North West Lima -SEF Lichtenburg

26 – 28 September 2023

Lichtenburg

Introduction

Rural livelihoods are still changing as a result of climate change,; it's crucial that participants are capable of adjusting to the variations in rainfall and rising temperatures. Lima Rural Development Foundation has focused on organising training to equip its supervisors and field employees with the knowledge and abilities needed to create flourishing family garden skills to adapt to climate change. The fourth two-day training was held in Lichtenburg with the assistance of MDF field workers, where North West Lima supervisors received practical and theoretical skills for adapting to the changes brought about by rising temperatures and variable rainfalls. They learned about climate-change-related garden interventions and practices, nutrition, and value-adding. The training skills will be applied in their day-to-day production livelihoods, where they can also apply value-adding for prospective income.

Garden site viewing and preparations

The Lima SEF training starts with a day of preparations where the MDF staff meet with the Lima facilitators go through the training programme and view the garden site and demonstration stations. On Tuesday the 26th of September 2023. MDF staff met with Mida and her team at the Lima offices in Lichtenburg. The meet-up started with a quick meeting to go through the training programme and discussion on all the required material for the garden site demonstrations and value-adding stations. After the meeting, the team left for the site visit and preparation of the garden stations. The village where the training will be held was an hour away from Lichtenburg and the garden site and hall used were 5 minutes driving distance apart. On arrival at Schoongezicht, the supervisors were already waiting for us at their new garden site venue where we would conduct the training, The venue had a lot of space to work with, but it was not safe at all as it was far from the supervisors' household for security, the fence was broken and allowed livestock and thieves to enter whenever they want. Stealing had already occurred as all the tins the group collected and stored at the venue had all been stolen before the training even started. Looking for a second location was the safest option. One of the supervisors had a safe and fenced garden and water which he did not mind using for the practices. So, we moved to the supervisor's household where we had enough space to dig a trench bed and an eco-circle and construct a keyhole and tower garden without interfering with his carrot, onion, cabbage, potato, and maize field.

We started with digging the eco-circle and trench bed with the males while the females went to collect dry grass, rocks, tins, bones, and manure. The soil was very dry and rocky and took a lot of strength from the team. The Eco-circle was the first practice to be dug at 80cm deep, then the trench bed. Next was creating a base for the keyhole garden and making the sack compost bag. While waiting for the other participants to get manure we started with one of the drip irrigation pipes and collecting of green manure around the household. When the manure arrived, we distributed it between the practices and started mixing it with the soil for the tower garden, keyhole, and eco-circle.

After the garden preparation, a quick discussion was held to conclude the training arrangements like the meeting time which was negotiated to 10 am since the supervisors are from 11 different villages and they had to be collected by 4 cars from the areas. We discussed materials that needed to be available in the morning like fresh dung, a table, and wood ash as they couldn't collect it on the day.

Figure 1: MDF staff and Lima participants preparing the garden site, by digging a trench bed, and eco-circle and collecting natural resources like rocks and manure.

Day 1: CCA introduction and intensive homestead food production

With the garden site and community hall being in different locations the day started in the garden and the presentation on climate change and CRA practices were scheduled for day two. The day started with a quick prep and setting of the stations before the Lima supervisors arrived. On arrival of the participants, there was a quick introduction of the trainers and sharing of the purpose of the training. The group was then split into three groups and divided between the three stations that had different CCA practices that could be implemented in our gardens to adapt to climate change. The groups were then going to rotate between the stations until they received information about all the practices.

Tower garden demonstration

The tower garden is one of the strategies used to promote resilience to climate change and to supply food while using fewer resources and working less. The construction of the tower garden was shared with the lima participants as a vertical garden that is suited for persons with little garden area, as well as for the elderly and disabled because it requires less labour once built and uses local resources. Participants came to the station with manure and soil already mixed together and the shed net sown with a back stitch made with nylon string. Before they could begin building the garden, the participants helped add wood ash to the sand and manure mixture.

A four-metre tower garden was built with an 80% shade cloth, a soil, manure, and wood ash combination, four 1.8m wooden poles, a 5-litre bottom cut bucket, and gravel stones to make a stone column in the centre of the tower. The group that began at the station built the garden from the ground up, spacing the poles 1m apart and supporting them with shade fabric. The bottom cut bucket was placed in the centre and filled with gravel stone, which was then transported up the tower once the soil mixture had been levelled with the bucket. The soil was put to the bucket's side and neatly packed inside the net. While adding the soil at levels the bucket was also moved up at levels leaving the gravel stones at the bottom and creating a stone column. The stone column is used to trap water and spread it to the roots of the crops, it also helps filter grey water trapping the soap residue from the water.

