Food security:
It is possible to grow your own food with limited resources!

Henk Stander
Aquaculture, Department of Animal Sciences, Faculty of AgriSciences, University of Stellenbosch.

Food insecurity, as the Department of Health Affairs defines it, is "a condition in which households lack access to adequate food because of limited money or other resources." Impoverished areas prevent their inhabitants from living a nourished, healthy lifestyle when they are unable to access sufficient food. The cyclical nature of such poverty impacts generations to come. Children are often born undernourished, therefore inhibiting potential productivity at school and work. Poverty impacts rural South Africa areas more than urban areas.

Major causes of hunger and food insecurity in South Africa relate to several factors including conflict and instability, the changing climate, poverty, and an increasing population. According to World Hunger, the prominence of violence leads to limited employment opportunities, a downfall in imported and exported goods and the destruction of fertile land that would be otherwise used for crop growth.

The COVID-19 pandemic has exacerbated hunger in South Africa. According to Ipsos, most South Africans have seen an overwhelmingly negative effect on their income during the pandemic.

Hunger in South Africa:
South Africa is in a fortunate position to have up to date and reliable data on the extent of hunger in the country, both before the pandemic and now. Between 2000 and 2018, the rate of child hunger among households with children in them declined from 35% to 16%, attributed to the successful rollout of the Child Support Grant and improving economic conditions over this period. However, hunger is only one measure of malnutrition. One might have food to eat, and therefore not be hungry, but the quality of that food may be poor. Meals composed primarily of processed carbohydrates are far less nutritious than those that include protein, vegetables, and healthy fats. We know from research that inadequate diets like this led to stunting as well as poor attention, which influences schooling.

The National Income Dynamics Study Coronavirus Rapid Mobile Survey (Nids-Cram) has collected data on a broadly nationally representative sample of South African households covering the period from May 2020 to March 2021. It showed that there was a huge spike in reported household hunger in May and June 2020 following the hard-lockdown, with one in four South African households (23%) reporting hunger in the previous week. This has subsequently come down but seems to have settled at a lower (but still remarkably high) level of 16-17% of households.

Current food crisis: 2.5 million South Africans experience hunger "**every day**."

Why should you grow your own food?
Growing your own food yields more rewards than just tasty produce and fun times with dirt. These are some benefits that prove growing your own food is worth the effort:

- Nutrition – Homegrown fruits and vegetables, picked at the peak of ripeness, are more nutritious (https://www.gardentech.com/en/blog/gardening-and-healthyliving/garden-to-table-goodness-and-nutrition) than supermarket versions picked early and then shipped in, or kept in storage. (In addition, homegrown tastes better, too with much more flavour.)
- Selection – Growing your own food means more choices, especially when you grow from seeds. Rather than choosing whatever your local market has, you decide what varieties you want to eat.
- Savings – Depending on what you grow, homegrown food can cut your food expenses significantly. A single zucchini plant can yield enough squash to feed family, friends, and neighbours, too.
- Sustainability – Forget about long-distance trucking and deliveries. When you grow your own food, you are the supply chain. In addition, the carbon footprint from garden to table is impressively low.
- Control – When you grow your own food you know everything that goes into it, from the hands that touch it to the fertilizers that feed it (/all products/fertilizer), from planting to home-cooked meals.
- Satisfaction – Harvesting your own vegetables and fruits is also therapeutic and gives you a lot of fulfilment and contentment.

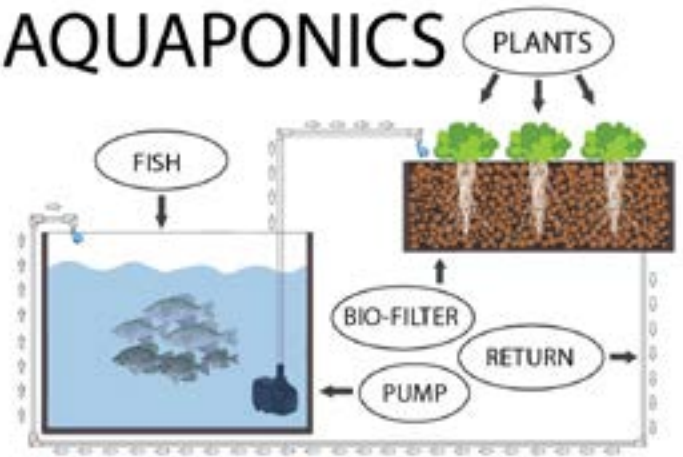
The healthiest and nutritionist vegetables to grow:
Vegetables are well known for being good for your health. Most vegetables are low in calories but high in vitamins, minerals,

