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Impact Assessment of Farm Diversification Schemes in Haryana, India

Elizabeth Jose and K. Ponnusamy

ABSTRACT

Green revolution was capable of mitigating hunger and malnutrition but it had reportedly made a negative impact in terms of soil and water degradation. Diversification was also seen as one of the solutions to problems brought out by green revolution. As part of farm diversification, the Haryana government has initiated programmes like Mera Pani Meri Virasat (MPMV), Crop Cluster Development Programme (CCDP), Bhavantar Bharpayee Yojana (BBY) etc. This study highlights the impact of MPMV Scheme in a detailed way. It was undertaken in three agro ecological zones of the Indian state of Haryana. One district from each agro-ecological zone was chosen. From each district, 60 farmers were contacted. The study reveals that there is only limited acceptance of new diversification schemes among farmers as it is reflected in their area of adoption. Adequate amount of incentives and timely provision of the compensation amount are likely to further improve the utilization of these programmes among farmers.

Keywords*: Impact; Schemes, Farm diversification, Haryana*

INTRODUCTION

Haryana is widely known as the 'bread basket' of India. The state has diverse agro-ecology and cropping pattern. During 2020-21, Haryana had the share of 5.92 per cent of total food grain production of the country. The share of agriculture and allied sector in total GSVA of Haryana state at current prices is 20.92 per cent in 2020-21 (Agricultural Statistics at a Glance, MoA&FW, GoI, 2021). Green revolution was capable of mitigating hunger and malnutrition but it made negative impacts in terms of soil and water degradation (Davis et al., 2019). Agriculture diversification was also seen as a solution to problems brought out by globalisation and liberalisation as well as a way to make agriculture more competitive internationally (Radhakrishna and Reddy, 2004). Recognising the increasing importance of allied sectors, the committee on Doubling Farmers' Income (Kumar and Chahal, 2018) considers dairying, small ruminants, poultry, fisheries and horticulture as engines of high growth and has recommended a focused policy with an associated support system.

From being a state with a food shortage at its beginning, Haryana has advanced to become a significant provider to the national supply of food grains. Largely because of the state's dynamic political leadership, emerging science and technology, agricultural institutions, land reforms, generous central government assistance, robust infrastructure, improved grain varieties and production technologies, agricultural production has advanced significantly (Alagh, 2007). The Green Revolution, which significantly

Dairy extension Division, ICAR-National Dairy Research Institute, Karnal , 132001.

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increased output, brought perhaps the biggest change. Upto early 1990s, agriculture played a large role in the state economy. However, after that point, its contribution to the Gross State Domestic Product (GSDP) started to steadily drop. Furthermore, the situation was made worse by natural disasters and inconsistent rainfall frequently resulted in significant losses in food production. Additionally, the reduction in the proportion of the agriculture sector was caused by the quickly expanding services sector (Kumar, 2016). During post reform period, Haryana's cropping pattern underwent a quick transition, with wheat and rice both gaining significant percentages of the total cultivated land, while all other cereals, including pearl millet, sorghum, maize, and barley, were seen to lose ground as a share of the total cropped area (Ponnusamy and Devi, 2017).

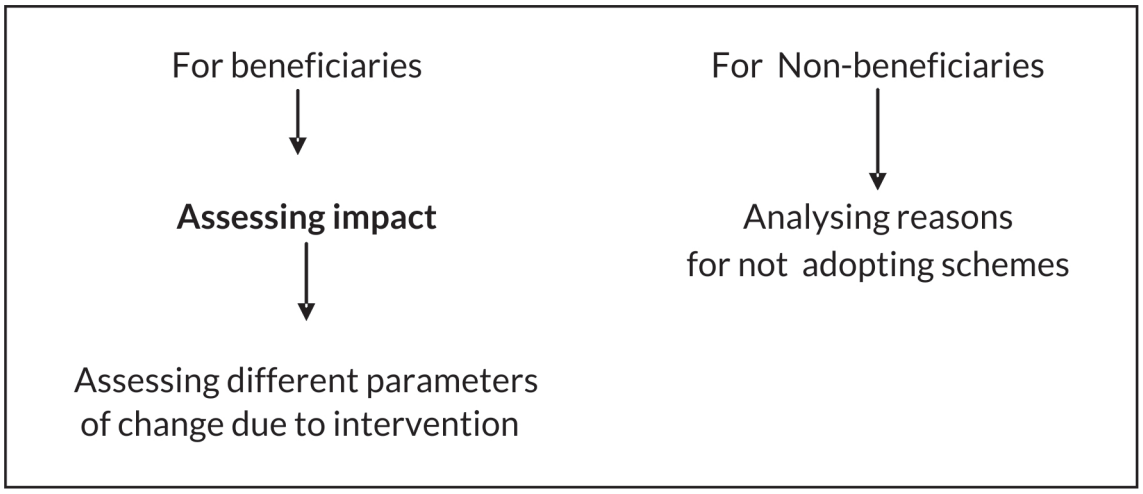
As part of farm diversification, Haryana government has initiated programmes like Mera Pani Meri Virasat (MPMV), Crop Cluster Development Programme (CCDP), Bhavantar Bharpayee Yojana (BBY) etc. Limited studies on institutional interventions behind farm diversification necessitates designing appropriate methodologies to capture the necessary data on impact assessment as well as further formulation and implementation of such programmes and schemes. These facts warrant the need to conduct a study based on impact assessment of farm diversification scheme. The objective of the study is to assess impact of MPMV based on certain quantitative parameters. This study enlightens the impacts of MPMV Scheme in a detailed way.

