Chapter 7
Problems and Prospects of Vegetable Farming in a Mountain Region

One of the main objectives of the present study is to evaluate the replicability of the transformation process and its conditions. In previous chapters, attempts have been made to highlight some positive as well as negative implications of this process. This chapter attempts to analyse the problems faced by vegetable growers in the Garampani area and their attitude towards vegetable crops after a long experience in vegetable farming. Their experiences could serve as guidelines in developing a plan of action for replication of the transformation process in a more effective and sustainable manner in other mountain areas.

Table 7.1: Average Water Requirements for Micro-irrigation during March-April

Particular	Capsicum	Tomatoes	Chillies	Total
Plants per ha	46,000	25,000	66,000	-
Water requirements per plant per time (litre)	1/4	1/4	1/4	-
Period of irrigation				
(i) days	15	12	15	-
(ii) times	22	17	22	-
Maximum daily water requirements (lit./ha)	23,000	12,500	23,000	-
Per ha total water requirements (thousand lit./ha)	253	106	363	-
Area under cultivation (ha)	190.88	135.72	29.29	255.89
Total water requirements (in 100,000 lit.)	483	144	106	733
Average Water Requirements				
(i) Per household (lit)	-	-	-	52,400
(ii) Per household per day (lit)	-	-	-	1750

Problems of Vegetable Farming

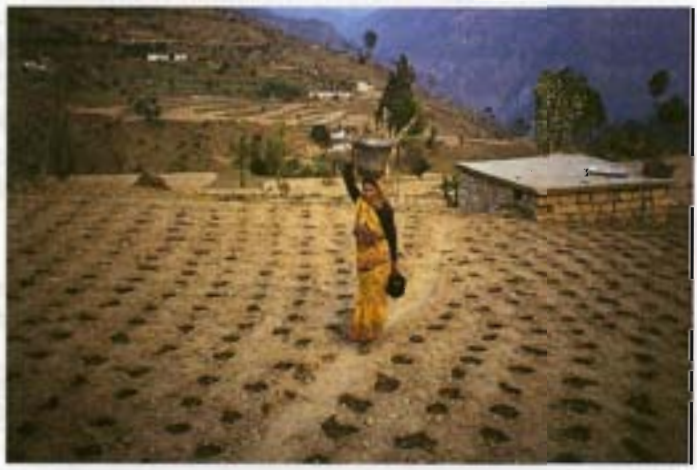
(1) Availability of Water

Water is required for plants to survive during summer just after plantation. Water is given from plant to plant in small pits. Each plant requires about 1/4 of a litre of water at a time. Under normal ground moisture levels, the average watering frequency is about 15-22 times. The estimate of average water requirements is given in Table 7.1. At the present level of commercialisation, a household requires about 1,750 litres of water per day for irrigation

Although the water requirement for irrigation is not very high, it is difficult to manage it in villages that face problems with availability of drinking water. The problem is becoming more serious because many natural sources of water have dried up because of the denudation of their recharge areas (Valdia 1996). An integrated approach covering protection of forests, afforestation of recharge areas, and proper management of available water resources, is required to solve this problem.

(2) White Grub (Kurmula)

White grubs or *Kurmula* are the larvae of beetles belonging to various species of Rutelinae, Melolonthinae, and Dynastinae sub-families (Garg 1997, 294-95). The grub feeds on newly-transplanted seedlings and roots of mature plants. The problem of the white grub is endemic and serious, causing very heavy losses in vegetable yields. Although farmers are using insecticides (mainly Thaimate 10-G) to control it in the larva stage, this has not been very successful. Light trapping may be an effective method for control in the beetle stage, but this requires community-level involvement.



Carrying Water to the Fields

(3) Diseases

Many plant disease are increasingly becoming endemic and causing heavy loss to vegetable growers Summer crops (i.e., *kharif* and *jaid* crops) are more prone to diseases. Damping off of seedlings, root rot, leave spots, and fruit rotting are very common in capsicum and tomatoes. During our field survey we found that in some villages loss caused by fruit rotting is more than 50 per cent for capsicum. Peas (a *rabi* crop) are also affected by powdery mildew and white rot. Farmers are using some common fungicides (Dithane M-45, Thiram, etc) to control these diseases, but they have not been fully contained.

Watering the Fields-Micro Irrigation

(4) *Deteriorating Soil Fertility*

Diseased Capsicum Plants

Declining crop yield, in general, is one of the common experiences shared by the farmers with the survey team. Almost all the crops are affected by this tendency but, according to the farmers, the vegetable crops are more prone to it. This tendency is not limited to the Garampani area, but it has also been experienced in other parts of Uttarakhand (Singh 1996: 115). Depletion of nutrients in the soil, impact of chemicals, climatic changes, etc may be responsible for this. Proper scientific research and an action plan are required to control this process.