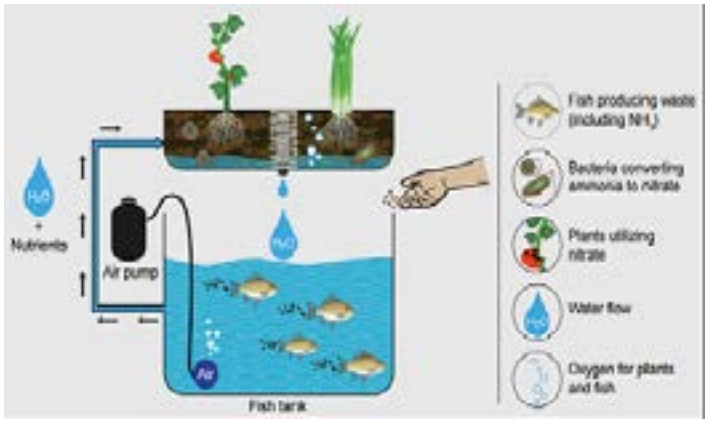
and fibre. However, some vegetables stand out from the rest with additional proven health benefits, such as the ability to fight inflammation or reduce the risk of disease.

Some of the healthiest vegetables to eat are listed below with an indication of their health-promoting plant compounds:

- Spinach – Vitamin A and antioxidants.
- Carrots – Vitamin A, vitamin C, vitamin K, potassium, beta-carotene, antioxidants.
- Broccoli – Glucosinolate and sulforaphane.
- Garlic – Allicin.
- Brussels Sprouts – Kaempferol, vitamin K, vitamin A, vitamin C, folate, manganese, and potassium.
- Kale – Vitamin A, vitamin C, vitamin K, potassium, calcium, copper, antioxidants.
- Green Peas – Vitamin A, vitamin C, vitamin K, riboflavin, thiamine, saponins, fibre, niacin, and folate.
- Swiss Chard – Vitamin A, vitamin C, vitamin K, fibre, protein, manganese, and magnesium.
- Ginger – contains potent anti-inflammatory properties, treatment of diabetes and osteoarthritis, decrease blood sugar levels.
- Asparagus – Vitamin K, folate, selenium, thiamine, and riboflavin.
- Red cabbage – Vitamin C, antioxidants, fibre, and anthocyanins.
- Sweet Potatoes – Vitamin A, vitamin C, vitamin B6, beta-carotene, fibre, protein, potassium, manganese.
- Collard Greens (*Brassica oleracea)* – Calcium, fibre, reduce the risk of osteoporosis, glaucoma, and prostate cancer.
- Kohlrabi – Vitamin C, fibre.

