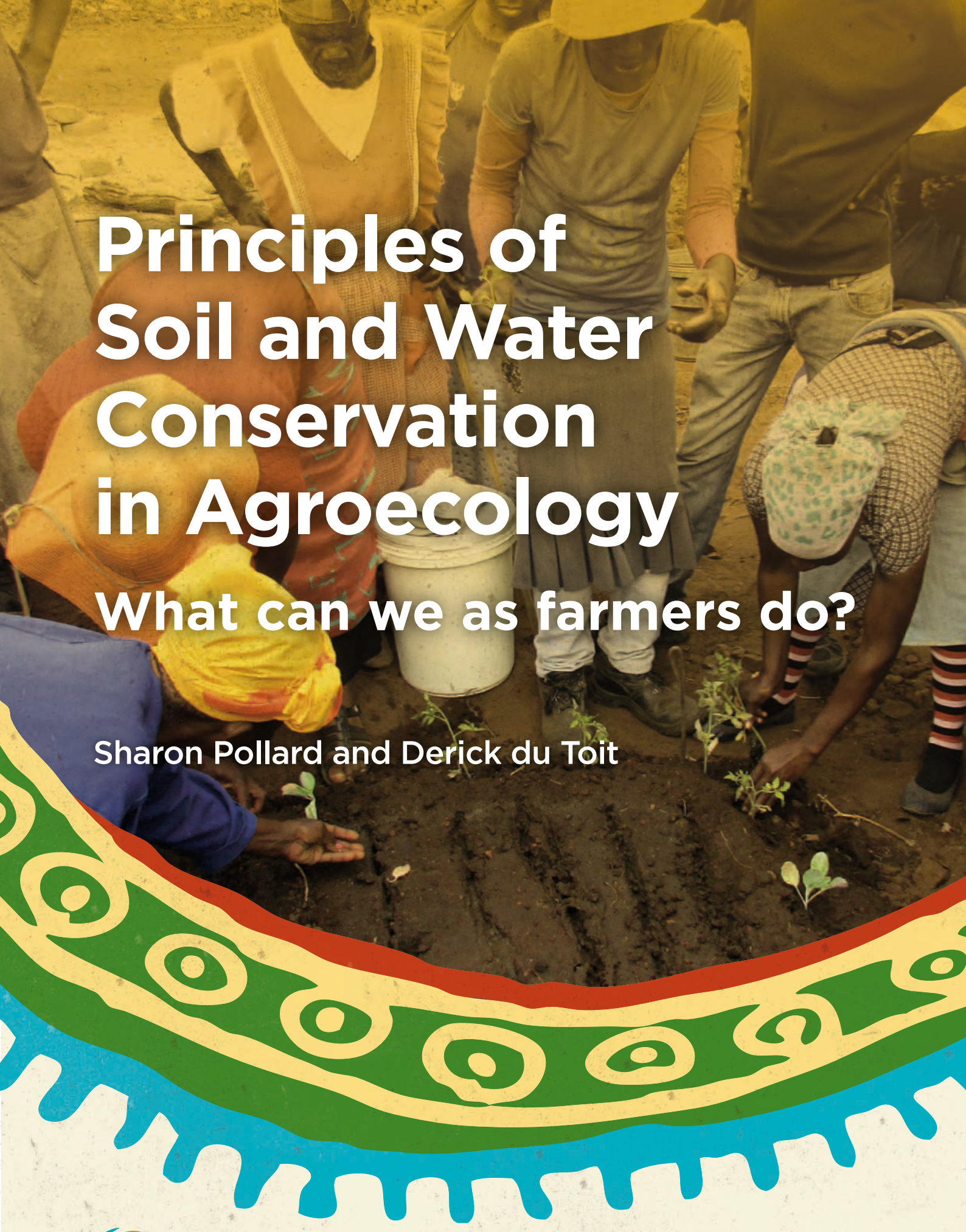

Principles of Soil and Water Conservation in Agroecology

What can we as farmers do?

