

Possibilities And Constraints In Crop Diversification: A Case Study Of Sonipat District Of Haryana

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Abstract

Agriculture sector plays a crucial role in the economy of the state of Haryana, which is predominantly an agricultural economy. However, the mono cropping of wheat and rice has led to grave problems in the state such as the decline in the fertility of soil, exploitation of ground water in some areas whereas excessive irrigation increasing the problem of water-logging in the other. Indiscriminate use of fertilizers and pesticides has also contaminated water and soil. Therefore, there is a compelling need to diversify the cropping pattern towards the alternative crops for sustainable development of agriculture sector. Moreover, the findings of the study indicated that the investment in paddy and in vegetables is economically feasible, as the benefit cost ratio of paddy and vegetables elucidate that on an average, Re. 1 investment brings more than Re. 1 return for the farmers and the generation of return is higher in the case of vegetables as compared to that of paddy.

Key words: Agriculture, Diversification, Vegetables, Benefit-Cost ratio (BCR)

INTRODUCTION

Haryana belongs to one of the paramount states in the sector of agriculture. Wheat and paddy are the substantial crops of this state. The state is dominated by the presence of small and marginal farmers. The population explosion and the metamorphosis of joint families into nuclear ones resulted in rapid declination of the size of farm holdings. According to the Statistical Abstract of Haryana, 2019-20, the average size of land holding in Haryana turns out to be 2.25 hectares. Presently, the agriculture in Haryana is at such a crucial stage where some necessary actions are certainly required in order to stimulate this sector. Intensive agriculture is eventually degrading the natural resources of the state. In some areas, the availability of water is plummeting whereas in some other areas, the unmethodical use of irrigation as well as the scantiness of drainage system has raised the water table. Biodiversity has been affected by selective monocropping pattern. Use of chemical fertilizers, indiscriminately, developed a number of complications. For instance, with the excessive use of fertilizers and pesticides, soil and water are now tremendously contaminated and various bird species disappeared over time. In a nutshell, high productivity has been achieved not without creating perilous harm to the

natural resources and environment in the recent times. This is a major impediment to the attainment of sustainable development of agriculture sector. There has been an increase in seasonal unemployment and under employment in the agriculture sector of the state. Safeguarding environment, employment generation, food availability and preservation of natural resources are widely consented vital goals of sustainable agricultural development. The unemployment issues may be eradicated through crop diversification as there ought to be more labour involved in horticulture and livestock farming as compared to the traditional crops. This fact is further justified in Chand's study (1999) where it was found that, for the state of Punjab, the labour absorption was 307 hours per acre in potato production and 225 hours per acre in case of other vegetables; whereas it was only about 127 hours per acre in the case of traditional crops like barley, mustard and wheat cultivation. He further propounded that if the area under wheat and paddy cultivation, i.e., the traditional crops, is substituted by alternative high value crops along with the cultivation of dairy farming on the area itself, the absorption of labour can be increased around 7.3 times than earlier. Not only does diversification provide direct employment, it also promotes indirect employment by augmenting agro-processing industries. Diversification is, therefore, required to reclaim the degraded natural resources. To enhance the value of natural resources; land and water, the cropping pattern had been diversified several times in the past, along with the introduction of new cropping patterns (Vyas, 1996; Chand, 1999).

Hence, in this paper it has been attempted to bring out the possibilities of crop diversification towards vegetables and discover the problems faced by the farmers of Sonipat district in Haryana.

REVIEW OF LITERATURE

In research, the review of literature is apparently a substantial exercise as it helps the researcher in exploring the research gap. Numerous research studies have been undertaken by various researchers in the arena of crop diversification at both the national and international level. In India itself, several research works have been completed in order to address and strengthen these various diversification aspects.

Kumar and Gupta (2015) analysed "Crop Diversification towards High-value crops in India: A State level empirical Analysis" in their study. The researchers observed that the area coming under high-value crops increased during the study period. The study further revealed "that the agricultural economy in India was now diversifying from the traditional food grains to high value crops although the diversification was not being evenly distributed among the states". The authors suggested that presently, diversifications promote agribusiness and more emphasis on the vertical integration between retailer and farmer but there is requirement of both public and private investments, especially in the area of research and development. The authors also suggested that more emphasis should be needed towards establishing the link between production, processing, marketing and crop management.

