MKULIMA WA
SEVIA

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OCTOBER - DECEMBER, 2017 #6

The importance of irrigation in commercial vegetable production

Irrigation is arguably the most important factor required in commercial vegetable production. Along with the market, good quality seed and proper crop management, the availability of water and its control are game changers in any vegetable enterprise.

Drip at a farm in Karatu

If resources are available, it is best to use drip irrigation for better crop yields, quality and efficiency

Which water sources do we find in Tanzania?

- Many farmers get their water supply from their local authorities especially through **canals (mfereji)**. For example, this is very common in the individual farming plots of Kilimanjaro, Arusha and regions.
- Farmers utilize **streams and rivers** for irrigating. Where rivers are seasonal, farmers even dig holes into the dry sandy river bed to extract water. This is common in Dodoma, Morogoro, Mwanza, Shinyanga and Tabora areas.
- Where there are **dams and lakes** farmers utilize these large natural or man-made water bodies by either pumping water directly from the lake or taking advantage of the high water table, in areas like Mwanza Region, Kikore and Iringa.
- Hand or machine dug **wells** are crucial for vegetable production. These boreholes might be communally or privately owned.
- Some farmers rely on **rain water** for irrigation, especially during the long rain season.

Which types of irrigation do we come across?

- **Surface irrigation** out of furrows or basins: While this method is common due to the nature of water supply system (canals), it is also very wasteful as a lot of the water is lost through seepage and evaporation and the crop will not grow uniformly.

- Farmers use a **bucket and a cup**, especially on sandy soils like in Bagamoyo. Scooping water from a furrow onto a bed or high ridges is also common, like in Ilemala, Mwanza. Unfortunately, both practices are laborious and water gets wasted.

- **Sprinkler irrigation**: Water is applied under high pressure from a pipe and sprinkler system. A powerful pump and pipe system are required. This method has some disadvantages: a lot of moisture is lost to wind and evaporation, and prolonged leaf wetness of the crop results in higher disease pressure.

- **Drip irrigation** is the most cost-effective and efficient form of irrigation. Each dripper provides the same amount of water and hence there is uniformity of irrigation. The drippers also avoid waste by applying water directly to the root zone where most of it is taken up by the plant. There may be an added advantage if one applies fertilizer though the drip system (fertigation).

Research done by Sokoine University of Agriculture in 2016 showed the following cost-benefit analysis of irrigation methods:

Cost/benefit analysis of tomato under the different irrigation methods

Irrigation method	Fixed costs	Variable Costs/ acre	Total costs	Revenue	Profit	Ratio (Profit/ Total costs)
Furrow	0	2,267,000	2,267,000	3,040,000	773,000	0.34
Water pump and hose pipe	360,000	2,887,000	3,237,000	4,960,000	1,713,000	0.59
Drip + water pump	4,500,000	4,192,000	8,692,000	17,440,000	8,748,000	1.01
Drip + bore holes	9,800,000	4,192,000	13,992,000	17,440,000	3,448,000	0.25

*Life span for the drip irrigation system 3-5 years

How can storing and conservation of water be realised?

- It is important to store water either using **tanks** or **ponds**. Lining the ponds with impervious material helps to prevent water loss through seepage.

- While storing canal water in ponds or tanks may be a form of **water harvesting**, the term especially has significance when collecting rain water for future use. This is a normal practice in countries like Botswana where rainfall/water is a scarce commodity. However, one must consider the water need of a crop, which can be 3-4 mm (or 1-2 inch) a day. For one acre the daily need is then roughly 15.000 liter or 15 m^3.

- Use of **mulching** (like straw of grass) will reduce moisture loss due to evaporation. This mulch has the added advantage of providing the soil with organic matter when it decomposes. Plastic mulches may be applied particularly where drip irrigation is used under cooler conditions. In very hot environments in Tanzania plastic mulch should not be used as it negatively affects crop growth!

Water harvesting

Collecting rain water and storing it for future use can be crucial when water is scarce

What is the best time of day to irrigate vegetables?