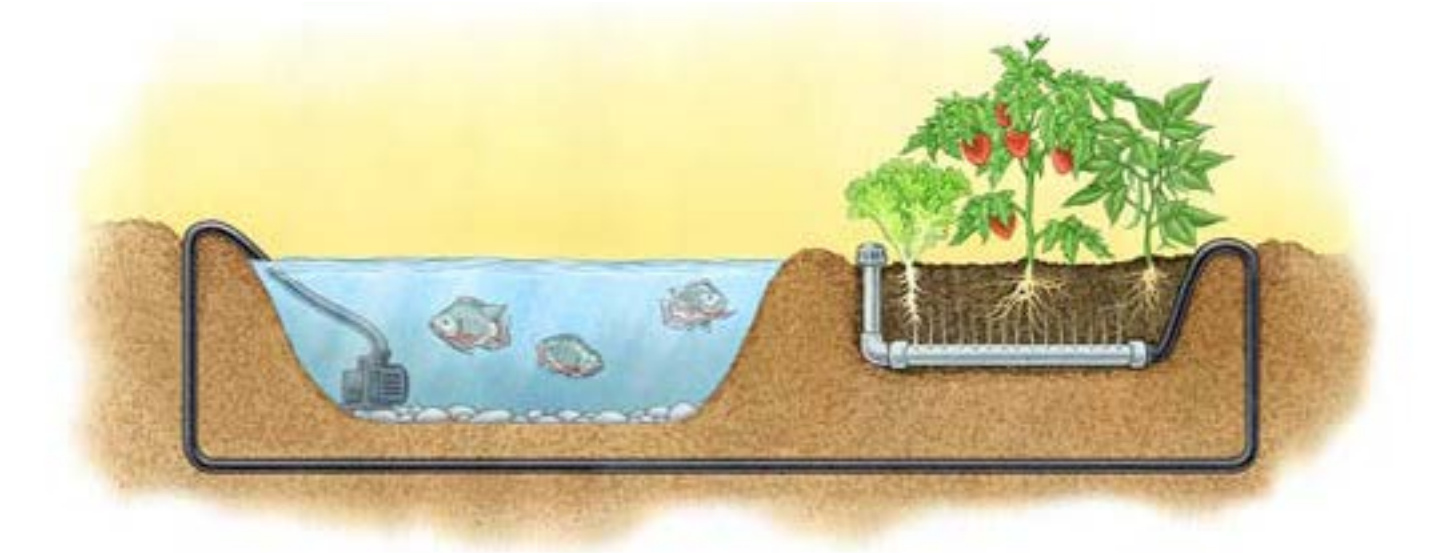
Community gardens:
Admittedly, food insecurity is no longer confined to and experienced only in rural areas. Instead, it has become a common





occurrence in cities, where millions are unable to either purchase or access enough food for themselves and their families due to a myriad of reasons. To address this ill, people in a few residential areas have started cultivating community food gardens. The gardens are viewed as a viable and feasible vehicle for increasing food access and availability, as well as reducing the cost of food. To better understand and appreciate the role of community food gardens in the food availability and income generation, a case study of food gardens was conducted in the Hammanskraal township in Pretoria, the administrative capital of the Republic of South Africa. The study highlighted how community food gardeners in Hammanskraal are reaping meaningful benefits in terms of food supplementation and income that is generated from the sale of their produce. A lot still needs to be done to support and encourage communities to expand and sustainably maintain their food garden projects. Long-term success can only be achieved if all relevant and critical stakeholders, including central and local government authorities, nongovernmental organisations, local communities, and individuals, make a concerted effort to support organised urban farming. There is a need also to build the capacity of urban poor communities, through the provision of funds, equipment, skills, and suitable and adequate strategically located land for this purpose.

Low cost aquaponics system:
The cheapest aquaponics system can be constructed by simply digging a hole in the ground and put a pool liner inside, lining the hole out, for creating the fish tank. Some planks can then go across on top and that is where the growing container (media bed, NFT or deep-water culture/raft system) will go on



top. The growing container needs a screened hole in the bottom for the water to drain. All what is then still needed to complete the aquaponics system is to add an inexpensive water pump for hydroponics, which will pump the water from the fishpond to the growing container via a hosepipe. The balance between the fish and the plants with the correct ratio are particularly important. With fewer plants, you might lose a fish or two, and with to small numbers of fish, the plants will start to yellow as a result in a lack of appropriate nutrients.

Wicking garden beds:
Wicking or self-watering garden beds need much less water and maintenance than conventional garden beds to produce an abundance of vegies. In a wicking bed, water moves from a reservoir at the bottom of the garden bed up through the soil on top, watering the roots of the plants from below. Once established, the plants do not need overhead watering - you just keep the water in the reservoir topped up by filling the pipe coming out the top of the garden bed.

