PRODUCTION GUIDELINE FOR AFRICAN LEAFY VEGETABLE CULTIVATION IN THE CAPRICORN AND VHEMBE DISTRICT IN LIMPOPO

Hintsa Araya, Salmina Mokgehle, Christian du Plooy, Stephen Amoo, Mariette Truter, Khomotso Maboka and Manaka Makgato

WATER RESEARCH COMMISSION

TT 914/23

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Report to the
Water Research Commission of South Africa

edited by

Hintsa Araya, Salmina Mokgehle, Christian du Plooy, Stephen Amoo, Mariette Truter, Khomotso Maboka and Manaka Makgato

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WRC Report No. TT 914/23

ISBN 978-0-6392-0402-4

May 2023

Obtainable from

Water Research Commission
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Lynnwood Bridge Office Park
4 Daventry Road
Lynnwood Manor
PRETORIA

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This is the final report for project no. C2021/2022-00247

EXECUTIVE SUMMARY

This guideline was made possible by the Water Research Commission (WRC) under project number C2021/2022-00247, in collaboration with the Agricultural Research Council on adopting *small-scale irrigation farming as a climate-smart agriculture practice through vegetable production systems in Limpopo.'* This guideline focuses on the practical application of problem-solving strategies in agricultural practices for smallholder farmers in the Capricorn and Vhembe district in Limpopo. This included on-farm activities in informal training talks on seedling production, irrigation installations and utilization of chameleon irrigation sensors. This included discussions and demonstrations on the principles, processes and methods, and other aspects of mulching. During the regular monitoring visits, smallholder farmers were assisted in planting and applying fertilizers on their farm plots. This guideline summarises progress in human capacity development through school engagement and on-site training to transfer skills to the communities. This guideline argues that accelerating technology transfer to a farming community, including cultivation of indigenous or indigenized crops, climate-smart technologies are a viable option and that provided resources (e.g. agricultural inputs) can increase agricultural production.

ACKNOWLEDGEMENTS

The authors acknowledge the following institutions and persons who made various inputs to the successful coordination and running of the project activities over the period 2020-2023. These are:

Funding:

Water Research Commission of South Africa.

ARC-VIMP for contributions in kind in terms of technical support.

Governance and collaboration:

Members of the Reference Group for their constructive discussions and guidance during Reference Group Meetings.

Dr L Nhamo (Chairperson)	Water Research Commission
Prof. S Mpandeli	Water Research Commission
Prof. A Modi	University of Kwazulu-Natal
Dr SN Hlophe-Sinindza	Water Research Commission
Prof. C Mutengwa	University of Fort Hare
Dr B Petja	Water Research Commission
Prof. M van der Laan	Agricultural Research Council
Dr KA Tshikolomo	Limpopo Department of Agriculture and Rural Development
Prof. E Nesamvuni	University of Free State
Ms Sandra Fritz	Water Research Commission (Committee Secretary)

All project team members for their interest, dedication, and effort in editing the deliverables and the final report:

Dr HT Araya	ARC-Vegetable, Industrial and Medicinal Plants
Dr S Mokgehle	University of Mpumalanga
Dr CP du Plooy	ARC-Vegetable, Industrial and Medicinal Plants
Prof. SO Amoo	ARC-Vegetable, Industrial and Medicinal Plants
Dr M Truter	ARC-Vegetable, Industrial and Medicinal Plants
Mr MJ Makgato	ARC-Vegetable, Industrial and Medicinal Plants
Mr K Maboka	ARC-Vegetable, Industrial and Medicinal Plants
Dr M Nyathi	ARC-Vegetable, Industrial and Medicinal Plants
Ms B Serote	Tshwane University of Technology
Ms K Mashiane	Tshwane University of Technology
Mr T Mawela	Tshwane University of Technology
Mr A Matidze	University of Venda

Community members (Ms S Masethe, Ms A Mudau and Mrs R Kale) are acknowledged for their contribution to the projects and willingness to adopt technologies that have improved their livelihoods. **All the students** for their dedication and perseverance. Prof. JBO Ogola (University of Venda), Prof. P Soundy and Dr G Senyolo (Tshwane University of Technology) for their guidance and supervision of the **postgraduate students**.

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CHAPTER 1

INTRODUCTION

1.1 Background

Agriculture continues to contribute to rural economies in sub-Saharan Africa, with the majority of the population (60 to 80%) employed in agriculture and producing 15 to 50% of the Gross Domestic Product (GDP), as reported by Raidimi and Kabiti (2019) and the Organisation for Economic Co-operation Development (OECD), (2016). South Africa's agriculture is vital for economic growth, food security, and poverty reduction by supporting smallholder farmers. Smallholder farmers are essential drivers of the agriculture sector as they grow most food. Despite being endowed with limited resources to produce crops to combat food insecurity. Previous reports showed that establishing household food security is widely encouraged to advance the living standard of poor rural households (Ngema et al., 2018). One avenue towards realising the potential of smallholder farmers in agriculture can be fostered through appropriate agricultural extension, education and training (Ngema et al., 2018). The training can incorporate on-farm demonstrations as practical education to facilitate effective learning situations for farmers to experience practical adoption and diffusion of innovations. The training can also include the farmer to farmer learning involving participants learning from and with each other through informal and formal learning.

Training through demonstrations can include practical knowledge and activities such as field day events to monitor farms to allow the researchers, extension officers and industry members. This can assist with demonstrating innovative technologies and approaches. Given this variety, there is no ‘one-fits-all’ approach for successfully training smallholder farmers on various aspects of agriculture. This guideline offers an overview of the essential elements to consider when conducting farm-based training to enhance climate-smart technologies to inspire smallholder farmers' adoption of new practices in the Vhembe and Capricorn districts. The study outlines the on-farm training for smallholder farmers on different aspects of African leafy vegetable production in two districts in Limpopo province.

CHAPTER 2

TRAINING ON AFRICAN LEAFY VEGETABLE PRODUCTION IN THE TWO DISTRICTS OF LIMPOPO PROVINCE

2.1 Introduction

Agricultural training interventions are critical in facilitating knowledge transfer and agricultural skills to benefit smallholder farmers. Training interventions for smallholder farmers vary substantially, considering the theory and practical methods that can potentially adopt new technology and interventions to benefit communities. Such training interventions can contribute to the smallholder farmer's economic and food security outcomes. In this report, the smallholder farmers in the Vhembe and Capricorn districts were trained on different vegetable production training offered by the ARC team.

