

Reprint

Volume 5, No. 1&2, 2009

ISSN 1993-4041

**Journal of
Agricultural Machinery
and
Bioresources Engineering**

Published By :

Department of Farm Power & Machinery
Bangladesh Agricultural University
Mymensingh-2202
Bangladesh

Impact of Modern Agricultural Technology on the Livelihoods of Rural Women

M.M. Alam¹, L.R. Mallik¹, A.B.M. Nurul Anwar² and C.K. Saha¹

Abstract

The main purpose of the study was to determine the impact of selected modern agricultural technologies on the livelihoods of rural women of Garadia village under Phulpur upazila of Mymensingh district. The selected agricultural technologies are Livestock and Poultry Production Technology (LPPT), Home based Vegetable Production Technology (HVPT) and Crop Production Technology (CPT). Women are classified into three categories namely never poor, occasionally poor and usually poor on the basis of their family land holding, income, food security, employment, education, and social networks. The impact of modern agricultural technologies on the livelihoods of rural women are studied based on six livelihood outcome indicators namely, income, food security, well-being, empowerment, vulnerability and access to institutions. The rural women are found mostly involved in crop production technology, homestead vegetable production technology and livestock and poultry production technology for supplementary income of the households. The adoption of modern agricultural technologies have 'moderate' to 'good' impact on the livelihoods of about 86 percent of the rural women of the study area. Among the three selected modern agricultural LPPT recorded the highest livelihood index of 1384 followed by HVPT and CPT with livelihood indices of 1092 and 403, respectively. The study indicates that among the agricultural technologies, LPPT has the most significant influence on the present improvement of the livelihoods of rural women. The women are also very keen to involve in HVPT. Alongside of LPPT and HVPT home based post-harvest processing of crops such as threshing, winnowing, drying, parboiling and storage of crops are the important activities, where women are actively involved. The study also reveals that most of the benefits go in favour of the 'never poor' category of rural women (total livelihood index 1423) followed by 'occasionally poor' (TLI=793) and a limited impact to 'usually poor' category (TLI=503). In any future livelihood strategy formulation for the rural women the involvement of 'usually poor' women need to be ensured, so that they can not be left out of the main stream development.

Key words: Characteristics of farmers, Modern agricultural technology, Livelihood index

1. Introduction

A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and cover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the long and short term.' (Chambers *et al.*, 1992).

Sustainable livelihoods offer both a conceptual and programming framework for poverty reduction in a sustainable manner. Conceptually, livelihoods denote the means, activities, entitlements and assets by which people make a living. The sustainability of livelihoods becomes a function of how men and women utilize asset portfolios on both a short and long-term basis (DFID 2002). Sustainable livelihoods are those that are able to cope with and recover from shocks and stresses (such as drought, cyclone, flood, civil war, policy failure) through adaptive and coping strategies,

economically effective, ecologically sound, ensuring that livelihood activities do not irreversible degrade natural resources within a given ecosystem and socially equitable, which suggests that promotion of livelihood opportunities for one group should not foreclose for other groups, either now or in the future.

The contribution of women to households is valued in the society but their contribution in terms of labour and their roles in agriculture do not get social recognition (Mortozza, 1992). Women participation in paid works is restricted by socio-religious customs. During mid-seventies, NGOs oriented with relief and charity aimed to develop integrated community development programmes with various sectoral activities such as agriculture, fisheries, livestock, health and family planning, credit and input delivery, cooperatives etc. The women play a vital role in performing activities in general and homestead farming activities in Bangladesh (Ahsan, *et al.*, 1986; Brammer, 1993; Hossain, 1985; Karim and Wee, 1996; Majumder *et al.*, 1983). Miah, *et al.* (1993) found that women earned on an average Tk. 16,000 annually from

¹ Department of Farm Power and Machinery, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

² Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

homestead farming. At rural small holders' context this financial contribution is regarded as very valuable in maintaining family food and nutritional security.

