CHAPTER 9
SUMMARY OF FINDINGS, CONCLUSION AND POLICY IMPLICATIONS

9.1 This study has analysed the issue of post harvest management of horticultural crop section for the agricultural development of the state economy in two ways. The first one is at the macro level for the state as a whole by explaining the potentiality and available post harvest management provisions of the state economy. In the next one at micro level for individual selected horticultural crop growers. Before, drawing the final conclusion, it would be convenient to recall the principal findings of the study. Hence, the principal findings have been recapitulated in section 9.2. Then the conclusion and policy implications from the study are drawn in the sections 9.3 and 9.4 respectively.

9.2 Summary of the Major Findings

The summary of the major findings are presented under the following heads:

9.2.1 Findings from Secondary Data

- The different agro-climatic zones of the state have potentiality of growing different categories of horticultural crop groups. The area share of these agro climatic zones has shown a fluctuating trend over the period. The increased area share of the North Bank Plains zone can be attributed to the increased area under the crop vegetables, whereas, in upper Brahmaputra valley zone, the declining share is due to a major shift from orange cultivation to the plantation crop segment.

- The examination of the gross cultivated area share for some of the major crop groups in the state reveal that the horticultural crops have an increasing share over the period. This basically indicates the preference of the farmers to go for extensive cultivation of these high value crop groups. These crops have also reported a higher compound annual growth rate in
terms of area, production and productivity as compared to the other major crops of the state. The examination of the dynamism of the growth trend has revealed that almost all the major horticultural crops groups have acceleration in growth rate over the period. Only, the vegetable crop group has recorded a deceleration in production and this is due to the deceleration in the productivity of this crop group during the study period.

- This high value crop segment also has reported an increasing value share in the total value of output from agriculture and allied activities. This may be attributed to the increasing demand of this crop section and also this crop section being highly valued crops.

- The examination of available post harvest infrastructural status in the state reveals that the state has a good number of wholesale and retail markets, although the operational pattern of these provisions has not been examined. But the number of packaging and processing units is very limited. In terms of the access to market, the state is lying in an advanced position with greater percentage of people having access to the markets in a distance of less than five kilometre area. In terms of the transportation and cold storage facilities, the state is still lying behind to support this emerging high value horticulture crop section. The transportation facilities provided under various government schemes are small in numbers and all the farmers do not have equal access to such facilities. The number of cold storages is inadequate both in terms of their number and capacity. Most of these cold storages are situated in urban areas of the respective districts and most of them are potato based.

**9.2.2 Findings from Sample Survey Inputs**

- Value chain analysis of the selected crops reveal that the main value chain actors in the study area are input suppliers, producers of the specific crop, collectors, wholesalers and retailers. Private vendors and department of agriculture are mainly involved in the input supply activities. The role of the agriculture department in case of supplying the required inputs is limited and most of the inputs have been purchased from uncertified sources by the farmers. The collectors in the identified value
chain model are playing an important role by connecting the surplus production centres with the wholesalers and retailers. Wholesalers are the only value chain agent in the study area dealing with huge volume of the produce and they connect the farmers with retailers. The retailers are playing an important role as the last link between producers and end consumers in the identified value chain model. There are some governmental and non-governmental supportive actors in the value chain of the selected crops. These supporting actors are mainly helping in increasing the output produced through various extension services. The identified supporting actors are District Agriculture Department, informal Credit Institutions and the various marketing committees of the selected districts.

✓ An examination of the functioning of selected crops value chain reveal that various constraints hindering the overall efficient functioning of the entire chain at different stages. At production level, producers do not have access to certified input supply, lack of required modern techniques of cultivation, having huge amount of post harvest losses, lack of post harvest management facilities and so on. On marketing side, the farmers face the problems like limited access to market and specially to end consumer, low price of the produce, lack of adequate storage and transportation facilities. Besides, the role of the supporting agencies is also inadequate and is found to be not equally accessible to all farmers.

✓ The identified major intermediaries in the in the study area are collectors, wholesalers (local and distant) and retailers (local and distant). These actors add little value to the produce at each stage of the supply chain. These intermediaries purchase the produce at a lower price from the farmers and sell to the other agents with a higher price just paying the marketing costs of the produce. In fact, the end price of the produce becomes more than double of the price received by the farmers for all the three selected crops. Farmers are relatively in worse position for all the three crops although they do the main value addition functions. The pineapple growers are in relatively in better position than the tomato and
chilli growers. The tomato growers have less than one tenth of the total profit share in the identified value chain.

