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Analysing Production and Marketing Practices: Peas AND Tomatoes in District Nainital and U. S. Nagar of Uttarakhand

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Abstract-

Like our nation, the economy of Uttarakhand is predominantly agrarian. About 80 per cent of the manpower is directly or indirectly linked with agriculture and allied activities, irrespective of the fact that only 12.5 per cent of the total land area (approx. 52000 sq km) of Uttarakhand is cultivable and only 11 percent of the total cultivable area is irrigated. Maximum cultivars in Uttarakhand are of marginal and small category. But various horticultural crops have gained their credibility for providing sustainable income, nutritional security and for providing employment opportunities in Uttarakhand. In the state, annual vegetable production from an area of 80580 hectare comes to 1.04 million tones (2009-10) but supply chain is equipped with inefficiencies across the entire supply chain which consequently results in poor price realization for the producers of tomato and pea on one hand and high purchase prices to consumers on the other. A big share of consumer rupee goes to number of market intermediaries (commission agents/ adatiyas/ other intermediaries with big or small numbers) who exploit the farmers and the producer is left to receive only residual part of the spread. Other prominent reasons for poor realization are poor marketing linkages, non availability of adequate market information, and lack of cold chain infrastructure and non-standardized processing facilities which make all the marketing efforts ineffective and uneconomic. Tomato and pea both are happen to be perishable commodities. This chapter seeks to integrate the information platform for various stakeholders and design an innovative supply chain that will benefit millions of tomato and pea growers, processors, distributors, dealers, exporters of fresh & processed tomato and pea products in U.S. Nagar and Nainital district of Uttarakhand.

Keywords– Production, marketing channels. Marketing margin and supply chain model

I. INTRODUCTION

Uttarakhand came into existence on 9th November 2000 is the 27th Indian state and the 10th in Himalayan region. It lies between 28^0 43'and 31^0 27' N Latitude and 77^0 34' and 81^0 02' E Longitude. The total geographical area of the state is 53,483 sq. Km., of which approximately 89 percent is under hilly regions. Of the total geographical area of this state, about 19 percent is under permanent snow cover, glaciers and steep slopes. The total population of the state is 10.11 million (Census 2011) of which over 7 million people live in the mountainous parts of the state. Below Poverty Line population in hills is 44 percent and in the plains is 19 percent, thus, making the State average BPL population 36.5 percent.
Uttarakhand state is split into 13 districts within two revenue divisions: Garhwal and Kumaun (table1.)

Table 1. Districts in Uttarakhand

Districts under Garhwal Devision	**Districts under Kumaun Division**
Dehradun	Nainital
Haridwar	Almora
Rudra Prayag	Udham Singh Nagar
Chamoli	Bageshwar
Uttarkashi	Champawat
Tehri	Pithoragarh
Pauri Garhwal	

Uttarakhand is bestowed with wide range of agro-climatic and bio-diversity suitable for growing variety of agricultural crops couple with increasing volume. More than 80 per cent of the work force is directly or indirectly engaged in agriculture and allied activities in state. Though only 12.5 per cent of the total land area (approx. 52000 sq km) of Uttarakhand is cultivable and only 11 percent of the total cultivable area is irrigated. A significant part, that is 70.64 per cent of the operational holdings of the hill region are less than one hectare, another 17.77 percent are up to 2.0 hectare (Agricultural Statistics at a Glance, 2007). But, U.K. is now becoming profitable belt for horticulture farmers. Every year production of horticulture crops are increasing with the great magnitude. In year 2009-10 Uttarakhand had total vegetable

production of 1,560798 MT while in 2008-09 it was 10,84270 MT. This has been made possible only by adopting high yielding seed/seeding and suitable production technologies being used by farmers. Facts reveals Nainital and U.S. Nagar have their unique existence for high production of vegetable crops mainly in peas and tomatoes. In Kumaun region, U.S. Nagar and Nainital got 1st and 2nd rank in pea with 13944 MT and 10558 MT productions and got 2nd and 1st rank in tomato with 13582 MT and 20346 MT productions respectively in year 2009-10 (fig.1 and fig. 2). But lot of inefficiencies are equipped across the supply chain leading to poor price realization of growers on one hand and exorbitant prices paid by consumers on the other in concern districts. A major share of this consumer rupee goes to a plenty number of market intermediaries who exploit the farmers due to poor market linkages, virtually non-existent cold chain infrastructure and processing facilities.

