

# Path to Sustainability

Vegetable seedling nursery

# 03



bulungulaincubator



A model for establishing a vegetable seedling nursery in a rural area with limited resources

# Content

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As an “incubator” we wish to enable collaboration by sharing the wealth of knowledge we have collected over the years to support communities, NGOs, corporate entities, and government in designing and implementing solutions that contribute to rural development.

We therefore have developed our "Path to Sustainability" series to outline our projects and programmes, sharing our approach, resources, and takeaways for success.



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# A catalyst in the creation of vibrant and sustainable rural communities

We work with the Xhora Mouth Administrative Area (A/A) community, which is based in the Mbhashe municipality along the Wild Coast of the Eastern Cape. In the last Statistics South Africa (StatsSA) census, the Mbhashe municipality was the poorest in the country.

When the BI founders first came to Xhora Mouth A/A—where our work was launched in 2004—there was no road, access to healthcare, functioning schools, electricity, sanitation, or safe drinking water. Only a handful of people had ever succeeded in graduating from high school, and almost all adults in the village were illiterate. For livelihoods, people from the community relied on subsistence farming, government grants, and wage remittances from migrant workers.

The population's health was severely compromised by the inaccessibility to health care, insufficient health knowledge, poor nutrition, poor water quality, HIV and cysticercosis. We conducted a local survey and found that 53% of households had lost at least one child to diarrhoea-related diseases, and one in nine had lost three or more.

It became clear that the approach to developing vibrant and sustainable rural communities must be holistic. There is no single intervention, no 'silver bullet', that can enable a path out of poverty. Over time, we have steadily built our interventions to span from 'Pre-conception to Career'.



## **Education**

To promote early childhood development through a series of programmes that support the education and care of learners throughout their student-lifetime.



## **Health & Nutrition**

To ensure access to necessary healthcare for members of the community and run quality programmes to promote health and wellness.



## **Sustainable Livelihoods**

To support and promote the generation of a local economy that uses the valuable assets in the region to create local jobs and opportunities.



## **Vibrant Villages**

To promote growth and vibrancy of youth through sport, art, and cultural projects.

# Background

Our rural location means we are far from grocery stores, significantly limiting our access to fresh, nutritious foods. But in our communities, families typically own large plots of very fertile land that is used for subsistence farming.

Small farmers generally prefer to grow vegetables from seedlings and not seeds. In the past, getting seedlings was tough. Without local nurseries, people had to travel long distances to buy them.

By providing accessible seedlings, we're bridging a gap that once made farming an even bigger challenge than it already is. Our community can practice sustainable farming, developing self-sufficiency and ensuring more nutritious meals for everyone.



## Choosing a site

Select a site near a reliable water source that can supply about 2000L of water per week, every week. If there is no pressurised water supply, then it is helpful if the site has a natural slope to allow for a header tank to supply water under pressure.

## Water Source

Critical to the successful production of seedlings is irrigating with the use of water containing soluble fertiliser (Qula Nursery Mix). The easiest way to do this, is to have a dedicated rainwater tank which is filled with water and fertiliser. This tank should be about 7m above the seedling trays to ensure that you have sufficient water pressure for irrigation. The easiest way to do this is to situate the tank on a hill above the nursery.

The pipe from this rainwater tank should run down to the nursery. There must also be a second source of clean (non-fertilised) water running down to the nursery from another rainwater tank at the same height as the first. This is to ensure equal water pressure for the sprinklers.

The seedlings should be sprayed with fertilised water for three days followed by clean water for one day.

The length of time for watering is best calculated by timing how long it takes for water to begin dripping out the bottom of the seedling tray holes. Seedlings must be watered every day in the morning or evening.

The best way to ensure this happens reliably is to use an irrigation timer. These can be bought cheaply on Amazon/Ebay or more expensively at the local nursery. Have one timer for clean water and another for fertiliser water. Make sure they are programmable for multi-day cycles (e.g. Monday + Tuesday + Wednesday = fertiliser, Thursday = fresh water, Friday + Saturday = fertiliser, Sunday = fresh).

