

# Cultivating Learning with Gardens

## THE KUVUNA ONE WORLD GARDEN MANUAL



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*How to set up and use organic school gardens for Global Learning  
and beyond*

KF Reverse Alumni 2019

*Alliance for Empowering Rural Communities  
Ghana, 2020*

# Kuvuna One World Garden Manual

How to set up and use organic school gardens for Global Learning and beyond

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Partner in the KUVUNA project



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## 1 Introduction

At the Alliance for Empowering Rural Communities we have been able to establish a strong link between our Organic School Gardens Project and education for sustainable development through the Kuvuna One World Garden project. In the Kuvuna One World Garden project we have been supporting teachers and students with the knowledge to establish and run an organic school gardens as well as to use it as a learning and educational tool. The aim of Kuvuna One World Garden Project is to build well-functioning KF Reverse alumni network strengthened to contribute to the adoption of ecological strategies as models for sustainable development in the global south. This project also seeks to empower learners of all ages to become proactive contributors to a more just, peaceful, tolerant, inclusive and sustainable world.

We believe that global learning can be significantly strengthened by providing pupils with the opportunities to engage in hands-on, sustainable practices of school gardening. The pupils can engage all their senses and enlarge their awareness of the globally interlinked issues of climate change, sustainable food production and consumption to contribute to improved health and wellbeing.

We started the Kuvuna One World Garden project in 2020; since then we have provided expert support to 7 basic schools, 2 youth groups and 2 women

groups in Ghana, South Africa, Tanzania and Nicaragua. Since 2020, we've been developing tools and experiences on how to integrate organic school and community gardening and education for sustainable development. Based on these experiences, we have prepared this guide with the aim to provide support to schools, teachers and communities who want to develop school gardens or community gardens and use their many benefits for the pupils in the regular school learning, education process and communities. We also want to provide further opportunities for education for sustainable development in the schools.

The manual is focused mainly on the topics which, according to our experiences, are essential for the success of a "school/community garden project", but haven't yet been systematically covered. Of particular importance is the process of planning the organic garden school project, which has to be implemented as a "mini-social project" in order to succeed. In relation to the design of a school garden, we rely strongly on the permaculture approach. The manual further describes the main elements of an organic school/community garden from the specific school context. It looks into maintenance during the school holidays, as well as selected topics of educational use. Here we focus on education about farming and gardening as

well as food and nutrition, and global learning.

We don't elaborate on the details of organic gardening itself, because the information about this is widely available.

## Introduction to the SDGs

The Sustainable Development Goals (SDGs) are the foundation on which the Kuvuna project is built upon. They were first talked about in the year 2012 at the United Nations Conference on Sustainable Development. Three years later, all member states of the UN agreed upon 17 sustainable goals which should be achieved in the period 2015-2030. The view of the term development, which was mainly understood as economic development until this point, now also encompasses ecological and social aspects. The broader understanding is therefore reflected in the five Ps in which the 17 goals are categorized: People, Planet, Prosperity, Peace and Partnership. The prime objective is decent living for everyone, people are in the centre of the whole approach and this also accounts for the Kuvuna project. For this reason, the SDGs 1,2,3,4 and 5 are the most relevant ones. They deal with the goals "No poverty", "Zero Hunger", "Good health and well-being", "quality education" and "gender equality". In the manual each relevant SDG, also 12 (responsible consumption and production), 13 (climate action) and 17 (partnership for the goals), will be

However, we provide some recommended links.

We hope this guide will be useful both for newcomers as well as for already experienced users of school gardens, and most of all, we hope that it will support synergies between school gardening and education for sustainable development.

named throughout the text (indicated by each little box) to give an impression how important the SDGs are. Not only for the worldwide scope but also on the small one for a school garden. A guideline through unprecedented and uncertain times is of utmost importance. Action needs to happen on every possible plain.

First the actual state of affairs will be evaluated with possible effects of the pandemic to the implementation of the SDGs since half of the period is already over.

For SDG 1 "No poverty" the prospects seem to be very negative since people who are in extreme poverty have risen at around 120 million people. Employees in the informal sector were affected by the lockdowns the most: 75 % of them, which are 1.6 billion people. For SDG 2 "Zero Hunger" the ambitions went into the wrong direction because the number of people who are hungry increased by 161 million. Regarding the war in Ukraine worse effects are to be expected since they normally export a lot of wheat, especially to the global south. A shortage of fertilizers, seeds and veterinary drugs will also lead to

problems in food security. In the presence of the pandemic SDG 3 “good health and well-being” was impacted the most with around 500 million cases and 6.18 million deaths. Schools for more than 168 million children globally have been completely closed for almost a full year, says UNICEF. This isn’t just a problem on SDG 4 “quality education” alone because the consequences go beyond the educational mandate itself. Particularly girls were more restricted by it than boys by way of example that 10 million additional girls are at risk of child marriage over the next decade due to school closures. A holistic approach that doesn’t just look at one single SDG alone helps a lot here. Not only in schools are the consequences everything but equal between genders. Women are far more often in contact with the virus as they work in social jobs and do most of the care work. That noted the economic consequences are a lot worse for women. In the field of SDG 12 the

decrease of supply chains holds possibilities for a sustainable alternative where consumption and method of production are local. Urban school gardens, like Kuvuna, are a prime example how it could work and benefit people. The reduction of CO2 was just short-term, the world is currently on track to three degree Celsius. Global partnerships are impacted a lot since they depend on external financing. With all of that in mind the SDG Moment from the UN came to the following conclusion:

“The world is neither hopeless nor helpless. With the SDGs as a north star, we know what needs to be done and have the tools to do it. Ending the pandemic and advancing equitable, inclusive and sustainable recovery efforts is the first step to getting the SDGs back on track.”



## 2 Reasons for establishing a school garden

### The missing link

For many adults and children, gardening can be the missing link between their daily life and nature and – indeed – their daily food! In modern societies, the alienation from nature and food growing

is a serious issue. People fail to understand the depth of the problems we are facing worldwide, whether it's climate change or the deterioration of the quality of the food we eat, or the very availability of food on the global level.



School gardening creates a special relationship with education for sustainable development possibilities. A school garden (or community garden) can be an innovative demonstration site, education and learning tool that provides a holistic experience for pupils or community group. All the senses get involved and social interactions are stimulated and enhanced. By setting up this interactive space, school or community gardening literally opens the possibilities for new experiential education methods and contents.

### *Why should Community or school gardens be organic, permacultural, edible?*

Community or School gardening is a great tool to promote understanding and implementation of sustainable development in general. More specifically, however, it focuses on sustainable agriculture and sustainable and healthy eating habits using the guiding principles of organic gardening, permaculture, and growing one's own food.

By implementing organic farming methods, we raise an awareness on the sustainable production of food and demonstrate how it is done, while at the same time providing experiential learning for pupils.

The concepts of permaculture – the development of agricultural ecosystems intended to be sustainable and self-sufficient help us to design a smart school,

needs-oriented garden within the given conditions, to maximise knowledge input, and to minimise work and costs.

Growing edible plants in community or school gardens enables the development of a deeper understanding of food production and the importance of sustainable management of agro-ecosystems. It further helps children to develop their food-related senses, especially taste and smell, and the ability to recognise the quality of the products they buy and eat. It teaches them about the diversity of vegetables, fruits, herbs, and foods in general and the importance of obtaining nutrition from a wide variety of foods, particularly plants, for their health, well-being, and enjoyment.

### *School garden – a tool for any class and beyond*

Beyond these basic principles, school gardens can be used to support the learning process of almost any desired school topic – from mathematics to languages, and not only “the usual subjects” such as nature science or biology.

School gardens also provides possibilities for building up social competences of the pupils. It has the potential to improve the relationships and daily communications among the pupils themselves as well as with the teachers.

School gardens support better understanding of the importance of food security, addressing climate change and promoting sustainable development.

Last, but not least, school garden also provides many opportunities for developing links and cooperation with the local community, through different school actions addressed to the public, on-going cooperation with local partners, and the like.



In regards to the first SDG the Kuvuna project helps to decrease poverty in the way that less money is needed to be spent for food. In another sense it can also enable children to learn skills about gardening which might help some of them to find a job after school. Better job prospects can lead to a decrease of poverty.

## **Benefits of School or Community Gardens**

Throughout human history people have used gardens of all sizes to produce foods for their households – and sometimes to sell. The science and techniques of gardening have been passed down to us by our ancestors. Growing sufficient and safe food is essential to life, and millions of agronomists and scientists have devoted their professional lives and applied rigorous scientific methods to improving food production.

For more than 100 years, schools and communities around the world have cultivated gardens, not just to grow food for meals or to earn money, but also to use as demonstration sites for experiential learning. In countries all over the world, government leaders are interested in improving food security, while ministries of agriculture and education are concerned with improving academic outcomes. Small gardens in communities and near the school classroom can address both of these priorities.

### 3 How to start your school garden

Starting a community or school garden depends on the situation at the specific school or community. Every situation is specific in many aspects—from the area available, to the characteristics of the site, to the social situation. Nevertheless, through the experiences with our Organic School Garden Programme (in

Ghana) we have been able to identify some key issues which need to be considered when starting a community or school garden project.

These issues are:

- ❖ Define your primary aims: what do you want to achieve with the community or school garden, what are your top priorities? Of course we are pleading for a largely “edible garden” where vegetables, fruits, herbs... are the core plants to grow, whenever possible!
- ❖ Describe and assess your physical/spatial possibilities for setting up the garden (the type and the dimensions of the area/surface available; availability of direct sunlight, water ...).
- ❖ Assess your social situation: existing or expected support/opposition of the relevant parties, colleagues, teachers, management, other school staff... for the school garden project.
- ❖ Keep in mind that it is better to start small and grow gradually, in line with the growing experiences and support.
- ❖ Look for professional help and support, if available and/or necessary: is there an organization or program in your country or region that would support the development of school gardens or similar type of activity?

