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WOMEN'S EMPLOYMENT IN BANGLADESH AGRICULTURE: COMPOSITION, DETERMINANTS AND SCOPE[♦]

by

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[♦] The present paper is developed from the author's Ph.D. dissertation which was completed at the Asian Institute of Technology (AIT), Bangkok in 1998. An earlier version of the paper is presented at the Regional Conference on *Gender and Technology in Asia* held at AIT during 4 – 7 August 1998. The author is grateful to Dr. Jenifer Piesse, Birkbeck College, London for comments and suggestions. The usual caveats remains with the author.

WOMEN'S EMPLOYMENT IN BANGLADESH AGRICULTURE: COMPOSITION, DETERMINANTS AND SCOPE

Gender composition of labour use and factors determining demand and supply of female labour in crop production is examined using survey data from 14 villages in two agro-ecological regions of Bangladesh. The share of women in labour use ranges between 11 – 18 percent in foodgrain (rice and wheat) and 14 – 48 percent in non-cereal (highest for vegetables) production. Incidence of female labour hire is very low and varies directly with land size classes while supply from family varies inversely. Cultivation of diverse crops (local and modern varieties of rice, jute, oilseeds and vegetables), education as well as women's ownership of land increases demand for hired female labour. On the other hand, membership in non-governmental organisation and women's ownership of land decreases supply of female labour from the family. Also, sharp regional variation exists in hiring female labour. A decentralised crop diversification policy, gender sensitive educational program as well as institutional arrangement to increase women's access to land would promote women's gainful employment.

Introduction

There is widespread agreement that rural women in Asia play an important role in agriculture (Kaur and Sharma, 1991; Unnevehr and Standford, 1985) though its reflection is yet to be seen in formulation of agricultural development policies (Agarwal, 1998). Dearth of information exists on women's involvement in agricultural production in Bangladesh with a prevailing claim that they are involved only in the post-harvest processing of crops. Although it is widely held that gender division of labour in Bangladesh is strictly demarcated with women being responsible for agricultural work within the household and not allowed to undertake field work (Begum, 1985;

Abdullah, 1985), contrasting evidence is also available (Zaman, 1995). Women in Bangladesh spent an average of 3.1 hours per day on agricultural work while men spent 5.1 hours (Zaman, 1995) which is not substantially lower from an average of 4.4 hours for rural women in India (Kaur and Sharma, 1991). Also, a simple change in the definition of women's work increased the estimate of women in the labour force from 3.2 million in Labour Force Survey 1985/86 to 21 million in Labour Force Survey 1989 in Bangladesh and the increase was largely in rural regions (Rahman and Routray, 1998).

Issues Related to Employment Effect of 'Green Revolution' in Agriculture and Women's Participation

In general, technological change in agriculture and/or 'Green Revolution' is aimed at augmenting land and labour productivity and, therefore, has profound implications for labour absorption and/or employment in agriculture. However, widespread controversies exist on the employment effects of technological change in agriculture. Jayasuriya and Shand (1986) claimed that though the modern agricultural technology increased labour absorption at its initial stage, but the rapid adoption of the new labour-saving chemical and mechanical innovations in developing countries is resulting in net reductions of agricultural labour use. Alauddin and Tisdell (1995) also noted that the employment generating effect of the 'Green Revolution' in Bangladesh has slowed down in recent years though employment in the dry season increased four fold from 1960s to 1980s with wet season employment remaining stagnant. Hazell and Ramasamy (1991) noted that 'Green Revolution' did little improvement in increasing total crop employment though the modern rice cultivation utilises 5 – 10 percent more labour than local varieties in South India. On the contrary, Hossain (1989) and Hossain *et al*., (1990), using farm-level surveys, concluded that modern technology diffusion increases the size of the labour market with increased demand for

hired labour. Also, a change in the composition of labour took place from low-wage permanent labour to high-wage casual labour, thereby refuting the notion of a depressed employment effect of 'Green Revolution' in agriculture.

However, increased demand for hired labour owing to modern agricultural technology diffusion does not necessarily translate into gender equity in gainful employment. Starting from the early eighties, widespread introduction of automatic and semi-automatic rice mills to support the 'Green Revolution' technology dramatically displaced rural women in the post-harvest processing sector who are largely involved in manual husking of rice. An early examination of the employment effect of these rice mills revealed that they displaced 29 percent of the total husking labour, most of whom are women (Ahmed, 1982). Therefore, as employment opportunities for the growing mass of vulnerable and landless rural women is closing in post-harvest processing sector, and the non-farm sector in Bangladesh is highly stagnant, the alternative lies in actively involving women directly in crop production activities.

Though analyses of the employment effect of 'Green Revolution' in Bangladesh is widely available (Hossain, 1989; Ahmed and Hossain, 1990; Hossain *et al*., 1990; Alauddin and Tisdell, 1995) knowledge on factors determining demand and supply of female labour in agriculture is non-existent. The present study, therefore, attempts to contribute to the existing body of literature by explicitly examining the factors determining supply and demand for female labour in crop production in Bangladesh and knowledge of this is essential for appropriate policy prescriptions.

