

IMPACT OF TRAINING ON LIVESTOCK TECHNOLOGY TRANSFER FOR RURAL POOR FARMERS LIVELIHOOD IMPROVEMENT IN BANGLADESH

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ABSTRACT

The study was conducted to evaluate the impact of training facilitated by Nuton Jibon Livelihood Improvement Project (NJLIP) under Social Development Foundation (SDF) for transfer livestock technologies and livelihood improvement for rural poor farmers in Bangladesh. A total of 650 farming households were selected by baseline survey during January 2018 to June 2018. The training and non-training beneficiaries were primary level educated and their family size (4.52) was little lower than the national average (4.9). Average age was 36.73 and 35.12 years for training and non-training farmers, respectively. The rate and amount of loan was found higher with respondent received training than without training. Adoption rate of technologies was higher than the level of idea on the concept of housing, feeding, breeding and marketing. The training beneficiaries improved knowledge and skill on feeding, management and health care of livestock and poultry. Training and demonstration are considered two strong tools for adoption and dissemination of livestock technology. Herd and flock size was increased by training beneficiaries than non-training beneficiaries. Beneficiaries having training on various IGAs have expanded their land and asset possession to a greater extent compared to non-training beneficiaries. Housing and sanitation condition of training beneficiaries were higher than non-training beneficiaries. Increased annual income of training and non-training households was 19.43% and 13.30% where income from different IGAs of livestock was 32.19% and 14.53%, respectively. Livestock were not extremely price sensitive but more sensitive on non-price factors logistic support like institutional support, quality of input and availability of input. Thus, training was treated as vital tools for transfer livestock technologies to influence the poor farmer's livelihood improvement of training household than non-training household.

Keywords: Impact, Livestock technology, Livelihood, Socio-economic, Training

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INTRODUCTION

Training is an essential tool for developing attitude, knowledge and skill in a specific field. More than half of the total population is engaged on agricultural and livestock farming in Bangladesh. In case of livestock, poultry sub-sector is an important avenue in fostering agricultural growth, improve food security and employs over five million people, making it the second largest source of rural jobs (Modak et al., 2019). About two-third of the world's poor people live in rural areas, and most of them depend on agriculture for their livelihoods (Mogues et al., 2009). This large population needs training on improved management and technology for optimum livestock and poultry production. This study represents the findings of training impact on farmers' practices and livelihood resulting from training courses conducted through Natun Jibon Livelihood Improvement Program (NJLIP). The training programmers' are aimed at building the competencies, skills and capabilities of farmers for improving their farm practices and productivity. Skill development training programmers' are aimed at imparting skills to the youth and providing them the opportunities of entrepreneurship development and be productive, while improving their economic status (Sharma et al., 2017). This study depicts the primary objective of the training program to explore the impact of training in changing farmer's livelihood and economic status. The challenges of the twenty-first century, among others are alleviate poverty in Bangladesh (Akteruzzaman et al., 2008). The agriculture sector consists of crops, livestock, fisheries and forestry and indispensable role to play in meeting the challenges. Livestock is the integral parts of the agricultural farming system of Bangladesh and livestock producers may gain through increased income and employment through access to cheaper livestock products. It is evidence from field studies in developing countries indicates that rural poor and hard-core poor households typically derive a larger share of their cash income from livestock than do well-off farmers. The distributions of livestock population are more or less equal than the distribution of land. It indicated that any investment in livestock sub-sector would be greatly benefited by smallholders, which would help for equitable distribution of income and reduces rural poverty in Bangladesh. Participation of rural people in livestock farming activity plays a vital role in the economic development of Bangladesh. Realizing the great contribution of the rural people in the production process of farm facilities, government planners, policy makers and administrators are trying to take necessary steps to include rural people in livestock development process during the recent years. It is observed that smallholders can play an integral role and would get far better opportunities to organize themselves as functional group for livestock development. In the production of livestock, both men and women integrated together in rearing and management practices. However, in addition to Directorate of Livestock Services (DLS), several private organizations and non-government organizations (NGOs) are also trying to

