

Chapter 5

Micro-Enterprise Potential

Objectives of Micro-Enterprise Development

In the context of ginger and pineapple crops, the basic aim of any development initiative is to increase the returns to farmers from farm activities. Such interventions can be described as changes in the present market, new facilities, e.g., for storage, or new value-added products. These options and the objectives that would be served by each of them are presented in Figure 5.1.

Markets

The need for an efficient market cannot be over-emphasised as this option is the only alternative available to the farmer to generate immediate income. This could be in the form of interventions in present market mechanisms, with emphasis on improvement in the marketing channel, a reduction in the number of intermediaries, provision of better information flow in the

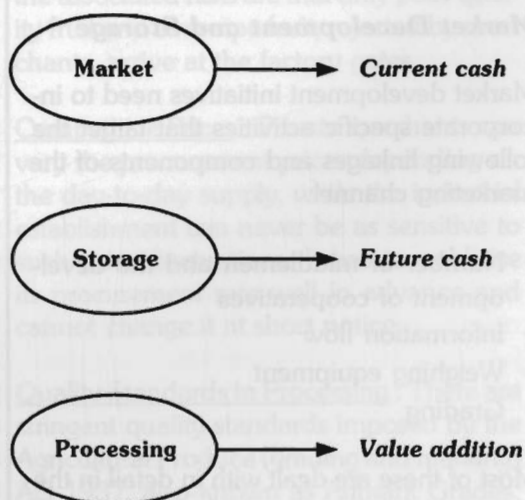


Figure 5.1: Forward Linkages and Their Objectives

markets, and/or provision of regulatory mechanisms to ensure fair, minimum prices for farmers.

Storage

The second intervention is the provision of storage facilities, especially for perishable crops and also for ginger, as this would help to reduce price fluctuations and arrest the fall in prices during harvest time. In addition, it would help to improve cash flow to farmers, thereby helping them reduce dependence on expensive short-term credit advanced to them by the pre-harvest agents.

Processing

The third type of intervention is the establishment of processing units that would help to add value to the crop and increase in returns for the farmer. These options are analysed in detail in the following sections.

Market Development and Storage

Market development initiatives need to incorporate specific activities that target the following linkages and components of the marketing channel.

- Number of middlemen and the development of cooperatives
- Information flow
- Weighing equipment
- Grading

Most of these are dealt with in detail in the proposed Market Act of Meghalaya (Box 5.1) and, hence, are not detailed here. There are specific provisions planned for integrating these 'backward linkages' in the development of agriculture in the area.

For storage facilities, the Department has plans to provide for cold storage and also have storehouses where farmers can leave

Box 5.1 Functioning of a Typical Regulated Market

In a typical regulated market, the commodity that is brought in by a farmer is numbered (lot no) and weighed by an authorised person and the weight is recorded. The lot is then arranged on the auction platform. A quality grader inspects the lot and a grade is assigned. The lot number, grade, etc are then flagged on the lot. Sales take place at a prescribed time by open auction or by closed tender system. Only licensed traders are allowed to participate in the transaction. Where there is a closed tender system of sale, the market committee issues slips for offering quotations. On the slips the lot number, price offered, etc are noted down. Once all the lots that a trader proposes to buy are quoted, the slips are deposited in a box. At a prescribed time, the tenders are taken out and the sale is confirmed to the highest bidder, and a sale agreement is signed. The farmer is paid immediately, either by the Market Committee or by the Commission Agent after deducting the prescribed service charges. The buyer in turn pays the Market Committee/Commission Agent and takes delivery of the goods within the prescribed time.

Once the lot is weighed and recorded, the farmer is free to attend to other business. The produce he/she has brought is under the care and protection of the Market Committee/Commission Agent. If a farmer is not satisfied with the price offered by the highest bidder, he/she need not sell the produce. If there is any urgency for cash, the farmer may deposit the stock in the warehouse of the market committee and take a percentage of the value of goods so deposited. The farmer may dispose of the goods when it is convenient. Thus, a regulated market provides a forum for the farmer to have the farm produce graded and get a price commensurate with quality.

the products over night or for a few days until they get the prices they expect. This would ensure that farmers are not pressured to sell their crops on a particular day, even if the selling price is low on that day. This would be especially beneficial for marginal small farmers who are vulnerable to such price fluctuations. Another scheme proposed under the Marketing Board is for the provision of credit against the produce stored.

