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Agriculture and Horticulture in Kullu District of Himachal Pradesh, India
PRACTICE, PROBLEMS AND PROGRESS

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THE PRACTICES

Traditional Farming in the Himalayas

The agricultural and horticultural practices of the region vary from other parts of India due to a variety of factors. The most important one is, of course, the unique climate and landscape of the Himalayas. The mountainous territory strongly influences both techniques and crops. Most agriculture takes place in the form of terrace cultivation, with small strips of the mountain slopes having been more or less levelled out to allow cultivation. The quality of the soil is less than optimal with few nutrients and many small stones and rocky patches. Further, the altitude leads to a harsh climate. While in the valleys with an altitude of around 1500 m above sea level the cultivation can still take place most of the year; it is reduced in the summer months in regions above 2500 m. Yet, the people there particularly depend on agriculture for survival, largely because the remote locality of their villages denies opportunities in other fields. The area is purely rain-fed, which creates difficulties if the monsoon and snow fall turn out weak. Problems of accessibility and transport are further crucial aspects of the farming in Kullu district.

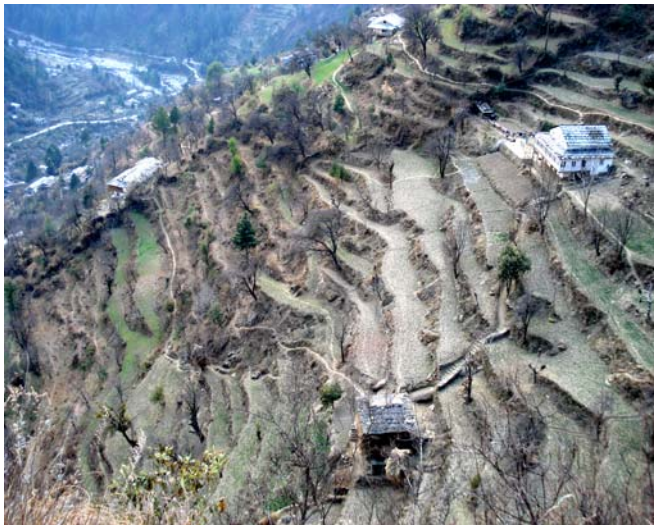

Figure 1: terraces on hillside near Kalwari

Yet, traditionally, most people of the area are engaged in agriculture and increasingly in horticultural activities. They grow grains for their own consumption, with wheat and maize being the most common ones. Cultivation of barley and millets has also been a practice for centuries, although these cultivars are slowly disappearing from the area for economic reasons. More recently, the cultivation of vegetables such as potato, beans, peas, cauliflower and cabbage has become an important source of income, as these products are grown for commercial sale. Cash crops also include garlic, both a blessing and a curse for the region, as it gives high profits but encourages monoculture. The main horticultural crop is apple, which requires the climatic conditions of the higher altitudes; yet some farmers have started to experiment with pears, cherries and plums to extent the variety.

Traditionally, the farmers of the Himalayas worked with what would now be described as basic organic methods. They cultivated their fields with local seeds saved from the previous harvest, using cow dung as fertiliser and leaving the growth up to natural conditions. Ploughing and sowing were carried out without any particular methods. The soil was lightly ploughed for the seeds which were distributed by strewing them in the field. As all activities in the mountains require labour, the farmers only found time for the most necessary weeding. Like all other work, the harvest is done by hand, after which the fields sometimes would be left

unused for a few months due to climatic reasons. Although the farmers of Kullu did not use specific methods for water or soil management, their farming did not require any chemical input and could therefore be considered as *traditionally organic*.

