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Women's Contribution to Household Food and Economic Security: A Study in the Garhwal Himalayas, India

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Poverty and household food security are much debated issues in development literature, and women's contributions to food and economic security have received attention for the last 15 years. Collection of natural resources is

usually carried out entirely by women in developing countries, particularly in fragile and rugged mountain environments. Our study in the Garhwal Himalaya attempted to monetize this unpaid work by women through a survey conducted by researchers of time use on a recall basis for the last 7 days. The value of women's contributions was then computed by

2 methods: opportunity costs and output method. The results show that women are at the forefront of food and economic security and in some cases are breadwinners. Policies must address the specific problems of fodder and fuelwood collection in mountains by promoting renewable and nonconventional energy resources such as biogas and solar energy and by involving women in grassroots participation. This will significantly lessen the drudgery of women's work.

Keywords: Gender division of labor; time use analysis; monetization; unpaid work; opportunity costs; output method; food and economic security; India.

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Introduction

Women's work remains unrecognized and formally unorganized despite the fact that women's contributions to the family are vital; in many cases women are the breadwinners and work longer hours than men (UNDP 1995). This underestimation reflects women's lower status in the family and locality; they have very little or no say in household decision-making. Disparities in responsibilities and income share received ample attention in the *Human Development Report 1995*: "Men received the lion's share of income and recognition for their economic contribution while most women's work remains unpaid, unrecognized and undervalued" (UNDP 1995: 93).

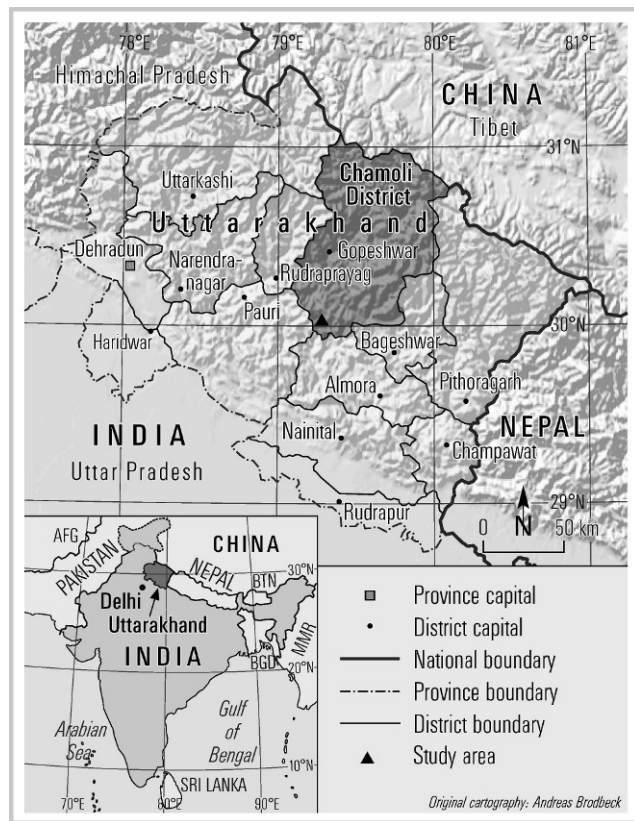
This is the result of a faulty concept of participation in the labor force that does not include household or domestic work as economic activity, mainly because of the focus on use value rather than exchange value (Donahoe 1999). This indicates a reason for the neglect of women's economic contributions to the household in particular and to society in general (Ironmonger 1999). Gender bias in intrahousehold allocation of resources, participation in decision-making, and time spent within and outside the house need to be studied further (Buvinic 1999). The most striking characteristic of household labor is that, whether employed or not, women continue to do most of the

housework around the globe (Shelton and John 1996). Women in Nepal rise before dawn to fetch water and firewood. They are usually the first in the family to get out of bed and the last to rest. Women in poor households work more hours than men, and the poorer the household the longer women work (Buvinic 1999): "All women spend more time on housework, have more responsibility for child rearing, have less access to many social and material resources, and have less access to public spaces and public power" (Krishnaraj 2006: 4441).

