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GUIDELINES FOR

Establishing Community Learning Centres

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Contents

Abbreviations and acronyms

AFU	Agriculture and Forestry University
AI	Artificial Intelligence
AKC	Agriculture Knowledge Centre
ANASTU	Afghanistan National Agricultural Science and Technology University
BAU	Bangladesh Agricultural University
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
CAU	China Agricultural University
CBO	Community-Based Organisation
CEAPRED	Center for Environmental and Agricultural Policy Research, Extension and Development
CGIAR	Consultative Group on International Agricultural Research
CLC	Community Learning Centre
CNR	College of Natural Resources
CRA	Climate-Resilient Agriculture
CSA	Climate-Smart Agriculture
CSO	Civil Society Organisation
CVCA	Climate Vulnerability and Capacity Analysis
DOA	Department of Agriculture
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
FGD	Focus Group Discussion
FM	Frequency Modulation (radio)
FPO	Farmer Producer Organisation
GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
GIS	Geographic Information System
GRAPE	Green Resilient Agriculture Productive Ecosystems
HI-REAP	Himalayan Resilience Enabling Action Programme
HKH	Hindu Kush Himalaya
ICAR	Indian Council of Agricultural Research
ICIMOD	International Centre for Integrated Mountain Development
ICT	Information and Communication Technology
IPM	Integrated Pest Management

IVR	Interactive Voice Response
KVK	Krishi Vigyan Kendra/ Agricultural Science Centre
LAPA	Local Adaptation Plan of Action
LG	Local Government
LI-BIRD	Local Initiatives for Biodiversity, Research and Development
LRP	Local Resource Person
MAIL	Ministry of Agriculture, Irrigation and Livestock
MCCSAP	Myanmar Climate Change Strategy and Action Plan
MOALI	Ministry of Agriculture, Livestock and Irrigation
NAPA	National Adaptation Programme of Action
NARC	National Agriculture Research Centre
NbS	Nature-based Solutions
NGO	Non-Governmental Organisation
PAR	Participatory Action Research
PMF	Performance Monitoring Framework
PPP	Public–Private Partnership
PRA	Participatory Rural Appraisal
Q&A	Question and Answer
QR	Quick Response (code)
RMV	Resilient Mountain Village
SAPCC	State Action Plans on Climate Change
SAU	State Agricultural University
SDG	Sustainable Development Goal
SMS	Short Message Service
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TU	Tribhuvan University
UK	United Kingdom
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
YAU	Yezin Agricultural University

SECTION 1

Introduction

1.1 Background

Climate change presents significant challenges to food security, destabilising food systems and endangering the livelihoods of farming households. The Hindu Kush Himalaya (HKH) region is among the most climate-vulnerable in the world, already experiencing severe impacts from climate variability and change – particularly in agriculture, which remains the primary employer of the rural workforce and a crucial contributor to national economies. In Nepal, for example, agriculture employs two-thirds of the population and accounts for over a quarter of the country's gross domestic product (GDP). Smallholder farmers, the backbone of this sector, are facing mounting challenges, including rising temperatures, erratic rainfall patterns, prolonged droughts, and an increasing frequency of extreme weather events.

The urgent need to transform food systems and enhance resilience to climate and other changes is well recognised across communities grappling with climate shocks. Climate-Resilient Agriculture (CRA) offers a practical approach to help farmers adapt, safeguard their livelihoods, and ensure food security across the region. CRA integrates Nature-based Solutions (NbS) such as, biological pest control and organic fertilisers, with modern innovations in agricultural extension services like digital agro-advisory services and climate forecasting. Together, these solutions aim to respond to the existing and emerging climatic and environmental challenges face by the agricultural sector, stabilise crop yields and secure farmers' incomes amid growing climate uncertainties.

Additionally, with the rampant outmigration of the male workforce, agriculture is undergoing a shift towards greater female labor participation. Addressing the feminisation of agriculture is essential, and Community Learning Centres (CLCs) can play a key role in this transition. By promoting labour-saving technologies, improving farm productivity, and fostering women's leadership in farm management, CLCs can empower female farmers while advancing sustainable agricultural practices.

The focus of the Green Resilient Agriculture Productive Ecosystems (GRAPE) project in Karnali and Sudurpashchim provinces was on developing and testing socially inclusive, climate-resilient agricultural technologies. Through 19 community learning centres, the project worked to empower local smallholder farmers by facilitating on-farm experiments and action research, enabling them to participate in and witness the effectiveness of CRA firsthand. It emphasized gender equality and equitable resource access, promoting gender-friendly tools and encouraging women's participation in digital services and collaborative research. Through participatory action research, the project tested over 40 climate-resilient agricultural

technologies and techniques at the CLCs, designed to foster resilience to climate change. These innovative, nature-based strategies address a range of issues, from soil degradation to plant pests and diseases. The project engaged more than 2,500 smallholder farmers, the majority of whom are women.

1.2 ICIMOD's role in promoting CLCs

The International Centre for Integrated Mountain Development (ICIMOD) through its partners has implemented several climate adaptation initiatives, which involve an array of good practices such as, combining technological innovations and traditional knowledge for climate-resilient food production systems, green entrepreneurship, revival of springs and integrated water management , and deployment of cleaner and greener energy solutions

One such initiative is ICIMOD's Resilient Mountain Village (RMV) approach that integrates CRA and simple and innovative resilience building solutions to deal with the impacts of climate change. This is based on a framework that combines the social, economic, and environmental pillars of sustainable development and incorporates dimensions of climate change adaptation, resilience, and preparedness for future risks to form an integrated and modular approach to resilience building. ICIMOD adopts the working definition of resilience as 'the ability of an individual, community, or a socio-ecological system to not only overcome stress, shock, or setback (recover or bounce back), but develop capabilities to move forward to a better state (bounce forward)' (Agrawal et al, 2023).

RMV focuses on presenting a menu of simple, affordable and scalable solutions to adjust, adapt and transform to a better state in case of any climatic and non-climatic shocks. The solutions include: training of extension agents for early diagnosis of crop health, use of bio-fertiliser and bio-pesticides, and efficient water management technologies; Information and Communication Technology (ICT)-based digital services for crop advisory, technology to help assess plant health (e.g. leaf colour test to assess organic matter in soil), and digital planning and solutions for local governments, crop condition monitoring, weather forecasts, market price information; community-based seed banks; and, product development and value chain strengthening, start-ups and entrepreneurship development, financial literacy and women empowerment.

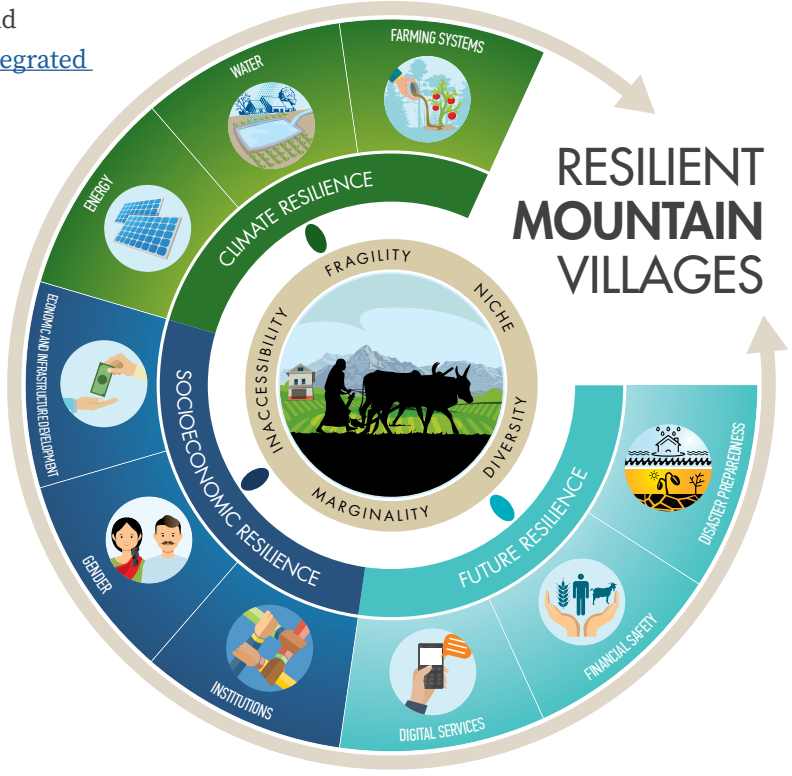


FIGURE 1: **THE RESILIENT MOUNTAIN SOLUTIONS FRAMEWORK SHOWING THE THREE DIMENSIONS OF RESILIENCE: CLIMATE, SOCIOECONOMIC, AND FUTURE RESILIENCE**

Source: ICIMOD

Later, under the GRAPE project, which was aimed at fostering climate-resilient and green economic growth of Sudurpashchim and Karnali provinces in western Nepal, the focus was on action research and the co-production of knowledge to foster climate-resilient food systems and enhanced digital access for farmers by establishing demonstration sites. Through this project we established 19 Community Learning Centres across the two provinces, building on our learning and experience from the RMVs, which was a multi-country project focused on improving resilience in the agricultural sector. Local governments have since adopted the CLC model into their development plans and budgets and upscaling it to other rural municipalities.

After the GRAPE project concluded, ICIMOD continued its work on CLCs through the Himalayan Resilience Enabling Action Programme (HI-REAP), beginning in 2023. Funded by the UK Government, HI-REAP has so far supported 19 CLCs across Bangladesh, Bhutan, and Nepal. To date, the programme has trained over 200 government and non-government stakeholders as well as 594 farmers (74% women) in these countries. HI-REAP's training and exposure initiatives have also had an amplifier effect – Civil Society Organisations (CSOs) in Nepal that availed these capacity enhancement opportunities have established an additional 60 CLCs to demonstrate climate-resilient and agroecological solutions.

Our experience from these projects has shown that co-creation of knowledge through collaborative action research with communities and nodal government agencies plays an important role in supporting evidence-based policy making and scaling up of solutions. This experience also reinforces the importance of translating knowledge into practice through piloting and demonstration of best practices, which also allows for identifying and addressing the risks faced by farmers in a timely manner. These solutions can be potentially customised, replicated, and scaled out across the diverse contexts and locations of the HKH.

1.3 Rationale for establishing community learning centres

Community-driven development has been proven effective in promoting sustainability, particularly in rural and resource-scarce settings (Ostrom, 1990; Uphoff, 2002); participatory and community-driven approaches enhance local knowledge exchange, encourage experimentation, and improve resilience strategies (Chambers, 2013; Altieri, 1995).

CLCs provide a participatory approach to disseminating climate-resilient agricultural techniques and promoting knowledge sharing among farmers, researchers, and policymakers (FAO, 2019; Pretty, 2002). By integrating traditional knowledge with scientific innovation, CLCs offer scalable solutions for climate-resilient agriculture that are responsive and grounded in lived experience. CLCs serve as decentralised hubs where farmers can test innovative farming techniques, access expert guidance, and collaborate on sustainable agricultural solutions. Participatory models such as Farmer Field Schools (FFS) and knowledge hubs in Africa and Latin America have demonstrated that locally driven learning mechanisms result in higher adoption rates of improved farming practices (Kiptot & Franzel, 2012). These lessons are highly relevant to the HKH region, where CLCs can be instrumental in bridging the knowledge gap between policymakers, researchers, and local communities.

Integrating traditional knowledge and modern science: Indigenous and traditional knowledge play a crucial role in climate adaptation and environmental sustainability. Many farming communities in the HKH region have developed climate-resilient practices over generations, such as crop diversification, integrated pest management, and water conservation techniques (Berkes, 2008). However, the integration of scientific research with traditional wisdom remains a challenge.

CLCs can serve as platforms for co-production of knowledge, where researchers validate traditional

farming techniques through scientific analysis, ensuring that local innovations are not lost but instead strengthened (Scoones & Thompson, 1994). Agroecological principles advocate for this fusion of Indigenous wisdom and empirical research, leading to more sustainable and adaptable farming systems (Gliessman, 2015).