The best time is early in the morning, especially between 4 and 10 am, when there is little loss due to evaporation. Such timing also provides the plants with the moisture required in photosynthesis (the process by which plants produce food) during the rest of the day. The next best time is late afternoon: between 4 and 5 pm. Irrigating in the midday heat results in high losses of moisture due to evaporation, but with drip irrigation it might be different. Irrigating at night may result in fungal diseases. Besides the water is not fully utilized since the plants will not be carrying out photosynthesis, or do so to a low extent, as they will mostly respire at night.

Straw mulch covering watermelons

Ask SEVIA!

For successful commercial vegetable production, farmers are implored to utilize available water resources, explore new ones and conserve water. Ask SEVIA's Extension Officers about irrigation: they can customize their advice, taking into account your budget and circumstances

SEVIA REACHES OVER 6,000 AT NANENANE

This year SEVIA once again participated in our popular national agricultural exhibition: Nanenane. It was our third and biggest Nanenane event so far. We participated in four centres: Arusha, Dodoma, Morogoro and Mwanza. For Mwanza it was the first time. Overall we were able to reach 6,070 farmers of which 4,428 men and 1,642 women.

We never leave our theme 'SEEING IS BELIEVING' behind: we mainly exhibit our services through demos which are being set up several months in advance. It was no exception this time. The staff members were organized in teams to effectively serve the thousands of farmers expected.

The farmers started arriving in trickles on the 1st and 2nd of August. However, by the weekend and up to the 8th of August, the farmers were coming in floods. The Mwanza team was almost overwhelmed by the more than 4,000 farmers who turned up to experience the SEVIA services and see the varieties and technologies, exhibited by the new kid on the block. Farmers who visited learned about how small pieces of land can be efficiently utilized, benefits of good seeds, better crop management and availability of

It seems everyone in Mwanza was virtually pouring into the SEVIA plot

SEVIA's Mary Maganga explaining outdoor production of sweet pepper in Morogoro

free extension services. Both greenhouse and outdoor production were covered.

Besides the heavy attendance, the other highlight of this year's Nanenane was the visit to the SEVIA demo plot by Dr Charles John Tizeba (The Minister of Agriculture, Livestock and Fisheries). Extension manager Epaphras Milambwe gave him a briefing on how SEVIA contributes to improving vegetable production, productivity and income of smallholder farmers. The Minister complimented SEVIA for its work. "Continue networking with local authorities for sustainability", he said encouragingly.

We look forward to continuing our partnerships with the farmers we met at Nanenane and with many more. In 2018 SEVIA will be back at Nanenane !

SEVIA: Seeing is believing

WHERE ARE WE NOW?

by Elijah Mwashayenyi

In the first edition of Mkulima wa SEVIA (in 2015) we indicated the targets that we hoped to achieve during the project period. Halfway through the project we are happy to present to you a summary of our progress.

Quotes from farmers:

"I had always been making losses. At SEVIA I was trained to grow tomatoes on a piece of land measuring 250 m². From that small piece I have made 400,000 shillings within two and half months, from the cost of production that was 50,000 TZS. Before, I would spend like 200,000 TZS with only 20,000 returns. My intention was to give up farming and move to work in the mines. Now I have changed my mind: I will depend on vegetable production. Asante sana SEVIA."

SEVIA Centre at full blast

The SEVIA Centre has been established at Lambo Mferejini, Hai District (near Moshi Town), with presence of buildings for office use, trial/demonstration plots, irrigation systems, water harvesting facilities, staff, and hardware structures that support the institutes' operations. By August 2017 the centre is working at full blast: it is involved in the development, implementation and dissemination of farm innovations and the screening of genetic vegetable resources for Tanzania. The centre has become a highly recognized knowledge and innovation base for vegetable production.

More than 23,000 farmers have been reached

Building capacity in knowledge on vegetable production, that has been SEVIA's key focus! Since inception, 18 training events have been held at the SEVIA centre and numerous trainings off-station. It has supported farmers to adopt and change vegetable production. Until now we have reached more than 23,000 farmers. Also with thematic trainings on e.g. crop protection, fertilizer management, drip irrigation, greenhouse farming and post-harvest handling. The SEVIA project has increased knowledge capacity for vegetable farmers and sector professionals.

