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Return Per-Rupee of Investment and Break Even Point of Ginger Cultivation

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ABSTRACT

Ginger as a major cash crop cultivation of Himachal Pradesh has a unique place in its production in the state. The crop has immense potentiality towards generating farm income as well as employment thereby improving the standards of living of the farmers. On account of a very limited research on the production aspect of ginger cultivation in the state, depth analysis of the economics of ginger cultivation assumes importance with the objective of determining the various cost and returns pattern of ginger production. The sample data comprised ginger growers categorized as 60 marginal, 32 small, 18 medium and 10 large farmers, classified on the basis of probability proportion to size of holdings. The study revealed that the variable costs varied inversely to the size of holdings meaning that it was highest for the marginal and small farms and least for the large farms. The same pattern was found to be true for the total costs of ginger cultivation whereas the fixed costs were found to be directly proportional to the farm sizes. Moreover the study also revealed that seeds occupied a larger share in the variable costs for all the farm sizes whereas rental value of owned land had the largest share (74.00- 78.00 per cent) in the total fixed cost. Data analysis revealed that the large sized farms were highly efficient with the highest net returns from ginger cultivation. The worked out the highest seed cost of ginger i.e. 27.57 per cent among all the size of holdings. Thus, further it can be concluded from the present study that return per rupee, benefit-cost ratio and breakeven point of ginger crop came out the highest on the large size of holdings i.e. Rs. 3.82, Rs. 3.47:1 and 0.30 tones production per hectare.

KEYWORDS: *Variable costs, fixed costs, Net-Return, RPR, BCR and BEP*

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INTRODUCTION

It has been used as a spice and medicine in India and China since ancient times. It was the first oriental spice known in Europe and having been obtained by the Greeks and Romans from Arab traders, who kept a secret of their origin of the spice in India. It was known to Discorides and Pliny in the first century A. D., the former frequently refers to it in his De Materia Medica describing its warming effects on the stomach and as an aid to digestion and antidote to poisons. The Sanskrit name Singhabera give rise to Green Lingiberi and later Latin Lingiber. It is mentioned in Koran. In Arabian nights it has been referred for its aphrodisiac properties. India enjoys from times immemorial a unique position in the production and export of ginger. Ginger was originated in Southern China. On world level, it grows in Jamaica, Nigeria, China, Taiwan, Australia, Japan etc. In India, it is grown in the states like Kerala, North Eastern States, Sikkim, Himachal Pradesh, Odisha, West Bengal, Karnataka, Andhra Pradesh and Maharashtra. Ginger (Zingiber officinalis Roscue) belongs to family–Zingiberaceae. It is a slender monocotyledonous rhizomatous perennial herb, leaves are linear, sessile, glabrous, flowers are yellowish green, spikes are cylindrical and fruits are oblong capsules. Rhizomes are white to yellowish brown in colour, laterally flattened and irregularly branched. Few scales gave a covering to the growing tips. Rhizomes are smooth and if broken some fibrous elements of the vascular bundles comes out from the cut-ends. It is one of the

important spices all over the world and India is the largest producer, consumer and exporter of the world. It is marketed in different forms such as raw ginger, bleached dry ginger, ginger candy, ginger powder, ginger oil, ginger squash, ginger beer, ginger flakes etc.

Review of Literature

The knowledge of scientific literature in any field of study is of great importance in the successful conduct of any research investigation. Singh et.al (2018), conducted a study on costs and income analysis of maize cultivation in Bahraich district of Uttar Pradesh, India, based on primary data collected from 100 respondents, in Tejwapur block of Bahraich district Uttar Pradesh. They concluded that the cost of cultivation of maize was highest on medium farms Rs. 51066.44, followed by marginal farms Rs. 49891.28 and small farms Rs. 47097.44 respectively.