In co-producing knowledge and advancing participatory research and learning, CLCs may help support and achieve the Education 2030 agenda to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'. It also aligns with the recommendation on Adult Learning and Education (UNESCO, 2015,) to 'expand equitable learning opportunities for youth and adults'.

Contributions to Sustainable Development Goals: Governments and international development organisations increasingly recognise the vital role of community-based learning initiatives in achieving several Sustainable Development Goals (SDGs):

Through these interconnected efforts, CLCs strengthen rural economies, enhance climate resilience, and equip communities with sustainable solutions for long-term development

Policy and institutional support for CLCs: The success of CLCs depends on supportive policies and institutional backing. Policies that promote participatory agricultural extension, farmer cooperatives, and knowledge-sharing networks can strengthen the institutional framework supporting CLCs (FAO, 2021). For example, in Nepal, the government has partnered with organisations like ICIMOD, Center for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED) and Local Initiatives for Biodiversity, Research and Development (LI-BIRD) to implement pilot projects on climate-resilient agriculture. These projects emphasise the need for long-term investments in capacity-building, infrastructure, and knowledge exchange to scale up successful CLC models (ICIMOD, 2020). Such efforts also highlight

FIGURE 2: **CLC'S CONTRIBUTIONS TO SUSTAINABLE DEVELOPMENT GOALS**

End poverty by enhancing agricultural productivity, value chains, and market access

Zero hunger through the promotion of indigenous crops, sustainable livestock management, and Climate-Smart Agriculture (CSA) technologies

Good health and well-being by reducing pesticide use, promoting diverse diets, and improving nutrition

Empower women through leadership opportunities, equitable resource access, and labour-saving technologies

Clean water and sanitation by fostering water-efficient irrigation and watershed management

Affordable and clean energy through energy-efficient tools and renewable energy adoption

Decent work and economic growth by expanding training, entrepreneurship, and market opportunities

Reduced Inequalities by empowering marginalised farmers

Responsible consumption and production through organic farming and sustainable land management

Climate Action by facilitate CSA practices that improve water efficiency, minimise pesticide residues, and promote sustainable land use

Life on land by advancing agroforestry, organic fertilisers, and soil conservation to restore ecosystems and biodiversity

the potential for CLCs to function as sustainable institutions that drive agricultural learning and innovation for the longer term.

This document serves as a guideline for the establishment and operation of CLCs in the HKH region by providing a structured framework especially towards making the CLCs contextually relevant, economically viable, and socially inclusive and for their successful implementation and long-term sustainability.

1.4 Objective of the guideline

The specific objectives of this guideline are to:

- Facilitate the establishment and sustainable operation of CLCs – provide step-by-step guidance on setting up and managing CLCs in diverse agroecological contexts, ensuring long-term sustainability and community ownership.
- Promote participatory learning and knowledge exchange – integrate traditional wisdom with scientific research, foster farmer-led innovation, and create platforms for peer-to-peer learning and skill development.
- Enhance climate resilience and sustainable agriculture – guide the adoption of CRA and NbS to improve soil health, water conservation, pest management, and overall farm productivity.
- Strengthen governance, institutional linkages, and market integration – define governance structures, stakeholder roles, and strategies for connecting farmers to markets, financial resources, and policy support to enhance economic viability.
- Ensure inclusivity and equitable participation – promote gender equality, social inclusion, and leadership opportunities for women, smallholder farmers, and marginalised communities, ensuring broad-based benefits.

By achieving these objectives, this guideline aims to make the CLCs effective knowledge hubs for farmers, practitioners, and extension workers, empowering farming communities to adopt sustainable solutions and build resilience against climate and economic challenges in the HKH region.

1.5 Users of the guideline

This guideline is intended for a wide range of stakeholders involved in establishing, managing, and scaling CLCs in the HKH region. It provides practical guidance for:

- Government agencies and policymakers – national, provincial, and local authorities responsible for agriculture, climate adaptation, and rural development can use this guideline to integrate CLCs into policies, extension programmes, and institutional frameworks.
- Agricultural education, research, and extension institutions – Universities, research centres, and extension services can apply the guideline to conduct participatory research, validate climate-resilient farming practices, and strengthen farmer-extension linkages.
- Non-Governmental Organisations (NGOs) and development partners – organisations working in sustainable agriculture, climate resilience, and rural development can use this guideline to design and implement CLC-based interventions, facilitate knowledge-sharing, and support capacity-building efforts.
- Farmer Cooperatives, Community-Based Organisations (CBOs), and Local Resource Persons (LRPs) – these groups and individuals play a key role in managing CLCs, disseminating knowledge, and ensuring community-led adoption of climate-resilient agricultural solutions.
- Private sector and market actors – agribusinesses, input suppliers, and value chain actors can collaborate with CLCs to promote sustainable farming, enhance market access, and support rural entrepreneurship.

SECTION 2

Integrated components of CLC

In tandem with the principles mentioned in the preceding section, this section explores the four key integrated components of CLCs:

1. Demonstrated solutions – showcasing practical, affordable, and climate-adaptive farming techniques, including proven technologies that could be important to specific sites.
2. Research trials and documentation – validating innovations and traditional practices through participatory research.
3. Information displays and interpretation – providing farmers with interactive, data-driven, and experiential learning opportunities, including the cost and procedure of using the technology.
4. Linkages with market, crop health, and climate advisory services – strengthening farmer-to-market relationships, real-time pest surveillance, and adaptive climate strategies.

By integrating these components, CLCs empower farming communities with the knowledge, tools, and networks necessary for sustainable agricultural transformation (FAO, 2021; Pretty, 2002). This approach strengthens rural economies, enhances climate resilience, and improves agricultural productivity across the HKH region and beyond (ICIMOD, 2020; FAO, 2019).

2.1. Demonstrated solutions: replicating and scaling climate-resilient agriculture

CLCs function as living laboratories, allowing farmers to observe, experiment, and adopt innovative yet practical climate-resilient agricultural solutions. These solutions are co-developed with farmers, ensuring affordability, gender responsiveness, and adaptability to local agroecological conditions (ICIMOD, 2024). Through hands-on trials and demonstrations, farmers gain firsthand experience before adopting new techniques, reinforcing the principle of 'seeing is believing' (GRAPE, 2024).

By integrating low-cost, affordable, simple, sustainable, and context-specific practices, CLCs empower farmers to enhance productivity, reduce environmental impacts, and improve climate resilience. The successful models are scaled through farmer-to-farmer exchanges, local extension networks, and digital advisory platforms (FAO, 2021).

This subsection highlights examples of a range of demonstrated CRA solutions. Although the list is not exhaustive, these solutions, or a subset of these solutions, could be considered while establishing the CLCs, based on the identified needs.

Soil fertility management and organic inputs

JHOLMAL BIO-FERTILISER AND BIO-PESTICIDE

Jholmal is a fermented liquid organic fertiliser and pest repellent, prepared using cow urine, plant extracts, and compost. It improves soil microbiota, enhances nutrient absorption, and suppresses insects and pests infestation, reducing dependency on synthetic fertilisers (GRAPE, 2024). Farmers using Jholmal report higher soil fertility, reduced pest infestations, and lower production costs, making it a cost-effective and eco-friendly alternative.

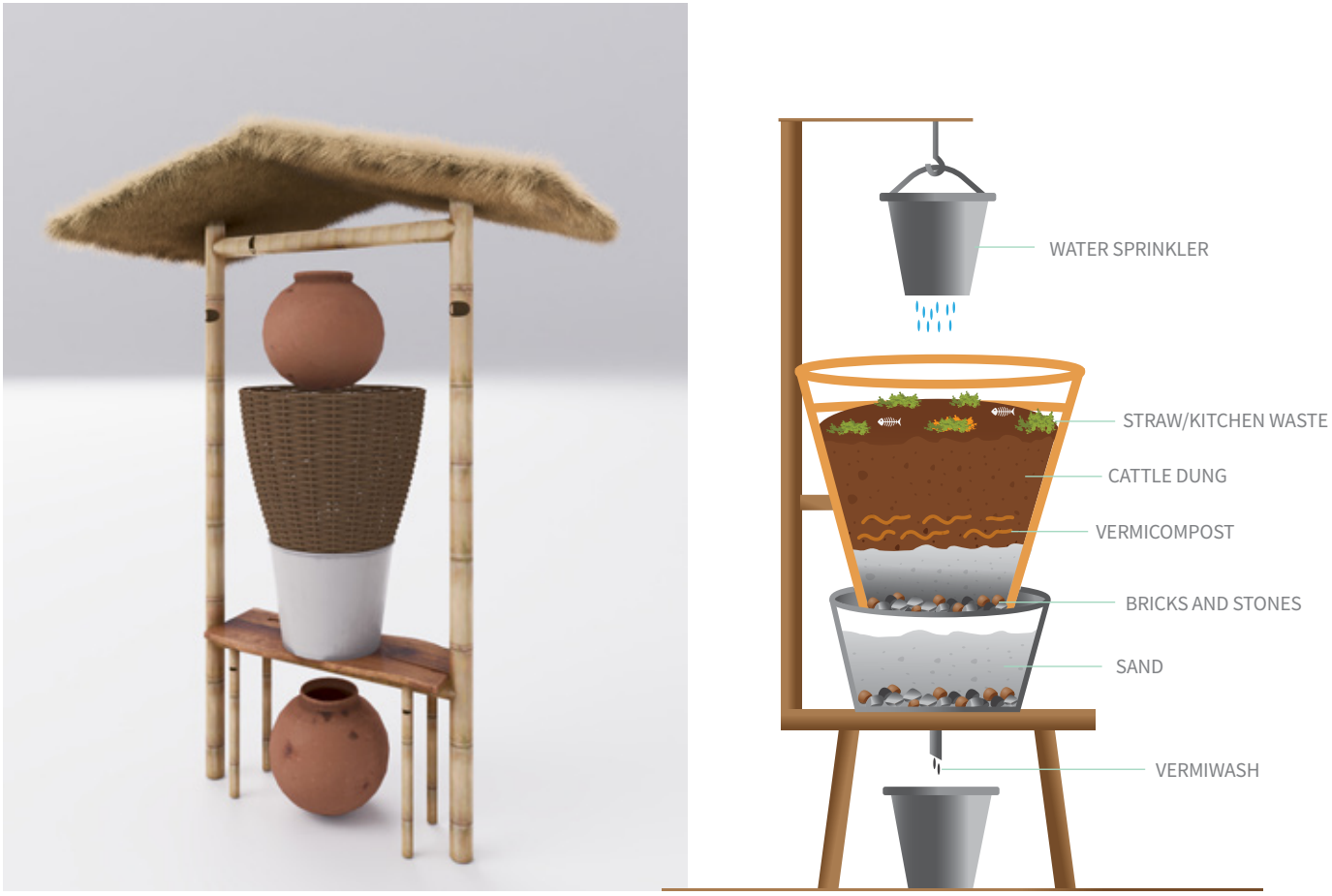
VERMICOMPOST AND VERMIWASH

Vermicompost and vermiwash, derived from earthworm composting, are organic fertilisers that enhance soil health and support sustainable agriculture (Altieri, 1995). Vermicompost improves soil aeration, water retention, and microbial diversity, while vermiwash, a liquid extract, boosts plant immunity when used as a foliar spray. ICIMOD's initiatives emphasise organic techniques to enhance soil fertility and climate resilience (ICIMOD, 2025). ICIMOD has promoted these practices through CLCs in Karnali and Sudurpashchim provinces of Nepal, showing their effectiveness in improving crop health and yield. Participatory research under the GRAPE project demonstrated that combining vermiwash with other organic inputs led to better plant growth and yields. This cost-effective, eco-friendly approach reduces farmers' reliance on chemical fertilisers and fosters sustainable farming.