organize rural poor people especially landless and marginal landholding as the active income generating groups, and at the same time to increase the overall productivity of different species of livestock in the country. Realizing the potential of poultry to meet the need of the country both government and NGOs have taken poultry as a device for solving some problems of rural disadvantaged and destitute women. Consequently, Participatory Livestock Development Project (PLDP) has been launched since 1998 to implement the poultry model to improve the status of those women, reduced poverty and increased rural employment (Akteruzzaman et al., 2008). Raha (2003) observed that major components of poultry production chain under PLDP were profitable. There are many opportunities to increase poultry production by rural women. A need based comprehensive training should be imparted to the concerned project beneficiaries. Recently government of Bangladesh has launched a goat/sheep project as a means of poverty alleviation through the technical assistance from DLS. This would be a viable project for poverty reduction in rural areas of Bangladesh (Akteruzzaman et al., 2008). Social Development Foundation (SDF) has launched a Nutan Jibon Livelihood Improvement Project (NJLIP) financed by IDE of World Bank on improving livelihood of the poor and ultra-poor smallholders through livestock and other agricultural technologies. The duration of this project was 2015 to 2020. The goal of the project was to improve livelihoods and food security of poor and hard-core poor households. Women empowerment through training on adoption of livestock technologies depends for sustainable IGAs. The emphasis of present skill development training is on self-reliance. Training is a way to enhance knowledge and improve skills about new innovations and ideas in different fields. It was found from a survey that about 33% farmers had short term trainings from different Govt., private and NGOs on goat fattening and rest 67% farmers had no training experience regarding this issue (Barman et al., 2017). Sarker et al. (2017) also found that only 3% farmers had some training experience on goat and sheep production technologies and 97% had no training on that area. So, training is a big issue to enhance knowledge and skill as well as the production of rural agriculture and livestock. Moreover, it also encourages the young generation to participate in agricultural and agro-based industries. Hence, the study was to examine the extents of transfer livestock technologies through training and explore socioeconomic impact of training on livestock technologies for livelihood improvement of rural poor and ultra-poor farmers.

MATERIALS AND METHODS

Study area and selection of farmers

A field visit was conducted before sample selection and a population list of beneficiaries with training and credit holders were prepared and discussed the process of NJLIP activities. Then a multi-stage stratified random sampling was applied for

conducting socioeconomic survey. A total of 650 farm households were selected where 220, 215 and 215 households from Sirajgonj, Jamalpur and Gaibandha districts, respectively (Table 1) covering three upazila from each district. Six technologies out of nine technologies were considered namely layer farming, broiler farming, duck rearing, goat rearing, cow rearing and beef fattening. This survey was conducted during the month of January to June, 2018.

Table 1. Distribution of sample beneficiaries under NJLIP project

IGAs	Training status	Respondents			
		Sirajgonj	Jamalpur	Gaibandha	Total
Layer farming	With training	30	23	20	73
	Without training	8	15	16	39
Broiler farming	With training	24	22	20	66
	Without training	8	12	11	31
Duck rearing	With training	6	5	8	19
	Without training	4	4	12	20
Goat rearing	With training	28	26	30	84
	Without training	10	12	15	37
Cow rearing	With training	32	30	31	93
	Without training	14	16	8	38
Cattle fattening	With training	35	30	27	92
	Without training	11	15	12	38
Total	With training	155	136	136	427
	Without training	55	74	74	203
Grand Total		210	210	210	630

Preparation of interview schedule

The interview schedule was carefully prepared based on objectives of the study. A draft schedule was developed before preparing the final schedule. The draft schedule was then pre-tested with selected farmers in study area and then it was rearranged and modified as required of study. The schedule was developed so simple manner to avoid misunderstanding and to get accurate information from respondents of research areas. Then it was finalized according to the experience gathered in primarily field level survey

Collection of data

The researchers collected all information through personal interview from individual respondent in their own house. An introductory visit was made to study area when

the aims and objects of study were explained to the most of the respondents. This helped to create a friendly atmosphere of respondents. The researchers also established desired rapport building systematically and explained whenever it was felt necessary. The information supplied by respondents was recorded directly on the interview schedule. The information was cross checked carefully before leaving study area to avoid errors. Data was collected in local unit. These were subsequently converted into desirable standard level unit. Excellent cooperation was received from all respondents during data collection period. The data generated from this experiment were entered in Microsoft Excel worksheet, organized and processed for further analysis.

Methods of measurement of livelihood change

The changes in the socio-economic and livelihood parameters due to involvement in NJLIP project are determined. Though livestock is traditionally practiced by the respondents, the intervention through NJLIP, by which they received training on semi-intensive livestock and credit assistance through NJLIP and other NGOs for two years is expected to have brought about livelihood improvement. In this session, a detailed discussion on the impact of the adoption of livestock technology under NJLIP on family and housing assets has been investigated.