The on-farm trials and smallholder farmers' training on climate-smart agriculture technologies occurred in Limpopo's Vhembe and Capricorn districts. Ms Awelani Mudau is located in the Vhembe district in the Collins Chabane municipality in Hatshikonelo (22.8805° S, 30.7379° E). Ms Masethe Shonisani is located at 22˚41'31" S 30˚37'56" E in the Thulamela municipality in the Vhembe district. Ms Raesetsa Kale (24.4048° S, 29.3802° E) and Ratanang cooperative (-23.855362, 29.711946) are located in the Capricorn district under the Lepelle-Nkumpi and Polokwane municipality, respectively.

The training also included a basic understanding of climate-smart technologies, encompassing the theory and practical aspects. Developing knowledge and skills among farmers is one of the primary functions of agricultural extension. Therefore, the training provided by the ARC team in collaboration with the local extension officers in the two districts can contribute to increased productivity and maintain food security at a household level for smallholder farmers. Therefore, this chapter will report different production guidelines for African leafy vegetables for smallholder farmers in the Vhembe and Capricorn districts.

2.2 Production guideline for African leafy vegetables

2.2.1 Soil preparation

As part of training the smallholder farmers, soil preparation included a sampling of soils to understand the site's suitability for African leafy vegetable production. Figure 2.1 and Appendix A give step-by-step training that the smallholder farmers in the Vhembe and Capricorn districts received on taking soil sampling and information about the laboratories that assist with soil testing. As part of the practical training, the smallholder farmers also demonstrated some equipment that plays a role in soil sampling. This included a soil auger and spade; clean plastic and box items are essential. Soil preparation also includes working the soil deep with a fork to allow a workable seedbed for planting.

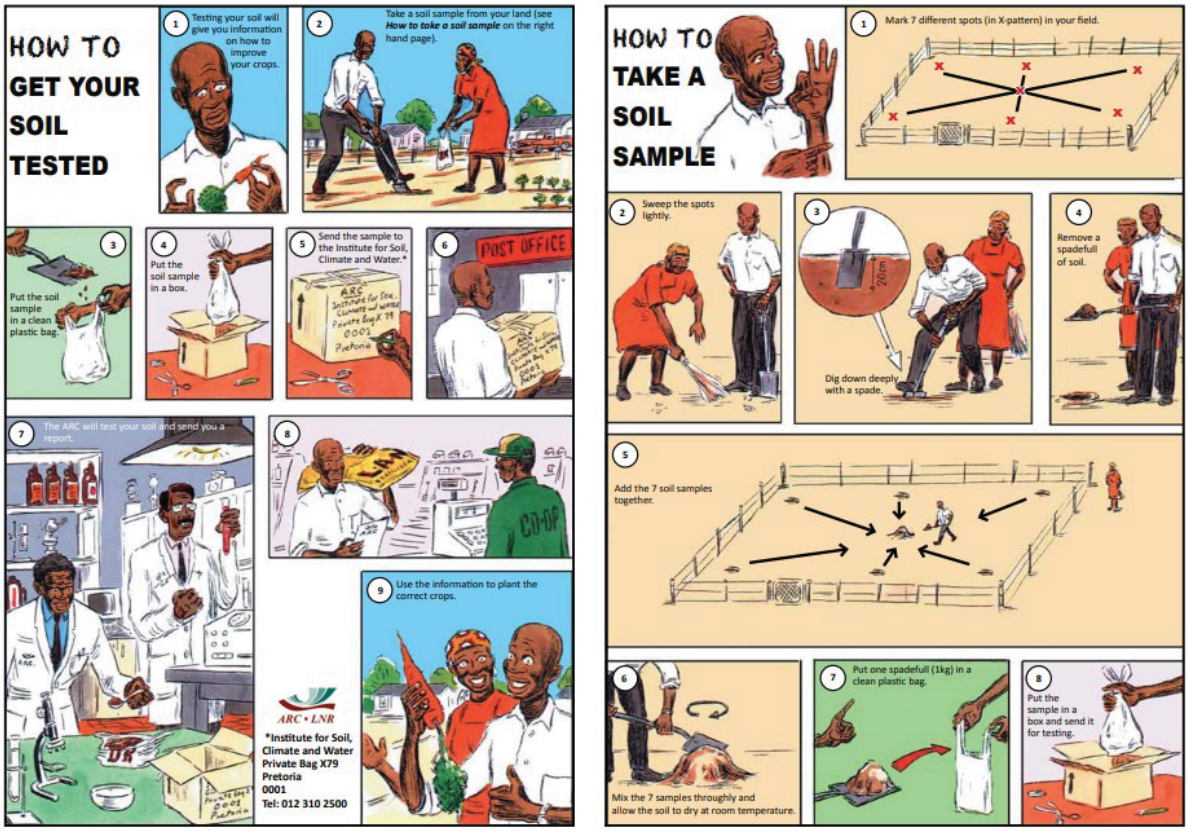

Figure 2.1: Step-by-step process of taking a soil sample and getting it tested in the laboratory.

2.2.2 Seedling production

Good quality vegetable seedlings are essential for improving yields and getting quality produce. The training of smallholder farmers provided step-by-step approaches to growing good-quality seedlings. As stipulated in Figure 2.2 and Appendix B, some materials required to produce good quality seedlings include seedling trays, growing medium, certified seeds and watering. In the Capricorn district at Kale's farm (see Figure 2.3), the smallholder farmers were trained to keep the seedling trays clean before as part of the preparations. The practical training included moistening the growth medium and putting it on the seedling trays to prepare for seed sowing. The smallholder farmers were trained to sow the seeds in each hole of the seedling trays (Figure 2.3). The guideline presented in Figure 2.2 also guides the smallholder farmers on thinning seedlings in cases where two or more seeds were sown.