FIGURE 2: **A MODEL OF A VERMICOMPOSTING SHED USING LOCAL MATERIALS**

Source: ICIMOD

FIGURE 3 & 4: **A MODEL OF A VERMIWASH SET UP AND A CROSS-SECTION SHOWING COMPONENTS AND MATERIAL.**



Source: ICIMOD

TRICHO-COMPOST

Tricho-compost is an organic fertiliser enriched with Trichoderma fungi, which suppresses soil-borne pathogens and enhances plant growth. In Nepal, the GRAPE project has promoted its use to improve soil health and reduce reliance on chemical inputs (GRAPE, 2023). Research suggests that combining Tricho-compost with vermiwash can effectively manage root-knot nematodes in crops like okra, leading to increased plant height, more branches, and higher yields (ICIMOD, 2023). These findings highlight Tricho-compost's role in fostering sustainable and climate-resilient agriculture.

BIOCHAR

Biochar, a carbon-rich soil amendment derived from biomass, improves moisture retention, nutrient efficiency, and carbon sequestration, enhancing soil structure and microbial life. This makes degraded lands more productive and resilient. Studies show that integrating biochar into smallholder farming systems can increase crop yields by 20–30% while reducing greenhouse gas emissions (FAO, 2019). ICIMOD's research, particularly through the GRAPE project in Nepal, has explored biochar's potential, demonstrating its role in improving soil structure, suppressing disease infection (rhizome rot) and supporting climate resilience and sustainable farming practices in mountain areas (ICIMOD, 2025).

MULCHING WITH ORGANIC WASTE

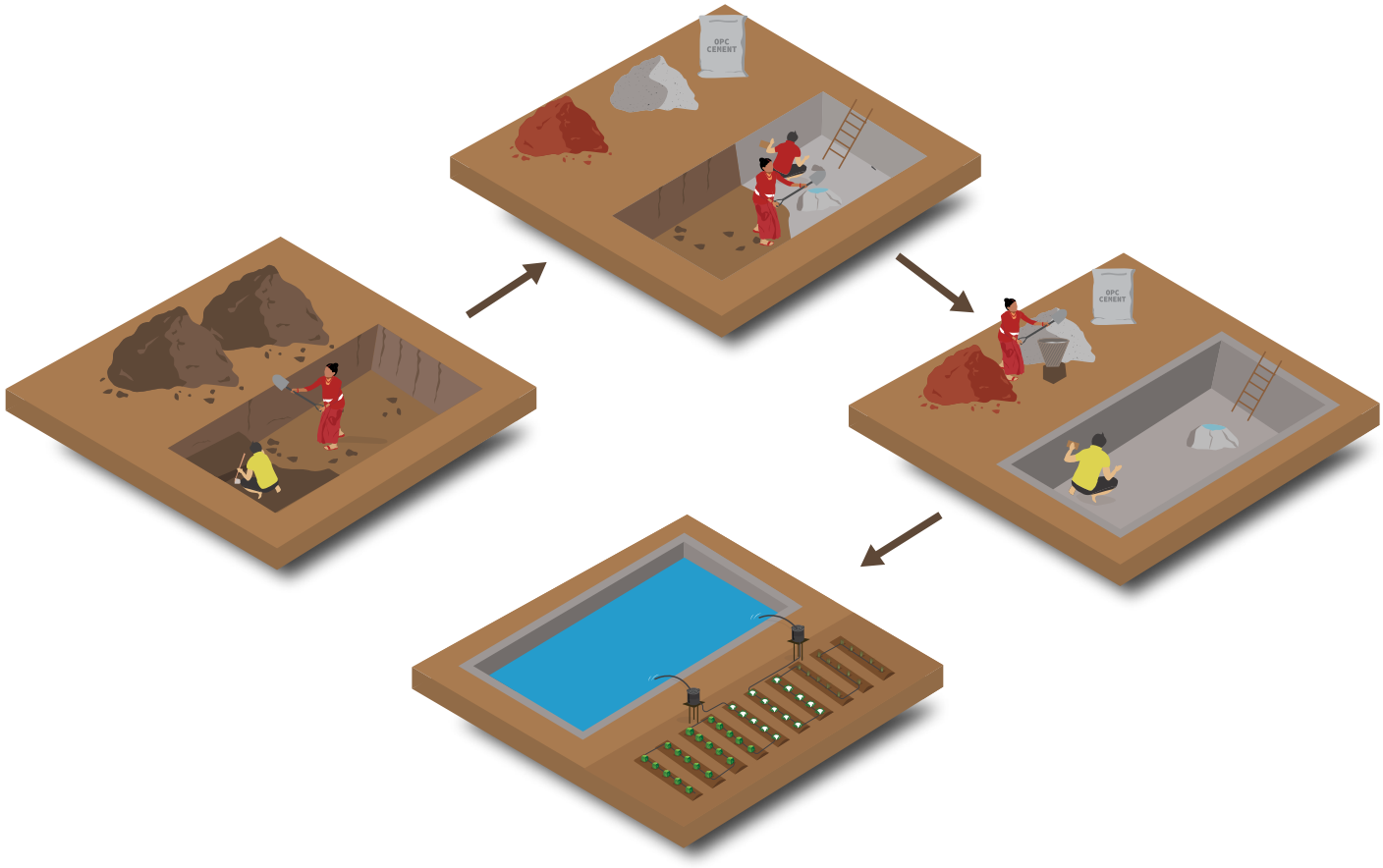
Mulching, which involves using crop residue, dried leaves, and agro-waste, conserves soil moisture, reduces erosion, suppresses weeds, and regulates soil temperature. This low-cost technique improves soil fertility and helps farmers adapt to erratic rainfall patterns (Pretty, 2002). ICIMOD's research, especially through the GRAPE project in Nepal, has demonstrated the effectiveness of mulching in enhancing soil health and water retention in the Himalayan region, helping smallholder farmers cope with climate variability and seasonal water stress (ICIMOD, 2025).

Water management and irrigation innovations

SOIL-CEMENT TANKS

Soil-cement tanks are semi-permanent, low-cost water storage structures made using red soil, cement, and sand. They collect rainwater and residual runoff, ensuring reliable irrigation and household water use in semi-arid and highland regions. These tanks have proven effective in improving water security in Nepalese hill farming systems (GRAPE, 2024).

FIGURE 5: **LOW-COST SOIL CEMENT TANKS CAN BE USED TO COLLECT RAINWATER AND RESIDUAL RUNOFF, ENSURING ACCESS TO RELIABLE IRRIGATION WATER DURING THE LEAN SEASON.**



Source: ICIMOD

DRIP IRRIGATION SYSTEMS

Drip irrigation delivers precise amounts of water directly to plant roots, reducing evaporation losses and ensuring efficient water utilisation. In drought-prone regions, this method minimises water wastage by up to 50% compared to conventional irrigation systems (ICIMOD, 2020). Adoption of low-cost drip irrigation kits in Nepal has enabled smallholder farmers to enhance productivity while conserving water resources. ICIMOD's initiatives, including the development of soil-cement tanks and drip irrigation systems, have proven popular among smallholder farmers due to their simplicity, affordability, and durability, significantly improving water storage and irrigation efficiency (ICIMOD, 2021). Similarly, the GRAPE project has supported farmers in adopting micro-irrigation technologies, to enhance agricultural productivity and climate resilience in Nepal's hill and mountain regions.

PLASTIC MULCHING AND RAINWATER HARVESTING PITS

Plastic mulch sheets reduce water evaporation and suppress weed growth, while rainwater harvesting pits store monsoon runoff, providing critical water during dry seasons (CGIAR, 2020). These techniques stabilise water availability, increase soil moisture retention, and improve year-round agricultural production. ICIMOD has demonstrated the use of plastic film technology to enhance soil moisture and temperature regulation, while its rainwater harvesting systems address water scarcity in hill regions. The GRAPE project also promotes these practices, helping farmers in Nepal adopt climate-resilient techniques to improve water management and agricultural productivity (ICIMOD, 2025). Women farmers ranked mulch sheets among the most beneficial CRA technologies since it significantly reduced the burden of provisioning irrigation water and weeding, both of which demand significant time and are physically exhausting.

Nature-based Solutions for pest and disease management

YELLOW STICKY TRAPS AND PHEROMONE LURES

Non-chemical pest control methods, such as yellow sticky traps and pheromone lures, are integral to Integrated Pest Management (IPM), effectively reducing pest populations without relying on chemical pesticides (FAO, 2019). ICIMOD supports these practices, promoting organic farming and IPM approaches to minimize chemical use while maintaining agricultural productivity. The GRAPE project through the CLCs has encouraged non-chemical pest management as climate-resilient agricultural practice to enhance sustainability of the agricultural sector and reduce adverse impacts on the environment.

BOTANICAL PESTICIDES (NEEM EXTRACTS, GARLIC-CHILI SPRAYS)

Botanical pesticides, such as neem oil, garlic-chili sprays, and plant-based decoctions, offer effective pest control while preserving beneficial insects. Neem extracts, known for their antifungal, antibacterial, and insect-repelling properties, are especially effective for organic vegetable farming, making them a preferred alternative to synthetic chemicals. Unlike conventional pesticides, these biodegradable solutions pose no risk to soil health or water quality (Altieri & Toledo, 2011). ICIMOD has promoted the use of neem and other plant-based biopesticides in integrated pest management, showcasing their effectiveness in sustainable farming practices. Additionally, the GRAPE project has supported the adoption of botanical pesticides, encouraging environmentally friendly pest management approaches that enhance agricultural productivity and resilience in Nepal (ICIMOD, 2025).

PUSH-PULL TECHNOLOGY

The push-pull farming system uses companion planting to manage pests by intercropping maize with Desmodium (a repellent) and bordering it with Napier grass (a trap crop). Originally developed to control infestation by fall armyworm, this method is now adapted for vegetables and pulses, reducing pest damage (FAO, 2021). ICIMOD promotes this approach in Nepal, highlighting its effectiveness in pest control and increased agricultural productivity. The GRAPE project has also promoted the use of push-pull farming system as a climate-resilient practice, enhancing food security and farmers' livelihoods in Nepal's hilly regions, which could be suitable to similar contexts in other HKH countries (ICIMOD, 2025).

Climate-resilient cropping systems

INTERCROPPING OF LEGUMES AND CEREALS

Intercropping nitrogen-fixing legumes with cereals enhances soil fertility, suppresses weeds, and reduces pest outbreaks. Farmers practicing maize-bean intercropping report 30% higher yields than monocropping systems, improving food security and sustainability (Berkes, 2008). ICIMOD has documented the practice of intercropping nitrogen-fixing plants with cereals, highlighting its benefits for soil health and productivity. Similarly, the GRAPE project has promoted such sustainable agricultural practices in Nepal's hilly regions, aiming to strengthen climate-resilient value chains and improve livelihoods. This practice could be promoted through CLCs in other HKH countries as well.

SHORT-DURATION, DROUGHT-TOLERANT CROP VARIETIES

Climate change disrupts traditional cropping patterns, making the adoption of resilient crop varieties essential. Short-duration, drought-resistant crops like millet, sorghum, and climate-adaptive rice varieties require less water and have shorter growing cycles, enhancing smallholder farmers' resilience to erratic rainfall and temperature shifts (CGIAR, 2020). ICIMOD has been promoting climate-resilient traditional crop varieties, such as millets, to help farmers adapt to changing climatic conditions.

2.2 Research trials and documentation: bridging science and traditional knowledge, advancing participatory knowledge generation

Integrating scientific research and traditional wisdom

CLCs function as collaborative research hubs, where farmers, researchers, and extension workers co-create and validate context-specific, climate-resilient and nature-based agricultural innovations. Participatory action research (PAR) is central to this process, ensuring that scientific advancements complement traditional farming wisdom. By testing, refining, and documenting new techniques through on-farm experimentation, CLCs enhance farmer confidence, technology adoption, and policy engagement (Chambers, 2013; Berkes, 2008). By conducting on-farm trials, refining techniques, and documenting findings, CLCs empower farmers with evidence-based solutions while fostering greater technology adoption and policy engagement (ICIMOD, 2024; FAO, 2021).

CLCs facilitate farmer-led research, strengthening local knowledge systems while ensuring that evidence-based practices reach policymakers, extension services, and agricultural training institutions. This integration is critical for scaling successful models, securing institutional support, and ensuring sustainable agricultural transformation (CGIAR, 2020, FAO, 2021).

