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Cost of cultivation of ginger in Himachal Pradesh

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Abstract

Ginger is the traditional cash crop in certain pockets of Himachal Pradesh. Over the years, the profitability of this crop has been affected due to several factors and as such there are indications of decline in its area in the state. Therefore, the present investigation was carried out to examine the changes, if any, in area under ginger and compute the economics of its cultivation. The total cost of production of ginger has been estimated at Rs. 21.75/kg. The gross returns from ginger (excluding mixed crops) were Rs. 361850/hectare and net returns amounted to Rs.97575/hectare. Major problems faced by ginger growers were non-availability of quality/disease free seed, problem in seed storage, incidence of rhizome rot, etc. There is a need to develop scientific storage methods/ structures and ensure adequate supply of quality seeds. There is also a need to create awareness about the improved management practices to raise the productivity of ginger crop in the state.

Key words: Trends, cost of cultivation, farm management costs, price indices.

Introduction

Ginger (*Gingiber officinale*), believed to be a native of Southern Asia, has long been a peculiar addition to Asian cuisines as a spice. It has been used in traditional Indian system of Ayurvedic medicines and has been recommended for the treatment of many diseases. India ranks first in ginger production in the world followed by China and Nigeria. Ginger is widely grown in different parts of India. The major ginger growing states are Karnataka, Assam, Orissa, West Bengal, Kerala, Meghalaya and Himachal Pradesh. In 2008-09, India grew ginger on 138.5 thousand hectares with the production of 795 thousand tonnes.

In Himachal Pradesh, ginger was cultivated on 2171 hectares with a production of 18814 tonnes in 2008-09. It holds the key for enhancing income of peasantry in the state as the agro-climatic conditions of certain pockets or valley areas favour cultivation of high quality ginger (Gupta and Sharma 2010). Therefore, the ginger cultivation ensures much higher pay-off to the farmers as compared to foodgrains and has emerged as the viable option in monkey menace prone hinterlands. Also, the Government of Himachal Pradesh has accorded high priority to diversify agriculture through cultivation of high value cash crops. However, the production potential of ginger is greatly influenced by the availability of quality seeds, good management practices (for control of rhizome rot) and remunerative markets for

sale. Unlike other major crops, ginger has not been provided price/market support so far, and as such, the price may sometimes fall below the cost of production. It was with this background that the profitability of ginger cultivation was examined in RKVY project 'Estimation of Cost of Cultivation of Commercial Crops in Himachal Pradesh' sponsored by Department of Agriculture, Government of Himachal Pradesh (Anonymous 2011).

Methodology

Sirmaur and Bilaspur districts have been purposively selected for the present study as these two districts account for almost 70 per cent of the total area under ginger in the state. Keeping in view the short span of the study, data were collected through RRA by randomly selecting 15 ginger growing villages in these districts. The RRA was conducted in the month of February, 2011 in Sirmaur and in April, 2011 in Bilaspur district. The detailed information on various aspects of production, input use pattern and marketing was gathered from the ginger growers in these villages through RRA on a comprehensive survey schedule designed exclusively for this purpose. Besides this, the secondary information on area, production and productivity and prices of ginger in major markets (Bilaspur and Solan) was gathered from various published reports and websites. Cost of cultivation and returns were analysed by using standard farm management cost concepts. Besides, behaviour of ginger prices in Bilaspur and Solan markets was examined by computing seasonal price indices (SI) as follows:

$$SI = \frac{P_i}{P_a} \times 100$$

where, P_a denotes the annual average price while P_i denotes the weekly/seasonal average prices w.r.t. production season in Bilaspur and Solan markets. Besides these, other statistical tools like growth trends, coefficient of variation, etc. were used to interpret the findings.

Results and Discussion

Trends in ginger production

Over the period from 1996-97 to 2008-09, area under ginger has hovered around 2000 to 2600 hectares (Table 1). There was steady increase in the area under ginger from 2059 hectares in 1996-97 to a peak level of 2609 hectares in 2001-02. However, thereafter, the area under it has decreased continuously and the production has also exhibited wide year to year fluctuations. The maximum production to the tune of 29012 tonnes was realised in 2001-02 while the minimum production of 14567 was in 2005-06. Like production, yield of ginger also revealed high variability over the years. The yield of ginger varied from as low as 66.85 q/ha in 2005-06 to as high as 112.35 q/ha during the year 2007-08. The sluggish trend in ginger production is also revealed through very low and non-significant growth in area (0.086% p.a.) and production (0.066% p.a.) and even negative growth (-0.020% p.a.) in

yield during the period under consideration. The instability in ginger crop is also shown by high coefficient of variation in production (23.07%) and yield (18.35%).

