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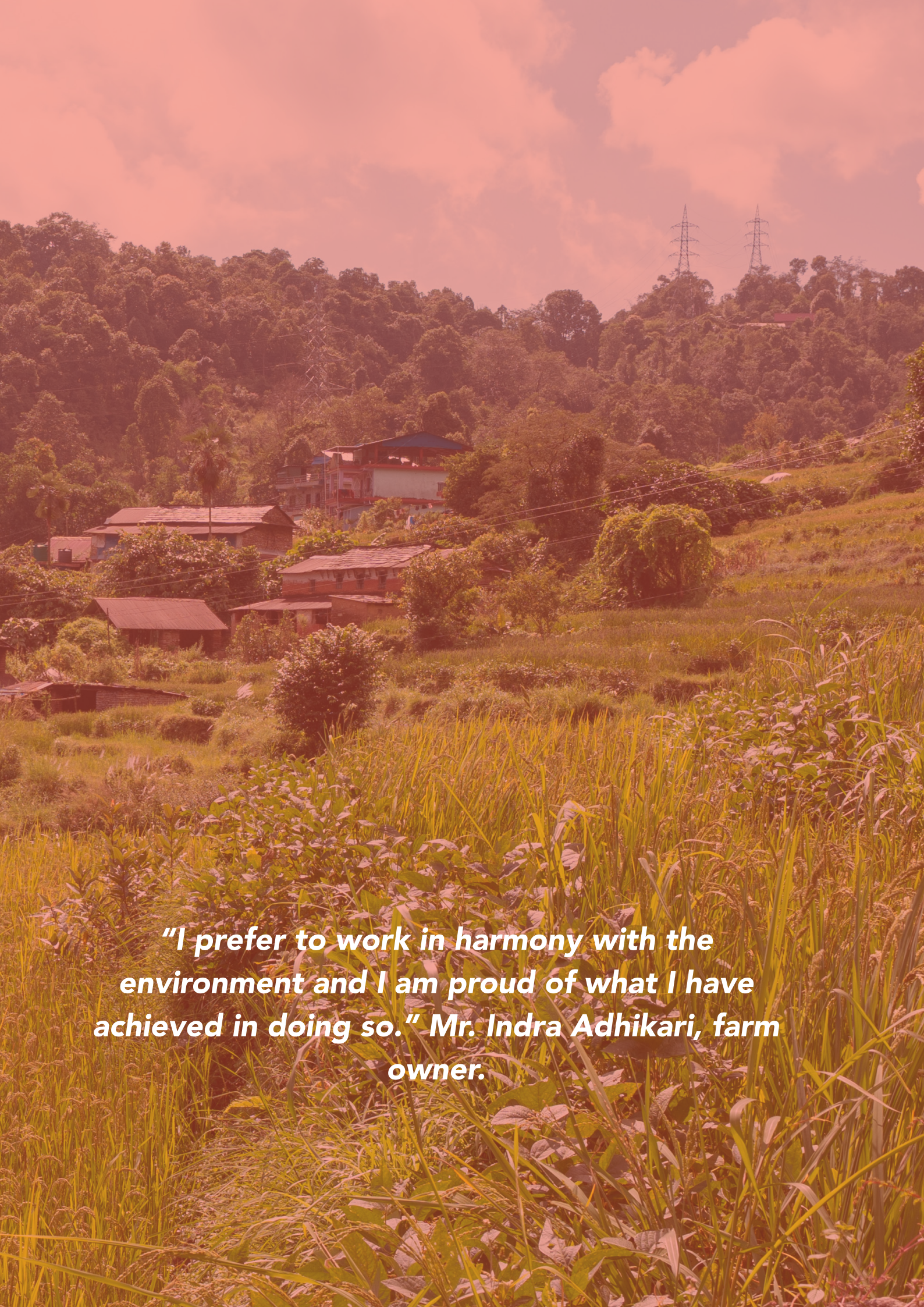
Amplifying Stories of Agroecology Practices and Principles

Maramche Agroecological Village

Nepal's agricultural sector has experienced increasing challenges due to resource depletion, environmental degradation, and vulnerability to climate change. Agroecology offers a sustainable alternative by integrating ecological, economic and social principles into agricultural and food systems. To operationalise agroecology in Nepal, Local Initiatives for Biodiversity, Research and Development (LI-BIRD) has implemented the Climate Resilient Agriculture (CRA) project with financial support from Bread for the World Germany since 2019. Currently, the project is running in its third phase from October 2024 till September 2027 in Sindupalchowk, Kaski, and Synagja districts. DKA Austria has also partnered with LI-BIRD for the project's third phase. The project promotes agroecology through the establishment of the agroecological village model, which refers to geographically defined communities where integrated agroecological practices are adopted at the landscape level. This approach fosters environmental stewardship, food and nutrition security, and community resilience. The establishment of an agroecological model village is an intensive process that not only includes the members of the villages and the project staff, but all the concerned stakeholders of that community to collectively contribute to the sustainability of the applied approaches. One of the successful model villages of the CRA project is Maramche agroecological village, which is situated in Annapurna Rural Municipality of Kaski district. The village constitutes 36 households who are primarily engaged in agriculture and are extremely motivated to practice agroecological principles to be able to contribute to sustainable food production.

LI-BIRD adopts a six-element framework to guide its activities, namely i) strong community institution, ii) agricultural biodiversity and local seed system, iii) soil fertility and water resource management, iv) disease and pest management, v) traditional knowledge, social values, and food system, and vi) value addition and marketing. These elements are aligned with the ten elements and thirteen principles of agroecology developed by the FAO. The core of which lies in strengthening the community institutions such as farmer groups, cooperatives, and community seed banks and ensuring women's participation in such institutions. This helps to create an enabling environment that enhances their leadership, facilitates resource mobilisation from local authorities and other stakeholders, establishes green enterprises, conserves local agrobiodiversity, and strengthens local seed systems through community seed banks, among others. All households of Maramche village are members of both Shree Pragatisheel Agriculture Cooperative and Annapurna Community Seed Bank binding them in a system dedicated to providing services that are equally accessible to all and creating a platform for knowledge exchange. Guests from various places visit this location for learning, sharing and study purposes. By using different agroecological technologies, the community is moving toward zero use of chemical fertilisers and pesticides. The various agroecological interventions that they practice in their households to contribute for the establishment of a model village will be shared through the lens of Mr. Indra Adhikari, an active member of the cooperative and community seed bank and a progressive farmer of Maramche village.

Mr. Indra Adhikari and his family of five practice agroecological farming, blending indigenous knowledge to create a self-sustaining ecosystem, and demonstrate that this approach is both viable and profitable in a local context.



"I prefer to work in harmony with the environment and I am proud of what I have achieved in doing so." Mr. Indra Adhikari, farm owner.

Foreword

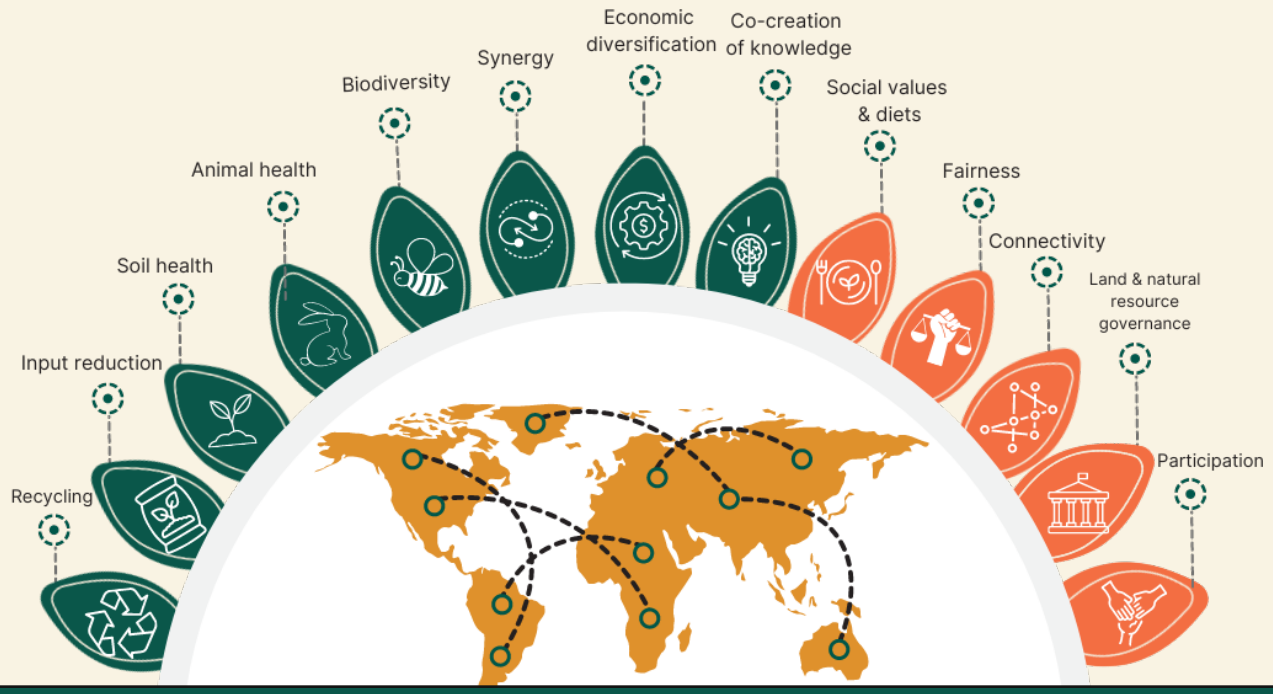
Welcome to our project, where we strive to bring the 13 Principles of Agroecology to life for farmers and policymakers alike. Given that accessible information on this topic is limited, we are excited to present visually engaging leaflets which speak directly to you. Through captivating visuals and real-world examples, we aim to illustrate how these principles can be practically applied in various agricultural settings.