Ansari (2018) in his study "An analysis of crop diversification in India" investigated the diversification trends in Indian agriculture. The study revealed that the share of agriculture sector in India's GDP has been continuously decreasing along with the decrease in total agricultural workers in the country. Marginal size land holdings dominated the total agriculture

sector as it occupied 67 per cent of the total land holdings. The authors also revealed that the gross cropped area has shifted to non-food crops from food crops but mainly diversified towards fruits and vegetables.

Bansal, et al. (2020) investigated the factors influencing and various technological and socio-economic constraints for crop diversification in Haryana in their study. The study revealed that the regression coefficients, age and education, were found statistically significant at one per cent level while the size of land holdings and income of households were statistically significant at one per cent. The researches further stated that insufficient marketing facilities have been a major limitation in diversification measures as farmers of the area reported difficulties in sale of their produce in neighbouring markets as a result of which they are required to go farther, thereby increasing the cost of transportation and reducing returns over cost.

Bansal, et al. (2020) examined the extent of diversification towards high value crops in Haryana. The outcome of the study stated that the area coming under high value crops i.e., vegetables and fruits has increased for the study period as most of the districts showed increasing percentage of area under these crops. Panipat, Sonipat, Kaithal, Kurukshetra and Karnal were reported as more diversified districts while that of Panchkula, Yamunanagar, Jhajjar and Rewari were comparatively low diversified districts in the state.

RESEARCH METHODOLOGY

This research is based on the primary sources of data. For the study purpose, a multistage sampling method has been used. Using purposive sampling, district Sonipat has been selected at the first stage since it's the largest vegetable producing district in Haryana. At the second stage, by using simple random sampling, two blocks; Rai and Ganaur have been selected. At the third stage; four villages have been selected, two from each selected block, by using simple random sampling. And at the last stage; farmers growing both vegetables and paddy have been conscripted for the interview. Thirty farmers have been chosen randomly from a village and interviewed. Thereby, a total of 120 farmers have been interviewed for the said study.

For data collection, survey schedule was prepared for accounting the farmers' response. It consisted of the information regarding cost and returns of vegetables and paddy. The survey schedule was answered by conducting direct interviews after paying personal visits to the farmers.

Cost and Return Analysis:

“Benefit cost ratio analysis has been used in the study for comparing the costs and benefits of paddy and vegetable crops”.

The following variable cost components' classification and standard cost concepts have been used to devise the cost of cultivation. The production cost includes following variable costs.

$$C_P = C_L + C_I + C_S + C_{LA} + C_M + C_F + C_P + C_O$$

“Where:

C_P = Total production cost

C_L = Land preparation cost

C_I = Cost of irrigation

C_S = Cost of seeds

C_{LA} = Labour cost

C_M = Cost of machine and other tools

C_F = Fertilizer's cost

C_P = Pesticide's cost

C_O = Other costs of input (transportation and marketing)"

"By multiplying the total production with average price, gross returns have been calculated. The difference between gross return and production cost gives us the net returns over production cost".

Benefit cost ratio:

"Benefit cost ratio analysis is a significant tool used in evaluating the economies of crops/ farming system. It's the ratio of benefit to the cost and indicates the rate of gross return of an input. (Grover et al, 2015).

$BCR = \text{Gross returns} / \text{Total production cost}$ "

RESULT AND DISCUSSION

Initially, the cost of cultivating paddy and selected vegetables has been analysed along with the analysis of profitability of vegetable crops in comparison with competing crop paddy. Furthermore, the reasons for diversification towards vegetables as reported by the selected farmers have been thoroughly examined.

COST OF CULTIVATION OF VEGETABLES VIS-À-VIS PADDY

The Table-1 below represents distinct cost variables. Basically, it categorises the production cost of paddy and vegetables into eight parts i.e., land preparation cost, cost of irrigation, cost of seeds, labour cost, cost of machine and other tools, fertilizers cost, pesticides cost and other costs of input (transportation and marketing).