Types and Sources of Data

Primary data for the study pertains to an intensive farm-survey in two agro-ecological regions[1] conducted during the crop year 1989. A complete household census of eight villages from Jamalpur Sadar Thana (central sub-district) of Jamalpur region representing wet agroecology and six villages from Manirampur Thana (sub-district) of Jessore region representing dry agroecology were conducted. The survey initially covered a total of 1,755 households. However, detailed information relevant for the present study is available with 1,567 households (753 in Jamalpur and 814 in Jessore, respectively), which was taken as the final sample size. Details of labour input data for each of the 13 broad crop groups[2], classified by gender, is collected.

Gender Based Labour Use in Crop Production

Labour input used for all types of crop produced[3], classified by gender and sources of supply are presented in Table 1. It is clear from Table 1 that women's labour input varies substantially across crops. The share of women in labour use ranges between 11 – 18 percent in foodgrain (rice and wheat) and 14 – 48 percent in non-cereal (highest for vegetables) production, and, therefore, refutes the prevailing claim that women's labour use in Bangladesh is confined only to post-harvest processing sector. However, the incidence of hiring female labour is strikingly low. Except for cotton (grown only in pockets of Jessore region), the incidence of hiring female labour is less than two percent of total labour use. This indicates that though modern agricultural technology increased the demand for hired labour employment, the benefit remained skewed in favour of men as only they are largely hired.

For a further insight into the incidence of women's labour use in crop production, an estimate of overall labour use for producing crops at the household level classified by land size classes[4]and sources of supply is presented in Table 2. It is clear from Table 2 that women's labour input varies substantially across landsize classes as well as regions with an inverse relationship between family labour use and landsize categories. Proportions of family female labour and male labour use steadily decline as one move upward from marginal to large landsize class. On the other hand, the proportion of hired labour use is positively related with landsize classes. However, the overall use of hired female labour is negligible though family female labour contributes to about 11 percent (14 percent in Jamalpur and 9 percent in Jessore) of total labour use. The estimate for women's labour input in crop production seems to be in line with Boserup's (1989) estimate of less than 20 percent women being involved in agricultural production systems in Asia (Bangladesh not included).

The incidence of hiring female labour improves substantially when only households that hired female labour in addition to male labour are examined. About 12 percent (182 households) of the total sampled households hired female labour in addition to male labour. The level of hired labour use in these 182 households increases from 2.1 person-days per household to 11.2 person-days (Table 2). The increase in hiring female labour largely substituted the increased workload of family supplied female labour in these households as the difference in total labour use is not large as compared to all sampled households.

Another interesting feature of the households hiring female labour is the substantially higher amount of hired labour use (both male and female). This phenomenon can be attributed to

increased cropping intensity and/or higher levels of modern technology adoption. The cropping intensity is estimated at 188.5 (221.5 for Jamalpur and 158.8 for Jessore region) as compared to 168.6 (191.8 for Jamalpur and 147.1 for Jessore) for all sample households. Also, the area under modern varieties of rice and wheat is estimated at 53 percent (55 percent for Jamalpur and 52 percent for Jessore region) as compared to about 42 percent for all sample households in both regions. Therefore, the employment generating effect of modern agricultural technology diffusion in Bangladesh remains undisputed and also favours female labour employment to some extent.

Determinants of Male and Female Labour Demand: A Multivariate Regression Analysis

A number of factors may influence demand for labour input in crop production that cannot be determined a priori and furthermore might not be uniform across the decision to hire male and female labour. Therefore, in order to identify factors determining male labour as well as female labour demand, multivariate analyses were performed at the household level. The following equation was fitted to the data:

HLABOR = f (WAGE, LANDOWN, TENANCY, WSHLAND, LVRICE, MVRICE, WHEAT, JUTE, POTATO, PULSES, OILSEEDS, SPICES, VEGETAB, WORK, EDUC, REGION)

where,

HLABOR = number of days of hired labour used in crop production (personday/household)

WAGE = the wage rate paid by the farmer (Tk/day)

LANDOWN = the amount of land owned (ha)

TENANCY = the amount of land rented-in (ha)

WSHLAND = share of land owned by women member (mainly wife) of the family (%)

LVRICE = the amount of land allocated for local varieties of rice (ha)

MVRICE = the amount of land allocated for modern varieties of rice (ha)

WHEAT = the amount of land allocated for modern varieties of wheat (ha)

JUTE = the amount of land allocated for jute (ha)

POTATO = the amount of land allocated for potato (ha)

PULSES = the amount of land allocated for pulses (ha)

OILSEEDS = the amount of land allocated for oilseeds (ha)

SPICES = the amount of land allocated for spices (ha)

VEGETAB = the amount of land allocated for vegetables (ha)

WORK = number of working member in the family (persons)

EDUC = number of highest completed years of schooling in the household (years)

REGION = dummy variable for region, 1 for Jessore and 0 otherwise.