We have interviewed farmers who are already implementing these principles, and we are eager to share their stories with you. Our goal is to build an informative and inspirational case study repository that not only raises awareness but also fosters a deeper understanding of agroecology.

By focusing on easy-to-digest visuals and practical insights, we hope to make learning about and adopting agroecological practices both enjoyable and impactful for everyone involved in agriculture.

The 13 Principles of Agroecology

Overview of the High-Level Panel of Experts' (HLPE) 13 Agroecology Principles.



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Maramche Agroecological Village

The Maramche agroecological village in Annapurna Rural Municipality, Kaski District, consists of 36 agricultural households eager to adopt agroecological principles for sustainable food production.

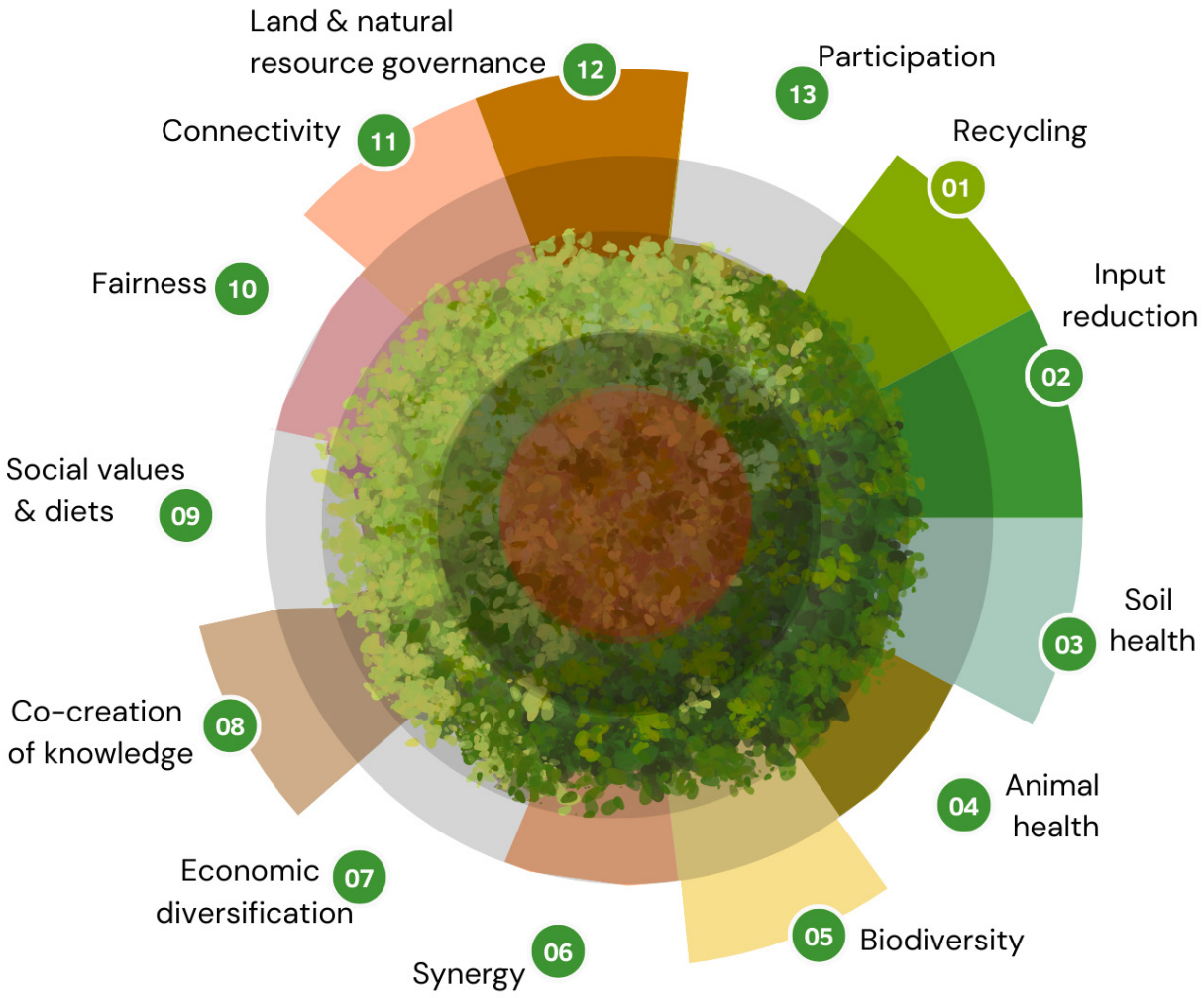
Utilised agricultural area in hectares	0.6
Occupational status	Full-time
Number of people working on the farm	Five-member family-run farm with seasonal workers hired during peak periods
Agricultural certifications	The farm has been organically managed for more than twenty-five years but is not certified due to demanding government requirements
Farmning activities	Combined crop and livestock farming
Type of crops and livestocks	Livestock: • Cattle: 5 • Local Chicken: 25 (Ulte and Sakini species) • Chicken: 30 (Giriraj Species) Crops: • Cereal crops: Kalo Patle Rice, Chomrong Local Rice, Lumle-2 Rice, Machhapuchre-3 Rice • Vegetables: Cucumber, Sponge Gourd, Bitter Gourd, Okra, Chayote, Pumpkin, Cauliflower, Cabbage, Radish, Chilli, Beans, Tomatoes, Onions, Broad Leaf Mustard • Fruits: Kiwi, Guava, Peach • Fodder: Drooping Fig, Milky Fig, Himalayan Fig

Agroecological integration

Agroecological integration corresponds to the degree of alignment of a farm with each of the 13 Principles of Agroecology, based on the Agroecology Assessment Framework. It can be understood as the boundaries within which agroecological farming operates, with a minimum of four core principles to be met: co-creation of knowledge, social values and diets, fairness, and participation.

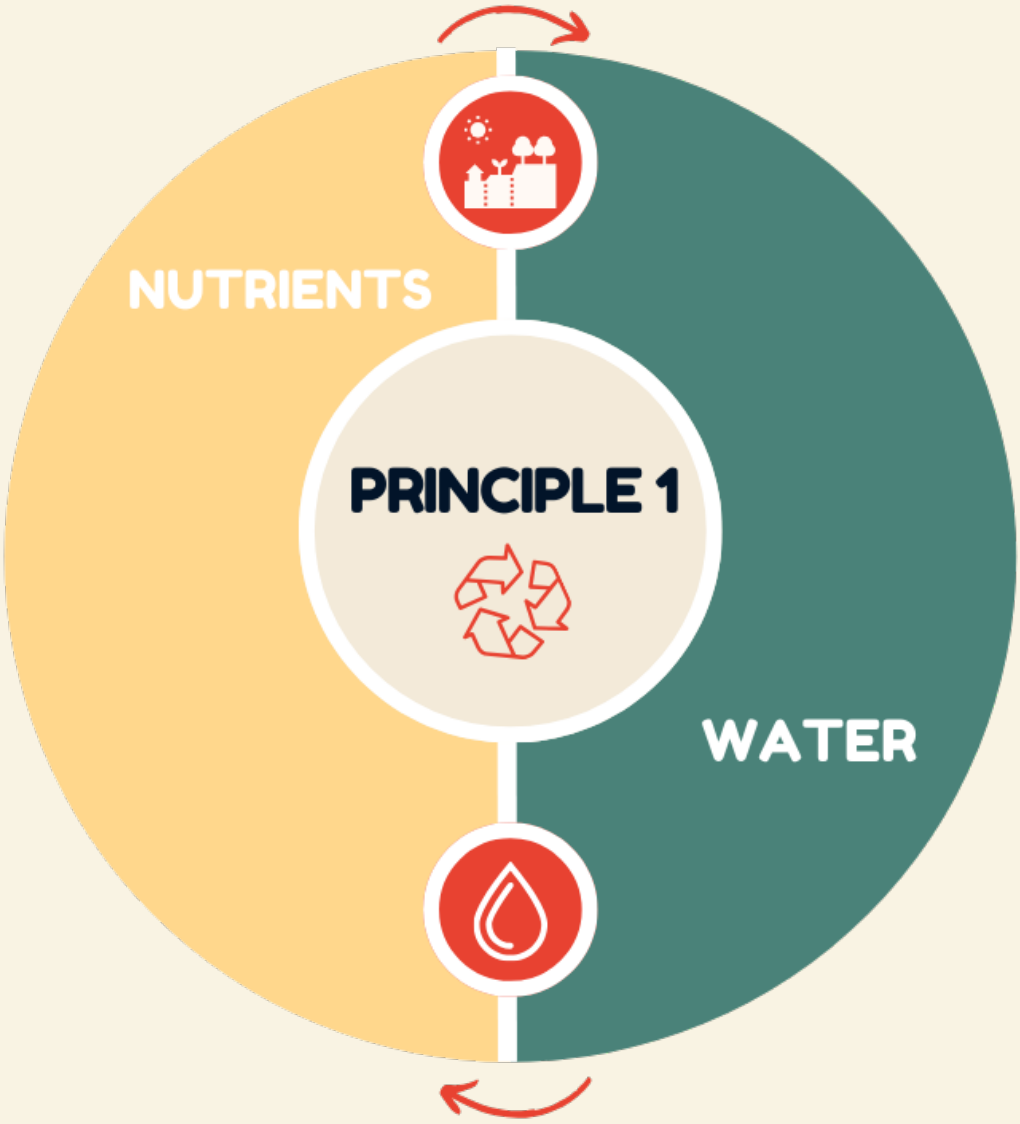
The agroecology principles encompass ecological, socio-cultural, technological, economic and political dimensions, aiming to ensure that agricultural activities do not degrade natural resources, disrupt ecosystems, or compromise food security and community wellbeing. By operating within these limits, agroecology aims to create a harmonious balance between farming, people and nature.

