high input dimba garden run by Dalison Miziya. Interested in low input organic, already testing ideas and showing that organic matter soil does much better. Also doing crop rotations.
Working towards Model	10. CADECOM	Find via CADECOM KU or LL Box 71, KU, 01-253-202 09-321-384 (w.k.)	12. William Kawenda (KU Proj Coor)	*100*	-	• Working towards integrating the ideas into a typical high-input irrigation / maize / vegetable project.

Model Development sites & Potential trainers						
Models	**Organization**	**Contact info & location**	**Participants**	*number using the model*	*Model Rating*	**Rating Description**
Working towards Model	11. MoAIFS, Kasungu	Box 62, Nkhamenya	13. Mark Moyo (AEDO for James Munthali) 14. Patricia Kanyika Sinyangwe (AEDO Yesaya)	*2*	-	• Supporting two of the model sites • Unable to assess their level of low input knowledge
Working towards Model	12. WFP, Kasungu	Office in Kasungu boma Find via District Assmebly kasungu.FAM@wfp.org 01-253-242 08-859-451 (s.t.)	15. Sellina Tengatenga (Food Aid Monitor)	*1*	-	• Grasped ideas very well *** **Potential Trainer: Already has good training skills, potential to advance**
Workshop Cooks	Kondwani Restaurant (?)	Nkhamenya trading centre Box 215, Nkhamenya 09-403-249 (a.n.)	Ms. Dorothy Nyirenda Mr. Austin B. Nyirenda	*0*	-	• Good understanding of low input food preparation and meal planning
	MANGOCHI	all sites are between the *boma* and 30 km east		*0*		
Personal Model	13. Permaculture Network in Malawi	7 km south of Monkey Bay. Take road to east just opposite Cape MacClear turnoff. Thanthwe, Box 46, Monkey Bay 01-587-656 junewalker@africa-online.net	16. June Walker (Founder & Patron)	*1*	***high***	• Applying ideas since about 1994, founded Permaculture Network, wrote booklet in English and Chichewa to guide others • Provides training and field visits to home, spreads ideas to community • Assisted in writing food preparation book on traditional and modern foods. *** **Potential Trainer: already does many trainings**
Model	14. Chiutula Mitumbu Chigwirizano VAC Project	Group supported by Namwera AIDS Coordinating Committee	See NACC, Mangochi	*50*	*medium*	• Community gardens (munda and dimba) were struggling for 2 years. • Started mulching, inter-planting, live fencing, and improving designs in gardens. Working toward improving inter-planting designs. • Using local foods, making mud stoves based on ones used in this project.
Model	15. Majuni Community Irrigation	Stop at Majuni bus stop, on the south side of the road. Find via Majuni MoA office, or ask at Majuni School.	17. Ali Dickson (Community Vol.)	*50*	*medium*	• Core member group of about 15 really understanding concepts and applying in garden area. Mulching, redesigning to use land better, inter-planting, getting higher yield with less input. • Started as Food for Work for fish ponds integrated with fruit trees • Dealing with problems of goat, cattle and thieves. • Not using ideas in lives around homes as far as I could see
Model	16. Malindi Orphan Care	In Malindi, just south of mission hospital. East side of road. Box 50, Malindi 09-210-482 manager malindi_opharncare@yahoo.com;	18. LH Lhulanga (Manager) 19. MC Mkata (Field Asst)	*100*	*medium*	• Excellent use of mulch and natural recipes for insect repellent. • Needs to work on information sharing, status/power, interplanting, supporting independence, decreasing labour and decreasing reliance on donor when local resources are available.

Model Development sites & Potential trainers

Models	Organization	Contact info & location	Participants	*number using the model*	*Model Rating*	Rating Description
Model	17. MoH Mangochi District Hospital	Located in Mangochi Boma Box 42, Mangochi mjawati@yahoo.com; 09-928-624 m.j.	20. Nutritionist – M. Jawati	*10*	*medium*	• Brand new site, hospital staff vary in level of support of the ideas, small core group of staff that really understand • Not (yet) tapping into the resources that are available (organic matter, labour, water) – lots of potential! • Small garden area started and using the concepts pretty well, will need encouragement and ongoing lessons to staff at all levels to continue
Personal Model	18. NACC Namwera AIDC Coordinating committee	Located in Namwera Boma P/Bag 52, Namwera saeedwame@yahoo.com; 01-586-006 08-362-319 s.w.	21. Director: Saeed Wame 22. HBC OVC Officer– Mariam Afio	*2*	*medium*	• NACC already doing some tree planting, discussing capturing more resources (water, labour, organic matter) around office. • Saeed started designing at house to use grey water, increased mulching, great start with many more resources to capture. *** **Potential Trainer: Already has good training skills, potential to advance**
Personal Model	19. Staff Emmanuel International	North side of Mangochi Boma on road to Monkey Bay. 08-393-141 a.n	23. Relief - Andrew Ngulube	*1*	*medium*	• Reducing sweeping and labour and increasing use of wasted resources. Laid out design with bricks and started converting kitchen area gardens. *** **Potential Trainer: potential to advance**
Model	20. MoE Masongola 1 Full Primary School	Namwera Boma, ask anyon Box 13, Namwera 01-586-034 or 09-261167 f.k.	24. Felix Kwakwala (Head)	*5*	*low*	• Started at borehole, but stopped. Unsure why
?	21. MoAIFS, Mangochi	(transferred to Chilipa, 09-348-037 g.m.	25. AEDC – G.S. Mahame	*1*	-	• Unsure of implementation
?	22. MoE, Mangochi	Majuni at Secondary School Box 40, Namwera, 09-366-254 a.c. or 08-310-391 a.c.	26. PEA – Adrian Chilumpha	*1*	-	• Unsure of implementation
?	23. MoNR, Mangochi	Box 221, Mangochi, 01-594-425	27. FA – R. Zande	*1*		• Unsure of implementation
?	24. NASFAM, Mangochi	P/bag 1, Namwera 08-504-256 e.k.	28. Mang Mgr – Elisha Kakhabwe	*1*		• Unsure of implementation
?	25. Total Life Care	Harold lives in Chowe Box 404, Mangochi	29. Agric Com Dev. Fac – Harold J. Chipale	*100*		• Unsure of implementation – using ideas with TLC, need update. • Supporting Majuni Community Irrigation. Sharing open-pollinated seeds with others.
?	26. WFP, Mangochi	Mangochi.FAM@wfp.org; 09-953-909 w.n. or 01-593-377	30. Food Aid Monitor – Willy Ng'ambi	*1*		• unsure of implementation
Workshop Cooks	Neptune Resthouse, Restaurant and Bar	Namwera Boma	Mrs. Dias & family	*0*	-	• Good understanding of low input food preparation and meal planning
	MULANJE	all sites are near the *boma* and to the west		*0*		