The two water source pipes and their respective timers can be connected through a T join into the the single irrigation pipe. These timers don't allow water to travel in the reverse direction so there is no risk that water fresh water will flow to the fertiliser rainwater tank and vice versa. Prior to the first sprinkler there must be a 100 micron in-line water filter installed to ensure no dirt blocks the sprinkler holes.

## Nursery design

Our nursery is 4m wide and 11m long. It is built with treated poles sunk into the ground and treated and varnished rafters making a frame around the top. The poles are secured by high tensile wire stays on each corner to protect against wind damage. These stays are tensioned with stainless steel tensioners (non-coastal areas can use cheaper, galvanised tensioners).



The entire structure is covered with insect netting. A door that closes snugly with few gaps is important. This is to prevent pests from entering the nursery and thus reduce (but not eliminate) the need to use pesticides.

High tensile wire “benches” run the length of the nursery with a central walking passage. Galvanised wire benches are preferable as they will not run in constantly damp conditions. Each bench comprises of six lengths of tensioned wire, which can carry two seedling trays deep (3 wires per tray). An 11m long nursery can contain two rows of about 60 seedling trays (200 holes each), giving a total of 120 trays. The central walking passage is about 1.3m wide. The benches should be about 80cm above ground level.

About 1.2m above the centre of the tray benches should run a 20mm class 4 LDP pipe along the length of both benches. A gate valve should be inserted into the pipe every 5m to allow only section of the nursery to be irrigated at once. Test a variety of rain mister fittings to test which type will water the whole tray without wasting too much water spraying beyond the trays. The correct mister will depend on your water pressure. Fit the selected misters using 6mm hanging pipe connected to the overhead 20mm LDP pipe. An indoor working area and store-room about 5m x 5m will also be needed to work in and store supplies.

### **Additional supplies required**

1. **120 seedling trays** (200 holes)
2. **Hygromix** – 20kg bag (seedling mix) – you need 1 bag for every 30 trays
3. **Vermiculite** – 8kg bag (to cover seeds) – you need 1 bag for every 110 trays
4. **Seeds** (initially at least, choose the same seeds that your nearest seedling nursery uses so that there are no complaints about your seedlings versus that of the nearest competition).
5. Fertiliser: **Qula Nursery Mix** 25 kg bag – 1 bag to bring 350 seedling trays to 5 weeks' maturity.

## **Operational instructions**

### **Fertiliser**

It is important that the fertiliser is mixed correctly in the rainwater tank. A 2500L rainwater tank will need 2.5kg of fertiliser. Premix this in a bucket with water and then pour it into the rainwater tank while stirring with a thin pole/paddle.

You will need to have a way to accurately measure how empty the rainwater tank is at all times. One easy way is to have a clear plastic pipe connected with a T joint to the tap at the bottom of the tank. Fasten this pipe to the side of the tank. The water level in the clear pipe is the same as the water level in the tank. Make markings for every 100L of water volume on the pipe.

Thus if you have a 2500L tank and it is currently at 1000L, then you will need to add 1500L of water and thus 1.5KG of fertiliser to fill the tank correctly. Find/make a fertiliser scoop that when full contains 100grams of fertiliser. It is then a simple matter of counting the number of 100L intervals that the tank is below full and then adding that same number of 100g scoops of fertiliser.

### **Planting**

Fill each tray with Hygromix (seedling mix). Press down with your thumb and refill. Make a small hole in the mix and drop a seed inside. Fill the whole with vermiculite (to keep the moisture level perfect). Put the trays out on to the benches ( experts advise that after the





first irrigation that you stack these trays on on top of the other for about 36 hours indoors and then place them outside – apparently this improves the germination rate). Typically you should only place one seed in each hole, but if for some reason germination rates for a particular seed are low then you can use two or more seeds. Most seeds cost a fraction of 1 cent so it is preferable to use 2 seeds that have a tray with numerous holes where no seeds have germinated and thus wasting space and fertilised water irrigating for a whole month.