Adoption of modern technology is viewed as an essential element to agricultural development strategy in third world countries. Technological advances are used in poverty elevation programs to stimulate productivity and economic growth. Modern agricultural technology is the key, which allows certain changes in the livelihoods of rural women. The rural women have limited access to the existing modern agricultural technologies, mostly restricted by the male dominated society and cultural acceptance in a country like Bangladesh (Ali and Rahman, 1978; Islam, 2000). However, in recent time women are increasingly involving in modern agricultural activities and playing an important role in alleviating livelihoods of rural small farm holdings.

In the present socio-economic context the livelihood status of rural women and their further involvement in poverty reduction programmes are to be well understood. It is also necessary to identify the emerging problems and opportunities of rural women in the struggle for alleviating the poverty. In view of the content and nature of women participation in agricultural activities as a means of poverty reduction needs more attention and deserves specific investigation. Hence, the researchers undertook a study to determine the impact of modern agricultural technologies on the livelihoods of rural women.

2. Materials and Methods

2.1 Population, locale and collection of data

Hundred and fifty farm families of the village Garadia under Phulpur upazila of Mymensingh district were the population and locale of this piece of research. Fifty women members among the households were selected using stratified random sampling technique for this study.

A set of questionnaire was the instrument used for collecting data in this piece of research. A draft questionnaire was prepared in accordance with the objective of the study. The questionnaire was pre-tested on 10 women. Necessary alteration, additions and adjustments were made in the questionnaire based on the pre-tested results. Data were collected by the researchers through personal interview procedure with the help of the women of

the village. The interview of each woman was conducted separately and each of the queries in the questionnaire was explained properly.

2.2 Target group selection

The target households were categorized as usually poor, occasionally poor and never poor. The categories were defined on the basis of review of research articles and consultation with the community people and key informants in the relevant field. The main criteria based on such selected variables of such classification were: land ownership, food security, housing conditions, employing or selling labour, education, and social networks. The target groups for this study are shown and defined in the Table 1.

2.3 Selection of agricultural technologies

The economic activities of the study area was mostly dependent on agricultural (on and off-farm) and some related activities. The women were found to be involved mainly in home-based agricultural activities such as home-based vegetable production, livestock and poultry production, production and post-harvest processing of field crops etc. Depending on the major involvement of the respondent women modern agricultural technologies were classified into three categories as Crop Production Technology, CPT (included technologies related to production of field crop and their post-harvest processing); Livestock and Poultry Production Technology, LPPT (included technologies related to production and management of poultry and livestock); and Home-based Vegetable Production Technology, HVPT (included technologies related to management and production of home-based vegetable). Traditionally these technologies were being used by the rural women form a long time, but in last three decades modern management and production technologies were promoted to rural women by the department of agricultural extension, livestock and fisheries and other government and autonomous organizations, and playing an important role in alleviating livelihoods of rural farm families and in particular to the women.

2.4 Selection of Livelihood Indicators

Based on intensive search of literature and comprehensive interaction with the key informants six outcome livelihood indicators were identified and measured with appropriate instrument. The livelihood outcome indicators are: Income, Food security, Well-being, Empowerment, Vulnerability and Access to institutions (Table 2).

Table 1. Categories of farmers in the selected area

Category	Selection criterion
Never poor	More than 250 decimal of land; yearly income above Tk. 45,000. Can bear the cost of education of children; dominate the local power structure; secure food for 12 months. The number of household considered for this study was 20.
Occasionally poor	50 to 250 decimal of land; yearly income Tk. 20,000 to 45,000. Can secure food for around eight months. The number of household considered for this study was 15.
Usually poor	Land below 50 decimal; yearly income below Tk. 20,000. Can secure food for only three to four months. Women engaged in manual labour or work as housemaids. The number of household considered for this study was 15.

