Status of Agricultural Mechanization in Sylhet Region

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ABSTRACT

The purpose of the study was to assess the modern agricultural technologies used in Sylhet and develop statistical information. Three places such as Sylhet Sadar, Golapganj and Nabiganj were selected. The manufacturers, entrepreneur, service providers along with input supply traders and farmers were considered as the population of the study. Two sets of interview schedule for farmers and manufacturers were developed. Present status was analyzed based on tillage practices, weeding and insect control practices, irrigation management system, harvesting and post-harvesting operation and drying and storage facilities for rice production. It was observed that 83.23% people were engaged in agriculture from which 57.73% were literate. The total estimated land was 59.678%, 36.024% and 4.298% of cultivated using power tiller, tractor and draught animal respectively. Shallow water pump covered 93.75% of total irrigation. The threshing operation was done 20-30% by thresher machine. Crops were still dried through sun drying. Modern agricultural technologies present an increasing rate based on the collected data from 2014-2017. The government should develop proper planning by investigating present status of mechanization and improve the present condition by increasing machinery utilization.

Keywords: Agriculture, Technologies, Farmer, Manufacturer, Mechanization.

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INTRODUCTION

Agricultural mechanization is the process of developing agricultural machines to mechanize the work of agriculture. Generally, agricultural technologies are affected by the society and the importance of technological development can only be appreciated after consideration of a variety of social and technical factors. The introduction of new technologies has resulted in an increase in both farm size and agricultural output (Schmitz and Moss, 2015). In the sub-continental countries, the indigenous technologies practiced by the farmers for centuries, in some form, are still in use in rural agriculture instead of modern implements due to most of the agricultural lands are fragmented. Manual Labor remains the highest input cost in rice production in the country (Faruk et al., 2007). Adoption of more machines

reduces labour costs, and adoption of high yielding varieties appeared to be a partial solution to reduce loss (Chowdhury et al., 2010).

To feed about 160 million people from 8.2 million hectares of cultivable land is a tough task (Hossain, 2009). Every year almost 0.20 million people are being added to the total population whereas the estimated annual shrinkage of agricultural land is about 0.08 million hectares due to various non-agricultural activities like construction of houses, offices, roads, mills, factories, etc. (BRRI, 2009). For these reasons, appropriate farm mechanization has been emphasized as an important policy and development goal in Bangladesh (Mandal, 2014; Zhang et al., 2014). Rahman (2007) confirmed that divergence among regions disappeared and agricultural

Table 1. Different farmer categories.

Type of farmers	Number of farmers
Landless (less than 0.2 ha)	17
Small (0.2-1.0 ha)	23
Medium (1.0-3.0 ha)	21
Large (3.0 ha and above)	19
Total	80

Table 2. Information of different actors for mechanization.

Respondent/Actor	Nabiganj	Sylhet Sadar	Golapganj	Total per category
Manufacturer		1		1
Wholesaler and Retailer	1	2	1	4
Raw materials trader	2	2	1	5
Service providers	4	3	3	10
Farmers	37	23	20	80
Total			100	

productivity reached convergence in the long run. Some researchers compared to other South Asian nation, farm machinery use has advanced considerably in Bangladesh, particularly for land preparation, irrigation, and post-harvest activities. In 1996 there were only 0.1 million power tillers, 1.3 million pumps including all types of water pump, and 0.18 million rice-wheat threshers used in Bangladesh (Justice and Biggs, 2015). By the early 2010s, these figures increased to at least 0.55 million power tillers, 1.61 million pumps and 0.25 million threshers (Ahmmed, 2014; BBS, 2011; BADC, 2013). Agricultural growth benefits the poor by increasing their income (Alam and Nasrin, 2007). In the regards of these researches, there is a tendency for equipment development and commercial firms to concentrate their energies on tools that are affordable only to the wealthier farmers. The typical small farmers undergo financial constraints. Based on the view of the fact that agriculture is the backbone of our national economy, top-priority should be given on agricultural mechanization for the development of rural agriculture. There is quite a large number of technologies developed in our country, but in the absence of proper policies and guidelines, those technologies are not available to the farmers.

For this reason an expected way can be considered which consists of research and development, input production and technology transfer. Each of which is divided into public and private organizations both of the organizations can supply agricultural technologies to the farmers. This study assesses the modern agricultural machinery in Sylhet.