Prepare an action plan which define actions and stakeholders.



The prime objective of a gardening project is to grow and harvest fruits and vegetables while making it available to all people at the school and maybe around it. The most weak people in a household often fall short on food and suffer malnutrition which is counteracted with a guarantee of food at school.

## 4 Learning While Gardening

Students and communities can learn many things from school and community gardens.

These include the following:

1. Intellectual development and academic skills: science, math, environment, scientific methods, problem solving.
2. Social and moral skills: patience, cooperation, joy and dignity of work, responsibility.
3. Vocational and other life skills: using resources wisely, environmental stewardship, transferring new skills to home or community.
4. Physical development: provide nutritious foods, reinforce personal and public health concepts
5. Economic and entrepreneurial skills: income generation, business start-up skills and employment creation.



## 5 Permaculture designing of the school garden

### Basic considerations

The community or school garden should be used as an educational tool; therefore, we need to be able to integrate it easily into the daily education and learning process. It shouldn't be too far from the classrooms so that it can be reached in a (very) short walking time.

Permaculture is adept at handling the aspects of the spatial organisation of garden and buildings (a home, a farm, or any other type of buildings including a school building). This is the main reason that in the Kuvuna One World gardens we use the permaculture system and its methodological approach when we plan and design a school garden. We also devote time to this topic in our workshops for the teachers who act as organic school garden tutors. Of course, the permaculture approach, together with organic gardening methods, are the core of our Kuvuna One World gardening education in general, but these methods are especially important during the initial designing process. At this stage we carefully plan the placement of all the

### *Zoning in permaculture design*

Understanding the principles of zoning in permaculture design helps us to plan the garden and its elements smartly, in a functional way and enables the use of natural ecosystems' principles. In this way, our school garden will be easier to use and with fewer of the problems that gardeners usually face. The design will help to provide optimal conditions for the plants and to keep the life in the garden in balance, thus discouraging pests and diseases. When our school garden

elements of the school garden we want to include.

A school garden consists of several elements. There are the actual beds for the plants, as well as the areas for shrubs and trees if we have enough space. Another element that every (school/community) garden needs is the place for composting. Further, we need a place to store the gardening tools. We may also want to have a source of water for watering the plants – a water storage such as a polytank, or something similar. We also need some running water where the pupils can wash their hands, clean the tools, etc.; this can also be in the actual school building, if appropriate. If there's enough space, we should plan an outdoor classroom where the teacher(s) can sit together with the pupils. Here there could be a class outdoors, in connection with the garden, or it could be a place where everyone could take a break from the work and join in a discussion.

has been designed in such a way, we can make the pupils understand the principles of ecosystem-based agriculture: how they work and what are their benefits. This is actually the most important reason to implement the zoning in the best possible way.

The design principle of zones is related to efficient energy planning. We strive to place the garden elements (plants such as herbs and vegetables, shrubs,

trees, etc.; and structures and buildings such as tool shed, watering well, etc.) in such a way that we can achieve the most efficient use of energy. Elements which we need to visit most frequently should be closer and those which we visit less frequently can be further away. This is related both to the use of the elements as well as to their maintenance. For example, herbs are used daily so they should be the closest to the school while fruit shrubs and trees can grow

further away.

If the permaculture approach initially seems too challenging, you should first try to use its logic in garden planning, i.e. placing the beds and other elements so that the design will enable as easy, hassle-free daily use of your school garden as only possible. Then you may gradually implement more permaculture approaches in accordance with your increasing knowledge and experiences.



Gardening keeps all involved people more physically engaged while also delivering more nutritious food to them. More time spent outside can help by a vitamin D deficiency. The recommendation of 30min daily exercise from WHO is also guaranteed to be fulfilled. All of these positive results lead to a better health and well-being.

## 6 Steps to Gardening

People around the world prefer a wide variety of gardening practices. Gardening practices depend on the culture, climate, and resources, as well as on the habits, knowledge and skills of the people doing the gardening. To put it simply, there are many correct ways to garden.

The techniques taught here can be used in any garden, whether for a household, a classroom, a school, a group, or a community and anywhere one may be in the World. The steps are the same, no matter the type of garden.

### STEP 1

#### Choosing a Site: Where to Put Your Garden

*Community/school garden* – If you are going to use your garden as a demonstration site to learn about agro ecological farming, organic farming, permaculture, sustainable development goals, and other academic disciplines you will

want your garden right outside the classroom or at a location where community members can easily access. If you use intensive gardening techniques like square meter gardens or container

gardens, you will want to cultivate several gardens, perhaps one garden for each grade level, classroom or community group. If you plant gardens side by side, you can easily compare them and conduct experiments.