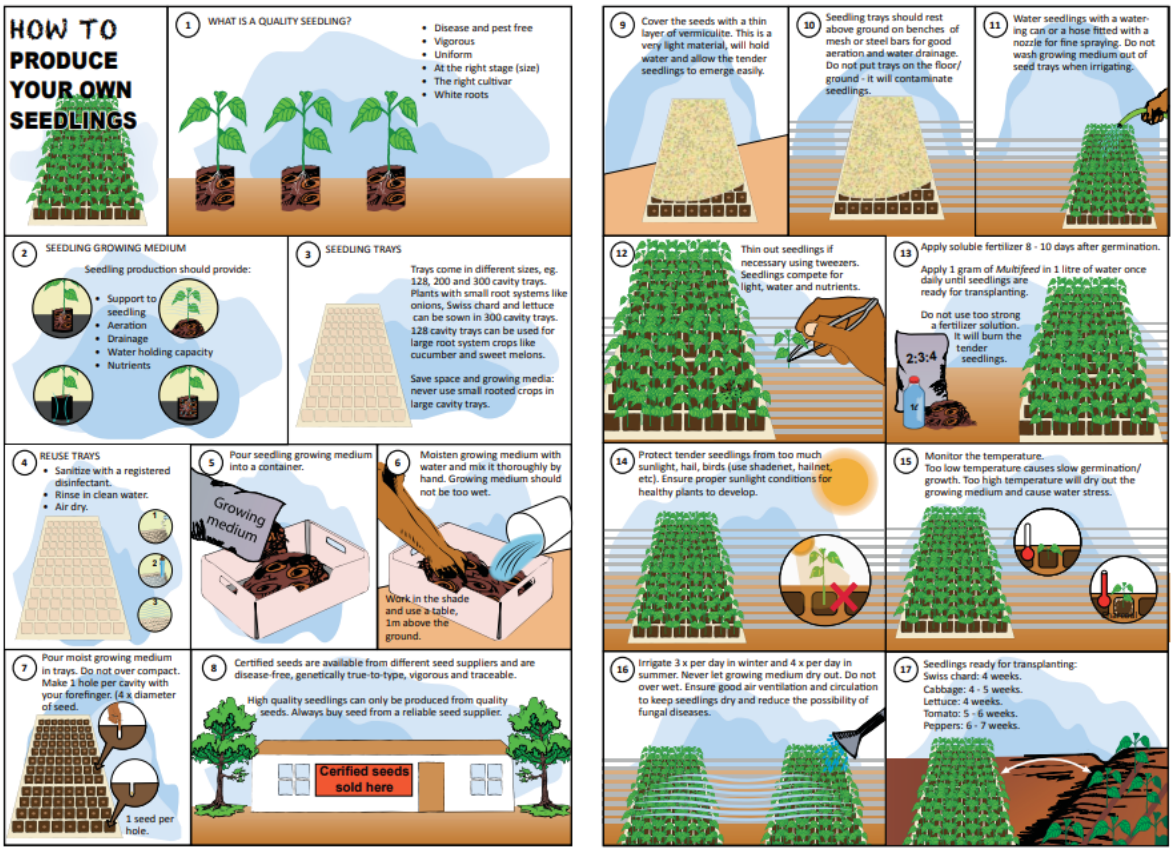

Figure 2.2: Step-by-step process of producing seedlings.

Figure 2.3: Training smallholder farmers in the Capricorn district on seedling production.

2.2.3 Cultivation

African leafy vegetables can be cultivated in different forms (Appendix C). For example, vegetable crop seeds can be sown directly into the field to grow (Figure 2.4). Smallholder farmers can use the transplanting method requiring good-quality seedlings (Figure 2.4). The African leafy vegetables such as Okra, cowpea and Bambara groundnut are cultivated from August to November for direct sowing and transplanting (Figure 2.4). The smallholder farmers in the Vhembe and Capricorn districts were trained to cultivate vegetable crops. Figure 2.5 shows the smallholder farmers in the Vhembe (A) and Capricorn (B) districts transplanting vegetable crops.

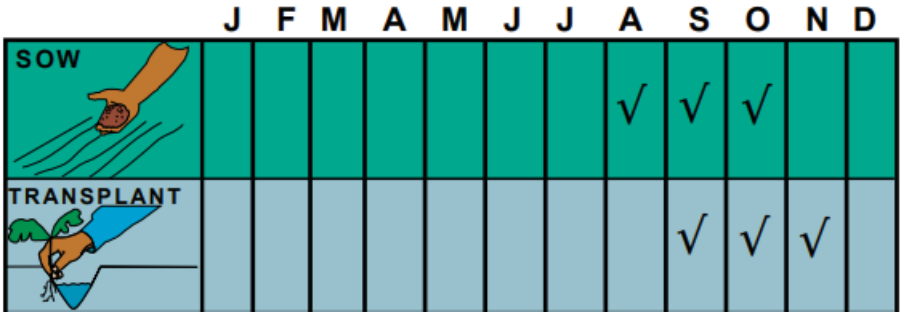

Figure 2.4: Training smallholder farmers in the Capricorn district on seedling production