MATERIALS AND METHODS

Study area

The study areas were Nabiganj, Golapganj and Sylhet Sadar. The selected manufacturing companies were Alim Industries Limited and ACI Motors. Alim Industries Ltd. is located in BSCIC Gutatikor, Sylhet, and was established in 1990. More than 40 types of different machines are produced from this industry. Various data were collected from Alim Industries on the basis of the manufactured machineries by prepared interview questionnaire. Another selected entrepreneur was ACI Motor which is located in South Surma, Prijpur. About 400 authorized dealers throughout Bangladesh are distributing agricultural machinery and parts available to farmers.

Climatic condition

Selected areas were under Eastern SurmaKushiyara Floodplain and Sylhet Basin agro-ecological zones. The land type was medium low land. Organic matter content and fertility level were medium to high. Suitable for Boro rice, Aman rice, Mustard and Grasspea cultivation.

Preparation of interview schedule

The interview schedule and questionnaire were developed according to the objective of the study with active consultation with the respective supervisor, expert from relevant fields and secondary information. The draft schedule was prepared and necessary corrections, modifications and switching or exchanging information were made accordingly and printed for field data collection.
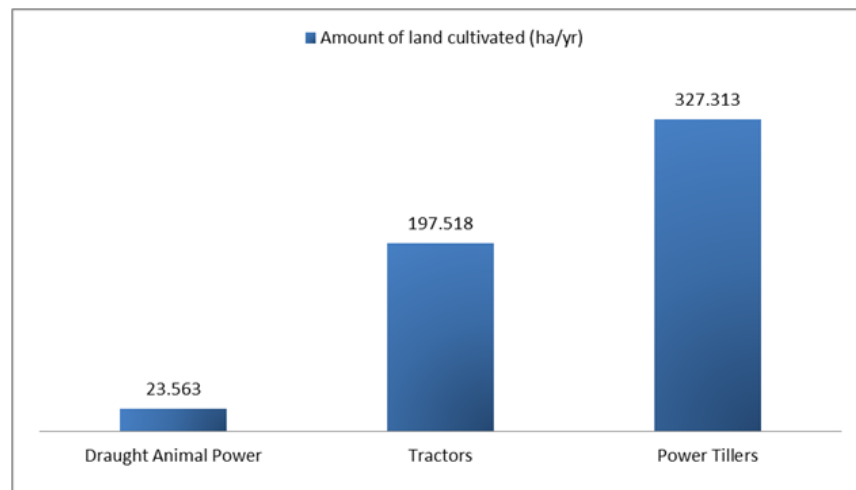
Sampling unit

Data were collected from 100 respondents (Tables 1 and 2). The questionnaire survey with the farmer was based on the present condition of agricultural practice and level of mechanization. The interview with the manufacturers, entrepreneur and other respondents was based on the

Table 3. Percentage of land utilization pattern.

Type of Farmers	No. of Farmers	Amount of land (ha)	Amount of lands (%)
Landless	17	63.684	11.615 %
Small	23	123.120	22.455 %
Medium	21	163.710	29.858%
Large	19	197.780	36.072 %
Total	80	548.294	100 %

Table 4. Percentage of land ownership pattern.

Land ownership pattern	Amount of land (ha)	Amount of lands (%)
Owner's	289.23	52.751 %
Lease	173.27	31.602%
Others	85.794	15.647%
Total	548.294	100%

Figure 1. Different power sources used in land cultivation.

quantity of machinery produced, distributed and marketing agents for establishing mechanization.

Data collection

Data were collected through personal interview based on sampling units. The data were collected solely by explaining the purpose of the study. During the interview each question was explained to the interviewee clearly and tried to find out the fact as much as possible. The interview schedule was developed in Bengali for easy communication with the respondents. All respondents answered all the questions according to the prepared questionnaire and provided the necessary data.

Data analysis

The collected data was compiled, tabulated and analyzed in accordance with the objective of the study. Statistical analysis was performed by Microsoft Excel 2007 software.