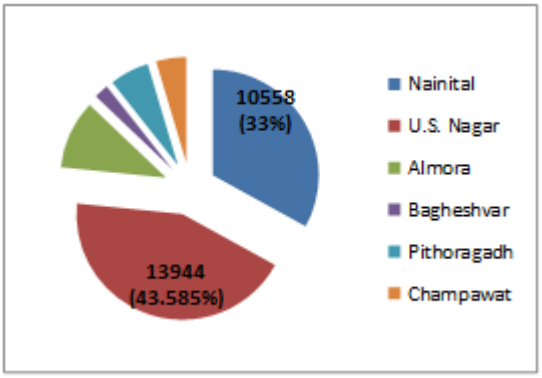

Fig. 1 Production of Pea (in MT)

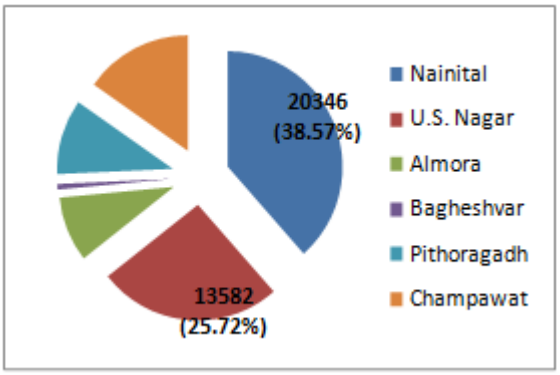

Fig. 2 Production of Tomato (in MT)

(Source: Directorate of Horticulture, 2010)

Cultivars have no idea of consumer needs and preferences, market prices, various government schemes, scientific agronomical practices especially agri-inputs, sources of timely and adequate credit availability and market linkages.
The tomato and pea farmers of Uttarakhand suffer due to inadequate infrastructure especially cold chains, absence of demand forecasting and meager value-addition. Thus here efforts had been made to design the efficient and economic supply chain model so that interest of farmers and consumer may be cushioned. Although Uttarakhand is having good volume of peas and tomatoes but inefficiencies are present across the supply chain which consequently results in poor price realization for the producers of tomato and pea and apart from this consumer has to pay exorbitant prices. A big share of consumer rupee goes to number of market intermediaries (Commission agents/ Adatiyas/ Other intermediaries with big or small numbers) who exploit the farmers and the producer is left to receive only residual part of the spread though Nainital and U.S. Nagar both are producing big volume of both crops but lack of infrastructure leads to more and more post harvest losses. Other prominent reasons are poor marketing linkages, non availability of adequate market information, and non-standardized processing facilities which make all the marketing efforts ineffective and uneconomic. Most considerable thing is that tomato and pea both are perishable commodities and seasonal in nature this problem becomes more dangerous at glut time.

II. REVIEW OF LITERATURES

Suryavanshi *et al*. (2006) conducted a study to identify marketing channels, to estimate marketing cost, marketing margin and price elasticity. The study had revealed that 80% of the tomato was sold through channel (producer-commission agent cum wholesaler-retailer-consumer). The cost of marketing incurred was the highest (Rs. 187.45) in channel-I, where as it was the lowest (Rs. 55.40) in channel (producer-consumer). And retailers enjoyed higher net proportion of margin as compared to commission agent cum wholesaler. Marketing efficiency was observed to be the highest (9.70%) in channel (producer-consumer) for achieving maximum profit and to reduce intermediary charges in trade, when the produce is in small quantity and if the produce is in large quantity channel-II should be selected to safeguard the interest of tomato growers.
Sumit Deolia *et al.* (2009) studied the supply chain model for peas from farmers to corporate giant in Garhwal region. In study it has been found that existing model of supply chain of pea was equipped with vast number of intermediaries which resulted into high cost. In study, model has been Proposed encompasses in itself the intervention of local NGO which strive to make the tradeoff between farmers and corporate. Corporate will provide input required in production through NGO. It is suggested that this model will be beneficial for remote area of Garhwal like-Maund, Kaddukhaal, Chopariyaal, Ranichauri, Purola, Netri, Badkot etc.
Singh *et al* (2009) studied the supply chain of peas, cabbage and capsicum in district U.S. Nagar and found that Block Sitarganj and Rudrapur are potential areas for cabbage having highest volume. In the case of peas Block Gadarpur and Bazpur are having highest production and on I and II position in district respectively while for capsicum, block Sitarganj and Rudrapur are the main production belt. Study revealed that district U.S. Nagar is performing well in the terms of above horticulture crops but marketing of these crops are not satisfactory. Study also proposed the supply chain model through which processors can procure the farm produces from concerned place in efiicient and effective manner.
Bhardwaj *et al.* (2011) emphasized value chain of Tomato and Dehradun and Nainital districts has been taken for getting the sample of various stake holders. Study highlighted that farmer's share in a consumer rupee is only 50 paisa. Plenty number of middle man like Adatiya/ commission agents/ local collectors are pocketing from both sides. Study suggested