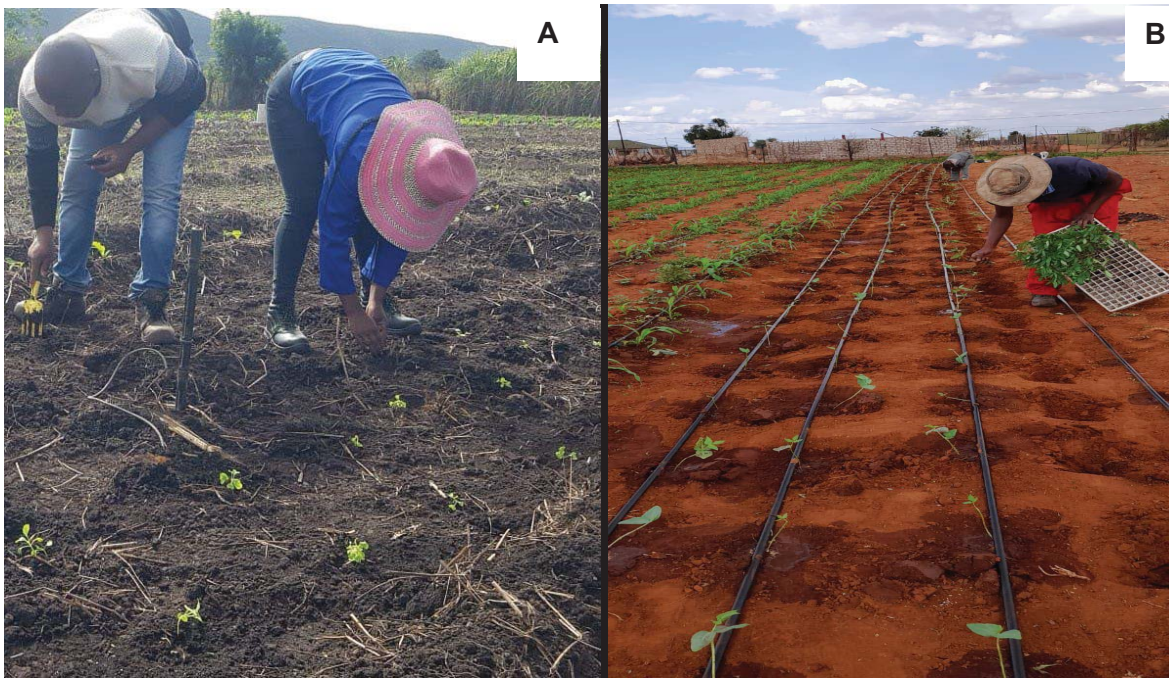

Figure 2.5: Training smallholder farmers in the Vhembe (A) and Capricorn (B) on cultivating vegetable crops.

2.2.4 Fertilisation

The smallholder farmers received training on fertilizers and their application methods (Figure 2.6 and Appendix D) below. Fertilization is supplementing the existing soil with additional nutrients such as nitrogen, phosphorus, and potassium vital because they are essential for the growth and development of plants. Figure 2.6 indicates fertiliser application methods, such as the complete hand application of organic fertilizers and kraal manure through broadcasting. During the training, the smallholder farmer in the Capricorn district indicated that application is achieved through broadcasting and working the fertilizer into the soil with a small fork (Figure 2.6).

Figure 2.6: Training smallholder farmers in the Capricorn (B) on fertilizer application.

2.2.5 Mulching

The smallholder farmers were trained on the different mulches, which serve as a blanket to the soil to conserve moisture, enhance the nutrient status of soil, control the erosion losses and suppress the weeds in crop plants. During the training, the smallholder farmers resonated with the seedless grass mulch they adopted as part of climate-smart practices (Figure 2.7 and Appendix E). The smallholder farmer in the Vhembe district incorporates mulch with the soil to realize the benefits, while in the Capricorn district, mustard spinach is mulched with grass (Figure 2.7).

Figure 2.7: Training smallholder farmers in the Vhembe (A) and Capricorn (B) on mulching.

2.2.6 Irrigation system maintenance and scheduling

The smallholder farmers were trained in basic irrigation installation and management techniques. The smallholder farmers were trained on different irrigation techniques, such as drip and simple irrigation, using watering cans for seedling irrigation purposes. As part of the climate-smart practices, the smallholder farmers in the Vhembe and Capricorn districts were trained to utilise the chameleon moisture sensor (Figure 2.8) as a smart invention that helps farmers decide when to irrigate their crops, improving food production.

Figure 2.8: Training smallholder farmers in the Vhembe (A) and Capricorn (B) irrigation and chameleon sensors.

2.2.7 Harvesting

Smallholder farmers were trained and equipped with the skills to harvest different vegetable crops. Figure 2.9 indicate that smallholder farmers were guided to harvest the vegetable crops after four weeks of transplanting. For example, the smallholder farmers were shown to get multiple harvests from different vegetables (e.g. Swiss chard). The smallholder farmers were equipped with the skills of harvesting early in the morning or late in the afternoon when it was cool and postharvest handling (Appendix F). Some of the vegetable harvested from farmer's field in the Capricorn district is shown in Figure 2.9.

