



Value Addition and Employment Generation in Agriculture through Producers' Organizations: A Case of Farm's Produce Promotion Society (FAPRO) in Punjab

Udeshna Talukdar* and Kamal Vatta**

ABSTRACT

The present study was conducted to examine the economics of value addition and estimate the extent of employment generation through value addition activities FAPRO, which was a producers' organization in Hoshiarpur district of Punjab. The study was based on both primary and secondary data. The net returns per acre from turmeric cultivation was higher than wheat and rice. The processing of turmeric gave net profits of ₹2838/q with the resulting benefit-cost ratio of 1.31:1. The capacity utilization of FAPRO was very low at 4.67 per cent and turmeric cultivation generated employment for 33 mandays/acre. The turmeric seed was having much higher benefit-cost ratio of 5.02:1. The processing of honey had a benefit-cost ratio of 1.32:1. The value addition activities by FAPRO resulted the generation of 1872 mandays of employment for turmeric and 420 mandays of employment for honey processing at the FAPRO unit. At the farm level, there was employment generation to the extent of 33 mandays/acre in turmeric and 162 mandays/100 boxes in honey. There is a need to encourage producers' organizations to promote value addition and for employment generation. These initiatives need to be supported by public sector efforts to expand the markets for these products so that increased supply does not lead to a sharp fall in the prices and hence profitability. Income enhancement and employment generation will ultimately lead to the growth of rural economy of India.

Key words: Producers' organization, Value addition, Employment generation

JEL Classification: D2, D4, D24

INTRODUCTION

Value addition involves processing and preservation of commodities which otherwise get obscure and are usually disposed-off at cheaper prices. In India, more than 40 per

cent of the fruit and vegetable production gets wasted due to lack of post-harvest handling and processing (Dodamani, 2007). The country ambitiously targets 25 per cent processing of fruits and vegetables by 2025 (Anonymous, 2011). Under proper policy push, agro-processing industry in India has the potential to become a major driver of the growth of economy which will not only boost

*Ph.D. Scholar, Department of Agricultural Economics, Assam Agricultural University, Jorhat.

**Director, Centers for International Projects Trust (CIPT), New Delhi.

agriculture sector but will also boost the exports (Singh, 2004). Value addition also generates employment opportunities in rural areas, enhances income of the farmers, minimizes migration from village to towns and increases exports which ultimately translate into increased inflow of foreign exchange earnings (Thorat *et al.*, 2003). The food processing sector in India is one of the largest in terms of production, consumption, exports and growth prospects. The turnover of the total food market is approximately ₹250,000 crores (US\$ 69.4 billion) out of which value-added food products comprise ₹80,000 crores (US\$ 22.2 billion) (Chandrasekharam, 2001).

Farmers complain of the marketing system because they get lower prices, mainly due to high marketing charges and due to the prevalence of malpractices. The objectives of economic development and social justice can be furthered by channelizing agricultural produce through co-operative institutions. These organizations pool the produce of small farmers to market and improve their bargaining power. Co-operative processing is also making good progress in addition to co-operative marketing. The need for strengthening co-operative organization has, therefore, been recognized for the marketing of the produce of farmers in addition to co-operative marketing. The value of agricultural produce marketed through the co-operative marketing societies increased from ₹179 crore in 1960-61 to ₹13,526 crore in 2002-03 (Baviskar, 2009). It is a well-known fact that the cooperatives are one of the core segments of Punjab economy. An important aspect in this situation is to process the farm produce at farmer's level so that

they can get better prices for their produce and earn higher profit by processing their produce and marketing the same. Therefore, there is an urgent need to introduce processing units at a level where farmers are directly involved and can get direct benefits from the processing units. The present paper makes an attempt to estimate the extent of value addition and employment generation carried out by Farm's Produce Promotion Society (FAPRO) in Punjab. The analysis is focused on two major activities of FAPRO which are turmeric and honey processing and marketing.

