The Pivotal Role of Women in the Hills: Gender Analysis in Arah Village in Uttar Pradesh, Central Himalayas, India

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Abstract

Women of the rural central Himalayas play a pivotal role in sustaining the mountain economy and in upholding ecological and cultural values. Several studies suggest that women have varied and demanding occupations but the suggestions have rarely been supported by any data on energy expenditure. In the study described here, an attempt was made to analyse the major functional activities of women living in the remote central Himalayan village of Arah in the Kumaun hills in terms of energy expenditure (Mcal[1] per person per year). Women of four age classes, viz., 5-15, 16-35, 36-55, and above 55 years were analysed in terms of the energy used to perform various categories of work. The tasks analysed were performed exclusively by women, with the exception of a few activities in agriculture and animal care to which men also contributed. The maximum energy (average of the four classes for the individual category of work) was expended by women on household activities (169 Mcal per person per year), followed by agricultural operations (148 Mcal per person per year) and animal care (112 Mcal per person per year). The energy spent on different functions was also calculated for each age class. Girls in the age range 5-15 and women of 56 years and above spent their maximum energy on household activities (227 Mcal per person per year and 258 Mcal per person per year respectively), while women in the age ranges 16-35 and 36-55 expended the maximum energy on agricultural operations (313 Mcal and 246 Mcal per person per year respectively). Overall women in the age range 16 to 35 expended the most energy on average and those of 15 and under the least.

Introduction

Contemporary social studies largely focus on gender issues in energy and environment management. While the role of women varies in different parts of the world with the ecological, topographical, social, and cultural setting, their contribution towards preserving and sustaining ecological and socio-cultural values is widely recognised. In the rural areas of the central Himalayas in Uttar Pradesh, India, women of all ages play pivotal roles, and have varied and demanding chores to perform. The major duties undertaken by rural central Himalayan women are directly associated with access to common property resources and the quality of the natural resources (Gurung 1995). In this context, women in the mid-hills of the central Himalayas are subjected to a variety of stresses. The diminishing of natural resources and shrinking biodiversity of ecosystems have become matters of concern for society as a whole. One of the results is that there is an increasing tendency towards out-

1 1Mcal = 1 megacalorie = 1000 kcal; 1 calorie ~ 4.19 Joule

migration, particularly of men. Migration has served to undermine methods of natural resource management and has diverted communities away from investing energy and effort in their immediate environment (Myers *et al.* 1995). Long-term migration is steadily increasing, and this is increasing the workload of women (Bisht and Tiwari 1996; Rawat *et al.* 1997).

The functional value of women is very high as they share major responsibilities and perform a wide spectrum of duties in and outdoors. The role of women in terms of energy input to the rural ecosystem is more important than that of their male counterparts. They contribute more calories in performing necessary agricultural operations, household activities, chores related to animal care, and various routine jobs. In the rural Himalayas, practically all domestic and non-mechanised work is performed by women. Female participation in labour is also high (Vashudevan and Santosh 1987; Singh and Rawat 1992; Kadekodi 1997). The energy costs of common tasks in rural Nepal are summarised in Panter-Brick (1992).

The multiplicity of work performed and energy input by women is characterised by extensive interrelationships between such factors as the location of a village, social structure, age, composition of the family, environmental endowments, size of household, per capita land holding size, level of land fragmentation, irrigation conditions, cattle population and type of energy and resource base (Briscoe 1979; Bajracharya 1983; Vidyarthi 1984; Dewees 1989; Singh and Rawat 1992, 1993; Rawat and Kothyari 1994).

The hardships that women face result from the gender-based division of labour, their double work burden, the unequal distribution of resources that results from their subordinate status, and their lack of control over productive resources (including land) and cash. Against this backdrop, the lives of women are greatly affected, in ways different to men, by the environmental degradation that is occurring in the Himalayas as well as in other regions of the world (Venkateswaran 1992).

Detailed studies have been made on the lifestyles of women in Nepal (Acharya and Bennet 1981) and Garhwal (Reynolds and Nautiyal 1990). Both these and the present study in Kumaun show that the general condition of rural Himalayan woman is similar over a wide area in terms of the nature of work that is being performed. So far, however, there have been few studies on energy expenditure and none similar to the present one. A series of studies by Panter-Brick (1992, 1993, 1996) on women from rural Nepal largely focuses on issues such as nutritional efficiency, pregnancy and lactation, seasonality, and human biology but not on the parameters chosen here.