The major component of the cost were human labour 34.17 per cent, Machinery charge 18.18 per cent, manure and fertilizers 16.18 per cent, rental value of owned land 12.35 per cent, seed cost 5.90 per cent, plant protection 1.71 per cent and irrigation charge 1.32 per cent respectively of the total costs of cultivation. Per hectare cost of cultivation was found of positive trend with farm size. The net income was highest on marginal farms Rs. 13262.56, followed by small farms Rs. 12029.12 and medium farms Rs. 11907.56. On an average family labour income, farm business income and farm investment income were observed to be Rs. 22461.22, Rs. 28779.10 and Rs. 23389.97, respectively. Kumar and Kumari (2018) conducted a study on economics of food-grain crops in Himachal Pradesh, A Study of Solan District based on primary and secondary data collected from 120 respondents in two blocks namely, Kunihar and Nalagarh in Solan District of Himachal Pradesh. The per hectare cost of cultivation of wheat was worked out at Rs. 17619.21 on marginal farmers, Rs. 18290.50 on small farmers, Rs. 72693.56 on medium farmers and Rs. 25717.05 on overall farmers. Among the various input costs, cost B was highest among all the farm size followed by imputed value of family labour. On the other hand gross return was worked out at Rs. 21835.45, Rs. 49504, Rs. 132175 and Rs. 50820 in respect of marginal, small, medium and overall farmers. The net returns on wheat were observed that the Rs. 4216.24, Rs. 31213.50, Rs. 59481.44 and Rs. 25102.95 on marginal, small, medium and overall farmers. Cost of cultivation of maize crop was incurred at Rs. 15870.18 on marginal farmers, Rs. 34408.09 on small farmers, Rs. 48455.35 on medium farmers Rs. 27005.45 on overall farmers. Singh et al. (2019) carried out a study on economic management and analysis of potato cultivation, a case study of Agra district of Uttar Pradesh based on primary data collected from 44 growers in Sonari village, block namely, Bichpuri in Agra district of Uttar Pradesh. They concluded that the overall cost of cultivation Rs. 140303.7 per farm and Rs. 78657.98 per hectare. Among all the inputs, per hectare value of potato seed was 25.00 per cent, the human labour was 14.00 per cent, the total variable cost was 78.00 per cent, the total fixed cost was 22.00 per cent per hectare and the overall total cost C_3 of potato was Rs. 154334.07 per farm and Rs. 86523.78 per hectare. The gross income received by farms with the overall average of Rs. 188370. They further concluded that the investment of per rupees in potato cultivation the small, medium and large farmers earned Rs. 3.42, Rs. 2.61 and Rs. 2.21 respectively.

The Specific objectives of the study are given below:

1. To estimate the cost of cultivation and resource use efficiency of Ginger crops
2. To estimate profitability of ginger cultivation

Hypothesis of the Study

Null Hypothesis H_0: There has been no impact of RPR on net-return.

Alternative Hypothesis H_1: There has been more impact of RPR on net-return.

Materials and Methods

The present study is conducted in Rajgarh and Shillai blocks of Sirmour district of Himachal Pradesh. Two panchyats are randomly selected from each development block. From these noticed villages of ginger cultivation, three villages from each sampled block and panchyat were taken randomly. Thus in all 120 farmers was selected randomly. After that ginger growers were categorized into marginal ($0 \leq 1$ ha), small ($1 \leq 2$ ha), medium ($2 \leq 4$ ha), and large (≤ 4 ha). The study comprised of 60 marginal, 32 small, 18 medium and 10 large farmers. The primary data are collected from the farmers through personal interview with the help of well-prepared schedule for the agricultural year 2019-20.

Cost and Returns Analysis

The cost and returns has been worked out following farm management cost concepts like Cost A_1, Cost A_2, Cost B_1, Cost B_2, Cost C_1, Cost C_2 and Cost D. The definitions of these concepts has been explained below.

Cost A1 = This cost approximated actual expenditure incurred in cash and kind and included the following cost items:

1. Value of hired human labour
2. Value of bullock labour

3. Value of seed/seedlings
4. Value of manure 5. Value of fertilizers
5. Value of plant protection chemicals
6. Machinery uses
7. Depreciation of farm equipment, taken as 10.00 per cent of the total value.
8. Irrigation charges
9. Land revenue and other taxes
10. Interest paid on working capital or half of the growth period of the crop.

Cost A2 = Cost A1 + Rent paid for leased-in land

Cost B_1 = Cost A1 + imputed interest on owned fixed capital (excluding land)

Cost B2 = Cost A2 + imputed rental value of owned land (less land revenue) + imputed interest on owned fixed capital (excluding land)

Cost C1 = Cost B1 + imputed value of family labour

Cost C2 = Cost B2 + imputed value of family labour

Cost D = Cost C2 + 10.00 per cent of cost C2 (management charges)

Calculation of the Net-Returns from Different Cash Crops Cultivation

The net return from ginger crop has been estimated over different costs. The calculation has been made on per hectare basis. The details of procedure followed to compute the returns are explained below.

