CHAPTER-8
Summary of Findings, Conclusion and Policy
Prescriptions

8.1 This concluding chapter is meant for summarizing the broad inferences emerging from the study. To contextualize the discussion on inferences and policy implications thereof, the principal findings of the study are first recalled without much of the technicalities and numbers associated with them.

8.2 Core Findings
It may be recalled that data available from various secondary sources and those collected through sample survey by this researcher have been used in tandem for fulfilling the set objectives and securing answer of the research questions of the study. The main findings are restated in the following two subsections.

8.2.1 Findings from the Analysis of Secondary Data
- Despite the fact that the shares of agriculture in GSDP and in employment generation in Assam have been declining, still this sector has remained a significant contributor to the state economy. In fact, importance of agriculture in the economy of Assam is more than that of in the economy of the country as a whole in terms of generation of both employment and state income.
- While dependence of the economy of Assam on agriculture is found to be more than that of the country as a whole, growth of Assam’s agriculture has been lagging behind the growth of agriculture of India. Cropping intensity in Assam is lower than the All India level. The yields of food grains such as rice, pulses etc. of the state are below the level of the country as a whole. Again, fertilizer consumption in Assam is also well below the All India average. Thus the study reveals a dismal picture of the agriculture in Assam.
With regard to irrigation status, extent of irrigation in the country as a whole is found to be significantly higher than in Assam. During 2001-07, there was marginal increase of intensity of irrigated cropping in the state. Among the various sources of irrigation, sources included in ‘other’ category are predominant indicting higher share of private irrigation in the total irrigation in Assam. Further, huge amount of under utilization of irrigation potential created have been observed.

Examining the status of use of agricultural capital goods, it is found that almost all the agricultural capital goods are being used by farmers in Assam. But the extents of use of most of the agricultural capital goods especially of heavy types are well below the all India level and agriculturally advanced state like Punjab. Further, the extents of use of power tillers and tractors are found to be varied across both agro-climatic zones and districts of the state. Again, activity-wise intensities of use of power operated implements in Assam are below the All India level and of Punjab.

The proportion of farmer using agricultural capital goods has been found to be higher among the larger farmers. However, although lesser proportion of smaller size group farmer uses agricultural capital goods but intensity of use of such capital goods is more by the smaller size group farmers than by the larger size group farmers.

**8.2.2 Findings from the Analysis of Sample Survey Inputs**

**8.2.2 (a) Extent of Rental Markets**

Rental markets of ploughing and irrigating machinery are active in Assam agriculture. Activity-wise, participation in rental market of ploughing machinery is higher than that of in rental market of irrigating machinery. In fact, participation rate in rental market of irrigating machinery (34.91 percent) is even lower than that of in rental market of tractor (41.38 percent) and in power tiller (60.34 percent). The difference can be attributed to two factors. First,
the irrigation machineries are relatively less movable than the ploughing machineries which hinder renting out of the formers. Second, ploughing operation by ploughing machineries, enhances ploughing mechanization, are needed in cultivation of all crops whereas in Assam context irrigation is primarily used only for dry season crops. Further, the extents of participation in rental markets of both ploughing and irrigating machinery are different across locations.

- Proportion of hiring out of ploughing machinery is higher (93.75 percent) than that of irrigating machinery (28.81 percent).
- With regard to the spatial extent of the rental market of ploughing machinery, it is found that leasing of such machinery time goes on within the village and across nearby villages. However, extension of rental markets beyond villages is more common in case of tractors than power tillers. In fact, rental market of tractor is found to be extended beyond adjacent villages.

