



Key messages

- *The intersection of caste, gender, and ethnicity makes women and marginalised groups in eastern Uttar Pradesh and North Bihar particularly vulnerable to flooding, increasing labour burdens and limiting their capacity to adapt.*
- *Gender-equitable and socially inclusive (GESI) Climate-Resilient Farming (CRF) strengthens women's leadership, livelihoods, and decision-making. By enhancing climate adaptation, ecosystem restoration, and labour-saving practices, it increases women's access to resources, markets, institutions, and public life.*
- *GEAG's CRF approach aims to be GESI-transformative. It includes landless and under-resourced groups, supports women-led collectives, and leverages institutional partnerships to strengthen women's agency, resources, and leadership.*
- *GESI-transformative CRF requires coordinated action across policy, practice, local government, and financing. Embedding farmer-led, ecosystem-based, and gender-responsive approaches into agricultural systems can expand women's agency, leadership, and access to resources.*

Author: Patricia Bamanyaki

Inclusive climate resilience in practice: How climate-resilient farming is shaping gender-equitable outcomes in flood-prone India

Transformative gender equity and social inclusion (GESI) approaches address the root causes of exclusion to achieve lasting, equitable outcomes for historically disadvantaged groups, particularly women. This inside story examines how a climate-resilient farming (CRF) initiative in four flood-prone districts of Uttar Pradesh and Bihar advanced GESI-transformative outcomes among smallholder farming communities.

Climate-resilient farming (CRF) is an integrated approach that combines technology, sustainable practices, and farmer support systems to strengthen agriculture against climate challenges. Unlike conventional farming, which prioritises short-term yield maximisation and economic return through intensification, CRF reframes agriculture around long-term risk management, livelihood resilience and environmental services.

Implemented by GEAG with support from the Poorest Areas Civil Society programme of the Department for International Development (PACS-DFID) in Uttar Pradesh and the Asia Foundation (TAF) in Bihar, the initiative aimed to reduce agricultural losses caused by floods, waterlogging, and extreme rainfall, while improving agricultural productivity and strengthening the resilience of communities facing economic hardships across the four districts. The initiative was implemented over two project cycles: the PACS-DFID Project (2012-2016) and The Asia Foundation Project (2021-2023). Its achievements strongly align with the GESI-transformative ambition of CDKN for the South Asia region, demonstrating how inclusive, locally led adaptation can shift power, expand opportunities, and build resilience in climate-vulnerable contexts.

Context

Eastern Uttar Pradesh and North Bihar in India experience widespread seasonal flooding and waterlogging driven by a combination of geographical and climatic factors. Both regions are in the Indo-Gangetic plain, which is predominantly low-lying and flat, with numerous converging Himalayan rivers that flood during the heavy rain of the summer monsoon season. Flooding is further exacerbated by land-use change, river management challenges, and other unsustainable human activities.

Districts in Uttar Pradesh and Supaul District in Bihar are among the most historically disadvantaged regions in India, characterised by high poverty levels, poor health and nutrition outcomes, low literacy rates, and inadequate infrastructure. Predominantly rural and reliant on agriculture, roughly half of its working population (50% in Uttar Pradesh and 44.2% in North Bihar) is classified as marginal workers who secure livelihoods for less than six months each year.¹ Most farming households fall into the small and marginal category, cultivating less than one hectare of land. Inequality in the region is further reinforced by entrenched caste-based feudal hierarchies, which disadvantage socially and economically marginalised groups.

Increasing frequency and severity of climate hazards threaten agricultural production and food security in these districts. Weather-dependent livelihoods and widespread monocropping of paddy, rice, and wheat increase vulnerability to climate shocks. These risks are compounded by limited access to CRF knowledge and extension services, weak post-harvest infrastructure, and underdeveloped markets for perishable produce.



Ms Bhanmati using groundnut de-husker. Credit: GEAG

As climate impacts intensify, male outmigration for work often leaves women managing farms and households with limited support, deepening their socio-economic burden.