Here are some factors to consider when choosing a garden site, whether the garden is for yourself, your school, your home, or your community:

- **Water** – You may have to carry water into the garden during dry periods. Is there a water source nearby? Can you collect rain water? Use grey (recycled) water?
- **Traffic patterns** - It is easiest to manage weeds and monitor progress if the garden is near a well-used path. Plant

classroom gardens close to the classroom to make it convenient to observe and conduct demonstrations or experiments.

- **Sun** - Most vegetables need at least 6 hours of full sunlight every day. Some plants do better in the shade and in cooler soil, and need shade during part of the day.
- **Topography** - Is your garden on sloping ground? If so, use techniques such as terracing to reduce erosion and retain water. Small, intensive gardens are best for hilly topography.
- **Ownership** - Sometimes a school garden can serve as a demonstration site for community and kitchen gardens. If you are going to do this, consider safety and accessibility for visitors.

## STEP 2

### Preparing a Site: Choose Your Garden Design

After you have found a location for your community or school garden, choose a design for the garden. Besides traditional rectangular gardens, some options for your garden design include container gardens using sacks, buckets, or old tyres, sloped beds/terraces,

#### Square Meter Gardens

Square meter gardening (SMG) is a type of intensive gardening that is gaining in popularity around the world. It works well for growing flowers, vegetables, herbs, and some fruits – in only 15-20 cm. of soil.

trenched beds, and raised beds above ground level. Square meter gardens are ideal for classroom and kitchen gardens; these gardens also apply all the theories and practices of gardening but in a small space and with fewer resources.

The garden is in production year round. As soon as one crop is harvested, compost is added and another crop from a different plant family is planted. This rotation enriches the soil and helps prevent plant disease.

## Benefits of Square Meter Gardening:

### 1. Less work.

The soil is never compacted in a SMG so smaller tools are sufficient. Weeding takes less time. The rich soil allows for growing more plants in a smaller space.

### 2. Saves water.

Soil with ample compost holds more water and needs less watering than soil with no compost. With intensive planting, you can water by hand and waste little water.

### 3. Little weeding.

Because plants are close together they form a living mulch and shade out many

weed seeds before they have a chance to germinate.

### 4. Pesticide/insecticide free.

Companion planting is a natural insect-repelling method. A large variety of crops in a small space prevents plant diseases from spreading easily. Rotating crops after each harvest further helps prevent disease and maintains soil fertility.

### 5. Accessibility.

People with limited mobility can reach around a small garden space from 2, 3 or 4 sides to plant, water, weed, and harvest.

## To prepare a square meter garden:

1. Use strings and sticks to mark off one or a series of beds, each 1 meter X 1 meter.
2. Raise the bed by putting logs, bricks or stones around the perimeter of the bed to hold in the soil. As an alternative, you can mark off the beds as is done in a standard raised garden bed.
3. Dig up the top layer of soil (about 15 cm.) Add 5 cm. of compost-rich soil and work it into the garden.
4. Use string and sticks to divide each square meter into 9 smaller squares, 3 squares x 3 squares. Your garden is now ready for planting.



If girls had the same access to production goods as men, the yields would be around 20 to 30 percent higher. By giving girls the chance in the early years of school to partake in such activities, they have a more just chance for the future. It might also bolster Empowerment for the female gender.

## STEP 3

### Planting the Garden

Some general planting guidelines:



- Make a map of your garden and record what you plant. This is especially important when planting a square meter garden and when rotating your plants.
- Most seeds should be planted in the soil twice the depth of the seed size. (Example: Plant a 1.5 cm. squash seed 3 cm. deep.)
- Intensely planted seeds produce higher yields and conserve nutrients, water, and soil.
- Space seeds so that when plants are fully grown, they are about one hand-width apart.
- When transplanting seedlings, hold the plant gently so you do not damage the vascular system.

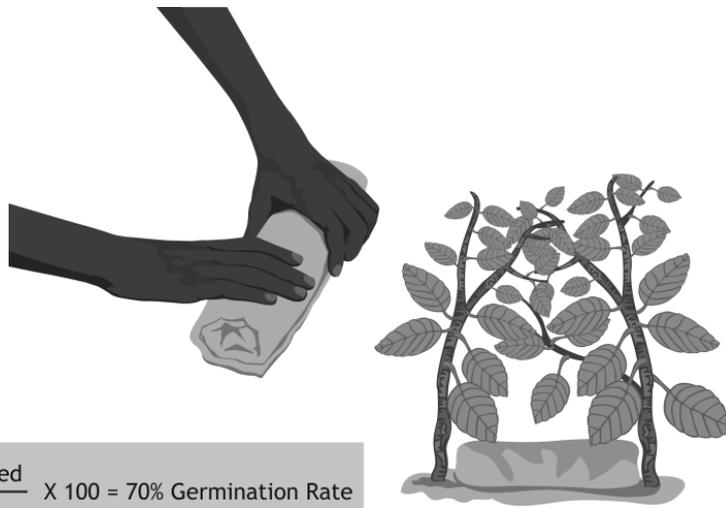


For a classroom or demonstration garden, label your plants with sticks and signs.