Farm's Produce Promotion Society (FAPRO): A Brief Overview

Farm's Produce Promotion Society (FAPRO) was formed by the collective efforts of the extension officials and farmers with an initial membership of 200 farmers in the year 2001 in Hoshiarpur district of Punjab. The organization aimed at acting as a catalytic institution for regenerating rural economy, developing the bargaining power of the producers, generating employment, empowering youth, enhancing farm incomes and capacity building of the rural population by generating self-employment opportunities, promoting value-addition and through training programmes. The organization set up the turmeric and honey processing plants with a capital of 76 lakh being provided by the state government and ₹11 lakh being contributed by the member farmers. The organization aims at expanding its future operations by increasing the coverage of their current activities and starting some new activities such as packaging of processed products, use of mobile units for marketing of the produce, producing cattle feed, etc.

DATABASE AND ANALYSIS

Both primary and secondary data were collected for the study. Collection of primary data pertains to the year 2010-11. Ten villages were selected randomly out of the villages belonging to the member farmers of FAPRO. Out of these 10 villages, 140 turmeric cultivators were identified and 40 of them were selected for the study proportionately based on farm size. Thus, 12 small, 17 medium and 11 large farmers were selected. Due to paucity of time and money all the turmeric farmers could not be selected as respondents for the study. In a similar manner, 10 beekeepers were selected for this study. The secondary data were collected from the published account sources of the FAPRO society. Simple tabular analysis was carried out to examine the extent of value addition and employment generation through turmeric and honey processing and marketing by FAPRO. Benefit-cost analysis was also carried out to examine the viability of its operations.

Value Addition in Turmeric

Turmeric (*Curcuma longa*, Family: *Zingiberaceae*) is a widely used condiment in India with many medicinal properties. The value-addition in turmeric is attempted at FAPRO in two ways. Apart from converting it to the turmeric powder, the raw material is separated to have rhizomes, which can be sold as turmeric seed to the farmers for turmeric cultivation. Turmeric seed is obtained by detaching the raw fingers from the mother rhizomes. The raw material is separated for being converted to the turmeric powder and for being sold as turmeric seed in the ratio of 1.17:1. It means that out of 100 kg of the

raw material, 54 kg is separated for being converted into turmeric and 46 kg is separated for being sold as turmeric seed. In the present study, the most common variety which was being cultivated by the members of FAPRO was *Rajapuri*. The value addition in turmeric involved 6-7 steps after the purchase of the raw material and these steps have been depicted in Figure 1. The steps involved in the value addition were washing, boiling, sun-drying, polishing, grinding, packing and marketing.

A brief description of various steps involved during the value addition in turmeric is given in Figure 1.

