Present livelihood Status of Farmers Following Technological Development in Some Selected Areas of Sylhet Division

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***Abstract*—Mechanized agriculture is the process of using agricultural machinery to work in agriculture field. Mechanization can improve operational efficiency, encourages large scale production developing economics. In Bangladesh agriculture is the major source of livelihood. This study was conducted to assess the livelihood status of farmers following technological development in some selected areas of Hobigonj district, Golapgonj, and SylhetSadarupazila of Sylhet district. The study was based on collection of primary and secondary data. A total of 500 farmers were interviewed from the selected areas. Different categories of farmers were determined. The results show that adapted modern technology 91%, 94%, 92% in SylhetSadar, Golapgonj and Hobigonj respectively. About 64%, 58%, 31% farmers were primary educated in SylhetSadar, Golapgonj and Hobigonj respectively. Farmers housing and sanitation were well enough and 45%, 48%, 69% terraced house in SylhetSadar, Golapgonj and Hobigonj respectively. The study result shows 64%, 52%, 54% farmer was visited upazila health complex in SylhetSadar, Golapgonj and Hobigonj respectively. The value from this demonstration prevail that Farmer bears a great role for developing economic condition of our country.**

***Index Terms*—mechanization, livelihood, technology, adaptation, development**

I. Introduction

Agriculture constitutes are the major source of livelihood in Bangladesh. The agricultural sector contributes more than 50 percent of national income and employs two-third of the labor force (Rahman *et al.*, 1998) [1]. There is growing interest in learning the impacts of mechanization especially in developing economics. Economic analysis may entail assessment of employment and time allocation effects of new technologies. The performance of this sector has an overwhelming impact on major macroeconomic objectives like employment generation, poverty alleviation, human resources development and food security. In Bangladesh the land-man ratio is extremely low, due to people are increasing day by day. Being one of the most densely populated country of the world the majority of the population lack of food security. Therefore, continued agricultural growth is concerned pivotal in prohibiting poverty and raising the levels of living for the whole population. Over the past four decades, the major thrust of national policies was directed towards transforming the agricultural sector via the route of rapid technological progress [1].

In agriculture, time and production are so important for planting, harvesting and delivering to stores. Modern agricultural machinery allows a small number of people to grow vast quantities of food and fiber in a shortest period of time. Historical experience suggests that agricultural mechanization can raise the productivity of factors (e.g. labor, capital, land and other natural resources), which played an important role in economic growth and development. Through developed countries, being the forerunner in technological innovations, benefited most from technical change, particularly industrial technology along with agriculture (Hayami and Ruttan, 1985) [2]. During the last two decades more than 80 percent of the increased in rice production has come from the expansion of irrigated boro rice (GOB, 2012) [3]. Modern agricultural technology increased production, employment, income and it has exacerbated income inequality, poverty, gender gap in employment, regional disparity and environmental degradation and is threatening food production sustainability (Rahman 1998) [1]. Rice is grown over almost 75 percent of the land area and is the country's most important crop. Two-thirds of this land area is now covered by MV technology after a rapid expansion over the past 15 years. In 1987, 3 percent of a sample of households owned shallow tube wells, this increased to 9 percent by 2000. Only 1 percent owned a power tiller in 1987 compared to 19 percent in 2000 (Hossain *et al.* 2003) [4]. In Bangladesh significantly increased the national average cropping intensity from 155 per cent to 187 per cent and total food production from 12 million to 21 million. There were 1292 people in the Darmarpotavillage in SatkhiraDistrict. From 1985 to 2000 village population grew by 405 people (46%), per capita arable land has decline from 0.17ha to 0.10 ha. (Ali 2004) [5]. Hossain reported the average rice yield has increased from 1.7 to 3.5 t/ha for all rice crops and annual rate of growth of rice 2.3% per year. For the dry season for which the expansion of MV has been very

