

Women's Empowerment and Farm Productivity: A Case of Project Intervention

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Abstract

Despite substantial efforts from the donors and the public sector, food insecurity is still a major challenge in Nepal. Its effect seems to be more chronic for women because of the deeply rooted unequal distribution practices prevalent in the traditional rural communities, although working on a farm is considered as women's responsibility. A "with and without assessment" approach had been used to compare the impact of intervention on curtailing the observed gender differentiation. Women's access to technology transfer, especially the distribution of training quota among women farmers, was more equitable than for the male farmers as revealed through Gini coefficient. Women's participation in skill trainings, off-farm jobs, and project activities contributed to empowerment. Correspondingly, wage differentiation, women's participation in capacity building, natural resource management, and institutional development were found to be influential in pushing women's to increase farm physical productivity. Consequently, the working hours for economic activities were found to be significantly different ($p < 0.001$) between the groups.

1. Introduction

Globally, women's participation in labor force has increased by only three percent in twenty years, from 37 percent in 1970 to 40 percent in 1990. Overall, women still have only 36 percent of the total wage employment and only one-third of the share of national income. Women's wages are generally only three-quarters of men's wages in the non-agricultural sector in 56 developing countries (Heyzer, 1995). Heyzer further states that women receive only a very small percentage of credit from formal institutions. This is particularly observable in Nepali society, because of its inherited patriarchal system. According to UNDP (2002), the Human Development Index (HDI) in Nepal is low (0.48), even by Asian standards, which is only slightly above that of Bhutan and Bangladesh (0.47).

Similar to many other Asian countries, women are lagging far behind in Nepal. Socio-economic indicators such as physical survival, health and educational opportunities, ownership of assets, mobility, and overall cultural status show

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their lower status. The country's Gender-related Development Index (GDI) of 0.466 (UNDP, 2002) also proves it. Unlike GDI, the Gender Empowerment Measure (GEM) of Nepal (0.38) vividly shows that women are far less empowered than men. The Gender-related development varies based on geographical and other development activities. GDI is higher for the urban ones (0.605) than the rural areas (0.426) because of significantly greater access to knowledge and information, health facilities, and better economic opportunities of the former.

1.1 Women in Livestock Production

Generally, farming in Nepal is labor-intensive because of the geophysical settings. Women occupy an overwhelming share in the labor force as they shoulder the major burden in various farm activities. According to NPC (1992), 91 percent of women are engaged in agricultural activities, whereas the active male share is 75 percent (in Bajracharya 1994). Vaidya *et al.*, (1990) suggest that women contribute to between 50 and 80 percent of agricultural labor force, depending on the geographical and socio-economic variations. The contribution of women to household incomes from agricultural wage labor ranges from 10 to 53 percent (Dey, 1985). However, women farmers are not fully recognized yet as individual farmers but are referred to as farmers' wives, sisters, daughters, and daughters-in-law etc. The majority of them receive information on innovation and access to other than non-farm production inputs through their male counterparts. To date, attention has not been paid to appropriate technology specifically designed to help women, which is undoubtedly an important component hindering development (Gurung and Banskota, 1990). Therefore, integration of women in agriculture has recently become a major focus of the government.

The involvement of women in livestock production is a long standing tradition in Nepal. They play a major role in livestock production system irrespective of the ecozones (high hills to the flat lands of Tarai) as their contribution is more than 73 percent of the total labor force required in livestock raising (Tulachan and Basta, 1992). According to Sharma and Awasthi (1993), women contribute 61-75 percent of the total labor required for livestock raising, depending on the ecological region and socio-economic system. The role of women, particularly in livestock production, is overwhelming, though not satisfactorily addressed in the plans. On an average, 24 percent of the decisions concerning livestock issues are taken by men, 11 percent by women, and the remaining 65 percent by both (Shrestha, 1989). According to Karki and Bauer (2005), women's participation in the formation of farmers' groups (solely

female, mixed) is found to be 33 percent, which is slightly higher than the 30 percent modality set in the eighth five year plan (NPC, 1992). In livestock production systems, women mostly decide on the area for fodder collection and on who does collection and feeding management for livestock during the dry season (Bajracharya, 1993). Karki (2004) mentions that respondents ranked women's groups first, based on their active work and better progress than the mixed and men groups. The mixed type of group was ranked second, whereas the performance of male groups is least effective, and that 88 percent of the respondents reported that the functional status of women group is more sustainable compared to 83 percent and 75 percent of respondents who voted for sustainability of mixed and male groups respectively.

