

Contribution of Women Farmers in Hill Agroforestry Systems (Has) in Uttarakhand

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Hill Agroforestry Systems (HAS) are often characterized by the integration of woody perennials with other crops like cereal, pulses, vegetables and livestock on steep sloppy terrain where agrarian lands are managed through terrace farming. It forms an integration of various plant species and their interactions with other ecological components which plays a crucial role in sustainable land-use management and environment conservation. Usually in hilly regions, farming is predominantly of subsistence type. Due to rough terrain and harsh climatic conditions, fear of human animal conflict and poor soil productivity, farmers here often face challenges while maintain their farmlands and the livestock.

In Uttarakhand, particularly in the Garhwal Himalaya, men have been traditionally considered as main bread earner with prime and dominating role in landscape management, while women holds various responsibility in resource conservation followed by farm plus livestock management, and community development as a whole. women actively participate in various activities which include but not limited to tree planting and management activities, maintenance of cropland, production-harvesting of crop component and rearing of livestock. They also play other kind of associated activities as animal health care, manure making and application, collection storage of seeds etc. and their involvement in such activities is often admixed with traditional knowledge passed down through generation aligning them enough to cope-up with region's ecological and socio-economic dynamics. This however, is facing challenges such as animal infiltration and irregular rainfall. In this regard, one key aspect of women's contribution is management of diversified crop regime which promotes biodiversity and enhanced resilience in HAS. Hence, focus on women farmers in hill agroforestry system becomes crucial as they play a central but overlooked role in day to day management of agroforestry systems in the region A list of activities related to component management has been discussed below:

1. *Management of tree crops:* Women folk play a significant role in the establishment and management of tree component which includes propagation of indigenous tree species mainly to supplement seasonal fruits, fodder during odd season, firewood and timber for small works. Their involvement in tree management if done scientifically can enhance afforestation efforts, biodiversity conservation sustainable livelihood practices at times.
2. *Management of associated crop components:* Women actively participate in collection, processing of seeds and planting material, their periodic management, timely harvesting and post harvesting practices. It demonstrates their expertise in selecting, planting, caring, and harvesting of farm produces with its core embedded in indigenous crops and sustainable farming based traditional knowledge systems forming a base to multi-way resilient agro-ecosystems.
3. *Rearing of livestock:* Although hill women farmers spent much of their time in performing activities related to child care and household management, they frequently take charge of rearing livestock and associated activities like fodder collection, daily cattle care, farmyard manure etc., including small scale livestock as well. It further ensures integration of livestock with HAS while providing fodder and shelter for livestock and manure plus diversified income on the other hand.

The additional diversified role of women farmers in management and promotion of HAS can be recognized in points mentioned below:

1. *Decision making process*: Women's participation in decisions related to crop selection, resource management and utilization fostering a sense of social wellbeing, communal cohesion leading to development of community based management efforts in HAS.
2. *Sustainable agricultural practices*: Through construction of gully plug, contour strips, planting trees on slopes and ridges, improved irrigation and rainwater harvesting through small scale channels across the fields.
3. *Efforts to manage organic farming practices*: By selecting organic seeds and planting material, no use of fertilizers and insecticides, minimal use of plastics in farm related activities, involvement of animal husbandry and application of farmyard manure, and adoption of holistic and cyclic farming practices with zero waste., these women often contribute to prevent erosion of sloppy terrains and sustainability and productivity of hilly landscape.
4. *Indigenous knowledge systems*: Often act as custodian by carrying and disseminating indigenous knowledge related to local crops, herbs, shrubs trees and climatic conditions. Conservation and documentation of such knowledge is crucial for the well being of local communities and development of integrated methods of resource utilization and conservation.
5. *Community engagement*: In hills of Uttarakhand, women farmers are integral to societal fabrication and hill agroforestry in not excluded from it. Their involvement in HAS have widen implications of community engagement and efforts.
6. *Community development*: Furthermore, women farmers in Garhwal Region are integral to the community's social fabric. The involvement of women in agroforestry has wider implications for community development.

Now day's, women farmers have started cultivation of medicinal plants and other commercial crops or those crops which require less resources during production while fetching more market values at the same time. Very often, women farmers here sell their products to market but in very minimum quantities. Hence, their role is much extended beyond subsistence farming as to include the conservation of native plant species and cultivation of such crops which can provide them more livelihood securities without disturbing the natural conditions. It will not only sustain the local agri-ecosystems but also preserve the regions rich biodiversity making women farmers self reliant in terms of production and income.

Therefore we can affirm that women are an integral to the success of any traditional or newly developed agroforestry systems in the Himalaya. Recognizing their contributions is crucial for fostering sustainable practices and ensuring the long-term success of these integrated land-use systems as it can unlock greater potential for sustainable development in the region. This is need of hour to call for policies and initiatives that empower and support women in their crucial roles as stewards of hill agroforestry system.

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