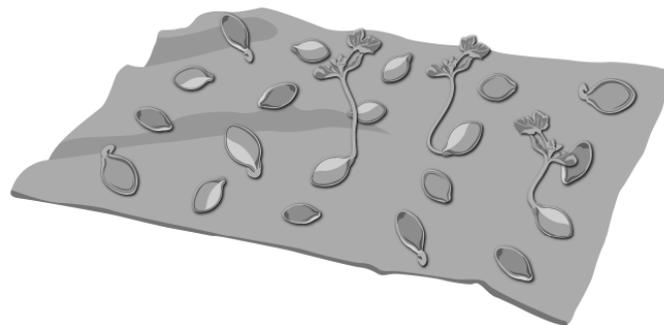
## Are Your Seeds Viable?

Before you plant, test your seeds. When you know how viable your seeds are you can make the most of them, either by planting more if the germination rate is low or planting fewer if the rate is high. While it is not necessary to test all seeds, seeds can be tested simply:

1. Select the seed type to be tested. If you have seeds from more than one source, be sure to label them, to keep them separate, and to conduct a separate test on each group. Place a minimum of 20 seeds in organized rows on a clean damp cloth. Cover the seed with another piece of clean cloth and roll the two cloths together. Place the rolled cloth in a shady place for 5-7 days. Keep it moist. Most seeds that are viable will have germinated within this time. Examine the seeds.
2. Count the number of seeds that have germinated and divide that number by the number you first tested. This is your germination rate. If the germination rate (GR) is less than 85%, you need to plant extra seeds. The lower the GR, the more (extra) seeds you need to plant to ensure that the beds are fully planted. For example, if you want four squash plants but the germination rate was only 70%, you will need to plant enough seeds for five or six plants.



$$\frac{14 \text{ Seeds Germinated}}{20 \text{ Seeds Tested}} \times 100 = 70\% \text{ Germination Rate}$$



## Planting a Square Meter Garden

Plant a different crop in each square. This planting method (called “companion planting”) helps ensure that many types of crops are grown, maintains crop diversity, and makes it easier to rotate crops. To help prevent disease, do not plant vegetables from the same family next to each other.

How many plants per square? It depends upon the size of the plant at maturity. Plant seeds for either 1, 4, 9 or 16 plants per square, evenly spaced. Your garden might look like this with different numbers of plants in different squares, all planted intensively within

one square meter.

Some plants normally cover many meters of space as runners. Pumpkins are an example. Plant vining plants in an outside square so you can string the vines to climb a frame. Or plant them in a corner square so the vines can grow over the edge.

If you plant fewer than nine different types of plants and are planting more than one square of the same vegetable, do not plant vegetables from the same plant family in squares that are next to each other.



## Watering



- Gently water your seeds immediately after planting to help them germinate.
- Use water wisely. Irrigate only the plant, not the entire garden. Plants need about 3 cm. of water each week. (Set out a container to measure the rain.)
- Water in the morning or early afternoon so leaves can dry before nightfall, therefore reducing the chance of mildew and disease from mildew.
- Tomato plants do best when their leaves do not get wet. Water deeply at the base of the plant to avoid wet leaves.
- Maintain moist topsoil for plants with shallow roots. You may need to water these plants more frequently than elsewhere in the garden.
- Plants with medium-length roots can have dry topsoil. Keep moisture about 2 cm. below the surface.
- Plants with deep roots can have dry topsoil. Keep moisture about 4 cm below the surface.

12 RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



A gardening project with all kinds of fruits and vegetables makes food available where it is needed and decreases the length of supply chains. An increased return to regional products gives people a better understanding how we are globally connected and the consequences that follow to it. The long-term effect is to have a more sustainable consumption and production methods.

## STEP 4

### Tending the Garden

A large part of tending a garden involves controlling the garden's ecosystem by rotating crops, watering, composting, weeding, and controlling pests and diseases.

### Rotating Crops

Rotating crops is the practice of planting a vegetable from a different crop family after each harvest or season in the same location. Rotating crops has two main benefits:

**Better yields from improved soil fertility** - Plants use and/or return different nutrients to the soil. When you rotate crops you lessen the depletion of the nutrients from the soil and actually help to rejuvenate it. With rotation, you do not need to use as much fertilizer. Improved fertility also lessens erosion.

**Fewer disease and insect problems** - Plants that are related tend to have similar pest and disease problems. If you rotate your crops, pests will be less likely to eat them, and diseases may not establish or spread as easily.



