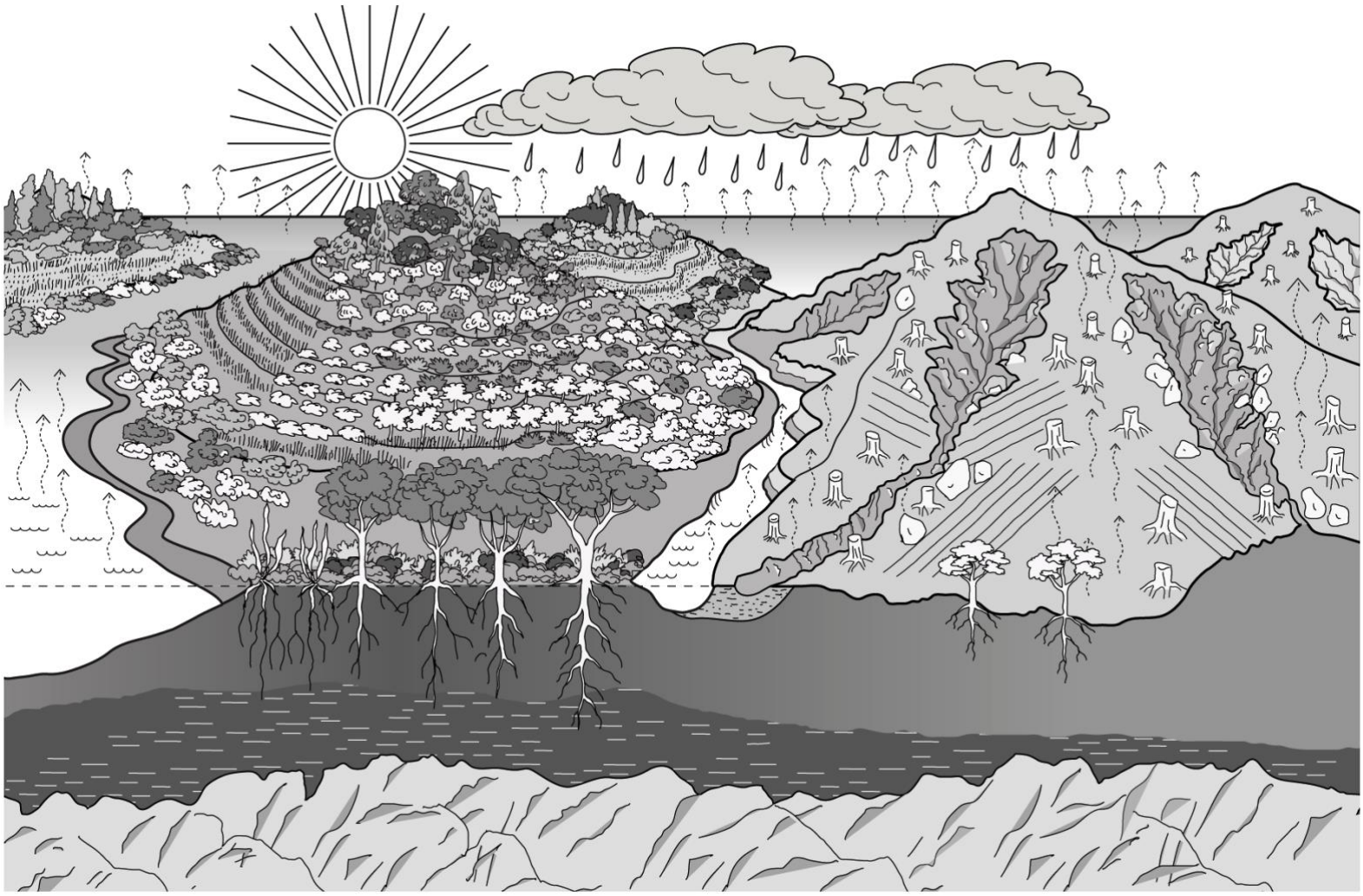
Draft for feedback - 2021.08.21

Building Back Better

Working Together to Prevent Floods



Sustainalble Nutrition Flyers are adapted from the:

Sustainable Nutrition Manual (SNM)

Food, Water, Agriculture & Environment

http://bit.do/SustainableNutritionManual

WFP

World Food Programme

wfp.org

Are you tired of the floods that have become an annual occurance in Malawi?

Did you know that there are 8 districts who have experienced 5-8 floods from 2000-2013? That's a flood every other year! The districts are: Chikwawa, Karonga, Mangochi, Machinga, Nkhata Bay, Nsanje, Salima, and Zomba.

Five other districts have been affected by three or more floods between 2000–2013, or just about one every three years. The districts are: Ntcheu, Phalombe, Blantyre, Nkhotakota, and Dedza

Unfortuntely flooding is becoming more frequent in other districts as well. Remember the flooding in Lilongwe and Blantyre every year from about 2015 to 2020? There were huge financial losses.

What causes these floods? No, it is NOT just rain.

Much of the flooding is a result of environmental degradation such as from the loss of tree cover, or because homes, schools, and business sweep their soil bare and hard, or cover it with pavement or concrete, casuing water to run off.

This pamphlet is going describe how YOU can change this in your community and in Malawi. The steps are NOT difficult, in fact, once you have a mindset of Earth Care and People Care, you'll start to see many solutions to our current problems.