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rapid, the yield has grown from 1.7 to 4.3 t/ha, an annual increase of 2.9% per year (Hossain 2006) [6]. The land preparation was done almost 70% by machine which has now been raised to about 80% and more than 350,000(estimated) power tillers are present in the country along with 5000 four wheel tractors (Farouk *et al.* 2007) [7]. Bangladesh has produced a remarkable progress in producing cereal grains (rice, wheat and maize) and to some extent, vegetables (tomato, cauliflower, cabbage, egg plants, beans etc.) by introducing farm mechanization. (Islam 2009) [8]. Agriculture contributing 23.5 per cent to the national GDP and providing employment for 63 per cent of the population. Approximately 82 per cent of the country's population lives in rural areas (Soni *et al.* 2010) [9]. During the last three decades Bangladesh have had a tremendous growth in agriculture. The rapid expansion of the new technology has had a positive impact on food grain production. Agricultural output grew by 4.7 percent during 1996 – 2000. The growth rate output in present decade is 2.9 percent (Islam 2012) [10]. The number of power tillers and growth rate of power tiller use in different in different places. The rate of increase in the use of power tillers during 1993-2003 is found to be highest in Dhaka division and the lowest in Chittagong division and the corresponding figures for rate of increase are 415% and 245%, respectively (Quayem *et al.* 2012) [11]. Agriculture sector of Bangladesh contributes 19.29 percent of gross domestic product (GDP), where crop sector contributes alone 13.44% and Agricultural labors are decreased from 63% in 2007 to 47% in 2012 (Milon 2015) [12]. Therefore, farm mechanization is inevitable to increase crop production. The present status of integrated farming and its impacts on farmers has the potential of increasing farmer's income and employment creation over the mixed and traditional farming practices in the study area (Uddin *et al.* 2015) [13]. There have been relatively few studies on impact of farmer's livelihood after mechanization of agriculture in Bangladesh. Most of the study based on food production of modern Varity crops adaption. Therefore, the present study focused on mechanization impact on livelihood of farmers with respect to present status and adapting problems. Based on the above discussion this study was investigated the livelihood status of farmers in Sylhet areas.

II. Materials and Methods

The methods and techniques are for identifying the present livelihood status of the farmer following technological development. This study is based on field survey. The primary data were collected by interview schedules from individual farmers from different upazilla.

A. Study Area

The data was collected from rural areas of Sylhet, Golapgonj and Hobigonj. The study was conducted in 12villages based on different types of farmer, different types of machinery used and cultivating pattern. The areas were selected for good road communication with the respondents.

Most months of the year the climatic condition is tropical and the short dry season has little effect in Sylhet. A tropical monsoon climate with hot and humid summers and cool and dry winters dominates the village, which experiences a mean annual temperature and rainfall. The average annual temperature and rainfall is 24.8℃ and 3.8m respectively. In Golapgonj temperature varies from 19℃ to 29℃. The average rainfall was recorded 3.7m in Golapgonj according to past 5 year's data in the month of November. In Hobigonj the average temperature and rainfall is 22.9℃ and 3.3m respectively. (Sylhet Radar Station)

B. Respondents Category

The respondents (farmer) were divided into four categories and farmers were randomly selected from each category (Table I). The total number of respondents was 500 from SylhetSadar, Golapgonj and Hobigonj.

TABLE I. Farmer's Categories according to the Land Ownership

Farmer's categories	SylhetSadar	Golapgonj	Hobigonj	Total
Marginal farmer (Below 1 hectare)	82	155	64	301
Small farmer (1-2 hectare)	9	45	18	72
Medium farmer (2-4 hectare)	9	45	27	81
Rich farmer (Above 4 hectare)	0	37	9	46
Total	100	282	118	500

C. Preparation of Interview Schedule

Schedule is the name usually applied to a set of questions which are asked and filled in by an interviewer in a face to face situation with another person. Interview schedule was prepared in context of the purpose of the present study. Questions were related to the farmer's family description, category, income and land use pattern, machinery ownership and other activities that are related to mechanization impact on farmer's livelihood.