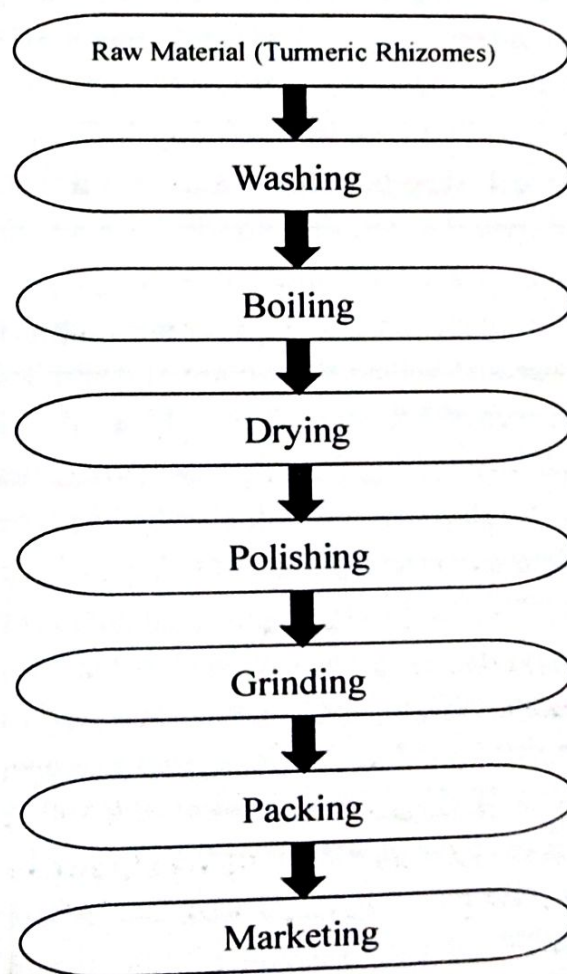


Figure 1: Process of value addition of turmeric in FAPRO

Raw material

The raw material is the turmeric rhizomes, which are grown in the farmers' field and are to be ultimately converted into turmeric powder. The raw material when received at the FAPRO unit contains a large quantity of soil particles and also contains the roots of the crop, which are not very useful.

Washing

It is an important step to remove all the soil particles from the raw material. The washing of 100 kg of raw material yields about 98 kg of turmeric rhizomes as about 2 kg of dirt is washed away from the raw material in this step. FAPRO has invested in two washing units with the total washing capacity of 20 q/hr.

Boiling

Usually, turmeric is boiled by the farmers in big boiling pots and it adversely affects the quality of turmeric powder. The boiling units at FAPRO involve boiling in an autoclave. The autoclave has a pressure gauge and boiling takes place at controlled pressure of 7-8 lb and firewood is used as a fuel. The usual time for boiling is 45-60 minutes and the rhizomes turn soft after boiling. The colour and aroma of the turmeric powder is largely influenced by the extent of boiling as extended boiling spoils colour of the final product, while boiling for lesser period renders the dried product brittle. On an average, boiling of 98 kg of the rhizomes yields 100 kg of final output, due to absorption of water by the rhizomes.

Drying

The rhizomes are dried under the sun after boiling as they are spread to dry on floor for a period of 10-15 days. The drying takes

place in thick layers of the product as drying in thin layers of the rhizomes may have an adverse impact on the colour of the turmeric powder. When the drying starts, the boiled turmeric rhizomes have 80 per cent moisture level. The yield of the dry product varies from 10 to 30 per cent depending upon the variety. For the FAPRO farmers, 100 kg of boiled turmeric yields 20 kg of dried turmeric.

Polishing

Dried turmeric has a poor appearance and a rough dull outer space with scales and root bits. The appearance is improved by smoothening and polishing the outer surface by manual and mechanical rubbing. FAPRO has two, round casting, iron drums with erasing type of coating which descale the dried turmeric. The rotation of polishing drums causes the abrasion of outer surface and removes the rough surface, making it smoother. Polishing of 20 kg of dried turmeric gives out 18 kg of polished rhizomes.

Grinding

In this step, the polished rhizomes are grinded in the grinding unit. The grinding unit at FAPRO has two components; *churi* mill and powder unit. The product is first crushed in the *churi* mill and then is powdered in the powder mill. When 18 kg of polished turmeric obtained from the polishing unit is grinded, it produces 16 kg of turmeric powder for final marketing. In nutshell, 100 kg of raw material of turmeric yields 16 kg of turmeric powder. All the above coefficients have been considered while making the final benefit-cost analysis.

Packing

The grinded product is packed in the packets of 200 gm and 500 gm for final

marketing. The size of packets is determined based on the demand for turmeric in the market for different sizes.

Costs and Returns from Turmeric Powder

Turmeric rhizomes harvested by the farmers are bought to FAPRO for value-addition to produce turmeric powder which is packed, branded and sold. The extent of value addition, returns associated to such value addition and input-output ratios involved in the processing of turmeric has been presented in Table 1. The net value added turned out to be ₹2838/q. The total cost of processing including marketing and distribution was ₹9162. The cost return ratio was 1:1.31. It was observed that the value addition and input-output ratios in processing of turmeric were economically viable.