METHODOLOGY

Impact analysis is the formal, evidence-based procedure that assesses the effect of a programme. Impact studies determine changes that have happened due to programme implementation. These types of studies inform policy-makers about potential economic, social, and environmental effects.

About Mera Pani Meri Virasat (MPMV) scheme : The government of Haryana has introduced the MPMV programme to replace paddy with maize, cotton, pearl millet, and pulses on 1 lakh hectares in selected blocks with water tables higher than 40 metres. Farmers who diversified over 50 per cent of their paddy area for the kharif season (2019–20) would receive Rs. 7,000 per acre. Additionally, farmers would not be permitted to sow paddy in any new locations where it was not grown a year before. Farmers in the designated blocks who diversify more than 50 per cent of their paddy land would be eligible to sell the government all of their diversified crops at the MSP (Ministry of Jalshakti, GoI, 2020).

The study was conducted in three agro ecological zones of Haryana (HKA, 2018). One district from each agro-ecological zone was chosen (Kaithal from AEZ I , Hisar from AEZ II and Bhiwani from AEZ III) followed by two blocks each in every district and two villages of every block. With the help of expert opinion and progressive farmers, fifteen farmers from each village is selected constituting 60 farmers from each district. Thus a total 180 farmers contacted for the study. In the present study, impact analysis was carried out in a following manner using a questionnaire



Awareness on Various Schemes: It refers to understanding of diversification schemes such as *Jal Hi Jeevan Hai*, *Mera Pani Meri Virasat* etc. by the respondent. It was ascertained by the schedule and gathered responses were analyzed by frequency and percentage methods.

Training Participation: It refers to various training programs attended by respondents such as training on vermi-composting, beekeeping, sheep farming, dairy farming, fish farming etc. It was ascertained by the schedule and gathered responses were analyzed by frequency and percentage method

Impact Parameters: Diversification impact at household level analysed by the parameters such as change in area, change in cropping pattern and change in input requirement. The Below mentioned parameters were ascertained by schedule. For MPMV impact analysis only 40 diversified farmers from each district were considered.

Change in area: It refers to changes in the respondent's farm area after adopting the scheme.

Change in Cropping Pattern: It refers to a change in the respondent's cropping pattern after adopting the scheme

Changes in the Input Requirement: It refers to changes in the respondent's farm input requirement after adopting the scheme

FINDINGS AND DISCUSSION

Institutional intervention is a policy input initiated by public or private organisation with the intention of making improvements in different sectors and facilitating the development of respective areas. In this study, the impact of farm diversification efforts is captured in a descriptive manner as most of the diversification programmes are at early stages of development. So a qualitative approach is followed to describe the after effect of the programme.

Training programmes conducted by different agencies on various farm practices motivate the farmers to seek further information for diversification activities. In this study, all the 180 respondents were requested to indicate the details of training attended.

