Fruit processing industry in himachal pradesh commerce essay

The purpose of this paper is to study the fruit processing industry in Himachal Pradesh. This study focuses on three major functional areas of industry i. e. plant capacity utilisation, procurement and distribution system and marketing problems. The study finds that plant capacity is underutilised and there is significant association (X2 (1)= 8. 713, p <. 05) between type of technology used and plant capacity utilisation. Industry procures fruits from multiple sources including contractual relationship with the farmers, market intervention scheme and village mandis (markets). The produce is sold through company outlets, commission agents, distributors and retailers. The major marketing problems are related to infrastructure (i. e. poor roads, lack of cold storage facility, lack of refrigerated transportation), Lack of organised marketing system, publicity and high cost of production. Finally recommendations are made on the basis of analysis and observations.

Consumption of processed fruit products started since time immemorial. The production was mainly for private household consumption and commercial production started very late. The formal set up of fruit processing for commercial purpose started with the demand arising from defence forces. Dietary habits in the urban areas are rapidly undergoing changes because of the factors like lack of storage facility for fresh fruits at home, scarcity of time and ready availability of these products. The pattern of traditional social structure shows that women stay at home and men folk are at work, but with the emergence of nuclear families and increased number of working women, there is increased need for ready to eat or fast foods. Fruits are an important nutritional requirement of human beings, as these fruits not only meet physical needs to some extent but also supply vitamins and minerals which

improve the quality of diet and maintain health. It is therefore, necessary to ensure their availability throughout the year in fresh, processed or preserved forms.

World over there has been remarkable change in agri-food business during 1980’s and 1990’s. This was due to greater concentration in agricultural inputs and food distribution, the increasing importance of food quality and safety, and intensifying role of information and logistic technology. The total production of fruits in the world is around 370 million MT India ranks first in the production of fruits at 32 Million MT which is around 8 percent of world fruit production. The international trade of processed fruit products is around US$ 9200 million. The installed capacity of fruits and vegetables processing (FPO Licensed units) is 2. 1 million tonnes (MOFPI) and the level of processing of fruit and vegetables in India is 2. 02 percent. The low level of processing may be ascribed to lack of processable quality of fruits, seasonal nature of the fruits, and poor infrastructural and post harvest facilities.

Fruits are processed into various products such as fruit juice and concentrates, canned fruits, dehydrated fruits, Jams, and Jellies etc. According to the Food and Agriculture organization (FAO, 2006) major fruit processing countries of the world are Brazil, USA, Italy, Spain, Mexico, France, Turkey and Philippines. The level of processing as percentage of total fruit production in the major fruit processing countries is as follows: UK (88%), Malaysia (80%), Philippines (78%), Brazil (70%), USA (60-70%), Israel (50%), Thailand (30%), and China (23%). The total area under fruit in Himachal Pradesh is about 2. 07 Lac hectares with a production of about 5. 00 Lac MTs of all kinds of fruits. Apple is the major fruit accounting for more

than 40% of total area under fruits and about 88% of total fruit production. There are 36, 845, micro, small, medium and large scale enterprises of which 444 are in medium and large scale registered with the Department of Industries Government of Himachal Pradesh with an investment of Rs. 10408. 41 crore and employment of about 2. 42 lakh persons. (Directorate of Industries Govt. Of HP)

Himachal Pradesh experiences diverse agro-climatic conditions varying from sub-tropical to humid temperate and cold deserts. The topographical and latitudinal differences accompanied by fertile and well irrigated land makes it convenient to cultivate temperate to sub-tropical fruits.

The state has been classified basically into two categories namely, “ Industrially developing areas” and “ Industrially backward areas”. The blocks of Poanta Sahib and Nahan in district Sirmour, Nalagarh and Dharmpur in district Solan, excluding backward panchayats as notified by the government of Himachal Pradesh from time to time fall in the category of industrially developing areas. The rest of the state including industrially backward panchayats and industrially developing areas referred above fall in the category of industrially backward areas. Tribal areas of the state, as notified from time to time have been treated as tax-free Industrial zone.