Processing Units

These could be developed at the household or the community level depending on the type of product being developed. This section discusses the options available for processing pineapple and ginger at the local level.

Pineapple Products

As discussed in previous chapters, processing pineapple products requires large investments in infrastructure and considerable management inputs in terms of labour management, operations, and quality management. Also, the plant presently operating at Dainadhubi faces a shortage of good quality fruit as there is competition from the merchants who offer either better prices or facilities, such as transport, credit, etc, that the processing unit is unable to match. Another problem faced by the plant is packaging of processed products, as the packaging containers have to be procured from other manufacturers, and this almost doubles the price of the final product. The packaging is extremely important as the product is targetted at the final consumers and, unless it is suitably packed, it may fail to find a market. Some of the problems identified related to the production and sale of processed fruit are as follow.

Investment : Initial investments are substantial and require financial support from banks or other institutions, generally against some collateral such as land ownership rights and so on.

Seasonality : The crops are seasonal with the result that the plant operates for only part of the year, unless it is involved in the production of other products as well.

Procurement of Good Quality Fruit : At the time when the fruit is harvested, the competition for good quality fruit is intense and, given the well-established network of middlemen and merchants, it is difficult for any industrial unit to compete in terms of having a procurement network of its own for quality raw material. At the same time, while these units can offer a basic support price, the associated risks are that only poor quality fruit and over-ripe fruit, rejected by merchants, arrive at the factory gates.

Competitive Prices : Private merchants can vary the procurement prices depending on the day-to-day supply, while the industrial establishment can never be as sensitive to such price fluctuations. It has to publicise its procurement rate well in advance and cannot change it at short notice.

Quality Standards in Processing : There are stringent quality standards imposed by the Agricultural Produce (grading and marking) Act 1937, also known as Agmark Grades, and the Indian Standards' Organization (ISO). Small units are unable to attain these standards, especially as they have no control over the raw material.

Packaging : Packaging of processed fruit products, as mentioned earlier, causes the units to be dependent on other manufacturers and increases their costs.

Brand and Marketing : Since the products are for direct consumption, the brand name and the advertising of the product become important. For small units this is obviously extremely difficult. While institutional establishments, especially hotels and restaurants, can be targetted by small-scale units, in the absence of a significant price advantage, most of the main hotels prefer to stock more popular and well-known brands.

Hence, most of the growers and the local government departments expressed the opinion that processing fruit had more pitfalls than profits and would not be very successful on a small scale. However, the pineapple leaf waste from the present fruit processing units could be used to make fibre, and this has a number of uses. Fibre extraction technology is in the experimental stage and is being developed in India. In one such initiative, undertaken by SITRA with financial support from UNDP (see Annex 6), fibre extraction machines have been developed and the fibre tested for several end products. However, since investment in the fibre extraction plant is substantial and the local availability of sufficient quantities of pineapple leaf restricted to the units where pineapple is processed into other products or is consumed in very large quantities, this enterprise is not possible at the household/community level.

Ginger Products

Compared to processed fruit products, the processing of spices multiplies their value, and they are easier to market as they have an established acceptability in both the domestic and international markets. Therefore, the ensuing sections evaluate the op-

tion of processing ginger into different products and the scales of operation.

Micro-Enterprise based on Products from Ginger

There are several forms in which ginger is consumed. These were detailed in Chapter 3. However, only some of these products could be tried out at the local level, depending on the variety of ginger grown and within the existing trade framework. Some ginger products⁶ could be based on drying ginger or processing it in to other forms of processed ginger, as is detailed below.

Ginger in Brine : Ginger rhizomes can be preserved for long periods before they are processed. The method consists of steeping unpeeled or peeled ginger in a solution containing salt, acetic acid (AA), and potassium metabisulphite (KMS).

The tender, preferably fibreless, large-sized rhizomes are collected and washed in cold water to remove the adhering dirt and mud. After peeling them, they are sorted according to quality and cut into pieces. A brine solution is prepared with 12 per cent salt and one per cent acetic acid. The strength can be reduced by using KMS (Table 5.1). The ginger is then steeped in this solution and stored in acid-alkali proof HDPE jars. Ginger in brine can be exported in the HDPE jars. This is an intermediary product and is used in preparation of ginger preserve/candy.

Ginger Preserve : The tender, fibreless and large rootless fingers are selected and washed with cold water. Their skins are

⁶ The descriptions of the following four processes in this section for the preservation of ginger are adapted from CFTRI (1989).