Table 1. Distribution of Respondents According to Participation in training on Farm Diversification Schemes

Sl. No.	Training topic	Kaithal (n=60)		Hisar (n=60)		Bhiwani (n=60)		Total (n=180)	
		f	%	f	%	f	%	f	%
1.	Vermi composting	5.00	8.33	1.00	1.67	0.00	0.00	6.00	3.33
2.	Bee keeping	13.00	21.67	2.00	3.33	0.00	0.00	15.00	8.33
3.	Dairying	5.00	8.33	5.00	8.33	4.00	6.67	14.00	7.78
4.	Sheep farming	0.00	0.00	3.00	5.00	4.00	6.67	7.00	3.89
5.	Horticulture	33.00	55.00	12.00	20.00	3.00	5.00	48.00	26.67
6.	Pig farming	0.00	0.00	0.00	0.00	1.00	1.67	1.00	0.56

Table 1 shows that, in the surveyed area, 3.33 per cent farmers have attended training in vermicompost and 8.33 per cent farmers have attended training in bee keeping. More number of Kaithal farmers have attended training in vermi composting (8.33%) and bee keeping (21.67%) compared to Bhiwani and Hisar districts. Some of the Hisar (5.00%) and Bhiwani (6.67%) farmers have attended training in sheep farming also. About 55.00 per cent of Kaithal farmers have attended horticulture training. Only one farmer of Bhiwani has attended training on pig farming. Farmers opined that they are getting training from Haryana Agricultural University, KVKs, Departments like agriculture, animal husbandry, horticulture etc. Training conducted by input dealers on farm production practices were observed in Kaithal area. A notable scenario at Kaithal region is that the trained farmers themselves are training their fellow progressive farmers. Also several farmers expressed their interest to acquire knowledge in different farm production practices through training and capacity building activities. So, there is an urgent need for extension services to promote awareness among the farmers regarding farm diversification activities.

In the surveyed area 16.11 per cent farmers had awareness about JHJH scheme whereas 71.11 per cent had awareness on MPMV scheme. About 43.44 per cent farmers were beneficiaries of MPMV (Table 2). There is a requirement of multi-tiered extension strategy that needs to be adopted under various schemes and programmes in order to create awareness among farmers about the importance of this programme. Beneficiaries should get adequate financial support in a timely manner from the government, which aids in their interest to remain in the scheme, thereby motivating the progressive farmers and widening the coverage of the scheme among the people

Table 2: Distribution of Respondents according to Farm Diversification Scheme Involvement

Sl. No.	Nature of involvement in Diversification Schemes	Kaithal (n=60)		Hisar (n=60)		Bhiwani (n=60)		Total (n=180)	
	Jal Hi Jeevan Hai (JHJH)	f	%	f	%	f	%	f	%
1.	Only Awareness	22.00	36.67	4.00	6.67	3.00	5.00	29.00	16.11
2.	Beneficiary	10.00	16.66	0.00	0.00	0.00	0.00	10.00	5.55
	Mera Pani Meri Virasat (MPMV)								
1.	Only Awareness	45.00	75.00	48.00	80.00	40.00	66.67	128.00	71.11
2.	Beneficiary	25.00	41.67	26.00	43.33	27.00	45.00	78.00	43.33
	Bhavantar Bharpayee Yojana (BBY)								
1.	Only Awareness	24.00	40.00	0.00	0.00	2.00	3.33	26.00	14.44
2.	Beneficiary	7.00	11.67	0.00	0.00	0.00	0.00	7.00	3.89
	Crop Cluster Development Programme (CCDP)								
1.	Only Awareness	28.00	46.67	2.00	3.33	2.00	3.33	32.00	17.78
2.	Beneficiary	11.00	18.33	0.00	0.00	0.00	0.00	11.00	6.11

Impact Analysis of MPMV scheme

The MPMV scheme plays a major role in farm diversification and it is getting much more attention than other diversification schemes since its prime emphasis is on water conservation. In this scheme, government is providing Rs. 7000 per acre in two installments. First stage verification is conducted after sowing and second stage verification is done at the time of selling the produce. First and second installments are Rs. 2000 and Rs. 5000, respectively.

Table 3 shows that, in Kaithal district most of the beneficiaries of MPMV scheme adopted maize (37.50%) followed by fodder (17.50%). Sorghum and pearl millet are the main fodder crops cultivated by farmers. Among vegetable crops, which is practiced by 7.50 per cent respondents cultivated watermelon, bottle gourd and musk melon. In Hisar district, cotton was adopted under MPMV scheme by 15 per cent members. Pearl millet was adopted by 5 per cent respondents. In Bhiwani, 20 per cent respondents practised cotton under the diversification scheme. This proportion is not true for generalization, because according to expert opinion only 5-7 per cent of total farmers had adopted MPMV scheme at district level. Out of the total respondents, many respondents adopted (11.67%) cotton because of the suitability of Hisar and Bhiwani district for cotton cultivation and marketing. Pearl millet was also preferred due to limited water availability in the study area. In Kaithal district, the marketability of vegetable crops favours for adopting vegetable as an alternative option.