Model Development sites & Potential trainers

Models	Organization	Contact info & location	Participants	*number using the model*	*Model Rating*	Rating Description
Model	27. Likhabula CCAP House	About 4 km west of boma take road to Phalombe for about 10 km. Or, ask either in Boma or at Chitakale. Box 111, Mulanje 01-467-762, 09-336-593 e.m	31. Manager – Edna Mwale 32. Gardener – Fedson W. Ng'amina	*10*	***high***	• Highly supportive environment for concepts • Garden improved tremendously, in lowering input and increasing yields, starting to spread to other areas around the site • Arrange cooks for the low input menu and meals • **High potential for trainers and training site**
Model & Personal	28. MoH Mulanje Mission Hosptial	About 6 km west of boma take road to south for 3 km to hospital. Box 45, Mulanje mmh@malawi.net; 01-467-044/095, 09-265-842 e.g., or 08-869-782 b.k	33. PHC Nurse – Ebbie Gumbi 34. Garden – Bitter Steve Kalunga (left) 35. New Garden Officer: Felix Mkwate	*100*	***high***	• Greatly improved, breaking free from high input • Implementing concepts in garden, in life and around the hospital (grey water, reduced sweeping, using more waste) • Hospital seems supportive – much potential for spreading, especially if they can combine energy with the school • Has the potential to be amazing! Many resources still unused • Some staff starting to live the ideas personally, *** **Potential Trainer: Bitter & Felix already trainers with potential to advance**
Model & Personal Model	29. Tambala Model Village	Difficult to give directions, take someone from MoA or OXFAM, or ask at Mulanje Mission Hospital. Box 221, Mulanje	36. VDC Chairman – Simoni Kafodya	*100*	***high***	• Understands concepts well and teaches well – potential trainers and training site if concepts are applied to all settings. • Starting to capture local resources, more to use • Needs a bit more experience with design • Using the ideas personally in life *** **Potential Trainer: already a trainer, potential to advance**
Model & Personal Model (Mr. Saidi)	30. MoE Ulongwe Model School	About 4 km south of Mulanje Mission Hospital. Box 112, Mulanje 09-334-123 j.v.	37. Head Teacher, Jimmy Villiera	*200*	*medium*	• Started at borehole to use water and reduced sweeping the grounds (forests). Doing very well at borehole but need to apply concept to other areas. • Working on water management and soil health and could very easily extend to other areas • One committee member doing at home – Mr. Saidi
Model & Personal Models (2)	31. MoH NRU	NRU is at the old hospital, near prison and MoA offices. Box 227, Mulanje 01-466-211,01-466-295 09-255-651 m.k., 08-521-041 a.d	38. CHN – Margaret Kamdende 39. CHN – Annie Dillah	*10*	*medium*	• Brand new site, implementing basic ideas and starting to really understand. • Has many other people to consider at the hospital, but environment seems supportive • Both nurses live the ideas personally at home. *** **Potential Trainer: Both have potential**
Model	32. Nachimango AIDS CBO	About 15 km (?) east of Luchenza on Mulanje Road on south side of road. Sign posted. Box 112, Luchenza	40. Coordinator – Gedson Namanya	*200*	*medium*	• Implementing a lot in the villages, many sites are old sites that are improving • Not doing much at office, many resources to capture there
Personal Model	33. Staff MoE	Box 43, Mulanje 01-466-322 or 08-385-024 m.z	41. PEA – Mary Zimba	*1*	*medium*	• Already had small garden using similar ideas, not sure of implementation progress.

Model Development sites & Potential trainers						
Models	**Organization**	**Contact info & location**	**Participants**	*number using the model*	*Model Rating*	**Rating Description**
?	34. ProBEC (Pro for Bio-mass Energy Conserv.)	Box 438, Mulanje *ifspstaff@africa-online.net;* *01-466-279 or 08-894-744 v.c.*	42. Food Trainer - Veronica Chimulambe	*1*	*medium*	• Office started applying ideas on one side of building • Veronica already doing some of the ideas at home, unsure of implementation progress. *** **Potential Trainer: already a trainer, potential to advance**
?	35. MoAIFS, Mulanje	Mulanje Boma near prison and old hospital Box 49, Mulanje 01-466-299/4, 08-383-671 s.m 09-221-202 h.m., 01-467-107 h.m.	43. AEDO – Harriet Magomero 44. AEDO – Samson S. Mulenga	*2*	-	• Unsure of implementation progress, both AEDO's support models.
?	36. MoNR, Mulanje	At Likhabula Box 50, Mulanje 01-467-718	45. Forestry Asst. – Gertrude Maole	*1*	-	• Unsure of implementation progress, hadn't started implementing at the time I visited her home.
?	37. WFP, Mulanje	Mangochi Boma 01-466-250, 09-952-154 l.c., 08-866-257 m.m	46. previous FAM – Martin Mphangwe FAM Lusungu Chitete	*1*	-	• Unsure of both FAMs implementation progress.
	NKHATA BAY	all sites are 20-40 km south of the *boma*		*0*		
Model	38. Healthy Malawi / Kande Beach	Best to go to Kande Beach / Soft Sand Café and ask for someone to take you. While at Kande Beach visit Caroline and Timbo who are using permaculture at their home. sandraverbaan@planet.nl; sandraverbaan@malawi.net; softsand@africa-online.net; 01-357-376 c.w. or 08-572-586 c.w.	47. Gardener – Simone Saka	*50*	***high***	• Already a model started in 2003. • Guilds around every building, harvesting water, inter-planting well, integrating animals, live fencing, etc. • Advanced designs to feed the orphan children who come for food and school. *** **Potential Trainer: already a trainer, potential to advance. Site is great venue for future trainings.**
Model	39. MoE Sanga Primary	about 20 km south of Nkhata Bay turnoff, then about 5 km west of Sanga bus stage P/A Gong'otha, Sanga 09-371-122 r.p.	48. School Committee – R. Phiri	*200*	***high***	• Excellent energy and support at school, some teachers using ideas personally at home • Implementing 'edible landscaping', reducing sweeping, using sweeping pits for food production, planting at hand washing stations, using borehole runoff. • Excellent diet diversification meals for us at least! *** **Potential Trainer: probably more than one trainer from site**
Model	40. Katongomala Model Village	Located in Tukombo just off of main road Chief lives just near the cell phone tower. Could ask at Banda's development org. P/A Tukombo, PO Kande	49. V.H. Katongomala – James Chirwa	*100*	*medium*	• Applying ideas to own home, potential to be a high yielding area. • Using diet diversification, at least when we are there! • Just starting to spread ideas to community, potential to be great! *** **Potential Trainer: already a leader and trainer, potential to advance**