#### Rotating Crops in Square Meter Gardens

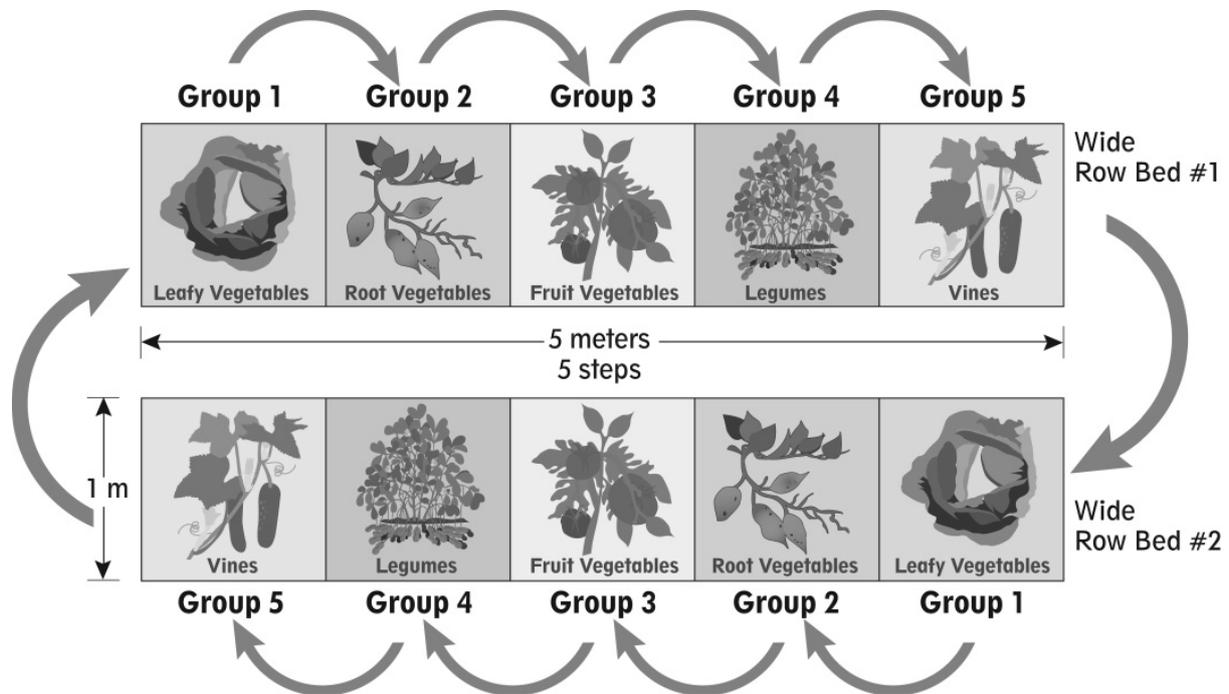
It is easy! As soon as a crop is harvested, add compost, and replant a crop from a different plant family. Do not plant crops in the same family side by side, because the close proximity makes it easy for insects and disease to spread. To grow more of certain types of vegetables, plant additional squares, but not next to each other. The more variety in your garden, the easier it is to rotate the crops.

#### The theories and practices of crop rotation...

...can be applied to any size, shape, or location of garden - large, small, round, square, rectangular, in containers, on terraces, in the field, near the kitchen...

Crop rotation improves soil, reduces disease, and boosts yields.

This picture shows how to rotate plants in a large garden. Note the 5 categories of plant families..



### Compost: A Recipe for Success in the Garden

You can make compost by combining organic materials to make a natural fertilizer. It is easy to create and costs nothing but can make a big difference in garden yields.

Compost provides the essential nutrients plants need to grow healthy and

complete their life cycle – nitrogen for green growth and protein in the plant; phosphorus for reproduction (flowers, fruits and seeds); and potassium for root growth, water uptake, and disease resistance.

To make compost you need:

**Air + Water + Carbon + Nitrogen + Microorganisms + Moisture = Compost**

| Compost-Materials  |   |
|--|---|
| <p><b>“Green Materials”</b><br/> <b>High in Nitrogen</b><br/> <b>Comes from things that are green or relatively fresh.</b></p>   | <p><b>“Brown Materials”</b><br/> <b>High in Carbon</b><br/> <b>Comes from things that are brown or drying up.</b></p>                   |
| <p>- <b>animal dung</b><br/> ok: dung from cattle, chickens, goats<br/> not ok: dung from cats or dogs</p> <p>- <b>kitchen waste</b><br/> banana peel<br/> coffee and tea grounds<br/> egg shells<br/> fruit waste<br/> green leaves<br/> green weeds<br/> banana leaves-fresh</p> | <p>banana leaves-old<br/> banana stalks-old<br/> bean pods<br/> corn stalks<br/> dried grasses<br/> dried leaves<br/> millet stalks</p> |

**Moisture** - Damp, not wet, materials make good compost. During the rainy season, cover the compost pit or heap with a layer of grasses or long leaves to shed the extra rain. In the dry season, keep desired moisture levels by covering the heap with leaves.