NR = GR-Cost D

Where

NR = Net Returns over Cost D

GR = YM PM + YB PB

GR = Gross returns per hectare of the crop

YM = Yield level of main product of the crop

PM = Price per quintal of the main product of the crop

YB = Yield level of the by-product of the crop

PB = Price per quintal of the by-product of the crop

Net returns have been worked out over different farm management costs like Cost A, Cost B1,Cost B2, Cost C1, Cost C2 and Cost D.

Gross Return/ Gross Income (GR)= (Main Product × Price per unit) + (By Product × Price)

Benefit Cost Ratio The benefit cost ratio (BCR) is calculated by dividing the proposed gross income cash by the proposed total cost D of the cash crops.

BCR= Gross Income/ Cost D

Break Even Point (BEP)= Fixed Cost/ Price (Rs./Tones) Variables Cost per Tones

Return Per Rupees (RPR)= Gross Income/ Cost C_2

Result and Discussion

Cost of cultivation of Ginger crop

The table 1.1 reveals that the average cost of cultivation of ginger has been worked out Rs. 83115 per hectare among all the sample size of holdings. The cost of cultivation of ginger has been worked out Rs. 85731, Rs. 83413, Rs. 82668 and Rs. 80649 per hectare on the marginal, small, medium and large size of holdings respectively. The share of family labour has been worked out 15.23 per cent per hectare among all the size of holdings. The share of family labour has been worked out 25.54, 19.16, 10.95 and 8.74 per cent per hectare on the marginal, medium, small and large size of holdings respectively. The proportion of cost on hired-labour has been worked out 13.43 per cent per hectare among all the size of holdings. The highest proportion of cost on hired-labour has been worked out 18.59 per cent per hectare on the large size of holdings,

Table 1.1 Per Hectare Cost of Cultivation of Ginger among the Sample Households (Value in Rs.)

Input Utilization Items	Size of Holdings				
	Marginal	Small	Medium	Large	All
Family Labour	21897 (25.54)	15979 (19.16)	9049 (10.95)	7046 (8.74)	13493 (15.23)
Hired-Labour	4020 (4.69)	10112 (12.12)	12781 (15.46)	14995 (18.59)	10477 (13.43)
Bullock or Tractor Labour	5241 (6.11)	5113 (6.13)	4910 (5.94)	4814 (5.97)	5020 (6.03)
Seeds/ Seeding	22221 (25.92)	21319 (25.56)	24735 (29.92)	22840 (28.32)	22779 (27.59)
Manure	9446 (11.02)	8438 (10.12)	8362 (10.11)	8258 (10.24)	8626 (10.32)
Fertilizers	2680 (3.13)	2832 (3.40)	3042 (3.68)	2993 (3.71)	2887 (3.51)

Plant Protection Chemical (insecticides and pesticides)	3297 (3.85)	2832 (3.40)	2688 (3.25)	2672 (3.31)	2872 (3.42)
Irrigation Charges	1167 (1.36)	1029 (1.23)	1032 (1.25)	1019 (1.26)	1062 (1.27)
Interest on working Capital for half of the growth period of the crop @ 9 per cent	1082 (1.26)	1163 (1.39)	1295 (1.57)	1296 (1.61)	1209 (1.48)
Total Variable Cost	71050 (82.88)	68818 (82.50)	67895 (82.13)	65934 (81.76)	68424 (82.26)
Depreciation of farm Equipment, farm Store and Machineries @ 10 per cent	1585 (1.85)	1705 (2.04)	1940 (2.35)	2060 (2.55)	1823 (2.23)
Land Revenue / Taxes	5 (0.01)	5 (0.01)	5 (0.01)	5 (0.01)	5 (0.01)
Rental value for owned land	5000 (5.83)	5000 (5.99)	5000 (6.05)	5000 (6.20)	5000 (6.04)
Interest on fixed capital @ 10 per cent	297 (0.34)	302 (0.37)	313 (0.37)	318 (0.39)	307 (0.37)
Total Fixed Cost	6887 (8.03)	7012 (8.41)	7258 (8.78)	7383 (9.15)	7135 (8.65)
Management cost	7794 (9.09)	7583 (9.09)	7515 (9.09)	7332 (9.09)	7556 (9.09)
Cost A_1	50743	54548	60791	60953	56759
Cost A_2	50743	54548	60791	60953	56759
Cost B_1	51040	54850	61103	61271	57066
Cost B_2	56040	59850	66103	66271	62066
Cost C_1	72937	70830	70152	68317	70559
Cost C_2	77937	75830	75152	73317	75559
Cost D	85731 (100.0)	83413 (100.0)	82668 (100.0)	80649 (100.0)	83115 (100.0)