Table 2. Selected livelihood indicators

Indicators	Items
Income	Improvement of income from different sources e.g. agricultural machine, crop, livestock, fisheries, homestead vegetable, wage labour, embroidery & handicraft and small business.
Food security	Adequate food supply, number of meals a day, supply of adequate animal & leguminous protein, fruits & vegetable, equal access to food for family members, balance diet for children and adequate food to women during pregnancy & physical illness.
Well-being	Improvement in residential house, children education, ability to call doctor, scope of joining social and religious festivals, recreational facilities, health & sanitation and family clothing.
Women empowerment	Decision making authority in family land holding & agriculture, children education, selling family assets, family planning, engagement in income earning activities, neighbours take advice for family affairs, voice against oppression and reduction of dowry in marriage.
Reduced vulnerability	Coping ability against flood, drought & cyclone, physical and mental sufferings, access to credit, access to education and skill training, reduce obstacles to outdoor working, decrease in child marriage & dowry and abandonment & divorce.
Access to institution	Increase access to NGO activities, membership of social organization, mobility outside home, easier mobility for receive training outside home, easier to enjoy movie, jatra and cultural functions, easier to visit children's school and health clinic and easier in involving Grameen bank credit & women associations.

2.5 Measurement of Impact of modern agricultural technologies on the livelihoods rural women

The impacts of modern agricultural technologies on the livelihoods of rural women have been measured by identifying different livelihood indicators and measured with appropriate measurement techniques. To do so each of the rural women respondents was asked 48 questions having relevance to level of improvement in income, food security, well-being, women empowerment, reduced vulnerability and access to institutions. A 3-point Likert scale was used to measure the livelihood index of the rural women by evaluating the level of agreement with the questions related to livelihood indicators. The weights assigned to level of agreement were 'agree = multiple of 2', 'moderately agree = multiple of 1' and 'do not agree = multiple of 0'. The Livelihood Index equation was as follows:

$$\text{Livelihood Index (LI)} = Lna \times 0 + Lma \times 1 + La \times 2$$

Where, LI = Livelihood index

Lna = Number of respondents did not agree with the statement related to livelihood indicators

Lma = Number of respondents moderately agreed with the statement related to livelihood indicators

La = Number of respondents agreed with the statement related to livelihood indicators.

The expected range of women livelihood index was 0-96. Therefore, the bottom one third LI (0-32) range was defined as "poor impact", middle one-third LI (33-64) range was defined as "moderate impact" and the top one-third LI (65-96) range was defined "good impact".

3. Results and Discussion

3.1 Overall impact of modern agricultural technologies on the livelihoods of rural women

The livelihoods scenario of rural Bangladesh has been changed in the last decades mainly because of the changes taken place in agricultural sector.

Alongside of agricultural production sector non-farm activities related to this sector has also been developed. These have created a positive impact on the livelihoods of the rural population, as an integral part of rural population women livelihoods have also deeply influenced.

The study shows that nineteen out of 50 women respondents fall in 'good impact' category and 24 out of 50 respondents also fall in 'moderate impact' category (Table 3). Only 7 respondents fall into 'poor impact' category. This indicate that the modern agricultural technologies have made a 'moderate impact' to 'good impact' on the livelihoods of most (86%) of the women respondents in the study area. It is also reveals from the study that in the last fifteen years time a substantial amount of modern agricultural technologies have been adopted in the study area and a significant improvement has been made on the livelihoods of rural women.

3.2 Impact of three selected modern agricultural technologies on the livelihoods of rural women

Among the three selected modern agricultural technologies livestock and poultry production technology (LPPT) recorded the highest livelihood index of 1384 followed by home based vegetable production technology (HVPT) and crop production technology (CPT) with livelihood indices of 1092 and 403, respectively (Table 4). It indicates that among the agricultural technologies, LPPT has the most significant influence on the present improvement of the livelihoods of rural women. It is interesting to note that women involve in livestock and poultry production are enjoying relatively better livelihoods especially in women empowerment (LI = 304), reduced vulnerability and access to

institutions (both LI = 265), well being (LI = 212), income (LI = 175) and food security (LI = 163).

CPT : Crop production technology
LPPT : Livestock and poultry production technology
HVPT : Home-based vegetable production technology

It is notable that women empowerment has increased considerably followed by reduction of vulnerability and increase of well being of women, because of their contribution in the family income. Women's supplementary incomes to the family have contributed to the increase of well-being and food security of the households. Women access to various institutions also has contributed in acquiring skill, knowledge and opportunity related to home based income earning activities. Therefore, in future national policy formulation, women involvement in income earning activities and enhancement of knowledge and skill related to home based activities must be considered with due importance.