In her effort in processing the huge production of fruits, Himachal Pradesh established its first experimental canning unit in Shimla in the year 1959-60, and its production capacity was enhanced in 1961-62 (Directorate of Horticulture, 2005, Rattan, et. al 2000, Parmar, 2002). The main objective was to utilize the unmarketable surplus of fruits in the state as also to:

Standardize recipes for the preparation of products of horticulture production in the state, provide community canning service to the prospective entrepreneur, Educating and training in the preservation of fruit and vegetable at household level.

In order to execute a project of world bank the state government incorporated, Himachal Pradesh Produce Marketing and Processing Corporation Limited (hpmc) in 1974 as a subsidiary of Himachal Pradesh Agro. Industries Corporation Limited. The project also helped in imparting training to the officials of hpmc and state Department of Horticulture in modern post-harvest handling system. Private participants in this industry are also producing fruit products at micro, small, medium and large scale. The total fruit and vegetable processing capacity in the state is 55, 000 tones/annum. (Economic Survey 2003-04, hpmc, Directorate of horticulture HP, 2005).

The micro, small, and medium scale under micro, small and medium enterprises Act. 2006 (MSME Act 2006) classifies the enterprises in India as follows;

Figure 1. Classification of enterprises

Sr. no

Classification of industrial enterprises

Investment limit in plant and machinery of manufacturing enterprise

Investment limit of equipments in service enterprises

1

Micro enterprises

Up to Rs. 25 Lakh

Up to Rs. 10 Lakh

2

Small enterprises

Above Rs. 25 Lakh and up to Rs. 5 Crore

Above Rs. 10 Lakh and up to Rs. Crore

3

Medium enterprises

Above Rs. 5crore and up to Rs. 10 Crore

Above Rs. 2 crore and up to Rs. 5 Crore

4

Large enterprises (not classified under MSME)

More than Rs. 10 Crore

More than Rs. 5 Crore

Source: MSME Act. 2006

OBJECTIVES OF THE STUDY

To study the status of plant capacity utilisation in fruit processing industry in HP,

To examine the procurement system of fruits and distribution system of fruit products, and

To study the problems faced by the industry in marketing its products.

In order to fulfil the objectives following hypothesis has been formulated for testing.

Hypothesis

H01= there is no relationship between plant capacity utilisation and scale of operation of fruit processing industry.

H01a= there is no relationship between plant capacity utilisation and type of technology employed.

H02= Fruit procurement system is positively related to the fruit products distribution system.

H03= there is no relationship between the marketing problems faced by the units and sale of the produce.

METHODOLOGY

Data Sources: The data has been collected from both primary and secondary sources. Primary data has been collected by administering a structured questionnaire for the producers of fruit products in Himachal Pradesh.

Sources of secondary data are Directorate of Horticulture HP, Directorate of industries HP, National Horticulture Board, HPMC, NCAER and journal and magazines from different libraries.

Sample: A sample of seventy fruit processing units has been selected from all over the state on convenient sampling basis. This sample comprises of 31 Micro scale, 15 Small scale, 11 Medium scale and 13 Large scale units.

Questionnaire: A structured questionnaire has been developed to collect the information personally regarding, general information about producers, product they produce, plant capacity utilisation and the technology, procurement and distribution system and marketing problems. The reliability of the questionnaire ranges between Cronbach alpha . 657 to . 821.

Analysis: Statistical techniques like Mean, Standard deviation, Percent, rank and Loglinear analysis has been used for the analysis. Rank has been calculated by assigning rank one for the most important variable and last for least important variable. The weights are also assigned as one to the most important and two to the second important variable and so on, thus finally variable with least final score shall be the most important variable. Loglinear analysis has been used to analyse three categorical variables i. e. scale of operation (four categories, Micro, Small, Medium and Large Scale units), Type of technology (two categories, Traditional technology and Modern technology) and plant capacity utilisation (two categories, Underutilised and Fully utilised). Those units that have not updated their technology for last ten years are put under the traditional technology category and units that have

updated their technology within ten years are put under modern technology category.