The Chemical Era

This changed about 20 years ago. Chemical fertilisers and pesticides had become a common practice in the plain areas already, and through increased promotion of these inputs from the Department of Agriculture, they slowly found their way into the Himalayan villages. Subsidies and improved connectivity of the more remote areas meant that the farmers there also had easy access to chemicals. Fertilisers increased yield of farm produce while insecticides and fungicides provided a way for countering pest attacks. The fertilisers introduced were nitrogen in the form in urea which promoted plant growth, super phosphate which increased root and stem strength and potassium as potash, beneficial for flowering and fruit development, all three of which are also available as a NPK mixture. The farmers started to use these inputs on a regular basis. A factor further promoting chemical farming was the increased commercialisation of the agriculture. Cultivation for own consumption does not require artificial means, yet to make sale in the market economically viable the crop has to be of reliable standard and sufficient quantity every year. This can be achieved easily with the new fertilisers and pesticides. Some farmers also apply ether for crop intended for late sale in the market. When the weather does not allow full ripening and colouring of fruits such as tomatoes, ether can help to give a good colour and therefore increase the market value. The same process occurred in the horticultural sector. Since apples are only grown for commercial sale, chemical methods took hold very quickly as they increased the price the products could achieve in the market. When the use of chemical inputs became a yearly practice, this also affected the seeds. Through seed selection the cultivars became more and more adapted and dependent on the chemicals. Further, once the farmers observed the good results of chemical farming, they would not continue with it as anything else would mean an economic loss.

Figure 2: pea plant showing light patches and rolled up leaves

But this prosperous period did not last long. Slowly output started to decrease without any obvious reason. Many farmers resorted to using higher quantities of fertilisers, yet the trend could not be stopped. It took some time until progressive farmers started to encounter the root of the problem. Having received no proper information about the chemicals they were encouraged to use, farmers did not know their adverse effects. So it took visits to the Department of Agriculture and university faculties until the problems with chemical farming became known and chemical farming was recognised as creating the difficulties. Production in the

valleys is now largely stagnant, despite application of chemicals to promote growth and ward off pest attacks.

Problems with Chemical Farming

The use of chemical inputs on a large scale has a variety of negative effects, some of which only become visible in the long run and are often not recognised as results of chemical farming by the local agricultural workers. Most significantly, fertilisers destroy the soil structure when used continuously in large amounts. Particularly high nitrogen contents adversely affect the soil, which becomes hard and loses its water holding capacity, a very serious problem in an area struggling with water shortage. Yet urea is the fertiliser most commonly used, as it is cheap and easily applied. Bad soil quality in turn directly affects the output, which explains the decreasing yields the farmers experienced. A second problem that arose from the chemical farming is the dependency the plants develop on the chemicals. Firstly, chemical fertiliser makes the plants more prone to pest attacks, as they affect the natural growth and defence mechanisms in the plants. Secondly, the seeds are selected as to produce best results with chemical inputs, so the crops do require these inputs after only a few years. The farmers from the village Edeshe also report wider reaching problems. The spraying of insecticide not only kills insects damaging the crops, it also reduces the amount of local bees. Bees, however, are crucial for the pollination of apples and play a vital role in the agro-ecosystem. The spraying therefore has direct negative effects on agriculture and horticulture. Often even the crop itself develops signs of illness when treated chemically, such as light spots or curling leaves. Others have recognised the impact of chemicals on health. Ranjiv Bharti from Gushaini describes how the health of his family suffered under the excessive spraying he conducted in his apple plantation which surrounds their house. Often these health effects are not measurable within a few years, further concrete data on the issue is lacking; but from the families' observation as well as the scientific studies, the danger becomes clear.

Other Problems

The problems the farmers of Kullu face are not confined to the effects of the use of chemicals. There are also a number of agricultural practices with adverse long-term effects, while natural factors increase the difficulties. One practice in particular has brought problems to the valleys. Ten years ago some farmers promoted the production of garlic on a commercial level. Garlic had always been grown on smaller scale, yet it can also be a profitable cash crop. After initial hesitation many farmers tried wider cultivation, and high market prices encouraged them to continue in the following years. Yet the success of garlic in the market meant that many farmers used their entire land for its cultivation year after year. Such monoculture practices severely damaged the soil. The soil loses its micronutrients as they cannot regenerate in periods of rest of alternative cultivation. This reduces its quality and has a negative effect on the output. Further, large-scale cultivation of the same crop in one area attracts diseases and pests for this species. Where different crops are grown, a particular disease will be contained and soon die out; while bigger cultivation also provides large opportunities for diseases, pests and fungi. Yet again the problems of such practices are largely unknown among the farmers.