Ginger is grown in nine out of twelve districts of Himachal Pradesh (Table 2). Sirmaur accounted for major proportion of area (63.38 per cent) and production (62.15 per cent) of ginger in Himachal Pradesh followed by Solan accounting for 18.56 per cent of area and 19.16 per cent of production during 2008-09. Bilaspur accounted for around 5 per cent of the area and 6 per cent of total production of ginger. Over the period 2001-02 to 2008-09, area under ginger has decreased in all the major ginger producing districts. The main concern is that this decrease is mainly due to reduction in productivity of ginger crop in all the districts. In Sirmaur, the major ginger growing district, the yield has decreased from 113 q/ha in 2001-02 to about 85 q/hectare in 2008-09.

Table 1. Trends in area, production and yield of ginger in HP, 1996-97 to 2008-09

Year	Area (ha)	Production (tonnes)	Yield (q/ha)
1996-97	2059	15228	73.96
1997-98	2153	19166	89.02
1998-99	2334	20699	88.68
1999-2000	2311	25294	109.45
2000-01	2551	23323	91.43
2001-02	2609	29012	111.20
2003-04	2455	17051	69.45
2004-05	2051	14658	71.47
2005-06	2179	14567	66.85
2006-07	2396	20589	85.93
2007-08	2273	25537	112.35
2008-09	2171	18814	86.66
Compound growth rate (% p.a.)	0.086	0.066	(-) 0.020
Coefficient of variation (%)	7.95	23.07	18.35

Source: Directorate of Land Records, Shimla

Table 2. District-wise area, production and yield of ginger in Himachal Pradesh

Districts	2001-02			2008-09		
	Area (ha)	Production (tonnes)	Yield (q/ha)	Area (ha)	Production (tonnes)	Yield (q/ha)
Bilaspur	164	1573	95.91	99	1176	118.79
Chamba	3	33	110.00	1	9	90.00
Hamirpur	7	78	111.43	2	17	85.00
Kangra	18	200	111.11	23	199	86.52
Mandi	78	867	111.15	122	1057	86.64
Shimla	267	2976	111.46	144	1051	72.99
Sirmaur	1458	16442	112.77	1376	11692	84.97
Solan	612	6821	111.45	403	3604	89.43
Una	2	22	110.00	1	9	0.00
H.P.	**2609**	**29012**	**111.20**	**2171**	**18814**	**6.66**

Source: Directorate of Land Records, Shimla

Ginger cultivation in the study districts

Ginger is propagated vegetatively which means the pieces of rhizome are planted in soil and each sprout of rhizome forms a new plant. It was observed that farmers store rhizomes in a pit for a period of two to three months after harvesting in the months of November and December and these are taken out from the seed pits in the months of March and April. The sprouted rhizomes are then planted in the field in mid May in higher hills and May end in low hills. Seed storage is most critical part of ginger cultivation. It has been found that farmers use seed pits of different dimensions and depth and there is no standard and scientific technique used for seed storage. Both purchased and own seed was used. The farmers also exchange seeds amongst themselves after every three years to maintain healthy seed and control incidence of rhizome rot. Rhizomes are planted either as sole crop or inter cropped with maize, turmeric, colocasia and chillies. Generally biennial crop rotation is followed viz, ginger-vegetables-vegetables or ginger- wheat- maize.

The cropping pattern followed by ginger producers in Sirmaur and Bilaspur districts has been given in table 3. Ginger (both sole and mixed) accounts for 11.50 per cent of the total cropped area in Sirmaur and 5.89 per cent in Bilaspur. Maize and wheat are the predominant crops accounting for 23.59 per cent and 43.59 per cent of the cropped area respectively in Sirmaur and 27.86 per cent and 37.40 per cent of the total cropped area in Bilaspur.

