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Role of Rural and Tribal Women in Conservation of Village Ecosystem: A Case Study of Nanda Devi Biosphere Reserve, India

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Abstract

Agrodiversity is one of the most important resource in which indigenous communities should have control over and access to various prospects of nature. It can be defined as the synergy and interaction among organisms, land, technology and social organisms that serve to fulfill production goals and sustain livelihood systems. The rate of biodiversity loss has been hastened by the combination of several economic, social, environmental and political factors in many marginal hilly village ecosystems. Such ecosystems are characterized by diversity in both space and time dimensions. The conservation of agrodiversity in village ecosystem the context of global food security assumes greater importance with specific reference to women. This study focuses on understanding gender roles, responsibilities, and its access to control over resources of rural and tribal women in conservation of village ecosystem in and around village of Nanda Devi Biosphere Reserve. This paper primarily deals with gender relationships and gender-sensitive strategies in promoting village ecosystem management through partnerships with local communities. As well as for policy recommendation, this paper highlighten the recognition of women farmerø capacity in traditional agrodiversity management, which can be the primary step in building an integrated and effective system for the use, enhancement and conservation of on-farm crop genetic diversity.

Keywords: Homegarden; NDBR; Conservation; Management and Agrodiversity

Introduction

The Himalayan region is vast, gigantic, diverse and one of the youngest mountain systems in the world. The Garhwal Himalayan region is characterized by undulating terrain, sparse human population, small and fragmented land holdings, rain-fed subsistence agriculture, low input-low output production system, poor means of transport and communication, women centered agriculture, migration of males in search of off farm employment, fragile ecosystem, low risk bearing capacity of farmers yet rich in plant and animal diversity. With their wisdom, the local hill people have maintained this fragile hill ecosystem without disturbing it. These people depend chiefly on forest, livestock and traditional agriculture in the hilly tracts for their survival. The forest products and agricultural yields meet the basic energy requirements of the central Himalayan people. Agrodiversity plays multiple roles in rural economy and has a strong human dimension as manifested through socio-cultural link and involvement of women. Earlier work has brought into focus the important role of women in the agrodiversity management and use of environmental resources including soils, crops, water, forest and the indigenous plants on which local communities depends. Women's central role in agrodiversity therefore cannot be over-emphasized. Agrodiversity often varies between different farms; and gender roles and relations in farm work, household dynamics, land tenure and differential access to productivity resource often contribute to these variations.

Present investigation is done with following objectives (i) to examine gender role and relation in ownership and management of homegardens and other field types; (ii) record management strategies in specific female homegarden and other farm types; (iii) examine the role of homegardens and community livelihood programmes in enhancing household food security and (iv) record women's indigenous knowledge and perceptions of endangered plants including food and medicinal plants.

Methodology

The study used data from a homegarden survey of plants among three sites of Garhwal Himalayas, two villages are around the Nanda Devi Biosphere Reserve (NDBR), and one village in buffer zone of (NDBR) were undertaken for the three years (2005-2008). The household survey was organized and managed including different aspect of agrodiversity using random sample of expert and innovative farmers, identified over the study periods in selected villages. The selections of farmers are including male and females, land-owner and tenant across each of the three villages. In-depth interviews were carried out with female expert farmers.

Results and Discussion

Sustainable resource use depends partly on local people's ownership; control and management of landuse and other resources. The hill farming systems are characterized by strong links between the main components of forest, livestock and crop production. Men and women both are involve in agricultural activity in Garhwal Himalaya. Women are dependent on their families in owing the land or the other way of obtaining the land is

to depend upon their husbands who are landowners. Male and female migrant, however, acquire land from owners on share-cropping arrangement which often favour the land owner. In Garhwal Himalayas, inheritance is through patrilineal system only male children, except where there are no male in family; female can inherit as land owner. The percentages of women who have the accessibility of handling the landownership are indigenous but the group of migrant women is limited. Women in these areas depend on their husbands or other male relatives for access to land, but do not own or control such land and cannot pass it on to their children. They may also obtain land from owners through share-cropping arrangement. Lack of access and control over land affects women's freedom and choice to practice land conservation and vary management strategies. This was a critical area of concern for migrant women in particular.

In homegardens, women obtain plots from their husbands and cultivate a variety of food crop, vegetable and medicinal plants. Agrodiversity is maintained by the economically poor society with other income sources being mostly non-descriptive in nature for ensuring low dependency on market. In rain-fed conditions there are three/four cropping seasons in two years with a fallow period, and two crop seasons in a year with a negligible fallow in irrigated conditions. An interesting feature in rain-fed agriculture is that the entire cultivated area in a village is divided into two mostly equal parts called 'Sarsö' which is used in rotation keeping only one part under short fallow during the winter cropping period. Thus during the summer cropping season the entire rain-fed agriculture area of the village is under crop (except when the land is abandoned).