FIGURE 6: **PARTICIPATORY ACTION RESEARCH IS AT THE VERY HEART OF THE COMMUNITY LEARNING CENTRE**

Source: ICIMOD

Research activities at CLCs: integrating trials, comparative research, and citizen science

CLCs should be considered as a site that help implement a range of research activities to validate, refine, and scale climate-resilient agricultural practices. These activities ensure that both traditional and modern farming techniques are tested, documented, and widely shared for farmer adoption and policy development.

ON-SITE ADAPTIVE TRIALS

Adaptive trials at CLCs allow farmers to experiment with new seed varieties, organic soil amendments, and agroecological practices under real farm conditions. These trials test:

- Climate resistant (drought- and flood-resistant) crop varieties to improve climate resilience (ICIMOD, 2024).

- Organic soil amendments such as compost, vermiwash, and biochar to enhance soil fertility and moisture retention (Altieri & Toledo, 2011).
- Agroecological practices like mixed-cropping and intercropping models, which boost biodiversity and reduce pest pressure, including methods like push-pull farming and integrated pest management (CGIAR, 2020, GRAPE, 2024).

These trials help farmers transition to sustainable practices that offer proven ecological and economic benefits, reinforcing the idea of 'seeing is believing'. In trials supported by ICIMOD in Nepal and India, improved wheat and barley varieties demonstrated higher resilience to extreme weather conditions, with enhanced germination rates, pest resistance, and adaptability (ICIMOD, 2020). By observing the direct impact of these interventions, farmers gain confidence in adopting successful practices, while researchers collect valuable field data to refine future recommendations.

COMPARATIVE RESEARCH

At CLCs, farmers engage in side-by-side comparisons of different cropping techniques, allowing for real-time assessment of their effectiveness. Comparative trials assess the effectiveness of traditional vs. modern farming techniques to ensure that new interventions truly benefit smallholder farmers. CLCs help conduct side-by-side evaluations of:

- Synthetic vs. organic fertilisers: comparing yield differences, soil health impacts, and economic returns. In Nepal, such trials showed a 20% increase in yields using biofertilisers over synthetic inputs (FAO, 2021).
- Monoculture vs. diversified cropping systems: analysing pest resistance, soil health, and productivity. Findings suggest that integrated cropping models reduce disease outbreaks and increase resilience (Pretty, 2002).
- Traditional vs. hybrid seed varieties: assessing drought tolerance, nutritional value, and input requirements to support seed sovereignty and food security (ICIMOD, 2020).

By quantifying the benefits of sustainable alternatives, comparative research helps farmers make informed decisions while strengthening evidence-based policymaking.

FARMER-LED CITIZEN SCIENCE

The citizen science approach empowers farmers to actively participate in data collection and knowledge generation through structured monitoring and digital tools. Key activities that could be considered at CLCs include:

- **Soil health monitoring:** farmers track soil organic matter, pH levels, and moisture retention to evaluate fertility trends. They also analyse soil microbial diversity to optimize composting and reduce chemical dependency, promoting regenerative agriculture (CGIAR, 2020).
- **Pest and disease surveillance:** farmers document pest outbreaks and disease patterns in real-time, enabling early interventions and biological pest control trials. This approach could inform low-cost, chemical-free alternatives to traditional pest control methods and reduce pesticide overuse (FAO, 2019). Additionally, it could help research institutions and government line agencies with information on the occurrence and spread of pests and pathogens, enabling tracking and response in real time.
- **Climate pattern monitoring:** farmers record rainfall, temperature fluctuations, and extreme weather impacts to inform climate adaptation strategies, helping them better prepare for climate-induced changes (Meinzen-Dick et al., 2019). While the network of weather stations provide reliable, long-term data, monitoring by farmers at CLCs expands this network to multiple sites and habitats, enabling a nuanced understanding of climate change patterns.

- **Women-led research:** women farmers play a crucial role in agroforestry trials, integrating tree-crop-livestock systems to enhance food security and biodiversity. These studies focus on identifying multipurpose tree species that provide fodder, fuel, and soil enrichment, supporting gender-inclusive agroforestry and improving household nutrition and income (Meinzen-Dick et al., 2019). Similarly, in the CLCs, it also enables women to prioritise their needs in research and interventions.

This participatory approach not only improves farm management but also generates grassroots data that contributes to research institutions and policymaking.

Impact of research trials on policy and knowledge dissemination

This structured approach ensures that lessons learned at CLCs inform broader agricultural strategies, supporting farmer resilience and sustainable food systems (FAO, 2021). By integrating scientific research with farmer-led experimentation, CLCs create adaptive, knowledge-driven agricultural systems. Participatory action research ensures that new technologies align with local contexts, build farmer confidence, and contribute to policy transformation. Through on-farm trials, comparative research, and citizen science, CLCs generate practical solutions for climate-resilient farming while strengthening rural innovation networks (ICIMOD, 2024). The success of research trials at CLCs depends on continued collaboration between farmers, researchers, and policymakers, ensuring that locally tested solutions can be scaled regionally and nationally. This farmer-first approach to agricultural research is critical for ensuring food security, environmental sustainability, and economic resilience in vulnerable farming communities (FAO, 2021).

STRENGTHENING EVIDENCE-BASED POLICY MAKING

- Research findings at CLCs contribute to national agricultural policy discussions, ensuring farmer-led innovation is integrated into extension programmes (ICIMOD, 2024).
- By validating sustainable farming approaches through real-world trials, CLCs support advocacy for organic certification, climate adaptation funds, and farmer incentives.

SCALING INNOVATIONS THROUGH DOCUMENTATION AND KNOWLEDGE SHARING

All research conducted at CLCs is systematically documented and shared through:

- **Community workshops and field days:** showcasing trial results to farmers and extension workers. Farmers and local resource persons also interpret the CLC and its CRA solutions during site visits by farmer groups and other local development organisations.
- **Policy briefs and reports:** translating research into actionable insights for policymakers. Such briefs could emerge from participatory research findings and also acknowledge the role of citizen scientists.
- **Digital knowledge platforms:** leveraging mobile apps, online databases, and SMS alerts to distribute findings widely (CGIAR, 2020).

2.3 Information displays and interpretation: enhancing learning and accessibility

The role of CLCs as knowledge hubs

A fundamental function of the CLC is to serve as an interactive knowledge dissemination platform, ensuring farmers have access to, interpret, and apply relevant agricultural information. By combining traditional learning methods with digital innovations, CLCs bridge the information gap for

farmers of diverse literacy levels, technological access, and geographic locations (Pretty, 2002).

Through demonstrations, interactive training, and digital outreach, CLCs create an inclusive learning environment that empowers farmers with real-time agronomic advice, weather forecasts, pest control strategies, and market intelligence (FAO, 2021). These multi-channel learning approaches help farmers adapt to climate change, improve productivity, and access better market opportunities.

Key learning mechanisms at CLCs

DEMONSTRATION PLOTS AND LEARNING STATIONS FOR HANDS-ON TRAINING

- Demonstration plots provide farmers with real-world comparisons of traditional and modern climate-resilient farming techniques, enabling hands-on learning and informed decision-making (GRAPE, 2024).
- Expert-led sessions and live demonstrations help farmers understand and apply sustainable practices such as organic pest control, drought-tolerant crops, composting, bio-fertiliser production, and precision irrigation.
- Participatory field trials and seasonal training sessions allow farmers to experiment with different soil management, irrigation, and pest control strategies, aligning learning with planting and harvesting cycles.
- Hands-on engagement builds farmer confidence, reduces risks associated with adopting new techniques, and ensures the long-term success of climate-resilient agricultural innovations.

FIGURE 7: **BY INTEGRATING SCIENTIFIC RESEARCH WITH FARMER-LED EXPERIMENTATION, CLCS CREATE ADAPTIVE, KNOWLEDGE-DRIVEN AGRICULTURAL SYSTEMS.**

Artwork: Sujana Singh

INTERACTIVE COMMUNITY ENGAGEMENT

- CLCs organise interactive forums, where farmers discuss challenges, exchange ideas, and propose solutions collectively.
- Participatory learning events include role-playing exercises, storytelling, and case study discussions, making technical knowledge more relatable and easier to apply.
- Local agricultural fairs and farmer innovation contests showcase success stories and incentivise creative problem-solving in agriculture.

DIGITAL LEARNING PLATFORMS

- Digital advisory tools, including SMS alerts, mobile apps, and Geographic information system (GIS) tools, provide farmers with real-time weather forecasts, pest outbreak warnings, agronomic guidance, and market price updates, enabling informed decision-making (FAO, 2019; CGIAR, 2020).
- Artificial Intelligence (AI)-driven mobile applications assist in pest and disease identification, soil analysis, and customised farm management recommendations, reducing the risk of infestation and yield losses.
- Interactive platforms like WhatsApp and Telegram facilitate community discussions, expert Q&A sessions, and peer-to-peer knowledge sharing, strengthening farmer networks and collective problem-solving.

COMMUNITY RADIO AND VIDEO-BASED TRAINING

- CLCs collaborate with local FM stations to broadcast pest outbreak alerts, climate advisories, and extension training schedules, ensuring timely and widespread knowledge sharing (ICIMOD, 2020).
- Video-based training modules provide visual step-by-step guides on sustainable farming practices, making learning accessible to low-literacy farmers.
- Farmers in remote areas benefit from audio podcasts and interactive voice response (IVR) systems, ensuring that those without smartphones still receive critical agricultural updates.

FARMER FIELD SCHOOLS AND EXTENSION TRAININGS

- CLCs can organise FFS to provide hands-on training on sustainable agricultural techniques such as soil health management, crop diversification, and Integrated Pest Management (Waddington et al., 2014).
- Practical workshops are held on topics such as climate adaptation strategies, market integration, and value chain development, ensuring that farmers receive skills-based, experiential learning.
- Extension services collaborate with universities and research institutions, ensuring that scientific research reaches farmers in a practical, understandable format.

FIGURE 8: **FARMER FIELD SCHOOLS AND EXTENSION TRAININGS PROVIDE HANDS-ON EXPERIENCE IN CLIMATE-RESILIENT SOLUTIONS.**

Artwork: Sujana Singh

CROSS-LEARNING VISITS TO OTHER CLCs

- Farmers participate in exchange programmes where they visit successful CLCs and progressive farms, observing and replicating best practices (FAO, 2019).
- These visits enhance peer-to-peer learning, allowing farmers to gain confidence in new techniques through firsthand experiences.
- Multi-stakeholder learning events bring together farmers, agribusinesses, and policymakers, fostering co-learning and market connections.

Impact of information displays and interpretation on farmer decision-making

CLCs serve as vital knowledge hubs, ensuring equitable access to agricultural information for farmers of all literacy levels and technological capacities. By integrating visual demonstrations, digital tools, community engagement, and FFS, they enhance learning, decision-making, and the adoption of sustainable practices (FAO, 2021). Through interactive training and real-time advisory services, CLCs effectively disseminate climate-resilient techniques, enabling data-driven, sustainable farm management. This holistic approach bridges the extension gap, fosters rural innovation, and strengthens climate-resilient agriculture in vulnerable regions (ICIMOD, 2024).

STRENGTHENING CLIMATE RESILIENCE

- Real-time weather updates help farmers adjust planting schedules, irrigation plans, and pest management strategies, reducing climate-related risks.
- Access to drought-tolerant seed varieties and water-saving techniques ensures greater adaptability to unpredictable rainfall patterns.

IMPROVING FARM PRODUCTIVITY AND MARKET ACCESS

- Knowledge-sharing networks enhance access to better-quality seeds, organic fertilisers, and improved farming tools.
- Market price updates and value chain training sessions empower farmers to negotiate fair prices and reduce post-harvest losses.

BRIDGING THE DIGITAL DIVIDE

- By combining traditional face-to-face learning with modern digital tools, CLCs ensure equitable access to agricultural knowledge for both tech-savvy and resource-limited farmers.
- Low-cost mobile advisory services enable real-time guidance, ensuring that farmers receive expert support regardless of location.