Although women have played very decisive roles in agricultural production, they still do not have direct access to production resources. Tisch (1992) states that access to and control of resources needs to be considered in gender concerns and benefits that contribute to family welfare and agricultural productivity. Access is the freedom or permission to use resources, whereas control is the power to decide whether and how a resource is used. Decisions regarding management of household, along with farm and livestock production, are affected by control of resources. Management and control of these resources are important to sustainable agriculture and it is important to know "who has access to resources used for agricultural production (food crop, animal, cash crop)". However, there is considerable evidence of women having less access to credit, technology, wage markets, and training than men in the same system (Acharya, 1989). Women lack assets that can be used as collateral and also the necessary institutional links. The lack of access to formal credit also places constraints on women in engaging in profitable self-employment, such as buying a buffalo that could earn profit or raising swine for fattening (Paris and Luis, 1991). Since women consistently contribute even more than their male counterparts in rural households, constraints on women's access to resources steadily slow down the productivity of half of the available rural labor force.

1.2 Interrelationship between Farm Productivity and Women's Empowerment

Women empowerment is associated with gender, which has originated from inequalities observed between men and women in resource, income, and power distribution. Before the 1980s, the policy agenda had been "Women in Development". The lessons learnt during the period resulted in "Women Empowerment" and "Gender Mainstreaming" approaches. This study deals with women empowerment rather than the latter concept.

Concerning the food situation, women are the major food producers around the world. The issue of food security is becoming prominent in connection with the development endeavors since many poor people are compelled to go hungry and undernourished, despite the fact that surplus food is produced in the world. Even though, globally, sufficient food is produced with wheat yield increased by 3.4 percent (CIMMYT, 1996) and rice yield by 2 percent per year between 1969 and 1995 in developing countries (Pingali and Heisey, 1999), some 800 million people across the world still suffer from hunger and malnutrition, mainly infants and children, as well as pregnant and nursing mothers. To lessen the severity, Baumann (2000) considers the livestock sub-sector as a privileged entry point to address and promote gender issues in the rural areas of developing countries. He points out that there is a greater possibility of gender-equitable development through livestock projects in comparison to crop projects. This is because the livestock sector offers advantages over other agriculture sectors, as all household members have access to livestock, whereas access to land is often biased toward men in most societies. In contrast to crops, livestock activities are a daily occupation and animal products such as eggs and milk are produced, processed, and marketed during the whole year. As livestock production is not subject to seasonal restrictions, it is an interesting sector for promoting gender issues. Increment in livestock products serves as a major source of food self-sufficiency for a rural farm family since they can have both substitution and complementary effects on it.

Gender equity in various studies is considered as one of the major indicators for analyzing the impact of projects. This is an emerging indicator to find out how men and women of a society benefit from project interventions. Any project that has not addressed equitable development of the various classes of a society may not be sustainable. Any development process that does not systematically address the needs of women and that of the poor is unlikely to be sustainable, since these two sectors of the society constitute together the overwhelming majority of the world's population. Sustainable development cannot be based on a partial and inadequate understanding of a society, but must have the needs of women and the poor as a core concern (Wee and Heyzer, 1995). According to UNIFEM (1994), equitable development not only generates economic growth but also distributes its benefits equitably. UNIFEM further mentions that equitable development tends to regenerate the environment rather than destroying it and empowers people rather than marginalizing them. Such development activities give priority to the poor, enlarging their choices and opportunities and providing opportunities for their participation in decisions that

affect them. It is a development that is pro-poor, pro-nature, pro-jobs, and pro-women.

This study was conducted to assess the impact on women empowerment and its effect on farm productivity of peasant smallholders. The indicators suggested by Mcallister (1999) have been used to assess women empowerment at individual, group, and community level in terms of strengthening local awareness of issues and options, participation in decision-making, planning and action to address problems, perception of ownership of the process, strengthening existing individual and organizational capacities, creating linkages between stakeholder groups, and empowerment in social transformation.

2. Methodology and Model Specification

2.1 Study Area and Project Intervention

The concept of leasehold forestry for the poor first emerged in Nepal only after the IFAD -supported Hills Leasehold Forestry and Forage Development Project (HLFFDP) was implemented in 1991. The project objectively planned to work with small farmers, who were below the poverty line, emphasizing marginal farmers, women, and disadvantaged groups of the community. Kavrepalanchowk is one of the first districts where HLFFDP was started in 1993 and continued until 1996/97 during the project's first phase. Three Village Development Committees (VDC) (Deupur-Baluwa, Kharelthok, Sathighar-Mahendrajyoti) from the project area and Nasikasthan-Sanga and Bhagawatisthan from non-project area were selected.