Wages are expected to be a major determinant of hired-in labour. In Bangladesh, land ownership serves as a surrogate for a large number of factors as it is a major source of wealth and as input in crop production. The opportunity to adopt modern agricultural technology and/or diversified cropping systems increases with an increase in land size and therefore, a positive relationship is expected between land ownership and hired labour demand. The impact of tenurial structure on crop production decision, hence on labour use, is another substantially controversial issue. Bhaduri (1973), using Indian data, revealed that it is in the interest of the landlords, who derive income from land rent and money lending, not to allow tenants to adopt new technology, as it would reduce their indebtedness and dependence. On the other hand, Hossain (1989) noted that shared tenancy may be a preferred arrangement for modern technology adoption as tenants and

landlords, also indicated by Bardhan (1979) can share the risk. Therefore, the tenancy variable is incorporated to capture the effect of tenurial status on employment.

Share of women's land owned[5] in the family is incorporated as an independent variable due to its overwhelming importance and relevance for policies to promote gender equity. As mentioned earlier, land is a significant source of wealth in the rural economy throughout Asia. Agarwal (1998) argues that issue of women's independent access to land is not only important for welfare implication and poverty alleviation, rather it is also for ways to improve productive efficiency by tapping the potential of women through a more gender-egalitarian approach to agricultural development. And ownership and control over land resources would be one effective means to improve women's bargaining power in the labour market (Agarwal, 1994). Therefore, in this study, it was hypothesised that women's ownership of land would presumably positively influence hired female labour demand owing to the higher wealth status and greater degree of decision making power associated with it. Among the sampled households, women own all of the total land in about 8 percent (116 households) and own part of the total land in 13 percent (201 households), respectively. As a whole, women's share in land ownership either partial or full is in about 20 percent (317 households) of the total households (24 percent in Jamalpur and 17 percent in Jessore, respectively).

Different crops use different amounts of labour and households also allocate different amounts of land to each crop in a cropping system. Therefore, the influence of individual crop on hired labour demand cannot be determined a priori, though in most cases, a positive association is

expected. As such, land allocated to each crop is incorporated to capture their individual influences on hired labour requirements.

The number of working members in the family is expected to ease the labour constraint and may reduce the hired labour requirement and is included to capture its influence. The education variable is used as a surrogate for a number of factors. At the technical level, access to information and the ability to utilise inputs optimally may influence the crop production decision. It may also influence the composition of hired labour use. Higher levels of education may promote an increased level of women's employment. A significantly positive correlation is estimated between hired female labour-days and the level of education of the household head with sharp regional variation. The correlation coefficient is estimated at 0.18 (0.32 for Jamalpur and 0.13 for Jessore region, respectively) and all are significant at the one percent level. The regional dummy is incorporated to capture the influence of regional characteristics.

Three labour demand functions: (a) hired male, (b) hired female, and (c) total hired labour is computed. Since many households do not hire-in labour, there are zero observations on the dependent variable. Therefore, the values are censored at both tails. The most appropriate technique for such case is the Tobit procedure (Hossain, 1989; Ahmed and Hossain, 1990; and Hossain, et al., 1990). For the present study, both OLS and Tobit estimation procedures[6] were applied to the data.

Wage remains an important factor in determining labour demand with its strong negative influence for all the three functions indicating that the higher the wage rate the lower will be the

demand for hired labour irrespective of sex[7] (Table 3). Land ownership is significantly positively associated with all categories of labour demand as expected, indicating that large farm households hire increased amount of labour of both sexes. However, the influence of tenurial status on labour demand is mixed. Though it is significantly positively associated with male labour demand, it is significantly negatively associated with female labour demand. This indicates the culturally rooted preference in hiring male labour in crop production, particularly, when a large amount of crop income need to be paid to landlords as rent by the sharecroppers. The land rent is estimated at about 38 – 44 percent of gross value of crop production (Rahman, 1998).

Except for spices and vegetables, the area under all other crops significantly increases hired male labour demand. The influence of modern agricultural technology (area under modern varieties of rice) remains undisputed as indicated by the large value of its coefficient compared to the coefficient on local rice varieties. Jute and potato cultivation also significantly increases hired male labour demand and the influence is even stronger.

The demand structure for hired female labour is quite different in magnitude as well as across crops. The low value of the crop coefficients in the female labour demand function indicates the relatively weaker participation of women in hired labour markets. Local and modern varieties of rice, jute, oilseeds and vegetables significantly increase female labour demanded while pulses and spices have a somewhat negative influence though not significant. The value of the coefficient on modern rice is about three times the coefficient on local rice, indicating that modern technology adoption sharply increases hired female labour demand.

