ABSTRACT

In India total geographical area is 328.7 million hectare which is only 2.5 per cent of world area and net sown area is 140.3 million hectare. In this available land 16.7 per cent global population is dependent for supply of food. On the other hand, contribution of GDP from this sector is going down gradually having only approximated 13.9 per cent in current year which was above 50 per cent in the beginning of planning period. But till now more than 50 per cent people depend on this sector for their livelihood. Peoples are migrating from farm sector to non-farm sector because per capita land holding is decreasing rapidly. Two options are open for the existing farmers to continue farming activity, first one is expansion of landholding and another is expansion of farm productivity. It is impossible to expand landholding where population is continuously rising along with industrialization, urbanization and land consumption in transportation work. So the second option which talks about farm productivity can solve the problem of food crisis. To get higher productivity farmers have to use better seeds, fertilizers, pesticides, proper irrigation etc. But all this improved factors will give successful result if their proper utilization takes place. Traditional system of farming is not compatible with modern farming system. That is why, efficient farm machineries are required to utilize these factors to get higher productivity. On the other hand, recently in farming activities scarcity of farm labour is a tremendous problem. Labourers prefer to do non-farm jobs neglecting the farm activities. So farm machineries fulfill the gap of labour shortage in farm sector.

Mechanized agriculture is the process of using agricultural machinery to mechanize the work of agriculture. With the help of the machineries farmers produce quality crops and get higher productivity. But mechanization of agriculture did not spread out equally for all crops and in all states. Few states like Punjab, Uttar Pradesh, Rajasthan, and Madhya Pradesh have used machineries successfully on farm sector for rice, wheat, potato and cotton only. But in some states like Assam, Bihar, West Bengal, Odisha, Nagaland etc. farm machineries are used marginally. In this study we have made an attempt to find out the reasons of variations of farm mechanization in the state of West Bengal. We have included total eight chapters in this study. Contents of all chapters are explained below briefly.

First chapter is the introductory chapter where we have included statement of the problem, research hypotheses, objectives of the study, research questions, research methodology, importance and significance of the study. As far as methodology is concerned we used different statistical tools such as average, ratio, correlation coefficient and Analysis of Variance (ANOVA) to test the hypotheses.

In Chapter-II we have included a brief review of literature with thematic grouping. At the end of our literature review we have identified the research gap. Throughout the journey of literature review, we have reviewed literature on the relation of farm mechanization and farm productivity, farm mechanization and labour employment and farm mechanization and cropping intensity and crop diversification. Most of the literatures reviewed are related to the agricultural scenario of states of India except West Bengal. Although we found few studies related to farm mechanization and farm productivity in West Bengal, we did not find any study related to farm mechanization and landholding, farmer's education and farm credits. Although a few studies have been conducted on the issue of farm mechanization these are not sufficient to know the agricultural scenario of West Bengal.

Theoretical background and conceptual issues of agricultural mechanization have been included in chapter-III. In this chapter we found that farm mechanization is not a new phenomenon. People lived in Harappan civilization around 2500 BC transformed themselves from hunters gatherers to settled farmers-cum-semi-pastoral livestock herdsman. In 1914, India brought tractor at first in farming. SardarJoginder Singh, agricultural minister of Punjab Government has introduced the steam operated tractors for reclamation of waste land in India. Agricultural mechanization speeded up after introduction of green revolution.But expansion of farm mechanization is heterogeneous in nature across the states. Punjab, Haryana and Uttar Pradesh achieved higher mechanized farming compared to other states.

Chapter-IV has dealt withthe patterns and structure of agriculture in DakshinDinajpur and Bardhaman districts of West Bengal.In this chapter we have shown that on the basis of land ownership the percentage of marginal farmers is 81.17 having less than 1 hectare land and percentage of land under operation for the same category is 50.65. Small farmers having 1 to 2 of hectare land occupied 14.38 per cent land and 28.87 per cent land as land under operation. Percentage of semi-medium farmers having 2 to 4 hectare of land, medium having 4 to 10 hectare land and large farmers having above 10 hectare of land is very less.

On this small arable lands farmers of the state are producing different crops. Among all these crops rice is the leading crop of West Bengal. Mainly three types of rice is being produced in the state namely, Amon, Boro and Aus among which Amon is in leading position. Intensity of Boro production has been decreasing because of higher cost of cultivation. As a substitute of Boro production Wheat and Maize is playing a vital role in the state of West Bengal. It was found that farmers of Bardhaman district have been producing different crops using modern technique. On the other hand, farmers living in DakshinDinajpur district are mostly dependent traditional farming system.