Note: Figure in parenthesis shows the percentage to the average cost hectare

followed by 15.46, 12.12 and 4.69 per cent per hectare on the medium, small and marginal size of holdings respectively. The cost of labour on bullock or tractor has been worked out 6.03 per cent per hectare among all the size of holdings.

The small size of holdings has incurred the highest, 6.13 per cent per hectare on bullock or tractor, followed by 6.11, 5.97 and 5.94 per cent per hectare on the marginal, large and medium size of holdings respectively. The proportion cost of seed has been worked out 27.59 per cent per hectare among all the size of holdings. The cost of seed has been worked out 25.92, 25.56, 29.92 and 28.32 per cent per hectare on the marginal, small, medium and large size of holdings respectively. The cost of farm yard manure has been worked out 10.32 per cent per hectare among all the size of holdings. The cost of farm yard manure has the highest, i.e. 11.02 per cent per hectare on the marginal size of holdings, followed by 10.24, 10.12 and 10.11 per cent per hectare on the large, small and medium size of holdings respectively. The cost of fertilizer has been worked out 3.51 per cent per hectare among all the size of holdings. The large size of holding has the highest, i.e. 3.71 per cent per hectare cost on fertilizer, followed by 3.68, 3.40 and 3.13 per cent per hectare on the medium, small and marginal size of holdings respectively. The highest cost of insecticides and pesticide has been worked out 3.85 per cent per hectare on the marginal size of holdings, followed by 3.40, 3.31 and 3.25 per cent per hectare on the small, large and medium size of holdings respectively. The cost of insecticides and pesticides has been worked out 3.42 per cent per hectare among all the size of holdings. As the rental value of different size of holding is concerned, it has been worked out 6.04 per cent per hectare among all the size of holdings. The rental value has been worked out 5.83, 5.99, 6.05 and 6.20 per cent per hectare on the marginal, small, medium and large size of holdings respectively. The proportion of cost of interest on the fixed capital @ 10.00 per cent has been worked out 0.37 per cent per hectare among all the size of holdings. The large size of holdings has the highest, i.e. 0.39 per cent on interest on fixed capital per hectare, followed by 0.37, 0.37 and 0.34 per cent per hectare on the medium, small and marginal size of holdings respectively. The management cost per hectare has been worked out 9.09 per cent among all the size of holdings as well as each size of holdings mainly because of addition of 10.00 per cent of cost C2 to cost D (total cost).

Gross Return and Net Return Over Different Cost of Ginger Crop

The gross returns of ginger crop among all the size of holdings has been presented in the Table 1.2. The total production of ginger crop has been worked out 8.64 tons per hectare among all the size of holdings. The total production per hectare has been worked out the highest on the large size of holdings, i.e. 8.75 tons, followed by the small, medium and marginal size of holdings 8.72, 8.58 and 8.52 respectively. The high production on the large size of holdings under ginger cultivation was due to better utilization of variable inputs. The net return/ farm business income on cost A of ginger has been worked out Rs. 219794 per hectare among all the size of holdings. The net return per hectare was the highest on the marginal size of holdings, i.e. Rs. 221888, followed by Rs. 219997, Rs. 219054 and Rs.218238 on the small, large and medium size of holdings respectively. The net return on cost B_1 of the cultivation of ginger among all the size of holdings has been worked out Rs. 219487 per hectare. The net return per hectare was the highest on the marginal size of holdings, i.e. Rs. 221592, followed by Rs. 219695, Rs. 218736 and Rs. 217925 per hectare on the small, large and medium size of holdings respectively. Similarly the net return/ family labour income on the cost B_2 of the cultivation of ginger per hectare has been worked out Rs. 214487 among all the size of holdings. The net return/ family labour per hectare was the highest on the marginal size of holdings, i.e. Rs. 216592 followed by Rs. 214695, Rs. 213736 and Rs. 212925 per hectare on the small, large and medium size of holdings respectively.