Model Development sites & Potential trainers						
Models	**Organization**	**Contact info & location**	**Participants**	*number using the model*	*Model Rating*	**Rating Description**
Model	41. NICE Farmer's Club	Located at Kapeska. Ask at bus stage. Road is at the bus stage, but not the one to Makuzi beach. Box 38, Chituka, Chintheche 01-352-206	50. Coordinator – W.K. Manda	*10*	*medium*	• Brand new site, implementing basic ideas starting to really understand. • Needs more practice and design *** **Potential Trainer: already training small group, potential to advance**
Model	42. Ripple Africa (Mwaya)	Just on the north end of Kachere. Sigh posted. Take road to east for about 5 km. c/o PO Box 75, Chintheche 09-383-645	51. Project Manager – Force Ngwira	*100*	*medium*	• Implementing personally and beyond, Understands concepts well and teaches well, Needs a bit more experience with design • Needs to, and can, break free of donor dependency and tap into local resources available. *** **Potential Trainer: already training and organizing, potential to advance**
Model & Personal Model	43. Sanga HBC	Located at Sanga bus stage. Ask for Davie Longwe, AEDO Kaonga, or Stevenia Mbewe Box 82, Nkhata Bay	52. Volunteer – D. Longwe	*50*	*medium*	• Implementing personally very well in his marsh garden, but not using ideas at home yet • Community garden still very high input thinking, needs support to implement ideas. Clearing grasses, making paths, and assessing area. Small forest spring located on site.
Personal	44. Staff MoAIFS	Kamanga: Ask at MoA office in Tukombo, P/A Tukombo, PO Kande, 01-357-236 a.k. Kaonga: Near Sanga bus stage, Box 132, Sanga.	53. AEDO (Tukombo) – A.M. Kamanga 54. AEDO (Sanga) – W. Kaonga	*2*	*medium*	• Unsure about Kamanga's implementation progress. • Kaonga is applying well at home, reducing erosion, covering soil, using wasted resources. Already was using some of the ideas before the project. *** **Potential Trainer: Kaonga has potential to advance**
Model & Personal Models (3)	45. VIBITAC (Vision Bible Training and Accommodation Centre)	Located on the main road, just north of Kande. Sign posted. Take road to east about 4 km. Box 29, Kande skansengwa@yahoo.co.uk; 01-357-383 s.k. or 09-204-883 s,k.	55. Director - Sidney Kansengwa 56. Gardener – Richard Phiri 57. Committee – Wadson Mambo Chirwa	*100*	*medium*	• Started implementing ideas personally and a bit beyond, Struggling with project implementation at work. All using ideas personally in life- huge potential to tap into wasted resources! • Arranced cooks for low input menu planning and preparation. *** **Potential Trainer: Sidney and Richard have potential to advance. Venue superb for workshop accommodation, food, field visits and practicals.**
Model & Personal Model	46. MoH Kachere Health Centre	Located right in the middle of Kachere on the main road. P/Bag 3, Kande	58. HSA – Dyzon V. Manda 59. Gardener – Grace Ndlovu	*10*	*low*	• Site has struggled for years with organizing food production gardens, seems to be communication and structure issues. • Much potential in terms of resources. • Personally has started implementing at home which may spread
?	47. MoE. Nkhata Bay	Box 45, Sanga 01-352-224 nkby, 08-392-856 e.k.	60. PEA – E.K. Mwase	*1*	-	• Unsure of implementation progress
?	48. MoG, Nkhata Bay	Sanga bus stage 01-352-297/231 (MoG Nkhata Bay)	61. SCDA (Sanga) – S.T.C. Mbewe	*1*	-	• Unsure of implementation progress

Model Development sites & Potential trainers						
Models	**Organization**	**Contact info & location**	**Participants**	*number using the model*	*Model Rating*	**Rating Description**
?	49. WFP, Nkhata Bay	Located in Mzuzu at St. John's staff housing. Covers areas Chitipa to Nkhata Bay. Box 505, Mzuzu mzuzu.FAM@wfp.org; mtendechipeni@yahoo.co.uk; 09-265-165 d.n. or 08-395-333 d.n.	62. Field Monitor– Dominic Nyirongo	*1*	-	• Unsure of implementation progress
?	50. CADECOM	Located about halfway between Chintheche turnoff and Nkhata Bay Boma at Parish. Box 49, Nkbay 01-352-297/231	63. Zone Care Facilitator – P.J.B. Munthali	*1*	-	• Unsure of implementation progress
	Other Districts	Each Participated in Model development		*0*		
?	51. ADRA	contact via ADRA main office p/bag 951, LL, 01-758-077 adramalawi@malawi.net adralilongwe@malawi.net 08-370-192 (d.k.)	64. Crop Diver Faci – David Kankwatira	*1*	-	• Attended Kasungu workshop
?	52. CARE	contact via CARE main office p/bag A89, LL, 01-775-846/740 hazel@caremalawi.org 09-920-581 (h.k.)	65. Health & Nutr – Hazel Kantayeni	*1*	-	• Attended Kasungu workshop
?	53. World Vision International	contact via WVI main office Box 692, LL	66. Food Distributor – Esnat Nseula	*1*	-	• Attended Mulanje workshop
?	54. Concern Universal	contact via CU main office 01-623-761/262 samson.hailu@concern-universal.org; jaykuyeli@yahoo.com; 08-879-678 j.k.	67. Chiradzulu Coor. – Janet Kuyeli	*1*	-	• Attended Mulanje workshop
Model ?	55. GOAL	contact via GOAL main office Box 31807, BT3. 01-456-463 09-337-067 (d.s.)	68. Nsanje Garden Manager – Daniel Singano	*50*	-	• Attended Mulanje workshop
?	56. The Salvation Army	contact via TSA main office	69. Trainer – Elvis Mthyoka	*1*	-	• Attended Mulanje workshop
Model ?	57. Malawi Red Cross Society	contact via MRCS main office or Box 217, Salima, 01-262-800 mrcsfoodsalima@africa-online.net; 09-404-134 (k.e)	70. FFW Officer– Kennedy Efeyani	*2000*	-	• Attended Kasungu workshop
?	58. MSF-Luxembourg	contact via MSF-L main office	71. Farm Home Asst – Ruth Jofilisi	*1*	-	• Attended Kasungu workshop
?	59. UniMA Chancellor / Polytechnic	contact via Chancellor college	72. Nutrition Chemist - David Tembo	*1*	-	• Attended Kasungu workshop