that small cold storage should be established nearby mandi. Study also suggested that Government should announce minimum support price for tomato. For forward and backward linkage is has suggested that there should be provision of ICT portal, community radio and farmers forums so that farmers may get valuable information of farming, marketing practices, market prices, etc.

To analyze the current production and marketing practices, a research had been conducted from May to June, 2010 in two district of Uttarakhand; Nainital and U.S. Nagar. The data collected, first have been tabulated then analyzed and inferences drawn and interpreted on the basis of appropriate statistical tool (mean mode, percentage and graphical presentation).

III. OBJECTIVES

The research was conducted with following objectives:

- To know the current production and marketing practices of peas and tomatoes in districts U.S. Nagar and Nainital.
- To analyze the costs spreading across the supply chain of peas and tomatoes in districts U.S. Nagar and Nainital.
- To suggest the innovative supply chain model equipped with ICT.

IV. MATERIALS AND METHODS

To study the present status of pea and tomato, descriptive research was conducted. With the help of structured, undisguised, well designed questionnaire, (consisting of open and close ended 25 questions). Primary data was collected by interviewing all stake holders of supply chain of both crops. Secondary data was collected from district horticulture offices and web sites of concern departments. Farmers, commission agents, wholesalers and retailers of pea and tomato had been taken as units of analysis. They have been interviewed in scrupulous manner and tried to accumulate the adequate information from them. Research has been confined with 50 farmers in which 25 farmers have been taken from U.S. Nagar and 25 farmers have been taken from district of Nainital. Research has also taken 10 wholesalers (5 from each district). To know the ultimate price and profit margins at which produces are being provided to consumers 20 retailers (10 from each district) have been selected. Also, commission agents have been selected from APMC mandi, who give the space for farmer's produces on their own platform, execute the marketing practices and make their commission, 20 commission agents have been selected (10 from 1 mandi of each district).

V. RESULTS AND DISCUSSIONS

Study reveals 37 farmers (75%) were happy with their production (pea and tomato) but mostly 45 farmers (90%) shown that they are not fetching profit as they expect because of monopoly of traders or commission agents. They are getting small share (40-45 paisa) in consumer rupee in both of districts. They are also facing the problems of post harvest losses because of perishability of produces. But tomato farmers were highly unhappy than pea farmers being high post harvest losses of tomato. 38 tomato farmers (95%) were facing post harvest losses. These problems is coupled with glut season when farmers strive only release out their produce irrespective of whether produce is sold below the cost or equal to cost. Almost 60 per cent of farmers sold their produce to local vegetable collectors only while 20 per cent of farmers sell their produce at *Mandi* and 10 per cent sold tomatoes directly to consumers in local *haats.* Only 10per cent sold their produce to processors of their local area.

Peas in U.S. Nagar

Although in U.S. Nagar, all blocks are having good volume of peas but block: Khatima and Gadarpur have been emerged as potential blocks for Pea production. In year 2009-10 these two blocks have produced 41.48 % of total Pea production of U.S. Nagar. While other districts like Sitarganj, Bazpur, Rudrapur, Kashipur, and Jaspur having somehow less production (fig. 3).

