



ISSUE BRIEF

Agroecology for climate resilience and agricultural sustainability

A case for western Nepal

Context

Farmers in Nepal routinely use chemical inputs such as pesticides and fertilisers to boost agricultural production. In the short term, such chemical use and the simplification of agriculture to focus on the cultivation of select crops increase food and fibre production.

However, agricultural systems built around chemical fertilisers and monocultures disrupt the natural balance of soil nutrients, ultimately leading to diminishing long-term productivity¹. Such systems are also affected by fertiliser shortages and price volatility.

Moreover, conventional agricultural practices, despite the high toll exerted on the environment, ecosystems, and society, are not the answer. Increased emphasis on a few crops has led to monocropping, loss of agrobiodiversity, homogenisation of agriculture, and degradation of the agroecosystem^{1,2}.

KEY MESSAGES

- Agroecological approaches to farming involve working with nature and the natural functions of ecosystems for agricultural productivity and diversity
- They work best when they blend Indigenous knowledge and scientific solutions
- In western Nepal, there is potential to develop a participatory agroecological approach – with local community as well as government departments involved
- An ongoing comprehensive assessment is studying its potential, looking to create a scalable blueprint that incorporates local resources, people’s priorities, and local government interests
- Inclusion of women and young people in planning and implementation increase demonstrable effectiveness and foster scalable adoption
- Seeing is believing – local communities and government can only be convinced to adopt and scale approaches that are proven to be effective



Agriculture in a changing climate

Climate and demographic change complicate and exacerbate issues. Nepal is particularly susceptible – it is the fourth most vulnerable country to climate change³. Additionally, its economic development is closely linked to agriculture, with 23.95% of the country's GDP reliant on the sector.

Farmers are struggling to adapt to variations in precipitation and temperature patterns, dry spells, increased incidences of crop pests, declining soil productivity, and loss of agrobiodiversity. In western Nepal, a region that remains the poorest, most food and nutrition insecure, and least developed in the country⁴, these effects are pronounced. The terrain is largely inaccessible. Limited road connectivity restricts flow of goods and services and remoteness exacerbates political neglect⁴.

Working with nature

Agroecological farming approaches based on the natural functioning of ecosystems, locally available resources, traditional knowledge, and the co-creation of knowledge present a win-win for the region. These systems can holistically address agrobiodiversity loss and ecosystems degradation while sustainably ensuring income and nutrition security^{1,3,4,5,7,8}.

Agroecological systems are also more climate resilient. They are built around locally available resources and the cultivation of a diverse range of native underutilised crop species. This makes means crops are better adapted to local conditions and contribute to improved overall ecosystem resilience.

Testing climate-resilient agriculture

ICIMOD is working through the Green Resilient Agricultural Productive Ecosystems (GRAPE) project to test and demonstrate climate-resilient agricultural technologies and practices with farmers in the Sudurpashchim and Karnali provinces of western Nepal as research and implementation partners. Operating on the principle of 'seeing is believing', the project invites farmers to see, choose, and replicate – in contrast to externally mediated solutions that are 'delivered' to them.

The focus is on resilience building, ecological intensification, production diversity, circular and efficient use of local resources. Collaborative learning and sharing for the sustainability of agricultural ecosystems is ensured through:

- Consistent participation – from community members, key stakeholders, and local government
- Indigenous and scientific knowledge – traditional agricultural practices and farmers' innovations are valued and integrated with scientific solutions
- Co-designing and co-testing solutions packages – covering diversity and variety of crops; soil, nutrient, and water management practices; and pest control
- Demonstration sites – co-developed as learning hubs and managed by local community members, particularly women and the youth



- Enabling environment for scaling – supported through education, specifically the formal inclusion of agroecological practices in university curriculum and government support for consumption of locally grown produce through policies and linkages, wherever possible
- Capacity building and evidence generation – for local government and policy makers

Early results

Early findings suggest that agroecological interventions in western Nepal are improving agrobiodiversity – particularly through the revival of local, indigenous crops; decreased vulnerability to climate induced risks, i.e., pest attacks, droughts and dry spells, and water variability; and reduced dependence on external inputs⁵.

These interventions are also creating safeguards from market shocks. The less farmers rely on chemical fertilisers and pesticides, the less market shortages and price fluctuations affect them⁵.

Integration of local knowledge in designing solutions has helped boost farmers' confidence in the adoption and replication of solutions packages⁶.

Moreover, the local governments (municipalities) and Agriculture Knowledge Centres (AKCs) have mainstreamed our approaches into their plans, programmes, and activities.

RECOMMENDED POLICY ACTIONS

- Promote an inclusive, participatory, and collaborative research agenda on agroecology and climate resilience to strengthen farmer- and citizen-led innovations built around local knowledge systems
- Redirect public incentives and subsidies from agrochemicals to agroecological practices to encourage a shift from inorganic practices to agroecological ones
- Develop packages of agroecological solutions incorporating Indigenous knowledge and scientific technologies
- Promote inclusion of courses on agroecology and climate resilience in university curricula to ensure wider promotion and scaling of agroecological practices
- Create demand for agroecologically grown produce through government support for consumption of locally and sustainably grown crops
- Build capacity of local government on the agroecological aspects of agriculture – through trainings and exposure for government staff at the AKC and municipal levels
- Develop supportive policies – including guidelines on setting common standards for agroecological practices

Notes

- ¹ Rasul, G., Hussain, A., Adhikari, L. and Molden, D.J., 2022. Conserving agrobiodiversity for sustainable food systems in the Hindu Kush Himalaya. *International Journal of Agricultural Sustainability*, 20(6), pp.1117-1135.
- ² Rasul, G., Saboor, A., Tiwari, P.C., Hussain, A., Ghosh, N. and Chettri, G.B., 2019. Food and nutrition security in the Hindu Kush Himalaya: Unique challenges and niche opportunities. In *The Hindu Kush Himalaya assessment: Mountains, climate change, sustainability and people*, pp.301-338
- ³ LI-BIRD. 2022. *Climate Resilient and Agroecological Farming Practices: Compendium of Good Practices*. Local Initiatives for Biodiversity, Research and Development (LI-BIRD), Pokhara
- ⁴ Thapa, S. and Hussain, A., 2021. Climate change and high-altitude food security: a small-scale study from the Karnali region in Nepal. *Climate and Development*, 13(8), pp.713-724.
- ⁵ Sharma Oshin and Shrestha Kundan (2023). Exploring agroecological farming in Karnali, western Nepal. <https://www.icimod.org/article/agroecological-farming-karnali-nepal/>
- ⁶ Agrawal, N. K., Udas, E., Leikanger, I., Bhatta, L. D., Sharma, E., & Joshi, K. D. (2021). Resilience building solutions for mountain smallholders: catalyzing transformations with an integrated modular approach in the Hindu Kush Himalaya. In *Handbook of Climate Change Management: Research, Leadership, Transformation* (pp. 1-19). Cham: Springer International Publishing.
- ⁷ Bisht, I. S., Rana, J. C., Jones, S., Estrada-Carmona, N., & Yadav, R. (2022). Agroecological approach to farming for sustainable development: the Indian scenario. *Biodiversity of Ecosystems*, 107.
- ⁸ Sinclair, F., Wezel, A., Mbow, C., Chomba, S., Robiglio, V., & Harrison, R. (2019). The contribution of agroecological approaches to realizing climate-resilient agriculture. GCA: Rotterdam, The Netherlands.

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