**Wood Ash** - Sprinkle a little clean wood ash on the layers of materials when starting compost. Besides neutralizing

the acidity that can build up during decomposition, ash helps to accelerate the decomposition process.

**Starter Compost** - Add some complete compost to a new compost pile. The starter has microorganisms and bacteria that speed up the decomposition process.

**To use compost:**

1. Add it to your garden when you plant a new crop. Work it into the soil; a good ratio is approximately one-part compost to three parts soil.
2. While a plant is growing, add compost to the base of it every several days so the soil depth remains constant.
3. Compost fertilizer works best when you use a small amount frequently, rather than a lot at one time.
4. For square meter gardens, apply approximately 3 cm. of compost to the top of the soil..

## Make a Compost Heap or Pile

1. Cover an area 2 meters x 2 meters square with a thick layer of brown/ high carbon materials.
2. Add a layer of green/high nitrogen materials.
3. Sprinkle with wood ash calcium, or limestone.
4. Add a few shovelfuls of finished compost or good garden soil.
5. Repeat the process until the pile is heaped high.
6. Water well and cover.
7. Turn the pile in a few weeks, adjust the moisture level and cover again.
8. Turn one more time.

**Note:** Plant compost is like “black gold” in your garden.

It is important for...

- soil composition,
- moisture retention,
- good drainage, and
- erosion control.

While animal dung provides important nutrients to the soil, dung alone does not improve soil the way compost does.



## Make a Compost Pit

1. Choose a place at the edge of the garden to build a compost pit.
2. Dig a pit 2 meters x 2 meters wide and 1 meter deep.
3. Mix two parts brown/high carbon materials to one-part green/high nitrogen materials.
4. Let the mix rest for 1-2 weeks until it breaks down. Move it to another pit and begin again.
5. You may want to make several compost pits so that you have compost at different stages and ready for fertilizer when you need it.

If so:

- Spread compost from pit 3 on the garden.
- Move compost from pit 2 to pit 3.
- After 2 weeks, move compost from pit 1 to pit 2.
- Start new compost in pit 1.



The impact of climate change becomes clearer with everyday around the world and partaking in a project like Kuvuna makes people more resilient to crises in the future. Effective climate action not only happens in big organisation like the UN but also in municipalities or in projects that happen at schools by which all global coherences are better understood.

## Pest and Disease Control

The garden is an ecosystem, and a sustainable garden generally does not use synthetic pesticides. Besides being expensive, these chemicals usually have side effects which can interfere with

natural, ongoing ecological processes. Here are some eco-friendly ways to manage pests and diseases in your garden:

### Pests

- Include a variety of plants. Diversity helps to discourage dissemination of crop diseases by insects, which must crawl, hop, or fly to find the particular plant they desire.
- Plant with a fragrance. Onions, Artemisia, garlic, marigolds, cosmos, and basil, for example, deter insects.

These plants mask the fragrance of other plants, and at the same time repel harmful insects.

- Closely monitor your garden. If you discover pests early you can eradicate them before they do much damage. To do so, remove them and their eggs by hand, with a stream of

water or a brush. Drop the insects into a bucket of soapy water.

- Use a natural insecticide. By using neem leaves with pepper mixed in

## Diseases

In comparison to insect-borne problems, it is more difficult to control plant diseases that are caused by viruses, bacteria, and fungi.

### Provide a favorable growing environment.

Plant disease-resistant varieties. A monoculture (one type of plant, harvested over and over again), poor soil, improper watering (too much or too little), incorrect plant culture, or inadequate insect pest management all increase the possibility of plant diseases.

### Water properly.

Avoid getting water on leaves late in the day or in the night.

### Use early detection.

Try to remove the infected parts of plants as soon as possible. (After treatment, be sure to wash your hands before handling healthy plants.)

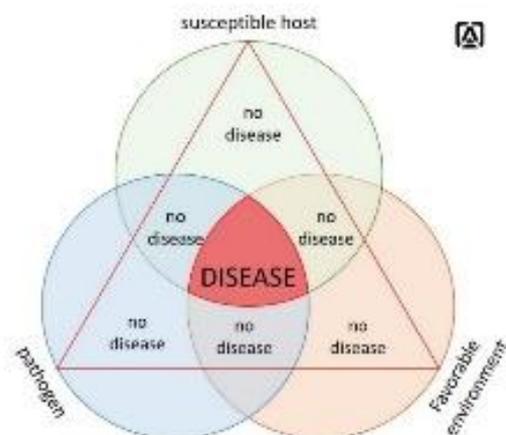
### Remove spent and diseased plants to remove the pathogen.

Discard at a distance far from your garden. Do not put diseased tomato plants in the compost heap. Diseases can be controlled in various ways. As is shown in the Disease Triangle illustration, there are three main factors in disease prevention and control. They are listed on

water to spray the crops, charcoal ash to sprinkle on the crops among many others..

each corner.