Box.1: Decreasing output through monoculture and use of nitrogen fertiliser

Yield of garlic cultivation on 1 bigha land (roughly equivalent to 1/12 hectare) with use of nitrogen fertiliser (urea) – same field used every year

1995	1200 kg
1996	1000 kg
1997	900 kg
...	
2005	250 kg

When asked about the most pressing problems they face with regard to cultivation, the farmers frequently mention lack of irrigation and water problems. While this results largely from changing rain patterns with long periods of drought or excessive rains in a short time, the deterioration of the soil contributes to the difficulties. Even smaller droughts can have disastrous effects if the soil is damaged. Increasing temperatures also pose problems for certain crops. Apples, which are widely grown in the valleys of Kullu, require a period of cold and snow for full fruit bearing. Yet the winters become milder year by year, therefore apple cultivation becomes less viable in these regions and slowly moves towards higher altitudes.

The Need for Change

This overview of the problems the farmers in Kullu face gives an impression of their struggle to make a living from agriculture and horticulture. Most farmers now cultivate using both traditional and chemical methods. Hence, they are neither full-scale chemical farmer, nor do they apply fully organic patterns. Rather it is a mixture of techniques available to them and applicable in their particular circumstances. Yet this mix of methods does nothing to reduce the problems; and the need for change is urgent. The problems are all results of longer-term processes, but every year in which the old practices continue further aggravates the difficulties. The most promising option in reversing the trend of decreasing production and destruction of the natural rural ecosystem is to adopt methods of organic farming. This strategy, while not a solution that will deliver results in the space of just one or two years, is a way out which is sustainable in the long term with benefits for both people and environment. Some farmers and NGOs have now realised the chance organic farming provides for Kullu. Yet the process of sensitisation, training and extension of these practices is a slow one. However, there are some promising examples of success.

Figure 3: garlic showing the effects of drought

THE NEW APPROACH

Farming without chemical inputs is not a new practice, but the organic approach incorporates more than just refraining from the use of chemicals and applying biological fertilisers and pesticides. There is variety of specific techniques involved that aim at increasing productivity and ensuring successful harvests every year. So even though the traditional farming methods of the Himalayas do not use chemical inputs, they are not fully organic. It has become the task of local NGOs to promote the new biological techniques among the farmers. One of these NGOs is GIT's partner SHARA in Banjar. GIT's program manager and promoter of SHARA, Mr. Chuni Lal is both a farmer and a social worker, and therefore can use his own experience when working on farming techniques. Under joint efforts of GIT and SHARA he applied progressive methods and organic farming and sensitised the farmers for this new approach. He describes a variety of techniques that are useful in this connection and which as a whole could lead to full-scale organic agriculture in the region.

Organic Methods

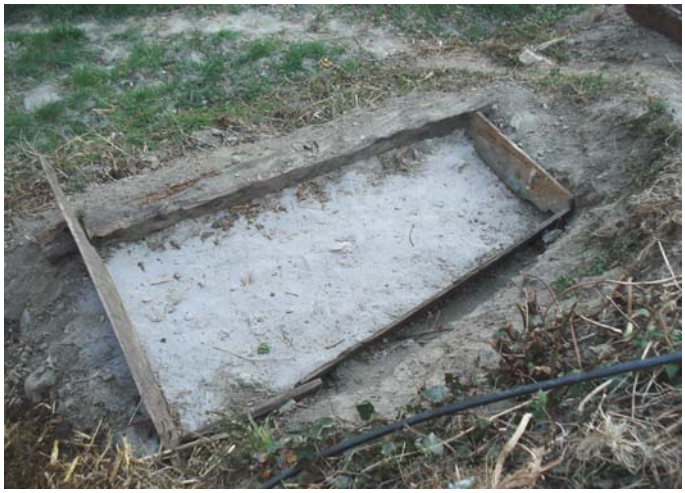

Figure 4: vermi-compost pit

<u>Organic Fertilisers</u>

- vermi-compost:
  composting technique using earth worms; produces composted soil very high in nutrients; also reduces the attack of diseases and even fungus.
  problem: large quantities are needed for proper fertilisation (800 kg per bigha; garlic needs up to 4000 kg per bigha) while a small compost pit cannot produce more than 50 kg.

- green manuring: growing a crop of plants producing nitrogen and phosphate on the field; crop is cut at flowering stage and left on the field as a layer of green manure; protects the moisture in the soil and provides it with fresh nutrients.
  problem: not easily applicable in mountain environment as cultivation of manure crop can take up to 4 months and conflicts with cultivation time of other crops.

