Work participation and Role of Gender in Village Ecosystem, Central Himalaya, India

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Abstract

Women in central Himalaya always play a significant role in managing and operating most of the household and agricultural activities. They are considered the backbone of hill agriculture and hill agriculture is the only feasible options of livelihood in Himalayan region. Mountain women with extensive knowledge of practices still trying mixed farming, preferring to traditional verities to increase on-farm biodiversity thus have been playing an integrated role in terms of ecosystem functioning and sustainability. However, in recent years, environmental degradation, poor resource management, and increased migration of men to plains have deteriorated livelihood options and added more workload of women in the Himalaya. The suffering of the mountain communities is gradually increasing and their standard of living is declining because they have been neglected at both policy and practice levels by the government. An empirical study was done to understand the work participation of women in different sub-sectors viz. agriculture, animal husbandry, forestry and their role in conservation of agro-biodiversity.

Keywords Sustainable, Mountain women, Village ecosystem, Traditional agriculture

Introduction

Women represent more than 50% of the population living in hills and actively participate in the social, cultural and economic activities and are major contributors to labour of agriculture, livestock, domestic and forest resource collections/utilization systems etc. Women in the mountains work harder and for longer hours than men and have vital role in conservation and management of sustainable ecosystem (Chandra et al 2009). In the mountain areas, contribution of labour is the most important factor in agriculture production and livestock management. Sex and age both play a critical role in determining labour allocation to particular work. Except to plough, harvesting, threshing and some time grazing livestock, which is symbol of male domination rest all other activities in agriculture and animal husbandry are in the exclusive domain of women, and thus their contribution in total work input of agriculture, forestry and animal husbandry is more than 85 percent. Agricultural practices are the main stay of
the people in Uttarakhand due to variations in climatic conditions, unavailability of reliable market accompanied by large family size on small fragmented farms on small terraces covered on steep slopes have led the farmers to adopt the subsistence farming systems which are characterized by substantial diversity (Maikhuri et al., 1996; Palni et al., 1998; Maikhuri et al., 2001; Nautiyal et. al., 2003; Chandra et al., 2010). Out of the total population, more than 80% people are engaged either with the main occupation of agriculture or its allied practices, dominated by traditional subsistence cereal farming. The farming of crops is mostly traditional and overall cropping pattern of the mountain region of central Himalaya is typically of an underdeveloped agricultural economy. All the farming systems are livestock based and form a spectrum of economic activities. Dependence on livestock and thereby on forestry is the common chord in these agricultural systems.

The economy of the region, operating at very low level of equilibrium unable to provide income and employment round the year to the dependent population; consequently it pushes large numbers of young male outside the region in search of livelihood. The status of different sexes varies from society to society and place to place depending upon culture, customs and traditions, in which they born and brought up (Singh, 1997). Though enough literatures are available focussing to the importance of Indian women (Sen Gupta, 1969; Desai and Krishnaraj, 1987; Biswas, 1990; Samal, 1993) yet, the information regarding the role of hill women in central Himalaya region is lacking in terms of functioning at different subsystems levels for sustainable development. Thus, role of hill women also need to be certified in various programme that improve their capacities in addressing the issues pertinent to rural development and village ecosystem management. Therefore, the objective of this paper is to analyze the work participation and functional attributes of women operating at different sub-systems and role of women in sustaining the traditional agroecosystem in Rawain valley of central Himalaya.

Methodology

To examine the gender role in conservation of traditional crop biodiversity and work participation rates (%) of men and women in different sector of village ecosystem i.e. agriculture, forest and animal husbandry, three village located within altitudinal variation of 1800–2400 m asl were randomly selected in the Rawain valley of Uttarakhand, central Himalaya. Equal representation was given to each village and a total of 210 families were identified and interviewed randomly. Approximately 210 women (70 from each village) respondents from studied villages participated in the study by sharing their perceptions and knowledge. A participatory rapid appraisal approach was used to fill up the semi-structured questionnaires. The questionnaire was designed with the help of the local people after individual and group discussion and subsequently it was tested in the field. All information pertaining to the involvement of men and women for varieties of works including agriculture sector, animal husbandry and forest based resources were collected through interview during the year 2006-08.