The information is taken from the Sustainble Nutrition Manual (SNM), which you will want to read if this pamphlet inspires you. The SNM also includes information about hudreds of other people already working together to "Build Malawi Back Better".

Topics covered in this pamphlet include:

- **WORKING TOGETHER TO PREVENT FLOODS**
  1. Earth Care: The Nature Cycle
  2. People Care: Working Together
- **KEY TO PREVENT FLOODS: WATER, SOIL, BIODIVERSITY, PEOPLE**
  1. Be Water Wise with 4 S's: Slow – Spread – Sink – Shade
  2. Soak up Water with Healthy Soil
  3. Slow Water & Wind with Biodiversity
- **DESIGN & PLAN BETTER TOGETHER**
  1. First: Organize people
  2. Second: Analyze the Site (Observe, Ask questions, Think)
  3. Third: Mapping & Designing
  4. Fourth: Implement your Design with an Action Plan
  5. Fifth: Maintain, Monitor, and Assess your Design
- **SNM: FOOD, WATER, AGRICULTURE & ENVIRONMENT**
  1. Sustainable Nutrition Part 1 - Healthy Humans
  2. Sustainable Nutrition Part 2 - Healthy Environments
  3. Sustainable Nutrition Part 3 - Healthy Designs
- **GET YOUR OWN FREE COPY OF SNM**

Working Together to Prevent Floods

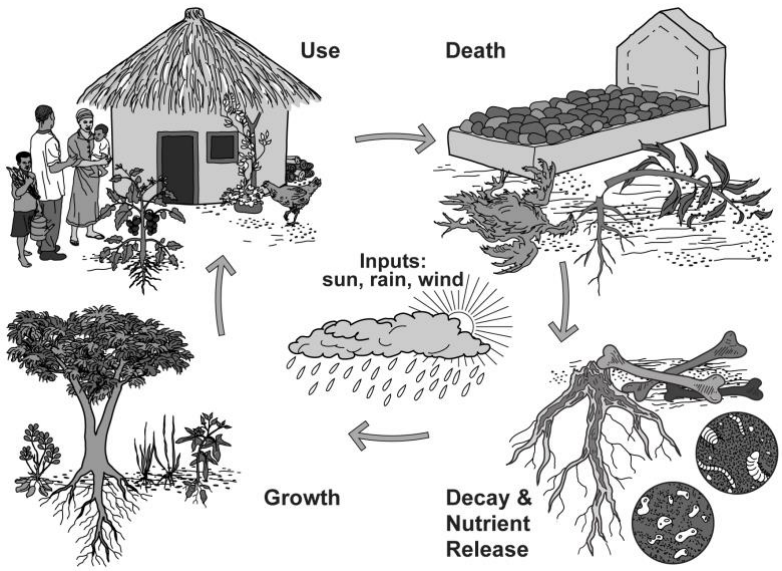
Some people claim that floods are a result of the devil, magic, or politics, but the reality is that a lot of the problems we've had with flooding in recent years is because of what we are doing in our communities – or what communities uphill are doing. Therefore, we need to work together to understand the Earth and what we can do differently in our communities to prevent or lessen floods.

1. Earth Care: The Nature Cycle

The Nature Cycle is the source of all our sustainability and must be used wisely if its resoruces are to go on sustaining us. If we work with Nature's Cycles, they will provide us with everything that we need to live. But if we break the circles, and destroy the cycle, it will not be able to give us what we need to live.

Poor, degraded soil must be repaired and improved. We need to understand the Water Cycle, and why it is important to conserve water and use it wisely. We need to encourage variety and diversity of plant and animal life in all environments.

The Nature Cycle



2. People Care: Working Together

Human Systems need to protect and conserve the Natural Systems of the environment. Stern Kita did a study on the 2015 floods and wrote an artlce called "*Can we 'Build Back Better'? Lessons from floods recovery framework development and implementation in Malawi"*, where he reports a disconnect between the public and experts.

He concludes that: "…long-term recovery requires adequate planning … with continuous consultations with the affected community and other key actors … This is key to the principle of 'Building Back Better' in the long-term" (Kita, 2017).In addition to Kita's ideas, we will also apply:

> *"The framework was not aligned to needs of the people as expressed by them."*
>
> *Stern Mwakalimi Kita*

3 Permaculture Ethics:

Earth Care, People Care, and Fair Share.

Permaculture is a way of designing human systems and thinking sustainably about our lives and our impact on the world. Permaculture comes from **permanent** + **culture**.

As members of our communities and organisations, we need to encourage good policies for education, agriculture, health, the economy, transport, energy, industry, etc.

