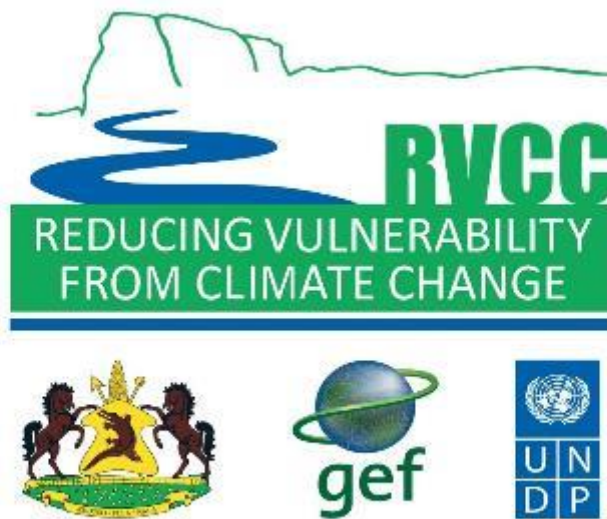




Contributing to climate change adaptation in Lesotho through policy interventions focused on scaling up permaculture principles and practice and linking with the Ecological Organic Agriculture Initiative (EOA-I)

Policy Brief
October 2021



BY RORY CLARK
PERMACULTURE SPECIALIST & CONSULTANT
rorymclark@gmail.com
+2760 702 1223

Acronyms

AU	African Union
CA	Conservation Agriculture
CSA	Climate-Smart Agriculture
EO	Extension Officer
EOA	Ecological Organic Agriculture
EOA-I	Ecological Organic Agriculture Initiative
FFS	Farmer Field Schools
GEF	Global Environmental Fund
GoL	Government of Lesotho
IFOAM	International Federation of Organic Agriculture Movements
IPES-Food	International Panel of Experts on Sustainable Food Systems
OKHSA	Organic Knowledge hub for Southern Africa
LCDF	Least Developed Country Fund
MAFS	Ministry of Agriculture and Food Security
MFRSC	Ministry of Forestry, Range and Soil Conservation
NCCP	National Climate Change Policy
NDC	Nationally Determined Contribution
NSDP	National Strategic Development Plan
PC	Project Coordinator
PFF	Project Field Facilitator
PGS	Participatory Guarantee Systems
PIC	Permaculture International Consultant
RVCC	Reducing vulnerability from climate change in the Foothills, Lowlands, and the Lower
Senqu	
ToR	Terms of Reference
UNDP	United Nations Development Programme

I. Background

The recently completed project "Reducing vulnerability from climate change in the Foothills, Lowlands, and the Lower Senqu (RVCC) permaculture project," hereafter referred to as the "permaculture project," implemented in the Moleleke's Hoek District between February 2020 and October 2021, allowing for the assessment of the potential of permaculture as a viable agricultural development pathway for Lesotho.

In order to determine the effectiveness of permaculture to regenerate agroecosystems whilst decreasing the negative impacts of climate change based on projected trends in Lesotho, a total of 20 trial sites were developed: three demonstration gardens - one in each tribal council that included the whole "suite" of permaculture recommended principles - and 17 subset gardens that included a portion of these, in order to test and identify the most cost-efficient and easy ways to implement and replicate permaculture interventions.

The suite of permaculture principles that were tested was contrasted to traditional agricultural practices. These were captured in a baseline assessment prior to project start and are essentially characterised by extensive extractive cultivation and practices that precipitate land degradation whilst making limited room for resilient and nutritionally rich and diverse food production.

The findings emanating from the pilot sites, crossed with the closeout interviews with beneficiaries, led to the following conclusions:

- The adoption and upscaling of permaculture as an alternative agricultural production system can play a quintessential role in containing and even reversing soil erosion and bringing back agro-biodiversity when compared to traditional agricultural practices.
- Permaculture can significantly help strengthen community resilience to climate change. Moreover, the iterative processes of action learning underpinning permaculture design enhanced the adaptive capacity within the beneficiary households where it was applied.
- Permaculture projects such as those piloted in the project area are well suited to the circumstances of small-scale farmers as they combine a range of quick wins – necessary to convince farmers of the worth of investing in such projects - with long-term development/food gains. In the case of the RVCC permaculture project, the post-intervention closeout visits indicated that most beneficiaries had already adopted many of the recommended permaculture practices.¹ Such immediate rewards create a fertile ground for beneficiaries to patiently nurture other permaculture systems that take more time to establish and bear fruit, such as fruit and nut trees and improved land design.
- The scaling-up of permaculture needs to go hand-in-hand with the good work being done on the ground by the Government and other organisations implementing interventions that are aligned and complementary to permaculture principles. This includes the work done by the Ministry of Agriculture and Food Security (MAFS) (who played, among others, an instrumental part in developing many keyhole gardens that could be seen throughout the community council areas) and other organisations actively involved in promoting conservation agriculture methods.

This policy brief proposes policy recommendations to integrate climate risk considerations, and more specifically, contribute to climate change adaptation in Lesotho through policy interventions focused on scaling up permaculture principles and practice at both the national and sub-national levels.

¹ The observed adopted practices include mulching, companion planting, allowing chickens to free range; improving animal well-being and health through holistic animal husbandry; planting a diversity of crops; run off rain water harvesting; water conservation through drip irrigation; integrating animal production systems with crops and trees, whilst bee hives are starting to be occupied.

II. Key Policy Messages

The United Nations Development Programme (UNDP) Lesotho Country Office (CO) and the RVCC implementation partners, namely the Ministry of Agriculture and Food Security (MAFS) and the Ministry of Forestry, Range and Soil Conservation (MFRSC), should:

- Capitalise on the gains of the RVCC permaculture project, which has, despite its short implementation phase and many challenges, already shown significant gains for the beneficiary farmers on the ground.
- Ensure there is ongoing monitoring and learning attached to this project, which is to be construed as a pilot to test the potential to upscale permaculture in the country.
- Take the required operational steps to streamline and improve the efficiency of future projects aimed at scaling up permaculture within the Government's programmes, in partnership with the relevant institutions, as detailed in the recommendations section.
- Set up a permaculture/Ecological Organic Agriculture (EOA) committee that would incorporate permaculture as the core practice to be upscaled, with focal points from relevant ministries and departments that would meet on a quarterly basis in order to track the progress of the upscaling process/es.
- Pursue and finalise the integration of permaculture principles/organic agriculture into the Farmer Field Schools (FFS) curriculum and define clear processes for ensuring that the farmers supported by the project keep on being supported within the FFS and Extension Officer (EO) networks, such as through Memoranda of Understanding. This would result in them being the custodians of all future permaculture projects to ensure their long-term sustainability.
- Take action to implement two possible policy avenues that will result in permaculture being mainstreamed into agricultural practices in Lesotho.
 - The first policy option presented in this brief proposes that a directive or decree should be issued calling for permaculture principles to be embedded into all future agricultural programmes and projects backed by the Government
 - The second alternative policy option proposes that a new policy be developed, namely an Organic agriculture policy for Lesotho, that would steer the country on a sustainable pathway, both from an environmental and a food security perspective. The rationale for promoting an organic policy as opposed to a permaculture policy is that organic agriculture can be regulated and enforced against a set of standards, whereas permaculture, which consists of a design approach, hasn't historically been policeable. Permaculture principles would nonetheless be strongly incorporated into an organic agriculture policy for Lesotho. The elaboration of this Organic agriculture policy would emanate from the implementation of an "Organic action plan," which is an operational plan giving tangible guidelines to the Government in terms of the steps to be followed.
- Further supporting this policy intention, it is recommended that the Government of Lesotho actively aligns and engages with a continent-wide initiative known as Ecological Organic Agriculture Initiative (EOA-I), which is supported by the African Union (AU) and is progressively being scaled up on the continent. Doing so would prove strategic to steer the Government of Lesotho on a pathway to set up the appropriate institutional structures to support EOA-I and develop the afore-mentioned organic agriculture policy, in which permaculture principles will strongly be embedded.
- The project custodians should systematically connect with the farmers producing excess for the market to link this production with the emergence of the organic sector in Lesotho and beyond, with a focus on linking with and supporting the newly created Participatory Guarantee System (PGS) in Lesotho.

III. Introduction

Lesotho's topography and location influence its temperate, alpine-like climate. This terrain is likely to compound the country's vulnerability to climate variability and long-term climate change². Basotho people and production systems are already experiencing the negative effects of climate change, including increasing unpredictability of weather patterns, increased frequency of extreme events, such as droughts, floods, increasing mean annual temperatures, changes in growing seasons, and crop suitability. Non-climatic factors linked to agricultural practices that lead to increased rates of soil erosion and desertification and reduced soil fertility³ are further aggravating climate change in the country.

Climate projections are different for each region, with the northern areas projected to see annual temperatures increase between 0.4-4.7°C while the southern regions will experience temperature increases between 0.2-3.8°C by 2100⁴. The warm growing season will shift towards Autumn. Climate change will exacerbate floods and droughts, and although there could be some positive increases in some grain crops, there are expected losses in others.