D. Data Collection

Data was collected through personal interview during the study period. The collected data was confirmed by holding informal interview. Before taking interview, the whole purpose of the study was clearly explained to the respondents and tried to find out fact as much as possible, farmer tried to make good cooperation and answer all the questions properly. The information given by the farmer was oral and from memory because few were maintaining records about education, housing and sanitation, medical service.

E. Data Analysis

The data for the study were compiled, tabulated and analyzed in accordance with the objective of the study.

III. Results and Discussion

The detailed analyses were collected in various parameters of livelihood characteristics of the farmer.

A. Different Categories of Farmers

Fig. 1 shows that marginal farmer was 82%, 55%, 54% in SylhetSadar, Golapgonj and Hobigonj respectively. From investigation it was found that although many landless farmers were entered in agricultural sector due to development of advanced agricultural technology for mechanization. Farmers might be hired easily agricultural machinery for cultivating other's land in this case percentage of marginal farmer was taken the highest position.

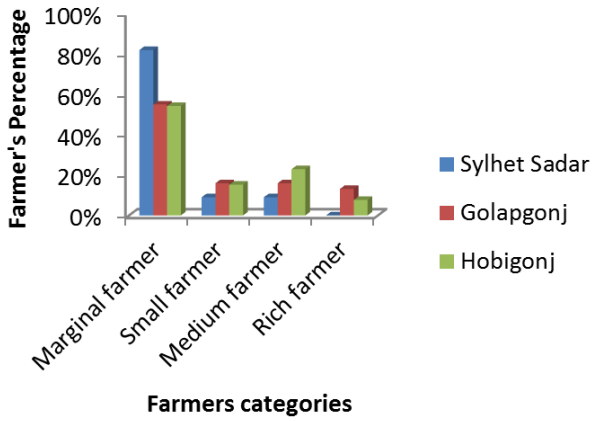

Figure 1. Different categories of farmers

B. Land Use Pattern

Fig. 2 represents that36%, 32%, 15% farmers were cultivated own land in SylhetSadar, Golapgonj and Hobigonj respectively. The result also indicates that 55%, 39%, 54% farmers were cultivated others land in SylhetSadar, Golapgonj, Hobigonj respectively. From the figure it is clearly seen that lease land was the highest position. Because of introduced advance technology in agriculture resulting the farmer might be cultivated more land by lease system.

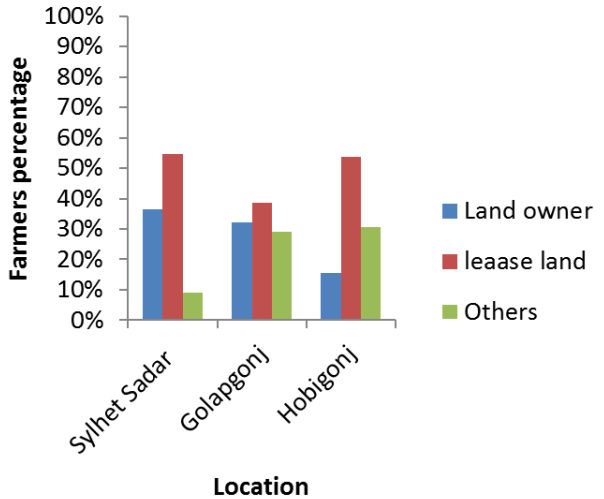

Figure 2. Farmer land use pattern

C. Comparison between Modern and Conventional Technology

Fig. 3 shows that most of the farmers were used modern technology (tractor, power tiller, pump, reaper, thresher, combine harvester) where as few number of farmer used conventional technology. The results indicate that modern technologies were used 91%, 94%, 92% in SylhetSadar, Golapgonj and Hobigonj respectively. It is clearly seen that utilize of modern technology was higher than conventional technology. The possible reason is as modern technology reduce drudgery, less time consume for farm activities. In this study found that most of the farmers are used power tiller, thresher, pump, reaper combine harvester, seed drill popular to farmers.