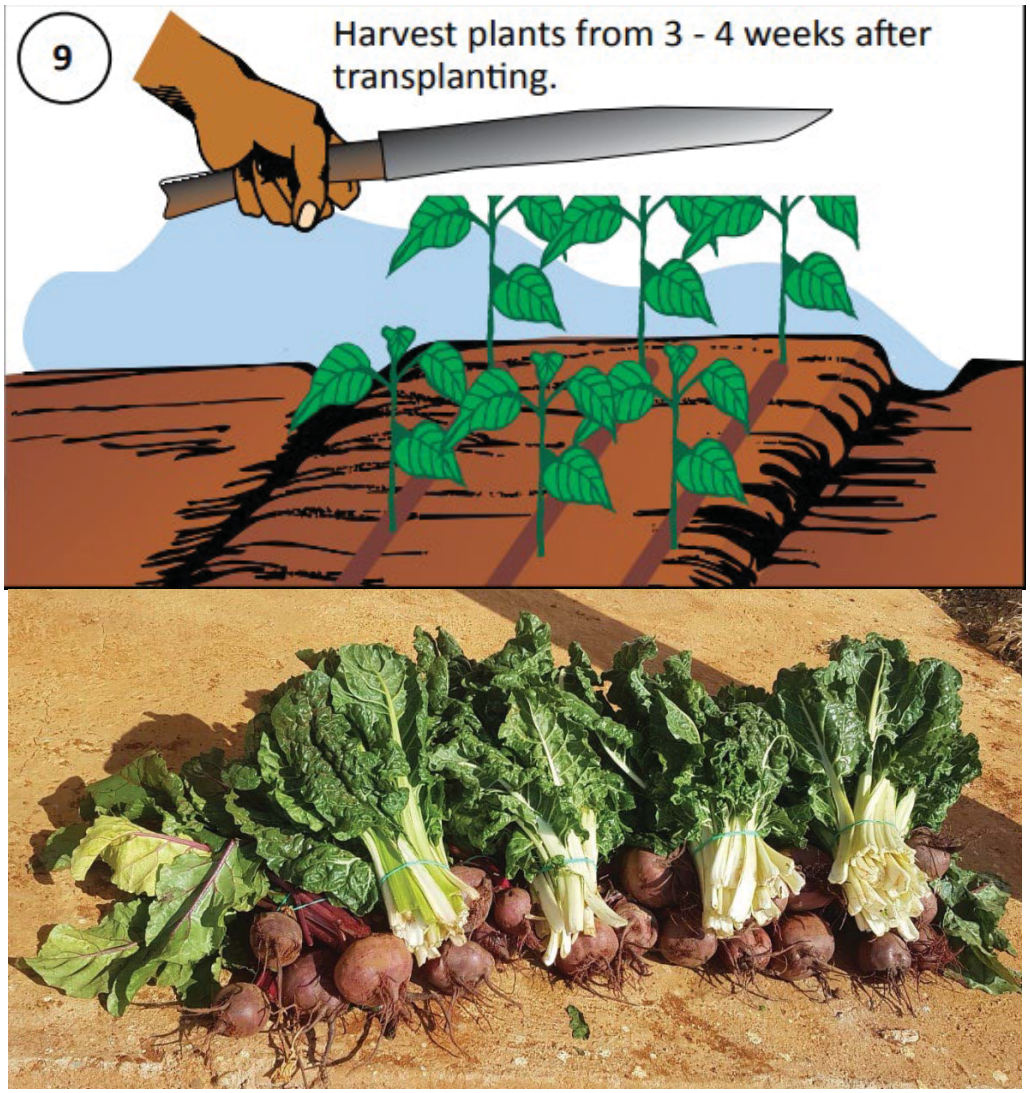

Figure 2.9: Training smallholder farmers in the Vhembe (A) and Capricorn (B) on harvesting.

2.3 Conclusion

This guideline has demonstrated several activities that smallholder farmers were trained on using the on-farm practical approach, which creates opportunities for smallholder farmers. The training based on the on-farm practical activities is essential in enhancing smallholder farmers in adopting climate-smart technologies.

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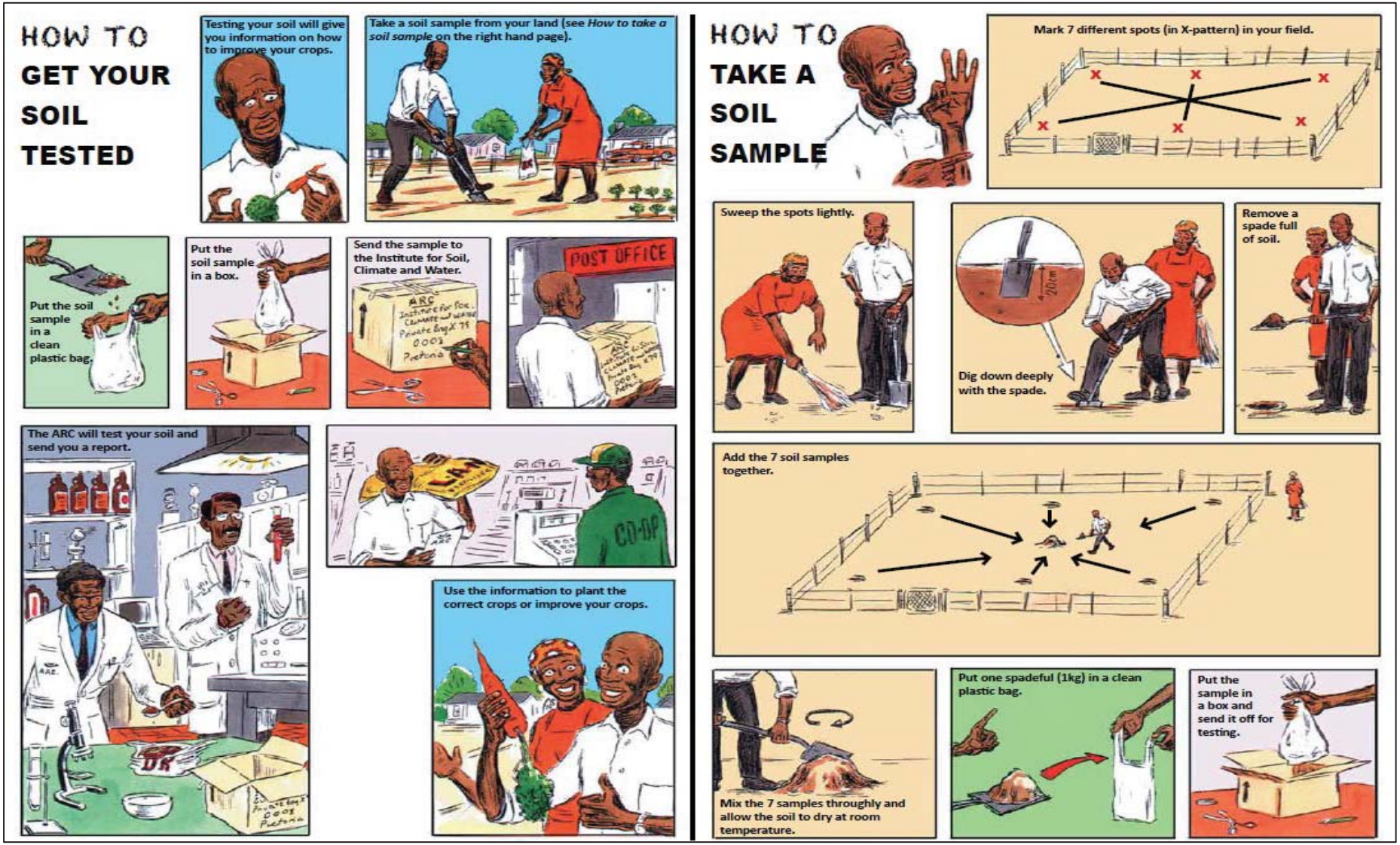
Appendix A: How to get your soil tested