As articulated in Lesotho's Second National Communication⁵ and in its Nationally Determined Contributions (NDC)⁶, Lesotho is focused on implementing adaption mechanisms to improve and diversify livelihoods in view of current and future climate risks.⁷ Among the initiatives rolled out to bolster the country's adaptation to climate change features the "Reducing vulnerability from climate change in the Foothills, Lowlands and the Lower Senqu River Basin" (RVCC) project, implemented through the Lesotho UNDP Country Office and by the Ministry of Forestry, Range and Soil Conservation (MFRSC) of the Government of Lesotho. This six-year GEF-financed project has implemented multiple strategies to increase resilience and mitigate the effects of climate change in Lesotho. Underpinning this project is a focus on countering current unsustainable or inadequate land management practices, which aggravate pressure on natural resources and contributes to climate change through the loss of carbon storage and sequestration capacity.

The RVCC permaculture project was conceived to supplement the scope of the RVCC main project. It was implemented between February 2020 and October 2021, specifically focused on empowering the target communities (over 7,000 households with potential for up-scaling to cover over 20,000) with skills, knowledge, partnerships, and institutions for managing natural resources to reduce vulnerability to climate change and increase the resilience of natural and social capital. It sought to address adversarial land management practices by piloting the introduction of permaculture principles.

In doing so, the project structured its activities along three main axis:

- 1) **A training component:** this entailed the development of a training manual and programme, which was developed concurrently with the setting up of pilot training sites. The training was then delivered in May 2021, reaching 23 technical government and NGO staff and 34 lead farmers.
- 2) **A demonstration site component:** the project designed, established, and supported the development and maintenance of twenty pilot sites. These included three demonstration

² Ministry of Energy, Meteorology and Water Affairs (2013). Lesotho's Second National Communication to the Conference of Parties of the UNFCCC. URL: [https://unfccc.int/sites/default/files/resource/LESOTHO%20SNC%20FINAL%20REPORT%](https://unfccc.int/sites/default/files/resource/LESOTHO%20SNC%20FINAL%20REPORT%20.pdf)

³ UNDP (2015): Lesotho Project Document: Reducing vulnerability from climate change in the Foothills, Lowlands and the Lower Senqu River Basin. URL: <https://www.adaptation-undp.org/resources/prodocs/project-document-lesotho-pims-4630>

⁴ IPCC's Fifth Assessment Report

⁵ Ministry of Energy, Meteorology and Water Affairs (2013) Lesotho's Second National Communication. Available from <https://unfccc.int/resource/docs/natc/lsnc2.pdf>

⁶ Lesotho Meteorological Services. Ministry of Energy, Meteorology and Water Affairs. 2017. Nationally Determined Contribution (NDC). Available from: <http://extwprlegs1.fao.org/docs/pdf/les187334.pdf>

⁷ Climate Risk Profile: Lesotho (2021): The World Bank Group.

gardens - one in each community council that included the whole suite of permaculture recommended principles - and 17 subset gardens that included a portion of these in order to test and unearth the most cost-efficient and easy way to replicate permaculture interventions. Of these twenty developed gardens, 12 were at the homestead level, seven were community gardens, and one was at the MFRCS district office in Mοhales Hoek.

- 3) **A networking/institutional linkages component:** the project worked closely with Farmer Field Schools (FFS) to ensure that the permaculture training is fully integrated into their curriculums, that the trainers have the capacity to replicate the training to more farmers, that they can support the replication of permaculture food gardens and the integration of permaculture practice into existing food gardens.

The project demonstration plots were set up in various villages within three different community council areas in the Mοhales Hoek district, i.e., Khoelenya, Thabo Mokhele, and, Lithipeng and are situated roughly 120km -220km south of Maseru (see Figure 1).

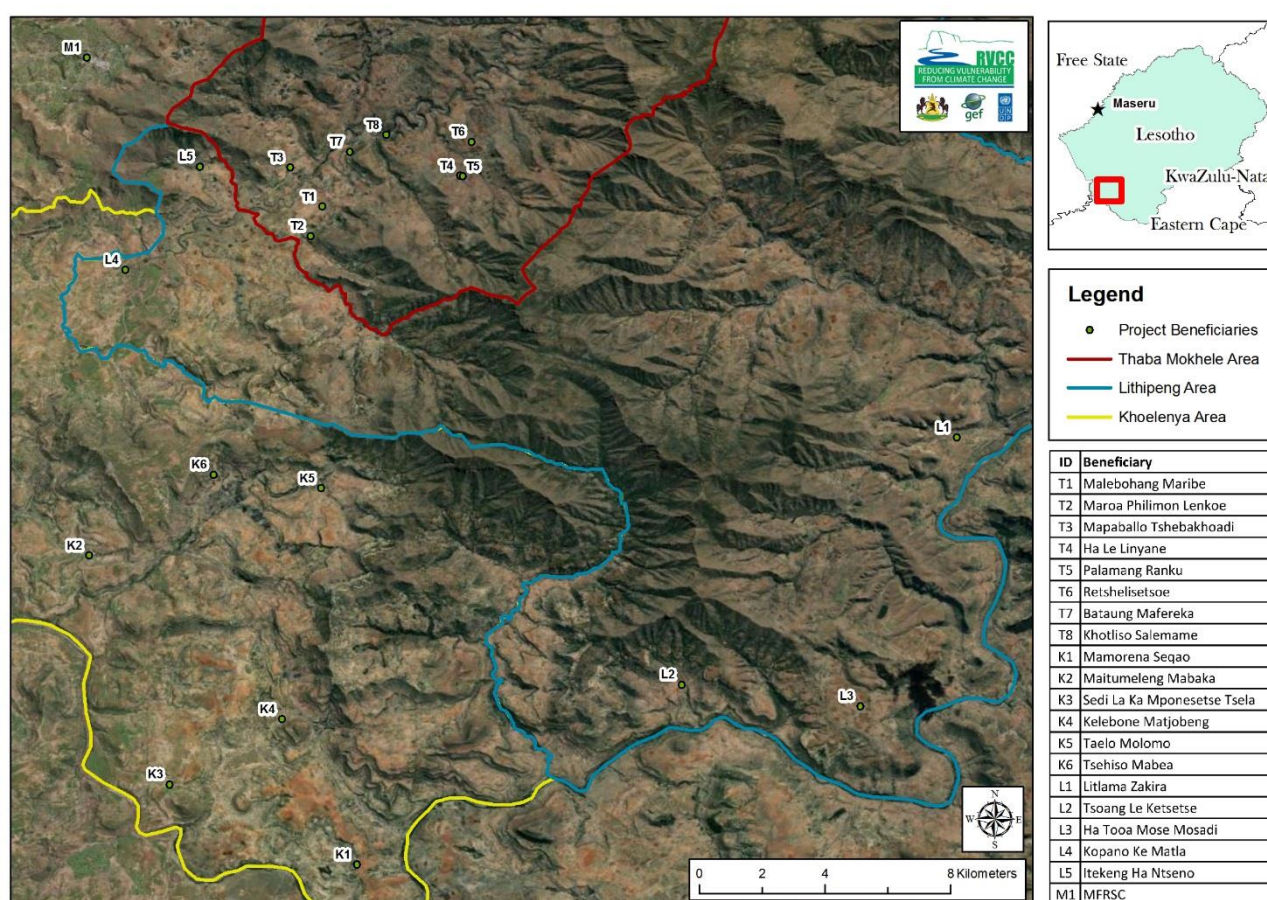


Figure 1 RVCC Map of Beneficiary Locations 1:150 000 Source: – Rory Clark / ESRI 2021

The site-specific interventions that were piloted as part of the demonstration plots featured:

- improving rainwater runoff harvesting & infiltration,
- increasing water storage and rainwater harvesting off roofs,
- providing homestead/farm connections to water sources (such as springs),
- providing solutions to halt and rehabilitate soil erosion, increasing crop diversity,
- increase perennial plant production (farmers mostly rely on one season crops for nutritional needs),
- providing all-year-round food production solutions,
- reducing input costs such as seed and fertilizers,
- increase crop yields and outputs, providing organic pest control methods and solutions,

- increasing technical capacity through permaculture trainings,
- providing holistic/ethical animal husbandry solutions (free-range chicken runs, pig pens, etc.),
- improving livestock nutrition and fodder availability, and
- increasing and diversifying livelihood enterprises.

This policy brief is based on the practical experience of rolling out the pilot programme, as well as on emerging outcomes observed on the ground, combined with interviews with beneficiaries as well as other stakeholders and captured in the RVCC permaculture project closeout report.⁸

IV. Successful implementation of the RVCC Permaculture project in Lesotho and its contributions to climate change adaptation

The closeout report referenced above details the project outputs and emerging outcomes based on the experiences gained during implementation, as well as an assessment, carried out just prior to project closure. These successes are briefly recapped below.