RESULTS AND DISCUSSION

Table 3 shows that 11.61%, 22.45%, 29.86% and 37.07% land cultivated by landless, small, medium and large farmers respectively. It is clear that the large category of farmers cultivated the highest percentage of land due to the availability of lands, credits and affordability to accept modern machinery. The farmers cultivated 289.23 ha, 173.27 ha, and 85.79 ha land under the owner, lease and others form respectively from the total 548.29 ha of cultivated land in the study area (Table 4). Boro Rice production was 111.25 MT/Yr as most of the lands were medium low lands. The percentage of land ownership was high (Table 3). It also observed that approximately 83.23% people were engaged in agriculture in these areas and while others in other occupations. 57.73% of the selected farmer were literate while 42.27% are illiterate.
Figure 1 shows that about 23.57 ha/yr (4.298%), 197.52 ha/yr (36.02) and 327.21 ha/yr (59.67%) land cultivation was based on draught animal, tractor and power tiller

Table 5. Different methods of weeding operation.

Methods	No. of farmers	Percentage
Hand	17	21.52 %
Locally made weeder	27	34.18 %
Japanese Rice weeder	35	44.30 %

Table 6. Different sources of irrigation water.

Source of irrigation	No. of irrigation water user	User percentage
River	23	29.11 %
Ponds	27	34.18 %
Canal	29	36.71 %
Ground water	No use	

Figure 2. Years versus number of machineries curve.

respectively of total estimated lands. It is clearly seen that very small portion of land was tilled by draught animal in the study area due to the increasing number of power tiller and tractor.

Although farmers used hand for weeding in the previous decade,currently most of the farmers are using mechanical weeders. Table 5 indicates that many farmers used mechanical weeder compared with conventional methods. The study observed that approximately 89.77 % farmer used different types of pesticides for weeding purpose. It also investigated among selected farmer categories 75.37% farmer used insecticides. Drudgery and labor cost might be reduced through proper mechanization.

The selected study areas were not under any irrigation project. Most of the croplands were irrigated through surface irrigation by LLP from different surface water sources like pond, river and canal. Table 6 indicates that

36.71% farmers used canal water for irrigation. It also found that approximately 93.75 % lands were irrigated through irrigation pump and the remaining 6.25 % lands were irrigated through traditional irrigation devices like as doon, swing basket, counter poise-bucket lift, etc. Although crop production was increased through the use of increased modern irrigation device, but most of the water was wasted because of the absence of proper irrigation management system in the selected areas. Consequently, farmers frequently face problems during drought.

Harvesting and threshing of crops were done using traditional devices such as sickle. Only 20-30% of the total cultivated crops were threshed by thresher machine. Different type of thresher machine such as Alim power thresher, ACI power thresher, Awlad power thresher was available to most of the farmers.

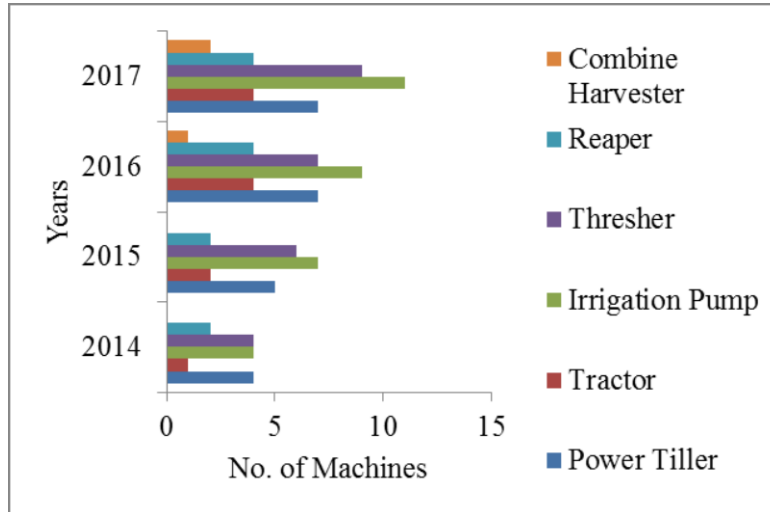Most of the crops were still dried through sun drying on