Table 3. Cropping pattern in sample villages in Sirmaur and Bilaspur, 2010-11

Crops	Per cent cropped area	
	Sirmaur	Bilaspur
Kharif crops		
Maize	25.93	27.86
Paddy	3.50	8.77
Ginger (including mixed crops)	11.5	5.89
Kharif pulses	2.28	0.14
Kharif vegetables	6.76	9.01
Rabi crops		
Wheat	43.59	37.40
Barley	1.93	4.49
Rabi pulses	1.25	0.07
Oilseeds	0.21	0.24
Rabi vegetables	0.21	5.80
Garlic	2.13	0.00
Chillies	0.71	0.00
Others	0.00	0.31
Total cropped area	100.00	100.00
Cultivated area		
Cropping intensity (%)	181.05	154.73

Source: Field survey, 2010-11

The vegetable crops (both Kharif and Rabi) also account for sizable share of the cropped area particularly in Bilaspur. The farmers reported shift in cropping pattern from ginger to high value vegetable crops particular tomato and cauliflower. The cropping intensity was 181.05 per cent in Sirmaur and 154.73 per cent in Bilaspur. Being a labour intensive crop, the farmers follow the age-old tradition of labour sharing (*satta-batta*) on community basis, especially for operations like FYM application that requires large amount of labour. It is practised by all the farmers in the traditional ginger growing belts in the interiors of the study districts.

Cost of cultivation and returns

The detailed analysis of input-output relationship and cost of ginger cultivation was carried out. The use of material inputs, labour and cost of cultivation of ginger has been estimated and presented in Table 4. The cost of cultivation has been estimated per unit of land namely, *bigha* (0.08 ha) and per hectare. It was found that cost of seed was the major component of total cost as it amounted to Rs.7640/*bigha* (Rs. 95500/ha) accounting for 36.14 per cent of the total cost. Ginger cultivation is highly labour intensive activity lasting for 7 to 8 months in a season. As such, total human labour requirement for sowing, manuring, intercultural operations, irrigation and harvesting came out to be 45 man days/ *bigha* (562.50 man days/ha) costing Rs. 6750 / *bigha* (Rs. 84375/hectare) and accounted for 31.93 per cent of the total cost. There was substantial use of farm yard manure (37q/*bigha*) which is also used as mulching material after sowing. A thick layer of FYM mixed with dry leaves is spread in the field after sowing. In this way FYM accounted for around 7 per cent of the total cost. However, the expenditure on fertilizers was just about 0.60 per cent of the total cost. The farmers used 13.5 kg/*bigha* (168.75 kg/ha) of IFFCO mixture (12:32:16) as a basal dose and 3 kg/*bigha* (37.5 kg/ha) of urea as top dressing dose. The bullock labour requirement was 2 days/*bigha* (25 days/ha) for field preparation and the cost of bullock labour was estimated at Rs. 1000/*bigha* (Rs. 12500/ha) accounting for 4.73 per cent of the total cost. The total variable cost of ginger cultivation came out to be Rs.17562/*bigha* (Rs. 219525/ha) accounting for 83.07 per cent of the total cost of ginger cultivation. The total fixed cost which includes rental value of land, interest on fixed capital and depreciation on tools and farm machinery was estimated at Rs.3580/bigha (Rs. 44750/ha). The total production includes recovery of old ginger rhizomes (previously used as seed), fresh ginger and some output of mixed crops. Many crops like maize, colocasia, chillies and turmeric were grown mixed with ginger. The productivity of ginger came out to be 9.72 q/*bigha* (121.50 q/ha) in which the share of fresh ginger is around 84.16 per cent. The price of fresh ginger was