TABLE 1: VALUE ADDITION AND RETURNS FROM TURMERIC POWDER AT FAPRO

| Particulars | Value |
|---|--------|
| Powder recovery from the raw material (100 kg) | 16 |
| Market price of powder(₹/q) | 12000 |
| Net value added(₹/q) | 2838 |
| Total cost of processing including marketing and distribution (₹/q) | 9162 |
| Benefit-cost ratio | 1.31:1 |

Table 2 indicates the economics of production of turmeric powder at FAPRO. It was observed that out of total cost of ₹20,52,321, the share of fixed cost was only 2.22 per cent and that of the operational cost was 97.78 per cent. The important items of fixed cost incurred were salary of permanent workers and depreciation of capital assets.

In case of operational costs, cost of raw material accounted for the highest proportion of the operational costs (47.76 per cent), followed by the interest on working capital and other items of cost like cost of bagging, cost of grinding, cost of boiling and cost of packing. Cost of labour in processing of turmeric accounted for 6.56 per cent of total cost. Similarly, the cost of electricity and fuel amounted to 24.23 per cent of the total cost of turmeric processing. The total cost of processing of turmeric was found as ₹9162/q with a net profit of ₹2838 per quintal. The cost-return ratio was 1:1.31 indicating a considerable amount of profits in the value addition of turmeric.

Costs and Returns from Turmeric Seed

Table 3 shows the value-addition in raw turmeric being sold as seed for turmeric cultivation. As has already been discussed, the proportion of turmeric seed recovered from the total raw material (turmeric rhizomes) was 46 per cent and the rest was used to be processed for turmeric powder. The raw fingers were detached from the mother rhizome, packed, labelled and were sold as seed.

During 2010-11, the total quantity of seed sold was 1200 quintals, which fetched gross returns of ₹57.60 lakh. Labour use and expenditure on packaging and labelling were two main components of variable cost apart from the interest on working capital. The fixed costs accounted for only 3.4 per cent of the total cost incurred during the seed preparation for turmeric. The benefit-cost ratio of turmeric seed production was as high as 1:5, which is substantial and indicative of huge profitability of this venture.

TABLE 2: COSTS AND RETURNS FROM TURMERIC POWDER AT FAPRO

| Items of Cost | Quantity | Value(₹) | Percent |
|--|---------------------------|----------|---------|
| Fixed costs | | 7679 | 0.38 |
| (i) Depreciation | | 3455 | 0.17 |
| (ii) Land Rent | | 24366 | 1.18 |
| (iii) Salary of permanent workers | | 10082 | 0.49 |
| (iv) Others | | 45582 | 2.22 |
| A) Total fixed cost | | | |
| Operational costs | | | |
| (i) Raw material consumed | 1400q@₹700/q | 980000 | 47.76 |
| (ii) Direct labour Costs | | | |
| (a) Washing and boiling | 56 man days @₹200/man day | 11200 | 0.55 |
| (b) Sun drying and storage | 280man days @₹200/man day | 56000 | 2.73 |
| (c) Polishing | 56 man days @₹200/man day | 11200 | 0.55 |
| (d) Grinding | 56man days @₹200/man day | 11200 | 0.55 |
| (e) Packing | 224man days @₹200/man day | 44800 | 2.18 |
| (iii) Cost of electricity and fuel | | | |
| (a) Washing | 224 q @₹10 | 2240 | 0.10 |
| (b) Boiling | 1344q firewood @ ₹300/q | 403200 | 19.64 |
| (c) Polishing | 252q dry finger@ ₹100/q | 25200 | 1.22 |
| (d) Grinding | 224q dry finger@ ₹200/q | 44800 | 2.18 |
| (e) Packing | | 22400 | 1.09 |
| (iv) Cost of bagging | | 89600 | 4.37 |
| (v) Cost of marketing | | 37800 | 1.84 |
| (vi) Repair and maintenance | | 21728 | 1.06 |
| (vii) Taxes and fees | | 4984 | 0.24 |
| (viii) Stationeries | | 17416 | 0.85 |
| (ix) Interest on working capital | | 222971 | 10.87 |
| B) Total operational cost | | 2006739 | 97.78 |
| C) Total Cost(A+B) | | 2052321 | 100.00 |
| D) Total production of powder(q) | Quintals | 224 | |
| E) Total cost of processing per quintal (₹/q) | | 9162 | |
| F) Price of turmeric powder(₹/q) | | 12000 | |
| G) Net profit (₹/q) | | 2838 | |
| H) B-C ratio | | 1.31:1 | |