2.4 Linking with market, crop health, and climate advisory services

A key objective of CLCs is to enhance the commercial viability of sustainable agricultural practices by improving market connections, pest and disease surveillance, and climate adaptation services.

MARKET LINKAGES

CLCs can enhance the commercial viability of sustainable farming practices by establishing strong market connections and providing necessary support services. Key strategies may include:

- Farmer-to-consumer models: CLCs promote cooperative-led aggregation and digital trading platforms, facilitating direct sales from farmers to consumers. This ensures fair pricing, minimizes post-harvest losses, and promotes transparency.
- Strengthening agri-business networks: By connecting farmers with agrovets, input

suppliers, and processing industries, CLCs strengthen rural agri-business models, ensuring timely access to inputs and fostering long-term economic resilience.

- Contract farming and value chains: CLCs encourage partnerships through contract farming, linking farmers with processors and exporters to ensure stable markets, fair pricing, and reduced post-harvest losses (FAO, 2019). This model is particularly effective in providing premium pricing for high-value crops like coffee, cardamom, and medicinal herbs (ICIMOD, 2024).
- Cooperative-based bulk marketing: By aggregating produce, farmers collectively sell to traders, ensuring fair prices and mitigating price volatility (ICIMOD, 2024). It also helps improve their collective bargaining power and mitigates distress sale by individual farmers.
- Climate-smart storage solutions: Solar-powered cold storage facilities and climate-resilient warehouses help reduce post-harvest losses and extend the shelf life of perishable crops, ensuring year-round market supply (CGIAR, 2020).
- Reduce post-harvest loss: Integrate technologies that showcase efficient post harvesting handling of the produce along with the transportation solutions.

These market linkages, supported by climate-resilient storage and strategic partnerships, strengthen rural economies, enhance market access, and promote sustainability in the agricultural sector (FAO, 2021; CGIAR, 2020).

FIGURE 9: **A CLC CAN IMPROVE RETURNS FOR FARMERS BY ESTABLISHING STRONG MARKET CONNECTIONS AND PROVIDING NECESSARY SUPPORT SERVICES**

Artwork: Sujana Singh

Crop health services

CLCs enhance crop protection through a combination of early warning systems, on-site diagnosis, and sustainable pest management solutions. Key components include:

- **Early warning systems:** CLCs establish farmer field monitoring networks that provide real-time alerts for pest and disease outbreaks, enabling timely responses and minimizing crop damage.
- **Pest surveillance networks:** Community-based pest monitoring networks track outbreaks using mobile apps, facilitating early intervention and reducing the need for pesticide use (FAO, 2021).
- **On-site diagnosis and bio-control:** In collaboration with agronomists and extension services, CLCs offer on-the-ground pest control solutions and bio-based alternatives, promoting sustainable crop protection without relying on chemical pesticides.

These integrated services not only improve pest management but also contribute to healthier crops and more sustainable farming practices.

Services for Managing Climate Risks

CLCs provide comprehensive climate advisory services to help farmers adapt to changing weather patterns and climate-induced challenges. Key services may include:

- **Seasonal forecasting and climate adaptation:** CLCs deliver seasonal weather forecasts and climate adaptation training using data from ICIMOD, Food and Agriculture Organization (FAO), and national meteorological services to help farmers prepare for erratic and shifting weather conditions.
- **Disaster preparedness training:** CLCs offer training to help farmers respond to extreme weather events like floods, droughts, and unpredictable weather, improving their resilience to climate-related shocks.
- **Climate-resilient seed banks:** CLCs promote the use of drought-resistant and locally adapted seed varieties to help farmers cope with climate uncertainties and improve productivity.
- **Weather forecasting alerts:** In collaboration with meteorological services, CLCs can send localised SMS alerts on weather patterns, enabling farmers to adjust planting and irrigation schedules based on real-time data (ICIMOD, 2020).
- **Crop and livestock insurance:** In collaboration with government agencies, insurance companies and development partners, CLCs can also sensitise on adopting crop and livestock insurance.

These services enhance farmers' ability to manage climate risks and ensure sustainable agricultural practices in the face of changing environmental conditions.

By integrating market access, pest surveillance, and climate adaptation strategies, CLCs strengthen rural livelihoods and food security (FAO, 2021; CGIAR, 2020) and act as catalysts for rural transformation. These services enhance market participation, reduce climate-related risks, and build farmer resilience (Joshi et al., 2019). CLCs go beyond traditional agricultural extension services by combining knowledge-based, market-integrated, and climate-resilient farming systems. Through a community-driven approach, they equip farmers with the knowledge, tools, and market access necessary for long-term agricultural sustainability and resilience (FAO, 2021; ICIMOD, 2020). Their success relies on continuous co-design with farmers, multi-stakeholder collaboration, and sustained policy support (FAO, 2021; ICIMOD, 2024), ultimately fostering innovation, improving food security, and promoting sustainable farming practices across regions.

BOX 1: **BHERIGANGA CLC: A MODEL OF SUSTAINABILITY**

In the village of Sadhikhola in Surkhet district, Nepal, the story of Chandra Bahadur Gharti Chettri and Tek Bahadur Gharti Chettri stands as a testament to the transformative power of sustainable agriculture. Once migrant labourers in India, the brothers returned to their homeland with a vision to reclaim their dignity and rebuild their lives through farming.

When the Gharti Chettri brothers first returned to Nepal, they relied on synthetic pesticides, unaware of the harm they caused to both their health and the environment. Frequent illnesses and financial strain pushed them to seek alternatives. Through GRAPE project, they were introduced to climate-resilient, nature-positive farming techniques. Embracing organic methods, they reduced chemical pesticide use by 85%, significantly improving their income, family health, and access to education for their children. “The first year was challenging, but over time, we witnessed the benefits,” shared Chandra.

Their farm became a hub of innovation when they established a CLC. The CLC showcases sustainable practices such as vermi-wash, drip irrigation, and biochar production, serving as a dynamic space for knowledge exchange. Visitors from neighbouring communities and districts come to learn and adopt these techniques, creating a ripple effect of sustainable agriculture across the region. Managed entirely by the Gharti brothers and their community, the CLC has empowered them to take ownership of their interventions, improving their decision-making power and fostering pride in their work.

The impact of their efforts extends far beyond their farm. By sharing their knowledge and experiences, the Gharti brothers have inspired countless farmers to transition to organic practices. Chandra provides training and orientation to university students and other stakeholders about his work and actively advocates for sustainable farming, while their CLC continues to attract visitors eager to learn. Their success has not only improved their own livelihoods but has also strengthened the resilience of their community against climate change and economic challenges.

The Gharti brothers’ journey is a powerful example of how sustainable agriculture can restore dignity, prosperity, and hope. Through their dedication and innovation, they have transformed their lives and ignited a movement toward regenerative farming in Karnali. They proudly said, “When we farm our own land, we work with pride and dignity. This is the life we always wanted.” Their story is a beacon of hope, demonstrating the profound impact of local commitment and sustainable practices in building a brighter future for rural communities.

SECTION 3

Process of establishment of CLC

This section focuses on the process and critical decisions that are necessary for establishing a CLC and the steps required to design and establish one that is in tune with specific local needs and conditions. This is not meant to be exhaustive, nor prescriptive, but offers a general guiding framework that could be adapted and revised in the diverse agroecological and socioeconomic contexts of the HKH. Our intention is that it remains a living document that could be revisited, improved and enriched by learning, and further adapted to changing conditions and needs, thereby continuing to serve the needs of mountain farmers in a time of rapid climate and environmental change.

INITIAL PLANNING AND ASSESSMENT

- Site selection
- Surveys
- Focus group discussion
- SWOT and vulnerability risk assessment

IDENTIFY NEEDS AND DEVELOP PLANS

- Selection of lead farmer
- Budget plan to test and demonstrate of CRA solutions
- Timeline development

ESTABLISHMENT OF LEARNING CENTRE

- Selection of lead farmer
- Budget plan to test and demonstrate of CRA solutions
- Timeline development

MONITORING AND EVALUATION

- Cross-learning visits
- Feedback collection from visitors
- Linkage between academic institutions and CLC
- Necessary amendments

SCALING UP THE CLC

- Learning and sharing workshops
- Documentation of success stories
- Integration of CLC in local, provincial, and national plans

3.1 Establishment phase

3.1.1 Community and multistakeholder consultations

Conduct consultations with local communities, local government (LG), provincial ministries and district/sub-district offices, CBOs, and other stakeholders. Build consensus on the need for a CLC, its objectives, and stakeholder roles.

A transect or observatory walk is useful to understand the natural resources, topography, Indigenous technology, soils and vegetation, farming practices, problems and opportunities in the target site. This could follow a predetermined course, cross country or covering the area, to observe and record different features and resources along a transect line. It helps identify key issues, changes, and patterns in the landscape and resource availability and distribution.

A seasonal diagram could be used for obtaining information on precipitation patterns, employment, income/expenditure, diseases, livestock, production, seasonal migration and workforce availability, cropping patterns and diversity, among others. A visual representation of the seasons and their associated activities, events, and problems can help identify seasonal vulnerabilities and plan accordingly.

Each region is different, and this diversity is even more striking across the sharp elevational gradients of the HKH. Therefore, all projects aiming to establish CLCs must necessarily start with a detailed analysis of the local context – its ecosystems, soil types, weather, market access, farming practices, demography, and socioeconomic conditions. Our approach to establishing these community learning centres recognises and underlines the need for context-specificity. This means working closely with local farmers to understand the local realities. This not only grounds the intervention and makes it responsive to local needs and aspirations, but also builds trust with local stakeholders, therefore increasing their willingness to test and adopt CRA solutions.

3.1.2 Site selection and feasibility assessment

Hold discussions with LGs, provincial ministries and district/sub-district offices to explore suitable sites based on accessibility, potential for regular monitoring, and active farmer involvement. Conduct field visits with LG agricultural units to assess feasibility, considering risk-bearing capacity and leadership potential of farmers for community-wide adoption of low-cost technologies.

The CLC could be set up on community land (commons), private land, or government land or other public land (such as schools and colleges). In case of the latter options, the relevant line agency would have to sanction the setting up of a CLC and budget for it. However, issues of sustainability and everyday management may crop up, as officials are transferred, or government funding priorities shift, or flagship programmes come to an end. If it is the former, this could be one or more farmer featuring solutions on their land, it ensures stewardship and security of the CLC but will require policy support. There are inherent risks here too, for instance if there is a change in community dynamics, or disagreement within the community or farmers' group. However, from our experience, communities and farmer groups are more invested in CLCs on community or private land since they have a say in everyday management decisions. They can decide on featuring or testing new solutions, contour the research agenda, and explore partnerships with other agencies without going through any formal government approvals process. In any case, it is important to carefully weigh the pros and cons of each option for long-term sustainability.

FIGURE 10: **COMMUNITY AND MULTISTAKEHOLDER CONSULTATIONS CAN HELP BUILD CONSENSUS ON THE NEED FOR A CLC, ITS OBJECTIVES, AND STAKEHOLDER ROLES.**

Artwork: Sujana Singh

3.1.3 Formation of CLC group, clarifying ownership and stakeholder roles

Identify a farmer-led group responsible for managing and sustaining the CLC. Allow the group to decide on the ownership model, ensuring inclusivity and sustainability.

The role of other actors needs to be discussed and clarified at this stage. The stakeholder institutions, both public and private, for support such as research, and other service providers such as those providing market or climate services, local government departments, etc., need to be brought on board to discuss the implementation modalities and define their roles and contributions where relevant. This early engagement and agreement are important elements that will enable institutionalisation, leverage support from local government, and ensure the sustainability of the CLC.

Hold consultations with local stakeholders, including farmer groups, community forestry user groups, government line departments (agriculture, livestock, horticulture, fisheries), Non-Governmental Organisation (NGOs), and others. During these consultations, present the CLC concept and approach and seek feedback and collaboration. Explore areas of alignment or conflict that could support or hinder the establishment and success of the CLC.