Share of women's land owned increases the demand for hired female labour as expected while decreasing the demand for hired male labour. Although the strength of the influences are not significant, correlation analyses of the relevant variables renders support to the general implication drawn above. Strong negative association between land owned by women and hired male labour use is observed, particularly, in households wherein women owned some or total land. The correlation coefficient between the share of women in total land owned and the share of hired male labour use is estimated at -0.37 (-0.48 in Jamalpur and -0.18 in Jessore, respectively) and all are significant at five percent level at least. On the other hand, positive association between land owned by women and hired female labour use is observed when households hiring female labour in addition to male labour are considered. The correlation coefficient is estimated at 0.22 (0.03 for Jamalpur and 0.45 for Jessore) and are significant (except Jamalpur) at one percent level.

The number of working members in the family has a negative influence on hired labour requirements as expected. The depressing effect is more pronounced (significant) in the case of male labour demand while it is relatively weak in the case of female labour demand. Education levels of the household head significantly positively influence all types of hired labour demand as expected though the influence is very high for male labour demand.

There is a sharp regional difference in the demand structure for both hired male and hired female labour. The use of hired female labour is higher in Jamalpur, a poverty-stricken region, as compared to Jessore, a relatively better off region, thereby, indicating the importance of regional dimension in the analyses of labour market and, therefore, limits the scope for generalisation.

Determinants of Male and Female Labour Supply: A Multivariate Regression Analysis

As with the case of the demand for labour, a host of factors may determine the supply of family labour for crop production activities. Those influences cannot be determined a priori. Therefore, in order to identify factors determining labour supply, particularly female labour supply, multivariate analyses were performed at the household level. The following equation was fitted to the data:

FLABOR = f (WAGE, LANDOWN, TENANCY, WSHLAND, LVRICE, MVRICE, WHEAT, JUTE, POTATO, PULSES, OILSEEDS, SPICES, VEGETAB, WORK, EDUC, REGION, BRAC)

where,

FLABOR = number of days of family labour used in crop production (personday/ household)

BRAC = membership in BRAC (a national non-governmental organisation)

Note: Definitions of all other variables are provided earlier.

In the supply function, a new variable, membership in an NGO, namely, BRAC[8] is incorporated. It is hypothesised that involvement in NGOs would reduce family labour supply as the members are expected to engage in other income generating activities supported by the NGOs. Three labour supply functions: (a) family male labour, (b) family female labour, and (c) total family labour supply function is computed. Both OLS and Tobit estimation procedures were applied to the data. The estimated parameters are presented in Table 4 with asymptotic t-ratio in the parentheses.

Wage remains an important factor in determining labour supply with its strong positive influence in all three functions indicating that higher wage rates will induce more family labour to substitute for labour hired and is consistent with a priori expectations (Table 4). Though a negative association is observed between land ownership and family labour supply, the effect is not very strong implying that involvement of family labour remains important irrespective of landsize classes, although there is a declining tendency in the magnitude of labour supply with an increase in land ownership. The influence of tenurial status on family labour supply is significantly positive indicating that sharecroppers tend to use more family labour to substitute labour hires as expected.

Share of women's land owned revealed a significantly negative relationship with all types of labour supplied from the family. The negative influence is stronger for family male labour supply and is supported by correlation analyses of relevant variables. The correlation coefficient is estimated at –0.15 (-0.21 in Jamalpur and –0.04 in Jessore) and are significant (except Jessore) at one percent level in households wherein women own some or total land. The negative relationships between family female labour supply and share of land owned by women confirms the substitution of family female labour use by hiring in female labour as revealed in Table 2 for households that hired female labour. Also, significant positive association between hired female labour use and share of land owned by women for these households mentioned in earlier section render support to this finding.

Local rice, modern rice, pulses, oilseeds and potatoes significantly increase the supply of male labour as well as female labour from the family. Apart from this, vegetable cultivation

significantly increases family female labour supply as expected. Vegetables in Bangladesh are commonly regarded as a kitchen crop grown mostly by women. And observing this trend, most of the NGOs (e.g., BRAC, PROSHIKA, ASA, etc.), dealing exclusively with women clientele, concentrated on promoting vegetable cultivation programs. For example, an estimated 15,755 BRAC organised women members cultivated vegetables in 2,072 ha of land in 1993 (BRAC, 1993).

Potato and jute cultivation relies largely on hired labour and, therefore, does not influence the increase in family labour supply. It is interesting to find that the value of the coefficient on modern rice is much smaller than the coefficient on local rice, a finding opposite to that observed in hired labour demand functions (Table 5), implying that local rice production utilises more family labour (both sexes) than modern rice. This finding, therefore, reinforces the fact the modern technology adoption in Bangladesh increases hired labour employment, though its distributional gain is not uniform as only men are hired to meet the increased demand (Table 1).