- Three demonstration gardens that showcase permaculture principles and best practices were created, and permaculture principles were integrated into an additional 17 existing food gardens, thus enhancing their sustainability and resilience to CC. The on-site closeout visits showed how much the farmer-beneficiaries of these 20 permaculture gardens were proud of their contributions and accomplishments in developing their gardens.
- Training material aimed at addressing the specific circumstances found within the project area were developed. These include a 111-page manual covering the permaculture principles and practices relevant to the Lesotho context. The project integrated permaculture principles into the FFS curriculum and provided a sowing calendar poster with detailed instructions for planting and harvesting.
- The project made provision for a total of 80 technical staff and farmers to be trained; this target was exceeded with a total of 57 technical staff from the MFRSC and MAFS-extension officers and farmers receiving training at the three five-day permaculture courses in May 2021; and a further 130 farmers at the open days in September 2021. This translates into a total of 164 farmers and 23 technical staff receiving training.
- The project successfully developed the capacity of technical staff so that they can replicate the training to more farmers and replicate the development of permaculture food gardens. This training of the trainers targeted technical staff from the MFRSC and MAFS-extension officers and provided them with the experience of co-facilitating the permaculture 5-day course and also the permaculture open days (1-day workshops).
- The project undertook to select food plants suitable to building resilience to climate change projections and local growing conditions and ensure food can be produced throughout the year. In total, 45 different species of perennial food plants were supplied to the permaculture gardens, including fruit and nut trees; berries and vines; and thirty-two species of vegetable seed that cover food production in all the seasons.

V. Policy options for scaling up permaculture in Lesotho

Two possible and complementary policy avenues that will result in permaculture being mainstreamed into agricultural practices in Lesotho are proposed, namely that:

- i) the Government of Lesotho explicitly resolves to include permaculture guidelines as the blueprint to all current and future agricultural programmes and projects in the country, and

⁸ Clark, R. 2021. *RVCC permaculture project close-out report* compiled for the RVCC Project, UNDP Country Office, Maseru, Lesotho, 26 October 2021.

- ii) the Government of Lesotho sets out to develop an Organic Agriculture Policy that incorporates permaculture principles.

Further supporting these policy intentions, it is recommended that the Government of Lesotho aligns and engages with a continent-wide initiative known as Ecological Organic Agriculture Initiative (EOA-I), which is supported by the African Union (AU) and is progressively being scaled up on the continent.

5.1 Embed permaculture guidelines into all current and future agricultural programmes and projects backed by the Government

Based on the success of the permaculture project to improve livelihoods whilst addressing environmental and climate change challenges, the Government of Lesotho should consider issuing a **decree or directive calling for all current and future agricultural programmes to embrace, integrate and implement permaculture principles and practice.**

Although Lesotho's National Climate Change Policy (NCCP)⁹ calls for "sustainable agricultural systems" as the fundamental basis for achieving national food security, nutrition, and poverty reduction; it does **not define what practices would underpin "sustainable agricultural systems,"** save for advocating for "climate-smart agriculture (CSA) technologies"¹⁰. These are also not explicitly defined in the policy, but generally speaking, they refer to enhancing farming with weather monitoring and adopting the suite of Green Revolution technologies rebranded as "climate-smart," but which effectively risks further locking farmers into debt traps and unsustainable practices¹¹.

Permaculture counts among the practices promoted by notorious research bodies such as the International Panel of Experts on Sustainable Food Systems (IPES-Food) that are "based on diversifying farms and farming landscapes, replacing chemical inputs, optimizing biodiversity and stimulating interactions between different species, as part of holistic strategies to build long-term fertility, healthy agroecosystems, and secure livelihoods." It is a **farming system based on design principles that organize plants and animals to function together while also providing abundant yield.**¹² It also sets out a framework for the methods of ecosystem mimicry (that is to say, imitating nature) and complex system optimization. This emphasis on **perennial design of agroecosystems** is what sets it apart from other alternative agroecological agricultural approaches. Importantly, **in the context of Lesotho, permaculture offers tremendous potential to reverse the trends of soil and land loss in Lesotho while substantially increasing community and household level resilience to land degradation and climate change.**

Permaculture is strongly aligned to and reinforces agroecological practices, but it goes further than agroecological approaches, as it provides "principles to guide the design, implementation, and maintenance of resilient agroecological systems"¹³ and promotes the integration of multiple facets of agriculture, e.g., animal husbandry, fruit growing, aquaculture, horticulture, agroforestry, regenerative agriculture to increase overall environmental resilience. The underlying principle is also to harness and encourage natural processes to work most efficiently with the least effort (labour and energy inputs).

⁹ LMS 2017. Lesotho's National Climate Change Policy. Ministry of Energy and Meteorology, Lesotho. Available from: <http://extwprlegs1.fao.org/docs/pdf/les203460.pdf>

¹⁰ LMS 2017. Lesotho's National Climate Change Policy. Ministry of Energy and Meteorology, Lesotho. Available from: <http://extwprlegs1.fao.org/docs/pdf/les203460.pdf> (2017:16)

¹¹ Indeed, the MAFS should be cautioned against embracing the technologies much vaunted by the "climate smart agriculture" (CSA) paradigm, which seems to have infiltrated the agricultural and climate change discourse in Lesotho (see Table 3). CSA has been extensively criticised for bringing in its wake an agricultural agenda that might be ill suited to the food security objectives of the country. CSA often translates as "sustainable intensification", the continued promotion of agro-chemicals, and the indirect support to Genetically Modified Organisms (GMOs). Small-holders are the evident intended target of CSA and there is ground evidence that they are being enticed – often via the agricultural subsidy regime - to use unaffordable agro-chemical inputs leading to debt (Refer to Biowatch South Africa. 2015. Fact Sheet: Climate-Smart Agriculture. Available from: <https://biowatch.org.za/download/fact-sheet-climate-smart-agriculture/?wpdmid=501&refresh=615f85aa22bf81633650090>)

¹² Mollison, B. 1991. *Introduction to Permaculture*. Tagari Publications. NSW, Australia.

¹³ Krebs, J.; Bach, S. Permaculture—Scientific Evidence of Principles for the Agroecological Design of Farming Systems. *Sustainability* 2018, 10, 3218. <https://doi.org/10.3390/su10093218>

5.1.1 The twelve permaculture principles

The most commonly used set of permaculture principles was developed by co-ordinator David Holmgren.¹⁴ Those twelve principles, adapted for the purpose of the RVCC permaculture project and which have been captured in the permaculture manuals developed for the project, are listed and briefly discussed in the table below.

Table 1: Permaculture principles to be used in the upscaling of the practice in Lesotho

No	Principles	Practical applications and emerging results from the intervention
1	Observe and Interact with Nature	- Farmers should embark on extensive walks in the surrounding natural areas. (This point about agroecosystems was highly emphasized during the course: we are a part of nature and farming in an ecosystem) - Sit and observe flora and fauna on your land or in your neighbourhood. - Watch and keep track of the weather, seasons, and moon cycles.
2	Catch & Store Energy	- In summer, when the sun's energy is at its strongest, we catch and store that energy in crop production - vegetables, fruit, nuts, firewood, and meat - When it is raining, catch and store the rain in tanks, ponds, and soil. (the project donated beneficiaries with rainwater tanks, pipelines, etc.) - Store and process surplus vegetables and fruit in preserves for the less abundant winter season.
3	Obtain a Yield	- Sprouts can be harvested in as little as two days and are nutritious and delicious (the project donated beneficiaries sprouting jars) - Fruit trees are a long-term investment but yield for many years once they start to bear. - Plant nectar plants that provide a yield and food for insects and bees. (the project donated beneficiaries with many fodder plants for bees)
4	Apply Self-regulation and Accept Feedback	- Don't burn fossil fuels unnecessarily by making multiple trips in your car or taxi; reduce the frequency of travel or use alternative means such as a donkey, horse, or a bicycle instead. - Technology consumes many natural resources; think twice before upgrading any of your equipment, including your mobile phone. Think of how best you can reuse materials. - Practice clearing your heart and mind when people are speaking or when observing in the fields. We will be more receptive to feedback with a calm focus.
5	Use and Value Renewable Resources and Services	- Animal tractors – chickens and pigs, are well known for scratching and digging up the ground in search of worms, roots, and insects. These animals will prepare the way for a fertile, well-weeded area if you enclose them for a few days in an overgrown fallow zone (the project donated beneficiaries chicken tractors) - Fertilizers – all animals recycle nutrients by eating vegetation or other animals and excreting nitrogenous manure onto fields and in gardens. Liquid fertilizers and manure provide essential nutrients for garden plants.
6	Produce No Waste	- Vegetable peels and vegetables not used in the kitchen are essential food for worms. Worms are needed to start the decomposition process in the compost heap. (The project taught beneficiaries compost making – beyond waste management, this is, of course, seminal for adequate soil building) - Grass cuttings – ideal to use as mulch around new seedlings, to keep the soil protected and wet, as well as to create an extra layer of nutrient-rich material that decomposes and adds to the value of the soil. (mulching is being practiced everywhere on project sites) - Greywater – instead of sending washing and bathwater into a drain, redirect this greywater to your trees or garden (ensure that you are using an organic and biodegradable detergent). Swales and mulched tree basins are perfect for recycling greywater.
7	Design from Patterns to Details	Utilize the natural contours of your land to construct earthworks, such as a swale, to capture rainwater runoff. The contour is the pattern; the swale is the detail. Work with the sun's seasonal pattern as it journeys in the sky - we place elements in the sun's changing pathway to best utilize the sun's energy.

¹⁴ Holmgren, D. 2001 Essence of Permaculture. Available from: https://files.holmgren.com.au/downloads/Essence_of_Pc_EN.pdf Accessed 23 September 2020.