600 demo sites: 'Seeing is believing'

Through SEVIA, farmers in 19 districts across Tanzania have been introduced to hybrid seeds and better crop management practices. We established over 600 demonstration sites as part of SEVIA' s 'Seeing is believing' strategy, covering many themes ranging from nursery management to field practices. Through the Afrisem breeding program 20 new hybrids on African eggplant and Chinense pepper were introduced on the market.

Market linkages

Though SEVIA does not buy or market products on behalf of farmers, it offers some information on markets and on

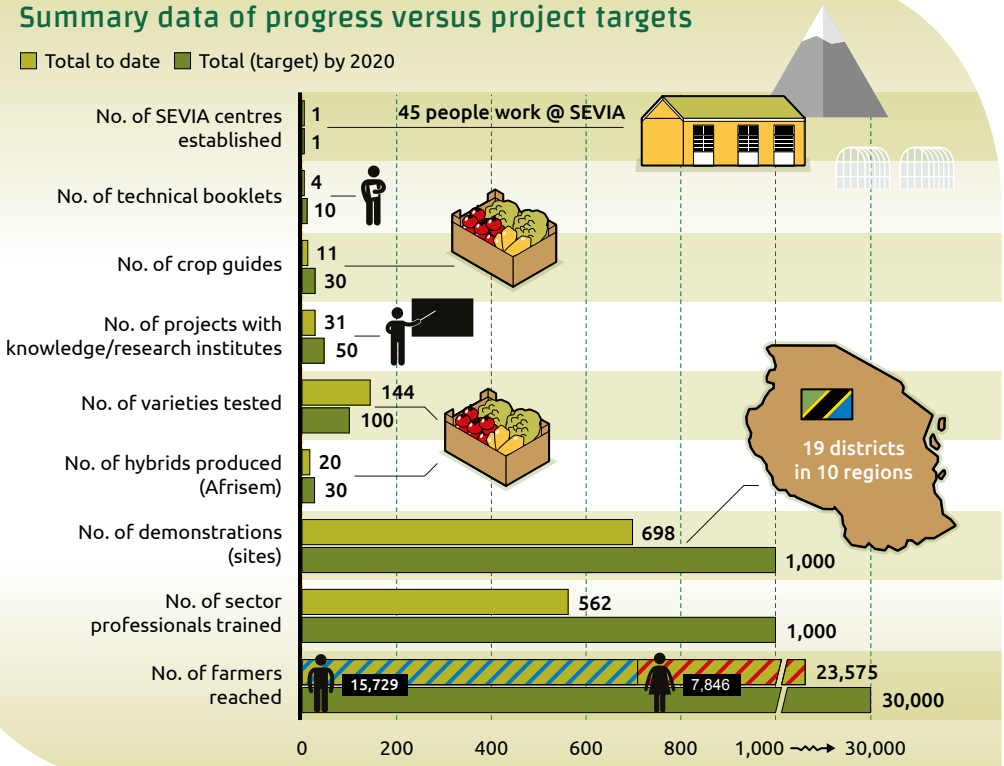
creation of linkages. SEVIA works closely with organisations like Tanzania Horticulture Association on topics like market access.

Improving the rural economy

SEVIA has been advocating for good vegetable production, which has massive employment potential. SEVIA does not provide finance to farmers. However, the project collaborates with organisations such as EFTA Limited who provides collateral free loans in the form of equipment and NMB Bank that provides loans to farmers. SEVIA recognises that, would vegetable production become a lucrative business for many farmers, it could contribute to poverty reduction in rural areas and migration to cities would become a less obvious choice .

"My daughter now appreciates vegetable production. Not only do we have enough to eat but we sell vegetables! We make enough money to meet our needs and save the rest. My daughter is no longer looking for an office job."