Social norms, resource inequalities, and limited decision-making power heighten climate risks for groups facing intersecting vulnerabilities, including factors of age, disability, caste, indigeneity, and socioeconomic status. Women often lack access to land, information, and finance, constraining adaptation. Their exclusion from formal and informal decision-making also limits their influence over adaptation strategies that directly affect their wellbeing and resilience.

Approach

The CRF approach was introduced to underprivileged and vulnerable groups in the four districts as a pathway to strengthen agricultural resilience and improve socio-economic outcomes. GEAG’s CRF approach focused on small and marginal farmers, particularly women and migrant households, from socio-economically weaker communities.



Ms Chohari Devi using compost filter. Credit: GEAG

Climate-resilient farming	Conventional farming
Diversified production systems	Predominantly monoculture systems
Focus on resilience, ecosystem health and risk reduction	Focus on productivity and yield maximisation
Climate information, resilient varieties and adaptive practices	Standard farming practices and inputs
Efficient resource use and reduced chemical dependence	Reliance on external inputs and chemical controls

Table 1: Distinction between climate-resilient and conventional farming^{2, 3, 4}

Systems, agents and institutions

The initiative aimed to reduce crop losses from flooding, waterlogging and extreme rainfall while improving productivity, profitability, and access to markets, services and government programmes. Drawing on a climate resilience framework⁵, GEAG organised its work around three interconnected spheres: systems, agents and institutions.

Systems: Systems refer to the physical and functional elements, such as infrastructure and ecosystems, whose continuity matters. At the systems level, CRF recognises the need to protect and conserve the natural resources essential to climate adaptation and resilience. It sees farms as interconnected circular systems that link households, fields, livestock, and assets such as ponds, trees, poultry, composting, and fisheries, which together sustain functionality and resilience. resilience and livelihoods.

Farmers received five-day weather forecasts, alongside tailored advisories on sowing, irrigation, input use, harvesting, and livestock vaccination. These were shared via SMS, digital platforms, and community noticeboards in local languages.

Farmers were also linked to farmer producer organisations, farmer field schools, self-help groups, and resource centres for access to markets, advisory services, and informal finance, as well as to relevant government departments and schemes that support rural resilience and livelihoods.

Agents: Agents include households, firms and local planners whose actions shape adaptation outcomes. At the agent level, women farmers' knowledge, skills and confidence were strengthened through training, exposure visits and participatory learning to support the adoption of climate-resilient technologies and practices. Participatory approaches integrated scientific, local and Indigenous knowledge.

Women farmers participated throughout the process, identifying vulnerabilities and co-developing solutions. They helped test and refine farming practices, agricultural tools and post-harvest technologies, including the weeding and hoeing tool and turmeric steam boiler. This ensured that innovations were responsive to women's priorities, workloads, and lived realities.⁶ Beyond farmers, government officials, service providers, seed sellers and Panchayat (village council) members were engaged to strengthen their roles as agents of change.