		Patterns are cycles; we can observe the natural cycles around us. Note how they affect the animal and plant life and make cyclical or seasonal decisions for our crops and animal systems based on these observations.
8	Integrate rather than Segregate	Create safe environments that enable children and old people to interact with the system. (the beneficiaries report the raised beds are easier to work with, especially for older people). Combine trees, crops, and animals in agroforestry so that each element contributes its services and products to the other. Create plant communities – guilds that support each other in pest control, fertilization, thus enhancing the concept of companion planting.
9	Use Small and Slow Solutions	·Start with a kitchen garden, especially if you haven't grown produce previously. You need to work within your capacity, i.e., do not over-extend yourself whilst aiming to steadily turn your farm over to become more production each year (this was one of the most important pieces of feedback received pertaining to how this helped redefine the beneficiaries' ideas of what constitutes a "large plot." They now understand they can grow a lot more with less and start small) Use equipment that is the right size for your operation, e.g., a big tractor on a very small field will move too quickly; an animal tractor moves slowly and achieves the same result with much less stress and no compaction of the soil. Build soil slowly, season by season, with compost and cover crops.
10	Use & Value Diversity	Plant a diversity of crop species (fruit, nuts, grains, and vegetables) that can produce throughout the year, as this builds food security and resilience against climate change (the project donated beneficiaries with a lot of different species of crops) and extends the growing season. Adapt your seed selection to local conditions. This creates genetic diversity within your seed stock, while seed-saving will enhance the viability and resilience of the garden or farm. Farm beneficial animal communities that provide complementary services to each other, such as chicken and cattle.
11	Use Edges and Value the Margins	·Hedgerows along crop fields planted to indigenous tree and shrub species (the project also helped establish food hedges along fences) Pathways in which two production systems are entwined (food forest and vegetable garden) create an opportunity to engage with both systems simultaneously. · Animal systems next to crop systems enable many services and outputs to be connected between the two; chickens and pigs can be made to roam in fields after harvest to fertilise the soil and do pest control.
12	Creatively Use and Respond to Change	The life cycles of farm animals require different needs at different stages of life. Take into consideration seasonal changes that influence crop selection and limit production. Keep on trialing new crops and species as you are the best observer of how your agri-system responds to climate changes, especially temperature and precipitation

5.1.2 The twelve permaculture guidelines

Although these twelve "philosophical "principles are the core tenets of permaculture and should feature in any future guideline/policy document, it might be easier to convey these through the lens of guidelines or "best practices." This was the approach that has been adopted by the RVCC permaculture project. In this respect, **it is recommended that the 12 key permaculture guidelines captured in Box 1 be incorporated into any future Government programmes, interventions, and plans.**

1. Planting a diversity of crops and making use of polycultures (plants that benefit from each other when grown together)
2. Planting perennial plants & using perennial agriculture systems
3. Practicing crop rotations and making use of cover crops
4. Making use of Open Pollinated Variety Seeds and maintaining a seed bank
5. Reducing pest pressures through improving the health of agroecosystem and applying organic methods for pest control
6. Planting propagation for small to medium scale farmers

7. Removing Alien Invasive Plants (AIPs) from your farm, land, or homestead.
8. Using no-till and minimum-till agriculture practices
9. Building soil and soil health through processing and applying organic inputs
10. Reversing soil erosion through slope planning
11. Practicing rainwater harvesting, and agricultural water conservation
12. Adopting a holistic approach to animal husbandry and wellbeing

Box 1 – The 12 key permaculture guidelines¹⁵

The relevant Ministries need to refer to Appendix 7.1 for an **operational matrix** illustrating the relevance of the proposed permaculture guidelines/best practices in the Basotho context and how the project went about implementing these best practices; the scalability potential of the proposed interventions in Lesotho, and recommendations for upscaling these interventions.

Finally, Table 2 sums up the **core tenets of the NCCP**, which calls for a suite of interventions, and how **these can be significantly advanced by the adoption and upscaling of permaculture guidelines** whilst pointing to **specific actions/recommendations that emerged from the RVCC permaculture project**. Where the permaculture orientations might diverge from the NCCP orientation, this is stated and explained.

Table 2. Contribution of permaculture to the strategic objectives of the National Climate Change Policy of Lesotho

Lesotho National Climate Change Policy actions (2017:17)	Permaculture contribution to policy aims
Integrate climate change in agricultural policies, strategies, plans, and regulatory frameworks;	Embedding permaculture and its wide EOA construct into policy will strongly serve this core objective. Importantly, from a policy level perspective, the benefit of diversified and less intensive systems and their contribution to CC adaptation and mitigation needs to be emphasised. Permaculture practices can deliver major GHG savings and increases in resource efficiency, particularly when a lifecycle analysis approach is taken. Agroecological systems that seek to improve soils and maintain vegetative cover have huge potential for carbon storage and sequestration.
Improve and harmonize research activities in climate-smart agriculture such as the use of crop simulation models to estimate agricultural production as a function of weather, soil conditions as well as crop management practices;	If the focus on CSA only implies the use of crop simulation models, there does not contradict permaculture principles. However, as explained above, CSA also usually implies the adoption of Green Revolution practices that go against the principles advocated by permaculture; caution should be exerted with regards to the forms of inputs recommended to farmers, and only agroecological inputs should be made available as subsidised inputs. Create permaculture demonstration sites "pilot research gardens" in each of the ten districts - a strong interest in this has already been expressed by the MAFS and MFRSC – and carefully monitor the performance of species (and combinations of species) and permaculture best practices.
Build and strengthen the capacity of extension officers in climate-smart agriculture to enhance support to farmers;	Rather than the focus on "CSA," a strong recommendation is to orientate this learning on permaculture and EOA. Permaculture, regenerative agriculture, and holistic management (grazing practices that rehabilitate degraded land) are slowly becoming accepted as mainstream practices and influencing academic programmes around the world and, therefore, government agricultural programmes. The Government of Lesotho needs to ensure its civil servants (technical staff in the various relevant departments: MAFS, MFRSC) are up to speed with this new information that can greatly benefit the country and its small-scale farmers. The project provided a 5-day permaculture course; however, this is not enough to fully equip the technical staff. Normally a ten-day course is provided and complemented by an internship and a mentorship programme.

¹⁵ These guidelines have been very much thought up and informed by the pilot sites tested in the context of the RVCC project and are based on a reflection of lessons learnt in the context of this project.

Promote capacity-building for farmers and build awareness on climate-smart practices;	As above, permaculture is an instrumental practice to build social capital and the capacity to adapt through the process of acting independently and retaining control over how resources are used. What is needed is regular awareness and capacity building through open days – using the permaculture sites developed by the RVCC project as demonstration sites and workshop venues.
Document and promote appropriate indigenous knowledge and best practices;	Permaculture is inherently about harnessing nature's abundance through "bio-mimicry" and what works in nature. Permaculture practices are a collection of worldwide indigenous knowledge and practices.
Develop climate-resilient cropping and livestock systems;	It is important that the "climate-resilient" focus not be captured by the CSA rhetoric and promoters of industrial agriculture. Often they claim that the promotion of organic production methods will put farm productivity in peril. This fear-mongering is a common rhetoric. A 2007 study found that in developing countries, organic systems outperformed conventional farms by as much as 80%. ¹⁶ Permaculture advocates perennial cropping systems and holistic grazing management (where animals are key to rehabilitating degraded land).
Build capacity for community-level weather data collection, analysis, and dissemination for agricultural planning and capacity of agro-meteorological units;	The permaculture principle of being aware of and monitoring the systems within which one is farming implies a knowledge of and a connexion with one's environment, including the weather
Promote diversified land-use practices, including agroforestry, dry-land farming, urban and backyard vegetable production to reduce risks and increase the capacity of farmers to cope with droughts and floods;	Permaculture promotes the design of integrated, zones-based agroecosystems that perform particularly strongly under environmental stress. Fully aligned to guidelines 1-2-3 and 4.
Promote programmes on livestock management and disease control, which integrate climatic conditions;	Fully aligned to guidelines 5-6 and 12.
Encourage use of appropriate technologies for irrigation, water reuse and water harvesting (e.g., waste/water recycling), etc.;	Diversified agroecological systems can increase water use efficiency through a combination of local water catchment systems, improved soil capacity for water absorption and retention, lower run-off, and soil cover that reduces evaporation and increases infiltration. Fully aligned to guideline 11. Permaculture offers many solutions to rainwater harvesting off the land for both micro and macro scale and is widely practiced around the globe in watershed improvement projects. Refer, for instance, to Geoff Lawton's greening the desert project. ¹⁷
Support risk transfer schemes (e.g., insurance schemes) against harvest failure due to climate-related risks;	Beyond the scope of permaculture as a practice.
Promote building capacity for recycling and conversion of agricultural waste and utilisation of biomass for cogeneration as a source of energy;	Fully aligned to guideline 9 and principle 6. Permaculture principle 6, "produce no waste," invites us to look at all waste as an unutilised resource and encourages us to find uses within our production systems to take up that waste and turn it into a yield. All "waste" or surplus energy from the system must be purified if and before it leaves the system.
Promote gene banks, community seed banks, zoological and botanical gardens to conserve the biological diversity of valuable species;	Fully aligned to guidelines 5-6 and principle 10. Principle 10, "Use and value diversity," invites us to take a page from nature's book on how natural ecosystems are diverse and therefore resilient, stable, and self-regulating. Permaculture uses this principle in a diversity of income, diversity of plant and animal species, and also in the diversity of time-planting in several seasons, for example.