RESULTS AND DISCUSSION

Fruit Processing Industry Plant Capacity Utilisation and Type of Technology

There are seventy fruit Processing Units out of which 44. 3% are Micro Scale, 21. 4 % Small Scale 15. 7% Medium Scale and 18. 6% are in large Scale.

Table 1: Sample Characteristics, n= 70 Figure 2.

Type of unit

N

Percentage

Micro Scale

31

44. 3

Small Scale

15

21. 4

Medium Scale

11

15. 7

Large Scale

13

18. 6

Total

70

100

Major products: The major products produced in the state are jam 85. 7%, jelly 41. 4%, candy 40%, sauce 63. 8%, ketchup 62. 9%, squash 77. 1%, juice 82. 9% and pickle 62. 9%. Other products produced occasionally are Murabba, chutney and marmalade accounting for 8. 6 % of the total produce.

Working profile: It is necessary to know whether seasonal nature of the fruits affects the operations of producers. Data regarding number of busy/slack working months in a year, total working days in a month and total working hours a day show that 70 % of respondents have 1-4 busy working months in a year and rest 30 % have 4-8 busy working months in a year. During busy months 11. 4% respondents work for 15-20 days in a month and 88. 5% work between 20-25 days in a month. All the respondents work for 8-12 hours in busy working month.

A majority of respondents (70%) face slack period for 4-8 months and 30% face slack period for 1-4 months. During slack period 82. 9 % work for 15-20

days in a month and rest 17. 1% work for 20-25 days in a month. 11. 4% respondents work for 1-4 hours and 88. 6% work for 4-8 hours during slack period.

Table 2. Working profile of the fruit processing units in Himachal Pradesh

Variables

Busy working months

Slack working Months

N*

Percentage

N*

Percentage

Working months

1-4

49

70

21

30

5-8

21

30

49

70

9-12

—

—

—

—

Working days

15-20

8

11. 4

58

82. 9

21-25

62

88. 9

12

17. 1

26-31

—

—

Working hours

1-4

—

—

8

11. 4

5-8

—

—

62

88. 6

9-12

70

100

—

—

N*-Number of Respondents

Table 3(a). Scale of Operation, Plant Capacity Utilisation and type of Technology (Data Information)

N

cases

Valid

70

Out of rangea

0

Missing

0

Weighted Valid

70

Categories

Scale of Operation

4

Plant Capacity Utilisation

2

Type of Technology

2

a. Cases rejected because of out of range factor value.

Table 3(b). K-way and Higher-Order Effects

K

df

Likelihood Ratio

Pearson

Number of Iterations

Chi-Square

Sig.

Chi-Square

Sig.

K-way and higher order effectsa

1

15

64. 349

. 000

100. 057

. 000

0

2

10

14. 801

. 140

14. 559

. 149

2

3

3

3. 174

. 366

3. 170

. 366

3

K-way effectsb

1

5

49. 548

. 000

85. 498

. 000

0

2

7

11. 626

. 114

11. 389

. 123

0

3

3

3. 174

. 366

3. 170

. 366

0

a. Tests that K-way and higher order effects are zero.

b. Tests that K-way effects are zero.

The initial output from loglinear analysis shows that there are 70 cases and three categorical variables, the first variable has four categories (scale of operation) and other two variables have two categories each plant capacity utilisation and type of technology respectively) . In Table K-way and higher order effects Likelihood ratio and Pearson chi-square for K= 1 are significant representing that removing this effect will significantly affect the fit of the model. However K= 2 and 3 are not significant, therefore removing these effects will not affect the fit of the model.

Table 3(c). Step Summary

Stepa

Effect

Chi-Squarec

df

Sig.

Number of iterations

Generating Classb

Capacity*Technology*Scale

6. 794

9

. 658

Deleted Effect 1

Capacity*Technology

8. 006

1

. 005

2

2

Scale

12. 883

3

. 008

2

a. At each step, the effect with the largest significance level for the Likelihood Ratio Change is deleted, provided the significance level is larger than . 050.

b. Statistics are displayed for the best model at each step after step 0.

c. For ‘ Deleted Effect’, this is the change in the Chi-Square after the effect is deleted from the model.