Table-1 Cost of Cultivation of Paddy and Vegetables, Sampled Households in 2020-21 (Rs. Per acre)

Sr. no	Input cost	Paddy	Ladyfinger	Cauliflower	Tomato
1	Land preparation cost	5400 (17.70)	3200 (1.53)	4300 (5.81)	3800 (5.12)
2	Cost of irrigation	1500 (4.92)	980 (0.48)	760 (1.03)	1280 (1.73)
3	Cost of seeds	800 (2.62)	9200 (4.40)	16800 (22.71)	4990 (6.73)
4	Labour cost	11800 (38.68)	117800 (56.38)	17500 (23.66)	19500 (26.31)
5	Cost of machine and other tools	2540 (8.32)	-	-	-
6	Fertilizer's cost	2250 (7.37)	6250 (2.99)	5300 (7.17)	6270 (8.46)

7	Pesticide's cost	4870 (15.96)	39500 (18.90)	17800 (24.07)	9760 (13.17)
8	Other costs of input (transportation and marketing)	1350 (4.43)	32000 (15.32)	11500 (15.55)	28520 (38.48)
9	Total cost	30510 (100)	208930 (100)	73960 (100)	74120 (100)

Source: Calculations based on primary survey

Although paddy is a water intensive crop, the cost of irrigation is still very low. The expenditure on irrigation has been 4.92 per cent of total cost i.e. for all farmers, Rs. 1500 per acre. The irrigation cost is low mainly due to the provision of subsidised rate of electricity to the farmers in the area and also because most of them are using tube wells for irrigation (as reported by sampled farmers). Low cost of irrigation doesn't indicate less use of water in paddy. Farmers reported that water consumption in paddy is 10 times more than in vegetables for the same season. In case of paddy cultivation, the cost of labour was the highest i.e., 38.68 per cent of the total cost. For cauliflower, pesticides' cost was the highest i.e., 24.07 per cent of the total cost. The cost of labour was highest for ladyfinger cultivation as compared to other vegetables i.e., 56.38 per cent of the total cost, which reveals that it is a labour-intensive crop. In tomato's case, marketing and transportation cost was the highest i.e., 38.48 per cent of the total cost.

COMPARATIVE ECONOMIES OF VEGETABLES VIS-À-VIS PADDY

The following table (Table-2) evinces the results of data collected regarding costs and returns of vegetables and competing paddy crop during Kharif season. Lady finger, Cauliflower and Tomato were the major alternative vegetable crops for paddy in the given study area. The sampled farmers, under different size group of holdings, followed more or less the same cropping patterns. A little bit of deviation was observed among the sampled farmers.

Paddy yielded an average of 25.70 quintals per acre, at the aggregate level and the farmers received an average price of Rs. 2680 per quintal for the year 2020-21. A total of Rs. 38366 per acre over cost was earned by the sampled farmers from the cultivation of paddy during the year.

Table-2 Comparative Profitability of Paddy and Vegetables, Sampled Households in 2020-21

Name of the Crop	Average Yield(qtl/acre)	Average Price (Rs. /qtl)	Gross Returns	Total Cost	Returns over cost	Benefit Cost Ratio
Paddy	25.70	2680	68876	30510	38366	2.26
Lady finger	320	1550	496000	208930	287070	2.37
Cauliflower	102	1890	192780	73960	118820	2.61
Tomato	340	720	244800	74120	170680	3.30

Source: Calculations based on primary survey

From the above table it seems clear that per acre cost of cultivating vegetable for all instanced farmers was much higher as compared to paddy whereas the benefit cost analysis indicates that the investment in paddy and in vegetables is economically viable as the benefit cost ratio of paddy and vegetables explicate that on an average, Re. 1 investment brings more than Re. 1 return for the farmers. The benefit cost ratio for all the sampled farmers was found to be highest in the case of tomato (3.30), succeeded by cauliflower (2.61) and Ladyfinger (2.37) and lowest for paddy (2.26). Although it was found that paddy costs less than the vegetables, higher benefits have been generated in the case of vegetables rather than the paddy. Therefore, from the economic point of view, vegetables tend to be more economically viable as compared to paddy.