The study described in the following was concerned with the quantification of labour input in terms of the energy expended by rural women in performing major duties in a typical mid-mountain village in the central Himalayas. The valuable inputs made by men to complete certain activities like agriculture and animal care were also taken into account, but they were not analysed in terms of energy because the inputs were not comparable to the inputs by women.

The Study Site

The study site (Arah village) was located between 29° 59' 30" and 29° 59' 56" N and 79° 35' 20" and 79° 36' 15" E at an elevation of 1468 masl in Bageshwar district of Kumaun region in Uttar Pradesh in the central Himalayas. Arah is situated approximately 4 km from Garur Rural Service Centre (the road head), is spread over an area of 98.75 ha, and has limited essential amenities. Although the village is dependent on Garur town for both basic and essential amenities, it has a very strong social institution for dealing with problems related to the village community and resource management. In the early 1990s the village population was 543 (288 male and 255 female), the livestock population was 326, and cultivated land totalled 52 ha (rainfed and irrigated). The agricultural areas are surrounded by pine forest.

Methodology

Detailed investigations of the actual workload of Arah women and their equivalent energy inputs into various tasks were carried out during 1993-96. A complete inventory was made of work performed in the major areas of household activities, animal care and related activities, and agricultural operations using a questionnaire prepared for the purpose.

Forty of the 86 households in the village were selected for detailed study. Family size, landholding size and type of agriculture (rainfed and irrigated), livestock number and type, and other factors were taken into account in the selection of households. After a preliminary survey, the women were grouped into four age classes (5-15, 16-35, 36-55, and >55 years) to reflect their physical capabilities, socioeconomic position, the nature of work they usually perform, and the inherited traditional family responsibilities. Ten women per age group were sampled with random selection for each class.

The activities were evaluated in terms of the total number of hours per person per age class per year for performing each operation. The energy equivalents for performing sedentary (79 kcal per hr), moderate (117 kcal per hr), and heavy work (217 kcal per hr) were calculated using the methods given in Gopalan *et al.* (1985). Gopalan *et al.* give eight hours per day as the average that women perform moderate and hard work, a value supported by our total study samples.

Study Groups

Group I (5-15 years)

Traditionally in the rural central Himalayas women are forced to take on responsibilities from childhood. Rural girls normally start providing a contribution to household and related activities from the age of 5-6 years; at the age of 9-10 years they are considered 'fully trained' and able to act as independent units in the female work force. In the modern setting of rural

society, education has also been introduced as an essential part of their lives. Almost every day, before and after attending school, they perform many tasks related to the household and other sectors.

Group II (16-35 Years)

Rural women in this age group are considered fully mature and able to take complete independent household responsibility for a family. This age group is physically strong and is used to the maximum limit in terms of energy input in all sectors, including family affairs and social responsibilities. However, they are not supposed to take independent 'decisions' on any matters outside routine household duties. The average age of marriage for women in the Arah area is 17 years.

Group III (36-55 years)

Rural women of this age feel slightly relieved and try to join the older groups. They are allowed to take 'decisions' on agriculture and related activities and to take an active part in social activities. They work in agriculture, animal care, and household activities. Once they reach the age of 50-54 years, a new generation (work force) is usually ready to take up most of the responsibilities outside normal household activities.

Group IV (above 55 years)

Women of this age group are physically weaker but remain 'in charge' of household activities and are very particular about the regulation of family affairs, a responsibility which is traditionally inherited. They keep themselves busy with household, animal care, and social activities.

Results and Discussion

The study showed that there was a clear division of labour between the women in different age groups (Table 9).

On average, the most energy overall was expended on household activities (170 Mcal per woman per year) followed by agricultural activities and work related to animal care. The

Table 9: **Average Energy Inputs by Women in Different Age Groups for Different Types of Tasks (Mcal per person per year)**

Activities	Energy Input				
	5-15 yrs (I)	16-35 yrs (II)	36-55 yrs (III)	>55 yrs (IV)	Average
Household	226.6	111.4	81.7	257.9	169.4
Animal care	103.6	79.9	127.1	138.1	112.2
Agriculture	14.2	313.4	246.1	20.0	148.4
Total	344.4	504.6	454.9	416.1	430.0

greatest amount of energy overall was expended by the women aged 16 to 35 (505 Mcal per person per year) and the least by the youngest group (344 Mcal per person per year). There was no direct correlation between age and energy input, but there was a clear-cut demarcation of specific work and responsibilities for women of different age groups.