In this case study, agroecological integration is based on farmers' self-assessment of how ascale from 1 to 5, with 1 indicating no alignment and 5 indicating a strong alignment. Note that some principles might not be applicable.



Principle 1 – Recycling

Preferentially use local renewable resources and close as far as possible resource cycles of nutrients and bioomas.



Water harvest in soil cement tank.

Water. Kitchen wastewater is collected in an 800-litre greywater tank, and rainwater in an 8,000-litre soil-cement tank. Both are stored and reused later to irrigate the kitchen garden and vegetables.

Nutrients. On the farm, nothing goes to waste. Nutrients are returned to the soil and animals through three main approaches:

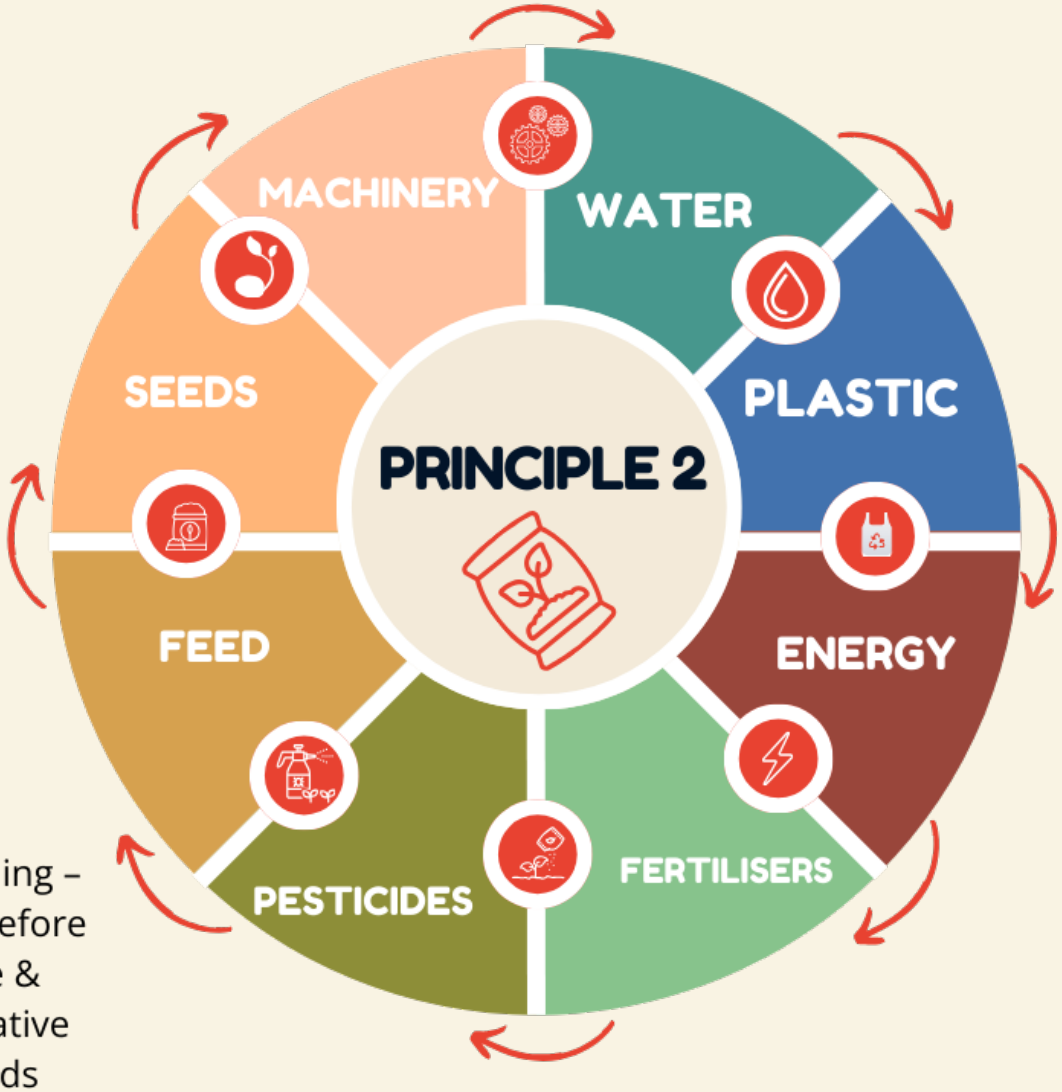
- Composting – Kitchen scraps and crop residues are composted and spread on fields to enrich the soil.
- Manure – Cattle manure and urine are carefully collected rather than discarded, and leftover crop stalks, husks, and grasses are added to this mix. Together, they are processed to create nutrient-rich farmyard manure and liquid fertiliser, both of which improve soil fertility and enhance crop growth.
- Food waste for animals – Uneaten food is fed to cattle, providing nutrition and reducing the need for extra feed.

Cattle urine collection tank.

Farmyard manure prepared for field application and nutrient cycling.

Principle 2 – Input reduction

Reduce or eliminate dependency on purchased inputs and increase self-sufficiency.



Overarching – Reduce before recycle & preventative methods

Pesticide-free protection: Madale cucumber wrapped to keep insects away for seed production.

Pesticides. The farm prepares its own bio-pesticide "Jholmal" using medicinal and pest-repellent plants fermented with cattle manure and urine. The mixture is left to ferment for about three weeks, with regular stirring to ensure uniform decomposition. Once ready, it is diluted with water and applied as a natural pesticide for pest control. Other natural pest management practices include the use of ash, cattle urine, raw milk, and repellent plants.

Fertilisers. The farm applies natural fertilisers such as farmyard manure and compost, while leguminous rotations and locally adapted landraces reduce the need for external inputs.

Energy. A shift to hybrid and electric machinery has reduced dependence on diesel and petrol. Biogas from livestock manure is occasionally used for cooking, while firewood remains the main fuel for preparing cattle feed.

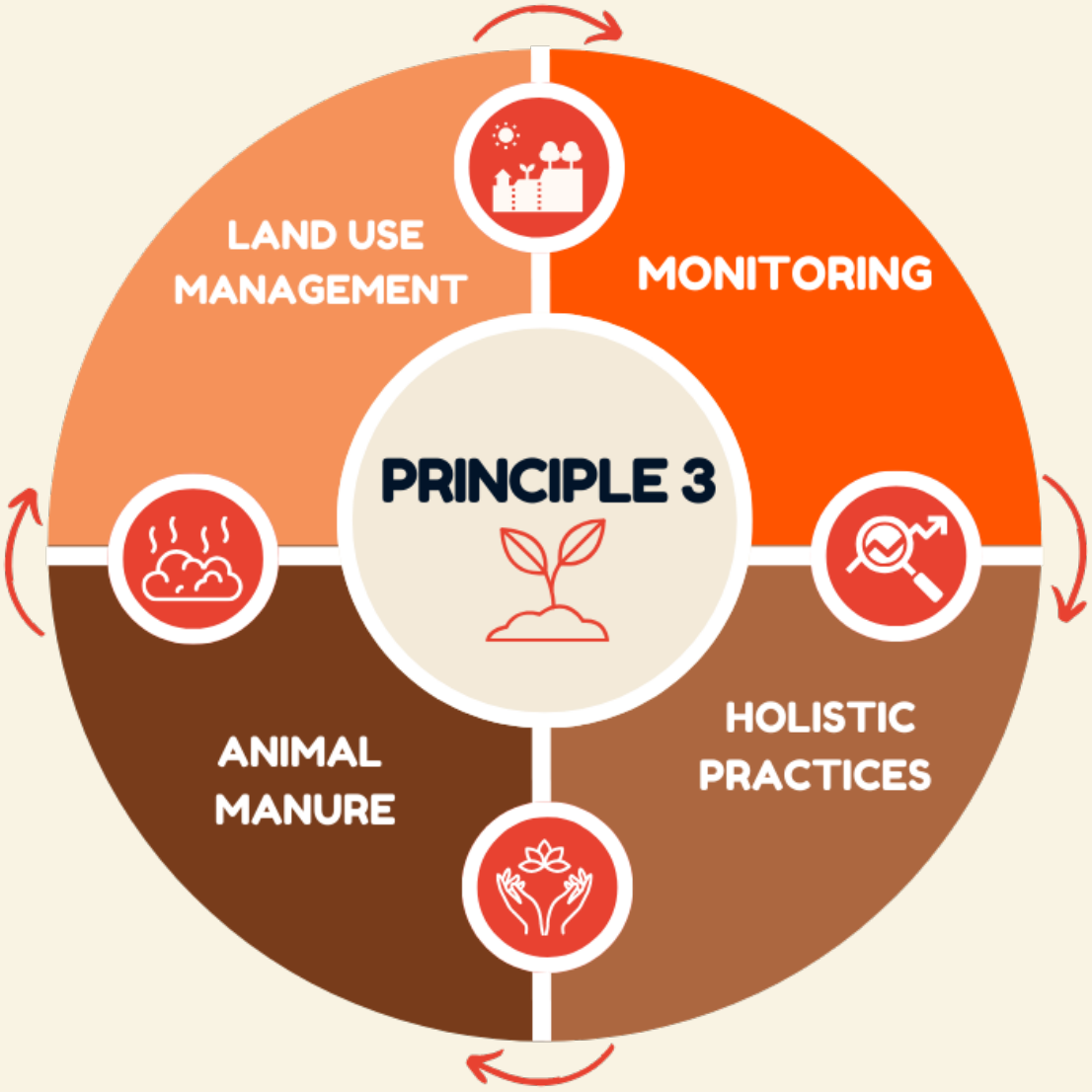
Integrating farmyard manure into the soil.