3.3 Impact of modern agricultural technologies on the livelihoods of different categories of rural women

The impact of modern agricultural technologies on the livelihoods of three categories of rural women such as 'usually poor', 'occasionally poor' and 'never poor' have been measured on the basis of most important livelihood indicators. The study reveals that the benefits of adoption of modern agricultural technologies mostly go in favour of the 'never poor' category of rural women (total livelihood index, TLI = 1423) followed by 'occasionally poor' (TLI = 793). A limited impact has been recorded for 'usually poor' category of rural women (TLI = 503 (Table 5).

Table 3. Overall impacts on the livelihoods of rural women

Category of Impact	Range of Livelihood Index	Frequency of the respondent
Poor impact	0-32	7
Moderate impact	33-64	24
Good impact	65 and above	19

Table 4. Impact of modern agricultural technologies on different livelihood aspects of rural women

Technology	Income	Food security	Wellbeing	Women empowerment	Reduced vulnerability	Access to institution	Total livelihood index
CPT	67	29	31	105	80	91	403
LPPT	175	163	212	304	265	265	1384
HVPT	135	179	171	227	183	197	1092

Table 5. Impact on the livelihoods of different categories of rural women

Category	Income	Food security	Well-being	Women empowerment	Reduced vulnerability	Access to institution	Total livelihood index
Usually poor	87	15	38	113	142	108	503
Occasionally poor	124	33	118	236	131	151	793
Never poor	121	272	254	288	229	259	1423
Cumulative livelihood index	332	320	410	637	502	518	2719

The findings indicate that in all categories of rural women much achievement have been registered in women empowerment (Cumulative livelihood index, QLI = 637), access to institution (QLI = 518), reduction of vulnerability (QLI = 502) and as a whole well being (QLI = 410) of the households. Much improvement has also been made in women's income earning (QLI = 332) and food security (QLI = 320) of the households (Table 5).

In the last decades, a significant amount of work has been done by the NGOs and government sectors to educate women specially the less privileged rural women to establish their rights in all social spheres and to ensure access to inputs such as micro-credit for income generating activities. Therefore, rural women are able to translate these opportunities into reality in home based agricultural activities. Although, much progress has been made, yet access to resources for income and food security specially for the 'usually poor' category of rural women must be taken seriously in future women development activities by GO, NGO and private sector initiatives.

4. Conclusions

Based on the findings and interpretation of the study the following conclusions are made:

- The study reveals that the selected modern agricultural technologies have made a 'moderate impact' to 'good impact' on the livelihoods of most (86%) of the women respondents in the study area. It is become possible because of the significant progress has been made in the last decade in the dissemination of the modern agricultural technologies in the rural Bangladesh by the government agencies and NGO initiatives.
- Among the selected agricultural technologies, livestock and poultry production technology (LPPT) has made considerable influence on the present improvement of the livelihoods of rural women, followed by home based vegetable production technology (HVPT) and crop production technology (CPT). The technologies

have made notable improvement in women empowerment, reduced vulnerability, access to institution, well being, family income and food security.

- Access to institutional skill training, technological information, micro-credit and awareness campaign have improved the capacity of the rural women for supplementary income for family and empowered them in the family and in the society, along with reduction of vulnerability and increased well being. In future agricultural policy formulation women involvement in income earning activities and enhancement of knowledge and skill related to home based agricultural activities must be considered with due importance.
- The study reveals that the benefits of adoption of modern agricultural technologies mostly go in favour of the 'never poor' to 'occasionally poor' categories of rural women. The 'usually poor' category of rural women is unable to harness the benefits due to lack of resources and inputs related to home based agricultural activities. Any future women development activities initiated by GO, NGO and private sector must ensure the access of 'usually poor' rural women to resources and inputs related to home based agricultural activities.

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