Table 3(d). Partial Associations

Effects

df

Partial Chi-square

Sig.

Number of Iterations

Scale*Capacity

3

2. 310

. 511

2

Scale*Technology

3

1. 152

. 765

2

Capacity*Technology

1

7. 848

. 005

2

Scale

3

12. 883

. 005

2

Capacity

1

19. 431

. 000

2

Technology

1

17. 234

. 000

2

The K-way and higher order effects for K= 2 shows combined two way effect (i. e. Scale*Technology, Scale*Capacity, Capacity*Technology) which is not significant, However Step summary and partial association analysis break down the combined effect into individual effects, which is significant for Capacity*technology. This is also supported by Z statistics as the important interaction. The effect size in loglinear analysis (Capacity*Technology) for Odds ratios is calculated as 5. 5. This ratio indicates that odds for full plant capacity utilisation in units using modern technology are 5. 5 times the odds for units using traditional technology. The one way interaction (the main effect) of scale, capacity and technology is also significant, indicating that one way interaction is important for this model. Therefore, the analysis seems to reveal fundamental difference between units using traditional and modern technology; units with traditional technology are more likely to face problem of underutilisation than the modern technology.

Table 3(e). Goodness of Fit tests

Chi-Square

df

Sig.

Likelihood Ratio

6. 794

9

. 569

Pearson

6. 895

9

. 648

Table 3(b). deals with the backward elimination. This indicates that deleting three way interaction (Capacity*Technology*Scale) will not have significant effect on our model, however deleting two way interaction(Capacity*Technology), and one way interaction (Scale) will have significant effect on our model.

The non-significant value of likelihood ratio and Pearson Chi-Square statistics indicate that the expected values generated by the model are not

significantly different from the observed data. In other words, the model is a good fit of data.

Table 3(f). Chi-Square Tests

Value

df

Asymp. Sig.(2-sided

Exact Sig. (2-sided)

Exact Sig. (1-sided)

Point Probability

Pearson Chi-Square

8. 713a

1

. 003

. 005

. 005

Continuity Correctionb

6. 933

1

. 008

Likelihood Ratio

8. 006

1

. 005

. 008

. 005

Fisher’s Exact Test

. 008

. 005

Linear-by-Linear Association

8. 589c

1

. 003

. 005

. 005

. 005

N of Valid Cases

70

a. 1 cells (25. 0%) have expected count less than 5. The minimum expected count is 4. 37.

b. Computed only for a 2×2 table.

c. The standardized statistic is 2. 931.

The reasons for underutilization of plant capacity are seasonal nature of fruits and lack of infrastructure facility 87. 2%, low demand 84. 3%, frequent power cuts 27. 1%, working capital problem 10% and lack of trained and skilled labour 5. 8 %. It has been found that when products are sold directly to the consumers, the returns are higher than when sold to commission agents, the returns are also fair when sold to government and co-operatives.

Table 3(d). on partial associations reveals that the significance level of scale*capacity is >. 05 indicating that scale of operation and plant capacity utilization are not associated significantly, supporting our null hypothesis (H01). Therefore the results show that under utilization or full utilisation of plant capacity is not related to the fact that the plant is in micro, small, medium or in large scale of operation.

Pearson X2 (1)= 8. 713, p <. 05 show significant association between the type of technology and whether the plant capacity is underutilised or fully utilised. Thus we fail to accept null hypothesis (H01a) and support alternative hypothesis that there is significant relationship between plant

capacity utilization and type of technology used. The result indicate that under utilization or full utilization of plant capacity may be due to the usr of traditional or modern technology.