The number of working members in the family has a strong positive influence on labour supply as expected. The effect is more pronounced (significant) in the case of male labour supply while it is relatively weaker in the case of female labour supply. Education levels exert a negative influence on family labour supply, though the influence is not strong.

There is strong tendency for male bias in the Jessore region indicated by two contrasting signs on the regional dummy coefficient in the male and female labour supply functions. The significant positive relationship in the male labour supply function indicates that the supply of male labour

from family is higher in Jessore while it is significantly lower for female labour supply, thereby reinforcing the importance of the regional dimension in the analyses of labour markets.

The involvement of household members in the NGO has a strong negative influence on family labour supply for crop production and is consistent with a priori expectations. It should be noted that households involved in NGOs are exclusively landless and/or marginal farmers with relatively lower cropping intensity as well as lower level of modern technology adoption. The main crops grown by these households are largely local varieties of rice and other subsistence crops. Also, the focus of the NGOs, particularly BRAC, is in engaging rural landless people in poultry, livestock, sericulture, fisheries, and small-scale cottage industries and petty trading activities (Rahman, 1997). Therefore, a simultaneous operation of these factors is expected to depress family labour supply since the members' involvement in NGO-led activities would yield income from sources other than field crops, except for vegetables production.

Conclusions and Policy Implications

Rural women in Bangladesh, as elsewhere in Asia, also play an important role in agriculture. Results of the present study confirm that the claim that women are actively involved only in post harvest processing of crops is an underestimation of women's contribution to agricultural production. However, the employment gain owing to 'Green Revolution' remains skewed in favour of men as they are mostly hired to meet the increased demand although the women also seem to benefit to some extent as about 12 percent of households hired female labour in addition to male labour.

While modern agricultural technology (modern rice variety cultivation) significantly increases female labour demand, the incremental effect is even higher for jute and is substantial for oilseeds, local rice and vegetables. This has profound implications for agricultural diversification strategies since widespread controversies related to adverse socio-economic and environmental impacts of modern agricultural technology are gaining importance (Rahman and Thapa, 1999; Mahmud et al., 1994; Shiva, 1991). Promotion of non-cereal crops, such as jute, oilseeds and vegetables, therefore, seems to have high potential in increasing women's gainful employment in agriculture. The increase in women's participation in cash crop (jute, spices, oilseeds, pulses and vegetables) production by the family might result in increased workloads only if the intra-household income distribution is not commensurate with participation. However, such analysis is beyond the scope of the present study and needs further investigation.

The observation of a strong association between land ownership by women, and hired female labour use seems to render support to Agarwal's (1994) claim of increasing bargaining power of women in the labour market through ownership and access to land. However, measures to promote women's access to land would call for substantial changes in all spheres of policies and institutions related to agricultural development. Agarwal (1998) emphasised 'collective action' by women that can be accomplished through appropriate institutional arrangements. For example, BRAC in Bangladesh provides support to organised groups of women (called Village Organisations) to lease in land as group to undertake a number of activities, such as establishment of plant nurseries, vegetables gardening, poultry farming, as well as pond aquaculture (Rahman, 1997).

The deprivation of women is largely due to cultural constructs in farming societies in Bangladesh and needs to be changed. One of the major vehicles for creating awareness of gender discrimination is the building up of human capital through gender sensitive literacy programs. Observation of the significant positive influence of education on hired labour demand, both male and female, renders support to the notion that promoting gender sensitive education would increase women's gainful employment in crop production.

The basic notion of balanced development requires that both men and women must be provided with equal opportunities in all spheres of life. The dominance of the agricultural sector in the Bangladesh economy indicates that attempts to bridge the gap in employment opportunities between men and women has to be sought in the agricultural sector itself, as it engages the majority of the rural population, half of which are women. The present study clearly indicates that policies for promoting agricultural diversification will lead to increased absorption of hired women labourers in all stages of the production process. However, this would require concomitant improvement in soil fertility and the development of rural infrastructure in order to link remote regions with the urban markets. The sharp regional variation in labour use patterns, particularly the composition of male and female labour, calls for decentralised region-specific planning of agricultural development programs as opposed to the present day top down development activities.

NOTES

1. These data were collected by BRAC (one of the largest national non-governmental organisation) to serve as base-line information for a longitudinal study project, called Village Study Project (VSP). The base-line data collection took about 6 months engaging 16 field researchers who were stationed in the core village of each thana. The author of this study was responsible for co-ordinating the data collection team from the head office.

2. The crop groups are: local Aus rice, modern Aus rice, local Aman rice, modern Aman rice, local Boro rice, modern Boro rice, wheat, jute, potato, pulses, spices, oilseeds, and vegetables. Pulses in turn include lentil, gram, chola, and khesari. Spices include onion, garlic, chilly, dhania, ginger, and termeric. Oilseeds include sesame, mustard, and groundnut. Vegetables include brinjal, cauliflower, cabbage, arum, beans, gourds, radish, and leafy vegetables.