Application of *Jholmal* in the field.

Hand tiller.

Principle 3 – Soil health

Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and enhancing soil biological activity.




Terracing in Maramche village.

Land use management - terracing. The farm uses terrace farming to adapt to its sloping land. By creating flat steps, terraces reduce soil loss and make farming possible on hillsides. A small irrigation canal is carefully managed, ensuring water reaches crops without washing away valuable soil. In addition, legumes such as soybean are planted along bunds to strengthen the ridges, prevent erosion, and improve soil fertility.

Holistic pratices - mulching. As part of the farm's holistic soil management, organic mulches such as dried leaves, wood chips, forest litter, and straw are applied over the soil surface. This layer conserves soil moisture, moderates temperature, reduces evaporation, suppresses weed growth, and improves soil quality as materials decompose.

Monitoring. Soil testing is done collectively through a provincial government initiative, with samples collected and analysed across the village. The farm uses the results to apply targeted amendments, maintaining soil fertility, supporting healthy crops, and preventing nutrient depletion over time.

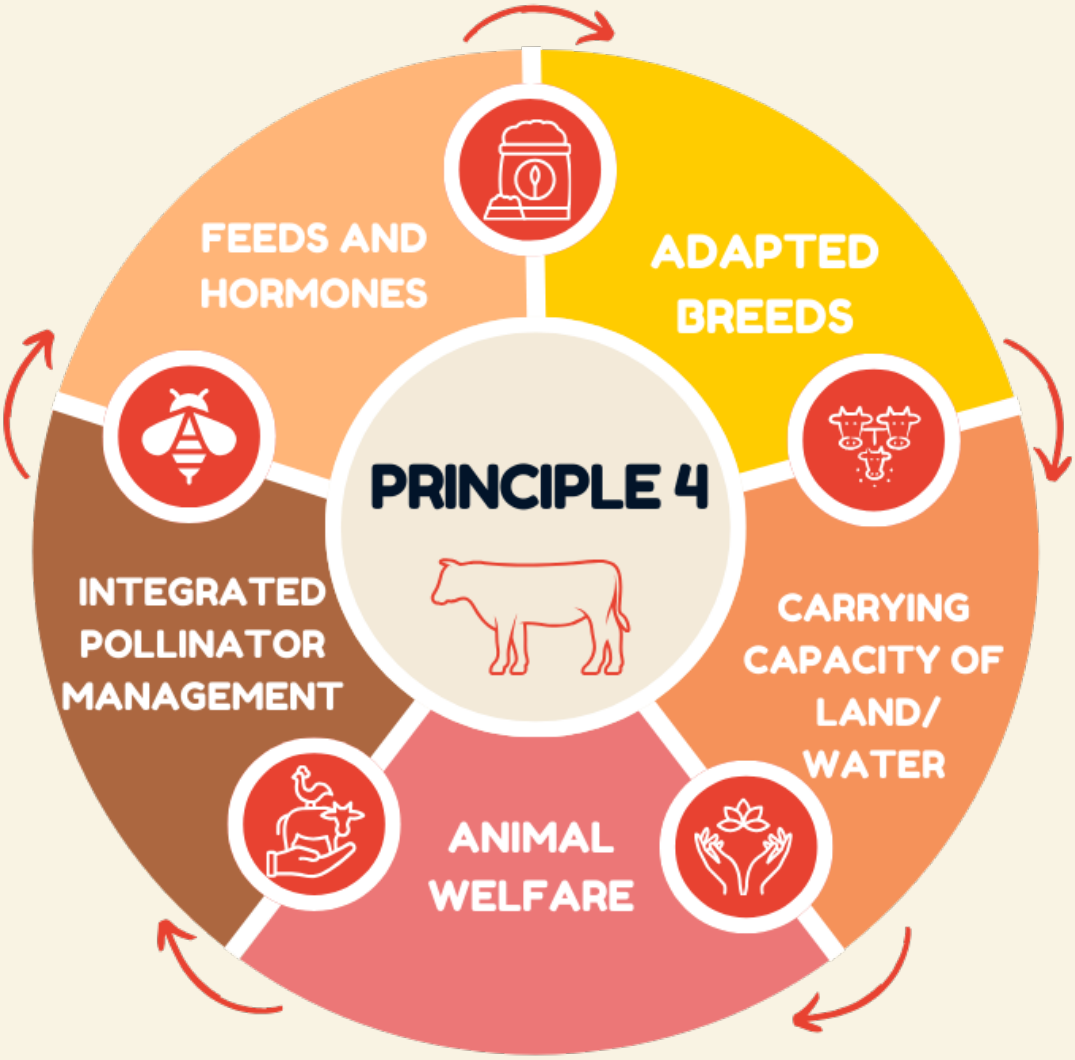

Hay and straw as organic mulch.


Vermicompost.


Tilling and weeding of the field.

Principle 4 – Animal health

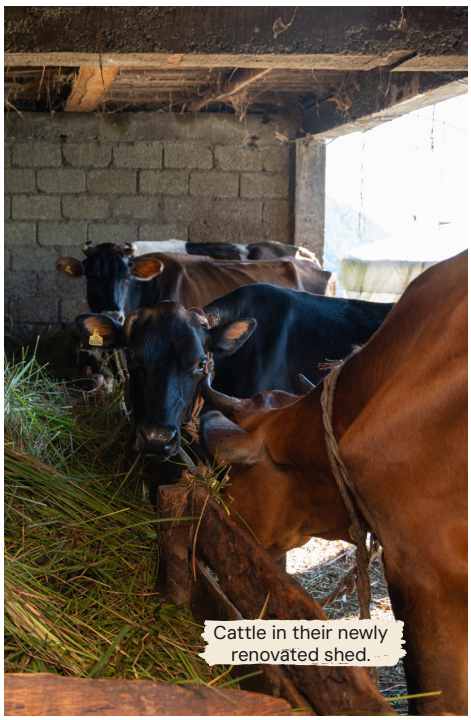
Ensure animal health and welfare.



Chicken feeding time.

Locally adapted breeds. Animal integration is an important part of the rural Nepalese agricultural system. On the farm, 5 cows, 25 local chickens (Ulte and Sakanaki breeds), and 30 Giriraj chickens are reared. These animals require minimal inputs and are resilient to local diseases. Herd size is maintained according to the farm's capacity, ensuring sufficient manure and urine for soil fertility without overburdening household labour or resources.

Animal welfare. The cattle shed was recently renovated to improve hygiene and animal health. The earthen floor was replaced with a water-resistant surface with a urine collection canal, and a designated feeding area ensures clean feed. The roof was repaired to prevent leaks. This upgrade improves sanitation, simplify cleaning and manure management, and together contribute to increased milk production.

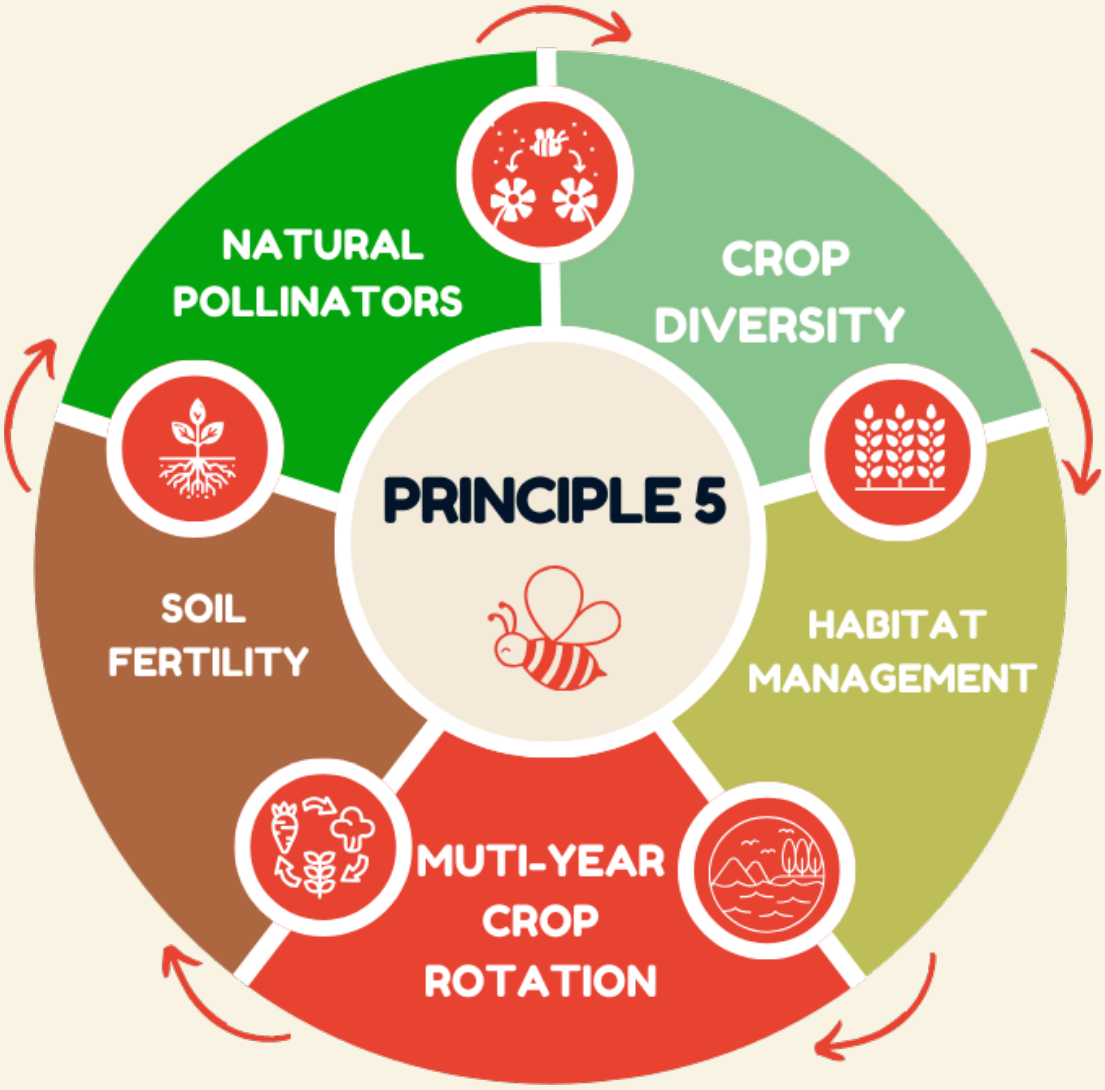


Cattle in their newly renovated shed.