Summary data of progress versus project targets



Lasting impact

At the current pace, it is projected that our thresholds such as of 1,000 demonstrations established, 1,000 sector professionals trained, 30 new hybrid varieties produced and 30,000 farmers reached, will be attained and surpassed by the year 2020. However, SEVIA's work is not so much about numbers. We hope that these outputs will result in a lasting impact on farmers and other stakeholders, in Tanzania and beyond ●

"Money is money. Whether earned in Dar es Salaam or here in my village. Whether earned by a doctor, teacher, engineer or whoever… I earn my salary through vegetable production…. my income is higher than the salary of civil servants in urban areas…. and I am a master of my own."

SEVIA is a team!

TIPS & TRICKS

Know which varieties to pick for greenhouse growing

Do you know that the success for greenhouse production depends on your knowledge of the crops and varieties, and of course on good crop management? The greenhouse will not make you a better farmer but your knowledge, skills and the information you acquire will.

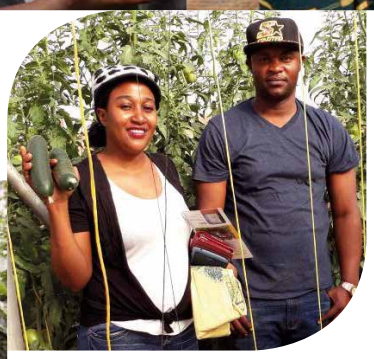
Do you know that...

The greenhouse's purpose may differ with environment

In temperate zone countries vegetables such as tomato, cucumber and sweet pepper are grown in greenhouses. In those areas the greenhouse mainly serves the purpose of increasing the temperature. However, in hot environments we do not wish to increase the temperature and the purpose of greenhouses in Tanzania is to keep out rain, pests and pathogens.

Knowing the crops that can be grown in the greenhouse is important

We recommend long warm season/ climbing crops that can be harvested for a long time (6 - 8 months) under good crop management. In Tanzania tomato, cucumber and sweet pepper are common crops for commercial greenhouse production. Do not grow cabbage or sukumawiki in a greenhouse, because the revenues of these cropswill not be sufficient to earn back your investment in the greenhouse.



Tomatoes in a greenhouse can be harvested over 8 months

When planning for tomato production in a greenhouse first think of the best type and variety. There are two types of tomatoes: the determinate (bushy) type and indeterminate type. The indeterminate type, like Monteazul F1 and Moyo F1, is the best choice for greenhouse production and can be harvested for over 8 months. They grow tall when pruned back to one or two main stems. For outdoor production determinate (bushy) varieties like Jarah F1 and Kipato F1 are recommended.

Outdoor en greenhouse cucumber varieties are different

There are two types of cucumbers, namely parthenocarpic and non-parthenocarpic cucumbers. Parthenocarpic cucumbers, like Mydas F1, are best suited for greenhouse production as they do not need pollinators. Harvesting can go up to 4 to 6 months. Non-parthenocarpic cucumbers are outdoor cucumbers, like Mona Lisa F1, that require pollinators (like bees) for production. For that reason they cannot be grown in the greenhouse (or pollinators need to be introduced).

Do you like coloured or green? Make the right choice beforehand!

There are two types of sweet pepper in the Tanzanian market: coloured (red and yellow) and green sweet pepper. Of course all varieties will provide coloured fruits when they are not picked green, but varieties for green harvesting are not the best for producing coloured fruits. Therefore it is important to decide beforehand which type you want to grow.

For greenhouse production we recommend coloured sweet peppers, like Pasarella F1 and Ilanga F1 varieties. Under good crop management they can be harvested up to 6 - 8 months. You need to remove the first flower(s) to promote lateral growth which will result in more uniform fruits. Do you prefer green sweet peppers? In the open field it is recommended to grow green only, because of the shorter maturation time of green fruits giving less risk of attacks by pests and diseases. We recommend outdoor varieties like Red Jet F1 and Kaveri F1. They can be harvested up to 4 months ●