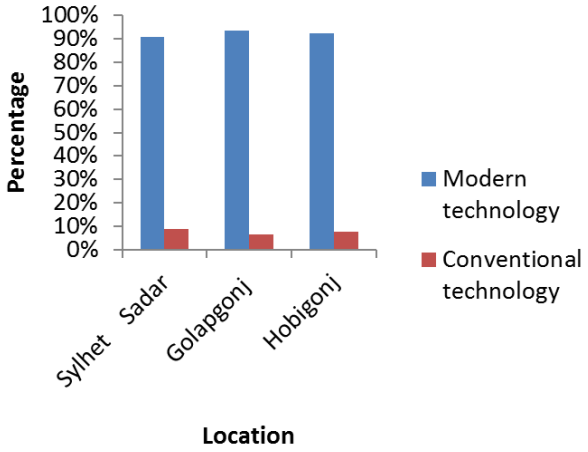

Figure 3. Technological comparison between modern and conventional technology

D. Machinery Ownership

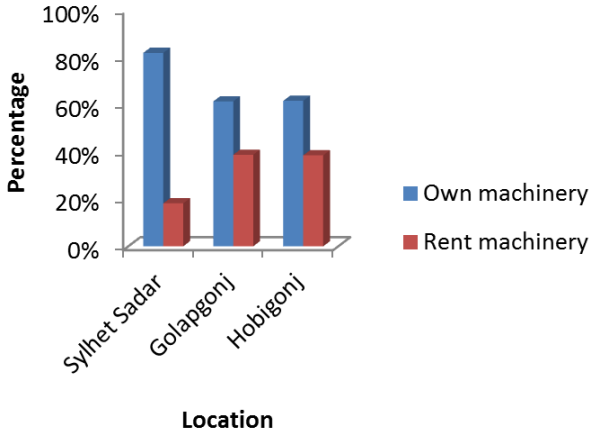

Figure 4. Machinery ownership

Fig. 4 represents that farmers were 82%, 61%, 62% cultivated land by using own machinery (tractor, power tiller, pump, reaper, and thresher) in SylhetSadar, Golapgonj and Hobigonj respectively. The result also represents that farmer's were18%, 39% and 38% cultivated land by renting agricultural machinery in SylhetSadar, Golapgonj and Hobigonj respectively. As most of the farmer had own machinery farmer could rent

the machinery to others and by renting machinery famer could income additionally besides own cultivation. In addition, as most of the farmer had pre harvest and postharvest machinery farmer could easily cultivated horticulture crops and by selling these crops their income was increased. It shown that percentages of own machinery was the peak value due to farmers income was better for modern agriculture machinery.

E. Different Development Status of Farmers in SylhetSadar

Fig. 5 represents that different development status of farmers after adapting mechanization in SylhetSadar. The results states that most of the farmer was uneducated 73% in 2000and 9% in 2018that means tremendously increased the education level of farmers within 18 years. It also found that in 2000 most of the farmers house were mud made (73%) then the percentage was sharply decreased (27%) resulting the percentage semi cemented house rate was increased in 2018. In 2000 only 9% farmers house were terraced but rate was 45% in 2018.The medical services were 64%, 36%, 0%, in 2000 and 0%, 36%, 64% were in 2018 with respect to kobiraj village doctor and upazila health complex. The investigation indicates that mechanization was played vital role on different development stages of farmer in all aspects.