In developing countries in general (Agarwal 1997) and in the study area in the Garhwal Himalaya in particular, the gender division of labor within and outside households is evident (Mawdsley 1998; Agarwal 2000). The basic nature of work performed by women in rural areas falls under nonmarket economic activities (Choudhary and Parthasarathy 2007). Because of the greater task specificity of agricultural work—women perform the tasks of transplanting, weeding, and harvesting—they face sharper seasonal fluctuations in employment and earnings than men (Agarwal 1997). The activities performed by women are often not counted as economic activities or are undervalued, and are typically excluded from analysis (Shelton and John 1996).

After exploring the literature on women's unpaid work, the gender division of labor, and the care economy

FIGURE 1 Location of the study area. (Map by Mountain Research and Development, based on a map by Andreas Brodbeck)



pertaining to developing countries and India, we carried out the present empirical study in the Garhwal Himalaya, in light of the impact of male selective outmigration on the local communities' livelihoods, women's dependence on forests, and women's significant and unrecognized contributions to the household (Krishna 2002; Sati 2008).

Study area

The study area (N30°03.377, E79°17.539) is located at the junction of the Garhwal and Kumaon regions in the middle Himalaya in the newly formed state of Uttarakhand (Figure 1). It is characterized by rugged terrain with average altitudes ranging from 1370 to 1830 masl (Everest Datum). Physical access is difficult, soils are poor and shallow, agricultural productivity is low (Ghosh and Dhyan 2005), animal husbandry is of poor quality (Krishna 2002), there is a lack of physical and social infrastructure (roads, water, electricity, telecommunication, schools, and hospitals), and forest (quality and quantity) and water resources are increasingly being depleted (Sati 2005). The area has very poor road and ropeway connectivity as an eco-friendly alternate to roads. According to a report by the Central Himalayan Institute in Dehradun (Bisht 2003), there is a yawning gap between demand and supply of

road connectivity in the hilly regions of the state, and construction is restricted because of the Central Forest Act. This has an impact on women's collection activities.

Uttarakhand has a population of 8.48 million with a geographical density of 159 persons per km² and a decadal growth rate of 19.20%. The sex ratio (number of females per thousand males) of 964 is higher than the national average of 933 (and 874 in Punjab; Premi 2001). The primary sector predominates with rainfed agriculture, and the secondary and tertiary sectors are absent. Crop production is the main activity with cultivation of *mandua* (finger millet), paddy, and wheat. Livestock is characterized by low productivity, and the premonsoon season is characterized by a shortage of fodder and water. This has made animal husbandry an economically unproductive activity.

The study area is politically sensitive and is currently being proposed as the "summer capital" for the state (Dikshit Commission; School of Planning and Architecture New Delhi 2008). Women in the study area have participated actively in the Uttarakhand movement for separate statehood and forest rights and have protested against increasing alcoholism in the area (Joshi 2001). Although this has no direct bearing on women's work, it reveals women's mobility and visibility outside the household domain. Historically the Garhwal and Kumaon Hills have experienced selective male outmigration for employment (Krishna 2002). This has resulted in "truncated families, with women, children and the old left behind" (Bose 2000) and has left women in worse condition because they have to toil hard for sustenance and shoulder the dual responsibilities of housework and work outside the household, irrespective of caste. Otherwise, it is the men's domain to perform market-related tasks. Women's migration is influenced by the social factor of marriage and is confined to short distances, primarily with the district.

Objectives and hypothesis

The objectives of the study were the following:

- To examine what time men and women spend on different activities in general;
- To measure and value the economic contribution by women to household economic security; and
- To explore gender (dimensions) of the division of labor.

We took freedom of mobility for women (without having to require permission from men) outside the household as a proxy for freedom and hypothesized that freedom enjoyed by women in the study area is bargained by them through their hard work and contribution to the economic security of the household. Women work more hours than men and contribute substantially to household income in more than 1 way.