Resource Organizations by technical topic

The organizations and resources listed below are arranged according to the type of assistance they offer related to this manual. Some organizations fit under several topics, but I have tried to choose what I felt was their primary technical topic, along with a few linkages under the various topics. The topics are:

* Agriculture	* Fish	* HIV & Food	* Nutrition
* Edutainment	* Food Security	* Irrigaition	* Permaculture
* Energy Use	* Funding	* Land Use	* Trees
* Environment	* Herbal Medicines	* Local Plants	*

(Please note that all contact information is subject to change as organiztions relocate, restructure, or update their communication systems)

Technical Topic	***Organizational Resources:***	***Contact information***	***Comments***
Agriculture	Bunda College	Mitundu, PO Box 219, Lilongwe.	Indigenous Foods, Land Resource Management, Nutrition, Seeds
Agriculture	Civil Society Agric Network	cisanet@globemw.net;	Network for any person
Agriculture	COOPI	P/bag 67, LL. 01-751-851. lilongwe@coopi.org;	Technical support / Development
Agriculture	COSPE	Area 3 TLC offices, dsg@malawi.net;	Integrated food security project in Nkhotakota
Agriculture	East and Southern Africa Small-Scale Farmers' Forum (ESAFF)	c/o PELUM Association Regional Desk, Independence Avenue 324, PO Box 320362 Woodlands, Lusaka, Zambia. +260-1-257115. Fax +260-1-257116. pelumrd@coppernet.zm , www.pelum.org.zm	ESAFF has offices in many countries in Africa.
Agriculture	Farmers Union of Malawi	City Centre, Nurses & Midwives Bldg, P.O. Box 30457, LL, 01-776-167	Support to member farmers nationwide
Agriculture	IFAD / Smallholder Flood Plains project	Area 3	Technical support / Development
Agriculture	Int'l Crops Res Inst for Semi-Arid Tropics (ICRISAT) / Consultative Group on In Ag Res (CGIAR)	Chitedze Ag Research. Station, ICRISAT, Box 1096, LL 01-707-057/67	Seed for semi-arid tropics
Agriculture	MALEZA	Area 4, P/bag 91, LL. 01-727-623, vezaint@malawi.net;	Technical support / Development
Agriculture	Ministry of Agriculture, Irrigation & Food Security (MoAIFS)	Capital Hill, Box 30134, LL3. 01-789-033, techsec@malawi.net	
Agriculture	MoAIFS, Agricultural Research Dept	Chitedze Agricultural Research Station, Box 158, LL. 01-707-222 nasc@malawi.net	Genetic Seed banks provide Indigenous seeds

Technical Topic	Organizational Resources:	Contact information	Comments
Agriculture	MoAIFS, Farm Diversification Income Development Dept.	Capital Hill, Box 30134, LL3 farmincome@globemw.net	Diversification
Agriculture	MoAIFS, Gender and Development	Area 4 at Agricultural Communications Branch, 01-750-379 gadunit@sdnp.org.mw;	Gender
Agriculture	MoAIFS, Malawi Agricultural Sector Investment Program	Area 4, agro-economic survey building, Private bag 8, LL. 01-756-532	
Agriculture	OPAL – Optimistic Partners in Agricultural Livelihoods	opal@horizonmalawi.org;	Development
Agriculture	Penal Reform International	01-770-141, fsandor@penalreform.org;	Diversified agriculture
Agriculture	Rodale Institute / Organic gardening	www.organicgardening.com	Technical publications on organic farming and regenerative farming.
Agriculture	SARNET/IITA (Southern Africa Root network?)	Chitedze Ag Res. Station, Box 158, LL. 01-707-213	Seed
Agriculture	Sasakawa Global 2000	City Centre, Dev House	Reduced input maize growing
Edutainment	Polytechnic, Blantyre, Theatre for Development	Blantyre	
Edutainment	Story workshop	P/Bag 266, Blantyre. 01-621-657, 01-621-335. swet@malawi.net;	Development
Energy use	Aprovecho	http://www.aprovecho.net/	Designs efficient, low emission, cooking and heating stoves
Energy Use	Legacy Foundation	Richard Stanley, rstanley@legacyfound.org	Briquette making, long history with working in Malawi, based in USA now.
Energy Use	ProBEC (Prog for Biomass Energy Cons. in Southern Africa) / Integrated Food Security Prog.	Box 438 Mulanje. 01-466-279, 01-466-435. ifspmulanje@malawi.net; ifspstaff@africa-online.net	Trainers in improved stove designs of mud or metal Food security and HIV
Energy Use	Renewable Energy Industries Association of Malawi (REIAMA)	Area 3 Hashim bldg, Mandala Rd, near Total Land Care 01-750-551, reiama@sdnp.org.mw;	Solar, Wind
Energy Use	Renewable Energy Policy Project, REPP	http://www.repp.org/	Great pages on all forms of improved energy. Discussion groups and terrific archives on making fuel efficient stoves of all types.
Energy Use	Solar cookers international, SCI	919 21st Street #101, Sacramento, CA 95814 U.S.A., T: +1 (916) 455-4499, F: +1 (916) 455-4498 info@solarcookers.org or http://solarcookers.org/basics/how.html	