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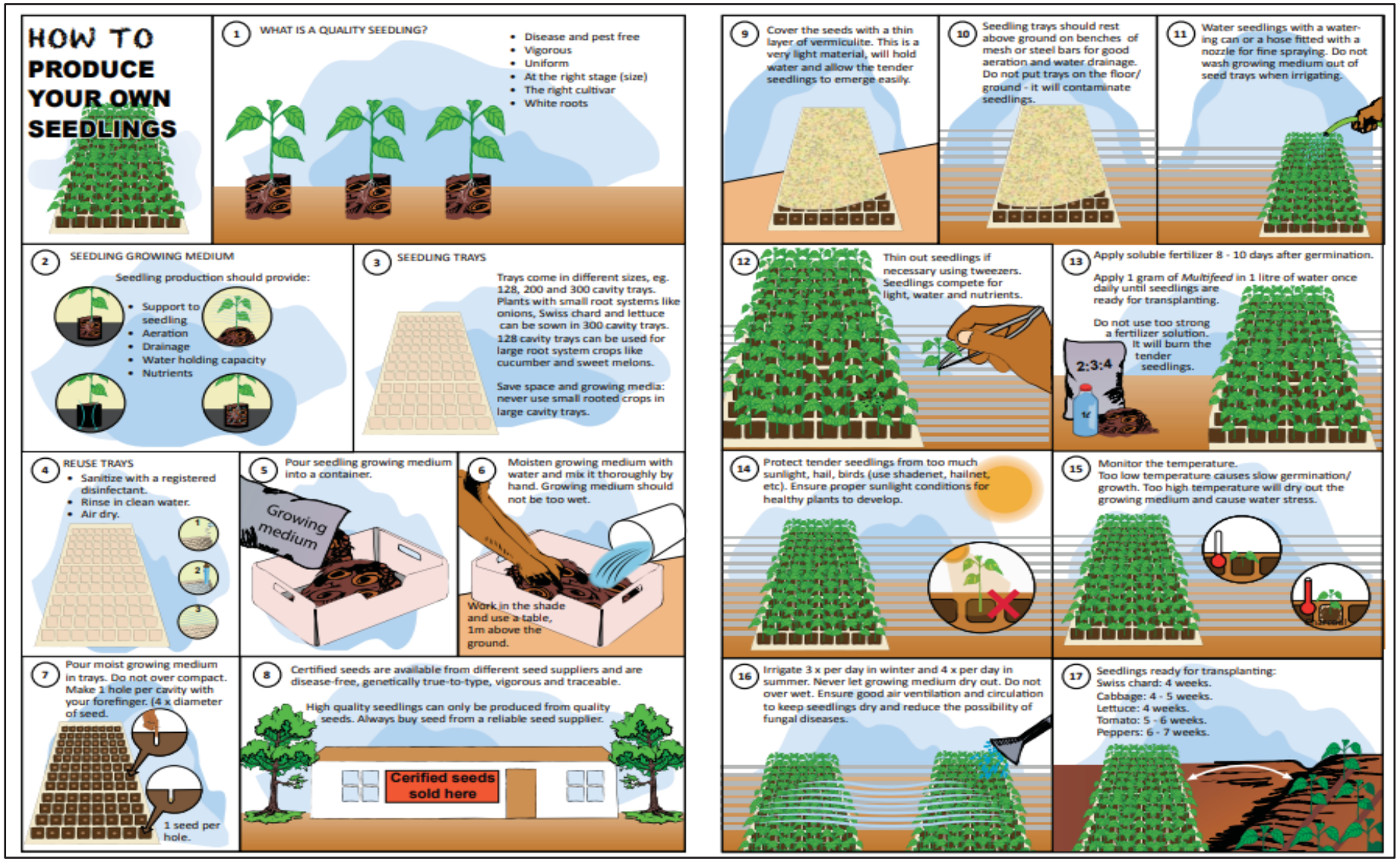
Appendix B: How to produce your own Seedlings



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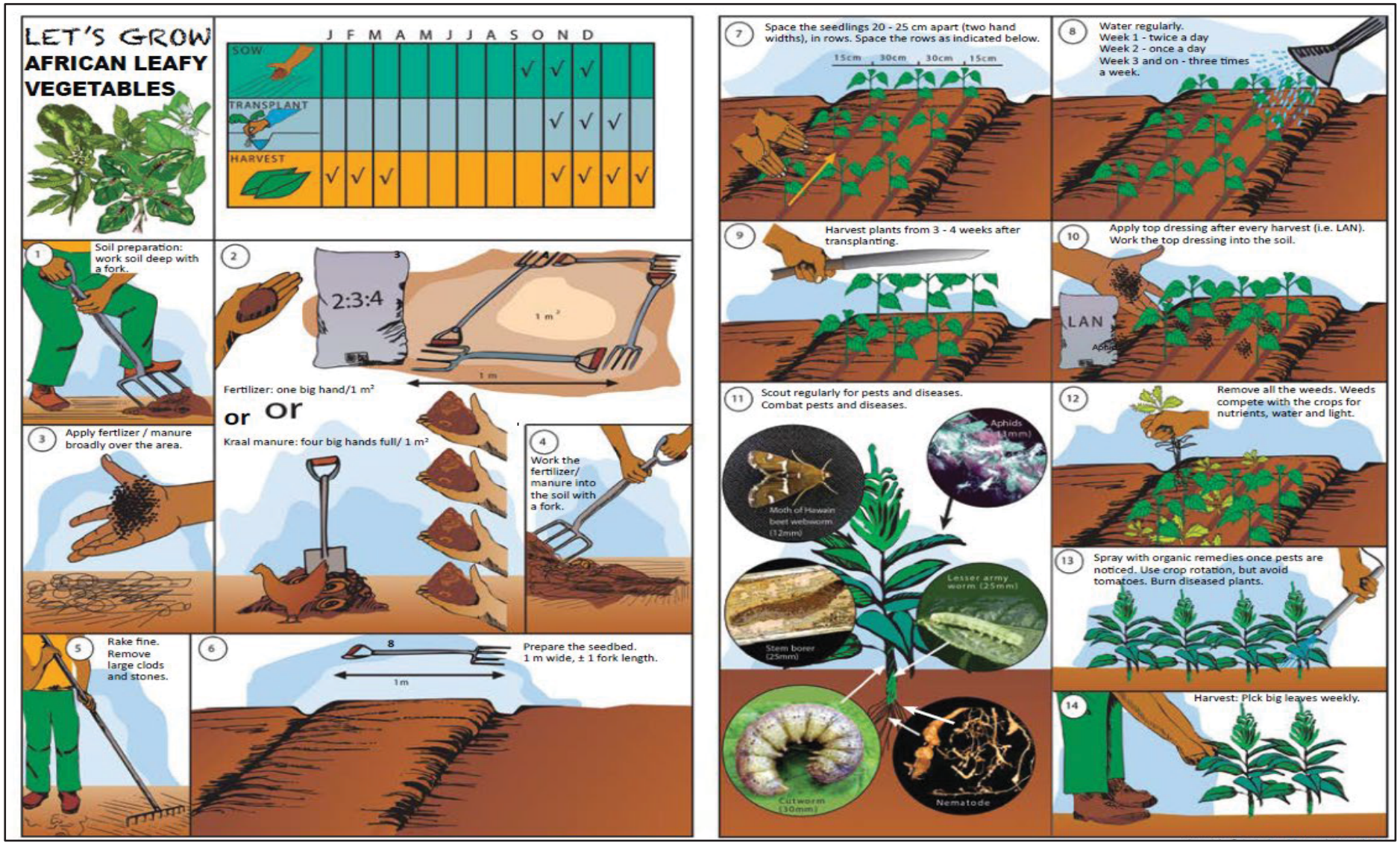
Appendix C: Let's Grow African Leafy Vegetables