The examination of the marketing cost components of various agents in the supply chain reveal that either the cost of post harvest losses or the cost of transportation constitutes the major portion of the marketing costs. The cost of post harvest losses constitutes more than half of the total marketing cost for the crop tomato.

The extent of post Harvest losses is found to be very high for all the three crops in the study area and tomato recorded the highest losses with more than one fourth of the total production. Pineapple recorded the highest monetary loss in terms of total monetary value of such losses. Field level losses recorded the highest quantitative post harvest losses for all the three crops. But in terms of monetary value, the losses at retail level have been found to be high for the crops tomato and chilly. The price difference mainly leads to the difference between quantitative and monetary losses at different stages.

The causes of post harvest losses vary across crops and markets. At farm level, improper placing and harvesting injury are the major constituents of post harvest losses for the crop tomato. But small and immature crops found to be the major constituents of post harvest losses for other two crops. The other identified causes are transit injury and fungal diseases. The nature of the market and the quantity marketed determines the post harvest losses at other stages of the supply chain. Improper placing is the main cause of post harvest losses at assembly market due to its unorganised structure and large marketed quantity. Retail market has lower improper placing loss because of its comparatively organised structure and small quantity marketed. But fungal and bruising injury constitutes the major part of post harvest losses at retail level.

These constituents of losses at various stages represent inadequate infrastructure and information constraint to deal with the harvested produce. Whatever the cause, the quantitative losses is found to be
maximum at farm level for all the three crops. Therefore, it necessitates an examination of the factors causing such losses at farm level.

✓ The factors affecting post harvest losses at farm level can well be categorised in to three broad groups, viz. infrastructural constraint, knowledge constraint of the farmers in better management of the produce and finally both availability and quality of the inputs used. The inadequate storage provision and required facilities lead to post harvest losses with the increase in storage time. The extent of losses is also found to have increased with the increase in the travel time to the market or the market distance. All these basically indicate the required infrastructural constraint at farm level. The study also reported a positive relation between post harvest losses and the area under the crop. This basically indicates lack sophisticated level of management on the part of the farmers to deal with large farm size. The using improved varieties of seeds and available family workers lead to a decline in post harvest losses at farm level. It refers that post harvest losses can be lowered by availing required quality inputs.

✓ The examination of the marketing aspect of post harvest system indicates that the farmers in the study area have a lower output disposition through the efficient marketing channel.

✓ The channels with more marketing agents provide a lower profit share to the farmers. This indicates the possibility of improving the farmers’ margin through an institutional rearrangement of marketing system.

✓ The access to market is not uniform for all the sample farmers. An exploration of the factors reveals that ‘transaction costs’ in terms market distance, owning transportation facilities, access to market information and value addition practice influences the outlet choice decision of the farmers. The difference in physical capital, like the quantity of output produced also has its influence on farmers’ outlet choice decision. The other factors that have been found significant are the available supporting services like access to extension services, access to non-farm income facility and the number of working age family members.
The examination of the status of value addition practices among sample farmers reveals that almost half of the total farmers are not adding value to their produce. The rest of the farmers practicing value addition activities are mainly primary by nature and identified major activities are grading, storing, packaging and sun drying. No secondary value addition activities like processing has been followed by sample farmers.

The major value addition activity has been found different for different crops. Grading has been found the mostly practised value addition activity for the crop pineapple. Tomato growers mostly follow ‘packaging’ as the major value addition activity. Storing and sun drying are two equally most practiced value addition activity for the crop chilly.

These primary value addition activities have reported a minimum operational cost. But by paying such minimum operational cost, the value added sample farmers have made a difference in the price realisation of per unit of the produce. But both the coverage and extent of value addition has been found minimum in the study area and so it requires an examination of the determinants of value addition at farm level.

The identified determinants of the extent of value addition are level of production, area under the crop and number of working age group family members. Thus, basically farm and farmer related characteristics influence the value addition decision at farm level. The available institutional background represented by marketing distance, extension services, farmers’ association with farm based organizations have also found to influence the farmers’ value addition decision.

The study also finds that the farmers having access to a developed post harvest management system has a better price realisation for the produce. The developed post harvest system has been defined here in terms of the accessing storage facilities, access to efficient marketing channel and distance to the wider market for the specific crop. The farmers having access to efficient market and lower distant wider market of the specific
crop helps in receiving a better price for the produce. This also proves the presumed hypothesis of the study.