The groups took turns filling up the tower garden sack while others helped plant and water the garden. An emphasis on which crops are to be planted on the sides and on top was shared with the trainees, only leafy vegetables that do not grow underground are to be planted on the sides of the garden, like spinach, Chinese cabbage, herbs, spring onion, etc. on top, beetroots, lettuce, and the leafy vegetables were planted, as they would tear up the cloth when harvesting if planted on the sides. The garden was then watered to help the seedlings hold onto the soil. Some of the participants felt that the tower garden construction requires too much labour but most of them felt it was easy to manage and a great way to save space.

Figure 2: Lima participants constructing and planting the tower garden.

Trench bed

The construction of a trench bed was important as it was a way to demonstrate how to improve crop productivity by improving the soil health of the soil. The trench beds are intensive garden beds, dug out 80cm deep, 1m wide and 4- 5m long and filled with material to create organic compost. At the trench station, the participants saw how the trench bed is dug, and the different layers of organic matter buried in the bed, and they helped fill the trench, plant, and water it. The groups took turns and were taken through the process, practically filling the trench in stages. The first layer was a layer of tins for iron and water holding capacity, the next layer was a layer of bones added for phosphorus and wood ash for potassium, and then a range of organic matter was added such as manure, maize stover and dry grass, green material, and the soil. The groups filled the bed adding layers of organic matter and water and taking turns in the whole process. The bed was built up into a small basin and was planted with spinach, kale, Chinese cabbage, rosemary, thyme, parsley, leeks, and beetroot. When planting the trench bed, the importance of spacing and mixed cropping was shared as it allows a variety of crops, promotes efficient use of space, and helps with insect pest and disease control. The trench was mulched and watered.

Figure 3: Lima participants filling the trench bed with organic matter and planting the bed.

Eco – circle

The eco-circle is similar to the trench bed in that soil is dug out of a 1m diameter circle 80cm deep and filled with layers of organic materials, manure, and soil. The eco-circle is a small circular dug bed with a 2L bottle with irrigation holes in the body put 30 cm deep in the centre of the circle. The eco-circle is suitable for small gardens and can be used to introduce the advantages of improved soil depth for rooting, organic matter, mulch, and irrigation management. The participants assisted in filling the circle by adding layers of organic matter, manure, and soil at various stages. The participants assisted in filling the circle by adding layers of organic matter, manure, and soil at various stages. When the circle was filled 60cm up, the 2L bottle was placed in the centre then sand was added to completely fill up the circle. The garden was bordered by a row of stones that help trap heat during the day and release it during the night. The eco-circle was planted with a variety of vegetables and herbs, watered, and mulched with dry grass to keep the soil moist.

Figure 4: Participants planting the eco-circle with a variety of plants.

Keyhole garden

The keyhole garden was also one of the practices that allowed the use of greywater, easy to construct and manage and requires local resources. The keyhole garden is more or less like the tower garden which is made up of a mixture of soil and manure instead of the shade netting used in the tower garden rocks are used instead and instead of the stone filtration bucket a compost sack is used for watering and greywater application. To construct the keyhole garden, a 4m2 plot was marked and a foundation was dug the day before which rocks would be laid and built up. The rocks were built up with organic matter, soil and manure layers being filled as the rocks rose. More layers of soil and manure were added until they were levelled with the rocks. The rocks help hold up heat during the day which they will release in the evening keeping the soil warm and avoiding frosting of the soil and crops. After the construction of the garden, the participants started planting the different seedlings in the garden using the mixed cropping method and spacing. The garden was mulched and watered.

Figure 5: Participants filling and planting the keyhole garden.

Drip irrigation

Water is a daily issue, therefore conserving every drop is critical. Grey water can assist in extending the limited amount of available water, and utilizing wood ash can help settle the soap and solids. Sand and stone can also be used to filter water. The use of grey water as a water supply for drip irrigation piping systems was introduced. Drip kits make better use of water by continually providing little drips of water to crops over lengthy periods of time. Water is delivered directly to crop roots in droplets throughout the day and night. The participants assisted in building the drip kit pipe, connecting the system, and seeing how the water flows to the crops.

Figure 6: participants testing out and seeing how the drip irrigation system works.