3. The data for crop production activity includes labour input for each of the seven specific agricultural operations (e.g., seedbed and/or land preparation, sowing and/or transplanting, weeding, irrigation, fertiliser and pesticide application, harvesting, and threshing and/or winnowing operations).

4. Land ownership categories are classified as follows: marginal = farmers either not owning any land or owning land upto 0.20 ha, small = farmers owning land between 0.21 – 1.00 ha, medium = farmers owning land between 1.00 – 2.00 ha, and large = farmers owning land above 2 ha.

5. It should be noted that share of women's land owned does not guarantee use and control of that land by women only. The questionnaire during the survey specifically asked to quantify the amount of land under the title of the husband, wife, and all children. Therefore, this variable is constructed using the amount of land under the title of the female (mostly wife) member of the household. However, as the formal title of ownership lies with the women member, one can expect some degree of access, use and control of that piece of land by her.

6. LIMDEP Software Version 6 (1992) is used for the analysis.

7. It should be noted that significant difference in wage paid to men and women is observed when specific crop production is considered (Rahman and Routray, 1998). However, when the average wage paid by the household for all types of crops is considered, which was used for this analysis, the wage differential does not seem to be that prominent.

8. BRAC, a national non-governmental organisation, is one of the largest NGO in the Asia-Pacific region engaged in rural development since 1972. Its two major goals are 'poverty alleviation' and 'empowerment of the poor'. BRAC utilises a target people approach with its focus on the landless poor, small farmers who own less than 0.20 ha of land, fishers, artisans, craftspeople and day labourers. Though both men and women form BRAC's target population, women constitute 82 percent of its 1.84 million members (Rahman, 1997). BRAC operates its multifaceted rural development programs through 54, 238 village organisations spread over 32, 102 villages in 60 districts of the country (BRAC, 1996).

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Table 1. Labor input in crop production (both region), 1989.

Crops	Proportion of labour use per hectare of land						
	Family labour		Hired labour		Total labour		
	Men	Women	Men	Women	Men	Women	Total labour
Local rice	41.0	10.8	47.3	0.9	88.3	11.7	100 (156)
Modern rice	37.5	9.8	51.5	1.2	89.0	11.0	100 (191)
Local wheat	46.2	16.1	35.6	2.1	81.8	18.2	100 (143)
Modern wheat	44.1	13.2	41.2	1.5	85.3	14.7	100 (136)
Jute	38.3	5.3	55.5	0.9	93.8	6.2	100 (227)
Potato	52.4	12.5	33.8	1.3	86.2	13.8	100 (311)
Pulses	41.3	25.7	31.2	1.8	72.5	27.5	100 (109)
Oilseeds	38.5	18.3	40.4	2.8	78.9	21.1	100 (109)
Spices	50.4	18.8	27.8	1.0	78.2	21.8	100 (276)
Vegetables	34.9	46.5	17.4	1.2	52.3	47.7	100 (186)
Cotton	50.1	15.3	23.1	11.5	73.2	26.8	100 (295)

Note: Figures in parentheses are total number of labor used per hectare of land. The total number of observations on crops are 8,102: 1,140 for local rice, 2,356 for modern rice, 130 for local wheat, 103 for modern wheat, 485 for jute, 100 for potato, 515 for pulses, 200 for oilseeds, 244 for spices, 2,825 for vegetables, and 4 for cotton, respectively.

Source: Rahman and Routray (1998).

Table 2. Labour input in crop production at household level, 1989.

Regions/ Landsize categories	Estimate of labour use (days) per household for all crops (Households hiring women labour in addition to men labour)					Estimates of labour use (days) per household for all crops (All households)				
	Family labour		Hired labour		Total labour	Family labour		Hired labour		Total labour
	Men	Women	Men	Women	Both	Men	Women	Men	Women	Both
Jamalpur										
Marginal	23.5	10.8	44.9	6.0	85.2	19.5	8.5	19.8	0.8	48.6
Small	33.5	16.1	148.8	16.3	214.7	53.6	17.8	80.4	2.7	153.5
Medium	63.1	18.1	233.0	14.9	329.1	78.1	21.1	158.5	8.3	266.0
Large	38.4	21.8	385.4	28.4	474.0	53.4	19.6	310.8	17.4	401.2
All	40.0	17.8	204.5	15.7	278.0	32.1	11.6	56.2	2.6	102.5
Jessore										
Marginal	19.7	6.8	29.7	4.5	60.7	18.3	4.7	25.1	1.0	49.1
Small	45.0	9.7	103.7	5.3	163.7	38.0	8.9	63.9	1.5	112.3
Medium	64.6	13.3	186.1	9.5	273.5	65.5	15.0	151.5	2.9	234.9
Large	84.3	13.2	340.2	13.6	451.3	73.7	19.7	270.1	4.5	368.0
All	53.2	10.6	159.5	8.3	231.6	36.8	9.3	79.4	1.5	127.0
Both Region										
Marginal	21.7	9.9	37.4	4.2	73.2	19.0	7.1	22.0	0.7	48.8
Small	40.2	11.9	122.5	9.3	183.9	43.9	12.4	70.2	1.5	128.0
Medium	63.1	16.3	205.5	12.2	297.1	69.3	16.7	153.6	4.9	244.5
Large	59.0	18.0	365.1	21.7	463.8	66.9	19.2	283.8	9.1	379.1
All	47.0	14.6	180.7	11.2	253.5	34.5	10.4	68.2	2.1	115.2
Sample size (n)	182 (Marginal = 47, Small = 36, Med. = 59, Large = 40)					1,567 (Marginal = 905, Small = 343, Med. 212, Lar = 107)				