(5) *Gap between Research and Extension*

Full benefits of research and development could not be derived by the farmers, either due to lack of information or due to lack of a necessary infrastructure and inputs. Some farmers said during the survey that they sent samples for soil testing to the Departments of Horticulture and Agriculture, but they had not received reports. They also thought that there was no appropriate agency to provide them with information on various scientific aspects of vegetable farming such as fertilizer mix, disease control, pest control, and varieties of seeds. Good quality seeds, fungicides, insecticides, and fertilizers are also in short supply. The government agencies have not proved efficient in providing extension services, therefore private or farmers' own organizations should be promoted for this task. These organizations should operate on business lines; more emphasis should be placed on efficiency and quality, not on subsidy. They should be given research support by the universities and research institutions on a commercial basis. This model of extension will be more effective for areas such as Garampani where a culture of farm entrepreneurship has already developed.

Fruit Rotting in Capsicum: The Most Serious Problem

(6) *Local Transportation*

Vegetable farming is closely associated with transport facilities. Being a perishable commodity, farmers have to carry the vegetables regularly to market. Many villages in the Garampani area are still more than six kilometres

from a motorable road. The hill tracks are in very bad condition. The farmers have to carry their vegetables manually or on horses, and this involves too much time, labour, and risk. A link road passing through the vegetable growing belt is required in this area.

(7) Problems in Marketing

The problems encountered by farmers in marketing vegetables during the initial phase of transformation have been discussed in detail in Chapter Three. Farmers were exploited by a non-competitive market and credit-based marketing system. Although the market has greatly developed now and many marketing options are available to farmers, problems still exist in the marketing process. The farmers who send their produce to external markets, particularly to Haldwani, have to rely completely on commission agents. No farmers' representatives are present at the market at the time of auction. During the survey, we came across certain incidences that indicated that the farmers are sometimes cheated by commission agents. A strong farmers' association is required to represent the farmers at the markets as well as in other areas. A random inspection of the market by members of this association can check such incidences.

Attitudes of Farmers towards Vegetable Farming

Before arriving at any conclusion regarding the replicability and prospects of vegetable farming, it is appropriate to examine the attitudes and opinions of farmers from the Garampani area about vegetable farming after their long experiences. Forty persons from different age groups were interviewed informally and in depth. They were asked to share their experiences and opinions about vegetable farming. On the basis of the attitudes displayed by them during the interview, they were assigned attitude points (Figure 7.1 and Table 7.2). The attitudes of respondents amongst the old and adult age groups were almost similar, but the school going, young respondents displayed quite a different attitude.

Figure 7.1: Attitude Scale used for Measurement of Attitudes of Farmers towards Vegetable Farming

+3 -----	Highly optimistic and innovative
+2 -----	Optimistic and Innovative
+1 -----	Optimistic
0 -----	Indifferent
-1 -----	Pessimistic and compromising
-2 -----	Pessimistic and withdrawing
-3 -----	Highly pessimistic and withdrawing

Respondents in the old and adult age groups had mixed attitudes: 37.5 per cent of them had developed a pessimistic attitude because of the problems they had been facing during recent years (i.e., increasing diseases, deteriorating yields, etc) but none of them (except one) was willing to withdraw from vegetable farming. Only seven (17.5% of the total) respondents were found to have innovative, information seeking, and problem solving attitudes. Out of them, a high level of motivation was found among three respondents. Most of the school going, young respondents showed a negative attitude towards vegetable farming. They wanted to look for alternative jobs, but the alternatives had not yet materialised. However, most of them realised that they would opt for vegetable farming if satisfactory options were not available.

Table 7.2: Attitudes of Farmers in Different Age-groups towards Vegetable Farming

(Number of respondents = 40)

Age Groups	Attitude Points							Number
	-3	-2	-1	0	+1	+ 2	+ 3	
Elders (60 and above)	-	1	4	-	4	2	1	12
Adult: (20-60)								
Male	-	-	4	1	3	2	2	12
Female	-	-	1	-	3	-	-	04
Young school going	2	5	2	1	2	-	-	12
Total	2	6	11	2	12	4	3	40

The Future of Vegetable Farming in Garampani Area

Vegetable growing has increased employment 2.69 times and income 2.72 times. Some farmers are dissatisfied with vegetable farming because of declining yields, but vegetable farming is still much more profitable than conventional farming, therefore they are not likely to withdraw from it. It is not surprising that most young respondents were ambitious and wanted better jobs; but in view of the shortage of employment opportunities, farmers' involvement in vegetable farming is not likely to decrease in future. It is expected that the share of vegetable crops will increase in future, provided more infrastructural facilities (particularly transport facility) are developed in the area.