Household Activities

Household activities include fetching water, cooking, childcare, and collecting firewood; education (attending school) was also included in this category. All these chores require major and regular energy inputs. The majority of household activities fall under the sedentary or moderate category of work. Table 10 shows the average energy inputs per year for different household tasks according to age group and overall.

The oldest age group contributed the most energy to household work (258 Mcal per person per year), mostly in the form of cooking and childcare, and the group aged 36 to 55 years the least (82 Mcal per person per year). The large contribution by the youngest group resulted from the inclusion of education in household activities. If this is discounted then their overall contribution is only a little more than that of the group aged 36 to 55 years. Overall most energy was spent on cooking and associated activities (56 Mcal per person per year), and the least on collecting firewood (1.4 Mcal per person per year).

In this village collection of water does not require as much energy as in many places because drinking water is available in the village from community water posts, private water connections, or a *naula* (spring). The youngest age group contributed the most energy to water collection.

The oldest age group made by far the largest contribution to cooking and related activities (116 Mcal per person per year), with similar, but much smaller, contributions by all the other groups. Essentially, the oldest age group did the actual cooking and other groups available indoors performed associated activities. Men also helped to prepare midday meals during the peak agricultural seasons.

The study village is surrounded by a good pine forest so firewood collection was not a major problem, and this activity was a low energy input sector for the village women. The

Table 10: **Average Energy Inputs for Household Activities by Women in Different Age Groups (Mcal per person per year)**

Activities	Energy Input				
	5-15 yrs (I)	16-35 yrs (II)	36-55 yrs (III)	>55 yrs (IV)	Average
Water collection	55.6	44.8	30.7	38.3	42.3
Cooking	36.0	29.0	42.7	115.6	55.8
Firewood collection	0.6	2.6	2.6	0	1.4
Education	134.4	9.1	0	0	35.9
Child care	0	26.0	5.7	104.0	33.9
Total	226.6	111.4	81.7	257.9	169.4

middle age groups contributed the most of this small amount. Occasionally men also assisted in felling and cutting of logs used for firewood.

One of the most important activities in the household sector is childcare. The oldest age group contributed the most energy for this (104 Mcal per person per year), followed by a much smaller contribution from the 16 to 35 year old group (Group II, 26 Mcal per person per year). The Group II women were mostly responsible for childbirth and the care of babies, but women in the oldest group took most of the responsibility for childcare activities overall as the women in Group II were busy in other sectors like agriculture and animal care. It is not uncommon for this lack of time and burden of work on the part of mothers to lead to poor health of both mother and child and even contribute to premature death. Surprisingly the youngest group played no part in activities related to childcare.

Only unmarried girls went to school, i.e., those in Group I and a few girls over 16. For secondary and higher-secondary education students have to walk to Garur town (approximately 4 km from the village). A major part of the energy input in this sector was due to daily return journeys between village and school.

Animal Care Activities

Animal husbandry is an important sector in the rural central Himalayas. The major tasks are care of cattle (and buffalo) during open grazing, care of cattle (and buffalo) at the homestead, and collection of fodder and leaf litter (for bedding). The average number of livestock per family was four (mid 1990s). The large livestock in Arah village comprised cattle (53% of all animals), buffalo (36.2%), goats (9.4%), sheep (0.7%), and horses (0.7%).

Table 11 shows the average energy inputs by women per year for different tasks associated with animal care according to age group and overall. On average every woman contributed 112 Mcal per year to these activities. The maximum energy input was used for the care of stall-fed cattle and the collection of fodder (36 Mcal per person per year for each activity), closely followed by care of cattle during open grazing. Considerably less energy was expended in leaf litter collection.

Table 11: **Average Energy Inputs for Animal Care by Women in Different Age Groups (Mcal per person per year)**

Activities	Energy Input				
	5-15 yrs (I)	16-35 yrs (II)	36-55 yrs (III)	>55 yrs (IV)	Average
Care of cattle during open grazing	49.0	7.1	11.5	51.1	29.7
Care of stall-fed cattle	19.6	24.4	36.7	63.9	36.2
Collection of fodder	21.3	38.5	63.7	21.0	36.1
Collection of leaf litter	13.7	09.9	15.2	2.2	10.2
Total	103.6	79.9	127.1	138.1	112.2

The oldest women contributed the most energy overall per person to animal care (138 Mcal per year) and the 16 to 35 year-old group the least (80 Mcal per person per year), although all groups contributed significantly.