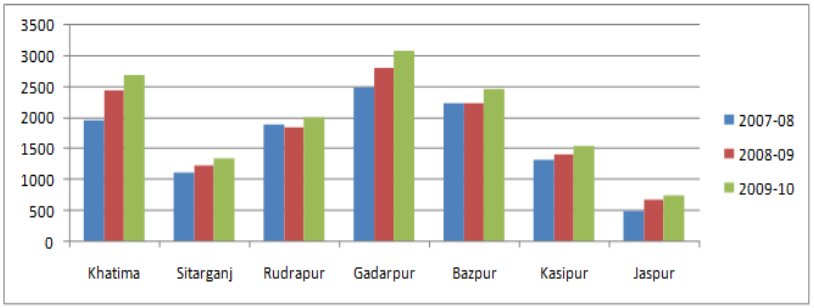

Fig. 3 Production of Pea in various blocks of district U.S. Nagar (in MT)

(Source: Directorate of Horticulture, Uttarakhand)

Tomato in U.S. Nagar District

Sitarganj and Rudrapur have been emeregd as main blocks in U.S. Nagar in tomatoes. These blocks produced 39.45% of total tomatos production in 2009-10 (fig 4). Other blocks – Khatima, Gadarpur, Bazpur, Kashipur, Jaspur were having less produce than Sitarganj and Rudrapur but production is increasing with good extent.

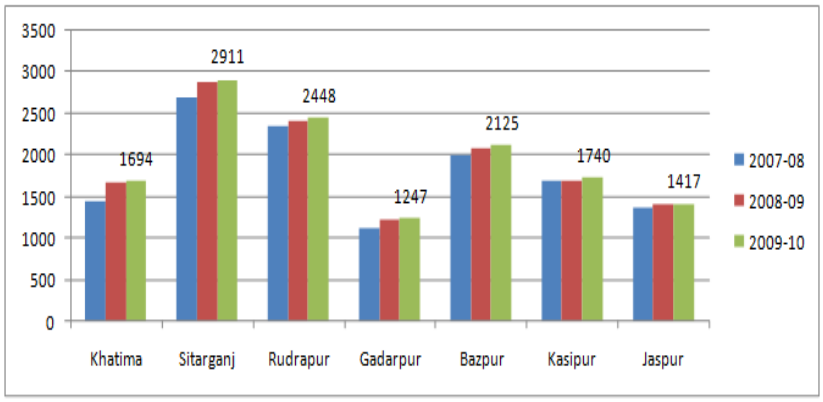

Fig. 4 Production of Tomato in various blocks of district U.S. Nagar (in MT)

(Source: Directorate of Horticulture, Uttarakhand)

Pea in Nainital District

Among all blocks Dhari is block which produced 26.35 % pea itself however as compare to other blocks Dhari had big harvested area (497 hectare) but on per hectare basis production is still higher. Here also, all blocks (with small or big production) of Nainital were showing increasing trend in pea production (fig. 5)

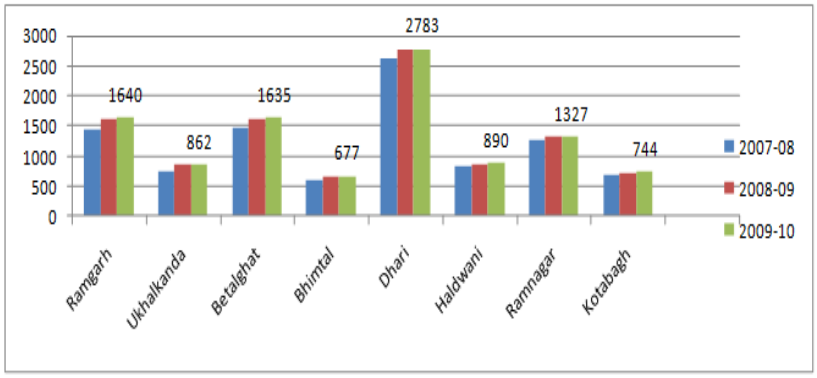

Fig. 5 Production of Pea in various blocks of district Nainital (in MT)

(Source: Directorate of Horticulture, Uttarakhand)

Tomato in Nainital District

Nainital is the big Producer of Tomato among all 13 district of Uttarakhand being this reason this is known as Tomato belt. Nainital District has produced 20346 MT with area of 1938 hectare. Study revealed that range between biggest and smallest producer block is very high. Where block Haldwani has produced 9765 MT Tomato, block Ramgarh has produced only 325 MT Tomato. This was biggest and smallest tomato producer in District in year 2009-10. Haldwani and Ramnagar have emerged as potential blocks in district. They have produced 81.58 % Tomato of District in 2009-10. (fig.6)