<u>Organic Methods against Insect attacks</u>

- spraying of natural insecticides, e.g. garlic paste spray, tobacco and chilli mixtures: very effective in warding off insects while not damaging to the ecosystem.
  problem: preparation of these sprays is labour intensive; requires good knowledge of preparation.

- planting insect repelling flowers like marigold between and around crop: limited effect against insects but very friendly to ecosystem.

Organic Methods against fungus

- garlic spray: also effective against fungus on limited scale.
- drying out the soil: if field is reused immediately after harvest fungus stays in soil and can attack following crop; leaving it open in the sun for a few days can kill fungus.
  problem: organic methods are not fully effective against fungus; large attacks cannot be countered; but in normal years methods are up to 90% effective.

Soil Management

- plant root crops like radish before grain cultivation: it loosens the soil.
- alternate cultivation between short rooted and long rooted crop: more efficient use of nutrients since roots reach to different depths.
- managed crop rotation: avoid cultivating the same or similar crop on the same field for more than one season; rotate crops which are beneficial for each other and require different nutrients.
  *sometimes already practiced but methods can be extended to more varieties of crop and carried out in more managed way

Water Management

- using crop that covers all of the soil (wheat, maize) or apply storey cultivation: keeps the soil shady especially in the summer months; retains moisture.
- levelling of fields: levelling the terraces properly to stop water from flowing downhill.
- horizontal rows: sow plants in rows to build blockages for water.
- dig trenches around the fields: again it stops water from running off.
  problem: practices require labour, e.g. row planting is much more time consuming than spreading seeds by throwing; farmers reluctant to adopt methods since they do not know the scientific background.

Time Management

- adjust cultivation time to occurrence of diseases: often occur in specific periods; use of pesticides can be avoided by delaying or bringing forward cultivation.
  problem: cultivation can only be varied by a short period (2 or 3 weeks); effectiveness of methods depends on specific regional conditions.

Biodiversity

Another aspect of the organic approach is its concern for agro-biodiversity and the protection of traditional cultivars. Organic farming places great importance on crop rotation and mixed cultivation, as monoculture is regarded as the origin of many problems the farmers and environment face. But there is also a question of how this diversity should look like and what species it should involve. In recent years, the cultivars of the Kullu region have changed significantly. Traditional crops such as millets, finger millets and barley have largely disappeared or been reduced to very

small-scale cultivation. They were substituted by cash crops, new varieties of vegetables and a new focus on the more profitable horticulture. The basic reason for this transformation lies with economic factors. Millets and barley lost their market value due to the common usage of wheat. Even for their own consumption the farmers started to prefer the tastier wheat, despite the higher nutrition value of millets. At the same time, the cultivation of vegetables on a commercial scale became more lucrative. This explains the shift in cultivars. The problem with this shift is that it has a negative impact on the biodiversity of the rural ecosystem. Once cultivars are no longer grown, they effectively die out. Often their replacements are less suitable for the climate, and are only used for the higher commercial value. This in turn might require higher inputs. Further, farmers increasingly opt for large-scale cultivation of few valuable crops rather than a wider selection. The organic approach seeks to avoid this reduction in agro-biodiversity by promoting the use of traditional cultivars and diverse cultivation within one village.

Efforts of Extension and First Steps

The popularisation of these methods is not an easy task. Not only need the people be acquainted with them, but they also have to receive proper training and scientific explanations of the methods. Only if they fully understand their value as well as the risks involved with the new techniques, the local farmers will adopt them. Even then, this will be a slow process. With few examples to demonstrate the success of the new methods, the people are understandably reluctant to change their traditional ways. Further, the conversion to organic farming often leads to a reduction in output, while the methods are more labour intensive. For farmers that struggle to make a living as it is, these are important considerations.