However, some doubts arise about the sustainability of vegetable farming because of the increasing problems of water, pests, diseases, and declining yields. These problems, if not tackled, will render vegetable farming an unprofitable venture very soon. Therefore, a proper plan of action is needed to solve these problems. The following suggestions can be made in this respect.

1. Community-level cooperation is required to solve most of the above problems, therefore, farmers should be encouraged to engage in community-level involvement through non-government organizations at local level.
2. Trees, particularly fodder species, should be planted in village forests and recharging areas for water sources. Farm forestry is a tradition in Uttarakhand, it should be made more popular. This can solve, to a great extent, the problems of diminishing supplies of water and organic manure. The water resource available should be efficiently managed.
3. Integrated programmes for pest control, as well as for disease control, are necessary. More emphasis should be placed on non-chemical measures; use of chemicals should be minimum and efficient. Light trapping may be an effective method for controlling the white grub; an action plan with community-level involvement should be designed for this purpose. Farmers (particularly farmers with entrepreneurial attitudes) should be made aware of and trained in various methods of disease control such as seed technology, mechanical controls, crop rotation, disease resistant varieties, and chemical control. These techniques will be quickly diffused among the farmers because horizontal transfer of knowledge is found to be more effective in rural societies.

4. Consultancy services (as discussed earlier) should be promoted.
5. A link road should be constructed passing through the vegetable growing belt.

Extension of Vegetable Farming into the Mountain Region

Nature of Replication

It is evident from this case study that vegetable farming can bring about considerable improvement in the income and employment levels in mountain regions. Therefore, other mountain areas should also be encouraged to initiate similar transformation processes in their farming systems. This is not to say that other areas should also adopt the same crop mix as the one in the Garampani area. Mountain areas are extremely diversified in terms of geoclimatic conditions, therefore suitability of different crops, their varieties, and timing will also vary from place to place. This study simply suggests that the farmers should shift their decision base from 'conventions' to 'markets' as true entrepreneurs Many other crops that can fetch higher market prices and can increase farmers' incomes can be identified for the mountain region. The more varied the crop mix in mountain regions, the fewer the risks of inter-area competition, thus farmers can harness their comparative advantages.

However, certain important lessons are implied in the autonomous process of agricultural transformation in Garampani area, and these must be taken into account while replicating this process in other areas. These lessons have been listed below.

i) Agriculture and animal husbandry in mountain regions are highly interdependent. Animal husbandry is likely to be affected adversely by commercialisation due to the shortage of fodder and, consequently, it will hinder the transformation process. Therefore, adequate provision for fodder is a precondition for successful and sustainable transformation. Farm forestry and social forestry may be helpful for this purpose.
ii) Effective management and protection of natural resources (particularly forests and water) are essential for sustainable transformation.
iii) Farmers should be given proper information, particularly on fertility management, pest control, disease control, new agricultural techniques, and seed varieties.

Selection of Areas for Replication

The main motivating factor in the transformation process is the presence of a market, therefore the process is more likely to succeed in those areas in which a primary market for vegetable produce is available. Secondary or dealers' markets would develop gradually with the development of the production process, and simultaneously the transformation process would be diffused to other areas. Although cooperative marketing has not succeeded in the Garampani area, a well- managed cooperative marketing society can be a catalyst for this process.

The Process of Replication

The experiences in the Garampani area suggest that, in the process of diffusion of innovation, horizontal transfer of knowledge is more effective than vertical transfer. There are al-

ways a few enterprising farmers who seek information, identify new opportunities, and take risks to implement innovative ideas. Inspired by their success, other farmers follow suit. Therefore, to initiate the process of transformation, farmers with entrepreneurial traits (e.g., need for achievement, information seeking, innovative, risk bearers, etc) and skills (e.g., skill in identifying opportunities, communications, creative thinking, and planning, etc) should be identified and trained for the transformation. In the initial stages, the pace of transformation is likely to be slow because of sociocultural and infrastructural constraints, but soon the economic motives will induce the process and gradually it will be diffused throughout the entire society. In fact, the process is likely to be faster at present than during the period when it started in Garampani, due to a greater extent of overall commercialisation and better communication facilities.

Infrastructural Support

The following infrastructural support is essential for successful transformation.

i) Micro-irrigation facilities
ii) Transport facilities
iii) A network of government, cooperative, and private institutions to provide necessary inputs (e.g., finance, seeds, fertilizers, pest and disease control measures); consultancy; and marketing facilities.