Table 5.1: Storage Life of Steeped Ginger

Treatment	pH of the Material	Storage Life (months)	Colour
0.1% KMS+ 2% acetic acid	3.84	2	Light yellow
2.0% salt+1.2% A.A. + 0.1% KMS	3.92	4	Light yellow
4.0% salt+1.2% A.A. + 0.1% KMS	4.10	6	Dull white
5.0% salt+1.0% A.A. + 0.1% KMS	3.90	9	Dull white
5.0% salt+1.2% A.A. + 0.1% KMS	3.86	12	Light yellow

Source: Central Food Technology Research Institute, Mysore 1989.

peeled and they are cut into pieces. The pieces are softened by (i) boiling in 0.5 per cent solution of citric acid (the solution being sufficient to cover the ginger) in a covered aluminum/stainless steel or heavy brass or copper vessel for a period of six hours or (ii) by cooking in 0.5 per cent solution of citric acid at 0.7kg per sq.cm. steam pressure for one hour. Citric acid is used to bleach or whiten the ginger during softening. The ginger is then removed and washed well with cold water. When sufficiently cooled, the softened pieces are pricked with stainless steel or wooden prickers. The pieces are washed again. The ginger is then ready for impregnation with sugar syrup.

A 30 brix syrup is prepared by dissolving three parts of sugar in seven parts of water. This syrup is boiled and filtered through a thick muslin cloth. About one kg of syrup is used for one kg of prepared ginger. The prepared ginger is boiled in the 30 brix syrup for 15 minutes and allowed to stand overnight, taking care that the ginger is completely covered by syrup. After about 24 hours the syrup is drained off and its concentration increased to about 45 brix by adding more sugar and heating the mixture. If necessary, the ginger is boiled with the syrup for 15-20 minutes and kept overnight again, ensuring that the ginger is fully covered by the syrup. This process is re-

peated daily, until the concentration of the syrup is about 60 brix. At this stage, a small quantity (about 0.1% of the total weight of the syrup) of citric acid or tartaric acid is added, or five per cent by weight of invert sugar of corn syrup. A process of absorption by increasing the strength of the syrup by five brix each day is carried out until it reaches 75 brix. The preserve is then ready to be packed.

Ginger Candy (glazed) : A prepared preserve is set aside for two to three months with thorough penetration of sugar into the ginger. It is then boiled for about five minutes. While still hot, the syrup is drained off and the pieces placed on a wooden tray and dried in the shade or at 50°C in a dryer until they are no longer sticky. The syrup left over after drying can be used for preparing more ginger preserve or used as a syrup for flavouring aerated water.

Crystallised Ginger : Crystallised ginger can be made from candied products by coating it with pure white crystallised sugar or by drying the syrup or wet candied fruits. The finished product is translucent and not hard or granular. It should be free from burnt or any objectionable flavours. The term crystallised refers to the sharp crystal coating on the ginger and not the consistency of the ginger pieces. Crystallised ginger thus consists of discrete pieces of gin-

ger in syrup which have been covered in a super-saturated sucrose solution, then coated with a dry slightly hygroscopic layer of crystalline sucrose.

Suitability of Various Species for Processing

The suitability of processing local ginger varieties was evaluated by the CFTRI, and the results are summarised below. The details of the experiment carried out are given in Annex 7. The two commercial varieties, viz., Tura and Nadia, obtained from the Meghalaya region were evaluated.

- The Tura variety was found to be fibrous even when harvested in October. The products made from Tura were not found to be satisfactory in quality.
- The Nadia variety, harvested at three maturity levels, viz., in October, November, and December, were studied for their suitability for processing. The October harvest was found to be less fibrous, soft and crisp in texture, mild in pungency, and had a desirable flavour. The quality of the products prepared from this were superior to those from ginger harvested in November or December and from the Tura variety harvested in October.

Dry Ginger

Dry ginger is the form in which most of the trade in ginger takes place. Additionally, in many states of the country, dry ginger is used for domestic cooking purposes. Fresh ginger has a short shelf life and, unless aired properly, it rots within a few days. Hence, for export and trade wherein the transportation requires a long time, it becomes imperative that ginger is dried to prevent spoilage. However, apart from the various trade reasons for drying spices, drying also helps

the farmer to reduce the loss of produce. Some of reasons for drying ginger and other spices as well are given below.