9.3 Conclusion

The findings from the present study on post harvest management of horticultural crops in the state leads to the following conclusions.

- The increased area, production and productivity of the horticultural crops in the state indicate that this crop segment has been playing an important role in agriculture sector the economy. The potentiality of the sector to absorb more labour and generate higher returns per unit of land and further scope of value addition renders the sector important for overall agricultural development of the state economy.

- The unorganised working of the value chain mechanism creates difficulties in the efficient functioning right from getting the inputs to marketing the produce. The level of supporting services has also been found to be weak and no farmer in the study area has received any formal credit assistance. The identified supporting actors in the study area are inactive in providing required assistance. Thus, adequate arrangement of an organised institutional mechanism will benefit the farmers and thus in overall development of the agriculture sector.

- The dominance of the traders in terms of major profit share of the produce implies that the sample farmers are relatively in weak position in the identified value chain model. Therefore, adequate rearrangement of marketing provisions is required to strengthen the bargaining power and profit of the farmer. An increase in profit share will encourage the farmers to grow these potential horticultural crops more extensively for commercial purposes and this will indirectly help in agricultural development.

- A high post harvest losses for the selected crops indicate about the inadequate infrastructure provisions in the study area. Such losses lead to drainage of major portion of income of all the identified agents of the
supply chain. The minimisation of such losses with identified factors will help the farmers and other agents to earn more for their already involved efforts in cultivation and marketing processes. This will indirectly boost the overall production and profitability for the selective crops and thus in overall development of the agriculture sector.

- The lower percentage access of the sample farmers to efficient marketing channel requires restructuring of the present institutional mechanism of marketing in the study area. The arrangement in the line of lowering transaction cost of marketing and availing adequate inputs could help the farmers to earn more from the marketing of the produce. This marketing rearrangement will the farmers help on one side receiving better price and on the other to the consumers through receiving the produce at a lower price through removal of unwanted marketing agents. This will develop the marketing aspect of this horticultural crop segment.

- The low level of coverage and extent of value addition in the study area indicates inadequate infrastructure and lack of awareness among the farms regarding the cost and benefit shares of value addition. The adequate financial support and development of post harvest infrastructure will be a great help for enhancing value addition at farm level than instant selling decision of the farmers. The emphasis on secondary value addition like processing should also be popularised.

- An organised post harvest system helps the farmers to have better market price for the produce. This would encourage the farmers to go for extensive and commercial cultivation and this would indirectly help in agricultural development.

### 9.4 Policy Implications of the Findings of the Study

- The creation of certified sources of seeds, fertilisers and pesticides is suggested for efficient value chain functioning at production stage.

- The nature and extent of supporting services should be strengthened and properly monitored.
The coverage and frequency of extension services should be increased. Such services should be crop and area specific.

The active participations of financial institutions as a supporting actor crops should also be ensured. This will bring an end of instant selling decision of the farmers and thus may earn more by targeting better market.

For reduction of post harvest losses both hard and soft intervention is need of the hour.

The hard intervention in terms construction of cold storages in accessible distance from the crop area is suggested here. A few cold storages presently working in the state being situated in urban areas and mainly being potato based failed to serve the greater interest of all the farmers. Therefore, having such provision in nearby major production pockets and for all horticultural crops would benefit the farmers as a whole.

Special vehicles for transporting perishable produce should also be introduced. The existing vehicles for transporting the agricultural schemes under various government schemes could not serve the purpose properly. Therefore, having such provisions would help the farmers in targeting better market with lower transportation cost and with reduced post harvest losses. It will indirectly reduce traders’ monopoly who often takes the advantage of reluctance of the farmers to cover higher market distance and with the transportation cost along with their busy farming schedule.

The soft intervention in terms training to the farmers especially on various aspects of post harvest management of the produce should be introduced. Theses trainings would help in better post harvest operations at household level.

Learning from the experiences of the pineapple growers, an organising themselves for more efficient market and corresponding better return,
similar institutional development for growers of other horticultural crops is suggested. For such institutions to try, however, the cluster of framers growing a particular horticultural crop will have to be a minimum size. Hence, in promotion of horticultural crops, a cluster can also facilitate better post harvest management of this crop.

- Finally, making provisions for extending the concept of ‘contract farming’ for the selected crops. This would ensure a direct market linkage of the farmers. Contract farming has proved to be an efficient option of successful value chain management in other states of the country. The successful stories are also there in our state for other agricultural crops, specially potato and organic joha rice cultivation.