Value Addition in Honey

The products of bee-keeping are sweet honey, bee wax and bee venom and it also increases the crop production by facilitating the crop pollination in many crops. Domestication of honey bee (*Apis cerana*) has been started only a few decades ago, employing scientific techniques as cottage industry. Bee keeping has been taken up in

Punjab as an economic activity in the recent decades and the production of honey was 12000 metric tonnes during 2010-11. The important steps involved in the value addition for honey are processing, packing and marketing and are depicted in Figure 2. The value-addition in honey usually takes place in three stages at FAPRO. First, the product is filtered to remove wax and foreign

TABLE 3: COSTS AND RETURNS FROM TURMERIC SEEDS AT FAPRO

| Items of Cost | Quantity | Value(₹) | Percent |
|----------------------------------|-------------------------------|----------|---------|
| Fixed costs | | | |
| Depreciation | | 6582 | 0.57 |
| Land rent | | 2961 | 0.26 |
| Salary of permanent workers | | 20886 | 1.82 |
| Others | | 8642 | 0.75 |
| Total fixed costs | | 39071 | 3.40 |
| Operational costs | | | |
| Costs of raw turmeric | 1200q @ ₹7/kg | 840000 | 73.27 |
| Direct cost of labour | 1200 man days @ ₹200/ man day | 240000 | 21.00 |
| Packing, labelling and marketing | | 26670 | 2.33 |
| Total operational costs | | 1106670 | 96.60 |
| Total costs | | 1145741 | 100.00 |
| Seed recovery | | | 46% |
| Gross return from seed | 1200q@₹ 4800/q | 5760000 | |
| Net profit over variable cost | | 4614259 | |
| Benefit-cost ratio | | | 5.02:1 |

particles after being heated at 45°C. At second stage, honey is heated again between 60-65°C for 10-15 minutes. Simultaneously, vacuum is generated to boil the water in honey at lower temperature, so that moisture can be collected separately. This procedure also helps in destroying yeast. At the third stage, honey is cooled to the normal temperature and stored in closed vessels for 24-48 hours. The product is then packed and

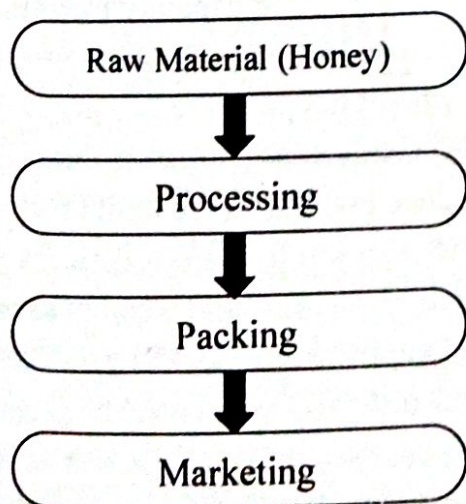


Figure 2: Process of value addition of honey in FAPRO

sealed immediately. During this process, honey is never heated directly. Proper temperature control and heating time is most important factor in honey processing. Excessive heating may affect the colour and flavour of honey.