Figure 5: Chuni Lal (r) with farmer

GIT/SHARA therefore adopted a step-by-step approach on the issue. Firstly, they aim to sensitise the farmers about the new methods through informal meetings in the various villages. Only the farmers who have reflect seriousness in adopting the new methods will be selected and trained. This has happened already in 20 Gram Panchayats, yet the campaign is not a fully organised project. Rather it depends on the availability of staff and time when such meetings take place. As Chuni Lal reports, the general discussion often has little result. Although the farmers listen to the new ideas, they resort to their old methods soon after. But in the case of some farmers the result looks more promising. The staff of GIT/SHARA gives them periodical training on techniques and crops depending on the season. This means the new methods can be directly applied. One advantage of the focused approach is that these progressive farmers will be able to act as a model for the rest of the village. If their results are good, other farmers

are likely to become more interested and copy the practices. The hope is that this will lead to an extension of the ideas without constant input from the NGO side.

GIT/SHARA further focuses on the inclusion of women in the organic farming process. It is the women who ultimately carry out most of the agricultural work, so their knowledge of the practices is crucial for the success. Yet the women are often absent from the meetings and discussions. This is why GIT/SHARA works specifically with self-help groups (SHGs) in the area. About 50 groups are supported by the NGOs.

Seeing the extension of organic farming that has been possible so far, it is hardly surprising that the visible results are small. No pure organic farming as such is practiced in Kullu yet. Most farmers apply mixed techniques, which combines traditional biological and chemical methods. But there is a growing awareness that chemicals are responsible for many problems. And some farmers are experimenting with the new methods for the first time this year. Chuni Lal and other farmers of Kalwari village describe their lands as a bio-diverse farm which serves as an example for others. There are also cases like that of Ranjiv Bharti of Gushaini, who decided to stop the use of chemicals. Although his profit is less than before, he feels that it was an important step. So far, no one else in his village has followed his example, but the farmers try to reduce the use of chemicals. These are promising first steps, while they also show the amount of work still ahead of the promoters of the organic approach.

THE ECONOMIC ISSUES

All questions of practices in agriculture and horticulture relate to economic issues in some way. Farming is the principal source of livelihood for the villagers of the region, either through sale in the market or through own consumption of the produce. Any change in techniques, cultivars or other aspects therefore has to pass scrutiny from an economic point of view.

Present Economic Situation

Agriculture in the Himalayan region is not a profitable activity for most farmers. They cultivate crops for own consumption, yet what they gain from their fields often does not feed the whole family for an entire year. Vegetables are sold in the market to allow the purchase of additional grains. Yet even cultivation on this scale requires the labour of at least four people for most of the year; where the production is more commercialised the labour requirement can rise up to 12 people. Since labour is expensive to hire in this region with wages of Rs. 80 per day, the input cost of agriculture is very high. Even where families do not hire external labour and work on the field themselves this labour cost has to be taken into account, though this is not a common way of thinking among the farmers. In addition to labour costs, expenditure is required for new seeds when the seeds from last year's harvest are not suitable, for transport and post-harvest activities like threshing and for fertilisers and pesticides. While labour occupies the biggest share of the input costs, chemical inputs can also become costly, especially pesticide sprays. This makes agriculture not very profitable in many cases, especially when conducted on a limited scale.