- It permits an early harvest. The ginger crop can be harvested from the sixth month onwards instead of waiting for ten. This reduces field losses from weather hazards, soft rot, and other diseases.
- Storage time can be increased without deterioration in quality and meets the desired level of moisture content for further processing.
- It ensures the quality in terms of finished product and nutrients.
- It helps farmers obtain higher returns and gives them the choice of time for sale.

Proper management and control of moisture in the product is the most important factor (besides aeration and change in temperature) for maintaining the quality of any spice product. Any delay in drying after harvesting results in rapid deterioration of the market quality of the product.

Ginger Drying Techniques

The common method of drying used for spice crops is open sun drying by spreading the freshly harvested material on the ground in a single thick layer. In Meghalaya, given the uncertain climatic conditions, especially during the ginger harvest months, drying time may vary between a minimum of eight to 10 days to many more. Alternatively, closed chambers can be used, where heated or unheated air (aeration) is passed through/over a thin layer of the product. This saves the crop from being exposed to unfavourable weather conditions and attacks from insects/micro-organisms and dirt, dust, and so on. It also takes less drying time. Proper selection of drying method/

equipment and drying parameters depend upon the end use of the product and the economics involved. In particular, a farmer may choose between solar dryers, gasifiers, or electricity-based drying units. These options are briefly described below.

Traditional Sun-drying : In the traditional practice, mature ginger rhizomes are harvested, the outer skin peeled, and then they are sun dried. It takes about eight to 10 days to sun dry them. On the other hand, if the rhizomes are not peeled and allowed to dry, it takes about 20 days (Natarajan et al. 1972). By peeling and blanching, the drying time decreases considerably but the yield of resin and volatiles is less than with the other treatments. The effects of pre-treatment of fresh ginger on drying time and quality are given in Table 5.2 (Krishnamurthy et al. 1997).

ing an electricity heating coil and a blower. However, part of the West Garo Hills does not have electricity and, in other places, the demand for electricity exceeds the supply. Hence, for this area, it could be more feasible to use other renewable and locally available resources for drying purposes.

Solar Dryers : Solar dryers can be used for drying spices such as ginger and are of two types – direct and indirect. The direct type of solar dryer, developed at Rajasthan Agricultural University (RAU), Udaipur, reduces the moisture content from 82 to 90 per cent in 30 hours (Figure 5.2). The indirect type of solar dryer takes 40 hours in comparison to the 45 to 60 hours using sun drying on a concrete and a mud floor, respectively. A cardamom dryer developed at CPCRI, Kasargod (Figure 5.3), could also be used to dry the ginger on a small scale;

Table 5.2: Effect of Pre-treatment of Fresh Ginger on Drying Time and Quality

Treatment	Drying Time ¹ (days)	Yield% (mfb) ²	Resin % (mfb)	Volatile Oil %(mfb)
Control	23	17.0	6.2	3.1
Hand-peeled	8	17.1	5.8	3.1
3 minute blanched	12	17.7	5.1	3.0
Peeled and 3-min. blanched	6	16.0	4.0	2.9

¹ Sun dried

² mfb - moisture free basis

Source: Central Food Technology Research Institute, Mysore 1989

Bleached ginger can also be prepared by dipping the peeled ginger in a solution of fresh slaked lime and then drying it in the sun. The process is repeated two to three times to arrive at a satisfactory product.

Electrical Dryers : Ginger can be dried by placing peeled ginger in a drying chamber over which hot air (60-80°C) is passed us-

60kg of peeled ginger would take about 22 hours to dry. The optimum temperature for drying ginger recommended is 60°C (Kachru and Gupta 1997).

However, for solar drying, a relationship/design criterion needs to be established for the drying process as a function of ambient conditions and solar radiation, and this