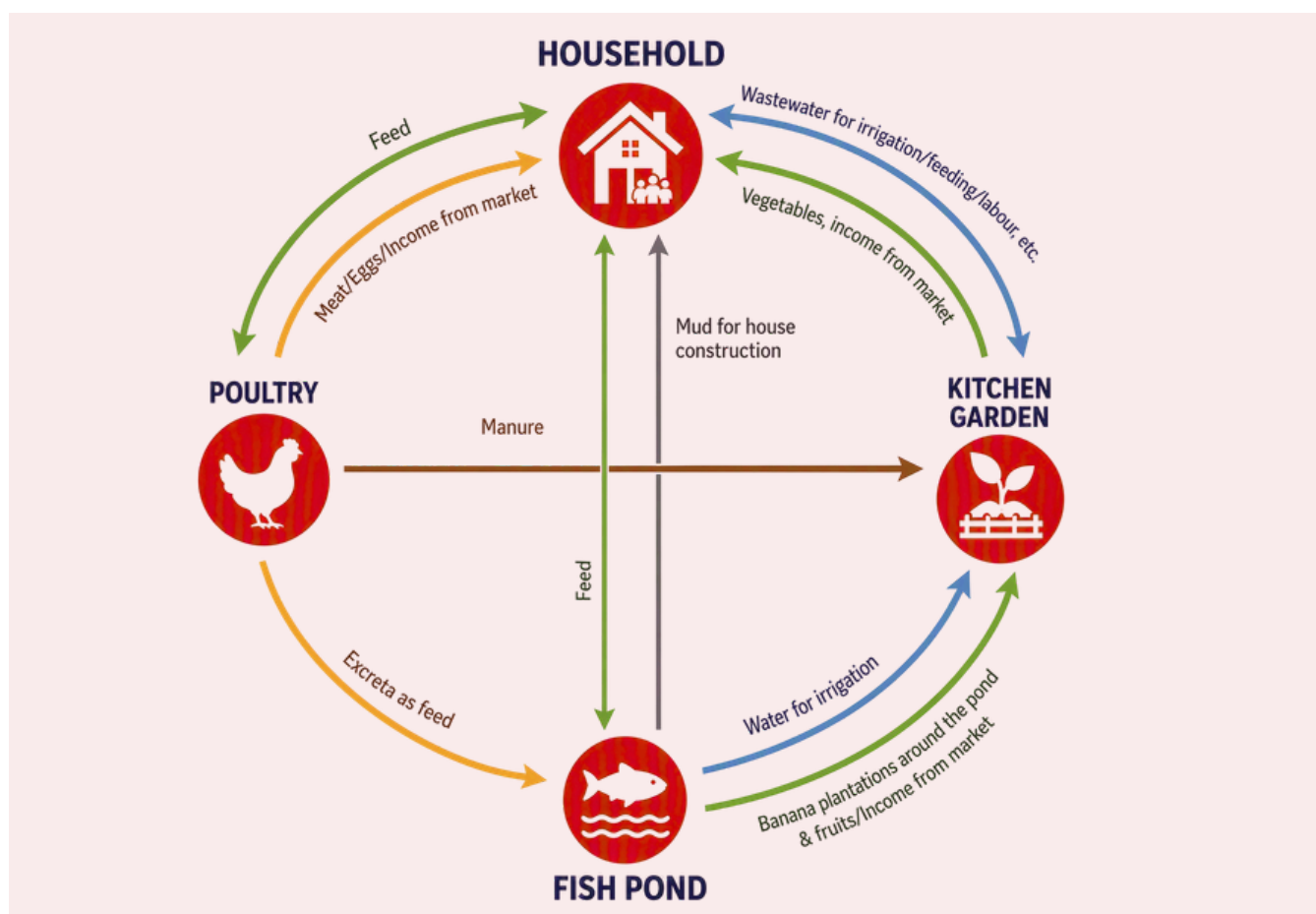


Figure 1: Illustration of a smallholder farming system. Adapted from illustration by Gorakhpur Environmental Action Group (2023).⁶

Institutions: Institutions refer to the rules, norms and governance linking agents to systems. These include laws, planning processes, financing mechanisms that can enable or block adaptation. At the institutional level, farmers were supported to engage in advocacy with government institutions at the block, district, state, and national levels.

GEAG advocated to institutions. This advocacy contributed to the formal recognition of small, marginal and landless farmers, particularly women, and to integrating climate adaptation and disaster risk reduction into development planning and institutional systems.

One example is the Resilient Village Planning process in Supaul district, Bihar, where advocacy led to the integration of climate change adaptation and disaster risk reduction measures into Gram Panchayat Development Plans and Village Disaster Management Plans, which were formally adopted by communities and Panchayats.

Results and outcomes

Across the four districts in Uttar Pradesh and Bihar, GESI-transformative CRF is expanding opportunities for displaced, smallholder, and migrant farmers, especially women, who are emerging as leaders in adaptation, production and community resilience.

Project evidence shows that the GEAG initiative not only strengthened their ability to adapt to flooding, waterlogging, and extreme weather but also sparked meaningful social change.^{6,7} Women farmers are gaining confidence, economic empowerment, and visibility in community life. This shifts gender norms and expands women's influence within households and local institutions.