Table 4. Cost of cultivation of ginger in Himachal Pradesh

Particulars	Per *bigha*			Per hectare		
	Quantity	Rate (Rs.)	Value	Quantity	Value	Per cent to total cost
A Variable cost						
1. Seed	191 kg	40/kg	7640	2387.50	95500	36.14
2. Seed treatment			150		1875	0.71
3. FYM & mulching	37 q	40/q	1480	462.50	18500	7.00
4. Fertilizers						
IFFCO mixture	13.5 kg	8/kg	108	168.75	1350	0.51
Urea	3 kg	6/kg	18	37.50	225	0.09
5. Plant protection			100		1250	0.47
6. Bullock labour	2days	500/BPD	1000	25.00	12500	4.73
7. Human Labour	Man days	150/Man.day				
i) Field preparation	2		300	25.00	3750	1.42
ii) Seed preparation & sowing	7		1050	87.50	13125	4.97
iii) Manuring and mulching	8		1200	100.00	15000	5.68
iv) Interculture	17		2550	212.50	31875	12.06
v) Irrigation	1.5		225	18.75	2812	1.06
vi) Spraying	0.5		75	6.25	938	0.35
vii) Harvesting & cleaning	9		1350	112.50	16875	6.39
Total human labour	45					
i. Hired labour	9					
ii. Family labour	36		6750	562.50	84375	31.93
8. Sub total			17246		215575	81.57
9. Interest on working capital			316		3950	1.49
10. Total variable cost for ginger			17562		219525	83.07
11. Material inputs for mixed crops			1280		16000	5.12
B. Fixed cost						
i) Rental value of land			3500		43750	16.55
ii) Interest on fixed capital			29		362	0.14
iii) Depreciation			51		638	0.24
Total fixed cost (ginger)			3580		44750	16.93
C. Total cost (ginger)			21142		264275	100.00
D. Total cost (ginger+mixed crops)			22422		280275	
E. Production & Returns						
i) Old ginger	1.54 q	1800/q	2772	19.25	34650	
ii) Fresh ginger	8.18 q	3200/q	26176	102.25	327200	
iii) Mixed crops (colocasia, turmeric, chillies, maize etc.)			3850		48125	
iv) Gross Returns						
i.With mixed crops			32798		409975	
ii.Without mixed crops			28948		361850	
v) Net Returns (without mixed crops)						
a) Over variable cost			11386		142325	
b) Over total cost			7806		97575	

Source: Based on Field Survey, 2010-11

much higher (Rs.3200/q) as compared to old ginger (Rs.1800/q). In this way, the gross returns from ginger (excluding mixed crops) came out to be Rs. 28948/*bigha* (Rs. 361850/ha) and net returns worth Rs.7806/*bigha* (Rs. 97575/ha).

Besides the cost of cultivation, different farm management costs have also been estimated and these have been displayed in Table 5. The total cost of production of ginger has been estimated at about Rs.21.75/kg and the variable cost (with family labour) amounted to Rs.18.07/kg (Table 6). However, cost of producing ginger on cost A_1 basis (without family labour) came out to be Rs. 12.56/kg.

Table 5. Farm management costs in ginger cultivation

Particulars	Rs./*bigha*	Rs./ha
1. Seed	7640	95500
2. FYM	1480	18500
3. Fertilizers	126	1575
4. Pesticides/Chemicals	250	3125
5. Bullock labour	1000	12500
6. Hired human labour	1350	16875
7. Depreciation & repairs	51	637
8. Interest on working capital @ 8% p. a.	316	3950
Cost A_1 (Items 1 to 8)	**12213**	**152663**
9. Rent paid for leased-in land	-	-
Cost A_2	**12213**	**152663**
10. Imputed rental value of land	3500	43750
11. Interest on fixed capital	29	362
Cost B	**15742**	**196775**
12. Imputed family labour	5400	67500
Cost C	**21142**	**264275**
13. Management cost @ 10 % of Cost C	2114	26425
Cost D	**23256**	**290700**

Source: Based on Field Survey, 2010-11

Table 6. Cost of production of ginger in HP

Particulars	Cost of Production (Rs.per kg)
Based on Cost A_1 (without family labour)	12.56
Variable cost (with family labour)	18.07
Total cost (variable & fixed)	21.75

Thus, the incentive to enhance area and production of ginger would depend upon the relative profitability of ginger *vis-à-vis* vegetable crops and also the ginger prices that cover the cost of production besides a reasonable mark up to sustain production.

Marketing and price behaviour

Ginger is a commercial crop as major proportion of produce is sold out (Table 7). It is also true that substantial part (about 20 per cent) of produce is kept as seed either for use on own farm or for sale. Out of total production, around 75 per cent

Table 7. Production and marketed surplus of ginger

Particulars	Quantity (q/village)	Per cent
Production	92.14	100.00
Kept as seed	18.43	20.00
Home consumption	1.73	1.88
Wastage/spoilage	3.25	3.53
Marketed surplus	68.74	74.60

is sold out either in local markets or to itinerants coming from Punjab, Haryana and Uttar Pradesh. Some part of the marketed surplus is also procured by the State Department of Agriculture for sale as seed to growers.