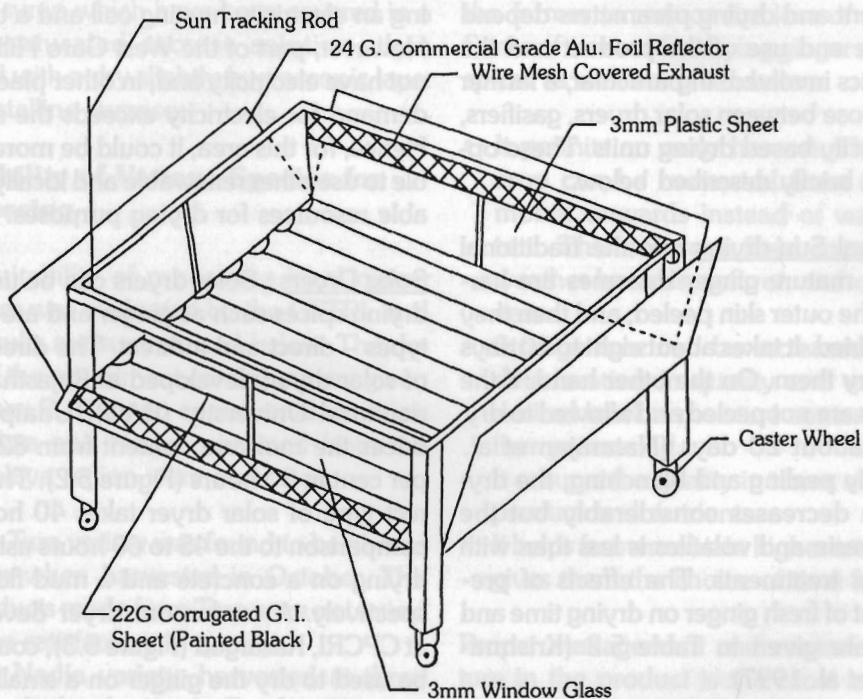


Figure 5.2: Solar Cardamom Dryer

Source: Kachru and Gupta 1997

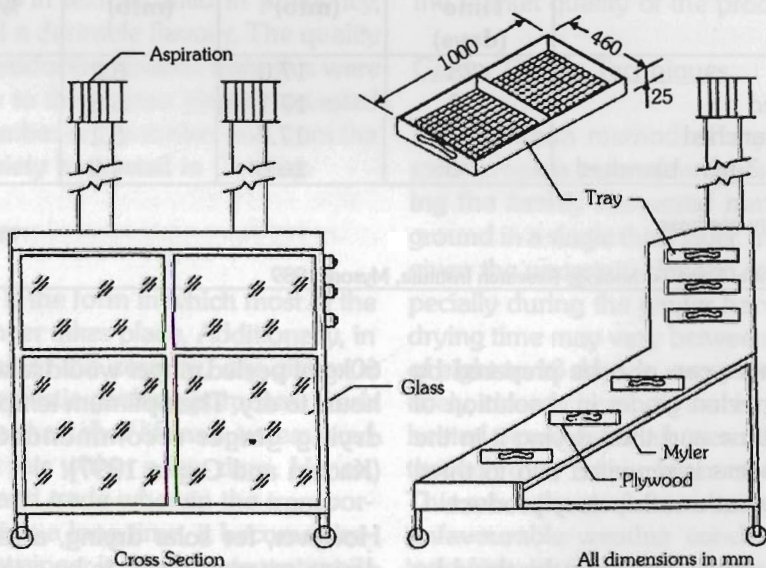


Figure 5.3: Solar Cabinet Dryer

Source: Kachru and Gupta 1997

may vary substantially over different regions and also depend on the loading density of the product. As mentioned earlier, this is especially important as Meghalaya encounters frequent cloudy days. This could make this technology ineffective for intermittent durations. Hence, while this could be a feasible option in other areas, it may not prove effective in the study area.

Gasifiers : Biomass-based gasifiers can be used for drying ginger. These are being used for other spices and are more efficient than traditional methods using firewood. Indirect gasifiers (Figure 5.4) are useful. While infrastructure costs, involving the construction of the heating chamber and the pipes, can vary depending on the type of construction materials used and the capacity, the estimated cost of the gasifier is about Rs 10,000. With an overall efficiency of 30-35 per cent, a maximum of one kg of fuel is needed per kg of fresh ginger. Hence, the maximum processing cost per kg would be Rs 1/kg of fresh ginger or about Rs 5/kg of dry ginger.

Recommendations

Low-cost dryers, involving minimum management and technical inputs, and based on-farm waste/ other biomass (to reduce the operating costs) as fuel sources, should be encouraged and made available to users on a trial basis.

Small farmers should be encouraged to dry ginger in community/NGO/department-owned dryers, or traders can set up small private enterprises as an extension of their fresh ginger storehouses.

Options for the Processing Enterprise

To establish any enterprise, the scale of operations can vary from single household level with limited private resources to a large-scale with government or bank financing. The methodology of implementation should integrate the investment potentials, technological requirements, and aspirations of the entrepreneurs targetted. The ginger processing options and the various levels at which these can be implemented are given in Table 5.3.