Procurement of Fruits and Distribution of Fruit Products

The industry has to rely on multiple sources for procuring fruits. A few units are having contractual relationship with farmers for procuring fruits, however they have to offer finance to the farmers for maintaining the orchid and repayment is done at the time of harvesting. The selection of farmers and the produce is a challenging task for the processers. In most cases visual inspection of the fruits size, damage level and freshness determines whether to accept the delivery. The selection of farmer generally depends on the volume of produce and leadership. Government of Himachal Pradesh has introduced Market Intervention Scheme (MIS) for procuring fruits. Himachal Pradesh Horticultural Produce Marketing and Processing Corporation Ltd (HPMC a state government undertaking) and State department of Horticulture procure fruits which are not suitable for selling in the open market. The processing units may face problem of poor or no packaging, inadequate quality and quantity in the process of procurement.

Majority of respondents want to acquire fruits from nearest sources. However if supply is inadequate, then they have to move to other places for getting their demand fulfilled. The findings reveal that eighty percent respondents get fruits at block level, 77. 1 percent at tehsil level, 81. 4 percent at district level, 55. 7percent at state level and 10 percent (mostly in large scale) has to get fruits from outside the state.

The growers get good price for their produce if producers directly approach them. The fruit procurement system of the industry shows that nearly 87 percent respondents get fruits directly from the growers. The respondents also use other procurement channels like commission agents 61. 1 percent, contractors 68. 5 percent and government 20 percent.

Sale of Produce: All respondents sell their produce in the local market, besides this 86. 6 percent sell in neighbouring districts, 70 percent in other states, 4. 3 percent each for defence supply, tourism, airlines and for exports. The major reasons for undertaking fruit processing business are availability of fruits locally (57%), cheap labour (54. 2%), high market demand (22. 7 %) produce because their product is easily saleable and high returns of investment (67. 1%)

Table 4 (a). Relationship between procurement of fruits and distribution of fruit products

Fruit Procurement System and fruit Products Distribution System

Strong Fruit Products Distribution System(FPDS)

Total

Yes

No

Fruit Procurement System (FPS)

FPS helps strengthen FPDS

Count

24

25

49

Expected Count

27. 3

21. 7

49. 0

% within FPS

49. 0%

51. 0%

100. 0%

% within FDPS

61. 5%

80. 6%

70. 0%

% of Total

34. 3%

35. 7%

70. 0%

Std. Residual

-. 6

. 7

FPS does not helps strengthen FPDS

Count

15

6

21

Expected Count

11. 7

9. 3

21. 0

% within FPS

71. 4%

28. 6%

100. 0%

% within FDPS

38. 5%

19. 4%

30. 0%

% of Total

21. 4%

8. 6%

30. 0%

Std. Residual

1. 0

-1. 1

Total

Count

39

31

70

Expected Count

39. 0

31. 0

70. 0

% within FPS

55. 7%

44. 3%

100. 0%

% within FDPS

100. 0%

100. 0%

100. 0%

% of Total

55. 7%

44. 3%

100. 0%

Table 4 (b). Chi-Square tests (Fruit Procurement System and fruit Products Distribution System)

Value

df

Asymp. Sig.(2-sided

Exact Sig. (2-sided)

Exact Sig. (1-sided)

Point Probability

Pearson Chi-Square

3. 002a

1

. 083

. 116

. 070

Continuity Correctionb

2. 162

1

. 142

Likelihood Ratio

3. 089

1

. 079

. 116

. 070

Fisher’s Exact Test

. 116

. 070

Linear-by-Linear Association

2. 960c

1

. 085

. 116

. 070

. 048

N of Valid Cases

70

a. 0 cells (. 0%) have expected count less than 5. The minimum expected count is 10. 84.

b. Computed only for a 2×2 table

c. The standardized statistic is -1720

(X2 (1)= 3. 002, p <. 083)

The Pearson chi square statistics tests if the two variables are independent. The table 4(b) shows that Pearson chi square is not significant at . 05 revealing that fruit procurement system is independent of fruit products distribution system (FDPS). Therefore accepting the null hypothesis (H02) that there is no significant relationship between fruit procurement system (FPS) and fruit products distribution system (FDPS). The results imply that a good raw material procurement system may not have effect on strengthening final product distribution system.

Distribution Channels: Different types of Distribution channels are used by the fruit processing industry. All units sell directly to consumers and through retailers, 97 percent also sell through commission agents, 49 percent through wholesalers, and 53 percent through distributors.