FIGURE 11: **STRUCTURED AND SEMI-STRUCTURED SURVEYS WITH FARMERS, LOCAL RESOURCE PERSONS, AND OTHER STAKEHOLDERS TO DOCUMENT PRE-EXISTING CONDITIONS AND EXPECTATIONS.**

Artwork: Sujana Singh

3.1.4 Climate change impact analysis, adaptation planning, and CRA solutions selection

Conduct a Climate Vulnerability and Capacity Analysis (CVCA) to identify major climate risks affecting local agriculture. Develop a Community Adaptation Plan, prioritising solutions that address climate risks while considering budget and stakeholder involvement.

Facilitators (NGO/local resource person) should work closely with the communities to co-evaluate the context for which the CLC is being designed, including the key issues to be addressed, the mix of CRA solutions to be incorporated into the design, the existing government programmes and services that this could build on, and the timeline for implementation. The design also needs to consider mechanisms for implementation and everyday management. In our experience, the CLC has been managed mostly by farmer groups, in some cases all women groups, but this may vary depending on the context.

Work with local communities to design, conduct and interpret a baseline survey and/or context analysis covering both biophysical and socio-economic conditions in the target area, including the assessment of cultural practices and norms that might hinder or facilitate the uptake of CRA solutions, and participation by women or certain disadvantaged ethnic or caste groups.

Various participatory methods could be used for data collection to ensure active community involvement. These methods must go beyond traditional surveys and engage community members

as co-researchers. Organise workshops and meetings where community members can share their insights, experiences, and perspectives on specific topics, especially their experience of climate impacts on agriculture, and specifically on issues related to crop pests, water, soil fertility and other issues. Facilitate open discussions to gather qualitative information and identify community priorities. This will enable discussion around and selection of the CRA technologies and solutions to be featured.

Conduct focus group discussions (FGDs) with homogeneous or mixed groups to explore specific issues or themes related to climate impacts on agriculture. Encourage participants to share their opinions, experiences, and ideas in a group setting. Ensure that women and marginalised groups have a say in these group discussions. This may not be easy in some settings, so it is important to conduct individual or group interviews to collect in-depth information from them. Lastly, use participatory mapping to visually represent spatial information, such as resource locations, land use, land cover, or community infrastructure. Engage community members in drawing maps to convey their resource landscape and their understanding of change.

FIGURE 12: **IT IS IMPORTANT TO HAVE CONSULTATIONS WITH DIVERSE STAKEHOLDERS ON THEIR RESPECTIVE ROLES AND RESPONSIBILITIES.**

Artwork: Sujana Singh

3.1.5 Capacity building and farmer leadership development

Train the designated CLC owner or lead farmer as a local expert in CRA technologies and NbS. Organise regular training sessions, technical backstopping, and exposure visits for farmers to enhance knowledge dissemination. Conduct on-site training for nearby community members, ensuring that the CLC serves as a practical learning centre.

To enhance information sharing and knowledge dissemination onsite, install display boards explaining demonstrated technologies, their applications, processes, and associated costs.

Integrate a QR code linking to detailed process documentation for easy access to additional information.

3.1.6 Institutional collaboration, leverage, and sustainability

Establish tie-ups with government offices, research institutions, and academic organisations for ongoing support. Advocate for LGs and agricultural education and research institutions to use the CLC as a training centre and engage Lead Farmers as resource persons.

For sustainability, it is important that CLCs are institutionalised, that is they become part of the institutional mechanisms for delivery of agricultural extension services, such as through the Agricultural Knowledge Centres (AKCs, in Nepal) or Krishi Vigyan Kendras (KVKs) in India. For this, the resources for their establishment and inception need to be invested by the government, and a sustainable resource generation mechanism needs to be put in place for long-term sustainability that could include visitor fees, sale of produce, or the use of the space as a training location. CLCs could also have tie ups with academic institutions so that they can leverage resources as study sites for students of agriculture and allied sciences.

However, we have seen local government adoption and scaling of the CLC based on the examples of successful community learning centres in 19 villages across two provinces. In the Karnali province of Nepal, following the successful implementation of the GRAPE programme, the provincial government has planned and budgeted for 10 new community learning centres.

FIGURE 13: **FOR SUSTAINABILITY, IT IS IMPORTANT THAT A CLC IS INSTITUTIONALISED, AS A PART OF THE INSTITUTIONAL MECHANISMS FOR DELIVERY OF AGRICULTURAL EXTENSION SERVICES.**

Artwork: Sujana Singh

Photo: Jitendra R Bajracharya

3.2 Social and environmental safeguards

Social and Environmental Safeguards are guidelines and practices used to anticipate and systematically manage or mitigate the unintended impacts of projects on local communities and the environment. They aim to uphold human rights, mitigate negative impacts, and ensure better outcomes for communities and nature. While a CLC may not require an exhaustive social and environmental impact assessment, it is necessary to apply the principles of no harm when selecting a site and setting up the CLC.

If the CLC is set up on the private land of a progressive farmer, this may not necessarily apply, but if the CLC is being set up on community land, you may want to start by asking: Who are the users of this land? It could be that the landless in the village are using it as grazing land, or collecting seasonal wild edibles from it? On unintended environmental impacts, perhaps you may want to ask: Are there rare or endemic species that are only found in that patch of land? It could be a range restricted amphibian, a medicinal plant, or a wintering bird. Is the chosen site a recharge area for a spring downstream? While a CLC may not require massive land use or land cover change, it is important to understand that even microhabitats matter, and these issues must be raised and discussed in community consultations. In many ways, a CLC inherently advances a socially inclusive approach because of the focus on small farmers, often in remote areas, who are among the most marginalised and vulnerable. But even within such contexts, the issues of social inclusion and exclusion need to be reflected on carefully and addressed during the design and development phase.

SECTION 4

Governance and operations of CLC

Effective governance and operational frameworks are crucial for the sustainability of CLCs. These frameworks should promote inclusive participation, transparent decision-making, and financial sustainability, while also facilitating strong institutional linkages. Depending on local feasibility and accessibility, CLCs can be established on individual farmer land or community-owned land. A well-defined governance structure, underpinned by farmer leadership and institutional partnerships, ensures the efficient operation of CLCs and supports their long-term benefits.

4.1 Management and oversight

A Management Committee will be central to CLC governance, providing strategic oversight and ensuring smooth coordination with stakeholders.

FORMATION AND STRUCTURE

- Typically, a CLC may consist of around 25 actively engaged farmers, who form the core group responsible for operations.
- A Management Committee is elected or selected through consensus, ensuring representation from a diverse category of farmers.
- The committee may comprise lead farmers, local resource persons (LRPs), and advisory members from local governments, NGOs, or agricultural extension agencies.
- The Management Committee should organise regular meetings, say on a monthly basis, to review progress, address challenges, and make decisions on CRA solutions to be demonstrated, any on-site training programs, financial management, and resource mobilisation.

INSTITUTIONAL LINKAGES AND COORDINATION

- Collaboration with local governments, research institutions, and agricultural extension services enhances technical support and policy alignment.
- Partnerships with ICIMOD and other relevant regional projects/initiatives, extension agencies and national research institutions facilitate the integration of scientific knowledge and traditional farming practices.
- Strengthening multi-stakeholder engagement, including cooperatives and agribusiness partners, ensures access to markets and financial support for CLC activities.

BOX 2: **JANABIKASH MAHILA KRISHAK SAMUHA: A MODEL OF SUCCESS**

Situated in one of the most remote regions of Nepal, the CLC in Dimmerpani is run by women farmers who have taken on leadership roles as men migrate for seasonal labor. Central to this initiative is the women-led farmer group, Janabikash Mahila Krishak Samuha, which comprises 26 women farmers. In 2022, this group began collaborating with the GRAPE project, receiving essential technical support to improve their agricultural practices. The CLC served as a testing ground for innovative techniques such as vermicomposting, vermi-wash, improved composting methods, tricho-compost, plastic houses, drip irrigation, soil cement tanks, and biochar. Following the success of these technologies, over 100 farmers from neighbouring communities adopted these practices, demonstrating the CLC's far-reaching impact.

"I used to think earthworms were pests and removed them from my fields. After learning about their benefits through vermicomposting training, I built a chamber with two kilograms of worms, which quickly reproduced. With my husband's help, we've sold over 70 kg of earthworms and 200 kg of vermicompost. This has improved crop productivity, and we now supply vegetables to the School Day Meal Program and the Kolti market, Bajura. Inspired by our success, several farmers have started their own vermicomposting chambers." – Biru Bohara (member of Janabikash Mahila Krishak Samuha)

Empowering Women and Expanding Knowledge

The women of Janabikash Mahila Krishak Samuha lead their group meetings, designing and implementing activities. They organise orientation programs for visiting officials, NGOs, International Non-Governmental Organisations (INGOs), and schools, showcasing their climate-resilient practices. Their knowledge extends beyond their community, with the group offering training to farmers eager to replicate these methods, fostering widespread knowledge transfer throughout Bajura.

To sustain the CLC, the group has introduced a Nepali rupee (NPR) 1000 ($6.89) interpretation fee for large visiting groups. This revenue is directed to a common fund, supporting further agricultural endeavours and granting the women access to financial resources.

A well-functioning Management Committee is necessary for ensuring operational efficiency, community participation, and long-term sustainability of CLCs.

4.2 Gender equality and social inclusion

Ensuring gender equality and social inclusion (GESI) is vital to making CLCs accessible and beneficial to all members of the farming community.

Inclusive governance and participation

- Women should be actively involved in the Management Committee and decision-making processes to ensure their perspectives shape CLC activities.
- Training programmes should encourage the participation of female farmers, acknowledging their role in ensuring household food security and agricultural productivity.

Reaching marginalized groups

- Efforts should be made to involve smallholder farmers, Indigenous communities, landless labourers (as relevant), and persons with disabilities.
- The design and implementation of CLC activities should be culturally appropriate and accessible to diverse groups.
- Strategies such as targeted outreach, flexible on-site training schedules, and reserved leadership positions can help improve inclusivity.

A diverse and inclusive governance structure strengthens the impact of CLCs by ensuring equitable access to knowledge, resources, and decision-making opportunities.

4.3 Farmer participation and operational guidelines

For effective operations, CLCs must have clear rules, responsibilities, and operational procedures.

Farmer engagement and decision-making

- CLC participants form a General Body (such as Management Committee) responsible for guiding activities and providing input on training needs.
- The Management Committee is elected or selected by consensus, ensuring that leadership is representative and accountable.
- Formal registration of CLCs with local governments or other relevant government agencies can help secure funding, institutional recognition, and technical support.

Operational guidelines

- A set of by-laws and standard procedures should govern CLC operations, covering financial management, facility maintenance, and training schedules.
- Regular record-keeping and documentation should be maintained to track participation, impact, and lessons learned.
- Membership models, participation fees, or shared resource management strategies can promote ownership and accountability among farmers.

A structured approach to farmer participation and governance enhances transparency, accountability, and long-term sustainability.

5.4 Financial sustainability and resource mobilisation

Long-term sustainability requires a combination of cost recovery mechanisms, external funding, and strategic partnerships.

Cost recovery mechanisms

- **Membership fee:** CLC users may start collecting a nominal amount as a membership fee.
- **Visitor fees:** Nominal fees can be charged for study tours, on-site training sessions, and exposure visits.
- **Sale of CLC produce:** As CLCs include demonstration plots, farm produce such as vegetables, seeds, organic fertilisers, and bio-pesticides can be sold to generate income.
- **Training and advisory services:** Offering customised farmer training, serving as resource persons to other sites, and on-site demonstrations to extension agencies and cooperatives can serve as an additional revenue stream.
- **An agritourism site**: CLCs can be promoted as a site for agritourism combined with homestay facilities.

Leveraging external resources

- Local government agencies (such as those focusing on agriculture, water, and forestry) can provide support for CLC infrastructure development, training, and exposure visits.
- Grants and funding from development partners (such as ICIMOD, FAO, United Nations Development Programme (UNDP), other agencies, and national/provincial ministries) can help scale CLC activities.
- Public-Private Partnerships (PPPs) with agribusinesses, cooperatives, and financial institutions can create long-term investment opportunities.
- Collaboration with universities and research institutions can support action research and technological innovation.