Methodology

In the present study, the time use survey (TUS) method was used for the purpose of data collection because the data provide a good measure for capturing the economic contributions of women in the household (Kulshreshtha and Singh 1999; Hirway 2003; Sikoska 2003; Craig and Mullan 2010). In TUSs, cultural bias is reduced because information is gathered without imposing a predefined concept of “work.” Time use data provide deep insights into women’s daily life, the nature of their work, their leisure time, their say in decision-making at household level, and the risks associated with collection of fuel, fodder, and water (Pandey 1999). TUSs increase our understanding of the limitations of standard national accounts and include activities such as unpaid housework and care of children, the elderly, and disabled—all of which are not covered in surveys of the labor force (Budlender 2007).

The study was undertaken from December 2007 to February 2008. To collect data we selected 29 villages using the purposive sampling method, with parameters such as location, for example, on top of a ridge, on a river site, or on a high terrace (locally known as *malli*). After identification of villages we conducted a house listing. We then identified households using systematic sampling and selected 8 households from each village. For these 8 households we conducted in-depth interviews (IDIs) with men, daughters, daughters-in-law, and mothers-in-law—all social status categories in this area that are relevant to gender and labor issues. Data were collected through IDIs. Prevailing illiteracy at the study sites prevented us from using the diary method. During the study we covered 232 houses with a response rate of 70%; a total of 162 IDIs were conducted. During IDIs data were collected on a weekly recall basis to even out daily fluctuations, rather than on a daily recall basis, which provides more accurate data. Structured questionnaires were used to collect background information on social and economic aspects of households.

Researchers were recruited on a voluntary basis and were given 7 days’ training on how to conduct qualitative research. Two teams were formed, each consisting of 2 female members and 1 male member. The presence of female researchers ensured a better response rate because females were comfortable with them. Researchers were from the same geographical region and had 3 years of college education up to the undergraduate level. IDIs were conducted individually in the local language for the duration, ranging between 30 and 40 minutes. These IDIs were then transcribed and translated into English.

Gender division of household work in Gairsain Development Block

Gendered division of labor within households is evident when we look at the daily tasks performed by family

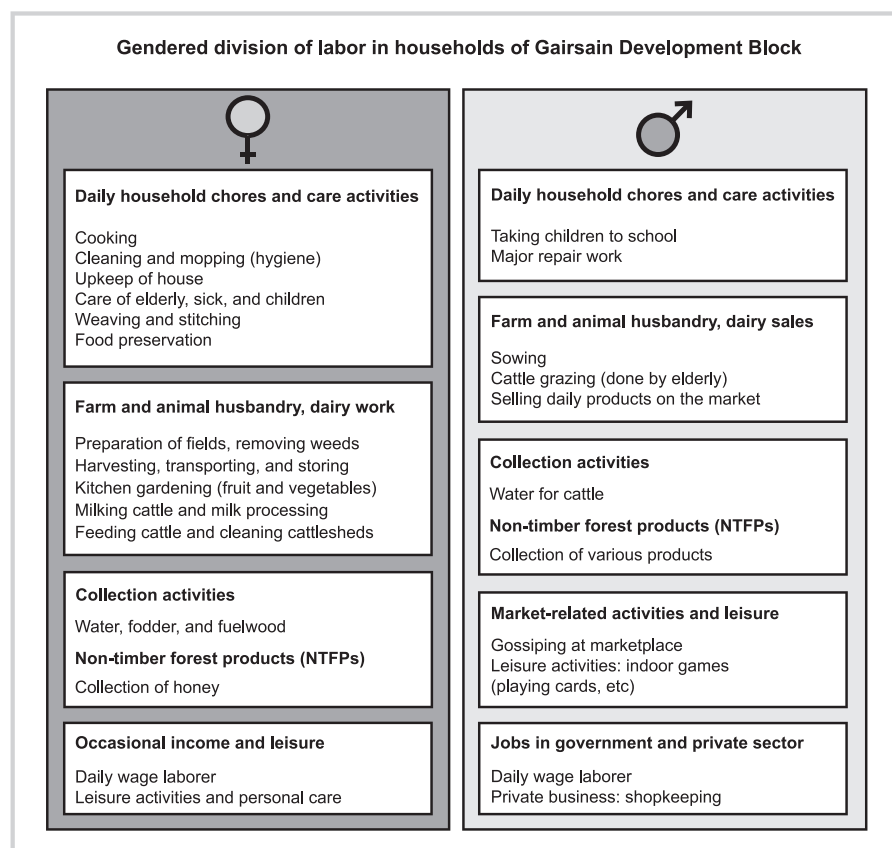
members in the study area. Apart from paid work outside the household, male members perform certain tasks such as planting paddy in fields, market-related work, dropping children off at school, grazing cattle, and major repair work at home. On the other hand, women work in and outside the household for most of the day and throughout the year. They perform such activities as preparing meals 3 times a day, cleaning and mopping, washing utensils and clothes and keeping house, looking after children, the elderly, and the sick, fetching water, fuelwood, and fodder, caring for livestock (feeding and milking cattle and cleaning the cowshed), weaving and stitching, preserving foodstuffs for lean seasons in the form of pickles, making squash and juices, preparing fields for farming, weeding, leveling, and dividing fields into blocks for irrigation, and harvesting, transporting, threshing, and storing food grains. This is not an exclusive list of activities. Women also engage in multitasking, which makes their work even more taxing. A study by Choudhary and Parthasarathy (2007) also found that labor is gender specific, women work for longer hours than men, and they contribute significantly to household nutritional security.