Based on the pilot project experience and the lessons learnt from overcoming implementation challenges and reflecting on how best to capitalise on possible opportunities and synergies, this policy brief **identifies key immediate institutional and operational steps** that could guide this process of embedding permaculture into Lesotho's plans and programmes¹⁸.

¹⁶ Badgley, Catherine; Perfecto, Ivette; Cassman, Kenneth , Responder; and Hendrix, Jim , Responder, "Can organic agriculture feed the world?" (2007). Agronomy & Horticulture -- Faculty Publications. 110. <https://digitalcommons.unl.edu/agronomyfacpub/110>

¹⁷ <https://www.greeningthedesertproject.org/>

¹⁸ NB : the close-out report identifies several challenges that are not flagged here - this section seeks to specifically focus on how to make the upscaling of future permaculture projects a success without delving into detail for instance in stalled implementation linked to the pandemic or specific operational issues such as logistical issues, payment delays.

5.1.3 Immediate Institutional-level steps for permaculture upscaling

Avenues for expanding permaculture into other Community Council areas have already been identified with the relevant stakeholders, and the MAFS and the MFRSC have pledged they will incorporate permaculture into their extension services and programmes and will, where possible, replicate the concept of demonstration gardens and hold permaculture open days for the new communities being reached. Whilst this is a step in the right direction, Government actors should also consider the following:

- Set up a **permaculture/organic agriculture committee** that would incorporate permaculture as the core practice to be up-scaled, with **focal points** from relevant ministries and departments that would meet on a quarterly basis. **This committee would be tasked with writing the said directive/decreree and planning for and monitoring its implementation.**
- Pursue and finalise the **integration of permaculture guidelines/organic agriculture into the Farmer Field School curriculum** (refer to the multiple recommendations on this in the closeout report).
- Avenues for expanding permaculture into other Community Council areas have already been identified with the relevant stakeholders, and the MAFS and the MFRSC have pledged they will incorporate permaculture into their extension services and programmes. In order to consolidate the mentoring and also ensure efficient budgeting, an agreement spelling out how supported farmers should become part of FFS and EO networks should be worked out, ideally through a consolidated Memorandum of Understanding. This would make these networks the custodians of all future permaculture projects to ensure their legacy. The MoU's or agreements clearly spelling out roles and responsibilities that would be entered into would entail, *inter alia*:
 - ongoing and consolidated training of communities, ideally strongly based on farmer-to-farmer learning;
 - setting up a targeted number of 5-day permaculture courses and 1-day workshops;
 - ongoing monitoring of the development of the permaculture garden/systems and uptake of principles and guidelines with the current project beneficiaries; and
 - specific monitoring of the species and varieties of trees introduced in this pilot phase (MFRSC)

5.1.4 Immediate operational-level steps for permaculture upscaling

- Develop, consolidate and keep up to date a roster of reliable suppliers. Issuing tenders to a list of pre-identified suppliers of needed goods for permaculture projects will fast-track procurement in the future and also curb the issue of delays incurred due to multiple contracting whilst ensuring that the service providers are reliable and able to identify quality services or goods. A list of selection criteria should be compiled for this process and include background checks on suppliers and their products, an assessment of their financial capacity to complete work, or that their products are of the quality required. The procurement of goods/payment of services should also ideally involve the project lead, who should pre-approve quotes before acceptance
- Allow adequate project time frames for any future permaculture projects: a project that includes agroforestry interventions would be well structured into quarterly planning phases and run for a minimum of three years, and ideally five years, so as to allow sufficient time for each phase of garden development and for farmers to go through several stages of development and receive the mentorship prescribed for each phase.
- Future projects should be adequately resourced and backed by government budgets, taking into consideration site accessibility and remoteness. A dedicated effort should be made for adequate logistical planning to serve current and future sites, including the necessary vehicles: bakkies and truck for the movement and delivery of materials.

- Ongoing support should be provided to project beneficiaries and the extension officers involved in training and on-site activities from the onset. This includes ensuring that extension officers, technical staff, and contracted labour are effectively available to back up project implementation when requested.
- Budget for dedicated funding to support existing and to roll out future permaculture projects and tie this into a broader policy agenda as advocated in this policy brief. Budgeting for permaculture projects should be linked to and aligned with the elaboration of an organic policy (see section 5.2) in synergy with the Ecological Organic initiative (EOA-I) to attract potential other international funding flows to augment government funding (see section 5.3).
- Develop additional and complementary training resources that focus on the individual elements of the permaculture approach and best practices.

5.2 Develop an Organic Agriculture Policy for Lesotho that incorporates permaculture best practices.

Steering the Government of Lesotho on a pathway to set up the appropriate institutional structures to develop an Organic Agriculture Policy, in which permaculture guidelines/ best practices will strongly be embedded, may have more impact than solely embedding permaculture principles into further programme and projects or any policy revision process.

Globally, what we see is strong momentum towards the elaboration of **organic agriculture policies** to shift countries on the pathway of sustainability. Many farms receiving 'Organic' and/or 'Biodynamic' certification are using the permaculture design system as a part of their management practices, some intentionally and others not. That being said, given that the greater proportion of people practicing permaculture (for profitability) are certified organic farmers, the line between the two "alternative" management systems is somewhat blurred.¹⁹

But there is **no legally binding standard for permaculture** such as exists for organic agriculture, nor are there standards such as those set by biodynamic associations, which is why **embedding permaculture up-scaling into the emergence of an organic agricultural sector** makes strategic sense. Organic policies are deeply rooted in the upholding of organic production standards, as they aim to protect consumers against false, misleading, and unfounded claims and create the obligation for all producers to indicate the levels of inputs used in their production. In this respect, **organic agriculture is "policeable" and can be enforced, unlike permaculture.**

This organic orientation for Lesotho's agricultural sector's future development is clearly articulated in the **Lesotho National Strategic Development Plan II 2018/19-2022/23**²⁰.

"(...) the country holds potential to produce organic products for exports to the European Union and United States markets, as well as other trade partners. There is a need to explore organic food production to economically reposition Lesotho and achieve prosperity in the short- to long-term." (NSDP II - 2018/19-2022/23: 86)

The NSDP II in this respect specifically points out the potential of the country's rangelands to support the production of organic (grass-fed and free-range) red meat.

¹⁹ However, if the two systems are compared by looking at the organic certification values and the permaculture design principles, it can be said that organic agriculture principles are embedded within permaculture, whilst "permaculture takes the values of organic agriculture one (big) step further" (Namululi, A.M. 2011. The Potential of Permaculture in Addressing Food Insecurity in Karamoja District, Uganda. Masters of Science Thesis (MSc Thesis) Available from: <http://uu.diva-portal.org/smash/get/diva2:408760/FULLTEXT02.pdf>) . This is because permaculture brings in the notions of perennial design and landscaping of land, which are specifically relevant to the mountainous terrain of Lesotho.

²⁰ National Strategic Development Plan II 2018/19-2022/23. Available from: <https://www.gov.ls/wp-content/uploads/2021/06/National-Strategic-Development-Plan-II-2018-19-2022-23.pdf>

Taking steps towards supporting the emergence of the organic sector and the elaboration of an Organic Agricultural Policy would thus be directly aligned to the NSDP II.

5.2.1 Launching a national organic action plan for Lesotho as the first step towards an organic agricultural policy for Lesotho

In order to prepare the ground for an organic agricultural policy backed by strategic action plans, the MAFS, supported by its strategic partners, should support the **elaboration of a national organic agriculture action plan for Lesotho**. Such a plan will set the ground for the emergence of the organic sector and ensure an inclusive and legitimate policy process. Facilitating the emergence of an organic policy framework for Lesotho should be envisaged as a medium to long-term process. This process can take from 12 to 18 months, depending on the local institutional dynamics and local buy-in, and will prevent disjointed interventions that do not have stakeholder buy-in and will have little impact.

The elaboration of this organic agriculture action plan will require the engagement of various stakeholders, commitment across several ministries, suitable budget allocations, and coherence with other national policies and action plans that concern the agricultural sector and/or rural development more broadly. The intended long-term output of the action plan will be an outline of targets for adoption, as well as a combination of specific measures to achieve the targets to be adopted. These will have to be well planned, i.e., inclusive of budgets, designated responsibilities, time frames, and M&E.

5.2.2 Possible process and timeline for the elaboration of an organic agriculture action plan for Lesotho

This section outlines the concrete steps to be taken to initiate the organic agriculture action plan for Lesotho that would culminate in an organic agricultural policy. This process should be funded and supported by the Government, using its existing institutions and their resources. However, where these resources prove to be inadequate, the detail provided below may be used to leverage funding support for short-term implementation, while the mid-to-long-term implementation must be more fully supported by government resources.

Phase 1

1. **Conducting an appraisal of the current situation of the organic agriculture sector and its development needs.**
 - a. First, a preliminary situation analysis should be conducted; it would be informed by a national stakeholder engagement.
 - b. This engagement should also be complemented by some site visits and deeper engagement with selected stakeholders (Government stakeholders, multilateral agencies, private sector, and farmer organisations, including the recently established Basotho Participatory Guarantee System (PGS) in Lesotho, which seeks to provide local organic certification to small growers).