Table-1.2 Gross Return and Net Return Over Different Cost of Ginger Crop among the Sample Households

Particulars	Size of Holdings				
	Marginal	Small	Medium	Large	All
Main Product	8.52	8.58	8.72	8.75	8.64
Average Price	32000	32000	32000	32000	32000
Gross Income	272631	274545	279029	280007	276553
Over Cost A	221888	219997	218238	219054	219794
Over Cost B_1	221592	219695	217925	218736	219487
Over Cost B_2	216592	214695	212925	213736	214487
Over Cost C_1	199694	203716	208876	211690	205994
Over Cost C_2	194694	198716	203876	206690	200994
Over Cost D	186901	191133	196361	199358	193438

The table shows that the net return on the cost C_1 cultivation of ginger per hectare among all the size of holdings has been deduced Rs. 205994, whereas, it has been worked out Rs. 211690, Rs. 208876, Rs. 203716 and Rs. 199694 per hectare on the large, medium, small and marginal size of holdings respectively. The net return on the cost C_2 of the cultivation of ginger per hectare among all the size of holdings has been worked out Rs. 200994, whereas, it has been deduced Rs. 206690, Rs. 203876, Rs. 198716 and Rs. 194694 per hectare on the large, medium, small and marginal size of holdings respectively. The average net return on the cost D of the cultivation of ginger per hectare has been worked out Rs. 193438 among all the size of holdings, whereas, it has been deduced Rs.199358, Rs. 196361, Rs. 191133 and Rs. 186901 per hectare on the large, medium, small and marginal size of holdings respectively.

Return Per Rupee, Benefit-Cost Ratio and Break Even Point of the Ginger Cultivation

Return per rupee of investment is one of the effective methods to measure the economic feasibility of any crop. The return per rupee of investment of ginger crop growers among all the sample size of holdings has been presented in the Table 1.3. The return per rupee of investment of ginger per hectare has been worked out Rs. 3.68 among all the size of holdings, whereas, it has been worked out Rs. 3.82, Rs. 3.71, Rs. 3.62 and Rs. 3.50 per hectare on the large, medium, small and marginal size of holdings respectively. The benefit-cost ratio of the cultivation of ginger crop per hectare has been worked out Rs. 3.34:1 among all the size of holdings, whereas, it has been worked out Rs. 3.47:1, Rs. 3.38:1, Rs. 3.29:1 and Rs. 3.18:1 per hectare on the large, medium, small and marginal size of holdings respectively. Breakeven point (BEP) analysis of productivity is useful to determine the minimum yield of farming that is profitable. While the BEP analysis of price will assist farmers in determining the lowest price of products which is still profitable.

Table 1.3 RPR, BCR and BEP of the Ginger Crop Cultivation among the Sample Households

Particular	Size of Holdings				
	Marginal	Small	Medium	Large	All
Return Per Rupee (RPR)	3.50	3.62	3.71	3.82	3.68
Input-Output Ratio/ Benefit-Cost Ratio (BCR)	3.18:1	3.29:1	3.38:1	3.47:1	3.34:1
Break Even Point (BEP)	0.29	0.29	0.30	0.30	0.30

To compare the performance of crops farming due to contribution margin (CM) implementation or how far is CM able to increase farmers' profits. The breakeven point on the growing of ginger among all the size of holdings has been estimated 0.30 tones production per hectare, whereas, it has been worked out 0.30, 0.30, 0.29 and 0.29 tones production per hectare on the large, medium small, and marginal size of holdings respectively. Data shown in table1.3 has been clearly presented in bar /pie diagram 1.1, and 1.2.