Technical Topic	Organizational Resources:	Contact information	Comments
Environment	Coalition of Journalist for Environment & Ag, COJEA	City Centre – at TEVET cojea@lycos.com;	Media stories on the environment
Environment	Community Partnerships for Sust Resource Mgt in Malawi, COMPASS II	Able House - 1st Floor, 8 Hannover Avenue, Pvt Bag 20, Blantyre. 01-622-800	
Environment	Mulanje Mountain Conservation Trust, MMCT	Box 139, Mulanje	Many creative livelihood & protedtion programmes around the mountain, small plant and tree nursery
Environment	Ministry of Parks, and Wildlife	Capital Hll	Food Security via natural resources
Environment	Wildlife & Environmental Society of Malawi - Secretariat	Executive Director, P/Bag 578, Limbe, 01-643-428, fax 01-643-765	Seed, Mostly trees, but also some other perennials. Nurseries in Lilongwe, Blantyre and Zomba.
Fish	also see JICA, Concern Universal, and Bunda College		
Fish	Ministry of Natural Resources (MoNR), Fisheries	Capital Hill, Fisheries, Box 593, LL. 01-788-511/441	
Fish	World Fish Centre	Domasi, Zomba. jnagoli@worldfishcenter.sdnp.org.mw	Great library and laboratory
Food Security	Also see Ministry of Agriculture under Agriculture and Nutrition; ProBec under Energy Use; and all Permaculture organizations.		
Food Security	Action Against Hunger	Area 4, LL. 01-759-667, 01-758-992, hom@aahmw.org;	Training
Food Security	Action Aid	Mchinji Roundabout. 01-757-500	Advocacy and food & nutrition trainers
Food Security	Adventist Development Relief Aid?, ADRA	Area 9 plot 102. P/Bag 951, LL.. 01-758-077 adramalawi@malawi.net; adralilongwe@malawi.net;	NGO
Food Security	AfriCare	Area 9	
Food Security	Canadian Physicians for Aid and Relief, CPAR	Box 30998, LL3. 01-757-811 office, 01-758-522 prog. cparll@malawi.net;	Technical support / Development
Food Security	CARE	City Centre, P/bag A89, LL. 01-775-846/740, 01-774-738	Technical support / Development
Food Security	Catholic Development Commission, CADECOM Natl.	Area 3, Box 2185, LL. 01-766-645 caritasmalawi@malawi.net; nutfoodsec@malawi.net;	Technical support / Development
Food Security	Catholic Relief Services, CRS	Area 3, Mchinji Roundabout. 01-7-55-534	Development
Food Security	CCAP Blantyre Synod	Box 413, Blantyre, btsprojects@globemw.net	Zomba integrated sustainable agriculture training site
Food Security	CCAP Livingstonia	Box 137, Champhira. synodev@sdnp.org.mw	Technical support / Development
Food Security	Christian Hospital Association of Malawi, CHAM	City Centre. 01-775-180. chamsec@malawi.net;	Technical support / Development

Technical Topic	Organizational Resources:	Contact information	Comments
Food Security	Concern Universal, CU	01-623-761/262	Technical support / Development
Food Security	Concern World Wide, CWW	Area 4, LL	Community Therapeutic Feeding Food Security
Food Security	Emmanuel International, EI	P/bag 12, Zomba, 01-524-391. ei-malawi@malawi.net;	Technical support / Development
Food Security	European Union Public Works Project	Area 3, Chilambula	Gardens, irrigation, tree nurseriers
Food Security	Family Health International, FHI	City Centre, Arwa house	Development HIV focused
Food Security	GOAL	Box 31807, BT3. 01-642-009	Technical support / Development
Food Security	I-LIFE consortium	Area 4 - H.B. House. 01-754-011, 01-754-012	Development
Food Security	Malawi Red Cross Society, MRCS	Area 14 Box 30096 LL3 mrcsfood@africa-online.net; mrcsnutritionist@africa-online.net;	Technical support / Development
Food Security	Management Sciences for Health, MSH	Area 4	
Food Security	MSF-Luxembourg	Box 219, Thyolo. 01-473-674/411. MSFL.Blantyre@brussels.msf.org; Msfb-thyolo@brussels.msf.org;	Technical support / Development
Food Security	National Association of Small-Holder Farmers in Malawi, NASFAM	City Centre, NASFAM house. 01-771-842 ceo@nasfam.org; or nasfam@nasfam.org;	Technical support / Development
Food Security	National Initiative for Civic Education, NICE - Main office	Area 4 HB house LL	Technical support / Development
Food Security	Natural Resources College	off Mchinji Road, 11 km west of LL.	Working toward low input food and nutrition security curriculm
Food Security	One Village One Product	City Centre, Eurpoa House	Development
Food Security	OXFAM	Box 213, BT. 01-620-813	Development
Food Security	Plan Int'l	City Centre. Box 2053, LL. 01-770-699	Development
Food Security	Polytechnic, Chemistry	p/bag 303, BT3	Food processing, food science
Food Security	Save the Children US	Area 4. 01-753-888	Development
Food Security	St. Gabriel Hosp.	P/bag 1, Namitete. 01-274-213, 01-274-263. stgabriels@malawi.net;	Development
Food Security	The Salvation Army	Box 51140, Limbe. 01-645-709. sa-projects@malawi.net;	Development
Food Security	US Peace Corps	Area 3, Murray Road. PO Box 208, 01-757-157/667 cd@mw.peacecorps.gov	

Technical Topic	Organizational Resources:	Contact information	Comments
Food Security	VSO	City Centre, LL above British Council Library	Development
Food Security	World Food Programme - Country Office	City Centre. Box 30571, LL3. 01-774-372/666	
Food Security	World Vision International	Area 4. Box 692, LL	
Funding	CIDA	City Centre	
Funding	DFID	City Centre. 01-772-400	
Funding	European Union Commission	City Centre, Big glass bldg. 01-773-199	
Funding	EU Micro projects	City Centre, Dev. House. 01-774-977/975 microprojects@microprojectsmw.org;	
Funding	FAO (Food and Agricultural Organization of the UN)	Area 13, Box 30750, LL3. 01-773-263, fao-mwi@field.fao.org	and technical assistance
Funding	JICA	City Centre, RAZA Plaza. 01-771-644. jicamw@jica.go.jp;	Fish
Funding	SIDA	City Centre	
Funding	UNICEF	City Centre, PO Box 30375, LL 3, 01-770-788	
Funding	USAID	City Centre, Nico House	
Funding	World Bank	City Centre, Development House	
Herbal Medicines	Action for Natural Medicine (Anamed)	Schafweide 77, D-71364 Winnenden, Germany. Fax +49 7195-65367 anamed@t-online.de , www.anamed.org	Many superb print materials, training workshops and technical support.
Herbal Medicines	Chifundo Herbal Project	Montfort Mission, PO Box 280, Balaka	
HIV & Food	Digintas International	PO Box 1071, Zomba. 01-525-420. www.dignitasinternational.org	Development
HIV & Food	NAPHAM – Nat'l Assn for People Living with HIV	City Centre, LL. 01-770-641. naphamed@malawi.net; napham@malawi.net;	Supporting and encouraging low input high output sytems
HIV & Food	National AIDS Commission	Area 14, Big Glass Bldg. 01-770-022	Supporting and encouraging low input high output sytems
HIV & Food	OPC, Nutrition & HIV	City Centre. P/Bag 301, LL3. 01-789-725	Policy direction
HIV & Food	UMOYO Network	Umoyo House, Victoria Ave BT. Private Bag 254, Blantyre. 01-622-517, 01-621-022/348, 01-624-680 networks@malawi.net; Or in LL at: Amina House, Chilambula Rd	Development
Irrigation	Also see Land Resource Centre, Land Resoruce Conservation Department, and Total Land Care		
Irrigation	Agro-in Farming – water resource & irrigation development	Area 3. PO Box 1097, LL 01-758-620 home	Artesian wells