- **Enhanced adaptation and resilience to climate change**

Around 5,000 women farmers adopted CRF practices, including climate-resilient seed varieties, diversified cropping systems and bio-inputs.⁷ These practices improved productivity, reduced climate-related losses, strengthened food security and increased farm incomes, while weather advisories helped farmers better manage climate risks. This has led to reduced distress migration linked to climate-related economic hardship. Some farmers, having experienced benefits, have begun leasing additional land to expand production.

- **Landscape and ecosystem restoration**

Through the restoration of soil health, tree cover, and water bodies under CRF, farms are once again benefiting from the natural provisioning and regulating ecosystem services, making them more self-reliant.

Women farmers are emerging as stewards of these ecosystems, strengthening both ecological resilience and community ownership. As these practices take root, farming households have increasingly recognised how trees and waterbodies support inputs, drainage, and overall farm functioning. This shift in understanding is driving collective efforts to protect and rejuvenate natural resources across their farms and communities.



Women farmers working in an agriculture field in a peri-urban area.
Photo Credit: GEAG.

"Floods would submerge my fields during the monsoon, and I lived with constant fear of losing everything. After learning resilient farming practices, especially crop combinations suited to my land, I now grow crops even in the flood season. By cultivating kundru [Ivy Gourd] with arvi [Elephant Ear], I not only increased my income by about 87% but also reduced the risk of total crop failure. Today, even if one crop is damaged, I have another to rely on – giving me both security and confidence in the face of changing climate."

Ms Rajpati Devi, Bhagwanpur village, Gorakhpur

- Reducing labour burdens and expanding opportunities for women

Climate-resilient technologies such as the groundnut de-husker, turmeric steam boiler and weeding tools reduced labour demands, improved productivity and lowered health risks from exposure to chemical pest control. Women have greater control over their time, and many are using this to pursue income-generating activities, upskill, and participate more fully in social and cultural life - including rest, family time, and community events.

- Shift in women's role and identity at household level

Women's participation in training, farmer field schools, self-help groups, and engagement with government institutions and agricultural universities has strengthened their understanding of their role in agriculture and household well-being. This has built confidence, enabling them to speak up in family and community decisions and influence key farm choices, including crop diversification, use of non-traditional varieties, organic inputs, tool purchases, and marketing. Women are also earning income and contributing to household welfare and children's education, gradually redefining their roles as recognised decision-makers and economic contributors within their families.

- Expanded opportunities and strengthened resource rights for women

Women's participation in the initiative has expanded their access to knowledge, high-quality farm inputs, technology financial services and government institutions and schemes. Through self-help groups and farmer field schools, women were able to enrol in government programmes, unlocking various opportunities for financial support and training.

"I began adopting new techniques and innovations in my farming after attending the training programmes by GEAG and started actively participating in women's groups... I observed that male farmers were forming and running Farmer Producer Organisations [FPOs]. Inspired by this, I decided to establish my own FPO. I started a new FPO, Chikni Millets Producer Company, and today, through my hard work and dedication, I serve as its Director."

Ms Subhawati Devi, Rakhukhor village, Campierganj, Gorakhpur

This has been critical during climate shocks. Even with restricted mobility or male migration, women can continue farming, sustaining household food security and income. Improved financial access also enables greater savings and investment in farms and education.

Women's collective platforms – self-help groups, village resource centres and farmer producer organisations – have also strengthened their market position. By buying and selling produce directly, they have gained greater bargaining power across the value chain and benefited from fair weighing practices and on-time electronic payments. Many women have taken up value addition, using their new skills and access to credit to process farm products and secure better prices.

"The Village Resource Centre ... inspired us to work collectively and opened up a new avenue for income generation. With support from GEAG, we procured raw materials and, through our self-help group, started producing and selling turmeric powder. In the beginning, we faced some difficulties, but now we have established it as a business model. In one year, we sold 5 quintals of turmeric powder at ₹20,000 per quintal, earning a net income of ₹1,00,000 against a cost of ₹60,000. Today, we are financially self-reliant and also provide 10–15 days of employment to 4–5 other women in our group."