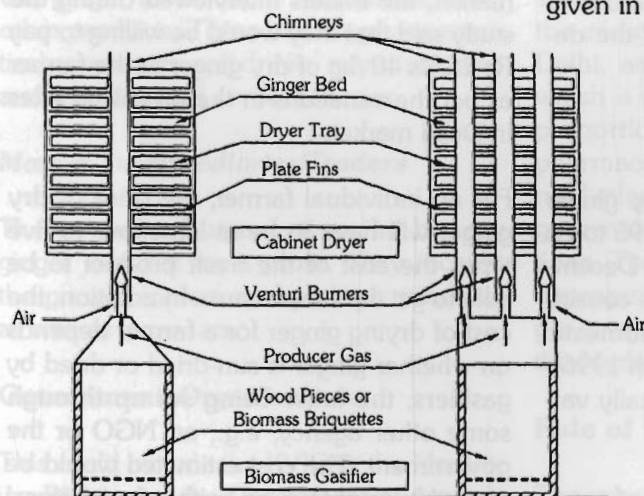


Figure 5.4: Biomass Gasifier for Ginger

A ginger drying unit could be set up in the yard at Garobadha, and the farmers can be given the option of drying the ginger before selling. Hence, after grading the produce at the yard, it could be segregated into different categories as per their suitability for fresh consumption, dried products, or processed fresh products. The main advantage of this option is that it facilitates marketing. The marketing division of the Department of Agriculture also receives export contracts.

Table 5.3: Ginger Processing Options on Various Scales of Operation

Product	Household ¹	Community ²	Cooperative / NGO ³	Private Entrepreneur ⁴	Govt. Dept. with Private Lease ⁵
Ginger in brine	✓	✓			
Ginger preserve*	✓	✓			
Ginger candy*	✓	✓			
Crystallised ginger*	✓	✓			
Ginger drying					
Sun drying	✓	✓	✓	✓	✓
Gasifier based drying			✓	✓	✓
Solar drying			✓	✓	✓

* The present variety was found unsuitable for these products (CFTRI 1989).

¹ **Household** - Family unit wherein the profit will accrue to the individual households

² **Community** - This could imply a group of farmers within a village or within a group of villages who form a formal or informal group to invest in and manage the operations. Women especially could be encouraged to form groups to undertake processing activities.

³ **Cooperative / NGO** - Any formal organization, such as a registered society or a local NGO, could initiate infrastructural development for processing activities with mechanisms for individual member participation.

⁴ **Private entrepreneur** - Individuals who are currently in the trade, such as the present ginger traders or other small entrepreneurs who are involved in the agro processing trade (crops other than ginger tea, cotton, cashew), could initiate ginger drying activities.

⁵ **Government department with private lease** - As suggested by the local community, the Department of Agriculture/Horticulture or other interested government departments could establish the infrastructural facilities. However, operation and management could be leased to private entrepreneurs, since past experiences in the area indicate that success of such ventures is dependent on initiative and profit motives.

Micro-enterprise in Ginger Drying

Among the various options mentioned, one of the most feasible enterprises is based on drying ginger using traditional methods or biomass-based gasifiers. Some of the details for this are as follow.

Prices

With the international price of dry ginger varying from Rs 66 in January 1995 to Rs 110/kg in June 1995 and Rs 68 in December 1995, the earning potential is considerable. At the same time, the domestic prices were about Rs 47.5/kg (March 1996). In the Delhi market, the price usually varies from Rs 45/kg to Rs 75/kg.

Being smaller in volume, the cost of transportation per kg of dry ginger is consider-

ably less than the cost for fresh ginger. Hence, for the trader-middleman, the returns vary depending on the amount paid to the farmer. Given the prices of dry ginger in the Delhi market, the traders interviewed during the study said that they would be willing to pay Rs 25-Rs 40 /kg of dry ginger to the farmer as per the variations in the prevailing rates in Delhi markets.

For an individual farmer, the price of dry ginger will have to be at least four to five times the cost of the fresh product to be able to get the same return. In addition, the cost of drying ginger for a farmer depends on whether ginger is sun-dried or dried by gasifiers; the latter being set up through some other agency, e.g., an NGO or the government. The cost estimated would be a maximum of Rs 5/kg (with infrastructural facilities being made available to him/her

and the farmer being required to pay for the processing only).