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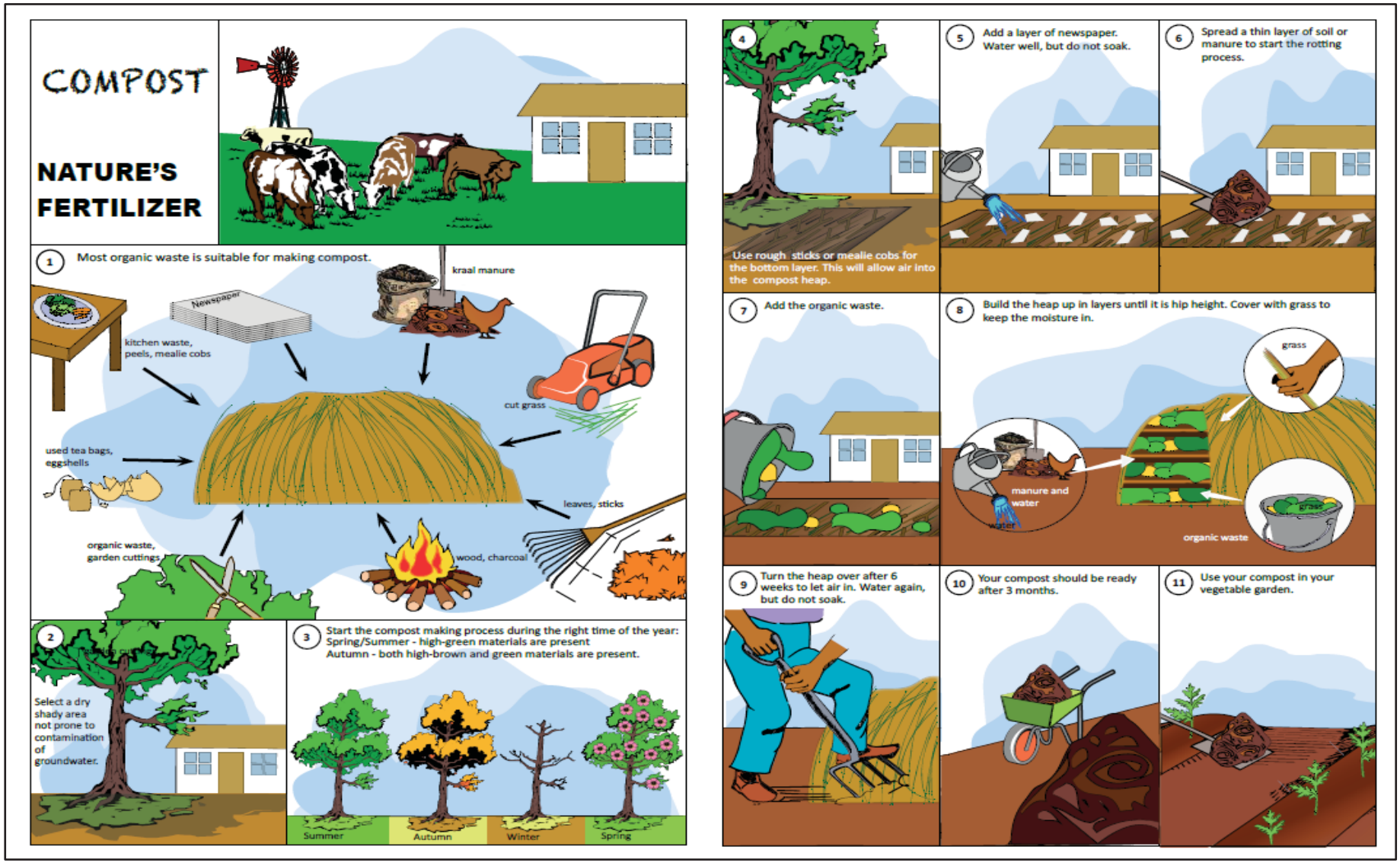
Appendix D: Compost Nature's Fertilizer