Ms Chohadi Devi, Panchgawa village, Kauriram, Gorakhpur



Women using cycle weeder in block campierganj.
Photo Credit: GEAG.

Enablers of the approach

A range of factors have enabled the GESI-transformative potential of the CRF approach:

- Using locally available natural resources and agricultural waste as core inputs, alongside low-cost, easy-to-construct technologies, reduces labour and financial barriers, especially for women. This strengthens farmers' autonomy and enables accessible, sustainable adoption of climate-resilient practices.
- Combining local knowledge with scientific expertise has enabled the co-creation of context-specific solutions that address farmers' realities. Farmer-led innovation, backed by training and timely advisories, has built confidence, strengthened decision-making, and enhanced ownership, particularly for women.
- The approach is well-suited to agricultural production with limited space, using vertical and multi-tier farming to increase productivity. This creates opportunities for landless households and enables families to meet nutritional needs while generating income and expanding participation among women, youth, and groups facing exclusion.
- Collective platforms such as self-help groups and farmer field schools enable farmers to pool resources, access finance and services, and share knowledge. These groups strengthen visibility, accelerate adoption of new practices, and build confidence and agency, especially among women.
- A strong enabling environment, through collaboration with government, local leaders, service providers, and agricultural institutions, reinforces and validates these approaches. Coordinated support helps scale innovations, strengthen farmer confidence, and ensure more inclusive and responsive agricultural systems.

Obstacles and how they were overcome

The pathway to building inclusive climate resilience was neither linear nor effortless. One of the earliest challenges was the hesitation and lack of trust among women farmers towards external facilitators. This was gradually addressed through sustained engagement with entire households – especially male members – along with facilitating

linkages with government agencies, which helped build credibility and acceptance. Rather than prescribing solutions, a 'learning by doing' approach was adopted, enabling women to experiment with climate-resilient practices on their own fields and witness tangible results. By placing women in leadership roles from the outset, the process fostered ownership and confidence. Early successes became powerful catalysts, encouraging wider adoption through word-of-mouth and the principle of 'seeing is believing.'

Access to government schemes further strengthened these efforts. Over time, collective leadership among women farmers emerged as a key force, empowering them to challenge existing social norms and to scale resilient practices within their communities.



Farmer, Ms Shanti Devi, preparing bio-compost for her crops.
Photo Credit: GEAG

Implications for decision makers and practitioners

The inside story highlights the concrete shifts in policy, practice and investment needed to support women and other groups who may face marginalisation to sustain CRF systems.

National policymakers

- Institutionalise GESI-responsive CRF by integrating small-scale, farmer-led, ecosystem-restorative, and gender-responsive practices into agricultural plans and budgets.
- Expand women's access to productive resources through land reforms and targeted support for climate-resilient inputs, technologies, finance, and services.
- Strengthen enabling systems by improving gender-responsive extension, climate information, monitoring of gender- and intersectionality-disaggregated outcomes, sustainable financing, and cross-sector coordination to scale CRF and women's agency.

Local governments

- Strengthen inclusive local climate governance by ensuring meaningful representation of women and marginalised groups in climate and disaster-risk planning and leveraging community platforms to co-design and implement climate-resilient solutions.
- Improve access to climate-resilient livelihoods and services by simplifying access to schemes, subsidies, insurance, and social protection, while investing in local climate-resilient infrastructure, support services, and community-managed resources accessible to women and groups facing exclusion.

Non-governmental organisations, community-based organisations, activists

- Adopt farmer-led and GESI-responsive approaches by grounding programmes in the needs and priorities of women and marginalised groups through participatory design and co-created climate-resilient solutions.
- Invest in women's leadership, skills, and collective action by strengthening continuous learning platforms, self-help groups, producer organisations, and other community institutions that enhance agency, bargaining power, and market access.