CONSTRAINTS FACED BY FARMERS

Table 3 presented the detailed information regarding the constraints that farmers are facing while cultivating the vegetable crops. Too much fluctuation in the price is considered as the most significant problem among the farmers. 98 farmers i.e., 81.67 per cent of the total 120 farmers strongly agree and 10 per cent farmers agree that they have been struggling with the issue, while none of them disagreed with the problem.

Table 3 Constraints Faced by Farmers during Production of Vegetables (N = 120)

Sr. no	Particulars	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1	Financial problems	32 (26.67)	35 (29.17)	12 (10)	22 (18.33)	19 (15.83)
2	Production problems	62 (51.67)	29 (24.17)	4 (3.33)	14 (11.67)	11 (9.16)
3	Too much fluctuation in price	98 (81.67)	12 (10)	8 (6.67)	2 (1.66)	0 (0)
4	Marketing problems	81 (67.5)	19 (15.83)	5 (4.17)	7 (5.83)	8 (6.67)
5	Transportation problems	17 (14.17)	34 (28.33)	19 (15.83)	35 (29.17)	15 (12.5)
6	Unavailability/Costly Inputs	95 (79.17)	7 (5.83)	9 (7.5)	8 (6.67)	1 (0.83)
7	Proper knowledge	15 (12.5)	35 (29.17)	12 (10)	36 (30)	22 (18.33)
8	Timely payments	8 (6.67)	14 (11.67)	34 (28.33)	38 (31.67)	26 (21.66)
9	Other problems	42 (35)	33 (27.5)	14 (11.67)	19 (15.83)	12 (10)

Source: Calculations based on primary survey

Similarly, marketing problem is one of the biggest constraints that farmers are facing; as 81(67.5) farmers out of the total of 120 farmers strongly agree and 19 (15.83) farmers agree

with the issue. As markets are unorganised, it results in monetary loss to the farmers since it reduces the bargaining ability of the farmers and they have to sell most of their produce in the wholesale market/ regulated mandis. Further, unavailability or costly inputs have been other significant constraints that the farmers are facing as the cost of vegetable seeds is exorbitant. Vegetables are labour intensive crops and farmers have been facing the issues of high cost and scarcity of labour. Other important constraints as reported by the farmers are production problems such as attack of pests, insects, and diseases, high infestation of weeds and lack of proper knowledge about the cultivation of vegetables. Without proper knowledge, farmers are not able to extract maximum produce from their field. Timely payment, transportation problems were not so common among farmers.

CONCLUSION

Haryana is referred to as one of the leading states in agriculture. Presently, the agriculture in Haryana is at such a crucial stage where some necessary actions are certainly required in order to stimulate it. Intensive agriculture is gradually degrading the natural resources of the state. This is a major obstacle for sustainable development of agriculture sector. So, diversification is the urgent need of the hour in the state. The study indicated that the investment in paddy and in vegetables is economically feasible as the benefit cost ratio of paddy and vegetables states that on an average, Re. 1 investment brings more than Re. 1 return for the farmers. The benefit cost ratio for all the sampled farmers was found to be highest in the case of tomato (3.30), succeeded by cauliflower (2.61) and Ladyfinger (2.37) and the lowest for paddy (2.26). Although it was found that paddy costs less than the vegetables, higher benefits have been generated in the case of vegetables rather than the paddy. Therefore, economically speaking, vegetables tend to be more economically viable as compared to paddy.

In order to bring out diversification from paddy to vegetable crops in Haryana during Kharif season, adequate systematic changes are required. A favourable price regime, enhanced technology for increasing productivity, infrastructural facilities in rural areas, monetary support and most importantly fiscal support from the government are some of the prerequisites for achieving the said goals. Diversification will remain an evasive goal in Haryana if such changes are not introduced in the machinery. Without robust policy reforms this remains an issue under debate with inconclusive outcome.

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