Hence, the minimum price of dry ginger would have to be Rs 20/kg. Given the national prices for dry ginger, the actual price received by local entrepreneurs should be more than this break-even price.

Markets

As outlined in Chapter 3, the present trade in the district is restricted to fresh ginger. The market for dry ginger has not been explored by the people as yet, and is hence subject to risks accompanying the creation of new marketing channels and markets. Market development becomes one of the most important prerequisites for the micro-enterprise project. This could be taken up by the Spices' Board. However, the broad categories for the types of markets available for dry ginger and the possible outlets are summarised below.

Manufacturers

This would include all the industries that use ginger as an input in manufacturing other products. These include pharmaceutical companies, soft drinks' manufacturers, and bakeries and confectioneries.

Market Intermediaries/Traders

These include all organizations that buy dry ginger to sell it for a profit. They include the present traders in dry ginger products as well as exporters.

Government Organizations

This could include the KVIC or the Marketing Division of the Department of Agriculture and Horticulture which could act as

an intermediary for local producers and exporters or other wholesalers outside the state. This function could also be carried out by the marketing board once it begins functioning. It could act as a centralised place for processing, grading, and selling processed ginger.

For local producers, the Marketing Board or the market intermediaries might be a more feasible option as direct marketing for industrial buyers (manufacturers) would require greater infrastructural development. The local producers would have to depend on intermediaries in order to create a market for the new product. This is essential as individual farmer's produce would not be in marketable quantities and some form of aggregation would be needed.

Marketing Channel

A marketing channel has to be set up for the transport and sale of the new product. The options available and the decision about the type of channel that could be tried would depend on the target market for the produce. While the existing channel could serve the purpose for trade in dry ginger, the end markets that they serve, except for Delhi, are for fresh ginger only, most of which is consumed in a raw form, a small proportion only being picked up by the pharmaceutical or other companies. The marketing channel could be through the government or through private organizations. The government channel would be appropriate and/or mandatory if dry ginger is one of the crops that is notified by the Marketing Board.

Role of Women

The primary occupation of the inhabitants of West Garo Hills is agriculture, i.e., *jhum*

and settled (valley) cultivation. The importance of agriculture as the main occupation cannot be overemphasised as a large proportion of men and women earn their livelihoods through farm-based activities. All of the adult population is virtually engaged as cultivators. However, given the traditional status of women in *garo* society, the activities of women have not been restricted only to farm-based activities, often extending to shopkeeping, handicraft making, weaving, areca nut processing, etc. They have enjoyed the support of the community for such activities.

However, over the years, the traditional organizational structure of communal land ownership and individual or family-based farming has begun to disintegrate, with erosion of women's land rights. The equality in class, gender, and economic terms, which the *garo* women have always enjoyed by virtue of their matrilineal society, also faces a threat from changing social values. From a society completely dependent on forest-based *jhum*, the district has witnessed a shift to wet rice cultivation (partly) in the recent past and is now going through a transitional phase of weaning away from *jhum* to commercial farming, leading to increased privatisation of land. This results in gender differentiation in access to land and control of produce by males.

Hence, it becomes increasingly important to complement changes in agricultural patterns with changes in other fields, so that the women are not adversely affected and are able to maintain their traditional equality with men. With the shift towards cash

and plantation of crops, setting up micro-enterprises becomes the only way to augment household incomes from the sale of crops only and provide income earning opportunities for women, providing them with the opportunity to be self-sufficient in monetary terms. The enterprises could be based on the agro-processing of crops such as ginger, areca nut, cashew, turmeric, and pepper, undertaken by individual households or the community. Most of the fresh ginger products could be prepared by women. In addition, the preparation of ginger before drying requires thorough cleaning and scrubbing. These activities can be carried out by women. However, an important prerequisite would be to create an awareness and motivation among them to use such opportunities and the necessary knowhow should be provided.

There are government programmes and financial institutions in the district that are willing to give credit for development of such enterprises. At present, the households are dependent on intermediaries for trade in cash crops. If women could be motivated to form self-help groups for sale and processing of agricultural produce, they can reduce their dependence on intermediaries and receive remunerative prices in the open market. With the existence of active NGOs, such as the Mothers' Union, which is primarily an association of women implementing several training and development programmes for women in the district, such enterprises and initiatives for women should be actively promoted and could become extremely important in shaping the future of *Garó* women.