Costs and Returns from Honey Processing

Table 4 presents the economics of value addition in honey at FAPRO. As in turmeric, the fixed cost in value addition of honey was very small at 1.85 per cent. The cost of raw material constituted almost two-third of the total cost of processed honey. The benefit-cost ratio appeared to be 1:1.32 which indicated that honey processing was economically feasible. The ratio was believed to be still lower and it was believed that there was a potential to improve such ratio substantially. However, there was an argument for fixing some floor price for honey so that there are not wide fluctuations of the price at which the honey is sold in the

TABLE 4: COSTS AND RETURNS FROM HONEY PROCESSING AT FAPRO

| Items of Cost | Value (₹) | Percent |
|---------------------------------------|-----------|---------|
| Fixed costs | | |
| Depreciation | 3201 | 0.24 |
| Land Rent | 1444 | 0.11 |
| Salary of permanent workers | 10182 | 0.76 |
| Other fixed costs | 10046 | 0.74 |
| Total fixed cost | 24873 | 1.85 |
| Operational costs | | |
| Raw material consumed (105q@₹8500/q) | 892500 | 66.37 |
| Costs of processing | 105000 | 7.80 |
| Costs of packing | | |
| Costs of labelling, bottle and cork | 105000 | 7.80 |
| Costs of labour and electricity | 52500 | 3.90 |
| Costs of marketing | 5476 | 0.41 |
| Repair and maintenance | 3146 | 0.24 |
| Taxes and fees | 7087 | 0.54 |
| Others | 2439 | 0.19 |
| Interest on working capital | 146643 | 10.90 |
| Total operational costs | 1319791 | 98.15 |
| Total Cost(A+B) | 1344664 | 100.00 |
| Total production of honey(q) | 104.48 | |
| Price of processed honey(₹/q) | 17000 | |
| Total profit (104.48@₹17000/q) | 1776160 | |
| Net profit | 431496 | |
| Benefit-cost ratio | 1.32:1 | |

market. There is a scope for better marketing strategies so that the demand for honey can be enhanced further and to synchronize the production in line with the growing demand for honey.

Capacity Utilization in Turmeric and Honey Processing

The plant capacity and its utilisation also affect the economics of value addition. Low utilisation of plant capacity directly affects the benefit-cost ratio. It was observed from Table 5 that the installed capacity for processing of turmeric and honey was 150q and 10q per day, respectively, while the actual

TABLE 5: CAPACITY UTILISATION IN THE PROCESSING OF TURMERIC AND HONEY AT FAPRO

| Commodity processed | Installed capacity (q/day) | Capacity utilized (q/day) |
|---------------------|----------------------------|---------------------------|
| Turmeric | 150 | 7 (4.67) |
| Honey | 10 | 0.35 (3.50) |

Note: Figures in parentheses are percentage of the actual capacity utilized.

capacity utilisation was 7q for turmeric and 0.35q per day. It means the capacity utilization was much less at 4.67 per cent for turmeric and 3.50 per cent for honey. There is a huge scope to improve the capacity utilization, which will further reduce the fixed costs of operations at FAPRO.

The increased capacity will also help in reducing the operational costs through the realization of economies of scale. It also indicates that the plant capacity for both turmeric and honey was generally under utilised and the management of FAPRO needs to explore the reasons to run the processing plant for meeting its objectives. However, increasing capacity may translate into a tremendous increase in the supply of these two products in the market having a significant adverse impact on the prices of the produce in lights of the limit to which the demand for such commodities can be enhanced in the short and medium term. The demand-supply scenario will prevail on the capacity utilization of the FAPRO plant in the long run.

Benefit-Cost Analysis

In order to examine the economic viability of FAPRO, benefit-cost analysis was also

carried out and the results are presented in Table 6. The benefit-cost analysis pertained to the overall business activities of FAPRO. The ratio turned out to be less than unity during 2006-07 and 2007-08, while it was unit in 2008-09. It reflects that owing to the huge investments in the initial years and small number of activities with limited volumes, FAPRO incurred losses initially.