Note: Marginal = farmers either not owning any land or owning land upto 0.20 ha, Small = farmers owning land between 0.21 – 1.00 ha, Medium = farmers owning land between 1.00 – 2.00 ha, and Large = farmers owning land above 2 ha.

Source: BRAC-VSP Survey, 1990.

Table 3. Determinants of male and female hired labour demand in crop production, 1989.

Variables	Hired male labour demand		Hired female labour demand		Total hired labour demand	
	OLS model	Tobit model	OLS model	Tobit model	OLS model	Tobit model
Constant	49.487	30.972	8.376	7.587	61.400	42.950
	(2.814)[a]	(1.570)	(4.406)[a]	(0.603)	(3.416)[a]	(2.130)[b]
WAGE	-1.604	-1.556	-0.268	-1.225	-1.975	-1.933
	(-3.073)[a]	(-2.665)[a]	(-4.752)[a]	(-3.229)[a]	(-3.701)[a]	(-3.236)[a]
LANDOWN	0.076	0.077	0.004	0.014	0.076	0.080
	(9.011)[a]	(7.862)[a]	(0.459)	(3.175)[a]	(8.826)[a]	(7.915)[a]
TENANCY	0.037	0.081	-0.013	-0.006	0.024	0.073
	(1.520)	(2.922)[a]	(-4.988)[a]	(-0.408)	(0.978)	(2.557)[a]
WSHLAND	1.771	-8.190	0.615	3.025	3.217	-7.913
	(0.377)	(-1.414)	(1.211)	(0.850)	(0.483)	(-1.337)
LVRICE	0.181	0.217	0.012	0.014	0.191	0.224
	(11.870)[a]	(12.078)[a]	(7.060)[a]	(1.810)[c]	(12.306)[a]	(12.210)[a]
MVRICE	0.381	0.407	0.016	0.042	0.398	0.423
	(35.297)[a]	(33.310)[a]	(13.602)[a]	(7.571)[a]	(36.079)[a]	(33.900)[a]
WHEAT	0.219	0.308	0.011	0.015	0.221	0.300
	(3.303)[a]	(4.083)[a]	(1.568)	(0.461)	(3.253)[a]	(3.875)[a]
JUTE	0.587	0.610	0.026	0.061	0.620	0.636
	(11.437)[a]	(10.567)[a]	(4.700)[a]	(2.282)[b]	(11.805)[a]	(10.785)[a]
POTATO	0.560	0.585	-0.026	0.038	0.537	0.573
	(2.644)[a]	(2.482)[b]	(-1.137)	(0.396)	(2.479)[b]	(2.375)[b]
PULSES	0.170	0.155	-0.006	-0.004	0.163	0.149
	(5.188)[a]	(4.177)[a]	(-1.554)	(-0.201)	(4.857)[a]	(3.963)[a]
OILSEEDS	0.276	0.250	0.028	0.057	0.333	0.305
	(2.593)[a]	(2.103)[b]	(2.408)[b]	(1.157)	(3.062)[a]	(2.517)[b]
SPICES	0.086	0.092	-0.034	-0.053	0.050	0.049
	(1.086)	(1.044)	(-3.981)[a]	(-1.342)	(0.612)	(0.577)
VEGETAB	0.020	0.011	0.005	0.011	0.028	0.018
	(0.843)	(0.400)	(1.955)[b]	(0.821)	(1.146)	(0.682)
WORK	-1.580	-1.899	-0.089	-0.606	-1.700	-2.058
	(-2.287)[b]	(-2.383)[b]	(-1.205)	(-1.361)	(-2.408)[b]	(-2.525)[a]
EDUC	0.574	0.832	0.037	0.374	0.621	0.886
	(2.553)[a]	(3.273)[a]	(1.526)	(3.217)[a]	(2.703)[a]	(3.407)[a]
REGION	2.793	8.445	-1.205	-4.970	1.361	6.894
	(0.930)	(2.419)[b]	(-3.710)[a]	(-2.342)[b]	(0.443)	(1.931)[b]
Adjusted R^2	0.80	-	0.31	-	0.81	-
$F_{(15, 1551)}$	403.35[a]	-	45.44[a]	-	413.51[a]	-
L-likelihood	-	- 6,942.14	-	-928.52	-	-6,974.61

Note: Figures in parentheses are t-ratios. [a] = significant at 1 percent level ($p<0.01$), [b] = significant at 5 percent level ($p<0.05$); [c] = significant at 10 percent level ($p<0.10$).