Key to prevent floods: Water, Soil, Biodiversity, People

Although we will never know exactly what the weather will bring, we can design our homes and communities better by understanding nature. There are three key points to prevent floods:

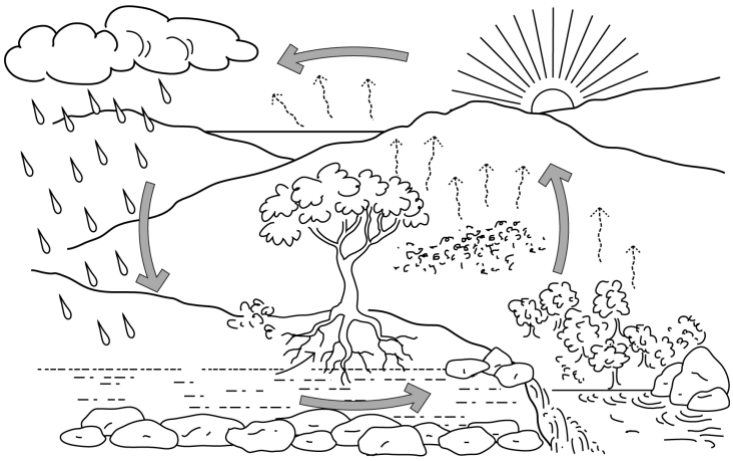
1. Be Water Wise with the 4 S's: Slow – Spread – Sink – Shade
2. Soak up Water with Healthy Soil
3. Slow Water & Wind with Biodiversity

1. Be Water Wise with 4 S's: Slow – Spread – Sink – Shade

It is important to humans and all living things to have a healthy Water Cycle. Water can be very easily disturbed by human activity and affect us and the whole environment we live in.

Water falls as rain and filters through the soil where it is absorbed to feed the plants and trees. Water transpires out of the leaves and evaporates off other surfaces where it condenses and falls again as rain to continue the cycle.

We can mimic this cycle to have healthy clean water – not too much (floods) and not too little (droughts)!



Water Cycle: Rainfall, filtration, absorption, transpiration, evaporation, condensation, rain, etc.

Water Table

The water table is the highest level of water in the soil.

☑ If the water table is high, you can find water quickly when you dig.

☒ If it is low, it takes a lot of digging to find the water table.

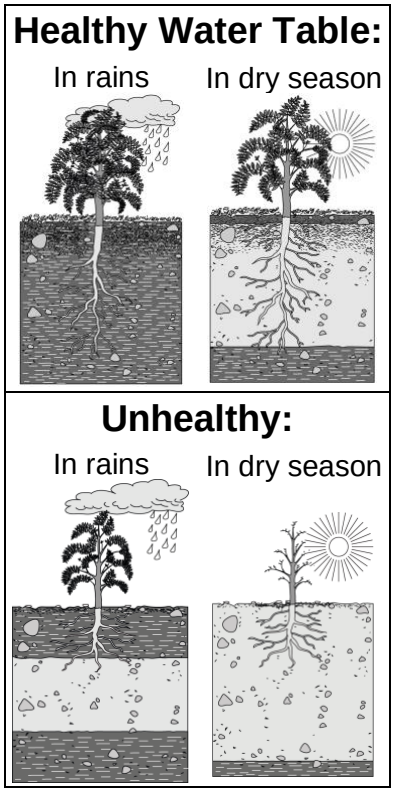
An unhealthy water table is often low because water has not been able to sink deeply, because the soil is bare and hard.

The soil has absorbed only a little bit of water, but most of the water has been washed away, down the slope.

You can see there is a dark wet area of soil, near the surface, but the pale soil under this is dry and hard because the water isn't sinking into the soil properly.

The surface probably has no mulch or plants for ground cover, or is covered in cement or pavement, so rain falls hard, compacting the soil as well as washing it away.

The roots of the plants and trees cannot grow deeply because the soil is too dry and hard. These plants and trees are stunted and weak and more likely to die if there is a dry spell.



There are Solutions! Let the 4 S's guide you: Slow – Spread – Sink – Shade

1 - SLOW water down so that it 'walks' and doesn't 'run'. Slowing the water gives water more time to soak into the soil so it filters through the layers fully and fills up the underground water stores.

2 - SPREAD the water out to make the most use of it. Design so that all parts of an area get some water when it rains and there is not too much water in one place.

3 - SINK the water into the ground to filter and store it. Healthy soil is alive, with many tunnels in it from insects, animals and from the roots of different plants and trees. This helps the water to soak in easily. The soil filters the water, so it is clean and filles the water table to be stored underground.

4 - SHADE the water to reduce evaporation. Nature plants lots of trees and bushes, climbing and creeping plants that protect the soil from the sun, wind and rain. Lots of low growing plants cover the ground and keep large areas of soil cool and shaded, so any rain, dew or moisture can soak in. You can copy this process with mulch, ground-cover plants, and many bushes and trees.

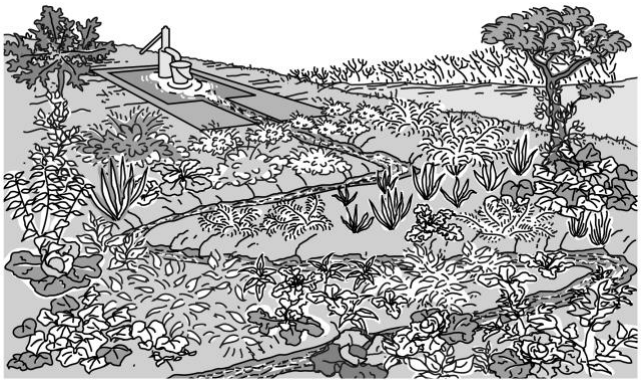
Problem!

A bit better, but won't last

This is better: Slow, Spread, Sink, Shade

Spread it and use it!