⇒ Expected output: Analysis of the bottlenecks to the emergence of organic agriculture; any specific economic, environmental, and societal potentials of organic farming; an analysis of current national policies in relevant sectors and their potential impacts on organic agriculture.
2. **Establishing, in consultation with stakeholders, the aims/goals and objectives of the action plan**
 - a. Organise a national stakeholder engagement. This is where the interests of different stakeholder groups will be tabled, discussed, and reconciled, a common vision shaped, and M&E will be discussed
 - b. Additional site visits and deeper engagement with selected stakeholders (inclusive of all those mentioned, i.e., Government plus multilateral agencies, private sector, and farmer organisations)

⇒ Expected output: strategic plan outlining the aims/goals and objectives of the action plan.

Phase 2

It is expected that by the time the second phase is reached, additional resources will have been secured and pledged by the Government and other relevant partner agencies.

1. **Identifying appropriate policy** (*a term used here broadly to refer to the means through which Government will concretise support to organic agriculture*) **activities to achieve the aims and objectives.** => *follow-up visits and stakeholder consultations, and remote assistance.*
2. **Deciding on the activities and allocating budgets, responsibilities, and time frames** => *follow-up visits and stakeholder consultations, and remote assistance.*

Throughout phases 1 and 2, due consideration will be given to the **institutional framework** needing to be set up to accompany the implementation of the organic agriculture action plan. This will, in particular, include establishing a national organic agriculture sector body or organic agriculture council of some sort, with representatives from stakeholders and relevant public ministries and institutions. Ideally, this institution should be supported by a coordinating organization to support action plan implementation (this could potentially be the permaculture/organic agriculture committee).

5.3 Link permaculture up-scaling in Lesotho with the Ecological Organic Agriculture Initiative (EOA-I)

To end with, it is recommended that permaculture in Lesotho be aligned and embedded into a continent-wide initiative, known as the Ecological Organic Agriculture Initiative (EOA-I), which is supported by the African Union (AU) and is progressively being rolled out on the continent (See Appendix 7.2 for detailed background on the EOA-I and how Lesotho features in the latest EOA-I report).

The AU-backed political focus on EOA-I and the high visibility of this approach also entails that policies and initiatives aligned to EOA-I could open up funding avenues. This is why this policy brief makes a strong case for supporting the emergence of the organic sector in Lesotho as the enabling policy vehicle for up-scaling permaculture in the country.

Note that Table 3 in Appendix 7.1 (last column) contrasts permaculture guidelines with organic agriculture (OA) and also how these can be embedded into an EOA-I policy effort as a means to further root them into legislated practice.

VI. Conclusion

This policy brief presents the findings and results of the permaculture consultancy carried out as part of the UNDP Lesotho Project "Reducing Vulnerability from Climate Change in Foothills, Lowlands, and the Lower Senqu River Basin" (RVCC), from early 2020 to mid-2021. It includes recommendations for the sustainable up-scaling of permaculture in Lesotho, which were elaborated based on the pilot project experience and the lessons learnt from overcoming implementation challenges and reflecting on how best to capitalise on possible opportunities and synergies. The brief also makes a case for linking this up-scaling of permaculture practices with an explicit policy effort to support the emergence of the organic agriculture sector in Lesotho, in alignment with the EOA-I, an approach that is strategic to turn around Lesotho's agricultural orientations and link the country with an international organic community of practice.

VII. Appendix

7.1 The 12 Permaculture Guidelines to be embedded into Government programmes, interventions, and plans to upscale the uptake of permaculture in Lesotho

Guideline/Best practice	Relevance and project intervention	Scalability	Recommendations (for the attention of the relevant/concerned ministries)	Link with EOA policy that can be legislated
1. Planting a diversity of crops and making use of polycultures (plants that benefit from each other when grown together):	Having a variety of crops in the ground mitigates against the risk of crop failure whilst reducing pest pressures and increasing the success of the growing season, and affording a diversity of livelihood opportunities. The project provided a variety of seeds: vegetables, forage crops, cover crops, as well as a variety of fruit, nut, firewood, forage/fodder trees.	The value of planting a diversity of crops and making use of polycultures can be advocated and taught through the Farmer Field Schools (FFS) and permaculture open day workshops.	- Organise that extension officers work closely with the farmers to i) provide awareness on how the climate change risk can be mitigated and ii) monitor the performance of crops and varieties introduced (through the Farmer Field Schools) to determine what are the most suitable fruit and nut trees for each agroecological zone. This monitoring should be performed at least on a bi-annual basis for the next five years. - Integrate the Climate forecasting, climate information, and dissemination from the sister project to the ongoing monitoring and scaling out of this project. - The monitoring effort should also include a component focusing on the commercial potential of the species/varieties introduced.	Polyculture systems are inherently part of organic production systems and are strongly recommended in some organic standards. However, there are many instances of large-scale organic systems that also tend to be monocultural – in this sense, permaculture goes beyond organic agriculture (OA), and incorporating these permaculture BPs into ministerial plans will go beyond the scope of an OA policy.
2. Planting perennial plants & using perennial agriculture systems:	Farming methods based on perennial agricultural systems such as agroforestry and peri-annual crops have multiple food, firewood, medicine, fiber production benefits whilst mitigating climate change and land degradation. The project established or enhanced agroforestry systems in the homes/farms of the beneficiaries.	The MFRSC has expressed significant interest and attention in the permaculture methods of planting and establishing food forests. There are opportunities to include permaculture agroforestry systems in their other projects in other areas.	- Provide mentorship to each of the gardens for this critical establishment period over the next five growing seasons. - Include permaculture agroforestry systems in their other projects in other areas - Ensure that the procurement of trees in forthcoming projects investigates suppliers that have not supplied the project before or question them (or allow the consultant to do	OA lays little emphasis on perennial systems – usually, growers rely on an annual or biannual changeover to meet market demands. In this sense, permaculture goes beyond OA. Incorporating these permaculture BPs into ministerial plans will go beyond the scope of an OA policy.

			so) on the products they quoted on supplying before approval.²¹ Consider micro tree nurseries in the three tribal councils, where champion farmers with an aptitude for plant propagation could be engaged to produce trees for agroforestry upscaling.	
3. Practicing crop rotations and making use of cover crops	Crop rotations are used for cutting pest cycles, ensuring sound nutrient management. The project sourced and availed cover crop species and OPV seed suitable to the agroecological areas.	Cover crops and crop rotation can be covered and promoted through the FFS's and the permaculture open days. Seed can be distributed on these occasions and during meeting/seed sharing days of the Participatory Guarantee System (PGS) Lesotho.	- Facilitate the inclusion of teaching about /promotion of cover crops and crop rotation through the FFS's and the permaculture open days - Provide more training on cultivation practices and cropping regimes - Facilitate and pursue the dialogue and work with the Lesotho PGS and support this initiative further through availing organic seed to farmers but also through making local organic trading spaces available. - Provide mentoring support to the beneficiaries of the permaculture gardens as well as monitoring.	Crop rotations are inherently part of organic production systems and are strongly recommended in some organic standards. But organic standards would not fail a farmer for not practicing crop rotation.
4. Making use of Open Pollinated Variety Seeds and maintaining a seed bank	The cost of fertilizer and seeds is cited as one of the biggest impediments to farmers in Lesotho in recent years. OPVs are natural seeds that can be grown out for their seeds - "seed to seed," season after season, thus reducing one of the most expensive inputs to these farmers. Seedbanks at three demonstration gardens have been created, large Ziploc bags to keep seed and saved seed in. were distributed, and training on how to maintain seed banks was given.	The intervention can be scaled up to reach many other farmers in the community area through the permaculture open days and FFS'.	- Organise (and co-teach) several training sessions on seed saving. This subject can be addressed through the Farmer Field schools' or permaculture open days (workshops). If funding can be sourced, the PIC would be available to conduct these workshops if needs be. Farmers would learn about the different pollination strategies, how to clean and treat seed, how to label and maintain a seed bank. - Support the emergence of these seed banks and set up small scale OPV seed multiplier businesses (as well as seedling suppliers)	An emerging EOA sector in Lesotho is completely dependent on the emergence of an organic seed sector. Currently, there is a great scarcity of commercially available organic OPV seed in the country. The use of organic seed and planting material is a requirement of any organic standards.

²¹ One one of the plant supplier's BG Greenlife supplied inferior quality trees.