Statistical Analysis

After ending data collection, the collected data were digitalized coded, compiled, tabulated and analyzed. The collected data were analyzed statistically by using simple statistical tools like average, percentages, frequency distribution and rank through descriptive statistics.

RESULTS AND DISCUSSION

Socio-economic status of the respondents

From the Table 2, it is revealed that there was six IGAs namely Layer farming, Broiler farming, Duck rearing, Goat rearing, Cattle rearing and Cattle fattening. Age of the respondents is an important factor in any income generation activities (IGAs). Average age of the respondent was 36.73 and 35.12 years, respectively for with and without training in all IGAs. It was highest (41.05 years) in case of cow rearing respondent with training and lowest (26.5 years) in case of layer farming respondent without training.

Table 2. Socio-economic status of respondents of studied areas

IGAs	Training status	Socio-economic status			
		Age (yrs)	Education (class)	No. of poultry and livestock	Family size (no.)
Layer farming	With training	32.5	6	35	5.5
	Without training	31.4	7	25	5.6
Boiler farming	With training	35.2	8	200	4.8
	Without training	33.4	6	125	4.5
Duck farming	With training	30.7	8	325	3.4
	Without training	28.9	4	250	3.2
Goat rearing	With training	40.0	9	5	4.8
	Without training	39.0	7	3	3.5
Cow rearing	With training	47.0	8	4	5.0
	Without training	44.0	7	3	4.0
Cattle rearing	With training	35.0	9	3	5.1
	Without training	34.0	8	2	4.8
All average	With training	36.73	14.96 %	N/A	4.77
	Without training	35.12	20.12 %	N/A	4.27

The results of this study were almost similar with Rahman et al. (2012) where they reported that 45.3% farmers were in middle aged category, and 16.0% farmers was in young age category, respectively. It was expected that young and middle-aged farmers (67%) were more active, energetic and enthusiastic in performing livestock related activities. Particularly the middle-aged farmers were well experienced and more acquainted with the livestock production (Sarker et al., 2017). Average level of education of the training and non- training respondent was 14.96 and 20.12%, respectively (Table 2). More than 80% beef fattening farmers were educated but only 20% were illiterate only known to sign (Anwar et al., 2019). Anwar et al. (2019) reported that 67% and 13% had primary and below SSC level of education, respectively. Average family size of the training and non- training respondent was 4.77 and 4.27, respectively. The family size of the present study was slightly lower than the national average 4.9 (BBS, 2008). Hossain et al. (2018) reported that average family size up to 5 and up to 8 was 80 and 20%, respectively.

Extent of training and rate of adoption of livestock technology

It was reported that more than 50% respondents received training on livestock IGAs from NJLIP.

About 325 respondents received training on technical IGA and 102 on social issues. The respondents also received training on IGAs from other GO and NGOs. The

extent and rate of adoption of different parameters of livestock technologies is shown in Table 3. The score range was 1-10 for different technologies. The score for rate of adoption was higher than the score for idea about the concept for parameters of housing, feeding and treatment, breeding and marketing of livestock products. These results were agreed with the findings of Akteruzzaman et al. (2008).

Table 3. Extent and rate of adoption of different parameters of livestock technologies

Parameters	Extent and rate of adoption	Livestock Technologies (Average score out of 10)					
		Layer farming	Broiler farming	Duck rearing	Goat rearing	Cow rearing	Beef fattening
Animals' housing	Idea about the concept	1.3	3	1.2	1.5	2.0	2.5
	Reception during training	8.8	9.2	9.0	9.5	9.6	9.6
	Adoption	7.2	9.8	7.2	7.9	8.7	8.2
Animals' feeding	Idea about the concept	1.9	4.1	2.2	2.3	2.4	3.9
	Reception during training	9.4	8.9	9.4	8.7	9.5	9.7
	Adoption	8.7	9.1	8.5	8.5	9.1	9.2
Animals' treatment	Idea about the concept	1.1	2.2	1.6	1.2	1.2	2.5
	Reception during training	7.4	7.2	9.1	8.2	8.5	8.4
	Adoption	6.4	7.3	7.8	7.4	7.8	8.1
Animals' breeding	Idea about the concept	0	0.4	0.2	1.4	1.6	2.1
	Reception during training	3.5	0.6	1.0	8.4	9.5	5.6
	Adoption	3.3	0.7	1.2	8.0	8.7	6.6
Livestock products marketing	Idea about the concept	1.2	3.0	2.0	1.3	1.4	2.2
	Reception during training	7.0	7.4	6.7	7.4	7.9	7.6
	Adoption	6.5	7.6	6.4	7.6	7.1	7.7

The extent of credit received by the respondents in three areas of the study is given in Table 4. Credit was one of the vital problems of the farmers for rearing livestock due to their poor economic conditions (Hossain et al., 2000). From Table 4, it reveals that the credit received by the training respondents was higher than the non-training respondents. First cycle loan proportion (%) was higher compared to 2nd and 3rd cycle loan of the studied areas. This result was similar to the findings of Akteruzzaman et al. (2008).