Out of the total area that was previously under paddy cultivation among beneficiaries, only 8-49 per cent is utilised for alternate cropping (Table 4). It is observed that some farmers have adopted alternate crops on pilot basis only. So that current results cannot be predicted for future years. Most of the farmers were facing problems in availing subsidy, delay in the verification process and problems at field level in terms of water management as the neighbouring farmers were growing paddy adjacent to alternate crop. This circumstance warrants the need for community adoption of crops to promote better management practices. Moreover, it is observed that high assurance of income from paddy than other crops can be observed in per cent paddy land converted to alternate crops (8-49%).

Table 3. Frequency of Respondents who changed Cropping Pattern under MPMV scheme

Sl. No.	Changes in the Cropping Pattern	Kaithal (n=40)		Hisar (n=40)		Bhiwani (n=40)		Total (n=120)	
		f	%	f	%	f	%	f	%
1.	Paddy to maize	15.00	37.50	0.00	0.00	0.00	0.00	15.00	12.50
2.	Paddy to fodder	7.00	17.50	0.00	0.00	0.00	0.00	7.00	5.83
3.	Paddy to vegetables	3.00	7.50	0.00	0.00	0.00	0.00	3.00	2.50
4.	Paddy to cotton	0.00	0.00	6.00	15.00	8.00	20.00	14.00	11.67
5.	Paddy to fallow	0.00	0.00	0.00	0.00	2.00	5.00	2.00	1.67
6.	Paddy to pearl millet	0.00	0.00	2.00	5.00	0.00	0.00	2.00	1.67

Table 4. Changes in the Area under Paddy to Alternate Crops by the adoption of MPMV scheme

Sl. No.	Changes in Cropping Pattern	Changes in the area under paddy to alternate crops (Ha)											
		Kaithal (n=40)			Hisar (n=40)			Bhiwani (n=40)			Total (n=120)		
		Area under paddy (ha)	Area under alternate crop (ha)	Per cent change in area (%)	Area under paddy (ha)	Area under alternate crop (ha)	Per cent change in area (%)	Area under paddy (ha)	Area under alternate crop (ha)	Per cent change in area (%)	Area under paddy (ha)	Area under alternate crop (ha)	Per cent change in area (%)
1.	Paddy to maize	51.20	9.06	17.69	0.00	0.00	0.00	0.00	0.00	0.00	51.20	9.06	17.69
2.	Paddy to fodder	20.00	4.84	24.20	0.00	0.00	0.00	0.00	0.00	0.00	20.00	4.84	24.20
3.	Paddy to vegetables	5.60	0.50	8.92	0.00	0.00	0.00	0.00	0.00	0.00	5.60	0.50	8.92

4.	Paddy to cotton	0.00	0.00	0.00	13.36	3.85	28.82	12.95	3.23	24.94	26.31	7.08	26.91
5.	Paddy to fallow	0.00	0.00	0.00	0.00	0.00	0.00	0.809	0.404	49.94	0.809	0.404	49.94
6.	Paddy to pearl millet	0.00	0.00	0.00	4.85	1.61	33.20	0.00	0.00	0.00	4.85	1.61	33.20

Table 5. Assumptions for estimating irrigation water supply of different crops in the study area

Sl. No.	Crop	Times of irrigation	Irrigation water supply (Lakh Litres/ ha)
1.	Maize	5	15
2.	Fodder	4	12
3.	Vegetables	4	12
4.	Cotton	5	15
5.	Pearl millet	4	12
6.	Paddy	15	75

(Source: Reddy and Reddy, 2016)

Above assumptions (Table 5) are used for calculating seasonal irrigation water requirement: In a crop growing season, paddy requires 15 times irrigation at 5 cm level, pearl millet, fodder and vegetables requires 4 times irrigation at 3 cm level. At a 3 cm water level, maize and cotton require 5 times irrigation, whereas paddy requires 15 times irrigation. The Government provides subsidies for shifting paddy even to fallow cropping in order to promote water conservation. By practising fodder and pearl millet water can be saved upto 3 lakh litre/ha since it requires additional one to two irrigation than maize and cotton based on set assumptions (Details for calculating irrigation water supply mentioned below). Overall, it is observed that 16-20 per cent water can be conserved through adopting these crops rather than following traditional paddy crop based on set assumptions. Table 6 shows that the MPMV scheme can reduce the per-hectare water requirement to some extent.