Figure 1.1 Return Per Rupee (RPR) of the Ginger Crop

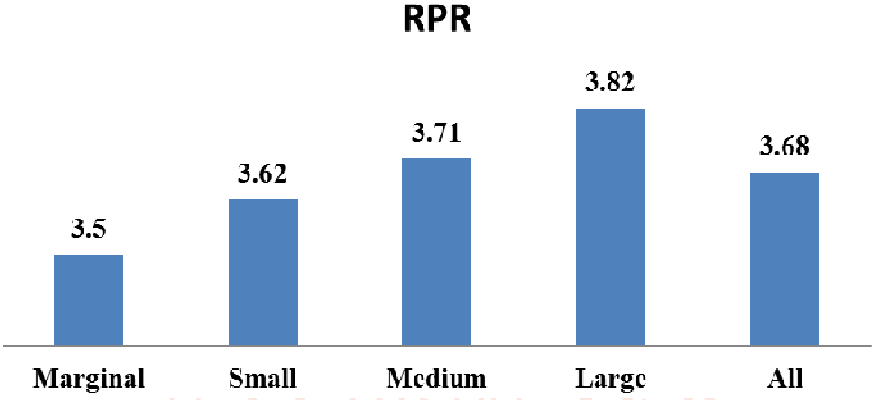


Figure 1.2 Input-Output/ Cost- Benefit Ratio (CBR) of the Ginger Crop

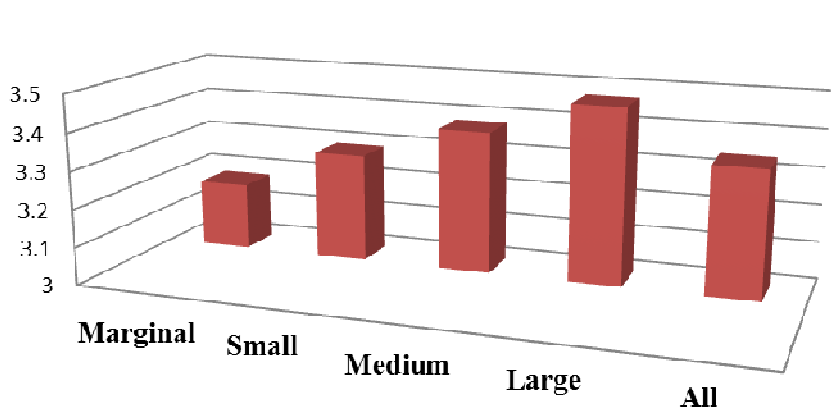
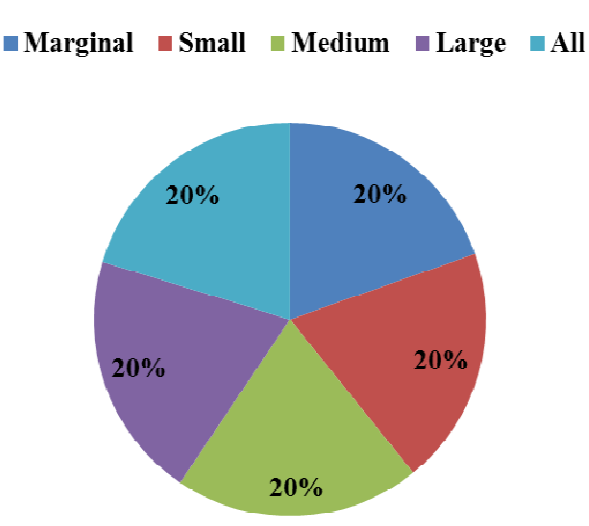


Figure 1.3 Break Even Point (BEP) of the Ginger Crop



Conclusion

Thus, it can be concluded that, the study of cost of cultivation and net returns from the ginger cash crop in the study area indicated that the per hectare cost D of cultivation of ginger under Kharif season was worked out Rs. 83115 per hectare respectively and net returns was positive Rs. 193438 per hectare. The worked out the highest seed cost of ginger i.e. 27.57 per cent among all the size of holdings. Thus, further can be concluded from the present study that return per rupee, benefit-cost ratio and breakeven point of ginger crop came out the highest on the large size of holdings i.e. Rs. 3.82, Rs. 3.47:1 and 0.30 tones production per hectare. Thus we reject the null hypothesis during the study area, he worked out the more impacted of RPR on the net return of ginger cultivation in Himachal Pradesh. The ginger cultivators reported that lack of knowledge to apply plant protection materials, lack of knowledge for recommended dose of fertilizers, lack of seed replacement, high price of fertilizers, and lack of knowledge for micro- nutrient applications and lack of knowledge about seed treatment in cultivation of ginger.

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