Storage of hay, rice straw and cornhusk to be used as feed for cattle.

Principle 5 – Biodiversity

Maintain and enhance diversity of species, functional diversity and genetic resources and thereby maintain overall agroecosystem biodiversity in time and space at field, farm and landscape scales.



Field of local rice landrace.

Habitat management. Multi-layer farming is practised by growing seasonal vegetables beneath kiwi plants. Because kiwi grows 1.5–2 metres tall and bears fruit once a year, vegetables can be cultivated underneath, making the most of available land and providing a steady supply of fresh produce for household use.

Natural pollinators. The farm maintains three bee hives, which provide essential pollination for crops and also produce honey, contributing to income diversification.

Crop diversity. A wide variety of crops are grown in both the home garden and cereal fields. The home garden includes vegetables, fruits, fodder, ornamental plants, livestock, and pollinators, providing diverse nutrition. In the fields, rice, maize, and wheat are rotated three times a year, with complementary plantings that add further diversity.

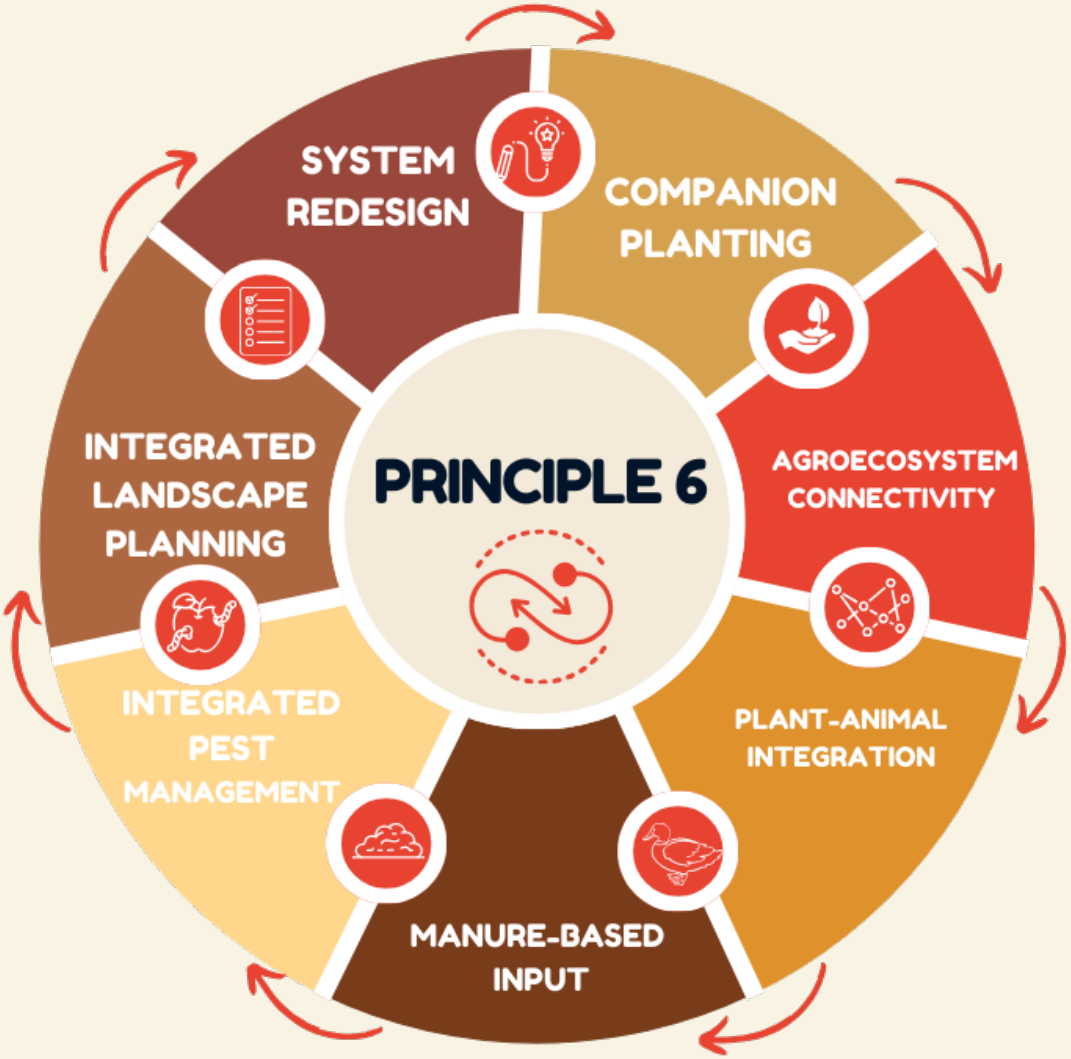
Diversity in home garden produce.

Kiwi fruit harvest.

Bee hive.

Principle 6 – Synergy

Enhance positive ecological interaction, synergy, integration and complementarity among the elements of agroecosystems (animals, crops, trees, soil and water).



Grasses and feed for cattle.

Companion planting. Intercropping and crop rotation are practised to harness natural complementarities. In rice fields, soybean and longbean are planted along the edges to fix nitrogen and provide an additional harvest. In maize fields, the "three sisters" system combines maize, beans, and pumpkin, with maize supporting the beans, beans enriching the soil, and pumpkins suppressing weeds and retaining moisture.

Companion planting.

Integrated pest management. Pest-repellent plants such as marigold, mugwort, mint, and garlic are grown alongside main crops, naturally deterring harmful insects without affecting crop growth. Holy basil is also cultivated for its religious significance and medicinal uses.

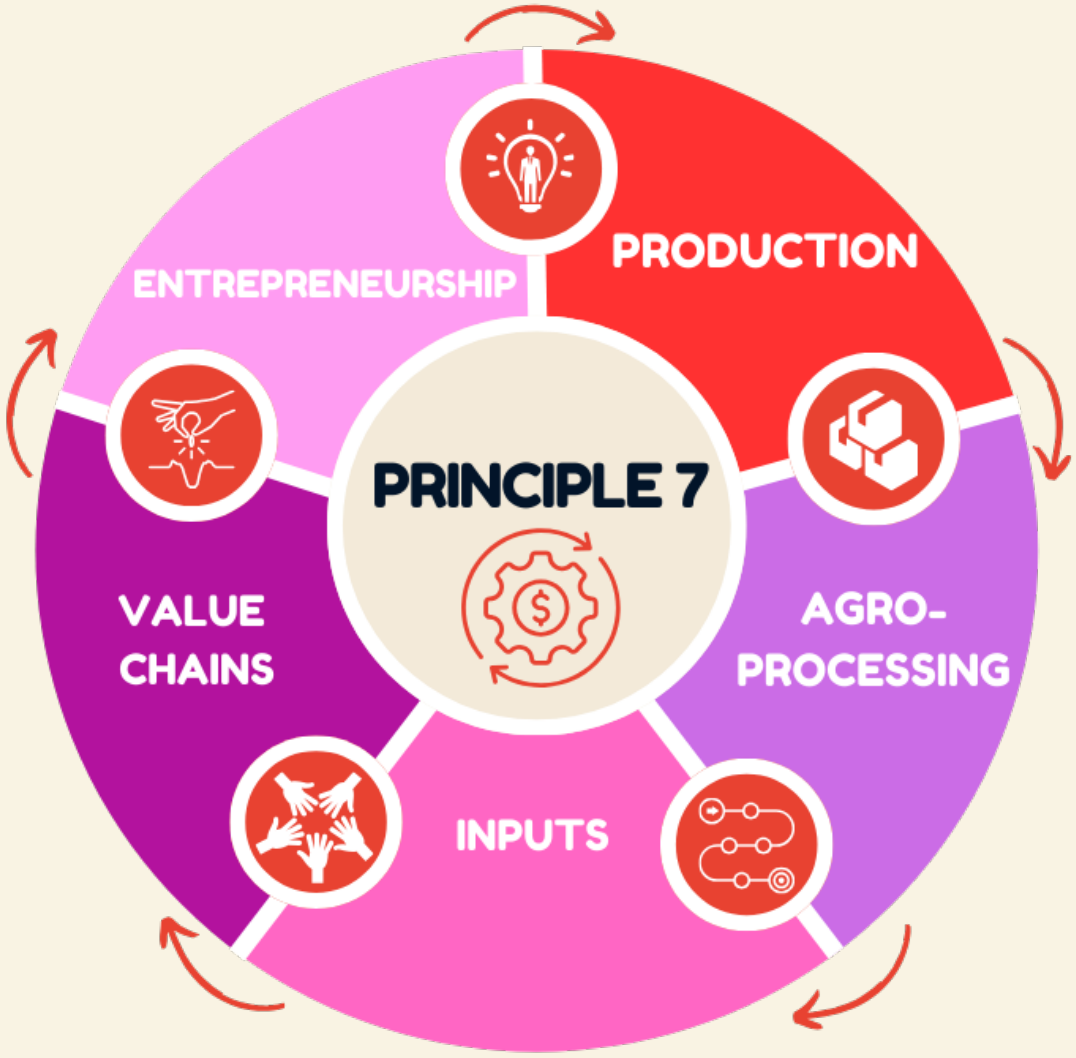
Plant-animal integration. A closed plant–animal system is maintained where livestock and crops complement each other within an agroforestry system. Cattle provide manure and urine for farmyard manure and compost production, while crop residues, grasses, and fodder trees serve as livestock feed, creating a circular flow of nutrients within the farm.