Method of calculating irrigation water supply

One mm water applied on one- square metre = 100 cm*100 cm*0.1 cm = 1000 cm3(1L)

One ha mm = 10000 L

One ha cm = 100000 L

(For 3 cm water level :3 Lakh litres water per hectare)

Table 6: Estimated Changes in Seasonal Water Requirement of Crops due to the Adoption of MPMV Scheme

Sl. No.	Changes in the Cropping Pattern	Kaithal (n=40)				Hisar (n=40)				Bhiwani (n=40)				Total (n=120)		
		Area (ha)	Water req. paddy (lakh litres)	Water req. for alter. crop (lakh litres)	Changes in water req. (lakh litres).	Area (ha)	Water req. paddy (lakh litres)	Water req. for alter. crop (lakh litres)	Changes in water req. ((lakh litres)	Area (ha)	Water req. paddy (lakh litres)	Water req. for alter. crop (lakh litres)	Changes in water req. (lakh litres)	Area (ha)	Change (reduction) in Water req. (lakh litres)	Per ha. water aving (lakh litres)
1.	Paddy to maize	9.06	679.50	135.90	543.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.06	543.60	60.00
2.	Paddy to fodder	4.84	363.00	58.08	304.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.84	304.92	63.00
3.	Paddy to vegetables	0.50	37.50	6.00	31.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	31.50	63.00
4.	Paddy to cotton	0.00	0.00	0.00	0.00	3.85	288.80	57.80	231.05	3.23	242.25	48.45	193.80	7.08	424.80	60.01
5.	Paddy to fallow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.404	30.3	0.00	30.3	0.404	30.3	75.00
6.	Paddy to pearl millet	0.00	0.00	0.00	0.00	1.61	120.80	19.30	101.48	0.00	0.00	0.00	0.00	1.61	101.48	63.00

Table 7: Estimated Changes in the Income of Respondents by the Adoption of MPMV Scheme

Sl. No.	Changes in the Cropping Pattern	Kaithal (n=40)				Hisar (n=40)				Bhiwani (n=40)				Total (n=120)		
		Area (ha)	Net return from paddy (Rs.)	Net return from alternate crop (Rs.)	Changes in net return (Rs.)	Area (ha)	Net returns from paddy (Rs.)	Net returns from alternate crop (Rs.)	Changes in Net return (Rs.)	Area (ha)	Net returns from paddy (Rs.)	Net returns from alternate crops (Rs.)	Changes in net returns (Rs.)	Area (ha)	Change in net returns (Rs.)	Per ha. change in net returns (Rs.)
1.	Paddy to maize	9.06	380520	321630	58890	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.06	58890	6500
2.	Paddy to vegetables	0.50	21000	58750	37750	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	37750	75500
3.	Paddy to cotton	0.00	0.00	0.00	0.00	3.85	161700	198275	36575	3.23	135660	166345	30685	7.08	67260	9500
4.	Paddy to fallow	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.404	16968	7070	-9898	0.404	7070	-24500
5.	Paddy to pearl millet	0.00	0.00	0.00	0.00	1.61	67620	47495	-20125	0.00	0.00	0.00	0.00	1.61	-20125	-12500

Adopting vegetables yields high returns of Rs.75000/ha (including subsidy amount) as revealed in Table 7. So it can be considered as a good option of diversification of paddy but it cannot be the solution for entire state since vegetable cultivation faces issues including perishability, requirement of daily management, prone to climatic variations and volatility in the price. Moreover, its markets are available only in certain areas. Maize and cotton showed a positive return ranging from Rs.6000-9500 only by including subsidy amount. Availing subsidy is a difficult process due to its lengthier verification and other formalities. The overall picture shows that diversification from paddy is a remunerative option to farmers only if subsidy amount is increased to 15000 to 20000 per acre. Negative return from alternative option of pearl millet shows that paddy is much more remunerative than pearl millet even by including the subsidy amount.

CONCLUSION

Impact studies show that there is only limited acceptance of new diversification schemes among farmers as it is reflected in their area of adoption. An adequate amount of incentives and timely provision of the compensation amount are likely to further improve the utilization of these programmes among farmers. Government farm diversification programmes such as MPMV (*Mera Pani Meri Virasat*) and BBY (*Bhavantar Bharpayee Yojna*) must be meticulously implemented and monitored by providing timely incentives to make them more successful in assisting farm diversification. Advance notification and popularisation of government schemes are crucial to increasing awareness among farmers and assisting them in planning their cropping patterns in order to promote farm diversification.

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