Water run-off is wasted if it does not flow towards something useful. Harvest the water round wells, boreholes, and any source of run-off water. Water is also wasted when washing clothes or dishes. Direct the water somewhere it will be useful to grow plants.



A tale of two homes

Two homes in the same area, with about the same resources, but one family makes the most of their resources by designing with Permaculture. Which community will have less floods?

The Bengos waste their water by not thinking. Water 'runs' away flooding their neighbour's land and leaving their home unproductive and dry.		The Bandas wisely harvest water by 'walking' it into trees, gardens, and tanks. Their plants and trees are thriving, and their neighbours are doing the same.	

Slopes

Some land should not be disturbed and is best left to nature, or very carefully design for orchards or forests. Any slope above 45 degrees needs special care. These are areas that are a huge risk for causing floods if care is not taken.

It is harmful to plant in lines that go downhill, but it is very common in Malawi. It damages soil, water, and the infra-structure downhill, such as roads and bridges. Rows pointing downhill make water 'run' and causes soil roll, or wash off the hill, even faster.

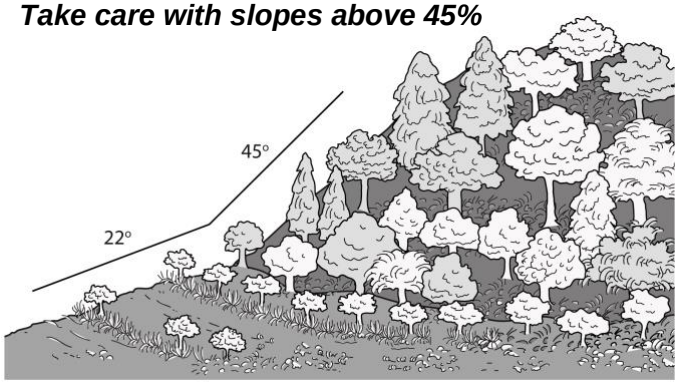
To repair damage on slopes you can work with the surface to slow water down and give it time to soak into the soil as it should.

Swales are ditches across a slope with ridges on the low side of the ditch to catch every drop of water and soil and prevent it from moving down the slope.

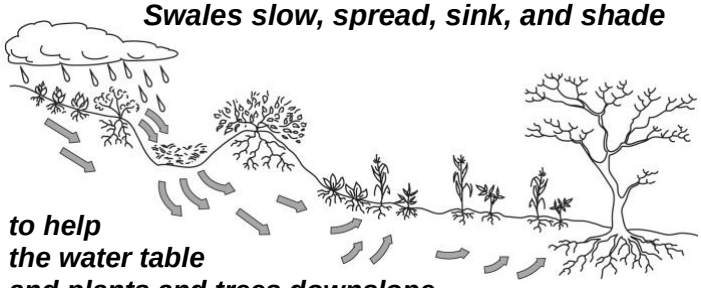
Rock walls can be built across the slope or in half-moons below the trees, on the lower side of the tree (down the slope), which works very well in rocky areas.

Terraces are areas that you flatten out on the side of the hill, each one a bit higher or lower than the other. The edges of the terrace are held in place with a wall or earth with very strong plants.

Take care with slopes above 45%

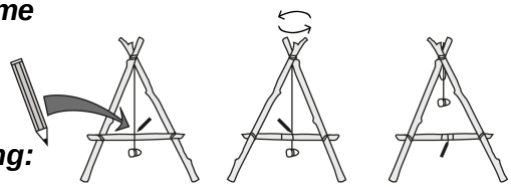


Swales slow, spread, sink, and shade



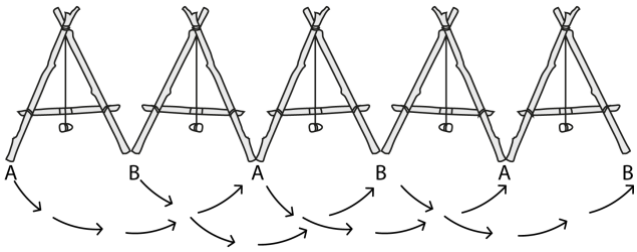
to help the water table and plants and trees downslope.

A-frame



Making:

Using:



An A-frame made from sticks, string, and a rock can help you find a level line across the slope (contour) for your swale, rock wall, or terrace. Make and use it as shown in the picture.

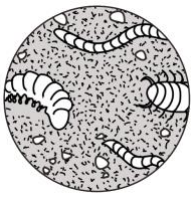
Perennials are very good for slopes as the roots go deeper into the soil than plants that only live for one year. Perennials often cope and survive even if there is lots of rain, or hardly any rain. Perennials are planted only once, but can keep being harvested for many years, so they conserve energy as well as preventing soil erosion.

Plant across the slope (on contour), using the A-frame if needed to help make a line across the slope, to slow down water giving it time to soak into the soil and stop soil erosion. Species such as vetiver grass, shrubs of different sizes, thorny vines, and many other strong species can be used.

2. Soak up Water with Healthy Soil

Think of any wild natural areas. Nature keeps these areas full of life and fertility.

In Nature digging is done by the roots of plants and trees, by animals scratching the surface, or insects burrowing underground.