The focus of leasehold program was limited to a specific category of people within the community who were below the poverty line: in general, homogenous groups of 5-9 farmers, who had less than 0.5 ha of private arable land and an annual per capita income less than NR 2,500/- equivalent to US \$ 44 in 1993 (NR. is a unit of Nepal's currency with 1 € = NR 85 in July 20 04) were selected as project beneficiaries and provided with 1 ha of degraded land (per member family) for a maximum of 40 years. The output from this land was used for individual families who were members of the group. The program implemented by the project can be grouped into five sub-headings: fodder and forage development, training and extension visits, institutional development (farmers' group), animal health, and animal resource and management services.

2.2 Data Collection and Analysis

A household survey was conducted to collect primary data using the multi-stage random sampling procedure. A total of 120 subsistence households that comprised 60 from project and 60 from the non-project VDCs of mid-hill district Kavrepalanchowk were sampled. In addition, requisite secondary data were also collected from relevant sources. Of the total respondents, 45 percent were female from the project area and 43 percent from the non-project area. The data collected were analyzed using quantitative and qualitative analytical tools.

2.3 Model Specification

The concept distribution pattern by Lorenz has been calculated (Equation 1) to measure the distributional pattern of human capital development activity between male and female farmers.

$$G = 1 - \sum_{i=0}^N (\sigma Y_{i-1} + \sigma Y_i)(\sigma X_{i-1} - \sigma X_i) \quad (1)$$

Where, G = Concentration area,

σX = Cumulative percentage of x 's (x represents the number of trainees),

σY = Cumulative percentage of y 's (y represents the number of trainings)

N = the Number of observations.

The overall situation of women empowerment has been expressed in the form of ordinal ranking done using the ordered probit model. It is statistically more efficient than the binary logit or probit model. According to Greene (1997), the ordered probit model is formulated as follows:

$$y^* = \beta' Z_i + \varepsilon_i \quad (2)$$

$$Z_i = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n + \varepsilon_j \quad (3)$$

Where,

y^* is an unobserved phenomenon and thus can be thought of as the underlying tendency of an observed phenomenon, ε_i is assumed to be normally distributed across the observations, β' is a vector of unknown parameters, Z_i is the linear combination of $X_1 \dots X_n$ explanatory variables (years of schooling, access to credit, number of farm animals, skill promoting trainings, age of the household

head, off-farm income, participation in project activities), and ε_j = error term; β_0 is the intercept and β_1 is the slope parameter in the model; Y is the probability of women empowerment (WOEMP) in project, where the rating scale for Y is 0=very low, 1=low, 2=good, 3=very good. Here we observe,

$y = 0$, if $y^* \leq \mu_0 (=0)$,

$y = 1$, if $\mu_0 \leq y^* \leq \mu_1$,

$y = 2$, if $\mu_1 \leq y^* \leq \mu_2$, and .. $y = J$, if $\mu_{J-1} \leq y^*$.

Here, y was observed in J number of ordered categories, and μ unknown threshold parameters separating the adjacent categories to be estimated with β . In order for all the probabilities to be positive, we must have, $0 < \mu_1 < \mu_2 < \dots < \mu_{j-1}$. This suggests that respondents view the importance as ordinal numbers and the categories are indeed ordered.

3. Results and Discussions

3.1 Farm Household Characteristics

The respondents were composed of nine different ethnic groups (different castes of people socio-culturally classified in the Hindu religion). Each ethnic group differs from another in cultural norms and taboos. The participation of Newar in the survey is the highest (41.67%) followed by Tamang (20%), Danuwar (10%), and Brahmin (10%). The remaining, about 18 percent, of the project participants, was shared between Kshatris, Damais, Magars, Thakuris, and Paharis. The family size of farm households in project (8.4) and non-project⁵ (7.5) areas is not significantly different. The literacy rate of the project farmers is 62 percent and 47 percent for the non-project farmers. The literacy rate of female farmers in both project and non-project areas is lower than that of male farmers. However, a higher population of women in the project area (44%) is literate compared to non-project women (36%). The land holding size of both groups is not significantly different, but that of the holding size of the non-project farmers is slightly larger (11.74 ropani⁶) than that of project farmers (10.58 ropani). The average livestock unit (LU⁷) with project and non-project farmers is 2.75 and 2.45 respectively.