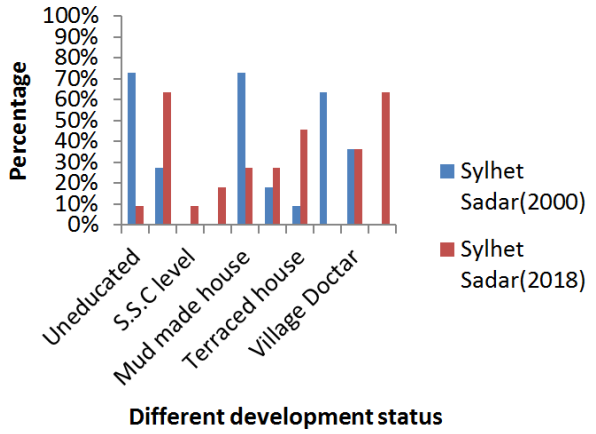

Figure 5. Different development status of farmers in SylhetSadar

F. Different Development Status of Farmers in Golapgonj

Fig. 6 represents that different development status of farmers after adapting mechanization in Golapgonj. The results states that most of the farmer was uneducated 69% and 15%in 2000 and 2018 respectively means tremendously increased the education level of farmers. It also invented that in 2000 most of the farmer had mud made house (74%) then the percentage was sharply decreased (32%) resulting the percentage semi cemented house rate was increased in 2018. In 2000 only 6% farmers house were terraced but rate was 48% in 2018. In case of medical service 48%, 45%, 6% and 0%, 48%, 52% farmer are dependent on kobiraj, village doctor and upazila health complex in 2000 and 2018 respectively. The investigation indicates that mechanization was played vital rule on different development stages of farmer in all aspects.

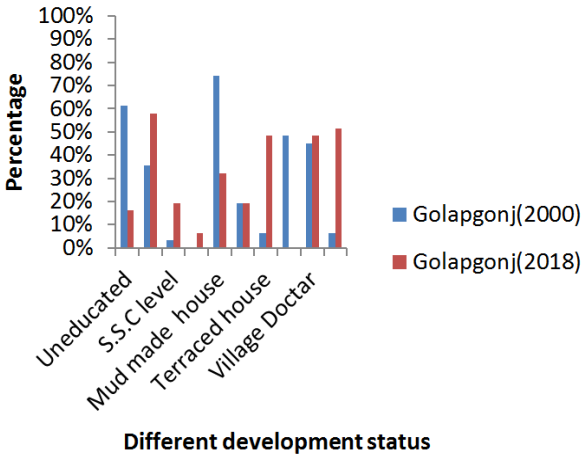

Figure 6. Different development status of farmers in Golapgonj

G. Different Development Status of Farmers in Hobigonj

Fig. 7 was initiated different development status of farmers after adapting mechanization in Hobigonj. The result states that most of the farmers were uneducated 69% and 15% in 2000 and 2018 respectively means rapidly increased the education level of farmers. It also investigated that in 2000 most of the farmer house was mud made 54% then the percentage was promptly decreased 8% resulting the percentage semi cemented house rate was increased in 2018. In 2000 only 15% farmers house were terraced but rate was 69% in 2018. In case of medical service 54%, 38%, 8% and 0%, 46%, 54% farmer are dependent on kobiraj, village doctor and upazila health complex in 2000 and 2018 respectively. All the data established farmer's livelihood development after mechanization in Hobigonj.

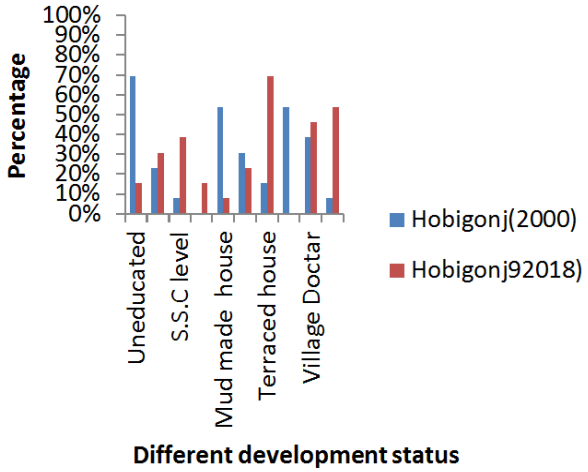

Figure 7. Different development status of farmers in Hobigonj

H. Changing Pattern of Different Proxy Variable after Technological Development

Fig. 8 shows changing pattern of educational status on the basis of time period of 2000 and 2018. It was found

that there was a positive trend of educational status which is because of easy access in education and awareness of the people through different technology. If we look back in the year 2000, digital technology such as the internet, computers, cell phones, TV and MP3 players were not common place inside the household. In contrast, today's students and children are considered "digital natives". Having a computer in every household as well as every school has exponentially increased student's awareness of technology and also broadened their horizons about the global economy. Today technology reaches well beyond the classroom to serve the needs of learners with disabilities, rural inaccessibility or being home schooled have more options open to them to learn and investigate.