Pest and disease control, enriched foliar spray and fruit production

Farmers tend to use chemicals to control pest and diseases which is costly and poisonous to humans and beneficial insects. With the participants at the pest and disease control station, they looked at the beneficial insects and the roles that each of the insects plays. The insects included the praying mantis, ladybugs, lacewing flies, bees, white spiders, and wasps. These insects prey on insects that damage plants such as aphids, moths, mosquitoes, flies, mites, larvae, and insect eggs. There were three brews demonstrated that can be used in the garden to help with the spread of pests and diseases. These brews are a natural way to control pests and diseases using organic crops. The brews were made of chillies, garlic, and onion and all these brews have a strong, stinging taste and smell that helps repel insects like aphids, mosquitoes, mites, ants, ticks, worms, cutworms etc. and they can also treat some fungi (leaf spot, scab, tomato blight and fruit rot) and viruses. The participants shared how moles affect their gardens and how most of the remedies and chemicals available do not seem to control the moles. The participants planned to try plant onions or garlic in their potato fields and see if they would repel the moles.

After the brews, the participants helped mix the immunity-enriched foliar spray in a 20l bucket. In the bucket, a mixture with 2 spades of manure, 20l of water, green matter, chopped banana stem, 2l of milk for fermentation, 1kg of sugar, 1kg of bonemeal, 1kg of lime and wood ash was mixed together to make the spray. The spray assists with both the fertility and immunity of the crops protecting them from any pests and diseases. The mixture was left to be stored for 10-15 days before it could be strained and diluted on a 1:5 litre ratio before application.

The area of Lichtenburg supports the growth of peaches, apples, and lemons; these trees were visible in most households as the trees started blooming. With fruit production not being talked about when looking at the climate change impacts as trainers it was important to bring up the topic to make the participants understand producing a range of fruit at the homestead level is an important aspect of both diversification and resilience. The participants understood fruit can be produced from seed, cuttings, roots, and grafting. Choosing the right site and preparing the planting site or hole is very important. Watering and fertilising the trees is important to help with their growth and to protect them from the wind. As vegetation is treated against pests and diseases so does the fruit trees. Organic remedies can be used to control pests and also are physical traps such as the fruit fly trap, barriers, and artificial guards. Fruit flies spoil fruit later in the season by stinging them and laying eggs inside the fruit. Small worms hatch in the fruit and make them rotten. A fruit fly trap can be used to control the flies. The fruit fly trap is made out of a cut-in-half half 2L plastic bottle, hung on a tree branch, filled with some water that is mixed with fruit or sugar which will attract the flies and they will fly into the trap to feed and will not find a way out. When sharing how worms are found inside a fresh-looking fruit participants shared that they always blamed the rain thinking it caused the rotting of the fruits when it was flies laying their eggs during the flowering season.

Figure 7: Participants at the pest and disease station.

Day 2: Nutrition and value-adding

The following report serves to give details of the training that took place in the Itsoseng community in Northwest on the 28th of September 2023. We had a total of 28 participants involved in the training and Miss Tebatso who was the project co-ordinator (evident to the register taken on the day). The purpose of the training was to expand the participants' knowledge of nutrition and the addition of value (processing) to the raw food in the household, especially in the garden. The information they are provided with at the training is aimed to equip them in passing on the knowledge and skill to the work they do daily and to the community members that they work with. The training was separated into three sessions, one

was for the recap on climate change, the second one was on Nutrition and the last was on value adding.

Climate change presentation (recap)

The session started off with a recap of what was demonstrated the previous day which was the gardening training. The participants had to recall the different practices that were demonstrated and their importance. In their answers, they mentioned the trench bed which assists in fertilising the soil, improving crop quality. They also mentioned the eco-circle, which is convenient when one does not have space, improves soil fertility and is a good practice to save water (using greywater). The participants further mentioned the keyhole garden with the stones that help in warming the soil in winter, and the tower garden which is convenient is saving space and use of greywater. Lastly, the participants mentioned the different methods and liquid solutions that assist in eliminating pests and diseases in gardens.

The discussion moved on to unpacking what climate change is, what participants understand it to be and the different impacts it has. Participants understand climate change to be the unpredictability of weather patterns and unfavourable weather changes over time. The impacts of climate change mentioned included floods, droughts, hailstorms, and disease outbreaks. It was also mentioned that plants become more susceptible to diseases and pests which in turn hinders their potential quality and quantity, or even death. This will then eventually lead to hunger, inflation of food prices in stores, and a threat to human life. The impacts mentioned were also the destruction of buildings and homes, a drop in the economy, and conflicts in communities.