A susceptible host must be planted, the pathogen must be present, and the environment must be favourable for the disease. **All three factors must be present** or there will be no disease, as inside the center of the triangle.



Chemical use is a last option. The following simple, inexpensive, and natural solutions are safe to use in the garden. To make these recipes stronger, add one small spoon of cooking oil. Remember to never apply during the hot and sunny part of the day, especially if the mixture contains oil. Doing so could cause the leaf to burn.

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| <p><b>Consider these natural repellants</b></p> <p><b>A garlic solution</b> will repel aphids, caterpillars, cutworms and flea beetles.</p> <p>Put 3 small spoons of chopped garlic and 2 small spoons of mineral oil in a pint of water for 24 hours.</p> <p><b>A hot pepper solution</b> will repel aphids, beetles and thrips.</p> <p>Put 2 spoons of chopped hot peppers, 2 small spoons of chopped garlic, and 1 small spoon of soap in a litre of water for 24 hours.</p> <p><b>A neem leaf solution</b> suffocates soft-bodied insects like aphids. It also is effective as a repellent to many insects early in their life.</p> <p>Chop the leaves and seeds of the neem tree into a bucket of water to soak for a day.</p> <p><b>Natural tea</b></p> <p>Crush the leaves and make a strong tea from marigold, cosmos, or licorice basil.</p> <p><b>Method:</b></p> <ul style="list-style-type: none"> <li>• Strain the mixture through a cloth (a sock will work).</li> <li>• Mix the first or second pesticide mixture in a bucket of water; the third and fourth solutions need not be diluted.</li> <li>• Apply to portions of plants being attacked by pests (include both upper and lower leaves). Use a small mop, broom or brush made from twigs, grass, or strips of cloth tied together. Rain will rinse off the insecticide; re-apply when necessary.</li> </ul> | <p>Apply to parts of the plant (both the upper as well as the lower leaves).</p> <p>Use a small mop, Broom, or a brush made from twigs, grass or strips of cloth tied together.</p> <p>Cloth Strips. Rain washes off the insecticide; reapply as needed.</p> <p><b>Recipe for natural insecticides</b></p> <p>To control soft-bodied insects like aphids, use a small spoon of soap in four liters of warm water.</p> <p><b>RECIPE FOR A NATURAL FUNGICIDE</b></p> <p><b>Ingredients:</b></p> <ul style="list-style-type: none"> <li>1 heaped spoon of grated soap</li> <li>2 cups hot water</li> <li>1 heaped spoon of sodium bicarbonate (baking soda)</li> </ul> <p><b>Method:</b></p> <ol style="list-style-type: none"> <li>1. Dissolve soap in water.</li> <li>2. Add baking soda and mix well.</li> <li>3. Mix one cup of fungicide mixture with 10 cups (1 small bucket) of water.</li> </ol> |
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**Always test a homemade solution before using it.**

To test, apply a little of the natural pesticide on a few leaves of several types of plants, wait a day, and check for damage. If no problems occur, go ahead and apply the solution.

**Apply the solution carefully.**

After preparation and pre-testing, apply solution to portions of plants being attacked by pests. Be sure to include both upper and lower sides of leaves. Use a small mop, broom or brush made from twigs, grass, or strips of cloth tied together. Rain will rinse off the solution; reapply when necessary.



**For square meter gardens...**

...you need to treat only the plants that are diseased or damaged by insects.

That is because certain insects like certain plants, and diseases attack each plant family selectively.

By planting a variety of vegetables, the diseases or insects are less likely to spread to the entire garden.



## STEP 5

### Harvesting, Preparing and Eating

One of the best parts of gardening is enjoying the fruits of your labour. A benefit of school or community gardens is that they can provide a variety of foods to supplement staple foods and improve our diets. Many people in the Global South have health problems

due to poor diet, including diabetes. Many children have stunted growth, which will likely lead to a lifetime of poor health and underachievement. Proper nutrition can help prevent these and other maladies.

### Here are some ways to use your garden to improve your nutrition.

1. Harvest foods at peak nutrition. Vegetables that are too mature may have already lost nutrition and also may need to be cooked longer.
2. Cook foods for maximum nutritional value. Cook as little as possible to avoid nutrient loss.
3. Eat a variety of foods. Different plants provide different benefits and no single food has all the nutrients we need. Our bodies need fruits, vegetables, grains, meats or proteins, and dairy or calcium every day.
4. Eat nutritious foods. The vegetables listed in this workbook contribute essential vitamins and minerals for people of all ages. While cassava, maize, and yams are filling, they do not provide all of the nutrition needed by growing boys and girls. Eat foods rich in vitamins, minerals, and proteins every day.

## 17 PARTNERSHIPS FOR THE GOALS



The partnership with the Eine Welt Netz NRW and the Alliance for empowering rural communities allows better exchange between the global north and global south and it opens the door for more partnerships in the future.