Source: Computed.

Table 4. Determinants of supply of male and female family labour in crop production, 1989.

Variables	Male labour supply		Female labour supply		Total labour supply	
	OLS model	Tobit model	OLS model	Tobit model	OLS model	Tobit model
Constant	-94.180	-108.230	-8.940	-10.610	-104.510	-106.29
	(-6.645)[a]	(6.682)[a]	(-2.630)[a]	(-2.834)[a]	(-6.448)[a]	(-6.374)[a]
WAGE	3.042	3.158	0.496	0.525	3.572	3.580
	(7.221)[a]	(6.571)[a]	(4.906)[a]	(4.718)[a]	(7.413)[a]	(7.227)[a]
LANDOWN	-0.007	-0.005	-0.018	-0.002	-0.008	-0.007
	(-1.009)	(-0.685)	(-1.066)	(-1.229)	(-1.044)	(-0.913)
TENANCY	0.120	0.153	0.014	0.018	0.141	0.151
	(6.108)[a]	(6.824)[a]	(2.872)[a]	(3.439)[a]	(6.297)[a]	(6.546)[a]
WSHLAND	-9.512	-20.096	-1.543	-1.964	-11.145	-12.748
	(-2.514)[b]	(-4.255)[a]	(-1.700)[c]	(-1.929)[b]	(-2.575)[a]	(-2.829)[a]
LVRICE	0.108	0.120	0.030	0.033	0.144	0.148
	(8.778)[a]	(8.434)[a]	(10.091)[a]	(10.023)[a]	(10.266)[a]	(10.204)[a]
MVRICE	0.082	0.090	0.012	0.013	0.092	0.093
	(9.201)[a]	(8.987)[a]	(5.912)[a]	(5.723)[a]	(9.210)[a]	(9.011)[a]
WHEAT	0.052	0.065	-0.001	-0.001	0.054	0.054
	(0.975)	(1.058)	(-0.105)	(-0.064)	(0.885)	(0.862)
JUTE	-0.003	0.002	-0.013	-0.017	-0.032	-0.032
	(-0.080)	(0.034)	(-1.260)	(-1.563)	(-0.668)	(-0.668)
POTATO	0.277	0.319	0.027	0.022	0.303	0.312
	(1.620)[c]	(1.645)[c]	(0.657)	(0.477)	(1.553)	(1.553)
PULSES	0.111	0.107	0.048	0.056	0.169	0.175
	(4.213)[a]	(3.547)[a]	(7.643)[a]	(7.925)[a]	(5.599)[a]	(5.596)[a]
OILSEEDS	0.300	0.302	0.081	0.086	0.400	0.404
	(3.489)[a]	(3.090)[a]	(3.934)[a]	(3.798)[a]	(4.053)[a]	(3.995)[a]
SPICES	-0.076	-0.070	0.004	0.009	-0.088	-0.084
	(-1.195)	(-0.964)	(0.263)	(0.525)	(-1.210)	(-1.119)
VEGETAB	0.016	0.011	0.027	0.029	0.055	0.055
	(0.844)	(0.496)	(5.846)[a]	(5.700)[a]	(2.510)[b]	(2.437)[b]
WORK	3.616	3.967	0.015	0.030	3.884	3.943
	(6.487)[a]	(6.140)[a]	(0.116)	(0.204)	(6.092)[a]	(5.979)[a]
EDUC	-0.207	-0.204	-0.009	0.001	-0.206	-0.177
	(-1.141)	(-0.979)	(-0.212)	(0.023)	(-0.992)	(-0.828)
REGION	4.507	7.366	-2.532	-3.590	1.666	-0.065
	(1.861)[c]	(2.597)[a]	(-4.356)[a]	(-5.538)[a]	(0.601)	(-0.023)
BRAC	-5.174	-6.107	-1.597	-1.638	-6.392	-6.534
	(-2.020)[b]	(-2.018)[b]	(-2.598)[a]	(-2.397)[b]	(-2.182)[b]	(-2.155)[b]
Adjusted R^2	0.35	-	0.28	-	0.38	-
$F_{(17, 1549)}$	50.66[a]	-	37.09[a]	-	57.85[a]	-
L-likelihood	-	-6,835.25	-	-5,233.03	-	-7,859.50

Note: Figures in parentheses are t-ratios. [a] = significant at 1 percent level ($p<0.01$), [b] = significant at 5 percent level ($p<0.05$); [c] = significant at 10 percent level ($p<0.10$).

Source: Computed.