8.2.2 (b) Participants’ Profile

- Smaller size group farmers’ participations in rental markets of ploughing and irrigating machinery are relatively more as lessee than as lessor while reverse has been found in case of larger size group farmers. Farmers with educational attainment below matriculation participates relatively more as lessee than as lessor. By caste, lower caste farmers’ participation is comparatively more as lessee than as lessor.
- In case of ploughing machinery, there are instances of participants as lessor in rental market of one type of machinery also participating as lessee in rental market of substitute machinery. Thus, it is found that activity-wise all the market participants are not pure supplier or pure demander. But implement-wise their participation is either as buyer or as supplier.
While participants in rental markets of agricultural capital goods as buyers are only individual households, all the participants as suppliers are not individual households. During the field study three groups were found who engaged themselves in supplying of ploughing machinery. In Bihubori village, a farmer group of twenty members has been acting as supplier of power tiller times. Another case was reported during the survey in Hariapar village. As reported by some respondents in Hariapar village, they had hired in tractor times from a groups who running their leasing-out business by taking tractors in contract from the owner residing in another district. The third case, which is similar to the second case, was reported by respondents in Rangia.

8.2.2 (c) The Rental Rates and its Determinants

- The rental rates of ploughing machineries vary within the village and the average rental rates of the villages also tend to vary.
- Rental rates of ploughing machinery were expected to be influenced by market power (monopoly power) along with other factors. This is due to the fact that relatively lesser suppliers of machinery in an area compared to another area means relatively more control over the rental rate of the concerned machinery in former area than the latter area. Therefore, rental rates are likely to be high in the area with higher market power where supplies are relatively less. But our analysis reveals that market power has no role in determination of rental rates of ploughing machinery. Despite the number of suppliers being far fewer than the demanders, the growth of market power of the suppliers seems to be smother by the fact that close substitutes in the form of plough and bullocks are often available in villages. Other factors reported and observed during the field survey were relationship between lessee and lessor, distance between lenders’ home and land to be ploughed and membership of farmer groups performing leasing-out activity of concerned machinery. Analysis using econometric tools has revealed the
relationship between lessee and lessor and membership of farmer groups performing leasing-out activity of concerned machinery are crucial factors in determination of rental rates of ploughing machinery while distance between lenders’ home and land to be ploughed has no role. The lessees from relatives/friends pay a significantly lower rental rate than the lessees from open markets. Thus, social contact is found as an important determinant of rental rates of ploughing machineries where a good social contact is beneficial for lessees. On the other hand membership of a group owning and hiring-out ploughing machinery benefits the members in the form of lower rental rate.

8.2.2 (d) Rental Markets and Good Farm Practices

- Functioning of rental markets of agricultural capital goods has significant contribution in farm mechanization. Data reveals that out of the total sample farmers, 78.45% have used ploughing machinery and 45.26% have used irrigating machinery. On the other hand, in the absence of rental markets, the percentages of users would have used these machineries are only 13.91% and 17.24% for ploughing and irrigating machinery respectively. Further, contribution of rental markets of agricultural capital goods is found to be relatively more to mechanization in small and marginal farms.

Regarding the intensity of mechanization of ploughing operation and irrigation, no significant differences between owner users and pure hiring-in users have been found. Rather intensity of use of ploughing and irrigating machineries tend to correspondence the market participation rate.

- Rental market of ploughing machinery contributes farm mechanization relatively more than the irrigating machinery. It seems that rental market is more attractive in mechanization of those processes that involves use of more expensive farm machinery.
About the impacts on use of production and productivity enhancing practices, our study shows that rental market of irrigating machinery has significant contribution to it. The values of cropping intensity, crop diversification and land productivity of paddy of pure hiring-in users of irrigating machinery are found to be significantly higher than the nonusers. But in the use of agricultural production and productivity enhancing practices rental market of ploughing machinery is found to be not so significant. Some special circumstances make the rental markets of ploughing machinery insignificant in stimulating agricultural productivity have been stated in chapter-6. Of course, rental market of ploughing machinery has been found to be contributing in agricultural production by facilitating farm operation in a situation where dependence on traditional ploughing unit is extremely limited.

As a whole, it is evident from the study that rental markets of costly agricultural machinery have been significantly promoting agricultural productivity and production in the study areas by facilitating farm mechanization especially by small and marginal farmers who are unable to invest in such machinery. Apart from that such markets also increase the farm mechanization by farmers who will able to invest in such machinery but may lack the incentives to procure them due to insufficient land to fully utilize them. This is because the possibility of hiring-out of such capital goods due to functioning of rental markets opens up a new way to earn additional revenue by the owners on their investment. In such a situation purchase of agricultural machinery will increase which will promote farm mechanization. Thus, it can be said that rental markets of agricultural capital goods have been substituting the consolidation of holdings programme under land reform up to some extent in Assam.
8.2.2 (e) Financial Access and Rental Market Participation

- Regarding the role of access to finance in farm mechanization, it is found that access to credit promotes mechanized farming. Further, borrowed money has an important role in procuring agricultural capital goods where non-institutional credits are still predominant.