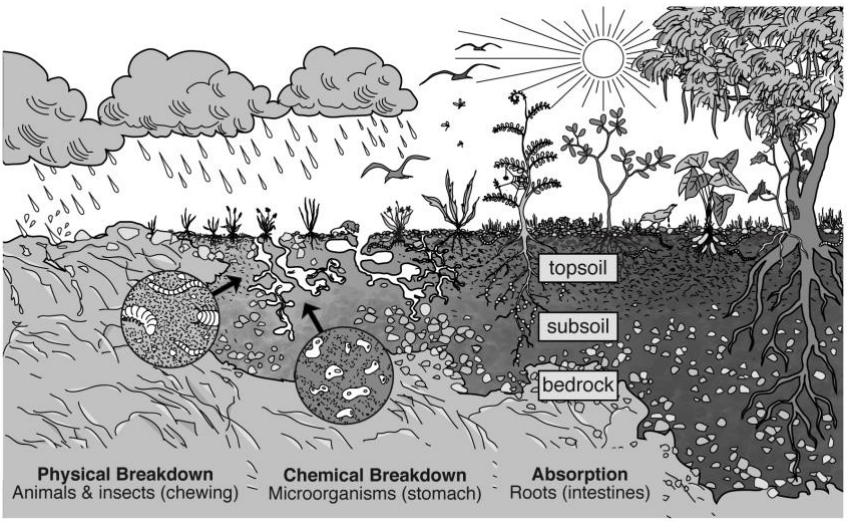
Animals often help, carrying seeds around on their fur or in their stomachs, ready to deposit (along with a dose of manure) back into the soil.)

The soil provides nutrients to the plants. The plants provide nutrients to animals and humans. (As well as animals providing nutrients to other animals / humans.) The plants, animals and humans provide nutrients back to the soil.

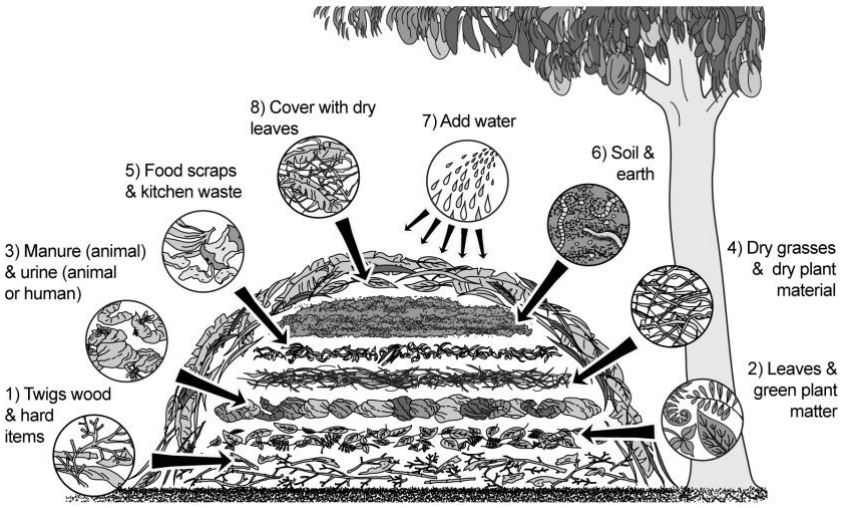
If we do not co-operate with this process the soil becomes unhealthy. Look at the list in the table and think about all the things that happen in your community to damage the soil. It doesn't have to be like this!

We can mimic nature to care for the soil. Now look at the list in the table and think about what you can do to change your home, school, or other part of your community.

There are many solutions!



What Damages Soil?	Care for the soil by:
☒ Cutting and clearing	☑ Clearing carefully
☒ Sweeping	☑ Sweeping less
☒ Burning	☑ Stop burning
☒ Digging	☑ Less tilling and hoeing
☒ Using chemicals	☑ Organics
☒ Mono-cropping	☑ Biodiversity
☒ Over-grazing	☑ Managing animals
☒ Compacting	☑ Mulching
☒ Disturbing steep slopes	☑ Taking care of slopes
☒ Paving	☑ Using windbreaks



3. Slow Water & Wind with Biodiversity

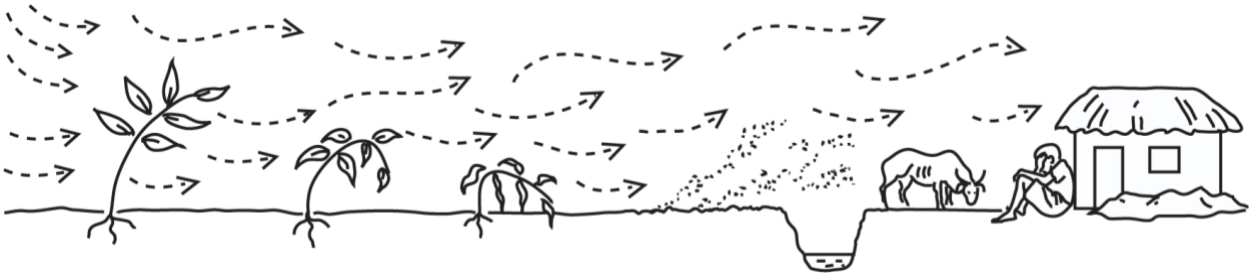
Wind and rain can damage your home and community and biodiversity. You need to know where the winds come from to put in windbreaks to protect your buildings, soil, and crops.