5. Reducing pest pressures through improving the health of agroecosystem and applying organic methods for pest control	Pest pressure is a key issue, especially in agro-systems where poor soil and crop management has resulted in imbalances which can increment the pest issue. Resorting to synthetic pesticides is problematic from an environmental and public health perspective. Organic pest control can be considered as an ultimate recourse. One of the main project interventions was to assist farmers with developing ecologically healthier farms. Making organic pest sprays and adopting companion planting was also dealt with in the course.	Once each farmer is propagating many of their plants and has satisfied their own needs, he/she can start sharing or selling to other farmers or projects. Working examples of these demonstration gardens can be used as venues for the FFS' or permaculture open days, thus showcasing what can be achieved and visually impressing this permaculture principle.	- Extension officers should be set out to closely monitor the effectiveness of the agroecosystem designed, companion planting, and organic pest management methods through the ongoing keeping of logs for each demonstration sites and beneficiaries interviews - Organise open days in the demonstration gardens (to serve as venues for the FFS' or permaculture open days), thus showcasing what can be achieved and visually impressing this permaculture principle and also using the opportunity to teach the making of organic pest control recipes.	EOA systems are based on the explicit banning of any form of agrochemicals, and mastery of organic pest management methods is a requirement.
6. Planting propagation for small to medium scale farmers	Plant propagation for small scale farmers.) can be easily done with low inputs and basic tools and helps farmers to drastically reduce input costs and even provide additional income opportunities through the sale of seedlings or bagged plants. The project supplied training in the basics of plant propagation to technical staff and farmer-beneficiaries; supplied a mini-nursery that and many propagation supplies and instruments.	The materials used to create the Mini-nurseries were simply timber poles, wore mesh fencing for the tables and shade clothe, and the materials supplied for propagation such as polystyrene trays, seedling compost can all be found locally.	- Monitor the beneficiaries' fields from mid-October to November 2021, i.e., 6 to 8 weeks after the planting of the seedlings, to assess its successes and challenges. - Support the emergence of these nurseries, as well as setting up small businesses (seedling suppliers) - Explore avenues to purchase the aforementioned inputs in bulk for further distribution.	The emergence of an organic seed sector will be conditioned by the viability of such small-scale propagation materials as a critical element of the organic value chain.
7. Removing Alien Invasive Plants - AIP's from your farm, land, or homestead.	AIPs are often very aggressive invaders and pioneer species that take over disturbed lands and out-compete native plants due to the lack of biological and other inhibiting controls that are naturally found in the invader's land of origin. The project identified and removed AIPs from farmer's lands	AIP education can take place at FFS and open days and be included in other land rehabilitation projects or future permaculture projects implemented by the Ministries.	- Include awareness on AIP as part of the FFS and open days and in the context of future permaculture projects to be implemented. - Explore and trial the use of pioneering native or non-invasive plants used for creating hedges (or fedges-food hedges) in replacement of these AIPs.	The removal of AIP and the preservation of indigenous wildlife corridors are recommended in some organic standards, but non-compliance does not prohibit farmers from being organically certified.
8. Using no-till and minimum-till	Mechanical disturbances to the soil, such as ploughing, are one of the leading causes of land degradation in Lesotho. No-dig and minimum-till agriculture practices help small-scale farmers	No-till, minimum-till land CA farming can be demonstrated at the FFS's and the permaculture open days, and If there is an	Undertake, as part of the scaling out of permaculture update in Lesotho, link it with further capacity building through extension support and training	Soil disturbance is not recommended in OA systems, but often commercial farmers would

agriculture practices	improve their soil structure, increase soil health and biology while minimizing soil erosion. The project assisted farmers with building permanent double-reach raised beds on contour lines - these permanent beds won't be ever stepped on, therefore reducing soil compaction and eliminating the need to plough. Conservation agriculture plots were demarcated, and small scale no-till seed planters were supplied to each of the project areas	interest in the small-scale farming equipment, it can be purchased from Jandrall hardware in Mhales Hoek (other outlets for other districts are to be identified)	Explore the feasibility of subsidising adequate equipment (e.g., no-till implements) and provide ongoing technical support on the no-till approach for the benefit of farmers as part of permaculture upscaling.	practice light till as weed management. Incorporating these permaculture BPs into ministerial plans will go beyond the scope of an OA policy.
9. Building soil and soil health through making and applying organic inputs	Applying organic inputs such as compost, mulch (dried grass, leaves, maize stover), kraal manure, and making compost and compost teas helps to build soil and improve soil structure. The project assisted farmers with compost and hay bales that were applied to their raised vegetable beds and used in planting fruit trees and berries, and training was given during the permaculture 5-day course in May on soil building and making compost and compost teas. Two hundred litre tanks were supplied specifically for making compost teas.	The principles and practices of building soil and soil health through making and applying organic inputs can be promoted (and improved – see comments on improving the use of kraal manure) and taught at the FFS', permaculture open days and through the projects implemented by the MAFS and MFRSC, and their general extension work in the communities.	- Incorporate training on building soil and soil health through making and applying organic inputs during open days and through future projects implemented, as well as through their general extension work in the communities. - Caution: To maximise the use of dry kraal cow manure, training on composting rolled out as part of future projects should emphasise the need to compost the kraal manure -if it is applied raw, the three key steps of composting are missed (mineralisation, humification, decomposition) - these still need to happen and will happen much quicker in a compost heap than being applied directly on the land.	Quality soil and fertility management are core tenets of OA, and often standards have high requirements in this respect. There is a strong alignment in practices here.
10. Reversing soil erosion through slope planning	The land degradation due to inappropriate land management such as ploughing and overgrazing, particularly on steeper slopes, is very evident in Lesotho. Farmers plough their fields off contour, causing further soil erosion through runoff. . In the context of permaculture, slope planning is a central element of planning: appropriate placement and cultivation practices (if any) need to be determined according to the slope gradient. The project assisted farmers with slope planning, designing, and laying out of their farms: steeper slopes were planted to trees; staple crop plots were laid out on contour lines (with trees and	The principle of mitigating and reversing soil erosion through slope planning can be promoted and taught at the FFS', permaculture open days, and through the MAFS and the MFRSC projects, and their general extension work in the communities.	- Upscale the dissemination of knowledge on soil erosion management through slope planning through FFS', permaculture open days, and through their general extension work in the communities. - Once this knowledge on landscape management is assimilated (with the use of A-frames and design of swales, etc.), it can also easily be shared through farmer-to-farmer knowledge exchanges, which the ministries could also sponsor.	This best practice would be upheld in OA systems but would not feature as an absolute requirement for organic certification. Incorporating these permaculture BPs into ministerial plans will go beyond the scope of an OA policy.

	vetiver plants planted in-between to contain erosion), and swales were designed into the land.			
11. Practicing rainwater harvesting, and agricultural water conservation	By practicing rainwater harvesting and agricultural water conservation, farmers can increase their water security, which would directly influence food and livelihood security. The project assisted farmers by providing them with: pipe installations connected to water sources to connect their farms and households with water; tanks on tanks stands (and connected to rooves where possible); tanks connected to rooves; drip irrigation for trees and vegetable beds; taps in the garden and by animal structures; swales for harvesting and controlling runoff rainwater to irrigate trees; raised vegetable beds on contour to control runoff rainwater.		- Capitalise on the existing promotion of drip irrigation as part of the scaling out of permaculture in Lesotho whilst combining it with a very proactive promotion of mulching as a best practice that should accompany the roll-out of any irrigation support. Drip irrigation systems can be demonstrated at the demo gardens, and farmers can be taught how to install these. - The irrigation technical offices should revise their brochures/training materials to incorporate this requirement to apply deep mulch to any planted fields and underline its benefits not only in terms of saving water but also in terms of building/protecting the soil.	Water harvesting is generally not explicitly mentioned in OA standards, but water conservation is usually recommended, as well as deep mulching. A farmer can, however, not be refused organic certification if these practices are not upheld. Incorporating these permaculture BPs into ministerial plans will go beyond the scope of an OA policy.
12. Adopting a holistic approach to animal husbandry and wellbeing	The foundations of permaculture are its core ethics: People care, earth care and fair share. Earth care is a broad term which includes the ethical treatment (holistic) and care for livestock (and other animals). Animal welfare is also a key component of organic standards, and certification will be denied to any farm production where animals cannot exhibit their natural behaviour, or where they have inadequate shelter/housing/roaming space. The requirement is also for them to be fed feed from an organic and localised source. The permaculture project assisted farmers by providing them with a wide range of adequate infrastructure to better house their animals. Annual and perennial fodder crops were also supplied; water taps were constructed close to the animal structures; beehives and bee equipment and tools were supplied; beneficiaries and technical staff were trained in holistic animal husbandry practices at the course in May 2021.	The principle of the holistic approach to animal husbandry and wellbeing can be promoted and taught at the FFS, during permaculture open days and through the MAFS and the MFRSC projects, and their general extension work in the communities.	- Proactively promoting the holistic approach to animal husbandry and wellbeing can be promoted and taught at the FFS, during permaculture open days, and through the MAFS projects and their general extension work in the communities. Farmers should be invited to the demo farms to showcase these improved housing and fencing perimeters. - Develop an illustrated manual specifically focusing on the holistic approach to animal husbandry and wellbeing (it could be inspired by the South African or IFOAM organic standard, for instance, and adapted to the Basotho context).	Animal welfare is a key component of organic standards, and certification will be denied to any farm production where animals cannot exhibit their natural behaviour or have inadequate shelter/housing/roaming space. The requirement is also for them to be fed feed from an organic and localised source.

As can be seen in the analytical section in the last column ("Link with EOA-I policy that can be legislated"), the core tenets of permaculture, as articulated through these 12 principles, it can be said that permaculture takes the values of organic agriculture one (big) step further. Organic certification requirements are in complete alignment with principles 4-5-6-9 and 12; for the other principles, their incorporation into ministerial plans will go beyond the scope of an OA policy. Whilst there are potentially great synergies in advancing an Ecological Organic Agriculture (EOA) framework to promote the emergence of the organic sector in Lesotho, the focus on advancing the "other" guidelines should not fall off the radar screen of the concerned ministries.