Study area

Uttarakhand is a newly formed hill state (29° 26’ and 31° 28’ N latitude and 77° 49’ and 80° 6’ E longitude) located in the central part of the Himalaya. The state
of Uttarakhand encompasses an area of 53,483 sq. km, which accounts for nearly 15.5 per cent of the total geographical area of western Himalayas and 1.63 per cent of the total land area of India along with population density of 159 person/sq. km with a total population of 8.5 million people (Nandy et al., 2006). The study area (villages) comes under the area of Govind Pashu Vihar Wildlife Sanctuary, in Uttarkashi district of Uttarakhand, India. The sanctuary is a fairly well populated area with 42 villages. The area has a significant value as a major watershed for River Yamuna, which is a very important river for the Indo Gangetic plains. The people living in these villages are by and large poor and lead a primitive life and are known as 'Parvati', who follow their own culture and community life (Negi et al., 2009a).

Results and Discussion

Division of labour

Demographic profile of the study villages is given in the Table 1. Women are heavily involved in subsistence crop production. The extent to which rural women are involved in agricultural production is a function of numerous interlinked factors. These include the type of farming system, the degree of mechanization used on the farm, farm size, available male labour, and a woman's social and economic status within the household as well as within society. Work-participation rate (%) of men and women in agriculture are presented in Figure 1. Women performed about 72 per cent of the work whereas men 28 percent. Work participation rates (%) of men and women in animal husbandry sector are shown in figure 2. Ninety per cent of the work related to animal are undertaken by women and remaining (10%) by men in all the studied villages. Men take part in animal rearing and watering however, work responsibility of women is relatively higher (68-94%). Involvement of women as compared to men is more than 60% for stall feeding, watering, forage collection and more than 88% in litter collection, milk extraction and cleaning shed and making compost.

Table 1 Demographic profile of the studied villages

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Name of the village</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of household</td>
<td>204</td>
</tr>
<tr>
<td>Total human population</td>
<td>1256</td>
</tr>
<tr>
<td>Adult male</td>
<td>634</td>
</tr>
<tr>
<td>Adult female</td>
<td>622</td>
</tr>
<tr>
<td>Average family size</td>
<td>6</td>
</tr>
<tr>
<td>Total forest area</td>
<td>249.0 ha</td>
</tr>
<tr>
<td>Total agricultural area</td>
<td>198.03 ha</td>
</tr>
</tbody>
</table>

*Source- Block office Mori and census 2001*
The collection of forest-based resources like leaf litter, fuel wood, and fodder, women allocate 82 per cent of their work time while remaining task (18%) are performed by men. Work-participation rate (%) of men and women at forest subsystem level is given in figure 3. Total involvement amongst the three ecological subsystems, women performed about 74 percent of the work whereas men 26 percent, out of the total man labour, the major work (28%) was involvement in agriculture subsystem followed by animal husbandry (24%) and forest subsystems (18%) respectively. On an average, women performed 15-16 hours of work per day, while men work hardly 5-6 hours per day. In some months, mainly during the peak period for crop production, men also allocate time for feeding animals. Women spend three to six hours a day on livestock and FYM activities, three to four hour for agricultural work and about three hours a day on fodder, leaf-litter, and fuel collection. They
expend 68 percent of their total labour on fodder, leaf-litter and fuelwood collection, 42 percent on cleaning sheds and compost making. This was in addition to their regular responsibilities within the household dwelling itself, such as child bearing and rearing, housekeeping, cleaning, cooking, baking and fetching water for domestic use.