Wind breaks designed with trees and perennial plants of different heights, growing closely together, especially with a few thorny vines or spiky plants like sisal work well.

Perennials are plants, vines, shrubs, and trees that continue to grow for many years. As they grow, they get bigger and stronger, holding on to the soil and protecting from wind and water erosion. Place perennials in strategic areas to protect and shelter your house.

This can take a few years to become well-established. While waiting, you can use live fence poles such as include bloodwood (*mlombwa*), *kobo*, tree cassava (*mpira*), moringa (*chamwamba*), cassava (*chinangwa*), and jatropha (*msatimanga*) with grass or reeds to slow wind down.

Without a Windbreak:



- ☒ Wind dries the plants, and they wilt
- ☒ Soil dries up and blows away
- ☒ Rivers and streams dry up and get full of silt
- ☒ Less for animals and people to eat

With a Windbreak:

- ☑ Strong wind is slowed down by the tall trees
- ☑ Slowed some more by the shorter shrubs
- ☑ Plants hold the soil in position
- ☑ Soil is more fertile
- ☑ Water stays in the soil longer
- ☑ Crops do well and the harvest is good
- ☑ People and animals eat lots of different foods and are health and happy

Design & Plan Better Together

Anything made by humans, a cup, a car, a house, a hospital, a gate, a garden, clothing, or a committee has been designed, whether they are large or small, simple or complicated. Unfortunately, not everything is designed well or for sustainability. But we are going to change that!

You are going to make a design with your home and community that will prevent / reduce flooding that will include small designs for some of the things we have discussed. These small designs will be part of a bigger design for Sustainable Living that will affect many areas of your life and it is going to change many things for the better. Having knowledge and understanding is the first part of the design process, which you have already begun.

Now, you will think things through further, discuss the issues with others, and come up with creative ideas to change the way you design and use your area – with about 80% thinking and 20% labour (Gor example, if you have 10 hours of work ahead, about 8 hours of that time would be thinking and planning, and about 2 hours would be implementing the well-thought-out plan).

1. First: Organize people

Start with who and what you have, even if it is only yourself to begin with!

Existing Committees are important to create, find, and share information. There are committees at every level that you can get involved with. All government sectors, community leaders, businesses, religions, and other organizations are represented at these committees. Add your voice!

Every sector has their own committees at every level, and each committee is supposed to feed into that level's Development Committees.

- District Executive Committee (District Council level)
- Area Development Committees (Traditional Authority level)
- Village Development Committee (Village Headmen level)

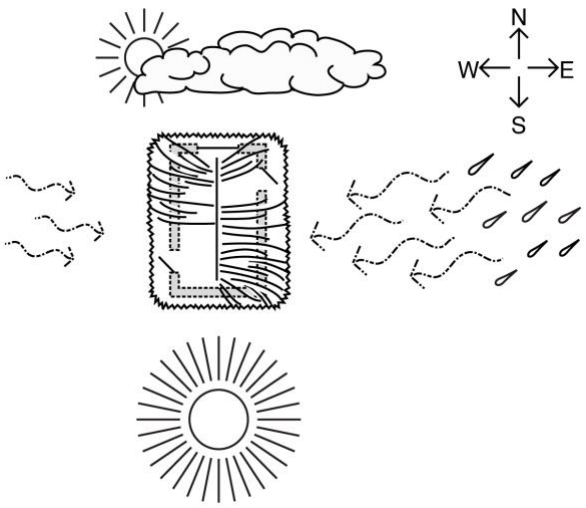
Under every committee there are many groups who organize themselves around specific interests. Floods involve many interests, so you'll want to approach people in agriculture, land ownership, forests, disaster, schools, religious groups, culture, youth, women's or men's group, business fora, etc. It can take time to find the right people who are interested in flood prevention, but as you meet more people you will develop a network of people that can keep growing.

2. Second: Analyze the Site (Observe, Ask questions, Think)

Choose your site: You should have an area that is 'yours' to improve – it might be through ownership, rental or responsibility, such as a school, office or hospital. You'll want to analyze and map the whole site, as a sketch at least. There are specific Traditional Authorities (TAs) that are most affected, and that is where we should focus our attention if we are going to understand why there is flooding in some areas and not in others. Some of the reasons will be because of the type of land or weather – and we can design with that in mind.

Observe your site: Think about what the area is like now. Thinking is the most important part of designing and can be creative and enjoyable. It will help you make the right choices and decisions. Go to the area that is your design site. Note your responses to the following questions, which will guide the development of your map, your records and eventually your design.

- **Walk around to see the site from different points of view**. Think about what happens at different times of the day and different times of the year? Do this several times to really get to know your site and ask others who know the area better than you do, or who just see it differently to you.
- **Where are the North, South, East, and West?** How does the sun move across the land at different times of the day? Which areas are always sunny or partly sunny? Which areas are always in shade or sometimes shady? Where does the wind mostly come from? What about the rains? Do these things change during the year?