TABLE 6: BENEFIT AND COST INCURRED BY FAPRO FROM 2006-07 TO 2010-11

| Year | (₹ in lakhs) | | | |
|---------|---------------|------------|--------|--------------------|
| | Total Revenue | Total cost | Profit | Benefit-cost ratio |
| 2006-07 | 1.307 | 3.525 | -2.218 | 0.37 |
| 2007-08 | 3.71 | 5.095 | -1.385 | 0.72 |
| 2008-09 | 16.21 | 16.08 | 0.13 | 1.00 |
| 2009-10 | 47.66 | 46.87 | 0.79 | 1.01 |
| 2010-11 | 51.89 | 50.69 | 1.2 | 1.02 |

It was able to break-even during 2008-09 and started earning profits during 2009-10 and 2010-11 as revealed by more than unit values of the benefit-cost ration. The FAPRO earned the profits of ₹1.20 lakh during 2010-11. The profits are not very high till now and it seems essential to increase the business activities to sustain in the long run.

Employment Generation at FAPRO Premise

The employment generation for processing of turmeric and honey is highlighted in this section. The labour is required to carry out various operations of turmeric processing such as washing of rhizomes, boiling of rhizomes, drying, polishing, grinding, packing, labelling and stitching. A significant amount of labour use

was also involved in separating turmeric to be used as a seed from the raw turmeric. For producing the turmeric powder, 4.8 man days of labour was used per tonne of raw material (Table 7).

Drying and packing/labelling/stitching were two most labour-intensive operations with 41.7 per cent and 33.4 per cent share in the total labour use. Washing and boiling, polishing and grinding were three other operations and each of them accounted for 8.3 per cent of the labour use in producing the turmeric powder at FAPRO. It all translated into 672 man days of employment generation at FAPRO for turmeric powder production. Another 1200 man days were generated for turmeric seed production.

TABLE 7: GENERATION OF EMPLOYMENT FROM PROCESSING OF TURMERIC AT FAPRO

| Particulars | (Man day/tonne) | |
|---|-----------------|----------|
| | Labour use | |
| Washing and boiling | 0.4 | (8.30) |
| Drying | 2 | (41.70) |
| Polishing | 0.4 | (8.30) |
| Grinding | 0.4 | (8.30) |
| Packing, labelling and stitching | 1.6 | (33.40) |
| Total labour use | 4.8 | (100.00) |
| Labour use at FAPRO for turmeric powder (man days) | 672 | |
| Labour use at FAPRO for turmeric seed production (man days) | 1200 | |
| Total Employment generation at FAPRO (man days) | 1872 | |

Note: Figures in parentheses are the percentages of total labour use.

Thus, a total of 1872 man days of employment was generated at FAPRO for turmeric and honey processing. It is significant particularly when the employment generation in agriculture is disappearing gradually.

Apart from turmeric, honey processing also helped in generation of employment at FAPRO. In all, 10.5 tonnes of honey was processed with 40 man days of labour use for each tonne of honey processed. Each of the processing and packaging of honey accounted for half of the labour use, i.e. 20 man days per tonne of honey processed (Table 8). A total of 420 man days of employment was generated at FAPRO for honey processing.

TABLE 8: GENERATION OF EMPLOYMENT FROM PROCESSING OF HONEY AT FAPRO

| Particulars | (Man days/tonne) | |
|---|------------------|--|
| | Labour use | |
| Processing of honey | 20 | |
| Packing of honey | 20 | |
| Total | 40 | |
| Employment generation in honey processing at FAPRO (man days) | 420 | |

In total, approximately 2300 man days of employment was generated at the FAPRO premise for processing of turmeric and honey. Apart from this, a significant amount of employment generation also occurred for marketing of the produce. As marketing occurred through a complex network, the estimates were not prepared in the present study.