![Work-participation rate (%) of men and women in forest sub-system](image)

Figure 3 Work-participation rate (%) of men and women in forest sub-system

**Role in sustaining the traditional agroecosystem**

The traditional crop diversity and their landraces in agricultural land use in Himalayas have great significance for long term sustainability of agroecosystems along with conservation and management surrounding landscape (Maikhuri *et al.*, 1996). As traditional land use in mountains is characterized by its dependence on local resources and locally developed technologies. Women performed a great job in preserving traditional agriculture with their broad indigenous knowledge. In crop production, women work long hours as comparison to men in transplanting, weeding, thinning, harvesting, threshing and winnowing and in many post-harvest activities such as sorting, grading, cleaning, storage and food processing (Chandra *et al.*, 2009). Women performed about 72 percent of the work whereas men 28 percent. On the production front women often consider nutritious aspects while making crops choices but also playing a vital role to maintain staple food under the marginal agriculture. The richness of crop diversity in the region is apparent from the fact that women traditionally harvest more than twelve grains and pluses (locally known as *Baranaza* system) in the monsoon crops and have evolved a very effective mechanism to prevent total crop failure to ensure food security (Negi and Maikhuri, 2009). They are maintaining the traditional practice of agriculture by their rich indigenous knowledge system and also retaining the essential linkages between the forest, livestock and agriculture systems (Figure 4). These women farmers of the region have realized that their crops have unique selling prize as bio-products, and have created marketing network through various NGOs, Expo-national and International trade fair etc. These platforms enable women farmers to access quicker benefits (Negi *et al.*, 2008). These
women cultivators more importantly then getting modest income have learnt an important lesson in marketing that proper processing and selling through organized channel could enhance market value of their products.

In order to understand the hardships and problems faced by the hill/mountain women it was realized to develop women capacity and skill in the field of cost-effective simple technologies (Table 2) to reduce the existing workload and alternate option of livelihood. Thus to minimize the existing rate of male migration as well as to reduce the workload of women folk on one hand and to utilize diverse bioresources sustainable on the other, it is imperative to synthesize cost-effective, simple agrotechnological interventions in most of the sectors of rural economy to provide viable alternatives for improving livelihood and food security (Joshi et al, 1998; Vyas et al, 1999; Maikhuri et al, 2007, Negi et al., 2009a).

Table 2 Brief description of some simple cost-effective technologies with their application

<table>
<thead>
<tr>
<th>Name of technologies</th>
<th>Uses</th>
</tr>
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<tbody>
<tr>
<td><strong>(A) Protected cultivation</strong></td>
<td></td>
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<tr>
<td>Polyhouse</td>
<td>It is used for enhancing the production of quality vegetables, flowers and ornamental plants etc. and also provides protection to crops from severe effect of frost, cold and diseases. It is very useful in high altitude areas. The temperature and moisture inside the polyhouse is greater as compared to outside environment, which enhances the rate of photosynthesis and helps in better and uniform growth of plants.</td>
</tr>
<tr>
<td>Nethouse</td>
<td>Off seasonal vegetables cultivation and nursery raising of medicinal plants provide better yield under net house. It saves the plants from extreme summer temperature and help in maintaining required air and soil moisture.</td>
</tr>
<tr>
<td>Polypit</td>
<td>It is equally beneficial as polyhouse. It helps in the buffering of temperature inside resulting into increased CO$_2$ fertilization effect, and also minimizes the water requirement</td>
</tr>
<tr>
<td><strong>(B) Organic compost</strong></td>
<td></td>
</tr>
<tr>
<td>Biocomposting</td>
<td>The compost prepared through this technique is richer in nutrients and take less time (30-45 days) in compost preparation whereas in traditional methods it takes 8-10 months.</td>
</tr>
<tr>
<td>Vermicomposting</td>
<td>Continuous use of vermicompost replenishes soil fertility quickly by improving physico-chemical and biological properties of the less fertile soils. In this process the earthworms are bred in a mixture of cow dung, soil and agricultural residues.</td>
</tr>
<tr>
<td>Vermiwash</td>
<td>Vermiwash is a liquifrom biocompost, which is applied on vegetables and horticultural crops through sprinkling. It helps in enhancing the number of macro-micro organisms and essential elements in soil for plant growth and acts as pesticides.</td>
</tr>
</tbody>
</table>

Building women’s capacity/skill to make these choices means not just bringing new rural technologies to their doorstep, but addressing their organizational capacities and opening new channels of information and knowledge. This is particularly important in the Himalayan region where local women have very limited access to modern facilities or to secure external help for solving the local problems. Establishment of integrated farming and sustainable systems contribute to long term
food security and increased productivity, which contribute to the health and general well being of women.