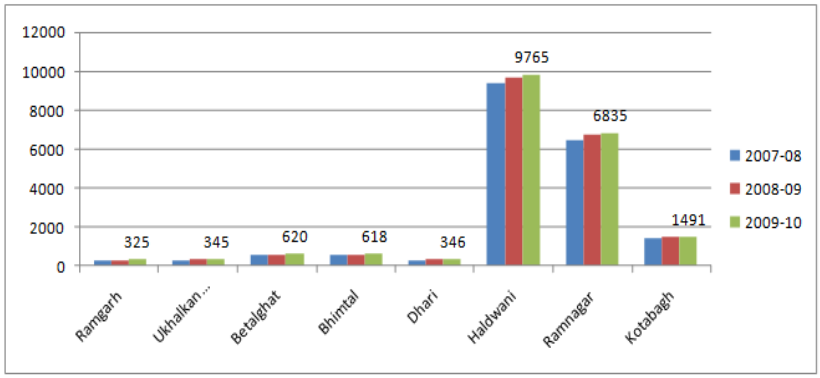

Fig. 6 Production of Tomato in various blocks of district Nainital (in MT)

(Source: Directorate of Horticulture, Uttarakhand)

Productivity is also different in both districts for peas as well as tomatoes. In U.S. Nagar, production (13944 MT) of Pea is higher than production (10558 MT) of Pea of Nainital District and productivity of U.S. Nagar is also higher. But in the case of tomato, U.S. Nagar has produced less volume and Nainital has produced much higher volume (20346 MT) of tomato but per hectare productivity of

Table 2. Production of Pea and Tomato in districts U.S. Nagar and Nainital

Year	Crop	District	Area (Ha)	Production (MT)	Productivity (MT/Ha)
2009-10	Pea	U.S. Nagar	2179	13944	6.39
		Nainital	1886	10558	5.59
	Tomato	U.S. Nagar	882	13582	15.39
		Nainital	1938	20346	10.49

Nainital is lower than U.S. Nagar in same year. This is because of vast area (1938 hectare) used for tomato cultivation in Nainital than area (882 hectare) used for tomato cultivation in U.S. Nagar in year 2009-10 (table 2).
Production cost of Peas (table 3) is very different in both of districts. There are also differences in composition of cost (A, B, C, and D). It has found that family labor's cost is very high in Nainital district as compare to family labor's cost in U.S. Nagar but machine's cost is zero or negligible in Nainital but in U.S. Nagar it is much higher comparatively.

Table 3. Production cost of Pea

PARTICULARS	U.S. Nagar (Rs./ hectare)	Nainital (Rs./ hectare)
A. OPERATIONAL COST (Value)		
Family labour	195.15	17,500
Hired labour	1963.65	00
Bullock labour	0.00	4750
Machine hours	1497.58	00
B. MATERIAL COST (Value)		
Seed	16312.88	16500
Manure	1242.42	2500
Fertilizer	1787.88	550
Plant protections & chemicals	1498.48	750
Irrigation	7.0	25
TOTAL WORKING CAPITAL	24504.10	42,575
C. Interest on working capital 10% for 3 month	613.00	1064.0
D. Rental value of land	15000.00	3000
E. TOTAL COST OF PRODUCTION	41117	46639

(Source: Department of Agriculture Economics, College of Ag., G.B.P.U.A&T, 2010)

But cost D is five times more in Udham Singh Nagar district. It is because of high rental value of land but total cost of production of pea is more than Rs. 5000 .00 higher in Nainital.
While in the case of tomatoes it is just opposite to previous case (table 4). In U.S. Nagar, the cost of production of tomatoes is much higher as compare to cost incurred in tomatoes cultivation. It is due to differences in composition of cost A.

Table 4. Production cost of Tomato

PARTICULARS	U.S. Nagar (Rs./ hectare)	Nainital (Rs./ hectare)
A. OPERATIONAL COST (Value)		
Family labour	4750	31,200
Hired labour	21000	00
Bullock labour	0.00	7000
Machine hours	4750	00
B. MATERIAL COST (Value)		
Seed	11400	9350
Manure	2200	1800
Fertilizer	2700	1900
Plant protections & chemicals	23600	18333
Irrigation	1800	275
TOTAL WORKING CAPITAL	72200.00	69858.00
C. Interest on working capital 10% for 3 month	1805.00	1746.0
D. Rental Value Of Land	15000.00	3000
E. TOTAL COST OF PRODUCTION	89005.00	74604.00

(Source: Department of Agriculture Economics, College of Ag., G.B.P.U.A&T, 2010)

Existing market channels and intermediaries margins

Existing supply chain model (fig 7) shows that farm produce (Pea & Tomato) is being reached up to end consumer through numbers of middlemen. After harvesting, crops are generally carried by the farmer to commission agent/ adatiyas at the mandi where auction is conducted in front of the farmers and produces go to bidders (wholesalers) with highest bid, commission agents take 6 - 7% commission which includes 2.5 % as mandi fee (2% market fee + 0.5% development fee).