Table 4. Extent of credit (%) received by the respondents in the studied areas

Loan frequency	With training		Without training		Total	
	No. of household	% of total	No. of household	% of total	No. of household	% of total
First cycle	202	47.31	152	74.88	354	56.19
Second cycle	165	38.64	45	22.17	210	33.33
Third cycle	60	14.05	06	2.95	66	10.48
Total	427	100	203	100	630	100

The loan size increased with the increase of frequency of loan received due to reliability of the farmers' activities (Table 5). The amount of loan ranges from 4500-25000 BDT and the rate and amount of loan was higher than the non-training beneficiaries. This finding was higher than the findings of Akteruzzaman et al. (2008). These results were not agreed with the present study

Table 5. Average loan received (BDT) by the respondents

Loan frequency	With training		Without training	
	Amount/household	% of total	Amount/household	% of total
First cycle	8000	22.06	5000	16.19
Second cycle	10500	32.04	6850	27.8
Third cycle	18950	45.9	10525	56.01
Total	-	100	-	100

Dissemination to popularize the technologies of livestock

The dissemination methods of livestock technologies are presented in Table 6. These should be helpful to popularize and enhancing of transfer livestock technologies. Upgrading training and exposure visit was the best method of popularizing livestock technologies and demonstration was the second for the farmers in studied areas. Focus group discussion (FGD) was the third option of popularizing livestock technologies for IGA beneficiaries. This finding was in accordance with the findings of Akteruzzaman et al. (2008). Moreover, case studies, role plays, and part of task trainers might have the established base of livestock development to support the effectiveness of training related attitudes, knowledge, and skills of livestock farmers. Rahman et al. (1999) stated that rural farmers used only indigenous knowledge for livestock production and they had no scientific knowledge or training in this regard. Therefore, it needs a massive training program as well as FGD on livestock production technologies along with practical demonstration, campaign through leaflet, poster, mass media (Radio and TV) and printing media to increase the knowledge and skill of rural farmers.

Table 6. Method of dissemination to popularize livestock technologies (ranking according to important)

Dissemination methods	Layer farming		Broiler farming		duck rearing		Goat rearing		Cow rearing		Beef fattening	
	With out	With out	With out	With out	With out	With out	With out	With out	With out	With out	With out	
Upgrading training	1	1	1	1	1	1	1	1	1	1	1	1
FGD	3	2	2	3	3	3	2	2	3	2	3	3
Poster	5	5	4	5	4	5	5	4	4	5	5	6
Leaflet	7	7	7	7	5	7	7	7	5	7	7	7
Radio	8	8	8	4	6	4	8	8	6	8	4	8
TV	9	6	9	6	8	6	6	9	7	9	6	9
Demonstration	2	3	3	2	2	2	3	3	2	3	2	2
Peer group	4	4	5	8	7	8	4	5	9	4	8	4
Campaign	6	9	6	9	9	9	9	6	8	6	9	5

Livelihood changes

From Table 7, the changes were shown of land, family and housing assets between with and without training households in respect of IGAs. The land of farmers with training and non- training was increased 35.29 and 14.85%, respectively. Bicycle, rickshaw/van, radio/ TV and sewing machine of farmers with training were increased 22.66, 30.43, 7.8 and 15.62%, respectively. Tin shed house and semi-pucca latrine were increased 4.68 and 26.34%, respectively. Some assets of farmers without training like rickshaw/van, radio/TV, tin shed house and semi-pucca latrine were also decreased in the studied areas compared to training farmers. Increasing assets of farmers indicated that training exposure earned more money than the farmers having non-training. The results guided that training is a vital part for increasing family income of the poor farmers. Hossain et al. (2018) found that impact of livelihood activities on food, cloth, social status, health care, education and housing were 32.74, 27.42, 22.22, 18.75, 15.25, and 9.36%, higher than previous stated of bull rearing respectively.