Profile of the selected blocks and sample farmers have been discussed in chapter-V. We found that landholding size is quite good in Bardhaman compared to DakshinDinajpur. Similarly, level of education is high in Bardhaman and in DakshinDinajpur it is very less. It has been found that total 73.33 per cent farmers of Bardhaman are bank account holder and total 69.17 per cent farmers are insurance policy holders whereas this percentage are 46.67 and 19.17 respectively in DakshinDinajpur. It has also been found that more or less all farmers are using mobile phone in both the districts. On the other hand, animal asset is higher in Bardhaman compared to DakshinDinajpur district of West Bengal.

Chapter-VI has dealt with factors affecting agricultural mechanization in the selected districts of West Bengal. In this chapter we have identified that landholding determine agricultural mechanization. Big machineries such as combine harvester, rotavator, tractors etc. require large holding. So if landholding is small it is not possible to use such machineries. To prove it we have used ANOVA test and number of tables and diagrams and found positive relation between the variables. Similarly, we have also found that access of farm credit determine farm mechanization. Here also we have used the same technique and found the positive relation between access of credit and extent of farm mechanization. Finally, we have examined the relation between levels of education and extent of farm mechanization. To prove this hypothesis we have used correlation coefficient technique along with ANOVA test. By using ANOVA we found that education determine farm mechanization and correlation coefficient shows us that there is a positive relation between farm mechanization and level of education.

In chapter-VII we made a comparison between the two selected districts on degree of mechanization, use of different farm input and cropping pattern. We found that Bardhaman

district is far advanced in agriculture compared to DakshinDinajpur district. Size of landholding is quite big on an average in Bardhaman and farming technique is modern. This district is also industrially sound and nearly 40 per cent people depend on this sector. As a result population pressure is not much in farm sector. On the other hand, more than 80 per cent people living in DakshinDinajpur district is dependent on farm sector. There is a huge difference in farming technique in the two districts. Farmers of Bardhaman district are cultivating by using modern technique whereas farmers of DakshinDinajpur are cultivating by both modern and traditional techniques. Primary data have revealed that presently 20 per cent farmers of Bardhaman district are using animal drawn plough whereas in DakshinDinajpur more than 50 per cent farmers are using animal drawn plough. We have surveyed total 120 households from each district. Use of rotavator in Bardhaman is quite high compared to Dinajpur district. In case of harrowing, farmers of Bardhaman are using rotavator, tractor and power tiller whereas in DakshinDinajpur the owners of bullock are using bullock operated harrow. Recently farmers of Bardhaman are using thresher for threshing paddy but the 75 per cent farmers of DakshinDinajpur are using wooden made blade as thresher till today. Although combine harvester has been introduced but farmers of both the districts do not much prefer to use this machine. Only 12 per cent farmers in Bardhaman and 7 per cent farmers in DakshinDinajpur district are using this machine. However others machineries have been introduced in farm sector such as Bund Maker, Drayer, Weeding machine etc. but farmers of both the districts are doing these jobs manually. Also in some farm works like spraying and irrigation more than 90 per cent farmers are using machineries.

Summary, conclusion and suggestions have been presented in the last chapter of our study.
At the end of the study the following suggestion are stated:

1. To solve the problem of fragmented landholding the system of cooperative farming can be adopted where farmers can have the advantage of large landholding to use big machineries.
2. Government should provide information regarding farming facilities through available sources of communication such as TV channel, newspaper, mobile phones etc. Awareness program can also be made through panchayat and Block Development Offices because villagers are much attached with these offices.
3. Government should concentrate to enlarge the branches of banks in remote areas so that farmers can achieve the banking facility. Similarly, to bring more or all farmers

under the pavilion of banking habits opening of Bank accounts should be simplified. This is because most of the farmers are less educated and they are afraid of too much paper works to open account.

4. It is also important that government should take the care of the irrigation system. Because now a days it is a big problem of farming. There should be sufficient irrigation facility so that farmers can use the water as they require for their crops.
5. It also very important that as much as possible government should provide high yielding seeds, fertilizers, pesticide etc. through agricultural cooperatives. Although agricultural cooperatives are doing such activities but it is not adequate.
6. To reduce the distress sale government should help to increase the number of cold storage because for some perishable crops such as vegetables, fruits etc. it very important. Government can extend the facility of warehousing where farmers can store their surplus crops and can sale at the time of higher demand.
7. It is also quite important that government should provide credit to petty traders who are trading in agricultural crops. If they get loan from banks at lower rate of interest they can purchase farm crops directly from farmers and sale these crops in nearby towns where they get higher price. In this way farmers can save the cost of transportation and get profitable price.