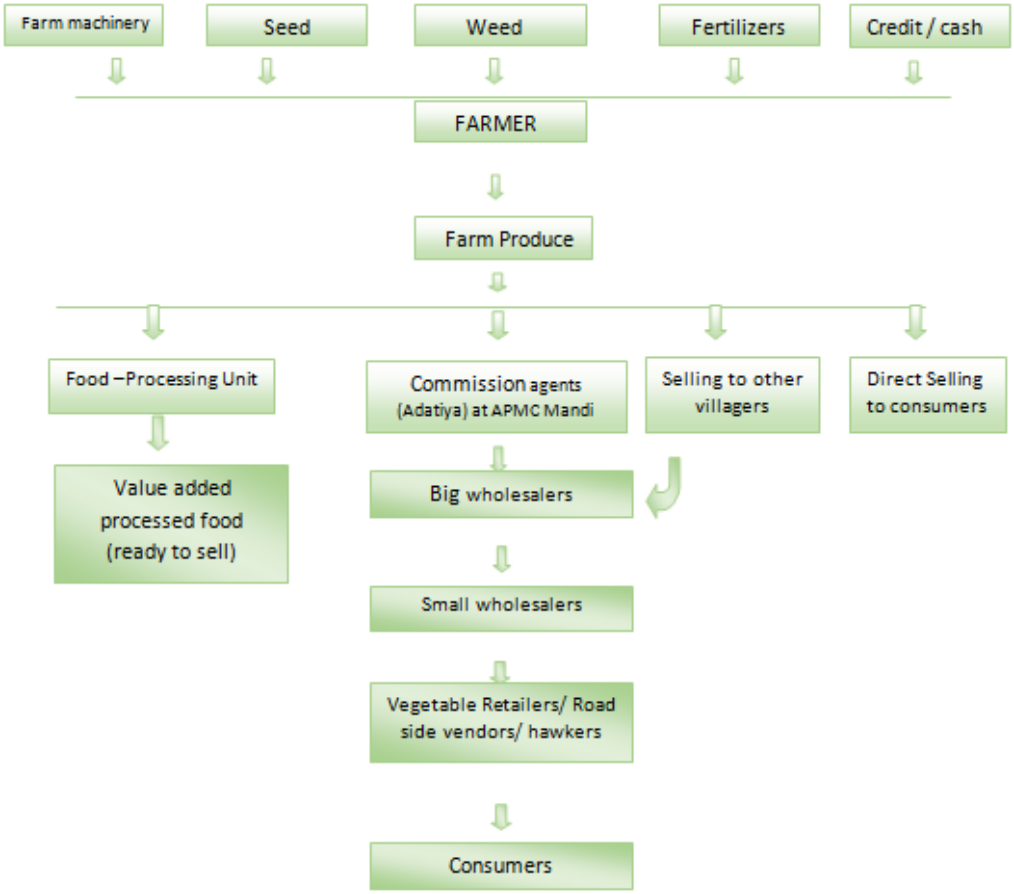

Fig.7 Existing market channels

Wholesalers then supply produce to smaller wholesalers and take 5-6 % margins from them. Then small wholesalers further take 15-20% margins from small traders/ retailers after adding logistics charges and other miscellaneous charges. Retailers, who receive produces at last, take 15-20 % margin further and handover the produces to ultimate consumers

Arrival Season of Pea in Mandi

Table. 5 Arrival Season of Pea

Location/Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rudrapur Mandi												
Haldwani Mandi												

As above table.5 shows that arrival season for pea is started from November and lasts till mid of March. This time pea is sold at Rs. 5-10/ kg. After this, pea will be available in Haldwani mandi which come from Hills area. This is time when pea stakeholders can fetch high profit. This time price of pea goes to rise and price is sold at Rs. 25-35/Kg

Arrival Season of Tomato In mandi

Table.6 Arrival Season of Tomato

Location/Season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rudrapur Mandi												
Haldwani Mandi												