Figure 2 shows the gendered division of labor in Gairsain Development Block. Looking at the aforementioned list of activities, it is evident that women shoulder greater responsibilities within the household, but these activities fall in nonmarket categories and do not earn income for the family. Women’s work is usually not done at a formal workplace and fails to generate direct cash income. This in turn partly results in their subjugation and their lack of say in decision-making within the household (Messias et al 1997; Lingam 2007). The following section presents an analysis of daily time use.

Daily time use analysis in the study area

Work hours and the nature of work for women depend on their social status, that is, as daughters, daughters-in-law, or mothers-in-law in the study area. When cross-tabulated with independent variables such as caste, religion, and class (economic status) by head of household, male and female, we found no significant differences in terms of daily work hours, but marked differences prevail according to the above-mentioned social status. Newly married women (daughters-in-law) have to work longer hours than their mothers-in-law and unmarried girls to prove themselves ideal daughters-in-law; hence they work many hours a day. This prevents us from classifying women as a single generic category.

Daughters-in-law carry out all the backbreaking heavy work of fetching water, fuelwood, and fodder along with agricultural activities, while daughters perform lighter tasks such as cleaning pots, cutting vegetables, and assisting their mothers in kitchen gardening. They also

FIGURE 2 Division of labor among women and men in households in the study area.

have more time than daughters-in-law for recreation and visiting friends. On the other hand, mothers-in-law enjoy all the privileges and perform much lighter work and work fewer hours (7 hours). They work in kitchen gardens and help with preparation of food, food distribution within the household, and looking after grandchildren. When asked about her daily activities, a 60-year-old woman stated, “I don’t do anything as I can’t work anymore ... my daughter in law performs all the work.” Moreover, in this rugged terrain of the Himalayas, daughters-in-law carry head loads of 35–40 kilograms for 5 km (one way) for 2–3 hours (in some cases forests are located more than 8 km away). One young married woman expressed her woes: “mother-in-law scolds me when I am late, but this is not fair because after working so long and too hard, I get all this rebuke ... do I deserve this?”