7.2 Background on the Ecological Organic Agriculture Initiative (EOA-I)

The EOA-I in Africa came about in response to the African Union Heads of State and Government's call for the promotion of organic farming in Africa in 2011²². The initiative first piloted activities in six countries; Ethiopia, Kenya, Tanzania, Uganda, Zambia, and Nigeria²³. EOA-I aligns with various strategic documents that focus on increasing agricultural production and ensuring sustainable environmental resource management, such as the Sustainable Development Goals, the United Nations Framework on Climate Change, the Convention on Biological Diversity, and the Comprehensive Africa Agriculture Development Programme.

Climate change mitigation and adaptation and inherent beneficial characteristics of organic production must be taken seriously by all stakeholders. Organic production has well-established practices that simultaneously mitigate climate change, build resilient farming systems, reduce poverty and improve food security. Organic production emits much lower levels of greenhouse gases (GHG) and effectively sequesters carbon and stores it in the soil. In addition, Ecological agriculture fosters biodiversity that is resilient to the impacts of climate change²⁴, mainly due to its water retention efficiency, resilience to extreme weather events, and lower risk of complete crop failure.

The ecological methods draw on agroecology, the science of applying ecological concepts and principles to the creative management of agricultural processes, such as nutrient cycles based on local self-sufficiency and adapted to local social conditions²⁵.

Most of the time, organic sector growth is a result both of policies conducive to growth and a particular dynamism in the private organic movement. In the case of Lesotho, building a commercial organic sector to increase access to and availability of healthy food whilst regenerating damaged ecosystems that compound vulnerability to climate change will play a critical role in meeting the country's adaptation aspirations. Although the EOA-I initially had a strong focus on East Africa, it is just a matter of time before support is expanded, with the support of other strategic partners, to Southern Africa. Those countries with frameworks in place and some policy intent in that direction would certainly be positioning themselves as countries active on the EOA front and derive great benefit from connecting with the EOA-I community of practice.

7.3 Current status of the Ecological Organic Agriculture Initiative (EOA-I) in Lesotho

Recent research commissioned by the African Union²⁶ provides an in-depth review of the general development of the agricultural sector, how the EOA-I is included in agricultural and trade policies, the nature (if any) of government support to EOA-I and key institutions involved in the sector, an overview of the certification landscape [including an over-view of participatory guarantee systems (PGS)] and

22 African Union (AU) Council's Decision on Organic Farming passed during the Eighteenth Ordinary Session, 24-28 January 2011, EX.CL/Dec.621 (XVIII).

23 <https://eoai-africa.org/eoa-history/>

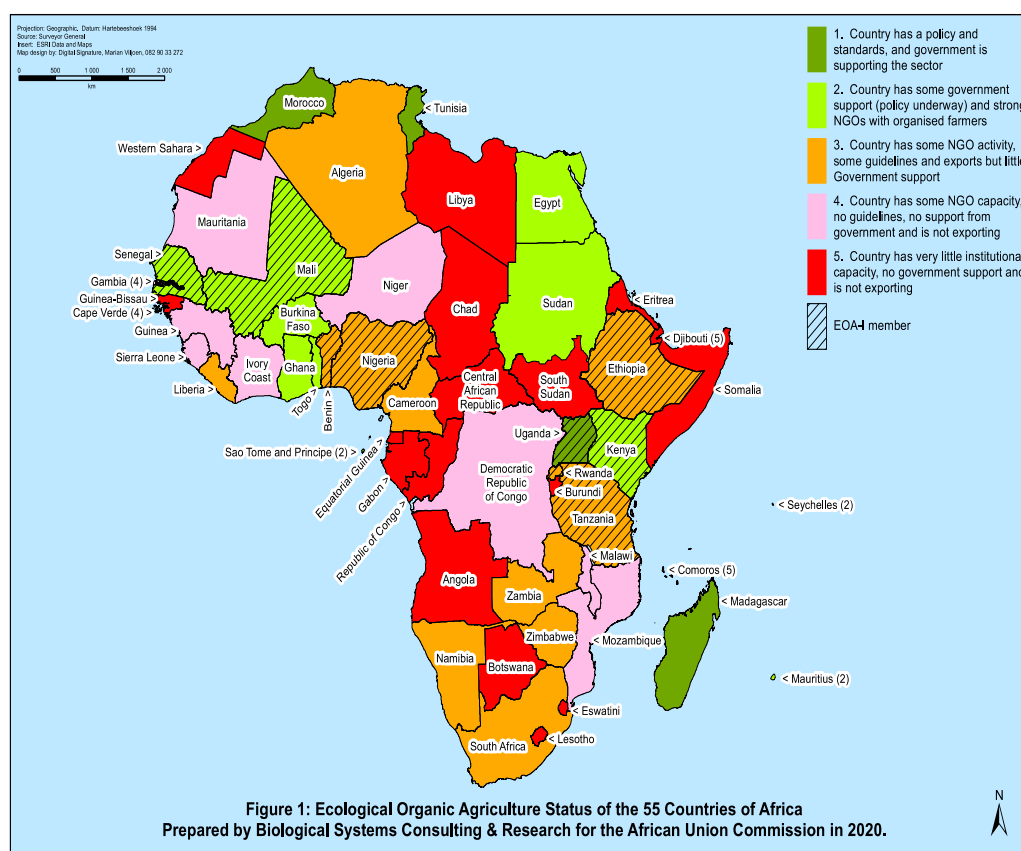
24 Ensor, J. (2009). Biodiverse agriculture for a changing climate. Practical Action, UK.

25 Vandermeer, J. and Perfecto, I. (2012). Complex Traditions: Intersecting Theoretical Frameworks in Agroecological Research. *Journal of Sustainable Agriculture* 37(1):120911083004002 - September 2012

26 Biological Systems Consulting & Research (2021). South Africa. Sustainable African Food Systems: An Analysis of the 55 countries in Africa and the systemic policies needed to make Africa Food Sovereign And Food Secure.

finally a review of challenges, gaps, and opportunities for the existing policy framework for each of the 55 African countries.

In this report, Lesotho is classified in the category "awaiting inspiration," which is the lowest level of performance based on the afore-mentioned criteria in the African context (see map 1 below). The typology defined to generate this classification can be found in the AU research report²⁷).



Map 1: EOA status of the 55 African countries - Source: Biological Systems Consulting & Research (2021).

Key aspects of the Lesotho section of the EOA-I report indicates that the overall absence of support to EOA principles in the agricultural policy, combined with an extension support system that is lacking in knowledge on EOA and a subsidy regime biased towards conventional agrochemical inputs, is perceived as an impediment to the development of EOA in the country. To date, the organic certification landscape in Lesotho has remained limited. Although in 2014 about 600 ha of land was certified organic in Lesotho, Willer and Lernoud (2019)²⁸ could only find one processor certified for (unspecified) wild collection in Lesotho in 2017.

However, there has since 2020 been some new momentum around the emergence of the organic sector in Lesotho. The GIZ- sponsored Organic Knowledge hub for Southern Africa (KH SA) launched in the region in 2020 with an initial focus on Namibia, Zambia, Malawi, and South Africa. But in the context of this programme aimed at enhancing the dissemination of organic agriculture knowledge, South Africa has accepted an application from a Basotho farmer to be part of this programme. The KH SA programme focuses on the establishment of Participatory Guarantee Systems (PGS), which are organic certification systems involving the participation of consumers, farmers, and other stakeholders. The system is based on participation, trust, and transparency and endorsed by the International Federation

²⁷ Biological Systems Consulting & Research (2021). South Africa. Sustainable African Food Systems: An Analysis of the 55 countries in Africa and the systemic policies needed to make Africa Food Sovereign And Food Secure.

²⁸ Willer, H. & Lernoud, J. (Eds). 2019. The World of Organic Agriculture Statistics and Emerging Trends 2019. Research Institute of Organic Agriculture FiBL IFOAM – Organics International. Available from: <https://orgprints.org/id/eprint/37018/1/willer-lernoud-2019-world-of-organic-low.pdf> Accessed on 23 July 2021.

of Organic Agriculture Movements (IFOAM International) as equivalent to third-party certification in terms of providing assurance of organic production, save that the produce thus certified can only be traded on the domestic market. However, the benefit of PGS is that it sets out those willing commercial PGS-certified farmers on the trajectory of third-party certification, should they wish to follow that route. A "Lesotho PGS" was thus set up in Lesotho in early 2021 and has encountered a resounding success, with farmer members not being able to meet the high demand for organic produce in Maseru. This speaks of the interest and potential of organic agriculture in Lesotho, the uptake of which is intimately tied to the promotion of permaculture practices.

But much remains to be done in Lesotho to further advance Ecological Organic Agriculture – in essence, the organic sector needs to be formally organised and the right policy framework defined. There is currently no organic standard in Lesotho, which doesn't prevent the emergence of the sector (the PGS initiative uses the South Africa organic standards) but much can be done at the policy and institutional level to set solid foundations for EOA in Lesotho.

Heeding the policy guidance provided in this brief would greatly contribute to the materialising of such a government-driven organic growth and serve to implement the strategic orientations outlined in the NSDP II for Lesotho's agricultural sector.