The seasonal variability in weekly prices of ginger in Bilaspur and Solan market has been presented in Table 8. In Bilaspur market the prices of ginger were maximum in the months of September and October. From October onwards the prices tend to fall in the subsequent months up to January. The lowest prices were observed in the month of December when monthly mean index was just 76.11 per cent. However, from January onwards prices of ginger show rising tendency. It is clearly observed that in the months of February and March the seasonal prices generally increase when stored ginger is sold as seed crop.

In Solan market too, the pattern of variability was almost similar with high prices in the months of September when the average price index for the month was 114.03 per cent. From November onwards till January, which is the peak arrival season of ginger in the market, the prices generally remain very low. However, in the month of February ginger prices witness remarkable increase with the average price index touching a peak level of 126.63%.

Table 8. Monthly prices and seasonal variability of ginger in Bilaspur and Solan markets

	Bilaspur Market			Solan Market		
Months	2009-10	2010-11	Average	2008-09	2009-10	Average
September	128.33	130.86	129.60	121.55	107.63	114.03
October	97.31	109.19	103.25	100.56	97.80	99.07
November	90.09	87.03	88.56	78.56	66.96	72.29
December	69.50	82.74	76.11	90.53	71.19	80.08
January	103.42	76.66	90.05	71.04	125.33	100.37
February	101.82	111.12	106.47	130.07	123.70	126.63
March	112.69	103.21	107.95	107.69	107.40	107.53
Overall average	100.00 (2684.40)*	100.00 (2680.54)	100.00 (2682.49)	100.00 (2095.06)	100.00 (2461.41)	100.00 (2278.23)

Source: http://dacnet.nic.in/dm/agmarkweb/sa_report/menu.aspxwww.agmarknet.nic.in

Note: Interpolation method used for missing data in few weeks.* Figures in parentheses show prices in Rs/q

This may be due to high demand for ginger seed. From the seasonal behaviour of ginger prices it can inferred that farmers can gain either by selling fresh ginger early in the months of September and October or store the crop after harvesting and sell in the month of February and March as seed crop.

Technological gap and problems in ginger growing

During survey of different ginger growing villages, various problems were pointed out by the growers. At the outset, the survey team found certain technological limitations/gaps in the use of critical inputs as displayed in Table 9. It was found that farmers used about 20 per cent higher seed rate of ginger (23.88 q/ha) than the recommended (20.00q/ha). Thus, the cost can be reduced by reducing the seed rate. Similarly, the use of FYM and mulching material was also about 32 per cent higher than the recommended level. Among fertilizers, the farmer used higher dose of IFFCO mixture (168.75 kg/ha) than the recommended dose (156.30 kg/ha). Contrary to this, the use of urea was negligible while there was no use of phosphorus and potash in ginger crop. Majority of the farmers did not use urea in Sirmaur.

The ginger growers were also interviewed to rank various problems and constraints experienced by them. The basic production problem revealed by ginger growers was the non-availability of healthy and quality ginger seed in adequate quantity. Further, there was no specific variety which could be recommended for these areas and also the research efforts to evolve new varieties were reported to be lacking. The farmers lacked technical knowledge regarding the crop rotation, seed and soil treatment, etc. Some of the farmers lacked the storage skills which results in decaying of their seed during storage. Various marketing problems were non-availability of market, far off markets, un-remunerative prices of produce, grading problems, packing problems, non-availability of quality packing material, high cost of transportation, etc.

Suggestions and policy interventions

Based on the field survey and interactions with ginger growers, the following interventions need to be made if ginger cultivation is to be promoted in Himachal Pradesh. Firstly, there is a need to develop scientific storage methods/ structures as there is always a risk of rotting of seed in traditional pits. Secondly, per hectare cost of cultivation can be reduced provided optimum seed rate is used and returns can further be increased substantially if the recommended package of practices are followed by the farmers. Finally, the precise market information on prices can guide the growers to take prudent marketing decisions regarding the disposal of their produce.

Table 9. Technological gaps in inputs use in ginger

Inputs	Actual use/ha	Recommended dose/ha	Gap (%)
Seed (q)	23.88	20.00	19.40
FYM (q) and mulching	462.00	350.00	32.00
IFFCO mixture (kg)	168.75	156.30	7.97
Urea (kg)	37.50	175.00	-78.57
SSP (kg)	0.00	315.00	-100.00
Muriate of Potash	0.00	80.00	-100.00

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