Health issues

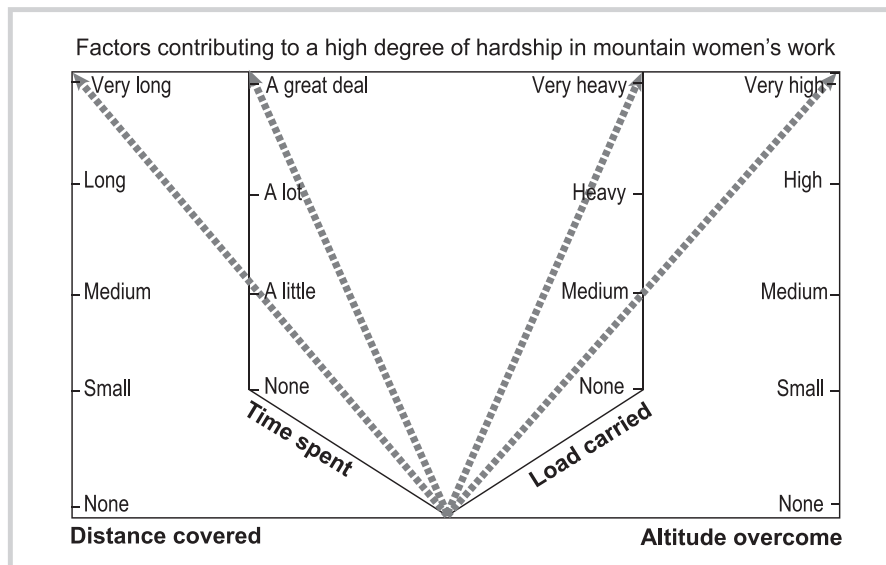
Women’s collection activities are affected by distance to reach a forest, the altitude to be overcome, the time spent, and the weight of head loads (Figure 3). Although studies generally consider the average distance traveled to fetch fuelwood, they usually omit the impact exerted by terrain and head load. When asked about health problems

associated with their work, women reported joint pain, back pain, deformation of bones, and scars on their backs and shoulders. The literature indicates that rural women face higher risks of morbidity and mortality because of strenuous physical work (Doyal 1995; Rawat 1995; Basu and Sidh 2008). Tales of death due to falling from hills while collecting fuelwood and fodder were narrated by 3 respondents in the study area. In the process of collection, women climb trees and cover several kilometers.

Table 1 makes it evident that collection of fuelwood and fodder is entirely done by women in general, and daughters-in-law in particular. When we look at leisure time as an indicator of human welfare, women—specifically daughters-in-law—do not have time for recreation (watching television, personal care, and rest between work hours). The time for rest is calculated to be 1 hour a day in the study area. The study was conducted from December to February, an agriculturally lean period; this is clear when we look at average time spent on the farm, but this does not mean that women have a great deal of leisure time. They invest this time in other household activities, as mentioned with respect to gender division of labor.

In the survey area wood is used primarily for heating and cooking. This poses a serious threat to women’s

FIGURE 3 Four factors increasing the degree of hardship in women's work in the Garhwal Himalayas.



health, because they spend an average of 5 to 5.5 hours (including care activities) indoors and are exposed to high levels of toxic pollutants in the kitchen area (Duflo et al 2008). These pollutants include carbon monoxide, which

results in chronic obstructive pulmonary disease (Clark et al 2010). In addition, women reported that the quality of the forest is fast degrading because of increasing human activities; along with reduction in areal spread, this is

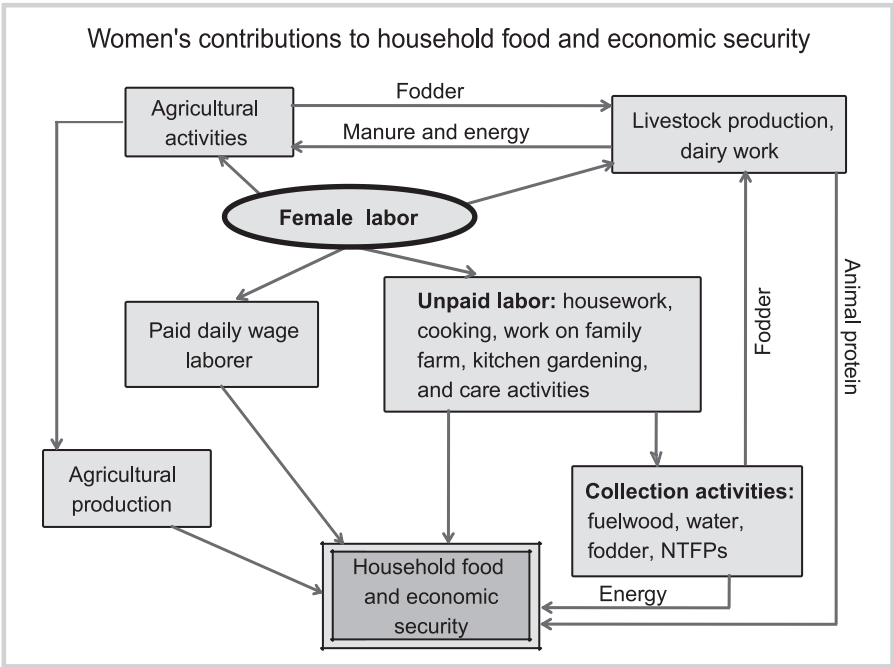
TABLE 1 Time spent on daily activities. (Source: Computed from survey data collected in Garhwal Himalaya for the present study)