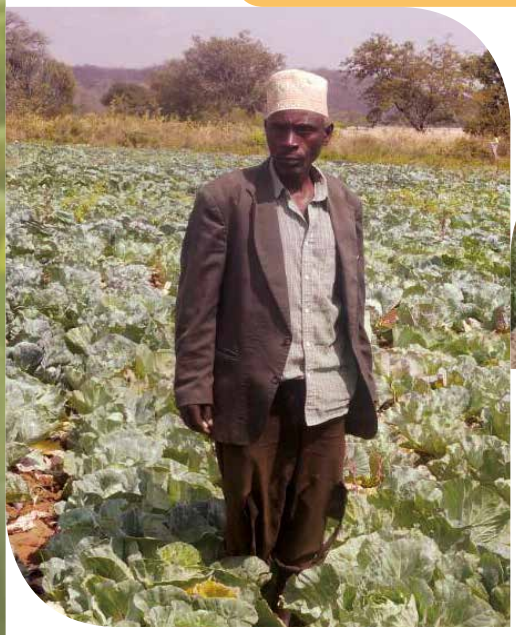
STORIES FROM THE FIELD

Keeping tomatoes till prices rise

Mr & Mrs Hendry Mchau are vegetable farmers of tomatoes, cabbage, cucumber and sukuma wiki from Mbokomu- Manyire, Arusha. Recently they built a local refrigerator for the storage of vegetable products; they adopted this technology from the SEVIA Centre after having attended a field day.

The refrigerator helps them to store their crops (especially tomatoes) after harvest, for a period of 2 weeks to 1½ month. "I can keep my vegetables till prices in the market rise," says Mr Mchau. "Some neighbors and friends came to find out and are now planning to build their own refrigerators."

Considering to buy a drip irrigation kit



Mr Tamimu's cabbage field that had an open pollinated local variety (Glory of Enkhuizen)

Mr Salimu Tamimu (57) from Mrua Village in Kondoa District has been in the field of local vegetable farming for 30 years. He grows tomatoes, sweet pepper, cabbages, onion, cucumbers, African eggplant and okra.

Salimu Tamimu's hybrid cabbage and sweet pepper demo hosted on April 2017

"I had no place to seek advice, while facing a lot of challenges for pest and disease control. I did not know which fertilizer to use", he said. In March 2017 he met with SEVIA's Extension officer, Paschal Lusolela. Mr Tamimu was keen to host a demo on hybrid versus open pollinated cabbage production and sweet pepper pruning. Afterwards he proclaimed: "I now know the importance of good seed variety selection, planting with the right spacing, and when to apply fertilizer on my crops. I am looking forward to grow Mapema F1 (cabbage) in October." Being inspired by the SEVIA field day in July he is considering to buy a drip irrigation kit for 1/4 acre.

Never too old to learn

Mr Marko explaining the demo to his neighbors

Mr Felicion Marko (52), is from Mwasonge village in Bukumbi Ward-Misungwi (Mwanza). He started growing vegetables in 1985. He grows tomato, sweet pepper, cabbage, watermelon and cucumber.

When SEVIA started working with him in February 2017, he realized he had to improve his farming techniques, especially after having learned from hosting the SEVIA demos. The demo treatments were application of fertilizer in sweet pepper and trellising of tomatoes.

Currently he has planted tomatoes using a better field layout, fertilizer application and trellising, all techniques according to the SEVIA way. "I am a happy farmer", he says.

PEOPLE @ SEVIA

Meet our extension team

SEVIA has now deployed 14 extension officers covering 19 districts in 10 regions. Each extension officer works with farmers to host demonstrations on vegetable production in a district. The demonstrations are both on improved varieties and technology.

Training, consultation/advice, farm visits and field days are part and parcel of the extension officer's portfolio. The services are free. This team is directly supported by Epaphras Milambwe (Extension Manager) and Mary Maganga (Senior extension officer, responsible for training and crop protection), who are based at the SEVIA centre at Lambo Mferejini, but travel frequently for supervision. Check with the extension officer closest to you, he might be hosting a demo not very far from you. Or maybe you want to host a SEVIA demo yourself?

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AGENDA

OCTOBER
- SEVIA Conference
- Planting of new trials and demonstrations
- Training of farmers

NOVEMBER
- Training of sector professionals from Uganda

DECEMBER
- Annual staff meeting
- Training of sector professionals

COLOPHON

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