- Access to institutional credit encourages ownership of agricultural capital goods while it has such no role in hiring-in such goods. On the other hand, access to non-institutional credit promotes both ownership and hiring-in of agricultural capital goods. However, in promoting ownership of heavy agricultural capital goods, access to institutional credit has relatively more role than non-institutional credit.

8.2.2 (f) Imperfection in Rental Markets

- Another important observation about the rental markets of agricultural machinery is the presence of market imperfection. This is clear from the fact that in case of all the three indicators of production and productivity enhancing practice of agriculture, have been considered in the present study, owner users are always in a better position than the pure hiring-in users which depicts the imperfection of rental markets of agricultural goods. A probable source of imperfection of rental markets of agricultural capital goods is the fact that majority of suppliers of agricultural capital goods are user cum suppliers. It is conceivable that their machineries are available for hiring-in only when these are not used in his/her farm. Therefore, such capital goods may not be available for hiring-in at the most convenient time for the hirers.

8.3 The Broad Conclusions and Policy Implications Thereof

The rental markets of agricultural capital goods are fairly extensive and active in the agrarian economy of Assam. Such markets have facilitated mechanization of farm operation across all farm size categories. Small and marginal farmers, who would not be able to own
and maintain expensive capital goods like pumpset, power tiller and tractor, are found to be fully or partially mechanized ploughing operation and to a somewhat lesser extent even irrigation by hiring-in such capital goods. A less obvious but important contribution of those markets is that they have encouraged ownership of agricultural capital goods by other groups of farmers. Farm size typically being small in Assam, even a medium or large farmer here usually does not have enough land to fully utilize the capacity of the agricultural machineries. Hence, the returns on investments on farm capital goods could not always be enough from own farm use of these goods. However, the possibility of renting out the excess capacity of these machines through the rental markets adds another component of returns on these investments. Thus the enhanced rate of returns on investments on agricultural capital goods encourages more ownership of agricultural capital goods.

Our study clearly reveals that rental markets of agricultural capital goods have also contributed significantly to adoption and use of production and productivity enhancing practices such as multiple cropping, crop diversification, application of soil nutrients etc. The market participants including hiring-in users have been found to have used these practices more intensively than the non-participants. Expectedly the former have been able to extract higher yields than the latter.

In enabling even the small and marginal farmers in mechanizing their farm operations and adopting and using other production and productivity enhancing practices, the rental markets of agricultural capital goods in Assam have been able to fulfill a goal that was to be achieved through the institutional reform in the form of consolidation of holdings. In that sense, the emergence of rental markets of agricultural capital goods has significantly substituted the component of land reform designed to consolidate small and fragmented holdings which has largely remained unimplemented over the decades. Consolidation of holdings can be socially and economically expensive. So long as the
rental markets of capital goods do the job of this component of land reform programme, the component can continue to remain in the backburner. Government policy may however concentrate on facilitation of other complementary markets like the water market and the land lease market for fuller allocative optimality of factors of agricultural production.

There are indicators of some imperfections of those markets. For instance, the rental rates of agricultural capital goods of the same type sometime vary even within a village. Moreover, as mentioned above, the pure hiring-in users are able to use better farm practices to a somewhat limited extent compared to owner users. Yet the imperfections have not been found to be so severe. By and large these markets have emerged spontaneously and been functioning in self-regulated and competitive manner. There is no evidence of market power playing any significant role in determining the rental rates. The role of the policy maker regarding these markets is to be watchful and act, whenever necessary, to prevent the growth of monopoly power and other forms of imperfections. Greater penetration and deployment of institutional credit can help in this matter by inducing increased ownership of farm capital goods and consequent greater supply to their rental markets.