- **What is the climate?** How does the climate change in different seasons? Have the seasons been similar every year or are they changing? Are there some areas of the site that are hotter, colder, wetter, and drier, sunnier, or shadier than other areas? (These are called micro-climates)
- **What does the soil look like?** Is the soil different in some places? Are there areas that have many plants and some that are bare? Think about all the things that might cause these differences: micro-climates, soil, moisture, sunshine, human activity etc.
- **Does the land slope?** If so, how much? Are there signs of erosion or soil loss?
- **How does water flow?** Think of rainfall but also run-off water from water points, roads or roofs. Where does the water go? Are there drains?
- **What is growing in the area?** Are there mature plants and trees? Are there annuals like herbs? Are there any food plants or other useful plants? Are there natural guilds already, with climbers, supporters, diggers, and food for the soil?
- **What signs of animal life are there?** Can you see any domestic or wild animals? What effects do they have on the area? What needs do they have? How can animals be encouraged and included in your design, so that they can add manure and serve other purposes?
- **How do humans use the area?** Are parts of it used for work, play, agriculture, animals, access, relaxation etc.? Can you find out the history of the area? History can help you learn what your site has experienced. These can be natural like flooding or fire, or it could be pollution and chemical use. Are there plans in place for that area? It is helpful to discuss history and future plans with people who use the areas near your site.
- **What kinds of buildings and other structures are there?** What are they made of and what are they for? How do these affect the water, sunlight, soil, wind, or rain? What effect does water, sun, soil, wind, or rain have on the buildings?
- **Are there roads, paths, driveways, or fences?** Where are people and animals walking? Do they use established paths or are they making their own? Do vehicles move through the area? If so, what sort of vehicles and why?
- **What improvements could be made?** What are the challenges? What are the solutions? With a lot of thought, some work and determination could this be made into a great place to live, work, travel through or play in?

Make a list of problems you have noticed: wasted space or water, soil erosion, shortage of food, loss of local knowledge, unhealthy practices, high use of firewood, unhealthy plants and soil, unnecessary use of chemicals, low yields, mono-cropping, mono-diet, piles of waste, etc. Your list of problems will hopefully turn into solutions over time.

Make a list of resources you have that can be used in your design: soil, minerals / rocks, sun, water, plants, animals, humans, and human materials. A big tree is a resource for food and shade and maybe it fixes nitrogen in the soil. Water is a resource that may be causing a problem right now but is a vital resource that we need to use more efficiently. Your resource list will grow over time.

Make a list of solutions for the problems you found, using the resrouces you have. All of this information will be used in your map, design, and action plan. All of these questions will change over time, and you will keep asking them as you monitor the area and make changes as needed.

3. Third: Mapping & Designing

Draw two maps of the area:

- ☑ **Map 1: as it looks now.** Note where the resources and problems are now, the sun, rain, wind, fire hazards and all the other key points that you found in your observation.
- ☑ **Map 2: your design map – your vision as you want it to look.** The design map wiill show what the area will be like in the future to prevent floods. It will show where you plan to put things, and what you plan to do where to make your area better.

All the areas of a map and design will be labelled so that anyone can understand your plan without being there. You will use simple signs and symbols to show everything that is in the area. You do not have to be an artist to do this! Do not worry about making the maps perfect or pretty.

For your design, you can use small pieces of paper or sticky notes and write each element (e.g., swale) on one note. You can move the things around until you are happy with the arrangement.

If you have doubts about anything, think and reflect on the issue. Resead this pamphlet. Ask others for advice and, most of all, ask yourself, what would Nature do? Everything in the design must be there for a reason, using the questions as a guide. It takes a while to remember these, but it soon becomes automatic to think like this. **This pamphlet can't go tinto detail on mapping and designing, use the Sustainble Nutrition Manual to guide you.**

4. Fourth: Implement your Design with an Action Plan

Your design and notebook will be full of things to do, but you cannot do them all at once, so **make an action plan** to know what needs to be done, who needs to do it, what resources will be needed and when it should be done. Whether you are working by yourself or with others in a group, an action plan is important to be organized and efficient.

Start small and let your vision grow as you see the results and the benefits they bring. You cannot write down everything that you will do over the next few years on one sheet of paper; start with a broad plan that will be a complete design and do a detailed action plan for the first few months or the first few projects you have chosen to begin with.

As you make these plans, think about the seasons, climate, other people's workloads, availability of resources and any other things that you need to turn your ideas into action.