You will need the following:
- Raised garden bed frame (at least 60cm high). Width and height to suit your garden space.
- 1 x 50mm diameter PVC pipe and cap – length is the same height as the raised bed
- 1 x 20mm diameter PVC pipe – 50cm length for the overflow
- 1 x 88 degree PVC elbow join (50mm diameter)
- Flexible ag pipe and coupling (50mm diameter) – at least if the garden bed
- Thick (200µm) black builders' plastic – enough to line the bottom and sides of the bed
- Permeable fabric such as 70% shade cloth or geotextile - enough to cover the garden bed and come halfway up the sides
- 7mm screening (gravel) or clean sand – enough to create the reservoir to a depth of 20 cm
- Garden soil, blended with compost – enough to fill bed to a depth of 40 cm
- 0.5m3 of mushroom compost
- 1 bale of Lucerne
- 2 x 25 litre bags of chicken manure.

Method:
- Level the ground. Rake and use a spirit level to check the ground is even. Remove any rocks that may tear the plastic liner.
- Join the PVC pipe, elbow join, and the coupling of slotted ag pipe as shown in the image. Use plumber's glue to secure.
- Line the raised bed with plastic taking care not to tear it. Stand the PVC pipe upright at one end of the garden bed and extend the ag pipe along the bottom.
- Line the raised bed with plastic taking care not to tear it. Stand the PVC pipe upright at one end of the garden bed and extend the ag pipe along the bottom.
- Put in the reservoir medium (gravel, sand). With people holding the sides, place the reservoir medium (either sand or gravel) on the ag pipe first, to hold it in place. Continue to fill the garden bed with the reservoir medium to a depth of 20 cm.
- Make an overflow by drilling a 20mm hole through the garden bed level with the top of the sand. Make a small 'X' cut in the black plastic and put the pipe through both the plastic and the garden bed. Seal around the overflow pipe well with duct tape and silicon.
- Fill the reservoir and lay permeable fabric. Fill the vertical pipe with water until it just starts to come out of the overflow pipe.

Check that the overflow pipe joins do not leak. Lay fabric across the top of the soil and up the sides of the beds. This prevents the soil above clogging the reservoir.

- Add layers of soil, compost, manures and lucerne on top of the shade cloth until you fill the bed. The soil will sink down over time, so you may top up more later.
- Plant the bed out with seedlings. Water these in well from above. Planting a combination of medium and long-term vegetables in the middle with leafy greens and herbs on the outer edges. Once plants are established, you can just top up the reservoir and do not need to water overhead – simple!

Source: www.hume.vic.gov.au/livegreen

The making of your own Bio Liquid Fertilizer at home:

Materials:

- Organic waste from the kitchen; food leftovers, vegetable peels, etc.
- Ashes from the fireplace
- Animal manure
- Green leaves
- Crop residues

Method to make 200 litres of Bio-fertilizer:

- Use a 200 litre barrel and filled it 1/3 with fresh manures or the content of the rumen of a newly slaughtered animal.
- Add 3 kg of fresh leaves.
- Add 2-3 kg of vegetable peels.
- Add 3 kg of ash.
- Add 1.5 litre of milk.
- Add 100 g of bread yeast.
- Add 2 kg of molasses or sugar.
- Fill the barrel up with water.
- Let the fermentation takes place and allow the process 40 days at 25°. Seal the barrel and allow pipe into water bottle for CO_2 to escape without letting oxygen in.
- Filter and keep the liquid Bio-fertilizer in containers.
- Add 10 litre of Bio-fertilizer to 2 000 litre of irrigation water for your hydroponics solution to grow your vegetables in.

Conclusion:

Every year, more food gardens are springing up across the country – in schools and communities, urban areas, and rural homesteads. With water shortages and changing weather patterns increasingly affecting the food supply, these gardens are helping to improve food security.

Planting more food gardens could be the solution for the 1.7 million households in South Africa whose members go to bed hungry every night. A third of the children in Gauteng, KwaZulu-Natal and the Free State are stunted due to chronic malnutrition. Meanwhile, the Western Cape and North West provinces are home to the highest percentage of underweight children.

Growing your own food is a healthy way to save money and enjoy fresh produce at home or supplement your food basket. When done correctly, even the smallest backyard plot can produce copious amounts of fruits and vegetables and even a significant saving to the grocery budget.

E-mail: hbs@sun.ac.za

Some pictures are from Google Images.