Table 7. Changes of land area and assets of respondent household

Assets	Duration of time	With training	Without training
Land(decimal)	Before	85	105
	After	115	120
	% change	35.29	14.85
Bicycle (no. of hh)	Before	75	61
	After	92	66
	% change	22.66	8.2
Rickshaw/Van (no. of hh)	Before	46	19
	After	60	16
	% change	30.43	-14.78
Radio/TV (no. of hh)	Before	154	80
	After	166	77
	% change	7.8	-3.75
Sewing machine (no. of hh)	Before	32	8
	After	37	8
	% change	15.62	0
Tin shed house (no. of hh)	Before	384	190
	After	402	185
	% change	4.68	-2.63
Semi- pucca latrine (no. of hh)	Before	186	101
	After	235	98
	% change	26.34	-2.97

Changes of household and income

From Table 8, it is revealed that the number of training and non-training households increased 19.43 and 13.30%, respectively and income increased from different IGAs of livestock was 32.19 and 14.53%, respectively. This finding was not agreed with Akteruzzaman et al. (2008) where they showed that income increased was 68.2 and 56.04%, respectively.

Table 8. Increased households and income from livestock rearing in studied areas

Category (HH No.)	Initial (No.)	Final (No.)	Per cent
With training	427	510	19.43
Without training	203	230	13.30
Category (income)	Initial (BDT)	Final (BDT)	percent
With training	8510	11250	32.19
Without training	4540	5200	14.53

Factors affecting sustainability of livestock technology

Table 9 showed the factors affecting sustainability of livestock technology. The factors were broadly categorized such as technical, economic and social aspect. The

institutional and input supports of farmers with training were 97% and 89%, respectively. These factors were more important for sustainability of NJLIP training beneficiaries. Disease affected farmers were 72% which was an important factor for sustainability. Input availability, input price and market demand within economic factors were 86, 82 and 84% with training receiving farmers which was an important factor for sustainability of training beneficiaries. Akteruzzaman et al. (2008) reported that input availability, input price and market demand was 95, 84 and 94%, respectively. These findings were higher than the present study. Price of products (90%) was lower than the finding of Akteruzzaman et al. (2008) where they showed the price of products

95% Social factors were also important factor for adoption and sustainability of livestock IGAs. Natural disaster (86%) such as flood, drought, heavy rain, thundering and earthquake was considered as major factor that affecting the sustainability of training beneficiaries. Social conflict was 80% including sharing of grazing areas, social status, position etc. were the affecting factors for sustainability.

Table 9. Factors affecting sustainability of NJLIP training household

IGA group	TS	Ts	Technical (%)			Economical (%) HH			Social (%) HH		
			IS	IQ	D	IP	IA	MD	PP	SC	ND
Layer farming	With	73	96	97	68	89	93	84	94	77	93
	Without	39	77	82	74	64	72	72	85	88	81
Broiler farming	With	66	94	90	60	88	95	89	93	87	66
	Without	31	66	78	48	77	66	62	66	61	60
Duck rearing	With	19	88	95	91	85	95	92	96	90	91
	Without	20	62	78	64	54	62	66	59	62	65
Goat rearing	With	84	91	87	74	77	95	93	91	77	95
	Without	37	84	75	42	46	68	63	56	52	74
Cow rearing	With	93	98	93	79	90	96	88	98	84	87
	Without	38	95	91	81	81	92	82	94	79	92
Beef fattening	With	92	95	98	77	82	88	85	88	81	85
	Without	38	75	85	42	50	56	54	54	48	63
All average	With	427	67	61	52	61	62	62	66	58	61
	Without	203	30	28	20	21	24	22	24	22	25
Grand total		630	97	89	72	82	86	84	90	80	86

TS= Training status, TS, Total sample, IS= Institutional support, IQ= Input quality, D= Disease, IP= Input price, IA= Input availability, MD= Market demand, PP= Price of product, SC= Social conflict and ND= Natural disaster

CONCLUSIONS

It reveals from the study that the adoption rate of livestock technology like housing, feeding, treatment, breeding and marketing of livestock products were satisfactory for training receiving beneficiaries which enhance livestock production. Hence, training should be urgent needed to all the training beneficiaries for higher adoption of livestock technology. The support of institutional input quality and availability of input also effect on sustainability for dissemination and adoption of livestock technology. Upgrading training and demonstration method were found to be the best methods for the beneficiaries. It was found a positive and significant impact of training on asset development and income generation of livestock farmers. Therefore, training might be an effective tool for technology transfer regarding livestock management and to improve the livelihood status of the livestock farmers. A holistic training approach also, could be an ample opportunity for prompt dissemination of livestock technology.

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