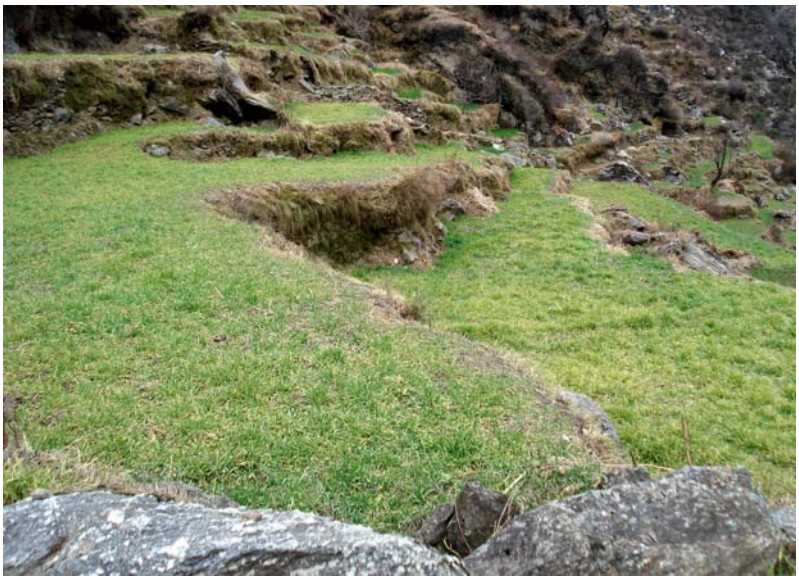

Figure 6: barley cultivation in the remote village of Manjhaili

The situation is slightly different for the horticultural sector. As apples have a higher market value, the income from horticulture is significantly higher. However, farmers also employ more chemical inputs in apple cultivation. Firstly, they cannot afford to lose crop which is so valuable, hence pesticides are more used at a larger scale. Secondly, apples are prone to diseases which may not affect the taste but their appearance, and big, shiny, colourful fruits achieve a much higher price in the market. This reduces the revenue from horticulture somewhat, yet it is more profitable than agriculture in this region.

It is very difficult to draw significant conclusions about the economic situation of the farmers from a few case studies observed in Kullu district. This is largely due to the

strong variation of conditions between different villages. Altitudes very much influence yield and growth, accessibility of the village has an effect on commercial cultivation while land holdings and practices also vary. However, some observations need to be mentioned here.

Box.2: Input Costs and Output

Duni Chand, Shikari Vir

Land holding: 15 bigha (1.2 ha)
Cultivated crops: maize, wheat, barley, potato (for own consumption) cauliflower, cabbage, peas (commercial); apples (commercial)
Fertilisers used: cow dung, urea (200 kg) and NPK mixture for apples (150 kg) per year
Pesticides used: fungicides (Carvendazim, Mencozev) and insecticides (Melathon, Cypermethrene) for apples

Input costs for one year:

Fertilisers	Rs 2500	Post-harvest	Rs 500
Pesticides	Rs 3000	Transport	Rs 9600
Labour cost	Rs 57600		

Total input costs: Rs 73200

Output and Income:

Wheat (600 kg)	Rs 6 000	Potato (200 kg)	Rs 1000
Maize (700 kg)	Rs 3500	Cabbage (200 kg)	Rs 1000
Barley (300 kg)	Rs 2400	Peas (600 kg)	Rs 6000
Cauliflower (500 kg)	Rs 5000	Apples (5000 kg)	Rs 125 000

Total value of output: Rs 149 000

Gross Income: Rs 75800 (including own consumption)

For farmers who engage in both agriculture and horticulture it seems that the input costs amount to around 50% of the value of their farm produce. This calculation includes the crops used for own consumption, so the revenue they receive in terms of money is actually significantly less. Most farmers grow grains and potatoes for own consumption only; vegetables and fruits are sold commercially. It has to be noticed that this ratio of input cost and output does not vary much whether or not the farmer uses chemical fertilisers. Although the use of chemicals instead of natural fertilisers adds some cost, this is weighed off by the higher output achieved. Similarly, farmers that do not apply pesticides also experience a lower yield; therefore this practice hardly shows in the economic analysis. A factor that is visible, however, is the accessibility of the village. Many villages of the district are not directly connected to a road and reaching them requires several hours of walking through mountainous terrain. This also affects cultivation. Firstly, it is much harder to employ inputs which are not produced in the village, as they need to be transported from outside. Secondly, it is less viable to cultivate on a large commercial scale, as this will involve high transport costs and time. So the

production of farmers in remote villages tends to be significantly lower than that in the road-connected valley locations. Connected with this is the feasibility of horticulture. As mentioned above it can achieve higher revenues, yet the cultivation of apples and other fruits requires good transport facilities, as the crop is heavy in weight. Farmers that rely on agriculture only actually turn out to lose money over the year if the labour cost of the family labour is taken into account. These cases are usually found in the remote villages. So overall, connectivity is a crucial factor in agriculture and horticulture.

