

Chapter 8

Summary of the Main Findings and Conclusions

This chapter summarises the main findings and conclusions of the study.

1. Availability of a primary market in Nainital was the main factor that motivated the enterprising farmers of Garampani to cultivate vegetable crops.
2. The transformation process started about 70 years ago in the villages adjacent to Nainital town, from where it spread to other villages. The pace of transformation was slow during the early years, but it accelerated in the last 10-15 years due to availability of external, secondary markets as a result of the development of transport and marketing networks.
3. The horizontal flow of information (i.e., from farmer-to-farmer) played a predominant role in diffusion of the transformation process over the vertical flow (i.e., from external institutions to farmers). Only a few information-seeking farmers interacted with research institutions or availed themselves of the facilities and services of government agencies.
4. Although the farmers in this region have adopted commercial crops, they have not completely abandoned conventional crops. This is mainly because of resource constraints (particularly those of labour and water) and differences in quality of land; however psychological attachment to conventional crops and lack of adequate provisions for food security were also found to be factors in the continuation of this practice. This practice has increased the biodiversity in this area and preserved the conventional genetic property. Currently, cash crops are sown on 63 per cent of the total area cultivated.
5. The inter-village and inter-household differences in the level of commercialisation are affected by the following factors.
 - i) Proximity of markets
 - ii) Availability of transport facilities or distance from roadside
 - iii) Availability of a minimum level of water for micro-irrigation
 - iv) Caste and occupational structure
 - v) Consolidation of land holdings
 - vi) Size of holdings
 - vii) Total labour available and its composition in the family
7. Market and production functions interacted with each other and helped in the development of each other.
8. Market development has been almost an autonomous and spontaneous process, external - state and institutional - efforts have not succeeded. A local market of vegetable

dealers emerged about 30-40 years ago. It developed and gained competitiveness gradually. Until some years ago, most of the farmers had to sell their produce to one dealer under the credit-based marketing system, but this situation has now changed. With expansion in the scale and area of vegetable farming, more collection centres have developed on the road. It has further induced the farmers to produce more, thus providing economy of transportation costs and time. On the other hand, more and more farmers have started to send their produce to external markets.

9. The changes in state of competition in the market have influenced the pay-off and consequently the mix of vegetable crops to a great extent. Tomatoes have lost out in this process.
10. On the basis of comparison of relative yields and market prices, the new crop mix has increased the income of farmers by 172 per cent (2.72 times).
11. Vegetable crops are more risky, in terms of both production risk and market risks, but the income advantages of the former more than offset the risks.
12. Vegetable farming is more labour intensive than conventional farming. The new crop mix has increased employment 2.69 times.
13. The high intensity of labour for the new crop mix has diluted the conventional gender-based division of labour in this area. Men now weed, apply manure, harvest, etc and women participate in marketing activities. An analysis of conventional and modern divisions of labour shows that vegetable farming increased women's workload 1.78 times and that of men 6.22 times. The gender distribution of workloads in agricultural activities is more equitable now, but the total workloads of women are still considerably high because they have also to spend a considerable amount of time in animal husbandry and household activities.
14. To a great extent, vegetable-farming has checked the outmigration of youth in search of menial occupations. The effective rate of migration among male workers is about 16 per cent.
15. Vegetable crops have increased the income levels of farmers, but there are also some unpleasant implications to this process. Fodder is an important by-product of conventional crops, and its availability has declined drastically after commercialisation. Consequently, dependency on the forests for fodder has increased, and this is not a good development from the ecological point of view. The number of cattle (particularly cows) has also decreased after commercialisation of agriculture, leading to a decline in production of milk and organic manure. This situation has raised doubts about the sustainability of the transformation process itself.
16. The following are the main problems impeding the progress of transformation and also affecting the sustainability of vegetable farming in this region.

- i) Decrease in water supplies due to drying-up of water sources
- ii) Increasing problems with white grubs (*Kurmula*)
- iii) Increase in crop diseases
- iv) Decline in crop yields
- v) Shortage of necessary inputs and lack of information
- vi) Problems of local transport

17. The future of vegetable farming depends upon how effectively the above problems are addressed. The following actions need to be taken immediately.

- i) Promotion of community-level organizations of farmers (through NGOs)
- ii) Afforestation and water management
- iii) Promotion of farm-forestry to ensure supplies of fodder
- iv) Light trapping of *Kurmula* beetles (the programme should be organized at community level)
- v) Training for farmers on seed technology, pest control, and disease control measures
- vi) Promotion of consultancy services (research institutions, private agencies, and NGOs can be employed in this task)
- vii) Construction of a link road passing through the vegetable growing belt.

18. The experiences of the Garampani area indicate that the commercialisation of agriculture, particularly vegetable farming, could be helpful in ensuring the economic sustainability of agriculture in mountain regions, provided an equitable balance is maintained between agriculture, animal husbandry, and ecological resources. Agronomical research should be addressed towards identifying different crops, varieties, and timings suitable for different localities, and farm economists should ensure their economic viability and market prospects.

19. For initial replication of the transformation process, only the areas in proximity to primary markets (towns) should be selected. The process will diffuse and the dealers' market will develop gradually, following the Garampani model. However, the pace of transformation can be kept high through external support.

20. Since only the farmers with entrepreneurial attitudes and skills are likely to accept the changes and to implement them effectively, they should be identified and motivated. Horizontal transfer of knowledge is found to be effective among farmers and the process is likely to diffuse throughout the whole of society gradually.