- Address structural and social barriers to inclusion by expanding women's access to land, finance, tools, insurance, and public services, while promoting GESI-transformative norms, shared decision-making, and recognition of women's leadership and innovation.

Community local leaders

- Champion inclusive decision-making by ensuring women and groups facing socio-economic hardship participate meaningfully in climate-related discussions, creating respectful spaces for them to voice priorities (such as women-only gatherings and elevating women's leadership in mixed-gender forums), and publicly recognising their contributions to farming and community resilience.
- Use community influence to shift social norms by endorsing women's leadership in farming, markets, and governance, challenging discriminatory practices, and celebrating women innovators and climate champions, thereby inspiring wider acceptance and change.

Donors

- Prioritise long-term, flexible funding for locally led, GESI-transformative adaptation by supporting multi-year programmes that allow communities to test, refine, and scale context-specific solutions, and by investing in models that centre lived experience, local knowledge, and women's leadership.
- Invest in ecosystem restoration as a core resilience strategy, linking ecological recovery with women's and marginalised groups' economic empowerment.
- Support innovation in GESI-responsive climate-resilient technologies and extension systems by funding research and development for resilient seeds, bio-inputs, and low-cost tools; strengthening extension systems, including women extension workers and community resource persons; and expanding digital advisory platforms that deliver timely, actionable information to women and small-scale farmers.

Conclusion

This inside story shows how the CRF approach can be implemented as a genuinely GESI-transformative pathway for small-scale farmers, especially women. In contexts marked by entrenched gender and caste inequalities – such as limited access to land, farm inputs, knowledge, and financial services, and exclusion from decision-making and local planning – the approach has shown strong potential due to its holistic, inclusive, farmer-led design. When CRF builds on the existing capabilities of women and other marginalised groups and grounds solutions in their lived experiences, CRF can enable context-specific innovations that respond directly to the constraints they face. At the same time, it challenges the status quo by increasing their visibility and participation in household, community, and public decision-making spaces.

Crucially, the approach is helping support women and communities to overcome cycles of poverty and socially assigned roles, giving them the resources, confidence and opportunities to expand their economic agency and shape their own futures. Although developed in a flood-prone environment, the approach is highly transferable to other climate-affected contexts because of its emphasis on local knowledge, adaptive practices, and social inclusion. Its dual focus on ecosystem restoration and improved productivity, yields, income, and food security demonstrates that climate resilience and livelihood strengthening can advance together – especially when women's agency and leadership are placed at the centre.



Farmer, Ms Shanti Devi tending her Lauki (calabash) crops. Photo Credit: GEAG

Endnotes

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Farmer and trainer Meera Chaudhary tending her crops. Photo credit: GEAG

Climate and Development Knowledge Network (CDKN)

The Climate and Development Knowledge Network (CDKN) is a global Southern-led programme founded in 2010. The programme is managed by SouthSouthNorth, and implemented in partnership with Fundación Futuro Latinoamericano and ICLEI South Asia. CDKN works to improve the wellbeing of the most climate-affected people in the Global South, especially marginalised groups, through transformative climate-resilient action. We work in partnership with the public, civil society and private sectors to mobilise knowledge, leadership and capacity in the Global South from local to global levels.

Gorakhpur Environmental Action Group (GEAG)

The Gorakhpur Environmental Action Group (GEAG) is a non-profit organisation founded in 1975 in Gorakhpur, India. Established by a group of students, researchers, and faculty members inspired by the environmental movement, GEAG works to promote sustainable and climate-resilient development. Since its formal registration in 1983, the organisation has evolved into a leading resource, implementation, and support institution in northern India, advancing sustainable agriculture, resilient livelihood models, climate change adaptation, gender equity, and the rights of small and marginal farmers. GEAG partners with communities, civil society, and government stakeholders to build inclusive, sustainable, and resilient rural futures.

Author: Patricia Bamanyaki

Reviewers: Shiraz Wajih, Nivedita Mani, Lisa McNamara, Mairi Dupar, Nadia Sitas, Lucia Scodanibbio

Editors: Robin Heuerman, Cris Robertson



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