Women of this region are aware about biological diversity and rich in indigenous knowledge of natural resource and its management on which they depend for livelihoods. Women performed an enormous job in preserving and conserving agrobiodiversity with their broad indigenous knowledge and century old experiences. Every aspect of economy and day-to-day lives of the majority of rural population is governed by agriculture sector. The stability and sustainability of its agriculture is therefore of much of significance. Traditional crop varieties and races, which evolved over time through trial and error, not only provide basic nutritional requirements, but also food security (Maikhuri et al., 1997). Inclusion of these crops into the cropping system will therefore produce the required food security, particularly to those communities who live in fragile ecosystem like central Himalaya (Maikhuri et al., 1997). In the present scenario traditional food crops have been replaced by income generating cash crops (Negi et al., 2009b), resulting in lower access to nutritious food and contribute to degradation of environment, production of unsafe food and ultimately deterioration of human and animal health while traditional crops have their importance as a health food, largely due to their nutritive composition, including high dietary fibre and the unique low glycemic index of their carbohydrate (Maikhuri et al., 2001). Women indicated that special incentives and ecological compensation are necessary to promote profitable conservation of local and traditional crop varieties because traditional crops or local crops are hardier with an ability of coping with the adverse climatic condition.

Seasonal and off-seasonal vegetable cultivation in protected condition (polyhouse, polypit, nethouse) together with organic farming is a vital option to improved economy of households and makes them self-sufficient and reduces their dependency on market for agrochemicals. Farmers earning can be improved not by just increasing productivity but also through efficient and effective bioprospecting of traditional agro-products. The price paid by consumers for value added products has been increasing rapidly. Lack of linkages between farmers and consumers has resulted in lack of adequate economic benefit to the farmers especially women. Capacity building and information on marketing system can maximise the economy of rural women farmers to certain level. Women farmers can get better prices for their value added products by direct marketing without (Figure 5) the involvement of intermediaries and this is possible with the formation of Self Help Groups (SHG) otherwise they have to buy these product at higher prices after value addition in the cities. This can be avoided by value addition in agro-products at village and their direct marketing at higher prices to local or urban market. Marketing through SHG provides rural women with access to markets that they never could access alone. Beside there are many programme of government for rural women at district and block level which might be a milestone for their livelihood options. Therefore, there is need to provide detail information about rural development programmes/activities (being executed by the state/central governments and their line departments) and make them empower about roles and functions of various rural departments through education and awareness. Educational and awareness programmes for women need to incorporate for village development and thus develop their capacity and skill in the field of enhancement of rural livelihood, leadership and strategic planning skills as well as confidence building, role in decision-making in local level governance.
Conclusion

In conclusion, one can undoubtedly depict that women have always had a central role in managing and operating in most of the household activities in the rural
areas of the hills and maintaining the sustainability of various sector of rural ecosystem. They play a significant role in natural resource management, on which the livelihood and the very survival of hill families/communities depend, and are an enormous source of traditional knowledge related to daily life and use of bioresources around them. Himalayan women have the necessary skill, indigenous knowledge and sharpness to utilize this opportunities, the only necessity is to evolve a community based institutional mechanism to utilize these wisdoms in policy making. So, the increasing levels of economic investment and multiplication of development programmes for women’s on the one hand, and the worsening of economic and environmental conditions on the other emphasize the need for a critical re-examination of prevailing development planning approaches in this Himalayan region of the country. A participatory approach through institutional and policy support is required for developing new strategies and approaches for land utilization with the involvement of women at ground level for sustainable rural ecosystem.

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