Activities	Average time (hours)				
	Men ^{a)}	Women			
		Daughters	Daughters-in-law When collecting wood	Daughters-in-law When not collecting wood	Mothers-in-law
Daily household chores and care activities	0.5	3.0	5.0	5.5	2.5
Animal husbandry and milk production	1.0	1.0	2.5	2.5	1.0
Collection/fetching activities	–	4.0	9.0	6.0	–
Agricultural/on-farm activities (agriculturally lean season)	– ^{b)}	–	–	2.0	2.0
Work in paid activities	8.0	–	–	–	–
Visit to marketplace (purchase of goods) and gossiping	3.0	1.0	–	–	–
Leisure activity	4.0	3.0	1.0	1.0	4.0
Total time	16.5	12.0	17.5	17.0	9.5
Time excluding leisure, visit to marketplace, and gossiping	9.5	8.0	16.5	16.0	5.5

^{a)}Men: Only 1 category because they do not participate in domestic chores, irrespective of their age, and marital and family status.

^{b)}Sowing is done by men.

FIGURE 4 Framework for understanding how and where female labor contributes to food and economic security of households in the study area.



adding to more hardship for women because they have to spent more time in forests at the expense of their leisure time.

The survey area has an average of 3 cattle per household, and animal excreta could be used to produce biogas. Biogas is a clean source of fuel. This would have a twofold impact on women's welfare and health. First, it would lessen the drudgery of fetching wood from long distances, and, second, it would improve indoor ambient air quality. Moreover, improvement in the design of the

chullah (traditional cooking stove) can also significantly improve indoor air quality (Clark et al 2010).

Men's contribution

By contrast with women, men are engaged primarily in paid work in government jobs (the armed forces are the main employer), the private sector, and in the unorganized sector as daily wage laborers. Primary data reveal that 24% of households had 1 member in government or military service and 49% reported 1 male

FIGURE 5 (A) A woman carrying grass for cattle on her back. (B) Returning from the woods. (Photos by Shiv Sidh)



member as a migrant. Men do not work on farms other than carrying out sowing activities and thus enjoy a greater amount of free time playing indoor games such as *carrom* and cards and gossiping at the marketplace. As reported by one of the respondents in a high terrace village: "My work is to plough the land, and the rest of the work is done by my wife [stated with a sense of superiority]." In the evening, men in the study area drink alcohol. We were told by one man who works as a daily wage earner on a construction site at the block headquarters: "After coming from the site I play cards, drink tea, and before going home I drink [alcohol]." When asked about participation in household activities and agricultural activities, one youth replied: "I don't know anything about these, my family members must know about it. ... I go home to eat and sleep otherwise I roam in the market." Older men do take care of cattle grazing and taking cattle to river sites for water. Men devote some time, though little, to household work such as maintenance of the home and cutting wood for fuel (brought by women from the forest).

It is quite apparent that males who are currently working do not participate in household work and agricultural and collection activities. We were informed by the men that they were working and earning a livelihood for family members and cannot work in both places (home and outside). Market-related activities, for example, purchasing groceries or food, are solely performed by male members of the household (the exception being households with selective male outmigration).

Figure 4 shows a conceptual framework representing women's contribution to household economic security. Women contribute to household income in many ways by engaging in activities such as agriculture, livestock farming, and collection of fuelwood, fodder, and water (Figure 5A, B). This results in direct and indirect contributions to food and economic security in the form of supply of animal protein, energy security, agricultural productivity, and work in unpaid activities within the household. Women also contribute to the family income in the form of non-timber forest products (Carr and Harti 2008). Thus the hypothesis that women's freedom is conditional and bargained by shouldering huge responsibilities holds true to a major extent.