Holy basil is a traditional insect repellant plant.

Marigold as a natural pest repellent.

Principle 7 – Economic diversification

Diversify on-farm incomes by ensuring that small-scale farmers have greater financial independence and value addition opportunities while enabling them to respond to demand from consumers.



Signboard for the collection centre.


Agri-produce harvest sold at the collection centre.

Diversified production. Through diversified production, including vegetables, fruits, cereals, seeds, honey, chicken, and milk, the farm meets household needs while generating surplus for sale. This diversity provides Mr.Indra and his family with a resilient and multifaceted income stream, contributing to greater economic stability. On average, they earn about 3,500 euros annually from farm activities.

Value chains. Vegetables are sold through a short value chain using a cooperative-led collection centre established with support from the Annapurna Rural Municipality and the CRA project. Located along a busy highway, the centre allows farmers from across the municipality to bring their produce daily. A management committee pays farmers based on the day's market price while keeping records, and the produce is purchased directly by local residents and passing travellers.

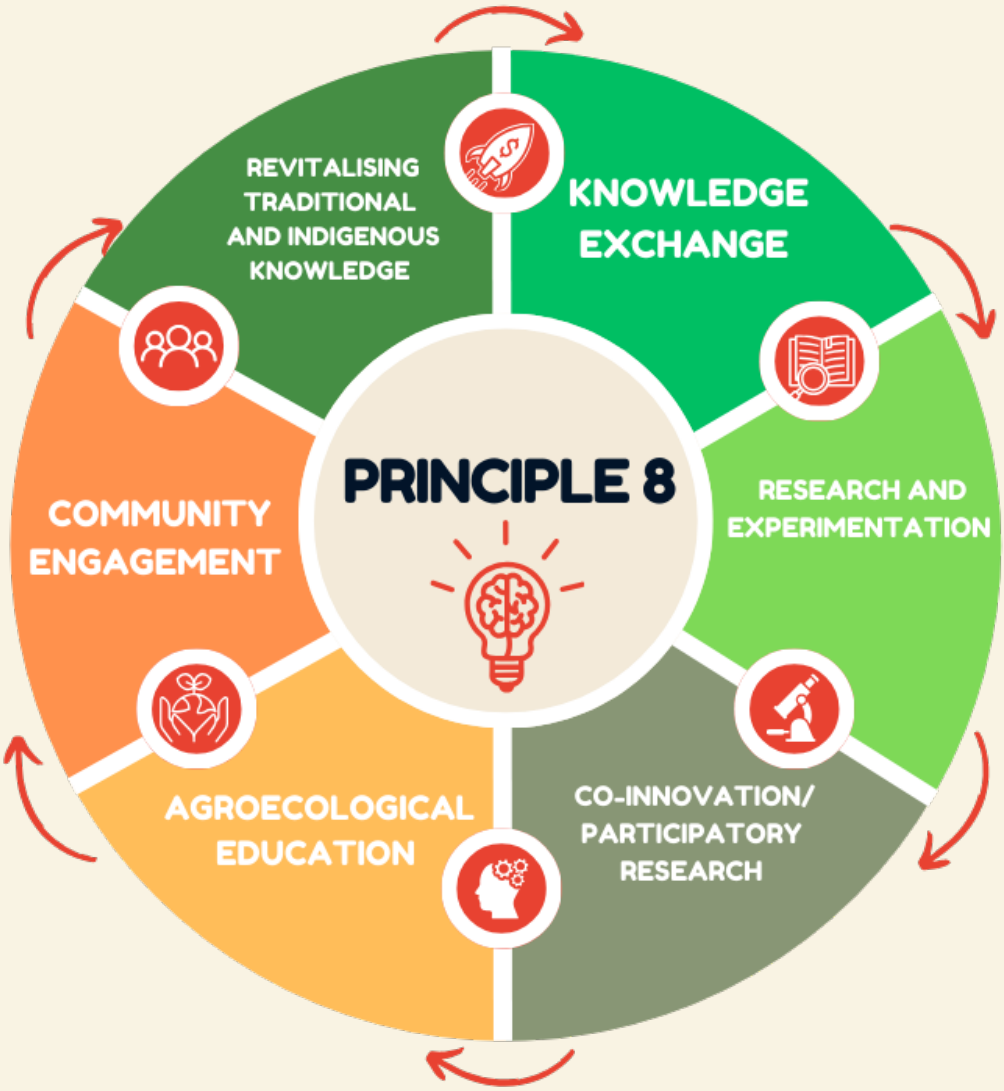

Maiyya harvesting vegetables.


Weighing and record keeping of produce.

Entrepreneurship. Maiyya demonstrates strong entrepreneurship and takes an active role on the farm, contributing to tasks like planting, irrigation, harvesting, and threshing, while sharing decision-making with her husband, fostering gender-inclusive management.

Principle 8 – Co-creation of knowledge

Enhance co-creation and horizontal sharing of knowledge including local and scientific innovation, especially through farmer-to-farmer exchange.



Crop showcase at diversity fair.

Knowledge exchange and research. Knowledge exchange is central to the farm, taking place through Farmer Field Schools, cooperative discussions, and research collaborations. On-farm experiments test organic fertilisers, mulching methods, and crop varieties, with results shared through community meetings. Knowledge is co-created by integrating scientific research with farmers' traditional and experiential practices, strengthening local capacity for adaptation and innovation.

Diversity block.

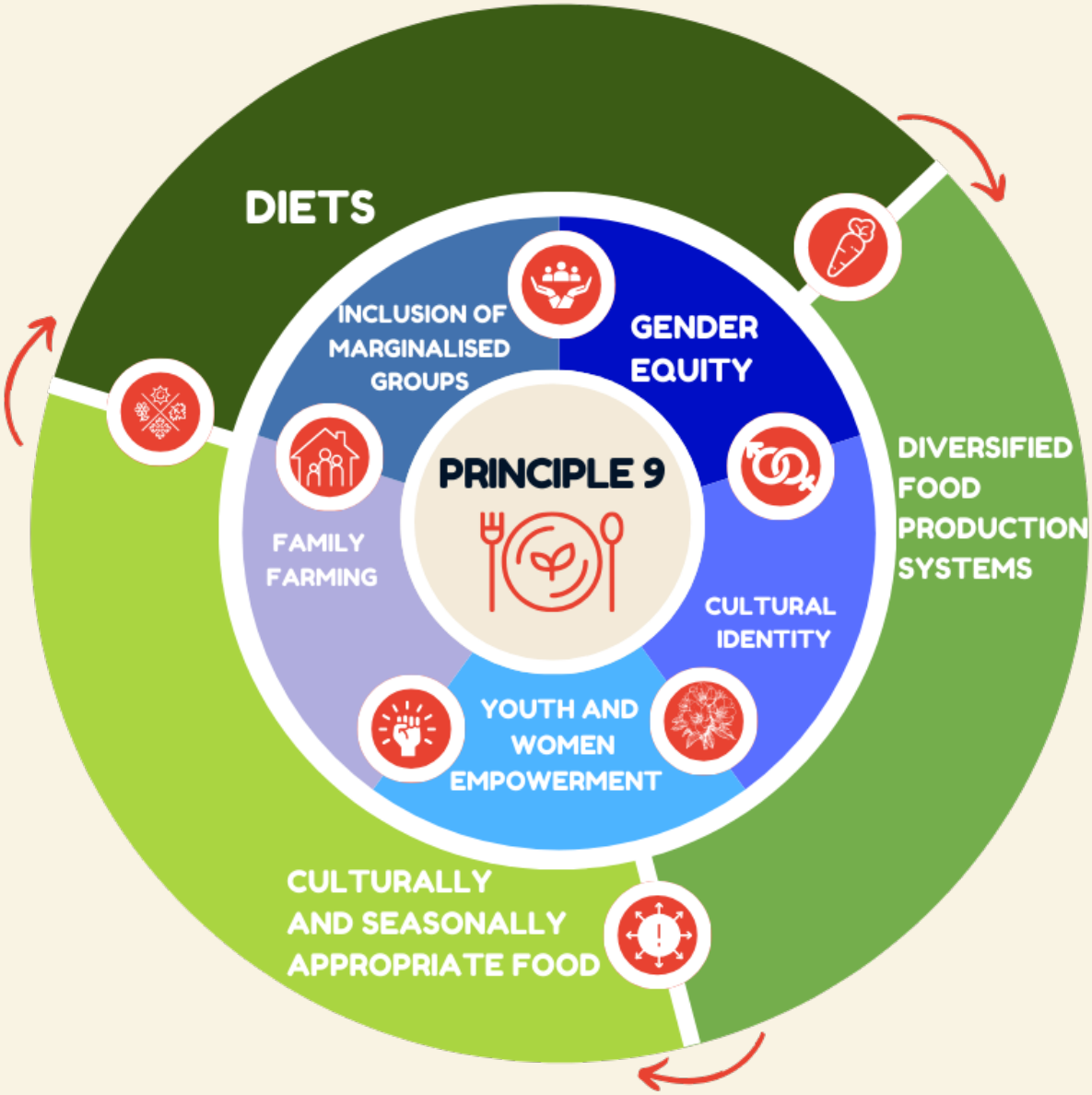
Research and experimentation. A diversity block has been established within the community in a participatory approach, where multiple crop varieties are cultivated side by side in small plots. Morphological traits, yield performance, and adaptability are observed under the same conditions to identify varieties best suited to local fields. Functioning as a living laboratory, the block fosters learning through observation, experimentation, and knowledge-sharing among farmers, agroecological practitioners, and policy makers.