In addition, developing a sustainable financial model will ensure that CLCs remain independent, scalable, and resilient over time.

Overall, the governance and operation of CLCs require structured leadership, inclusive participation, transparent decision-making, and financial viability to achieve long-term success.

- A Management Committee ensures operational efficiency and institutional coordination.
- GESI enhance the equitable distribution of benefits.
- Clearly defined rules and operational guidelines strengthen participation and accountability.
- A mix of cost recovery strategies and external funding sources supports financial sustainability.

By adopting a participatory and financially viable governance model, CLCs can effectively scale their impact, foster climate-resilient agriculture, and contribute to rural development.

SECTION 5

Establishing a Participatory Monitoring Framework for CLCs

By fostering peer-to-peer learning, co-creation of solutions, and scalable adoption of innovations, CLCs empower farming communities to address climate vulnerabilities effectively. To ensure their success and continuous improvement, a Participatory Monitoring Framework (PMF) is essential. This framework enables stakeholders – including farmers, researchers, extension workers, and policymakers – to assess progress, adapt strategies, and enhance the impact of CLCs over time.

A robust PMF should include four key components: (i) Conducting a comprehensive context assessment to understand initial conditions and suitability, (ii) Establishing baselines to measure changes over time, (iii) A participatory monitoring system to track adoption, scaling, and impacts, and (iv) Establishing feedback loops for continuous learning and course correction.

5.1 Comprehensive context assessment: understanding initial conditions and suitability

Before establishing a CLC, a comprehensive context assessment should be conducted to evaluate agroecological conditions, farmer needs, and socio-economic factors. This step ensures that CLCs are established in locations where they can have the highest impact and remain sustainable in the long run.

Key aspects of the assessment may include

- **Suitability analysis:** the assessment should examine the agroecological and farming system characteristics of the proposed location. Factors such as soil fertility, water availability, climate conditions, land tenure security, and infrastructure (roads, markets, storage facilities) should be assessed to determine whether the location is ideal for a CLC. The availability of lead farmers or farmer groups willing to engage with and sustain the initiative is also a critical consideration. The site should also be easily accessible to enable visits by farmers groups, officials and other stakeholders.
- **Participatory stakeholder mapping:** identifying key actors and fostering partnerships is essential for the success of CLCs. This involves engaging farmers, cooperatives, and farmer producer organisations (FPOs), as well as

local governments and extension services (such as Municipality in Nepal, Dzongkhag in Bhutan, Panchayat in India, Union Council in Pakistan, Upazila in Bangladesh). Additionally, partnerships with NGOs, research institutions, and academia can provide technical support, knowledge co-creation, and sustainability measures. Stakeholder mapping should also consider the role of agri-business actors such as seed suppliers, agrovets, and market intermediaries to enhance value chain integration.

- **Baseline condition review:** The assessment should establish pre-existing conditions related to key agricultural and socio-economic factors. This includes:
  - **Crop productivity:** average yields, prevalent cropping patterns, major challenges faced by farmers.
  - **Soil health and fertility:** organic matter content, nutrient availability, common soil degradation issues.
  - **Water resources and irrigation access:** availability of groundwater, rain-fed versus irrigated agriculture, efficiency of existing irrigation methods.
  - **CRA practices:** current adoption levels of climate-resilient techniques such as agroforestry, IPM, biofertilisers, and water conservation methods.
  - **Socio-economic factors:** household income sources, market access constraints, gender roles in farming, and access to extension services.
- **Defining Monitoring Indicators:** the assessment should outline the key indicators that will be monitored at the CLCs. These indicators should be designed to track changes in:
  - Agricultural practices (e.g., adoption of CRA interventions like biochar application, push-pull pest management, and drip irrigation).
  - Farmer knowledge and capacity building (e.g., participation in training sessions, engagement with demonstration plots, farmer-led experimentation).
  - Socio-economic impacts (e.g., changes in household incomes, market access improvements, food security levels).
  - Environmental benefits (e.g., soil health improvements, reductions in chemical pesticide usage, biodiversity enhancements).
- **Identifying potential risks and sustainability factors:** The assessment should also highlight possible risks that might affect the sustainability of the CLC. This includes external risks such as extreme climate events, policy changes, and market fluctuations, as well as internal risks such as weak institutional capacity, lack of farmer engagement, and funding limitations.
- **Farmer readiness and capacity building needs:** The willingness and capacity of farmers to engage in the CLC activities should be evaluated. This includes assessing literacy levels, record-keeping abilities, and exposure to modern agricultural practices. Where necessary, training programs on data collection, participatory research methods, and financial literacy should be designed to strengthen farmers' ability to contribute actively to monitoring efforts.

5.2 Establishing baselines: tracking progress and measuring change

Baseline assessments serve as reference points to compare before, after, and overtime impacts of interventions at CLCs. Establishing a well-structured baseline ensures that progress is measurable, and interventions are evidence-based.

Key steps in establishing baselines include

- **Data collection methods:** Various participatory and scientific approaches should be utilised to gather comprehensive baseline data. Methods include:
    - **Surveys and interviews:** Structured and semi-structured surveys with farmers, local resource persons, and other stakeholders to document pre-existing conditions and expectations.
    - **Participatory Rural Appraisal (PRA) Tools:** Techniques such as transect walks, resource mapping, seasonal calendars, and matrix ranking to identify key challenges and potential solutions.
    - **Spatial mapping:** use of GIS and remote sensing technologies to analyse land use patterns, soil health, and water availability.
    - **FGD:** Engaging farmers, cooperatives, extension workers, and community members in dialogue to validate data and understand socio-economic conditions.
- **Farmers' knowledge and practices:** A baseline should capture farmers' existing understanding and use of CRA techniques, including:
    - Traditional versus modern farming methods.
    - Use of organic inputs such as Jholmal biofertiliser, vermicompost, and biochar.
    - Pest and disease management strategies, including IPM.
    - Access to climate advisory services and digital agricultural tools.
    - Engagement in market systems and value chain integration.
- **Establishing farmers' diaries:** To ensure continuous data collection, farmers should be encouraged to maintain:
    - Daily ledgers tracking inputs (e.g., seeds, fertilisers, water usage), outputs (yields, income), and labor efforts.
    - Seasonal records on crop cycles, weather patterns, pest outbreaks, and adaptation strategies.
    - Observation logs documenting personal experiences, lessons learned, and changes in farming practices over time.
    - The CLC should provide training to farmers on record-keeping and data analysis to enhance self-monitoring.
- **Institutional capacity assessment:** Understanding the roles and capacities of key stakeholders ensures that monitoring is effectively institutionalised. This assessment should evaluate:
    - **Local Resource Persons:** Their knowledge, availability, and ability to support farmer-led monitoring and capacity building.
    - **NGOs and development partners:** Their involvement in training, documentation, and technical backstopping for data collection and analysis.
    - **Local government** (such as Municipalities, Panchayats, Union Councils, Upazilas, Dzongkhags): Their role in integrating CLC data into regional agricultural development plans and policy decisions.
    - **Extension services and research institutions:** Their capacity to validate findings, provide ongoing training, and facilitate cross-learning with other CLCs.
- Tracking Socio-Economic and Environmental Indicators: Establishing a mix of qualitative and quantitative indicators is crucial for long-term impact assessment. Key indicators include:
    - Adoption rate of CRA Practices: Number of farmers shifting to sustainable farming techniques.

- **Yield improvements:** changes in crop production per hectare over time.
- **Household income growth:** increase in farm revenue due to better market access and improved production techniques.
- **Water and soil health improvements:** reduction in chemical input use, increase in soil organic matter, and efficiency of water conservation measures.
- **Gender equality and social inclusion:** Participation of women and marginalized groups in CLC activities and decision-making processes.

By systematically collecting baseline data, CLCs can track improvements in resilience, adoption rates, and economic benefits for farming communities. Moreover, these baselines ensure that adjustments can be made to maximize effectiveness and scalability of interventions over time.

5.3 Participatory monitoring framework: capturing uptake, scaling, and impacts

A PMF ensures that learning, adoption, and impacts of climate-resilient agricultural innovations are systematically tracked and scaled. It also fosters local ownership and accountability by involving farmers, extension workers, and policymakers in the data collection and evaluation process.

Key components of participatory monitoring include

DEFINING INDICATORS:

- Indicators should be established for adoption (e.g. number of farmers using Jholmol biofertiliser, vermiwash, or push-pull pest management techniques), scaling (e.g. expansion of demonstrated solutions beyond CLCs and into farmer cooperatives), and impact (e.g. improvements in yield, climate resilience, and income levels).
- Both quantitative (e.g. percentage increase in adoption, reduction in chemical pesticide use) and qualitative (e.g. testimonials from farmers on improved knowledge and livelihoods) indicators should be tracked.

WHO COLLECTS DATA AND HOW OFTEN:

- **Farmers:** Take the lead in daily activity recording through Farmers' Diaries, documenting crop performance, weather patterns, pest outbreaks, and resource use.
- **LRPs and NGOs:** Provide monthly support for data verification, ensuring consistency and addressing gaps in reporting.
- **Local governments:** Conduct seasonal and annual assessments, aggregating data for broader policy planning and extension support.
- **Extension officers and researchers:** Facilitate comparative studies and validation trials, ensuring that data collection aligns with scientific research methodologies.

JOINT MONITORING VISITS AND LEARNING EXCHANGES:

- Regular cross-CLC learning visits where farmers, extension officers, and researchers exchange experiences and insights.
- Travelling seminars where stakeholders from multiple regions assess performance and discuss adaptive strategies for improving interventions.
- Multi-stakeholder dialogues with policymakers, private sector actors, and farmer organisations to align CLC monitoring efforts with broader agricultural development plans.

UNINTENDED OUTCOMES:

- Documenting positive and negative unintended consequences is essential for refining

interventions. Case studies focusing on socio-economic changes, environmental benefits, and market linkages should be developed. It is important to reflect as much on failures as on successes so that the learning and sharing is useful to others.

- Researchers and academicians can take the lead in compiling qualitative assessments through focus groups, farmer interviews, and success story documentation.

INTEGRATING DIGITAL TOOLS:

- Adoption of mobile applications, GIS mapping, and cloud-based platforms for real-time data collection and sharing.
- SMS-based advisory services for farmers to report observations and receive guidance from extension officers.
- Development of a centralized dashboard to track progress across multiple CLCs, enabling decision-makers to access real-time insights.

By involving farmers in regular data collection and building their capacity in record-keeping, CLCs foster a farmer-led, evidence-based approach to agricultural transformation. This participatory framework not only strengthens local ownership and decision-making but also ensures that interventions remain adaptive, scalable, and responsive to emerging challenges in CRA.

5.4 Establishing feedback loops for continuous learning and adaptation

A critical element of participatory monitoring is establishing mechanisms for feedback and adaptation, ensuring that CLC interventions remain dynamic, relevant, and responsive to local needs. Continuous learning allows stakeholders to refine their approaches, scale successful practices, and address emerging challenges effectively.

Key feedback mechanisms include:

COMMUNITY REFLECTION FORUMS:

- Quarterly meetings where farmers share their experiences, challenges, and successes related to CLC activities.
- Facilitates peer-to-peer learning, allowing farmers to discuss lessons learned and refine their approaches.
- Encourages participatory decision-making, ensuring that farmer insights shape future interventions.

LEARNING EXCHANGES:

- Cross-CLC visits to enable farmers, extension officers, and stakeholders to observe successful models in different regions.
- Exposure visits to showcase best practices in climate-resilient agriculture, strengthening confidence in new techniques.
- Farmer-led training sessions to enhance knowledge-sharing and co-learning among participants.

MULTI-STAKEHOLDER DIALOGUES:

- Brings together local governments, agribusinesses, NGOs, research institutions, and donor agencies to discuss challenges and opportunities for scaling interventions.
- Facilitates policy integration, ensuring that insights from CLCs inform agricultural extension services and rural development strategies.
- Promotes PPP to enhance investment in sustainable agricultural practices.