Monetization of women's work

Women's work is unpaid, done for household consumption, and not traded in the market. The value of these goods and services is counted neither as a part of household income nor in Gross Domestic Product (Kulshreshtha and Singh 1999). These goods and services should be valued at the basic price at which they could be sold if offered for sale in the market. By imputing value to these goods and services, we can estimate the

contribution of women to household income and compare it with the contribution of men to household income (UNDP 1995). Economists have argued against imputation and measurement of women's unpaid activities because of problems of measurement; imputed income also does not have the same significance in monetary terms. However, in principle these problems associated with measurement can be eliminated.

For measurement and imputation, this study used 2 principal methods: the input and output methods (Swiebel 1999). The *input method* measures the time spent in unpaid economic activities and assigns a price to it. This can be done in 2 ways:

- The *opportunity cost method* values individuals' time spent in unpaid work by taking hourly wage rates for men and women and then multiplying it by hours spent every day.
- The *market replacement cost method* also has 2 approaches: global substitutes (performs all tasks of a homemaker) and specialized substitutes (different persons professionally trained would take over different household tasks).

However, specialized substitutes would result in an overestimation as against global substitutes owing to higher productivity. On the contrary, the *output method* tries to measure goods and services produced by assigning a price. Theoretically, this method is superior but has problems in identifying physical units of production; owing to this limitation, the output method is rarely used in its original form. We used the opportunity cost method and output method (with its limitations) to measure and impute women's unpaid work. We used the input method to look into gender discrimination in wage rates and found that there is no visible discrimination based on gender, but women's overall participation in paid wage labor is negligible.

Output method

We conducted interviews about the number of days women spend collecting fuelwood and fodder. For fuelwood, women reported spending 2 days per week from April to mid-December and 1 day per week for the remainder of the year. In the case of fodder, they gather 2 bundles of green grass daily in the monsoon season; after drying, 10 bundles make one. During the dry season they collect 1 bundle (dry grass) every day, which makes a minimum of 120 bundles of 30–35 kg each. The details of imputation are available in Table 2. The average monthly income of women was calculated to be Rs 2847 and their annual income Rs 34,168 (1 US\$ = 46 rupees). This is more than the per capita income for Uttarakhand state (Ministry of Finance 2004–2005).

This appears to be an undervaluation owing to a host of factors: lack of reliable data on crop production (because crops are not traded on the market), exact

TABLE 2 Valuation of goods produced by households and their market value; all collection work is done by daughters-in-law. (Source: Computed from survey data collected in Garhwal Himalaya for the present study)

Goods	Quantity (units)	Market rate (rupees)	Total amount (rupees)
Wood	120 bundles ^{a)}	120	14,400
Fodder	120 bundles ^{b)}	125	15,000
Honey	2 kg	200	400
Water	Monthly charge ^{c)}	64	768
Vegetables	Monthly income ^{d)}	300	3600
Annual income			34,168
Monthly income			2847

^{a)}Weight: 35–40 kg per bundle.

^{b)}Weight: 30–35 kg per bundle.

^{c)}Government charge for water connection.

^{d)}For an average family size of 6.

quantities of vegetables and fruit produced in kitchen gardens and consumed within the household, and seasonal variations in the price of fodder and fuelwood due to fluctuation in supply and demand (we have taken average prices). Nor did we impute the value of dairy products to avoid the problem of counting twice, because fodder is used to feed the cattle, but in the process we lose the value addition while producing milk, butter, and curd. For water, we took the government rate for piped water supplied for drinking in rural areas (government department charges on a lump-sum basis). We did not include the time spent on care of children and the elderly and cooking (includes pre- and postcooking preparations).