⁵ Beneficiaries and non-beneficiary, project and non-project groups, treatment and control groups, intervened and non-intervened groups have been used interchangeably.

⁶ A unit of land measurement (is 1 ropani = 0.05 ha).

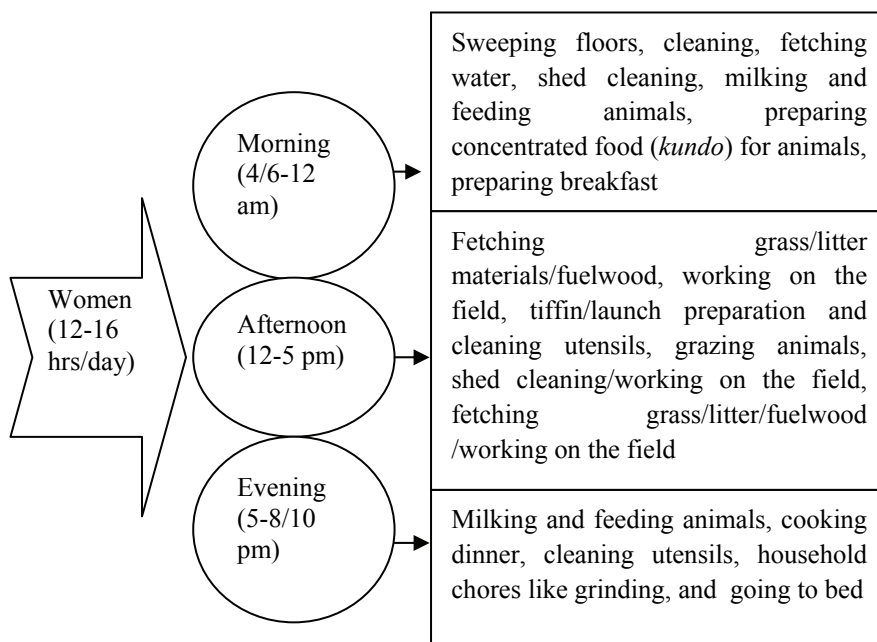
⁷ 1 LU = 0.8 cattle, 1 buffalo, 0.1 goat, 0.01 poultry, adapted from Devendra (1989).

3.2 Women’s Daily Working Schedule

Generally, women worked for longer hours than in both project and non-project areas men. Their involvement is found to be more or less fixed in most of the daily activities at the household level, such as house cleaning, fetching water, cooking food, cleaning dishes, and feeding and taking care of children. Besides involvement in household chores, they also have to work on farm as farm managers and workers. The daily working schedule of women farmers in the study area is illustrated below (Fig. 1).

Women were found working longer hours than men in both groups. The activities performed during the three shifts can vary depending on seasons, availability of family labor, geographic setting, and family status. However, the total working duration was barely reduced to 12-16 hours a day (excluding the day-rest time). The exact number of working hours varies depending on seasons, availability of family labor, geographic settings, and family status.

Figure 1: Women’s daily working schedule and regular activities in the study area



3.3 Distribution of Family Labor for Animal Production Activities

There is no distinct variation in the distribution of available family labor. Women work more in both cases. In the project area, 55 percent of the males are primarily involved in grazing animals, feeding, and managing materials and shed (fixing and transferring shed at different places). Forty-nine percent of the males are involved in livestock marketing (exchanging, culling, procuring, sale) and livestock products, such as milk, ghee and eggs. Female involvement is higher than that of males in milking, processing (boiling milk, making yoghurt and ghee), shed cleaning (56%), and cutting and preparing animal feed (60%).

Labor distribution among the non-project farmers is somewhat different from that for project farmers with female involvement higher in grazing, feeding animals, and shed management (38%); milking, processing of products, cleaning sheds (50%); and preparing animal feed (60%). Unlike females, males are heavily involved in management and marketing of livestock and products (40%). The rest are jointly done. Women are thus occupied in more time consuming activities in animal husbandry with males handling financial operations. One can thus infer that the activities are not enough for a meaningful change, especially in the gender-related roles of animal husbandry.