The share of energy contributed by women in different age groups varied according to the task. Cattle care during open grazing was mainly performed by the oldest and youngest women and girls. This work is considered sedentary and thus suitable for physically weaker women. Older and physically weaker men sometimes take on this task. In contrast, the energy input for the care of stall fed cattle was directly correlated with age, with the youngest contributing the least and the oldest the most.

Fodder collection is a major activity and includes collection of agricultural residues, collection of green fodder (for daily use), and harvesting of dry grass during the autumn to be stored for the winter months. Fodder collection is a supplementary activity when animals graze outside, but compulsory for stall fed animals. Generally families need to collect 40-60 kg per day, and in almost all cases women are responsible (Reynolds and Nautiyal 1990). Some fodder is obtained from the agricultural harvest and some from on-farm trees grown on the terrace margins. However, for much of the year women must make daily journeys to collect leafy branches and grass from the forest. In badly deforested regions, and especially in centrally situated villages, women of all ages might walk 10-20 km and back to find fodder and carry head-loads weighing from 20-40 kg (Nautiyal 1982; Nautiyal and Nautiyal 1983). Green fodder (grass and leaf fodder) is considered a luxury for cattle during winter in this region and is fed preferentially to milk giving animals. *Grewia oppositifolia* is considered the best green fodder in winter but is generally available in small quantities only. Except for the collection of green grass and leaf fodder from nearby agricultural fields, fodder collection was mostly done by the women of medium age (groups II and III).

Collection of 'leaf litter' from nearby forests for animal bedding is a very common activity. Although pine needles are not considered good for composted manure, they are the only material available in sufficient quantity near many villages in the Arah area. Collection of pine needles is a seasonal activity and is carried out during May and June. Traditionally pine needles are also used for burning on selected agricultural fields, for example while preparing paddy nurseries. This is because of the commonly held belief that fire helps to eradicate weeds—concomitant damage to soil micro-organisms and earthworms is not considered. The energy input into this activity was mostly divided between the women in the three younger groups, women in the oldest group contributed little.

Agricultural Activities

According to Swarup (1991), hill agriculture is very complex but universally highly dependent on women's labour. It is based on traditional methods, which are labour intensive with low external inputs. Rural women are busy round the year with agricultural operations, but the average total yield is generally low and the crop only sufficient to feed the family for five to six months.

In Arah village, the agriculture system can be classified into two types: rainfed (about 90%) and irrigated (about 10%). Agricultural operations broadly include activities like field preparation and sowing/transplantation, and operations related to yield enhancement, protection, harvesting, and storage.

Table 12 shows the average energy inputs by women per year for different tasks associated with agriculture according to age group and overall. On average every woman contributed 148 Mcal per year to these activities, but the vast majority of the activities were performed by women in the two middle age groups from 16 to 55 years who contributed 313 and 246 Mcal per person per year. The youngest and oldest contributed little energy. The maximum energy input was into yield increasing activities and the least in field preparation.

Field preparation, which is the first step, consists of such activities as breaking up clods of soil, digging the terrace margins (where planting is not possible), sowing, and transplantation (during *Kharif*; May to July). This is one of the sectors where traditionally the men contribute energy for ploughing, and for watering before or after ploughing. Bullocks, an essential part of the cattle population, are used during field preparation and for some other agricultural operations during the year. Women of 36 to 55 years contributed the most energy to this task (36 Mcal per person per year), slightly more than those of 16 to 35 years. The oldest women contributed the least.

Yield increasing activities basically cover collection, transport, and incorporation of fertiliser, mostly composted manure, and were considered the most tedious and tiresome of all the agricultural activities. Addition of composted manure was the main measure for improving soil fertility. The manure was added preferentially to irrigated fields as rainfed agriculture was considered uneconomic (three crops in two years). Only a small amount of manure was spread on the rainfed fields. Almost all the households had some irrigated agricultural lands along the Garur Ganga or Gomti river (Garur valley), approximately four kilometres below the village. The manure had to be transported by head-load from the cattle sheds in the village to the distant fields. Although inorganic fertilisers were also used in limited amounts, this had no direct effect on the quantity of manure transported and applied to the fields. The major part of the total energy input into this sector was expended in transportation. Women in the 16 to 35 years age group contributed the most energy to this activity (167 Mcal per person per year) followed by those of 36 to 55 years.