Sharon Pollard and Derick du Toit

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USAID: RESILIENCE IN THE LIMPOPO BASIN PROGRAM (RESILIM) – OLIFANTS

This resource is designed to support farmers and practitioners to explore – and remember – the principles and practices of soil and water conservation (SWC). SWC practices are an important part of an agroecology approach to farming. But first we need to understand what is meant by agroecology and to see how SWC 'fits in'.

What is Agroecology?

Agroecology has been defined and described in many different ways. In essence, it is an approach to farming that aims to work with environmental characteristics rather than against them. By working in harmony with nature to produce food, the strengths of an area are used to support, enhance and maintain crop production while also maintaining the very characteristics of the area that support farming in the first place. Another important aspect is that agroecology strives to reduce inputs like pesticides and herbicides, water and fertiliser, thereby saving costs for the farmers while maintaining the health and integrity of the area.

Agroecology embraces diversity and complexity and recognises the importance of locally-led farming practices. It has a strong scientific basis which informs its principles and practices. In particular, a great deal of evidence-based practices have emerged from research into nutrient cycling, water cycling, building and maintaining soil health, crop production and water conservation. Importantly, agroecology is not a fuzzy "green" or environmental approach only. Although it embraces ecological principles as its foundation, this does not mean that it is not politically, socially or scientifically sound. In fact, it is a strongly people-led movement that seeks to gain recognition in a rapidly changing world. To build social and environmental resilience, issues of food sovereignty as well as climate justice and adaptation are key considerations. Through on-farm practices, agroecology seeks to maintain and build biodiversity and to conserve, restore and maintain the resources on which it depends – soil, water and seeds – while maintaining ecological processes such as nutrient and water cycling.

Agroecology is deeply rooted in the ecological rationale of traditional small-scale agriculture. Such complex farming systems, adapted to local conditions, have helped small farmers to sustainably manage harsh environments and meet their subsistence needs without depending on mechanisation, chemical fertilisers and pesticides, or other modern agriculture technologies. As an applied science, agroecology uses principles that are fundamental to the design and management of sustainable agroecosystems. You can read about these at https://foodfirst.org/publication/the-principles-of-agroecology-towards-just-resilient-and-sustainable-food-systems/.

Although crop yield is important to all farmers across the world, agroecology aims to build and sustain benefits beyond yield alone. This is because we have to pay attention to issues of environmental, climate and generational justice. We cannot simply keep producing in ways that impact on water and soil, pollute and degrade the environment, pull people into debt, and undermine biodiversity as well as the rights of future generations. This is even more pressing in a world where the climate is changing rapidly and farmers are faced with increasingly uncertain futures. For this reason, agroecology already provides many of the principles and tools for climate change adaptation. The principles and practices of soil and water conservation provided in this brochure are an example of some of these.

The principles of agroecology

Towards just, resilient and sustainable food systems

The following is an extract from FoodFirst and offers a useful summary of why agroecology has emerged as an important approach towards sustainability and justice.

While industrial farming claims to have raised yields, it has done so at great cost, with extensive soil damage, huge biodiversity loss, and negative impacts on food sovereignty. By contrast, agroecology offers a wide range of sustainable benefits far beyond yields. Where conventional agriculture seeks to simplify, agroecology embraces complexity. Where conventional agriculture aims to eliminate biodiversity, agroecology depends on diversity, and builds upon it. Where conventional agriculture pollutes and degrades, agroecology regenerates and restores, working with nature, not against her.

Counting the crop yield per unit area has been the basic indicator of conventional farming technology. However, it is not enough - we need to establish new ways of measuring the impact of our agricultural systems. One established benchmark against which we can gauge our progress is the United Nations Sustainable Development Goals (SDGs).