Economics of Organic Farming

From an economic point of view, the conversion to organic methods carries several problems, while the benefits will materialise in the long run. This creates difficulties in popularising the approach. Firstly, the output is likely to decrease when farmers stop the use of chemical fertilisers. Although biological fertilisers are helpful, they cannot compare in effectiveness to their chemical counterparts. The reduction can amount to up to 30%, a very significant. Second is the issue of the market value of the products. While organic products are sold at a higher price in western countries, they cannot get the full market price in India. Organically grown products rarely achieve the same size, colour and overall appearance as crops treated with chemicals. This is due to natural influences such as weather or some insect and disease attacks. On the lets, however, it is just these factors that determine the price. Farmers which have provided organic products to the market give examples for the price difference. One kg of cauliflower can achieve up to Rs.15 per kg; yet if it is organically grown it will not make more than Rs. 8 per kg. Similarly, 1 kg of organic apples will often not be worth more than Rs.15 per kg, as the fruits have spots and tend to be smaller. This is significantly less than the chemically grown fruits that sell for up to Rs. 30 per kg. Lastly, one also needs to take the labour factor into account. Organic methods require more labour input. This either means more work for the family members or hiring of additional labour. In both cases one needs to calculate the cost that arises, even though families do not get paid for their time as such. With wages continuously on the rise and a new scarcity of labour in the area, the amount of work involved in a certain technique becomes an important factor. These points account for the reluctance of farmers to change their practices. Economically, the new methods will have a negative impact for the farmers in the short term, which in many cases is a sufficient reason for them to reject them.

Table 1: Market value of crops

Crop	*Average price in Rs./kg*
Wheat	10
Maize	5
Barley	8
Beans	10
Peas	10
Potatoes	5-8
Cauliflower	10
Cabbage	5
Garlic	25
Apples	Varies with quality – around 30

In the long run, the picture might be different, however. One of the biggest problems associated with chemical farming is the deterioration of the soil due to fertilisers. The decline in production resulting from this is a serious threat to the economic stability of farmers, especially since the process continues from year to year and the output will fall steadily. In the long term, therefore, organic farming is attractive from an economic point of view. If the organic methods are applied consistently, the soil will slowly regenerate and regain its old productivity. Through the proper application of crop rotation, biological fertilisers and mixed culture, this productivity will remain constant and output will be stable. Another point is the changing weather patterns the farmers of the Himalayas have observed over the past years. The temperatures have risen, leading to hot summers and snow free winters, while rain is unreliable and does not follow the well-known cycles. In an agri- or horticulture which works in a highly specialised way with few crops and chemical inputs, such changes are disastrous. The crops are often fine-tuned for specific conditions and are not resistant to changes in climate or soil. Organic methods, however, provide for greater flexibility. For one they encourage the growth of many varieties of crops, which gives a safeguard for a harvest failure of a specific crop. Further, organic techniques seek to support and strengthen the natural features of the plants. Plants which can cope with a variety of adverse factors through their own biological characteristics will also be less vulnerable to climate changes. Techniques of water management can contribute to avoid problems produced by excessive droughts.

Another way organic production could be made economically viable is through certification. Certified organic products can be sold at a higher market rate or even exported to other countries. But obtaining the certificate is expensive for individual farmers of Kullu. The guidelines for certificates are very strict, and as we have seen no farmer can call himself fully organic. The methods would have to be applied to all land and without exception first. Moreover, certificates require time-consuming applications and controls, which usually have to be financed by the farmers. So certified organic production is still a dream for the future, yet it is a goal that should be pursued even if the steps towards it are small.

THE DIFFICULTIES AND FUTURE PROJECTS

Problems Regarding the Extension of Organic Practices

While the organic techniques are all easy steps to reduce chemical inputs and boost production in a natural way and economic benefits are possible, there are big complications in sensitising the people about them and extending their use. Many factors contribute to the general reluctance of the local farmers to adopt these practices. Firstly, and most importantly, the lack of information about even petty things is a major problem in the area. The farmers have no information about the methods, their benefits and exact procedures as neither government agencies nor local NGOs reach all of the remote hillside villages to spread awareness. Yet a significant change in agricultural methods can only be based on reliable information. Farmers will be sceptical of the new methods and therefore require frequent discussion and assistance before they change the methods they have applied for generations. Even were NGOs can bring an initial awareness, they cannot follow this up through intensive trainings and meetings due to lack of funds. Secondly, the economic issues are a serious difficulty. Organic production tends to lower the yield compared to chemical farming while at the same time requiring more labour. For farmers who are struggling to make a living already, this makes switch to new practices undesirable or even impossible. The long-term benefits then move into the background; often the farmers do not fully understand the situation or dismiss the benefits as too uncertain and far away. Thirdly, there is a lot of rigidity in thoughts and beliefs in the villages. The people are not easily prepared to accept external inputs and will only move ahead in small steps after seeing small steps. This makes extension programmes even more complex and time consuming for NGOs and agencies. This problem is aggravated by the fact that the government agencies, and the Departments of Agriculture and Horticulture in particular, are slow in embracing and promoting organic techniques. They still advise the use of chemicals, especially in the horticultural sector; and only endorse a very small part of the organic approach. Since the Department is the first point of call for farmers in search for information and advice, this significantly inhibits the spread of organic farming.