5. Fifth: Maintain, Monitor, and Assess your Design

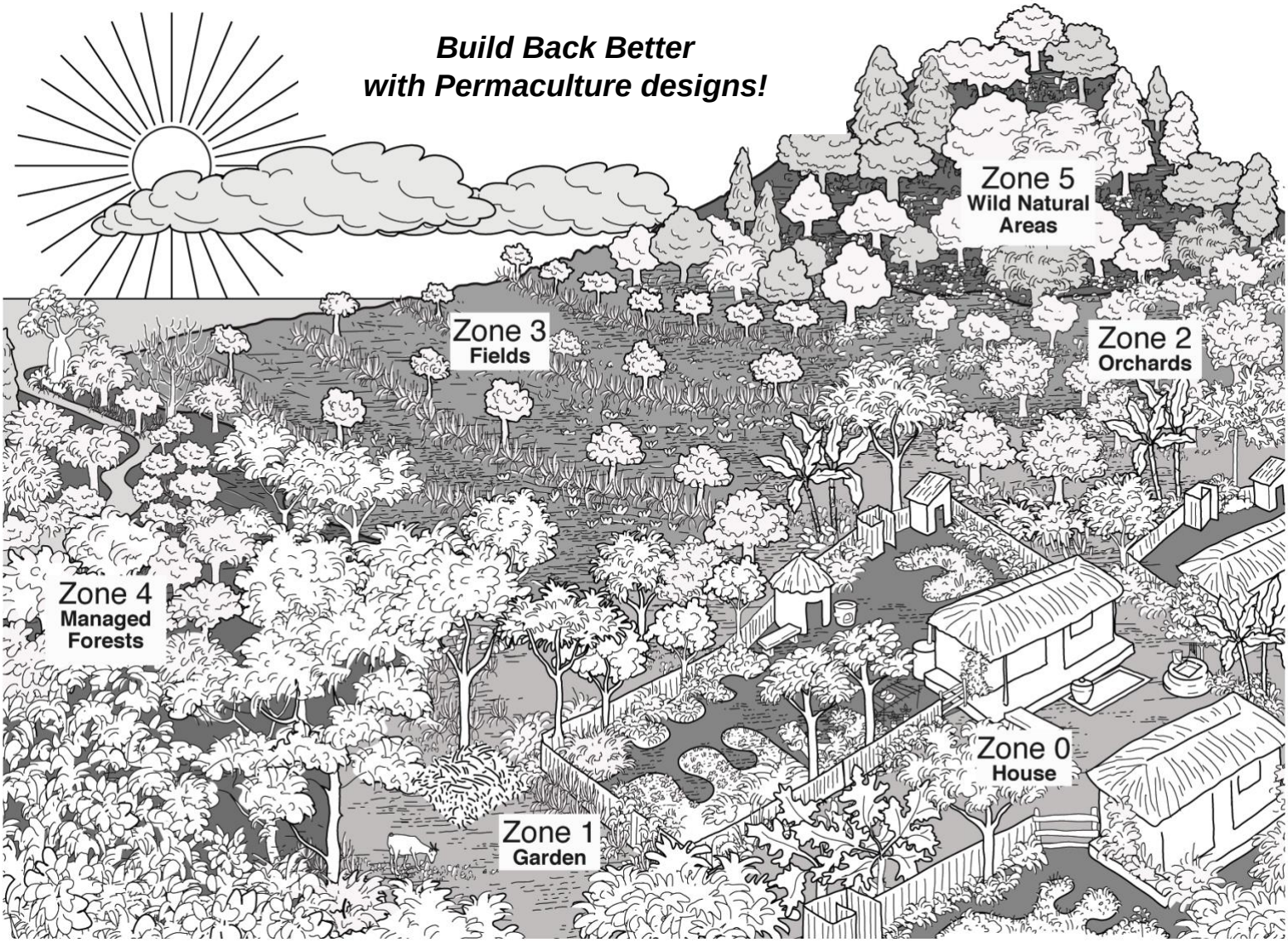
Monitor how things are working and adapt your design and action plan as needed. You should review the action plan every month or so. Ideas about your design might need to change as you start working on the action plan. That is fine as long as you tried to think it through first as best as you could. You will need to be adaptable and thoughtful throughout your work.

- Are you achieving the things you set out to?
- Are the results what you expected?
- What else do you need to do?

We hope this pamphlet has shown you the problems and solutions we have..

We CAN build back better after the flooding we experienced in the past.

We can start alone, but the more people we get to plan and design our communities together, the more problems we can solve.



SNM: Food, Water, Agriculture & Environment

The manual is for people who eat, grow or buy food and who want to improve their lives, their community and the environment that they live in. It has been written for, and by, people living in Malawi. It will show you how to eat and live better and guide you in designing a sustainable future.

The manual aims to show that by thinking differently and thinking sustainably you can improve your health, diet, lifestyle and surroundings easily and cheaply and gain an understanding of the term Sustainable Nutrition.

Use the ideas in the manual and you will be able to:

- Improve your diet and health
- Save money that was spent on food, medicines, and chemicals
- Double or triple yields and harvests (or even more!)
- Reduce the amount of watering in your gardens and orchards
- Reduce the amount of work done on your land and in your home
- Have healthier plants and animals
- Reduce infertile and unproductive areas of land
- Use free resources to improve soil and water in your area

1. Sustainable Nutrition Part 1 - Healthy Humans

Health Humans is about the human body and nutrition. You will also learn about food choices and the benefits of diversity in diet. It has lots of useful ideas to improve life and many delicious recipes and suggestions for tasty, healthy meals.

2. Sustainable Nutrition Part 2 - Healthy Environments

Healthy Environments is about natural systems and sustainability. You will learn about the Nature Cycle and the Water Cycle and natural sustainable systems. You will be introduced to Permaculture ideas and gain an understanding of the benefits of diversity in Nature.

3. Sustainable Nutrition Part 3 - Healthy Designs

Healthy Designs is about designing for sustainable living. This book brings parts 1 and 2 together and guides you to make a personalised plan for Sustainable Nutrition. This book is practical to design everything on your land. There is lots of information in the appendices about foods of Malawi and other resources that will be useful as your design develops.

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Sustainble Nutrition Manual: Food, Water, Agriculture & Environment.

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