Employment Generation at Farm Level

Apart from direct employment generation at the FAPRO premise, a significant amount

of employment generation occurred at farmers' fields due to cultivation of turmeric and beekeeping. This employment generation is due to labour-intensive character of turmeric cultivation and beekeeping activity. Table 9 indicates that the average employment generation at the farm level during turmeric cultivation was 33 man days per acre.

The harvesting of turmeric crop was the most labour-intensive operation accounting for 54.4 per cent of total labour use during the cultivation of turmeric. It was followed by land preparation and weed control in turmeric cultivation. Other activities like sowing/planting, fertilizer application,

TABLE 9: FARM LEVEL EMPLOYMENT GENERATION FROM CULTIVATION OF TURMERIC

| Particulars | (Man days/ acre) | |
|---------------------------------------|------------------|----------|
| | Labour use | |
| Land preparation | 3 | (9.10) |
| Sowing/planting | 2 | (6.10) |
| Fertilizer application | 2 | (6.10) |
| Irrigation | 2 | (6.10) |
| Weed control | 3 | (9.10) |
| Harvesting | 18 | (54.40) |
| Storage | 1 | (3.00) |
| Transportation on farm and to factory | 2 | (6.10) |
| Total employment generation | 33 | (100.00) |

Note: Figures in parentheses are percentages of the total employment generation.

irrigation and transportation generated 2 man days each per acre with a share of 6.1 per cent in the total labour use.

In beekeeping, labour is required for different activities like transportation, installation of boxes, sheets and cleaning of boxes, feeding, disease management and extraction of honey. The labour use in honey is presented in Table 10. The estimates have been provided for a colony of 100 boxes.

**TABLE 10: FARM LEVEL
EMPLOYMENT GENERATION FROM
BEEKEEPING**
(Man days/100 boxes)

| Particulars | Labour use |
|---|-----------------|
| Transportation | 12 (7.40) |
| Installation of boxes, sheets and cleaning of boxes | 130 (80.20) |
| Feeding | 5 (3.10) |
| Disease management | 5 (3.10) |
| Extraction of honey | 10 (6.20) |
| Total | 162 (100.00) |

Note: Figures in parentheses are percentages of the total employment generation.

A colony of 100 boxes required 162 man days of labour and more than 80 per cent of the labour was required during installation of boxes, sheets and cleaning of boxes. All other activities were minor in terms of labour use and required less than 20 per cent of the total labour. Hence the present study estimated 1.62 man days of labour use per box against one man day per box.

CONCLUSIONS AND SUGGESTIONS

The Farm's Produce Promotion Society (FAPRO) was established in Hoshirapur district of Punjab to promote value addition in agriculture, thereby, contributing to the growth of the rural incomes and generating employment in rural areas. The processing of turmeric into turmeric powder, sale of turmeric seed and honey processing were three main activities of FAPRO. Converting turmeric into turmeric powder and its sale was a profitable business with the benefit-cost ratio of 1:1.31. The turmeric seed was having much higher benefit-cost ratio of 5.02:1. The processing of honey had a benefit-cost ratio of 1.32:1. The plant capacity for turmeric and honey was highly underutilized, which could be increased in future to further enhance the profitability. However, increasing capacity may substantially increase the supply, having a downward pressure on the prices and profitability of these enterprises. The value addition activities by FAPRO resulted the generation of 1872 man days of employment for turmeric and 420 man days of employment for honey processing at the FAPRO unit. At the farm level, there was employment generation to the extent of 33 man days/acre in turmeric and 162 man days/100 boxes in honey.

It is therefore important to encourage such producers' organizations which can promote value addition and generate employment at the farm as well as higher levels. These initiatives need to be supported by public sector efforts to expand the markets for these products so that increased supply

does not lead to a sharp fall in the prices and hence profitability. Income enhancement and employment generation will ultimately lead to the growth of rural economy of India.

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