Imputation clearly reveals the magnitude of the economic contribution by women in the hill society. In Garhwal Himalaya, women are the breadwinners for the household, and they provide vital household fodder and fuel security. This leads to nutritional security and ultimately household economic security (Figure 5). In the study area men consume major parts of their income in drinking and smoking (as reported during the survey); this is negative and personal in nature and does not foster human welfare. On the contrary, women's income is utilized for the collective welfare of the family. When asked about their perception of work and whether they consider themselves to be working, 81% of the women

considered themselves to be “working.” This finding contradicts the commonly prevailing perception that men are the only earning members of the household.

Opportunity cost method

This method took prevailing market wage rates for 7 hours per day. Wage rates are different for government and private work: Rs 100 (the rate at which workers are paid in the Union Government of India's flagship employment scheme, the Mahatma Gandhi National Rural Employment Guarantee Scheme [MNREGA]) and Rs 130 (the rate at which people hire labor for construction and farm-related activities). Table 3 provides details for monetization based on daily wage rates.

According to this method, women (young and married) earn 1.8 times more than what men earn when hours spent daily are converted to income. Women's work is relentless, meals must be prepared 3 times a day, and care for children and the elderly must be given immediately. On the other hand, most male members of the household do not work on public and national holidays. This gap in earnings becomes greater if we extrapolate for the entire year.

This study did not take account of multitasking performed by women. For example, while cooking, a woman is also looking after her children. Nor did we factor in the seasonality of work. Women face greater

TABLE 3 Computation of wage rate based on market wage rates. (Source: Computed from survey data collected in Garhwal Himalaya for the present study)

Gender	Working hours (per day)	According to government rates ^{a)}	According to private sector rates ^{b)}
Male	9	128	167
Female (young married women)	16	228	297

^{a)}Rs 100 per day, or Rs 14.25 per hour, as paid under the Mahatma Gandhi National Rural Employment Guarantee Scheme.

^{b)}Rs 130 per day, or Rs 18.57 per hour, as paid for construction work.

seasonal fluctuations in the nature of the tasks they perform, but it was not possible for us to cover all 4 seasons because of time, financial, and human resource constraints. Some critics point out that women's work lacks intent and rigor and thus should not be assigned monetary values using these methods (Van den Berg et al 2006). Indeed, by imputing monetary value to women's unpaid work we may mask the specificity of work, and qualitative aspects cannot be captured even by a time use survey. However, this does provide a monetary estimation that is necessary for the social recognition and empowerment of women.

Conclusions and policy measures

In the survey area women reported using more than 50% of their time for collection activities: collection of fuelwood, drinking water, and fodder for cattle. Apart from this, women produce goods and services for households that would be produced by the market in developed countries (UNDP 2005). Women are the breadwinners in many households, in contrast to the common perception that they are economically dependent on their male counterparts; if their work is monetarized, they earn more than men and contribute to significantly household economic security. These estimates are an undervaluation and do not reflect the actual contribution of women owing to the omission of many activities, underreporting, and multitasking. Women work primarily in nonmarket household production activities, whereas men are engaged in paid market activities. Gendered division of labor is evident,

and women's work remains outside the formal economy. The work women do often affects their health, in particular because of the hardships of collection activities and the air pollution they are exposed to when working indoors. Biogas production could be an option to reduce air pollution and the need for fuelwood.

Policies should address the specific needs of women and offer solutions for household energy demand, fodder, and transportation. Household fuel and fodder security are very important for food and economic security. Based on our findings, we suggest the following policy measures:

1. The study area has potential for biogas production, which will provide clean and pollution-free fuel for cooking and will ensure greater welfare and better health for women by reducing indoor pollution (Parikh et al 1999). This will reduce the dependence on forests for fuel, save time and distance traveled to collect wood, and conserve degrading forest resources. Organic manure as a by-product of biogas will help improve soil fertility, which will result in better farm productivity, on the one hand, and will have positive dividends in forest quality, on the other hand.
2. The study area is free of fog and smog during the winter. This results in bright and warm days with ample sunlight, and solar incidence is 4–7 kWh per m² with variations in availability during the monsoon season (Ministry of New and Renewable Energy 2008). The state and central government need to promote nonconventional forms of energy to meet the needs of heating and lighting. This will also impact women as they will have to fetch less fuelwood.

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