3.4 Women's Involvement in Household Activities

The total daily workload of household activities related chiefly to family maintenance such as cooking and offering meals to family members, cleaning utensils, washing clothes, house sweeping, fetching water and fuelwood, raising children, and taking care of elders and the disabled) women farmers is less ($p < 0.001$) in the project area (12.9 and 5.7 hrs respectively) than in the non-project area (14.3 and 7.2 hrs respectively). This is due to the high involvement of project women in group activities such as training, group meeting, plantation of fodder, forage cultivation, nursery management, land terracing, track construction, and other activities. The male counterparts share the work that women in the project area used to do before the project intervention. Unlike reproductive activities, both groups of women farmers were found spending an equivalent amount of time (7 hrs.) in productive activities like milking and feeding livestock; fetching fodder, forage, and bedding material; working in the field; grazing animals; cleaning animal shed and marketing livestock and their products.

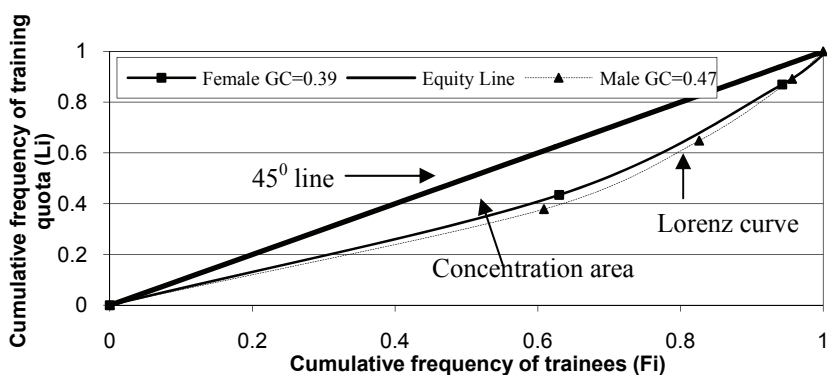
3.5 Wage Differentiation between Male and Female Labor

Differentiating wages for the same category of manual work between males and females is a customary practice in Nepalese society. This applies to both agricultural and non-agricultural sectors. The gender difference in wages in both areas is significant ($P < 0.001$). However, the gap is lower in the project area. Female wage is 68 percent of male in the project area with women farmers in the non-project area receiving only 60 percent of the wage men get.

3.6 Women’s Access to Technology Transfer

Women in the project area have higher access to knowledge and skill promotion (69 %) compared to women in non-project area (8%). In the Nepalese society, men are primarily supposed to participate in all capacity building opportunities. Opportunities for women are offered only when there are not enough men, provided guardians give permission. Human capital development activities related to “training in group management, feed and fodder production and management, husbandry practices, animal health services” concerned with sustaining the farmers’ status quo in technical-managerial capacity have been analyzed. Besides technical training, tours, and symposiums were also organized to enhance the beneficiaries’ technical capacity. The Gini Coefficient (G.C.) reveals that distribution of training quota among the female farmers is more equitable (G.C. 0.39) than for male farmers (G.C. 0.47) (Fig. 2), which seems to be a positive influence of project intervention.

Figure 2: Lorenz curve of training (no) distribution between male and female farmers



3.7 Women's Perception on Capacity Building

The results of score ranking suggest a positive impact of project intervention on all six indicators selected to assess women's capacity building. Among the activities, reduced working hours received the highest score due to which they can save time from additional productive work. Working hours for female farmers are found to have decreased in carrying out activities such as fetching fodder, forage, and fuelwood due to their availability in the leased land. The respondents gave second rank to increased earning capacity and chances of promoting knowledge and skills. In aggregate, the leadership quality was also found upgraded as they took over various positions in groups and other activities. As a whole, the performance of female groups was found to be the best of all types of groups formed. However, the impact on increasing female participation in household decision-making processes ranks second last from the bottom.

Table 1: Women's response about impact of project on capacity building opportunities

| Activities | Number of women with different perceptions (N = 15) | | | | Score ranking* |
|--|---|--------|-----|-----------|----------------|
| | High | Medium | Low | No change | |
| Working hours reduced | 7 | 8 | - | - | 52 |
| Earning capacity enhanced | 7 | 6 | 1 | 1 | 49 |
| Knowledge and skills increased | 6 | 8 | 1 | - | 49 |
| Leadership quality improved | 3 | 10 | 2 | - | 48 |
| Participation in household decision-making increased | 6 | 7 | - | 2 | 47 |
| Facilitation in disseminating innovative knowledge, skills | 7 | - | 6 | 2 | 42 |

*: High = 4, Medium = 3, Low = 2, No change = 1

The latent variables (such as increased knowledge and skills, leadership quality, participation in household decision-making process, earning capacity) were difficult to express on a cardinal scale since they are solely dependent on farmers'/women's perceptions (high, medium, low, and no change). More precisely, these are the expected changes whereby farm households have a lasting effect on total farm management and productivity. Certainly, in aggregate, the positive responses of the qualitative indicator variables lie in helping to improve the livelihoods of the beneficiary over the years.