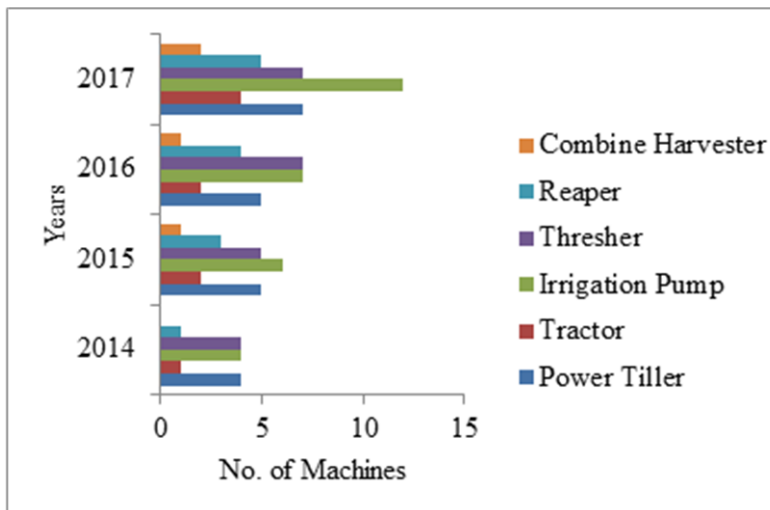**Figure 3.** Years versus number of machineries in Sylhet Sadar.

Figure 4. Years versus number of machineries in Golapganj.

the floor, which was locally called home yards or khola. The grains could not be dried in the worst climatic condition as a result the quality of grains gradually deteriorate.Though different modern dryers are available like as BRRI batch dryer, BRRI SRR-1 dryer and Alim dryer, these are not introduced yet to the farmers of the locality.

Figure 2 shows that the utilization of agricultural machinery sharply increased from 2014 to 2017. Small machinery (sprayer) was highly increased compared with large machinery because of lower prices and suitability of use. Figures 3, 4 and 5 show an increase number of machineries in Sylhet Sadar, Golapganj and Nabiganj respectively. From the graph, it is clear that the number of irrigation pump increased from 2014 to 2017. After irrigation pump, thresher, power tiller, reaper, tractor and

combine harvester increased gradually. 66 power tiller, 32 tractors, 93 irrigation pump, 162 weeders, 126 sprayers, 34 reapers, 74 power thresher and 12 combine harvester were found in the study areas.

Conclusion

Agricultural mechanization program has been accelerated in recent years. Over the last two decades the use of farm power has increased rapidly. The study found that 11.61%, 22.45%, 29.86% and 37.07% land is cultivated by landless, small, medium and large farmers respectively. The farmers cultivated 289.23 ha, 173.27 ha and 85.79 ha land under owner, lease and others respectively from the total 548.29 ha of cultivated land in
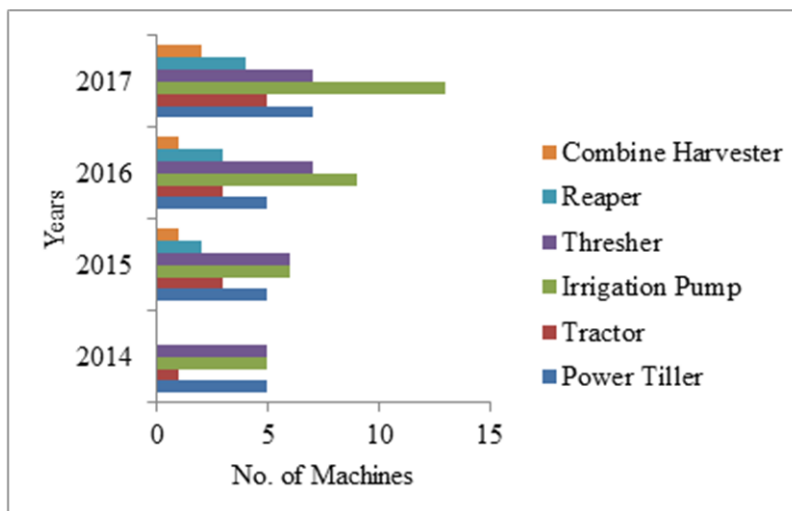
Figure 5. Years versus number of machineries in Nabiganj.

the study areas. A good progress of mechanization is made in weeding, fertilizing, spraying, harvesting, threshing, drying, and transporting activities. But the level of overall development is still relatively low. Developed mechanization leads to thousands of job facilities which will contribute in the national economy. In this regard, appropriate government policy should be established and entrepreneurs as well as manufacturers should be concerned to carry away the constraints.

Acknowledgment

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