Arrivals of tomatoes start from October which go to December and then arrival starts from mid April and it goes to June in Rudrapur mandi. This time is glut time where produce is available in both mandi. This time tomato is sold at Rs. 5-8/ kg. But in remaining months when tomato is available in Haldwani mandi and arrivals come from hill area, stakeholders fetch high profit by its business. This time tomato can be sold at Rs. 35-45/kg (table.6)

Price Checking Status before selling Farm Produce

In U.S. Nagar 40 % and in Nainital 45 % farmers never check the market price before selling the farm produces while farmers who always check price were few in numbers in both of Districts. This is clearly seen that there is lack of information among vast number of farmers in both of district (fig.8).

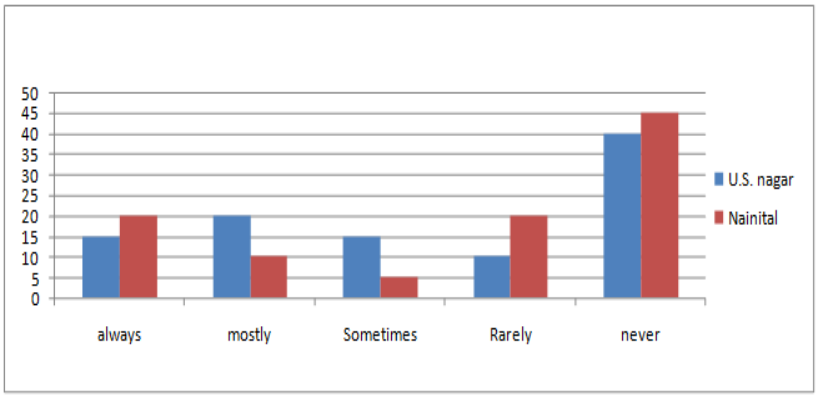

Fig. 8 Pricing status before selling farm produce in districts U.S. Nagar and Nainital

Innovative Supply Chain Model (Proposed)

In this model (fig.9) there are collection centre will be linked to distribution centre equipped with ICT (information and communication technology) so that each and every may get the proper information. This model will not only increase the farmer's share in consumer rupee by eliminating the unnecessary numbers of middlemen but also providing the precious information regarding market price of farm produce, market linkages, input market information, demand and market fluctuations etc. distribution centre will avail the produce to processors and organized retail stores. These retail stores will fulfill the end consumer's demand.

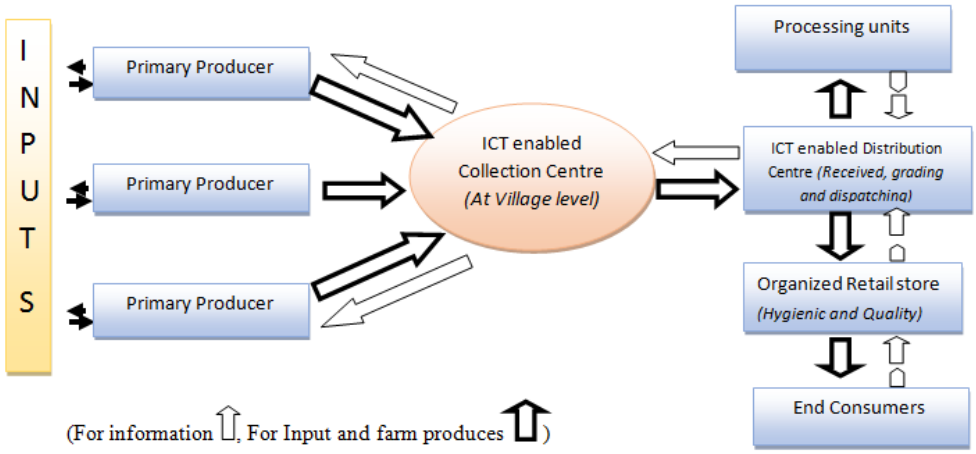

Fig. 9 Supply Chain Model (Proposed)

This model will follow "hub and spoke" concept. All primary producers will act as spoke and collection centre will be hub. Collection centre will work at village and supply the collected produce to distribution centre which will work at district and state level. Farmer will give only development fee at collection centre. Apart from the collecting and delivering the produce, collection centre will accumulate and disseminate the information too. Collection centre and distribution centre will be equipped with some required number of computers which will be handled by technical staffs. Collection centre will be linked with distribution centre by internet.

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