ADAPTIVE MANAGEMENT:

- Utilises real-time monitoring data to identify trends, gaps, and areas needing improvement.
- Adjusts interventions based on farmer feedback, yield performance, climate variability, and market trends.
- Encourages iterative learning, where interventions are continuously refined based on practical field insights.

INTEGRATED ENGAGEMENT:

- Strengthens collaboration between LRPs, NGOs, government officials, researchers, and farmers to ensure the sustainability of monitoring processes.
- Establishes joint monitoring committees, where diverse stakeholders co-review CLC progress and suggest improvements.
- Engages youth and women farmers, ensuring that diverse perspectives contribute to the monitoring and adaptation process.

CONTRIBUTIONS TO ICIMOD AND RELATED REGIONAL INITIATIVES:

- Links lessons learned with broader ICIMOD and other regional programmes on climate resilience, agroecology, and sustainable rural development.
- Ensures that best practices from CLCs are documented, analysed, and integrated into regional policies.
- Aligns monitoring insights with related climate-resilient agriculture initiatives, contributing to national and international knowledge-sharing platforms.
- By establishing structured feedback loops, CLCs can evolve into farmer-driven innovation hubs that continuously refine their approaches. These mechanisms ensure that knowledge remains dynamic, adaptable, and effectively disseminated, ultimately leading to stronger climate resilience and improved rural livelihoods.

The establishment of a PMF for CLCs is fundamental to ensuring long-term success, relevance, and scalability of climate-resilient agricultural interventions. By conducting Comprehensive Context Assessments, establishing baselines, implementing participatory tracking, and fostering continuous feedback loops, CLCs can evolve into farmer-driven innovation hubs that strengthen rural livelihoods, enhance climate resilience, and scale sustainable agricultural solutions across diverse agroecological landscapes.

SECTION 6

Adoption and outscaling of community Learning Centre interventions

CLCs play a transformative role in introducing, testing, and scaling climate-resilient agricultural solutions that are affordable, farmer-centric, and resilient to environmental shocks. Through demonstrated practices, participatory research, and knowledge-sharing mechanisms, CLCs ensure that smallholder farmers have access to the tools, training, and networks needed to sustain agricultural productivity amidst climate challenges (ICIMOD, 2024).

The establishment of CLCs in Nepal is a testament to the power of localised, collaborative efforts in scaling climate-resilient solutions. By empowering communities, fostering innovation, and integrating climate resilience into government policies, CLCs are transforming the way mountain communities approach the challenges of climate change. With the support of partners like Universities, Government Departments, and organisations with strong field presence (CEAPRED and LI-BIRD), these centres are creating lasting, positive changes that will help build a more sustainable and equitable future for all.

Adoption and outscaling of CLCs is critical to ensuring the sustainability and widespread impact of climate-resilient agricultural practices. By integrating CLC interventions into existing agricultural programmes, policy frameworks, and institutional mechanisms, these innovations can reach a larger number of farmers, enhance productivity, and strengthen climate adaptation efforts. Scaling strategies should focus on leveraging flagship agricultural programs, aligning with climate adaptation plans, integrating with local and provincial government initiatives, and embedding CLC approaches in academic curricula and extension services.

6.1 Integration with agricultural and extension programmes

To ensure seamless adoption and scalability, CLCs must be integrated with national and regional agricultural development programs. This includes linking with agricultural extension services, soil and water conservation programs, agroforestry initiatives, and energy-efficient farming technologies.

Key integration strategies may include:

- **Afghanistan:** Partner with the Ministry of Agriculture, Irrigation, and Livestock (MAIL) to integrate CLCs into extension services, promoting climate-resilient farming, soil conservation, and water-efficient irrigation, in collaboration with the FAO and local NGOs.

- **Bangladesh:** Link CLC activities with the Agricultural Extension Policy and Bangladesh Climate Change Strategy and Action Plan (BCCSAP) to ensure farmer access to tested climate-resilient farming solutions.
- **Bhutan:** Align with the Renewable Natural Resources (RNR) Strategy 2040, which emphasizes sustainable farming, community-based extension, and climate resilience.
- **China:** Align CLCs with the National Agricultural Extension and Technology Service Center (NAESC) and provincial programmes, leveraging Green Agriculture and Climate-Smart Farming initiatives for large-scale adoption through digital advisory and precision farming.
- **India:** Work within the framework of the National Mission for Sustainable Agriculture (NMSA) and KVKs to integrate participatory learning and CLC-driven CRA interventions.
- **Myanmar:** Work with the Department of Agriculture (DOA) under the Ministry of Agriculture, Livestock, and Irrigation (MOALI) to embed CLCs in extension services, linking them with the Climate-Smart Agriculture Strategy and the Agricultural Development Strategy (ADS) to promote agroecology and participatory learning.
- **Nepal:** Leverage the Prime Minister Agriculture Modernization Project (PMAMP) and Provincial Agriculture Development Plans to incorporate CLC-based climate-resilient agriculture solutions.
- **Pakistan:** Collaborate with Provincial Agriculture Departments, the National Agriculture Research Centre (NARC), and CRA programs to mainstream CLC innovations into national extension efforts.

By embedding CLC activities into flagship agricultural programs, their impact can extend beyond demonstration sites, ensuring sustainable, government-supported scaling efforts.

6.2 Alignment with Climate Adaptation Plans and subnational strategies

Scaling CLC approaches should be guided by national and local climate adaptation plans and flagship programmes, ensuring that demonstrated solutions can be scaled and contribute to broader resilience-building efforts.

Key opportunities for alignment may include:

- National Adaptation Plan (NAP) and Local Adaptation Plans of Action (LAPA): CLCs can support adaptation planning by integrating tested climate-resilient agricultural practices into district and provincial strategies.
- **Afghanistan:** Integrate CLCs with Afghanistan's National Adaptation Plan (NAP) and sectoral adaptation strategies under the Ministry of Agriculture, Irrigation, and Livestock. Link with local resilience-building initiatives to support climate-resilient agricultural practices in vulnerable rural communities.
- **Bangladesh:** Support implementation of BCCSAP and Delta Plan 2100, emphasizing agroecology and nature-based solutions.
- **Bhutan:** Link CLCs with Bhutan's National Adaptation Programme of Action (NAPA) and community-driven soil and water conservation initiatives.
- **China:** Align CLC interventions with the National Climate Change Adaptation Strategy 2035, focusing on sustainable agriculture, drought resilience, and ecosystem-based adaptation. Work with provincial adaptation plans to integrate digital agro-advisory services and climate risk management.
- **India:** Incorporate CLC learnings into State Action Plans on Climate Change (SAPCCs) to enhance decentralized planning for climate resilience.

- **Myanmar:** Integrate CLCs with Myanmar's National Adaptation Plan (NAP) and Myanmar Climate Change Strategy and Action Plan (MCCSAP) to enhance smallholder resilience through climate-resilient farming and ecosystem restoration efforts.
- **Nepal:** Align CLC efforts with the National Adaptation Plan (NAP) 2021-2050 and LAPA frameworks at municipal and provincial levels.
- **Pakistan:** Integrate CLCs into Provincial Climate Adaptation Strategies, linking them with Resilient Agriculture Initiatives under the National Climate Change Policy.

Aligning CLCs with climate adaptation plans ensures their role in building resilient food systems, while gaining institutional support for scaling interventions.

6.3 Leveraging local and provincial government programmes for scaling

For sustained adoption, CLC-led practices should be institutionalised at local and provincial levels through resource allocation, policy support, and multi-stakeholder collaboration.

Key strategies for leveraging government support may include:

- Institutionalising CLCs as local knowledge hubs by securing municipal or district-level funding.
- Integrating CLC activities into local development planning to ensure budgetary allocations for farmer training and demonstration programs.
- **Afghanistan:** Work with Provincial Agriculture Departments under the MAIL to integrate CLCs into local agricultural planning. Establish partnerships with district development committees to secure funding for farmer training and climate-resilient agriculture demonstrations.
- **Bangladesh:** Partner with Upazila Agriculture Offices to scale CLC interventions through farmer field schools and digital extension platforms.
- **Bhutan:** Collaborate with Dzongkhag Agriculture Offices to enhance farmer advisory services and participatory research.
- **China:** Engage Provincial Agricultural Bureaus and County-Level Agricultural Extension Centres to integrate CLCs into regional agricultural development programs. Secure support through China's Rural Revitalisation Strategy to fund farmer innovation and technology dissemination.
- **India:** Advocate for Panchayat-led agricultural innovation programs to fund farmer-led trials and scaling of CLC innovations.
- **Myanmar:** Work with Township Agriculture Departments under the Department of Agriculture (DOA), MOALI to embed CLCs in municipal development plans. Strengthen partnerships with regional agricultural offices to expand farmer training and agroecological initiatives.
- **Nepal:** Work with Palika-level Agricultural Units to integrate CLC-led practices into local agriculture development working plans.
- **Pakistan:** Establish Public-Private Partnerships (PPPs) with provincial agricultural departments and agribusinesses to expand successful CLC models.

Engaging local governments and securing budgetary commitments ensure long-term sustainability and localised scaling of CLC interventions.

6.4 Advocacy for policy inclusion and academic integration

To drive systemic change, CLC-driven climate-resilient agriculture approaches must be embedded in national agricultural policies, academic curricula, and training programs.

Policy Advocacy for Institutionalisation may include:

- Advocate for CLC-based participatory learning approaches to be recognised in National Agriculture Development Strategies.
- Promote integration of CLC experiences into subnational agricultural policies, ensuring farmer-driven innovations receive formal policy support.
- Encourage ICIMOD's engagement in shaping regional policies by highlighting successful cases from Nepal, India, Bhutan, Bangladesh, and Pakistan.

Embedding CLC Approaches in University Curricula is crucial:

- Integrate climate-resilient farming models demonstrated at CLCs into agricultural universities and vocational training institutions.
- **Afghanistan:** Collaborate with universities such as Kabul University Faculty of Agriculture and Afghanistan National Agricultural Science and Technology University (ANASTU) to integrate CLC-based climate-resilient agriculture models into agricultural extension and research programs. Establish field-based student engagement initiatives to enhance practical learning.
- **Bangladesh:** Partner with Bangladesh Agricultural University (BAU) and others to establish student learning exchanges with CLCs.
- **Bhutan:** Work with the College of Natural Resources (CNR) and others to document and integrate CRA technologies from CLCs into academic learning modules.
- **China:** Align CLC experiences with China Agricultural University (CAU) and Provincial Agricultural Research Institutes to integrate climate-resilient agriculture into vocational and higher education programs. Promote university-led participatory research on sustainable farming techniques.
- **India:** Link CLC experiences with State Agricultural Universities (SAUs) and Indian Council of Agricultural Research (ICAR) training programs.
- **Myanmar:** Collaborate with Yezin Agricultural University (YAU) and other agricultural colleges under the Ministry of Agriculture, Livestock, and Irrigation to embed CLC methodologies into university curricula and practical training programs.
- **Nepal:** Collaborate with Tribhuvan University, Agriculture and Forestry University (AFU), and other universities to integrate CLC methodologies in agricultural extension courses.
- **Pakistan:** Introduce farmer-led knowledge-sharing models from CLCs into university-based action research projects.

Embedding CLC interventions in higher education curricula and research programs strengthens the scientific credibility of farmer-led innovations and enhances long-term knowledge dissemination.

The widespread adoption and outscaling of CLC interventions require strong alignment with agricultural extension systems, integration into climate adaptation plans, leveraging of local and provincial government programs, and advocacy for policy inclusion and academic engagement. By embedding CLC approaches in institutional frameworks, these participatory models can be mainstreamed into national agricultural systems, ensuring that farmers across Bangladesh, Bhutan, India, Nepal, and Pakistan benefit from climate-resilient, locally adapted solutions. The integration of CLC-driven interventions into ICIMOD and GRAPE-supported regional initiatives further amplifies their impact, fostering resilient and sustainable agricultural ecosystems across South Asia.

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