3.8 Women's Participation in Household Decision - Making Processes

Women's participation in household decisions, such as buying and selling farm products, application of innovation, choosing farm enterprise, schooling children, participating in social functions, and sharing casual chores were taken as indicators to assess women participation. The coefficient of women's participation in household decision-making process between the two groups is positive and significantly different ($P < 0.001$). It implies project intervention left a positive impact on increasing women's participation in household decision-making processes. In other words, women are being empowered in the project area in their involvement in household decision-making process. Participation was measured in terms of multinomial variables, where 1 implied decisions were made by males, 2 decisions made by females, and 3 decisions made jointly.

4. Factors Affecting Women Empowerment

Factors (years of schooling, access to credit, number of farm animals, skill-oriented training, age of the household head, off - farm job, participation in project activities) affecting women's empowerment have been analyzed using the ordered probit model. The variables training, off farm job, and participation in the project reveal significantly different coefficients at 1, 5, and 10 percent levels implying a unit increase in those variables increases the level of women empowerment (WOEMP). Threshold parameters, μ_1 , μ_2 , and μ_3 , are also significant at 1 percent level implying the four categories in response are ordered

Table 2: Estimates of the ordered probit for factors affecting women's empowerment

| Variable | Coefficient | P[Z >z] |
|---------------------------|-------------|-----------|
| Constant | 0.38195 | 0.4130 |
| Years of schooling | -0.60008 | 0.7712 |
| Access to credit | 0.40453 | 0.8591 |
| Number of farm animals | -0.66824 | 0.9762 |
| Skill-oriented trainings | 0.55691 | 0.0002 |
| Age of the household head | -0.81460 | 0.3539 |
| Off-farm income | 0.58733 | 0.0300 |
| Participation in project | 0.45396 | 0.0579 |
| μ_1 | 0.59080 | 0.0000 |
| Chisquare | | 0.0000 |

The marginal effects of significant variables are mentioned in Table 3.

Table 3: Marginal effect of independent variables used in women's empowerment

| Variable | Prob (Y=0) | Prob (Y=1) | Prob (Y=2) | Prob (y=3) |
|---------------------------|------------|------------|------------|------------|
| Constant | -0.1267 | -0.257 | 0.0429 | 0.0849 |
| Years of schooling | 0.0199 | 0.0040 | -0.0067 | -0.0134 |
| Access to credit | -0.0134 | -0.0027 | 0.0045 | 0.0090 |
| Skill-oriented training | -0.1847 | -0.0374 | 0.0625 | 0.1238 |
| Number of farm animals | 0.0027 | 0.0005 | -0.0009 | -0.0018 |
| Age of the household head | 0.0027 | 0.0005 | -0.0009 | -0.0018 |
| Off-farm income | 0.1948 | 0.0395 | -0.0659 | 0.1305 |
| Participation in project | -0.1506 | -0.0305 | -0.0509 | 0.1009 |

As far as marginal effects are concerned, one unit increase in skill-oriented training decreases the probability of scoring women's empowerment 'y=0' by 0.18 and increases the scoring scope for 'y=3' by 0.12. In the same way, one unit increase in the off-farm income decreases the probability of scoring women's empowerment 'y=0' by 0.19 and increases the scope for 'y=3' by 0.13. Similarly, with a chance to participate in the project activity, the probability of scoring women's empowerment 'y=0' is decreased by 0.15, and increases the scoring of 'y=3' by 0.10.

5. Policy Recommendations

The findings show that women are over-loaded with very long daily schedules and numerous farm and household operational activities, but receive less wages than men and almost no recognition. The factors that are of significant influence need to be considered to empower them. With adequate resources available, they may perform better than their male counterparts in managing groups, implementing activities, and utilizing resources which can assure higher farm productivity if women are empowered in agriculture-related production activities.

Women's empowerment in terms of capacity building is a need of the time to facilitate them to become efficient producers. This will both optimize farm production and minimize resource constraints, since women are recognized to be good managers. There is thus a need for strategic policies from both the public and private institutions to address the technological aspects of the resource allocation, comparative advantage, and equal opportunity for them to participate. Such motivating factors can enhance the competency and problem solving capacities of women farmers and other stakeholders of community to increase farm productivity. The future programs need to relax constraint on women's

production inputs gradually so that they can avail of alternative choices for production decisions.

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