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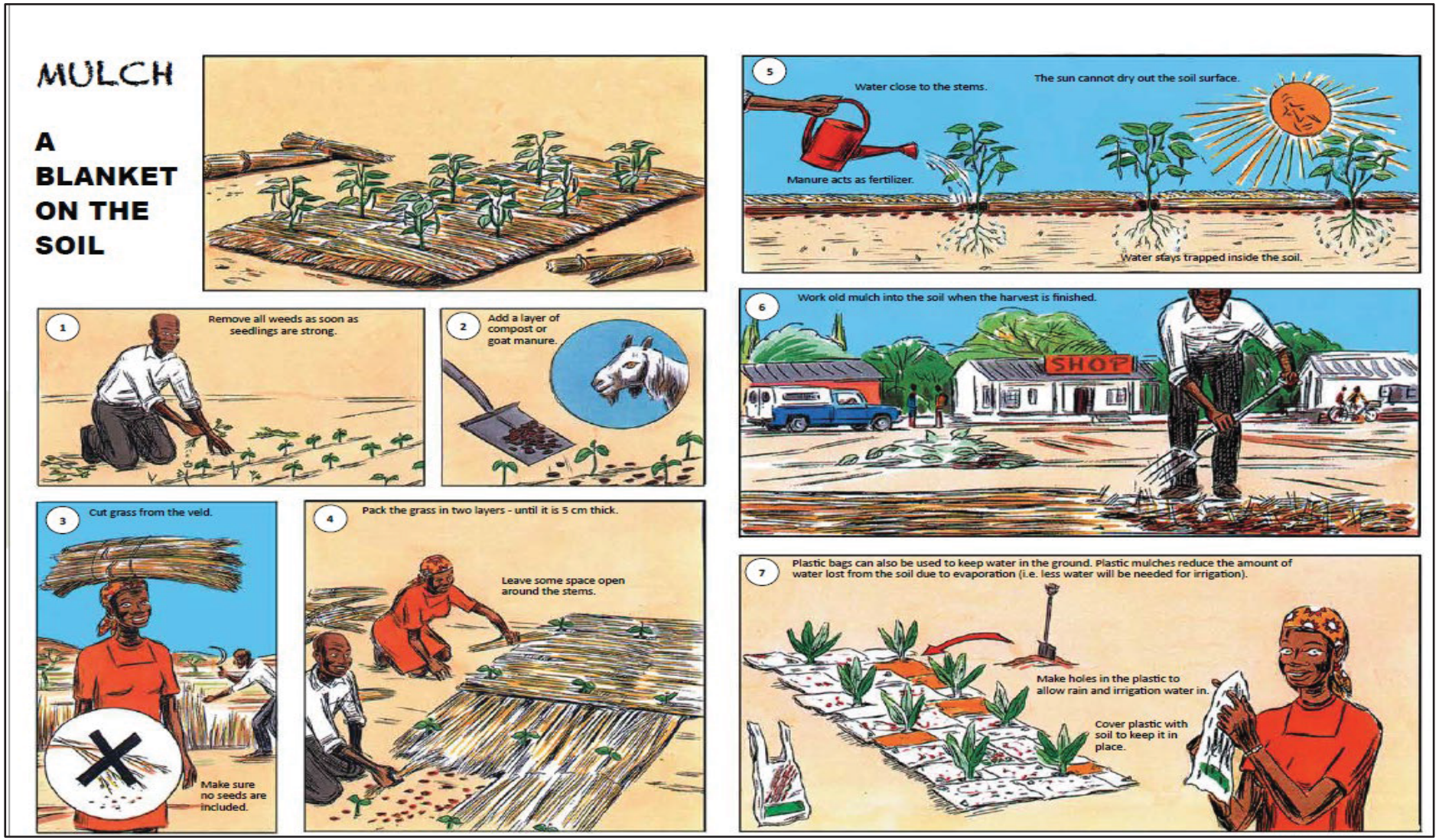
Appendix E: Mulch a blanket on the soil



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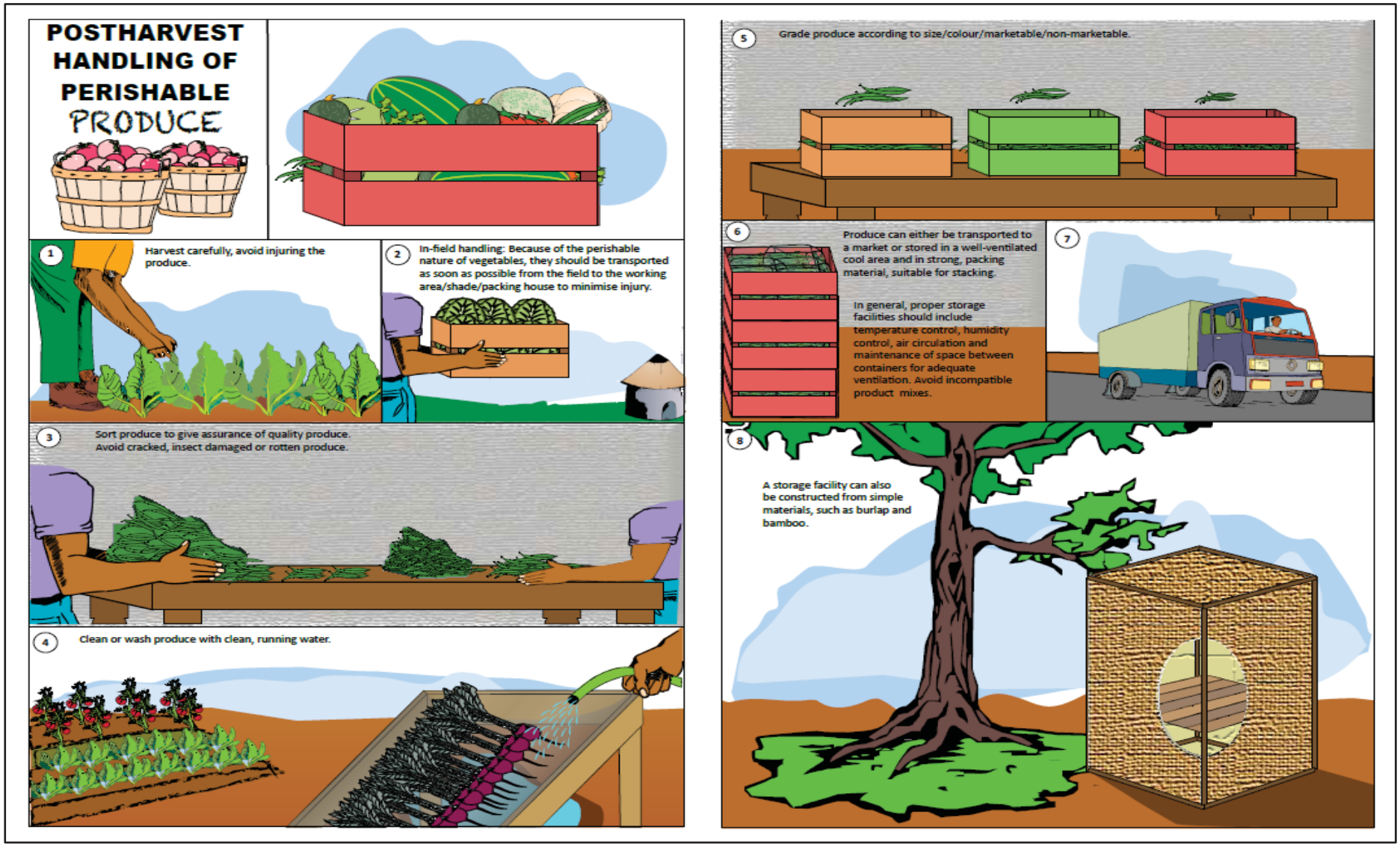
Appendix F: Postharvest Handling of Perishable Produce



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