Human labour is the most important input in crop cultivation, mainly comes from households itself and on some occasions from hired manpower. Maximum agriculture activities are performed by women except some heavier tasks of land preparation (clearing, felling trees and burning vegetable, ploughing and land preparations). Rest activity performed by women such as manuring and carrying; sowing and weeding. Threshing and winnowing; transportation and storing activities are mainly done by women and partly done by male (Table 1). The proportions of human labour contribution by different sexes indicate that males contributed only 20-30% of total human labour requirement for crop cultivation during the kharif and rabi cropping seasons, respectively (Figure 1). Male contributions in agricultural activity increased with altitude because in lower altitude the male have an alternative job option. Job option is decreased in higher altitude where these families are totally depended on agrodiversity and production.

Traditional method of management such as mulching with cleared weeds and stamps of crops after harvesting to conserve soil moisture, fallow period ranges from 3-6 month after a complete crop cycle. Deliberate leaving weed and tree present in agricultural field check soil erosion, are practiced as well. Farmers in the region prefer to grow paddy sole or mixed after a fallow as starting crop of a sequential cropping system, followed by wheat mixed with mustard and then with millets sole or mixed; or legumes sole or mixed. Such crop sequences are chosen (i.e. evolved) based on extensive experience/understanding gained by the farmers. They have perceived that cereals require higher manure input than millets; and legumes can perform reasonably well even when no manure is added. This in-fact is a vital traditional knowledge acquired by local

farming community and very much relates to emerging concept of synergism (Anderson, 2005). The farmers believe that continuous cereal or millet cropping without legumes could reduce the abundance of beneficial microorganisms. Use of legumes as one of the crop in a sequence was reported to improve productivity of crop system (Benites *et al.*, 1993; Adjei-Nsiah *et al.*, 2007; Kumber *et al.*, 2007, Chandra 2007).

Women farmers have a high level of awareness in environmental management. Their direct contact with the natural environment as providers of water, fuel, food and fodder and their high level of awareness of environmental practices in the face of resource constraints, need to be more widely utilized for sustainable management in farming systems. Due to deforestation, fuelwood is becoming scarce at demonstration sites, especially in lower altitudes. Women's central role in food preparation means that they have direct responsibility for fuelwood supply and are therefore worst affected by fuelwood scarcity. Accessibility of fuelwood is easier for landowners than for tenant farmers. Tenant farmers often have to share their fuelwood with landowner depending upon the share-cropping agreement between them. These families also use LPG, which depends on income of families. Consumption in fuelwood is higher as observed in winter in comparison to summer.

Both men and women at demonstration sites have homegardens where a variety of food crops and medicinal plants are cultivated. Household refuse is often dumped in homegardens as manure. Home gardens serve as a source of food supply for household needs especially in hilly region. The sustainability of rural livelihood is often critically dependent on livelihood diversification supported by variety of natural resource endowments.

Summary and conclusion

Present finding indicate that women have vital and changing roles as environmental resource managers. Yet they face significant constraints in access to resource including land, labour, credit and other income opportunities. Gender differences and gender relations in household dynamics, resource organization and other socioeconomic factors can play a part in explaining and impacting on bio-physical conditions. This needs to be recognized for sustainable environmental management.

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Table 1 Human labour input into different agricultural activity in and around NDBR of central Himalayas, India

S.No.	Agricultural Activities	Gender
1	Manuring and Carrying	W#
2	Ploughing and land preparation	M
3	Sowing	W
4	Weeding I	W
5	Weeding II	W
6	Weeding III	W
7	Harvesting	W/M
8	Threshing and Winnowing	M#
9	Transportation and storing	W

Where: M# mainly by Men with participation of women,
W# mainly by women and marginal participation of men

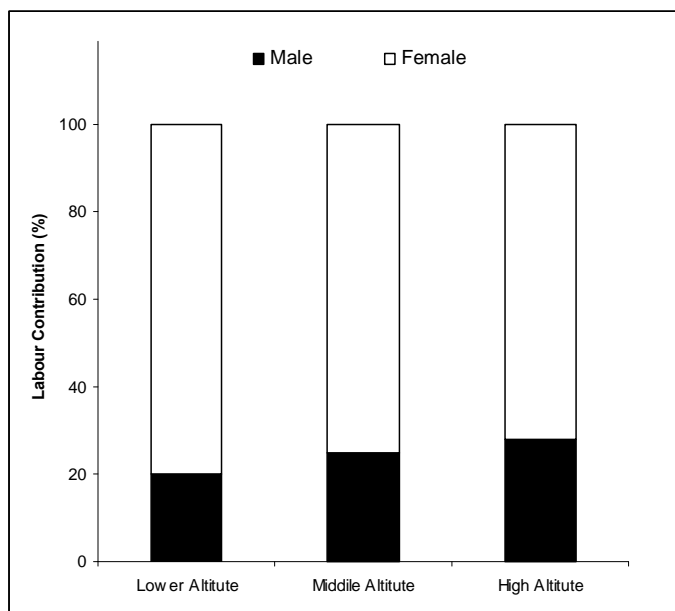


Figure 1 Human labour contribution by different sexes.

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