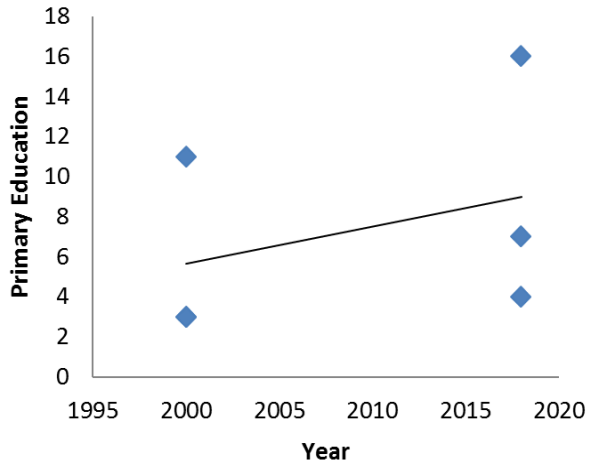

Figure 8. Changing pattern of educational status on the basis of time period of 2000 and 2018

Fig. 9 shows positive changing pattern of farmers housing condition. Farmer's economic conditions were developed after technological development. In this reason positive trend was found in housing condition.

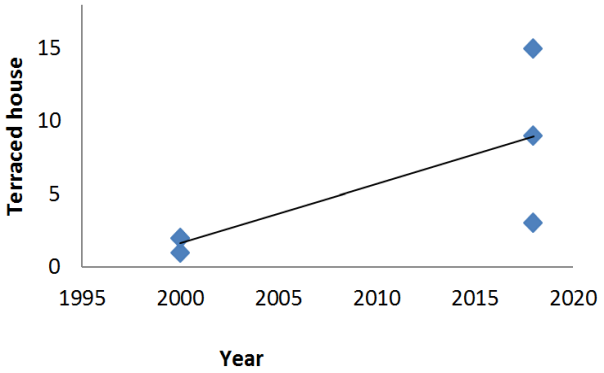

Figure 9. Changing pattern of terraced house on the basis of time period of 2000 and 2018

Fig. 10 represents positive trend of visiting upazila health complex for medical service. Most of the farmers were primarily educated and because of technological development farmer's income were increased and in case of diseases farmers are now visit upazila health complex.

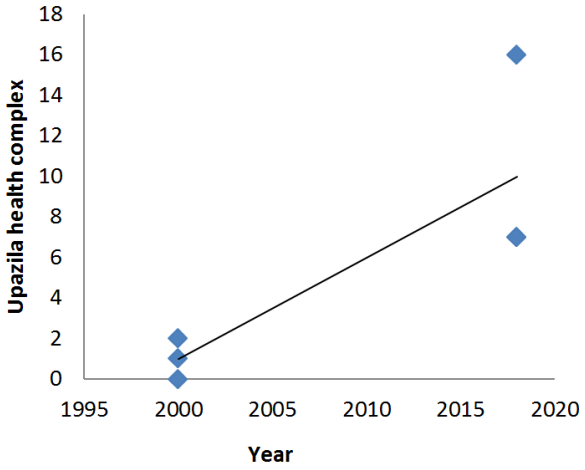

Figure 10. Changing pattern of visiting upazila health complex on the basis of time period of 2000 and 2018

IV. Conclusion

The study was investigated the present condition of mechanization and livelihood status of farmer's following technological development in Sylhet areas. The study reveals that advance technology was potential to increase farmer's income and employment creation over the traditional farming practices in the study areas. The study also focus that the housing and sanitation facilities was much better after adapting mechanization and about 45%, 48%, 69% terraced house in SylhetSadar, Golapgonj and Hobigonj respectively. Poverty was decreased in case of advance technology usage. The study investigated that mechanization developed the farmer's livelihood. Government should take proper policy for making agriculture fully mechanized as farmer plays a vital role in the uplifting of the socio-economic condition for developing country like Bangladesh.

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