The facilitator then moved on to the five-finger principle which looks at the following concepts:

- Environment: the surroundings or conditions in which a person, animal, or plant lives or operates. It was mentioned that it is important that the environment plants and animals are kept in is favourable for their growth and maintenance.
- Soil fertility: Soil fertility is the ability of soil to provide essential plant nutrients and favourable chemical, physical, and biological characteristics as a habitat for plant growth, examples given were the different demonstrations that were done the previous day, these include the eco-circle and trench bed.
- Crop management: Crop management is the set of agricultural practices performed to improve the growth, development and yield of crops. There was furthermore a discussion on the different steps in managing crops which are seedbed preparation, sowing of seeds and crop maintenance; and ends with crop harvest, examples of practices were made which were mixed cropping and multifunctional cropping, and how these methods assist in better management of crops against pests and diseases.
- Water management: Water management is the process of planning, developing, and managing water resources, in terms of both water quantity and quality, across all water uses, it was also mentioned the use of greywater especially in places where there is a scarcity of water. Different practises of water management were mentioned which included the drip kits, tower gardens, mulching, keyhole gardens, diversion ditches,
- Soil erosion control is the practice of preventing or controlling wind or water from washing away soil which has important nutrients for plant growth. Different practices to

control soil erosion include terraces, stone buns, check dams, cut-off drains, and diversion ditches.

We then looked at the differences in past and present farming practices which were as follows:

Past farming practices	Present farming practices
• Used rainfall as a means of irrigation. • Used cows for farming. • Weeding was done by hand. • used to dig to store maize	• we have different irrigation systems which are efficient including taps, sprinklers, and drip kits. • Use tractors for farming. • We now use chemicals to control weeds. • We now use silos for maize storage.

Nutrition.

To start of the conversation on nutrition the participants were asked what they understood nutrition to be, and they said they understood it to be a combination of healthy foods needed for the human body. We then asked the participants what they had eaten in the morning to distinguish whether it was healthy or not.

• Soft porridge- healthy • Vetkoek- not healthy • Oats- healthy • Brown bread- healthy • Tea- healthy.	Fruit salad- healthy Smoothie- healthy Eggs- healthy Noodles- not healthy Morvite- healthy Dinner leftover (pap and cabbage)- not healthy.

The discussion moved on to the three different food groups which are go, grow, and glow foods. These food groups were further broken down into simple terms because the participants did not know about these food groups. Go food group gives the body heat and energy and amongst them, we can include foods such as potatoes, cereal, bread, avocado, bananas, and a whole lot more which were included in the handout participants took. We then moved on to discuss the Grow food group which repairs and builds our body cells and listed a few foods that are considered grow foods which are chicken, beans, fish, eggs, etc. Lastly, we moved on to the glow food group which regulates and protects our bodies, glow foods include fruits and vegetables, and drinking lots of water.

We then had a short activity where we got different vitamins from the food participants regularly eat:

Vitamin A	Vitamin B	Vitamin C	Vitamin D
• Carrots • Avocados • Cucumber • mango	• chicken livers • nuts	• orange • green peppers • lemon • strawberries • broccoli.	• Milk • Cheese • Yoghurt • Fish

After the group activity, there was a short activity whereby the participants were divided into three groups the first group had to propose a meal/full plate for a mother, the second group had to propose a meal for a granny, and the last group had to propose a meal for a developing child. The meals had to clearly be inclusive of go, grow, and glow foods. The three proposed meals were as follows.

A mother.	A grandmother.	A developing child.
Breakfast: Brown bread Eggs Tomato Lettuce Cheese Tea Apple **Lunch:** Pap Spinach Chicken Water **Supper:** Macaroni Mince wine	**Breakfast:** Soft porridge Milk Banana Tea **Lunch:** Apple Brown bread Eggs **Supper:** Spinach Mashed potato Chicken Juice.	**Breakfast:** Egg 1 slice of brown bread Cup of milk Apple **Lunch:** Rice Chicken Spinach 100% juice **Supper:** Mashed potato Fish Green salad Water.

Figure 8: Group 1 working on their meal for a mother

After this activity, the entire group of participants with the facilitator then compiled a plate for a sick adult which was as follows:

Breakfast: soft porridge, banana, apple, milk.

Lunch: mashed potato, pumpkin, chicken, spinach, water.

Supper: pap and maas, brown sugar, apple, water.

Value adding

Value-adding comprised of two food stations led by Siphumelelo and Noxolo. The food stations were as follows.

Station 1	Station 2
Pesto Achar Sweet chilli sauce	Sweet potato bites jam

The entire group was taken through each station and the facilitators in the stations clearly explained the process of value-adding and its importance. We then moved on to the different methods of making the processed food in each station and the nutritional value found in the product. The participants found great interest in the different stations and said they would try out the different processed foods in each station.

Figure 9: sweet potato bites

Figure 10: lemon marmalade jam

Figure 11: sweet chilli sauce

Figure 12: Mixed herb pesto

Figure 13: archer ingredients and final product