Technical Topic	Organizational Resources:	Contact information	Comments
Irrigation	Freedom Gardens	Lumbadzi, Dowa. 09-912-655 or 09-931-265	Permaculture-like designs, amazing water use designs.
Irrigation	MoAIFS, Irrigation Department	01-752-122	
Irrigation	Rainwater Harvesting Association of Malawi	Area 3 near Total Land Care. c/o Land Resources Conservation Dept (MoA), p/bag 49, LL	Training, technical assistance
Irrigation	WaterAid Malawi	Area 4, LL, Amina House	Composting Toilets
Land Use Design	Land Resource Centre	Area 3, Box 30291,LL3. 01-753-430, resourcecenter@malawi.net;	Irrigation, agroforestry, local seeds
Land Use Design	Land Resource Conservation Department (MoAIFS)	Area 3, above Land Resource Centre Box 30291, LL3. 01-755-048. landcons@malawi.net	
Land Use Design	Ministry of Local Government (MoLG)	Capital Hill. Ask at each town or city assembly.	Designs for public works – buildings, roads, market, water and sanitation systems Almost every city council has a nursery.
Land Use Design	Participatory Ecological Land-Use Management	PELUM Association Regional Desk, Independence Avenue 324, PO Box 320362 Woodlands, Lusaka, Zambia. +260-1-257115. Fax +260-1-257116. pelumrd@coppernet.zm , www.pelum.org.zm	Produces Ground Up – a publication promoting sustainable agriculture and food security. Malawi also has a desk located at CURE, Blantyre
Land Use Design	Total Land Care	Area 3, LL. sdi@malawi.net;	Seed, Trainers
Local Plants	also see topics: Permaculture and Herbal Medicines also see orgs: Land resource centre, Total land care, MoAIFS Agricultural Research, Wildlife and Environmental Society of Malawi		
Local Plants	National herbarium	Lilongwe in City Centre, Zomba near Government	Seed and seedlings
Local Plants	University of Malawi Chancellor	Box 280, Zomba. 01-527-133	Local Foods and nutrient compostion
Nutrition	also see topics: Nutrition & HIV		
Nutrition	Ministry of Education (MoE) School Food & Nutrition Unit	Capital Hill. p/bag 328, LL3. 01-789-422	School Nutrition
Nutrition	Ministry of Gender (MoG) Nutrition Unit	City Centre. P/Bag 330, LL3. 01-770-411	Community Nutrition, Recipies
Nutrition	Ministry of Health (MoH) Nutrition Unit	Capital Hill. Box 30377, LL3. 01-789-400/8-201	Medical Nutrition
Nutrition	MoAIFS, Nutrition Extension	Area 4 at Agricultural Communications Branch. 01-755-522	Food Posters, Recipes

Technical Topic	Organizational Resources:	Contact information	Comments
Nutrition	Nutrition Society of Mal.	Bunda College Nutrition Department, Box 219, LL 01-277-222/436. Malawi-Nutrition@yahoogroups.com;	Nutrition advocacy and professional development. Members in almost every district.
Permaculture	Food Gardens Foundation	Johannesburg, South Africa, unsure of contacts, sorry.	
Permaculture	Lukwe Permaculture Gardens	Leiza Dupreez, Box 20, Livginstonia, 08-204-515	Seed small-scale sharing, Training.
Permaculture	Mangochi Orphan Eduation and Training Centre (MOET)	Box 328, Mangochi, 08-873-270, moet_mwcharity@yahoo.co.uk	Seedlings, trainings
Permaculture	Maziko Amoyo Wabwino Organization	Box 34, Chapananga, 01-429-506	
Permaculture	Nordin Family	Chitedze Trading Centre, Post Dot Net X-124, Crossroads, LL. 01-707-213. Nordin@eomw.net	Seed small-scale sharing,Training, well-networked around the world
Permaculture	Pa Nthunzi	Nyambadwe, Blantyre. 01-623-980. walker@globemw.net;	Seeds, Trainers, Landscape services indoor and outdoor
Permaculture	Permaculture Network in Malawi	PO Box 32587, Blantyre. permaculturemw@yahoo.com.au; Membership and newsletter editors: Nordin, Post Dot Net X-124, Crossroads, LL. 01-707-213. Nordin@eomw.net	Members in every district of Malwi.
Permaculture	Walker, June	Thanthwe, PO Box 46 Monkey Bay. 01-587-656. junewalker@Africa-Online.net	Seed small-scale sharing,Training, well-networked around the world
Trees	Int'l Centre for research in AgroForestry(ICRAF). World AgrFor Centre / Future Harvest	Chitedze Ag Research. Station 01-707-332 http://worldagroforestrycentre.org	Seed locally sourced

Resources Print & Electronic by technical topic

The Print and Electronic Resources listed below are arrange by technical topic as related to this manual The topics are:

* Agriculture	* HIV & Food
* Sustainable Development	* Local Plants & Animals
* Design	* Permaculture
* Food & Nutrition	* Trees

Technical Topic	*Print or Electronic Resources*	*How to access*	*Notes*
Agriculture	African Gardens and Orchards: Growing Vegetables and Fruits	MacMillan Education Ltd, 1989. Land and Life series. CTA Tchnical Centre for Agriculture and Rural Co-operation, Postbus 380, 6700 AJ Wageningen, Netherlands. http://www.cta.int/ Hugues Dupriez, Philippe De Leener. ISBN 0-333-49076-2 or 2-87105-008-2	Not completely low input, but a lot of good technical information on agriculture and some food processing. CTA has additional newer materials
Agriculture	Agriculture Crop Production Handbook	MoA. 2004?	Haven't seen personally myself, not sure how practical it is.
Agriculture	Better Farming Series	Food and Agricultural Organization of the Unitied Nations, 1988. www.fao.org ISBN92-5-102583-5	
Agriculture	Centre for Information on Low External Input and Sustainable Agriculture (LEISA)	PO Box 64, 3830 AB Leusden, The Netherlands. ileia@ileia.nl www.ileia.org	Great for programme managers, most information needs adaptation to use directly with communities.
Agriculture	Dimba la Kumpanda	June Walker. Permaculture Network in Malawi. (1990's) Out of print, contact June Walker or Stacia Nordin for photocopy	Nice step by step and practical tips for kitchen gardens.
Agriculture	Growing Positively: A Handbook on Developing Low-Input Gardens in Zimbabwe	Anna Brazier, John Snow International (Europe), June 2005. JSI website (www.jsieurope.org). For organisations that cannot download documents, they can write to: Information Officer, JSI Europe, 66 South Lambeth Road, Vauxhall, London, SW8 1RL, U.K.	Based on their development programme's experiences.
Agriculture	Low cost farming in the humid tropics: an illustrated handbook	Island Publishing House, Inc. Manila, PO Box 406, Metro Manila, Philippines. Paul Sommers ISBN 971-1007-02-9	