Farmer Field Schools.

Crop showcase at diversity fair.

Principle 9 – Social values & diets

Build food systems based on the culture, identity, tradition, social and gender equity of local communities that provide healthy, diversified, seasonally and culturally appropriate diets.



Youth and women empowerment. Planting, harvesting, and post-harvest work can be physically demanding and are often done by women. On this farm, tools like the electric millet thresher, corn sheller, and jab planter help make these tasks easier, saving time and energy.

Finger millet thresher.


Local dishes: Roti and finger millet pudding.

Millet products on display at diversity fair.


Broad leaf mustard.

Culturally and seasonally appropriate food. The farm preserves local food traditions by hosting traditional meals and taking part in diversity fairs, which showcase local crops, foods, and farming practices. It produces a variety of culturally important foods, including millet-based items such as pancakes, cakes, bread, and dhido (Nepali-style porridge), local rice landraces, vegetables, and salads. Seasonal crops like broad leaf mustard, cucumber, and local rice are grown for both household use and market sale. These varieties are prized for their distinctive taste, high market value, and ability to thrive without external inputs.

Principle 10 – Fairness

Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment and fair treatment of intellectual property rights.

Farmers from Maramche village.


Hail net installed over kiwi orchard.

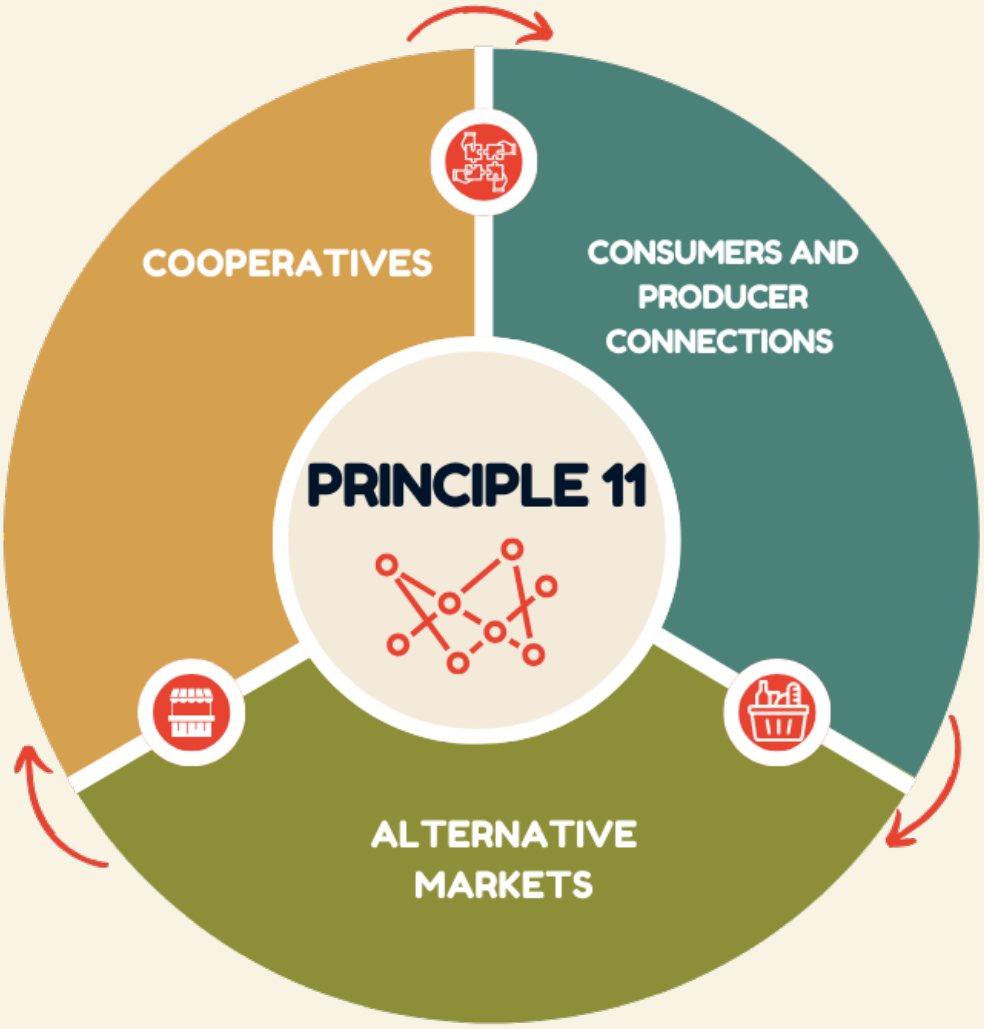
Social vulnerability. The community has strengthened its resilience through project support and strong local institutions. For example, after a severe hailstorm destroyed crops, the CRA project and local cooperative provided hail nets, tunnel structures and replacement seeds of the major crops through the community seed bank and community-owned nursery. When another storm struck a few months later, crop losses were minimal, and the community seed bank quickly provided replacement seeds, demonstrating reduced vulnerability and faster recovery.

Producer and consumer organisations. Farmers organise collectively through the nearby vegetable collection centre, established by the local government in collaboration with the CRA project, ensuring fair market access and reducing dependence on intermediaries. In parallel, a local certification/landscape branding system is being developed with support from the local government, cooperatives, and project partners to promote products grown under agroecological principles. Though still in progress, the initiative reflects growing awareness of the importance of fair valuation for agroecologically produced food, strengthening both producer livelihoods and consumer trust.


Farmers supplying vendor at collection centre.

Principle 11 – Connectivity

Ensure proximity and confidence between producers and consumers through promotion of fair and short distribution networks and by re-embedding food systems into local economies.



Vegetable collection centre building.

Customer buying products at the collection centre.

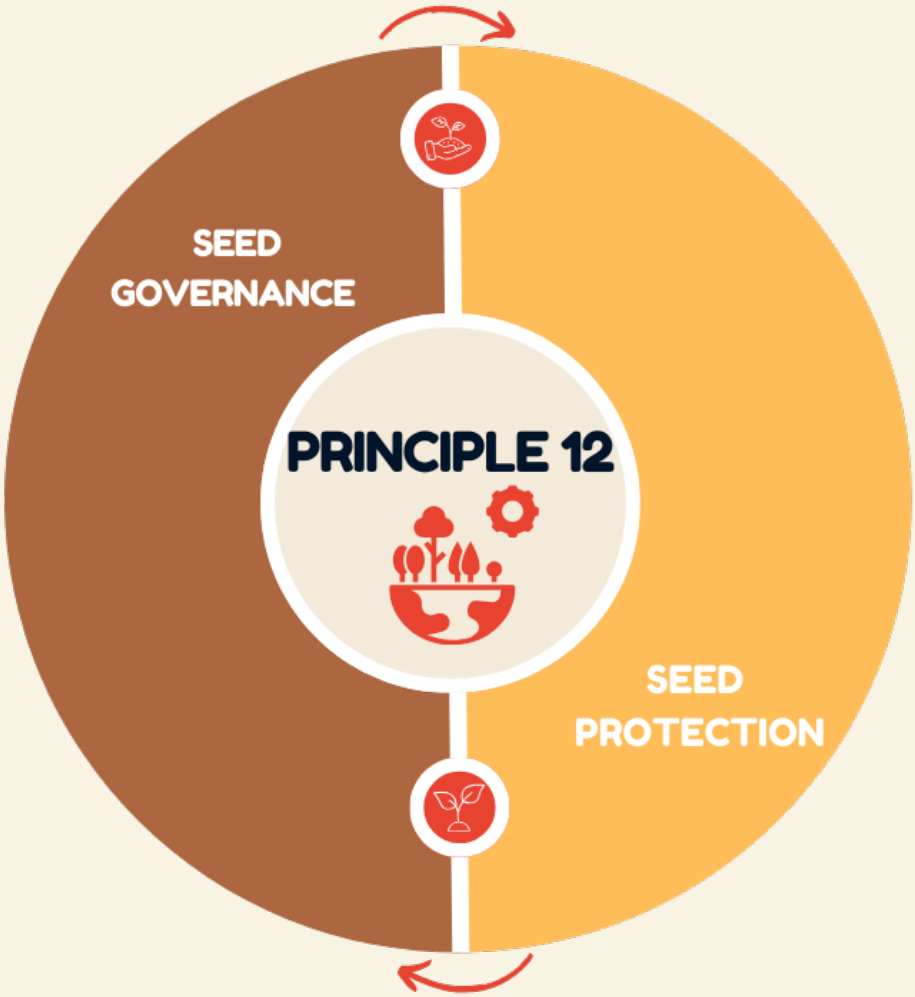
Alternative markets. The vegetable collection centre strengthens connections between producers and consumers by creating a direct, short market chain. Farmers from across the Rural Municipality, including Mr. Indra, can bring their produce to the centre and sell it at fair market prices updated daily, receiving immediate payment. This system reduces intermediaries, saves time and transport costs for small farmers, and fosters trust between producers and buyers. By keeping the market local and accessible, the collection centre contributes to resilient local food webs and allows farmers to reinvest time and resources into their fields.

Cooperative building of Maramche village.