Table 12: **Average Energy Inputs into Agricultural Activities by Women in Different Age Groups (Mcal per person per year)**

Activities	Energy Input				
	5-15 yrs (I)	16-35 yrs (II)	36-55 yrs (III)	>55 yrs (IV)	Average
Field preparation	5.2	29.5	36.3	2.3	18.3
Yield increase	3.6	167.2	92.5	0	65.8
Yield protection	0.1	53.3	31.7	5.5	22.7
Yield collection	5.3	63.4	85.6	12.2	41.6
Total	14.2	313.4	246.1	20.0	148.4

Yield protection activities include weeding, breaking up the soil surface, and protection from wild animals and diseases. Although the actual activities related to yield protection are considered sedentary, substantial time and strength is required to cover the long distances between the village and the fields. Crop protection is directly related to the return on investment, so the job is considered important and not suitable for children. Equally the most experienced women are physically weaker and not able to cover the long distances frequently. Thus women of 16 to 35 years contributed the most energy to this task followed by those of 36 to 55 years, with only a small contribution by the oldest and virtually none by the youngest.

In the rural setting of Arah village, yield collection is the last event in the agricultural cycle. The major activities are harvesting, transportation, threshing, drying, and storage. Harvesting of crops and transportation to the village are hard tasks usually done by women in the middle age groups. Threshing is a mixed effort done collectively by men and women and by using bullocks. Women in the older age groups (over 36) usually perform drying and storage activities with occasional assistance from anyone around, including men. Overall women of 36 to 55 contributed the most energy followed by those of 16 to 35 years with lesser contributions from the oldest and youngest.

Conclusions and Recommendations

Women constitute the backbone of the Himalayan economic system and contribute substantially to the economic growth of the region (Bhandari 1991; Samal 1993). They have major responsibilities in the fields of agriculture, cattle, and collection of fuel, fodder, and water, in addition to a plethora of duties at home. These oft-quoted general statements are substantiated by the present findings. The women in the study village expended large amounts of energy in all sectors of life. It is clear that development programmes for such villages need to take a serious note of the division of labour within households, and adopt a thoughtful, researched, holistic approach when considering the individuals who will carry out initiatives and development activities.

Some of the conclusions reached by the research team in Arah village are summarised below.

- The rehabilitation of degraded land in and around villages of the mid-hills, which accounts for up to 50 per cent of land in some areas, will only be relevant and sustainable if emphasis is given to the role that the women play in community resource management. The production of quality fodder and firewood and plantation of easily managed cash crops both on-farm and on degraded lands will have a direct beneficial effect on the workload of women.
- Selection of tree and grass species for rehabilitation of wastelands needs to be made on the basis of both socioeconomic impact and ecological values. The tree species recommended for mid altitude zones on the basis of villagers' practices and

ecological suitability are *Alnus, Bauhinia, Celtis, Dalbergia, Ficus, Grewia, Quercus, Dendrocalamus* and some perennial grasses.

- All natural resource management training activities (e.g., on the management of biomass production, water, animal husbandry, eco-technologies for horticulture and agriculture, planning and budgeting, and monitoring and evaluating) should focus on women. Women need to be apprised of the advantages of a judicious blend of ecological prudence with traditional technologies (Valdiya 1997).
- A reduction in the number of poor quality cattle and replacement with fewer economically more beneficial animals could substantially reduce the drudgery of women. Stall feeding of a few productive animals would reduce open grazing and improve the production of milk and of compost manure.
- Education on basic sanitation, health, and hygiene could improve the working capacity and living standards of hill women.
- Development of rural service centres must be associated with the development of road networks. Essential basic institutions like primary health and secondary education centres need to be provided in close proximity to the villages to facilitate the needy and to reduce travelling time.
- The increasing trend of rural out-migration by the male population has increased the workload on women. Development of rural service centres would reduce temporary migration. Encouragement in setting up small-scale industries, for example fruit processing units, could result in considerable benefits for employment and the economy.
- Across the Himalayan region, there need to be opportunities for women to train in specific tasks like mushroom cultivation, handicrafts, plantation, beekeeping and honey production, fruit preservation, cultivation of herbs, sewing, sericulture (silkworm breeding), and rabbit breeding. This should be done in such a way that the imparted skills reduce the overall workload of women and do not add to their existing chores.

Acknowledgements

The authors are thankful to the International Centre for Integrated Mountain Development (ICIMOD), SDC, and IDRC for financial assistance and to Drs. Subrat Sharma and D. S. Rawat for help and valuable suggestions.

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