Technical Topic	*Print or Electronic Resources*	*How to access*	*Notes*
Agriculture	Principles Behind a Kitchen Garden: A resource and training manual	Food and Agricultural Organization of the United Nations / Malawi, pilot 2005.	Built on FAO and partner's experience since 2003 in implementing Kitchen Gardens in 18 NRUs and surrounding communities.
Agriculture	With Drought in Mind materials: Many different booklets available: Water, Soil, Income generating, vegetable production	Isaiah Nyagumbo. * Swidish cooperative Centre;* SADC Centre of Communication for Development;* Smallholder drought mitigation programme. ISBN 0-7974-2057-6	NASFAM and MMCT have them in Malawi. All in English language.
Design	Holistic Resource Management	Allan Savory	MMCT Quite Detailed, but good for good english readers and scientific-minded people.
Design	One hundred and one technologies. Ottawa, Ont., IDRC, 1992. 231p.	International Research Centre, PO Box 8500, Ottawa, Ontario, Canada, K1G 3H9	
Design	The Humanure Handbook	Jenkins Publishing, 1999. PO Box 607, Grove City, PA, 16127 USA. www.jenkinspublishing.com ISBN 0-9644258-9-0	Superb, need a small booklet for training. Jenkins' copyright allows free information sharing for non-profit purposes.
Design	Where there is No Artist	Intermediate Technology Publications, 1997. 103-105 Southhampton Row, London WC1B 4HH, UK. Petra Röhr-Rouendaal. ISBN 1-85339-891-6. http://www.itdgpublishing.org.uk/	Excellent, it would be great to have one Made for Malawi specific issues
Fish	Simple methods of Auqaculture CD	Chief, Inland Water Resources and Aquaculture Service (FIRI), FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy or e-mail them to jiansan.jia@fao.org.	A compiliation of fish farming manuals from the FAO Training Series.
Food & Nutrition	CD Food and Nutrition Library 3.0	Copies for non-profit dissemination can be obtained either free or at minimal cost to cover CD-ROM production and mailing costs either from: United Nations System Standing Committee on Nutrition, c/o World Health Organization, 20 Avenue Appia, CH 1211 Geneva 27, Switzerland, Telephone: +41-22-791 04 56, Fax: +41-22-798 88 91. scn@who.int , http://www.unsystem.org/scn Human Info NGO / Humanity CD, Oosterveldlaan 196, B-2610 Antwerp, BELGIUM, Tel : 32-3-448.05.54 - Fax : 32-3-449.75.74,humanity@humaninfo.org , http://www.humaninfo.org	

Technical Topic	*Print or Electronic Resources*	*How to access*	*Notes*
Food & Nutrition	Community Nutrition training manual for extension staff. & Poster sets	MoAIFS, Nutrition Extention, Area 4 at Agricultural Communications Branch. 01-755-522	Superb Posters, every organization working with ANY aspect of Food should have them, use them and promote them.
Food & Nutrition	Creative Cooking	Stacia Nordin, Malawi, 2001. nordin@eomw.net	available for cost of copying electronically or print
Food & Nutrition	Dry It You'll Like it	www.dryit.com	Get one online - Could Adapt
Food & Nutrition	Early Childhood Development	MoG. 2004? City Centre. P/Bag 330, LL3. 01-770-411	Has small section on food and nutrition
Food & Nutrition	How to Grow a Balance Diet: A handbook for community workers	VSO Books, 1998. 317 Putney Bridge Road, London SW15 2PN, UK. www.vso.org Ann Burgess, Grace Maina, Philip Harris, Stephanie Harris ISBN 0-95090-50-6-2	Great info on different crops, basic nutrition, food preparation and growing plants. Only partially a low input approach.
Food & Nutrition	How to process and preserve fruits through drying	SADC-ISCAF Agroforestry Project (about 2000?). Makoka Agricultural Research Station, PO Box 134, Zomba. Alexandra Schomburg	Other materials probably available as well.
Food & Nutrition	Improving Nutrition through Home Gardening: A training package for preparing field workers in Africa	FAO, 2001. ISBN 92-5-104388-4 download from www.fao.org http://www.fao.org/DOCREP/003/X3996E/X3996E00.HTM (English) ftp://ftp.fao.org/docrep/fao/005/x3996f/x3996f00.pdf (French)	Very good manual, some low input ideas included.
Food & Nutrition	Malaŵi's Traditional and Modern Cooking	Chitukuko Cha Amayi m' Malaŵi (CCAM), 1992. Office of the President and Cabinet, Lilongwe, Malawi. ISBN 99908-0-000-6. Out of print - Contact Stacia Nordin to borrow mine to photocopy. June Walker has details of development and printing of book.	Needs to be put back into print!! Excellent, practical resource on preparing food.
Food & Nutrition	Recipies for Malawi	MoAIFS, Nutrition Extention, Area 4 at Agricultural Communications Branch. 01-755-522	
Food & Nutrition	Recipies for Malawi	MoG. 2004? City Centre. P/Bag 330, LL3. 01-770-411	
Food & Nutrition	Soyabean Cooking in Zambia	Department of Agriculture, Integrated Crop Management / Food Legume Project ZAM/92/003. Dave Wynne	Contact me for a copy.