Seedling are mostly mature after 4 weeks. They can be popped out by using the back of a large nail or a smooth blunt tick of the correct diameter. Plant once a week to ensure that you have a constant supply of seedlings.

### Pests

Try to keep the nursery door closed at all times to prevent pests from entering. However, it is inevitable that they will enter at some point and you will need an effective pesticide that can kill them quickly, as farmers won't buy pest-damaged seedlings. We use a mixture that we believe is ecologically low-impact but effective against most pests:

- 2L water (e.g. plastic soft drink bottle)
- 0.7ml Closer
- 0.7ml Agrimec Gold
- 2 grams Dipel DF

This mix must be used on the same day as it is mixed. Spray the seedlings and other places where pests might be hiding (beneath the wire benches). Repeat spraying 7 days after first spray to kill pest hatchlings.

We suggest you sell the above pesticide ready-mixed in 2L bottles. The cost price is about R4.20 so you can decide on the sale price. There is nothing more dispiriting to farmers than to see their crop destroyed by pests. Remember to print a pesticide warning label (a normal address label that can be printed on a normal computer printer) to avoid accidents.



## Sales

We sell 10 seedlings for R5 which is seen as a good price. We sell them in thin plastic bread bags. These are not ideal for pollution reasons but we haven't found a viable alternative. However, these bags are very thin and delicate so they disintegrate quickly in the sun and wind.



Within 4 weeks of planting you will have seedlings for sale. Start small and increase the number of trays planted over time to give your customers time to find you. Do not be tempted to sell seedlings that are too young. This can happen if you sell out of mature seedlings. Immature seedlings will often die when planted out and then you will damage the reputation of your seedlings as being inferior/"weak".

The big selling seedlings are Cabbage, Swiss Chard (incorrectly called Spinach), Onion and Beetroot. Other less popular seedlings are: Tomatoes, Lettuce, Green Pepper, Aubergines, Potatoes (grown from seed not seed potatoes). Do not make carrot seedlings as these do not work due to the tap root becoming damaged and creating stunted carrots. Farmers will request them – rather just buy carrot seed in bulk and then sell the seed in small packets.



We also plant new type of vegetables like Egg Plant, Pepperdews, Morning Glory, Spinach, and then give them away as freebies to our customers. The hope is that they will return to buy these if they like them. Our nursery has its own garden where we sell produce and use it to teach community members about the new crops and farming practices.

Be aware that sales can vary dramatically according to the season. In our region, vegetable seedling sales decrease dramatically in the summer as most vegetable gardens are converted to growing maize. Adjust your seedling production accordingly. We are also experimenting with fruit trees (Granadilla, Papaya, Gooseberry, etc) that we can grow in containers underneath/alongside the nursery benches where there is some excess irrigation water spray going to waste.

Besides walk in sales, we sell excess production at the SASSA pension payout points as well as in local markets. Walk in Sales can be quite unpredictable. If you are located in an area that lacks a local supply of seedlings then you can get large sales initially followed by a lean spell while these seedlings are maturing in the farmers' gardens.





# Integration into organisation

We garden at our sites to create a local food system. Everyday we provide lunch for our staff and preschool learners. Each lunch includes vegetables from our garden. Growing our own vegetables reduces the carbon footprint of food transportation and further supports sustainable agriculture practices in our community.



*Local seedling nursery*



*Garden at project sites (you can even involve the little ones!)*



*Succession planting for constant vegetable supply*



*Cook harvested vegetables for lunch at Bulungula Incubator*



*All staff and learners receive nutritious lunch*



*Seedling nursery can be a sustainable business/project*