Cooperative. The Shree Pragatisheel Agriculture Cooperative was already established when LI-BIRD began working in the village, and the Annapurna Community Seed Bank and agroecological village initiatives were later developed through it. Key positions are held by members such as Mr. Indra, and the cooperative serves as the central institution linking all community structures. It provides capacity building, financial services, and equal opportunities for production and marketing, while the seed bank and project activities are coordinated in consultation with it.

Principle 12- Land and natural resource governance

Strengthen institutional arrangements to improve, including the recognition and support of family farmers, smallholders and peasant food producers as sustainable managers of natural and genetic resources.




Local seeds preserved for display.

Annapurna Community Seed Bank.

Community seed bank. Through the Community Seed Bank, the community conserves, promotes, and produces local landraces and traditional crop varieties such as Madale Cucumber, Kalo Patle Rice, Amaranthus, Broad Leaf Mustard, and Beans. This strengthens farmer-autonomy by ensuring fair and reliable access to seeds, allowing farmers to borrow seeds for cultivation and return them after harvest, maintaining a continuous cycle of exchange and renewal.

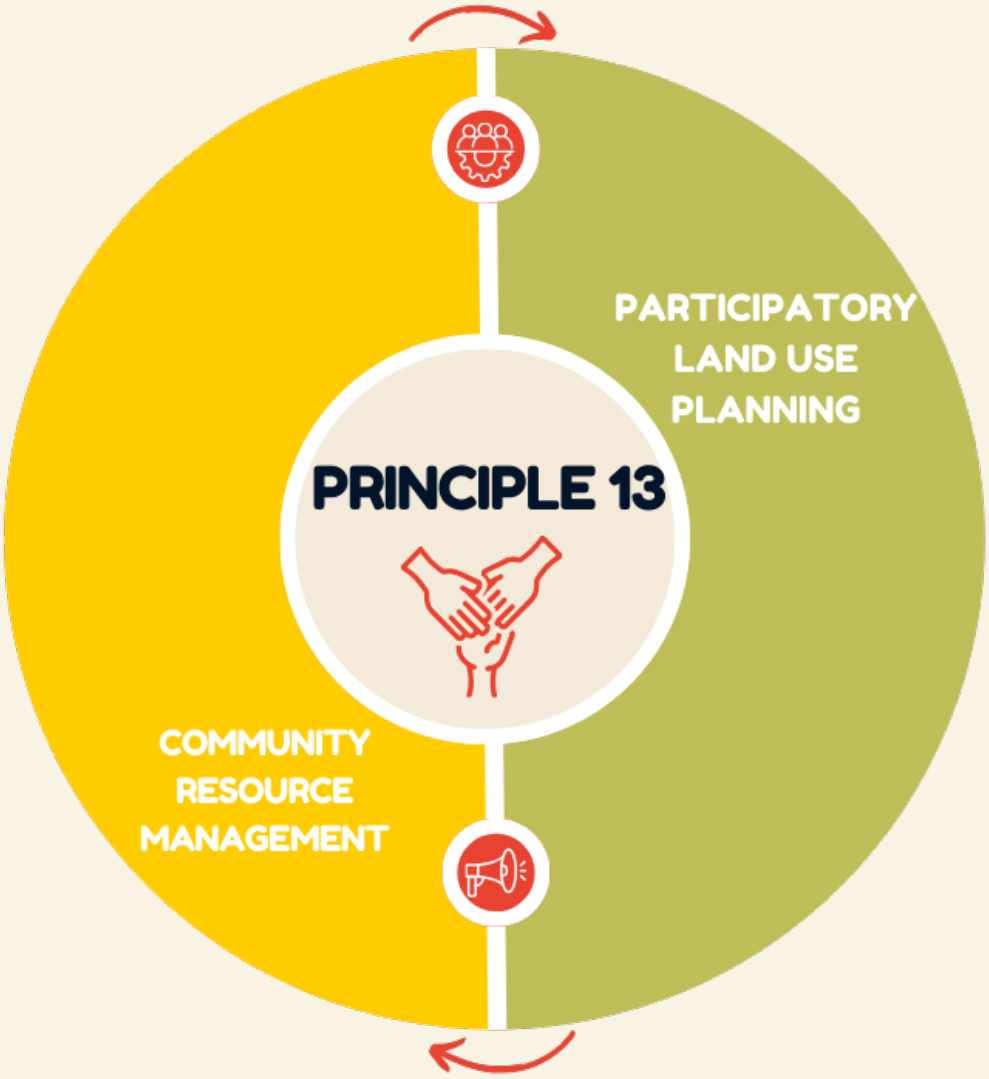
The seed bank is collectively governed by farmers cooperatives, under the umbrella of the Community Seed Bank Association of Nepal, ensuring shared responsibility and transparency. Efforts are also underway to register local landraces in the National Seed System, supporting legal recognition and potential commercialisation. Through these practices, the community safeguards agrobiodiversity and upholds farmers rights to save, use, exchange, and sell their own seed.


Women leading discussions at the Community Seed Bank.

Local landraces or rice.

Principle 13 – Participation

Encourage social organisation and greater participation in decision-making by food producers and consumers to support decentralised governance and local adaptive management of agricultural and food systems.



Technical team inspecting the rice diversity block.

Community-based natural resource management. The natural resources and the wider agro-ecosystem are assessed to identify areas requiring project intervention, particularly for conservation. A participatory four-cell analysis is used, in which community members and local government representatives categorise resources such as crops based on their availability and importance or use. This process helps list natural resources, identify those that are rare or at risk, and plan their sustainable use and conservation collectively, ensuring shared responsibility and informed decision-making.

Farmers planning the annual seed production plan.

Four cell analysis in the community.

Local Initiatives for Biodiversity, Research and Development (LI-BIRD)

Local Initiatives for Biodiversity, Research and Development (LI-BIRD) is a non-profit making, non-governmental organisation established in 1995, registered at the District Administration Office, Kaski (Registration # 217/052/053), and affiliated to the Social Welfare Council, Nepal (Registration # 3394). LI-BIRD is committed to capitalizing on local resources, innovations, and institutions for sustainable management of natural resources for improving livelihoods of smallholder farmers.

Vision, Mission, and Goal

LI-BIRD envisions a society where people are resilient, healthy, food and nutrition secure, and live in peace with dignity. LI-BIRD's mission is to diversify choices and secure the livelihoods of farming communities, especially smallholder farmers, through innovative approaches to research and development in agriculture, climate change, biodiversity, and natural resources. And the overall impact goal is to contribute to reducing poverty by strengthening resilient agri-food systems, improving ecosystem health and services, and ensuring food, nutrition and income security of poor and marginalised farmers, especially women, who depend primarily on agriculture, biodiversity and natural resources for their livelihoods.

LI-BIRD has three strategic programmes namely, i) Food and nutrition security, ii) Biodiversity and ecosystem health, and iii) Climate action. The various impact pathways LI-BIRD follows while achieving its goal through its strategic programmes are;

- *Partnership, collaboration and engagement pathway*
- *Environmental, gender and social safeguard pathway*
- *Research, knowledge management and capacity building pathway*
- *Evidence-based policy advocacy pathway*
- *Scaling up/out pathway*

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Annapurna Community Seed Bank

Introduction

A Community Seed Bank is a community-based institution established for the identification, conservation, and promotion of agricultural biodiversity and local seed system in Nepal. Currently, there are 28 Community Seed Banks established across Nepal in various locations with this same objective. Annapurna Community Seed Bank was established on January 3, 2020, and is operated under the Progressive Agricultural Producers' Cooperative Ltd., located in the Maramche village, Ward No. 3 of Annapurna Rural Municipality, Kaski District. The village is situated 30 Kilometers west of Pokhara and is located at an altitude of 1650 to 1700 meters above sea level. This centre has 107 individuals affiliated with it, 57 of whom are women.

Objective

The main objective of establishing the Annapurna Community Seed Bank is the sustainable management of local and indigenous crops and their seed system. To achieve this, the Seed Bank during its establishment time, created a plan through a four-category analysis to determine which varieties to conserve and how.

Conservation and Activities

The centre collects, conserves, and regenerates 132 varieties across 30 species. The seeds of these species are kept for display in the facility, which are replaced usually annually. It has established a biodiversity display site for 47 rice, 8 millet, and 10 tuber crop varieties managed by the cooperative. A notable achievement of this Seed Bank is the production and distribution of cold-tolerant high-altitude rice since its establishment. They have successfully registered 2 local landraces, Madale Cucumber and Kalopatle Rice in the National Seed Board in 2024 AD with technical and financial support from LI-BIRD. In recognition of its work in supporting the sustainable management of indigenous varieties, the Annapurna Rural Municipality honored the Annapurna Community Seed Bank with a cash prize of NPR 50,000/- and NPR 1,00,000/- along with a certificate of appreciation at the Agricultural Biodiversity Exhibition during the National Agricultural Biodiversity Week 2023 AD and 2025 AD simultaneously.

Collaborating Institutions

The successful establishment and strengthening of Annapurna Community Seed Bank was further contributed by various stakeholders like, Annapurna Rural Municipality, Agriculture Knowledge Centre, Prime Minister Agriculture Project, Regional Agriculture Directorate, Lumle, National Genetic Resources Centre (Gene Bank), Seed Testing Laboratory, Gandaki Province, and Community Seed Bank Association of Nepal.

This leaflet has been collaboratively produced by the following contributors:

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- Jenny Shrestha, Team Leader, CRA-III at Local Initiatives for Biodiversity, Research and Development (LI-BIRD), led the on-site data collection and communication with the farm, and contributed to the data analysis and writing.
- Mahesh Shrestha, Co-Founder | Executive Chairperson | Director at GrowInnova, led the visual content production, including on-site photography and video footage.
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