Source: https://foodfirst.org/publication/the-principles-of-agroecology-towards-just-resilient-and-sustainable-food-systems/. Accessed May 2019

The "five fingers" of soil and water conservation

Like agroecology, SWC is based on principles which can be used almost anywhere. To help remember these, we can use a hand or 'the five-fingers' to recall important principles. Each principle can be achieved by a diversity of farming practices (agroecological practices). These can be quite complex to remember and the practices that are associated with each principle may change from place to place and in different contexts. Thus, as a farmer, armed with your 'hand' to remember principles, you can work out which practices you can apply in your context. You can do this with our support and support from each other through being part of a network. You can also do this by experimenting but we understand that experimentation can be very costly for small-scale farmers which is why we offer support and ideas in this resource. The principles of SWC are:

3. Crop management for diversity:
Manage your crops for diversity, location and sustainability

4. Build soil health:
Adopt practices that build and maintain soil health

2. Limit soil movement:
Adopt practices that limit soil movement

5. Maintain indigenous plants:
Protect and maintain indigenous plants as part of your farming practice

1. Water management:
Practice good water management to enhance soil moisture and limit water movement

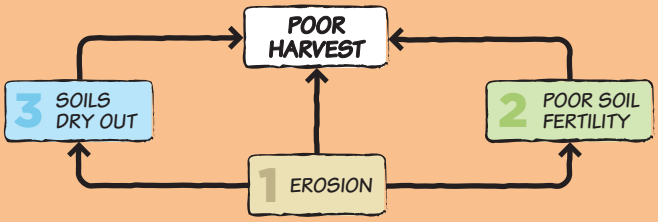
What are the problems the farmers face?

The main problem that farmers have always identified is that of **declining/poor harvests**. This is fundamentally linked to **erosion**, **drying out of soil** and **loss of soil fertility**.

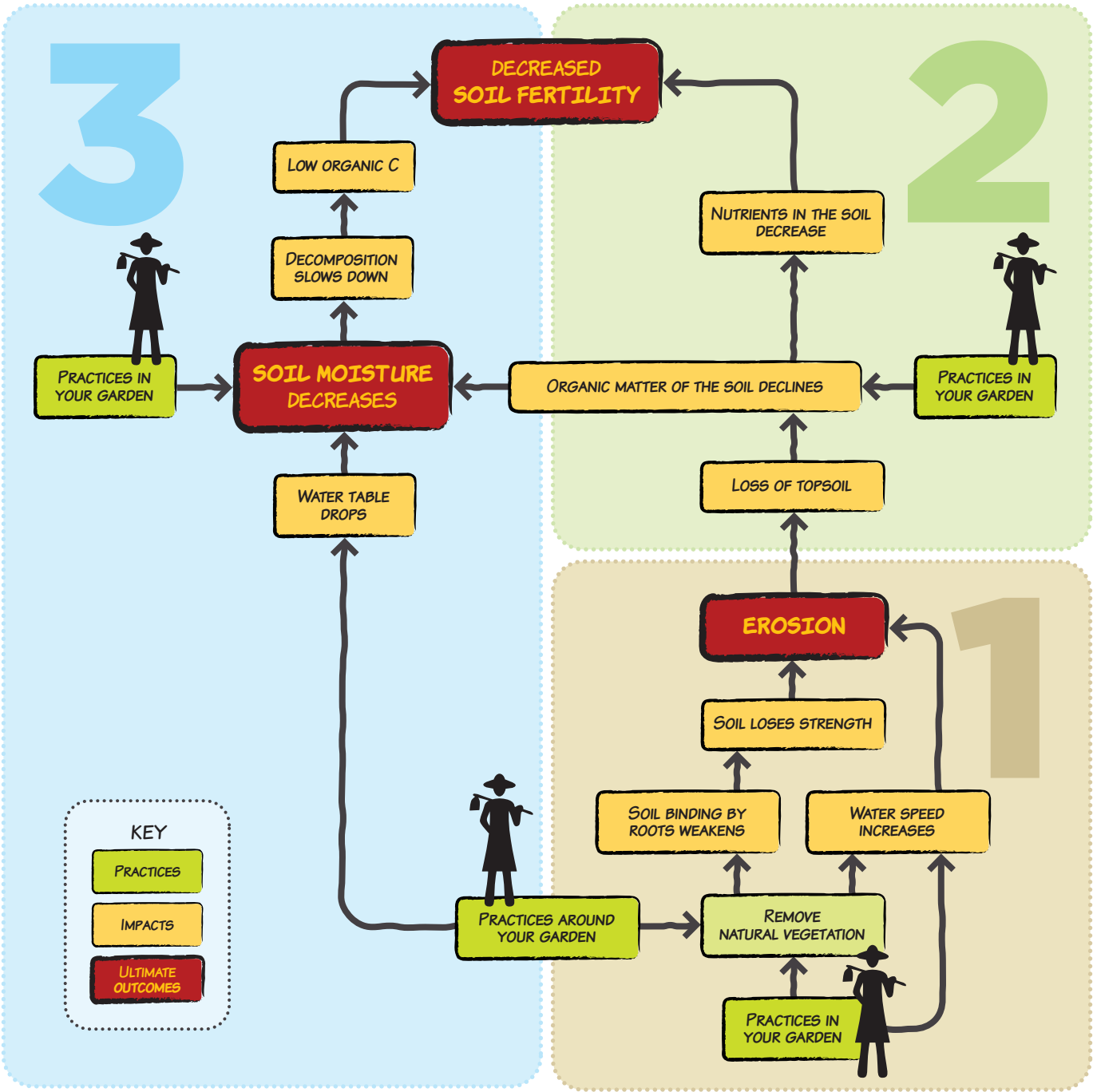
FARMERS SPEAK ABOUT FOUR KEY PROBLEMS:

DECREASED HARVEST, DECREASED SOIL FERTILITY, SOILS DRY OUT AND INCREASED EROSION.

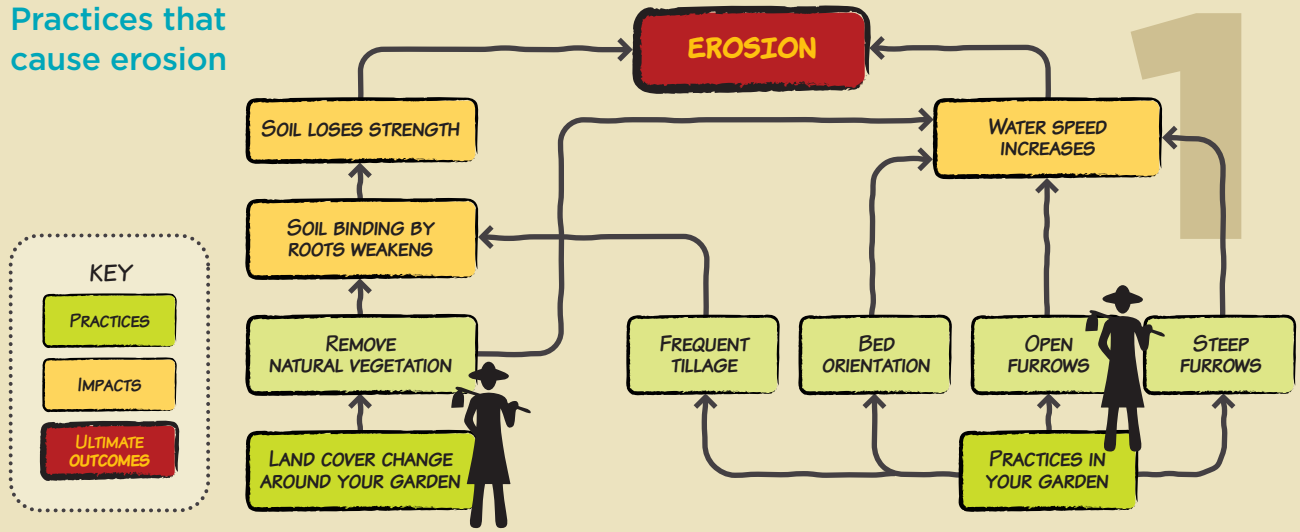
ALL OF THESE PROBLEMS ARE LINKED.