When asked about the Department of Agriculture's policy on organic methods, the extension officer in Banjar explains the difficulties of being bound to official guidelines while living in an area with very unique conditions. He says that he himself as a farmer adopts some practices, such as green manuring using a local bean variety known as "mash", which grows very rapidly and is therefore suitable to the climate. Yet this plant species is not officially endorsed in the Department's guidelines to farmers, therefore he cannot officially advise people on its use. The Department has been active, however, in the promotion of vermi-compost. By giving out 600 starter kits and providing financial assistance to farmers, they hope to extend the use of this natural fertiliser over the region. There are also trainings for farmers on its use; and the Department places great value on female participation by requiring one-third of the attendants to be women. Yet there is no comprehensive programme on the promotion of organic farming, and many of the techniques listed above do not feature in Department suggestions. In combination with the difficulties listed above, this makes the spread of organic methods a hard task indeed.

The Future

It is mainly the lack of funds that threatens the next big steps for the extension of the organic techniques. As Chuni Lal explains, their aim is to provide proper training at central level for the farmers who have successfully applied the first suggestions to encourage them and further increase their effectiveness. Yet without sufficient funding this will not be possible. Similarly, the farmers especially in the hillside villages require direct contact, which is only possible through extensive visits that are rare occasions without funding. Further, it is necessary to expand action to the more commercial farmers and those in the valleys that rely heavily on chemical inputs. So far the efforts have been concentrated on the more remote villages with small-scale agri- and horticulture and where people only use few chemicals. So the chance of introducing organic methods is better. This is different with commercial farmers, who are less willing to sacrifice any output in the conversion to organic methods and whose whole production is dependent on the chemicals. Targeting them will therefore require much more resources which are not available at the moment. To make future initiatives fully successful, more coordination between NGOs and government agencies is required, as small NGOs can only operate in a very limited area and on a few issues. So what is really needed is bigger project that may coordinate and manage these individual efforts with enough resources to facilitate field visits, trainings and frequent monitoring of the progress.

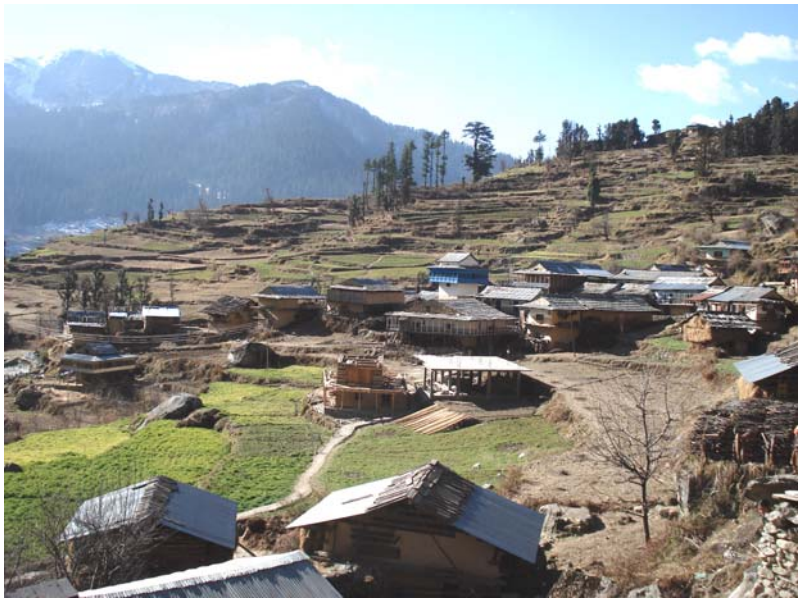

Figure 7: view on Majhali

About the Authors

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