The factors considered while selecting distribution channels are, deep analysis of target market by 35. 7 percent units, channels preferred by consumers 82. 1 percent, potential good working of channel members 90

percent and all respondents consider credit worthiness of channel members before selecting them.

The responses on storage and cold storage facility indicate that all the respondents' need storage facility but only 24. 3 percent have their own cold storage facility. The reasons given for not having cold storage facility are , plant located in the cold region 48. 6 percent, immediate transportation available 35. 7 percent, government cold storage facility available on hire, 8. 6 percent , private cold storage facility available on hire 75. 7 percent and lack of funds for 72. 9 percent units.

Marketing Problems of Fruit Processing Industry in Himachal Pradesh

The marketing and other problems faced by the consumers are shown in table 5. The problems in order of their seriousness are, Poor roads, Poor quality of goods, Higher cost involved, Lack of market, Lack of transport facility, Lack of publicity, Lack of storage, Lack of cold storage, Lack of packaging material, Non availability of credit, Lack organised marketing system, Lack of procurement system, Perishable nature of products, Distance from roads, Only limited consumers, Distance from city/town, and Ignorance about market.

Table 5. Marketing problems ranked on the basis of importance

Sr. No.

Variable

Final Score

Final Rank

1

Lack of transport facility

343

V

2

Lack of storage

506

VII

3

Lack of cold storage

533

VIII

4

Poor roads

119

I

5

Lack of market

294

IV

6

Ignorance about market

1119

XVII

7

Poor quality of raw material

203

II

8

High running cost involved

264

III

9

Lack of publicity

416

VI

10

Perishable nature of products

893

XIII

11

Limited consumers/Lack of demand

1079

XV

12

Lack organised marketing system

776

XI

13

Lack of packaging material

632

IX

14

Lack of procurement system

836

XII

15

Non availability of credit

689

X

16

Distance from roads

1067

XIV

17

Distance from city/town

1096

XVI

All the respondents have acquired Food Products Order (FPO) as quality standard. And all units adhere to the norms of the standard. However during visit to these units the researcher observed that in some of the units raw material was not properly stored and semi finished products (like pulp, chopped fruits etc.) were lying uncovered, also utensils and flour was not clean.

Table 5. 1(a). Relationship of sale of produce with marketing problems

Sale of Produce and Marketing Problems

Face Marketing Problems

Total

Yes

No

Sale of Produce

Increase in sale

Count

8

15

23

Expected Count

12. 2

10. 8

23. 0

% within Sale of Produce

34. 8%

65. 2%

100. 0%

% within Face Marketing Problems

21. 6%

45. 5%

32. 9%

% of Total

11. 4%

21. 4%

32. 9%

Std. Residual

-1. 2

1. 3

Decrease in sale

Count

29

18

47

Expected Count

24. 8

22. 2

47. 0

% within Sale of Produce

61. 7%

38. 3%

100. 0%

% within Face Marketing Problems

78. 4%

54. 5%

67. 1%

% of Total

41. 4%

25. 7%

67. 1%

Std. Residual

. 8

-. 9

Total

Count

37

33

70

Expected Count

37. 0

33. 0

70. 0

% within Sale of Produce

52. 9%

47. 1%

100. 0%

% within Face Marketing Problems

100. 0%

100. 0%

100. 0%

% of Total

52. 9%

47. 1%

100. 0%

Table 5. 1(b). Chi-Square tests (Sale of Produce and Marketing Problems)

Value

df

Asymp. Sig.(2-sided

Exact Sig. (2-sided)

Exact Sig. (1-sided)

Point Probability

Pearson Chi-Square

4. 491a

1

. 034

. 043

. 031

Continuity Correctionb

3. 476

1

. 062

Likelihood Ratio

4. 534

1

. 033

. 043

. 031

Fisher’s Exact Test

. 043

. 031

Linear-by-Linear Association

4. 427c

1

. 0355

. 043

. 031

. 022

N of Valid Cases

70

a. 0 cells (. 0%) have expected count less than 5. The minimum expect