Technical Topic	*Print or Electronic Resources*	*How to access*	*Notes*
HIV & Food	CD on PMTCT, Infant feeding, HIV and Food and Nutrition Security.	Academy for Educational Development, Global Health, Population, and Nutrition Group, 1825 Connecticut Avenue NW, Washington, DC 20009. Eleonore Fosso Seumo. This CD-ROM is free of charge. Send request to nutritionandhiv@aed.org with your name and complete mailing address. You can also visit AED's website at www.aed.org	Excellent. Some practical ready-to-use training and educational materials along with reports and other reading materials.
HIV & Food	Living Well with HIV/AIDS: A manual on nutrition care and support for people living with HIV/AIDS	Food and Agricultural Organization of the Unitied Nations, www.fao.org	Very user friendly and written for personal use or field workers. A few minor errors, should be adapted with local foods when used.
HIV & Food	Positive Health Malawi Training of Trainers Edition	Working Group from different organizations adapted, compiled by Catholic Relief Services, CRS, Area 3, Mchinji Roundabout. 01-755-534	Based on Positve Health South Africa. CRS, and AAH held first training in 2005 with the materials, will be adapted after evaluation.
HIV & Food	Positive Health South Africa, 2005	Neil Orr and David Patient david@empow.co.za, or drp@mweb.co.za	A DVD set is also available with training and advocacy materials.
Local Plants & Animals	Food from the Veld : Edible Wild Plants of Southern Africa Botanically Identified and Described, January 1982	Delta Books. Francis William Fox, Desmond Hallowes, Marion Memma Norwood Young. ISBN: 0908387202	MMCT Huge resource book that has many plants that are in Malawi, too. Includes medicines, beauty aids and other useful items. Must get for shelf.
Local Plants & Animals	Guide to Indigenous Plants of Southern Africa	Briza Publications, PO Box 56569, Arcadia 0007, Pretoria, South Africa. www.briza.co.za	MMCT Look at on-line for ideas
Local plants & animals	Herbs: The visual guide to more than 700 herb species from around the world.	DK Publishing Book, 1994. 95 Madison Avenue, New York, New York 10016 USA. Lesley Bremness and others. ISBN 1-56458-497-6	Superb, includes many Malawian species with great pictures and brief descriptions. Malawi needs to make its own just like this one!
Local plants & animals	People's Plants: A guide to useful plants of Southern Africa	Briza Publications, 2000. PO Box 56569, Arcadia 0007, Pretoria, South Africa. www.briza.co.za . Ben-Erik van Wyk, Nigel Gericke, Janine Smit, and others. ISBN 1-875093-19-2	Superb, Malawi needs its own.
Local Plants & Animals	The Larger fungi of South Central Africa	Baobab Books Box 567, Harare Zimbabwe. Supported by NORAD. L. Ryvarden, GD Pearce, AJ Masuka. ISBN 0-908311-52-4	MMCT has a copy in Malawi, we need more print resources like this one.
Local plants & animals	Traditional Food Plants	FAO Rome, 1988. www.fao.org . ISBN 92-5-102557-6	

Technical Topic	*Print or Electronic Resources*	*How to access*	*Notes*
Local Plants & Animals	Useful Plants of Malawi	Montfort press, Limbe, 1974 (earlier editions 1955,1968, 1972 by Government Printer, Zomba). National Herbarium Zomba holds a copy.	Out of print, need advocacy to modernize with ideintificaiton pictures and reprint.
Permaculture	Permaculture Magazine: Solutions For Sustainable Living & Permacutlure Magazinge E-news Group	http://www.permaculture.co.uk/ Enews@permaculture.co.uk	Practical thought provoking articles on organic gardening, sustainable agriculture, agroforestry, eco-villages, alternative technology, eco-architecture and building, community development and much more, written by leading experts, plus useful tips from readers.
Permaculture	Permaculture Nutrition Training Manual, 2006 edition underway	Nordin@eomw.net	Currently being adapted, should be ready mid-2006
Permaculture	Permaculture Teacher's Guide	Permaculture Association (Britain) / WWF-UK 2000. BCM Permaculture Association, London, WCIN 3XX. office@permaculture.org.uk , www.permaculture.org.uk	Also useful for international settings
Permaculture	Permaculture: A sustainable way of farming	Fambidzanai Permaculture Centre, 1995-1999. PO Box CY 301, Causeway, Harare, Zimbabwe. Stephen Mann. 1995	Very applicable to Malawi, but quite technically written.
Permaculture	Permanent Publications	http://www.permaculture.co.uk/PP/About.html	an independent publisher, was set up in 1990. Its mission is to publish information which encourages people to live more healthy, self-reliant and ecologically sound ways of life
Permaculture	The Permaculture Booklet: South Africa's first grassroots permaculture manual	Trees for Africa, Box 2035, Gallo Manor, Gauteng 2052 South Africa. (011)-803-9750 fax (011)-803-9604. Support form Eskom Community Development Fund. Michelle Nel	Great little manual covering the basics with good drawings. Many species also found in Malawi. Contact me or WFP for a photocopy.
Permaculture	The SCOPE Activity Book: from the Schools and Colleges Permaculture Programme	Anna Brazier, 2003. College Press Publishers Box 3041, Harare, Zimbabwe. SCOPE Box, CY 301, Causeway, Harare, Zimbabwe. ISBN 1 77900 463 X	Superb tool for anyone working toward food and nutrition security in school settings.

Technical Topic	*Print or Electronic Resources*	*How to access*	*Notes*
Sustainable development	Footsteps: A quarterly newsletter linking development workers around the world	PO Box 200, Bridgnorth, Shropshire, WV16 4WQ, UK. footsteps@tearfund.org , www.tilz.info	Superb for field workers. Free.
Trees	How to build a tree nursery & raise seedlings in Malawi	Department of Forestr/EU. Social Forestry Training and Extension and Project (SOFTE) 2003.	some low input ideas included
Trees	Nkhalango! A Social Forestry Model, Experiences from Blantyre City Fuel wood Projects in Southern Malawi	Randi Kaarhus, et al. Noragric - Agricultural University of Norway	NASFAM KU office has copies and likes them

Most of these references can also be found on the resource lists for organizations or print / electronic materials:

[1] Permaculture Nutrition Training Manual, Kristof & Stacia Nordin, 1999-2005 versions. 2006 draft version. nordin@eomw.net

[2] FAO Training Series, Handbook on Small-scale Freshwater Fish Farming, From Simple methods of Auqaculture CD. Chief, Inland Water Resources and Aquaculture Service (FIRI), FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy or e-mail them to jiansan.jia@fao.org.

[3] Extension Aids Branch, Department of Extension and Training, Water Conservation for Everyone Lilongwe, Malawi: JN 12-6000-111-76. Contact MoAIFS, Nutrition Extension, Area 4 at Agricultural Communications Branch. 01-755-522

[4] http://www.wagga.nsw.gov.au/home-garden/pdf/Waterwise_Salt_tolerant.pdf

[5] Look in resources for: Ministry of Agriculture, Total Land Care, Land Resource Centre

[6] Renewable Energy Industries Association of Malawi (REIAMA), Area 3 Hashim bldg, Mandala Rd, LL 01-750-551, reiama@sdnp.org.mw.

[7] Agro-In Farming– water resource & irrigation development Area 3. PO Box 1097, LL. 01-758-620

[8] Food Garden Foundation, Johannesburg South Africa

[9] Principles Behind a Kitchen Garden: A resource and training manual Food and Agricultural Organization of the United Nations / Malawi, pilot 2005. Area 13, Box 30750, LL3. 01-773-263, fao-mwi@field.fao.org.

~ The End of the Manual ~