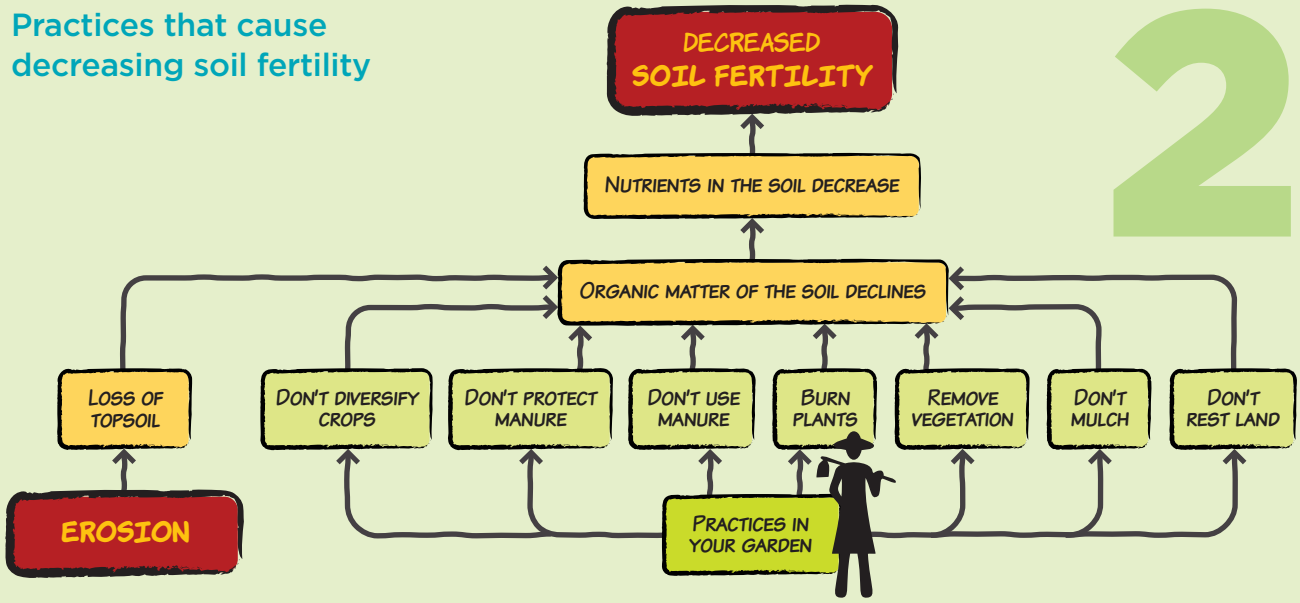
All of these problems can be either caused or alleviated by the farming practices you use. Let's look at each of these problems and its causes:



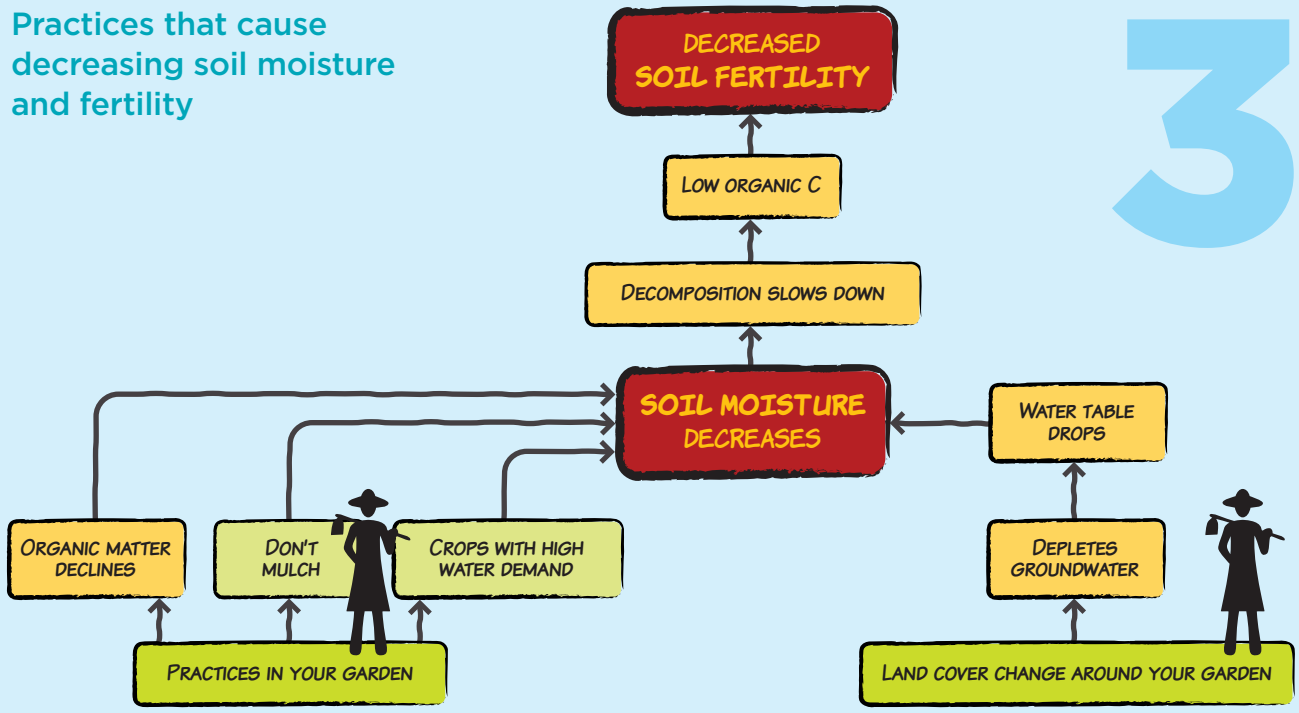
Practices that cause erosion



Practices that cause decreasing soil fertility



Practices that cause decreasing soil moisture and fertility



What can you do?

The hand of change:

Use your five fingers to remind yourself of the positive things you can do to **protect and conserve your soil and water** – and, in this way, **ensure good harvests**.

2. Limit soil movement

Adopt practices that limit soil movement

- Bed orientation and contouring
- Conservation tillage (Don't dig too much)
- Plants or mulch in furrows
- Ground cover

1. Water management

Practice good water management to enhance soil moisture and limit water movement

- ALWAYS slow down the water
- Control run-off (don't allow water to leave field or move soil)
- Increase water infiltration
- Keep water in the soil
- Use excess water (for other areas/crops)

3. Crop management for diversity

Manage your crops for diversity, location and sustainability

- Plant crops that are appropriate for the area and climate
- Rotation and intercropping
- Protect the soil: Cover soil 'with a hat' - mulching
- Weed management but maintain indigenous plants
- Save seeds

4. Build soil health

Adopt practices that build and maintain soil health

- Feed the soil - add manure, compost and humus
- Keep organic matter in the soil
- Feed your plants
- Try not to disturb the soil
- Protect the soil: Cover soil 'with a hat'

5. Maintain indigenous plants

Protect and maintain indigenous plants as part of your farming practice

- Don't 'blanket clear' your field
- Keep about 30 % of field – indigenous plants
- Maintain trees

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The Association for Water and Rural Development

AWARD is a non-profit organisation specialising in participatory, research-based project implementation. Their work addresses issues of sustainability, inequity and poverty by building natural-resource management competence and supporting sustainable livelihoods. One of their current projects, supported by USAID, focuses on the Olifants River and the way in which people living in South Africa and Mozambique depend on the Olifants and its contributing waterways. It aims to improve water security and resource management in support of the healthy ecosystems to sustain livelihoods and resilient economic development in the catchment.

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About USAID: RESILIM-O

USAID: RESILIM-O focuses on the Olifants River Basin and the way in which people living in South Africa and Mozambique depend on the Olifants and its contributing waterways. It aims to improve water security and resource management in support of the healthy ecosystems that support livelihoods and resilient economic development in the catchment. The 5-year programme, involving the South African and Mozambican portions of the Olifants catchment, is being implemented by the Association for Water and Rural Development (AWARD) and is funded by USAID Southern Africa.

Acknowledgements: Project funding and support

The USAID: RESILIM-O project is funded by the U.S. Agency for International Development under USAID/ Southern Africa RESILIENCE IN THE LIMPOPO BASIN PROGRAM (RESILIM). The RESILIM-O project is implemented by the Association for Water and Rural Development (AWARD), in collaboration with partners.
Cooperative Agreement nr AID-674-A-13-00008

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