



DIVERSIFICATION OF EXISTING FARMING SYSTEMS IN PUNE DISTRICT OF MAHARSHTRA



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ABSTRACT:

Crop diversification is needed to give a wider choice in the production of a variety of crops in a given area so as to expand production related activities on various crops and also to lesson risk. Crop diversification is generally viewed as a shift from traditional grown less remunerative crops to more remunerative crops. The crop diversification also takes place due to governmental policies and thrust on some crops over a given time.

KEY WORDS: Road transport system, Traffic congestion, Road accident, Passengers' satisfaction, Barasat municipality.

BACKGROUND INFORMATION:

Market infrastructure development and certain other price related supports also induce

diversification. High profitability and stability in production also induce diversification. With the advent of modern technology, there is continuous surge for diversified agriculture in terms of crops, animals and product diversification on economic consideration. Diversification is the outcome of the interactive effect of resource related factors viz; irrigation, rainfall, soil fertility, technology related factors viz; seed, fertilizers, marketing, storage, processing, household related factors viz; food and price related factors. The 'On Farm Research Scheme' (OFR) is a component of All India Co-ordinate Research Project (AICRP) on Integrated Farming Systems at MPKV, Rahuri. The experiments have been conducted on farmer's field in six centers of Pune district.

OBJECTIVES:

1. To estimate the profitability of selected households through diversification
2. To improve the livelihood and nutritional security through diversification
3. To estimate the impact of capacity building through diversification
4. To study the constraints in diversification

METHODOLOGY:

The data of 24 experimental trials under On Farm Research Scheme at Haveli and Maval tahsils of Pune district were collected by the cost accounting method with the help of designed schedule provided by the Project Directorate, Farming System Research Project, Modipuram, Uttar Pradesh. Six villages in two blocks, four farmers in each selected village were selected. Thus, total 24 farmers were selected for present study. The details of selected blocks and distribution of experimental trials depicted in Table No.1. The experimental trials conducted in Kharif 2013 and Rabi-2014 season are presented in Table 2.

Table 1 Selected blocks and distribution of experimental trials for the year 2013–14

Tahasil and Village	Season	
	Kharif	Rabi
Haveli		
Vithalwadi	4	4
Malinagar	4	4
Bodkewadi	4	4
Maval		
Sadumbre	4	4
Saduwadi	4	4
Jambawade	4	4
Total :	24	24

Table 2 Diversification conducted in Kharif and Rabi season for the year 2013-2014

Treatments	Interventions on farmers field
Bench marks	Comprehensive survey along with GPS location
Crop diversification	Change the cropping pattern and provided improved variety with chemical fertilizers
Livestock diversification	Supply of Phule Triveni semen for A.I, mineral mixture, goat kids and poultry chicks
Product diversification	Provided grading sieves /ghee making equipments
Capacity building	Arranged training and provided Sugi/Krishi dairy

RESULTS:**Existing and diversified cropping pattern of sample farmers**

Crop pattern changes increasing tendency towards crop specialization and commercialization of agriculture. The cropping pattern is dependent on several factors such as soil type, climate, resource availability with the farmers, decision making ability of the farmers under situation of changing prices and relative price of output of different crops. Low yield and long duration of existing varieties replaced by improved varieties. Existing and diversified cropping pattern of sample farmers are depicted in Table 3. In kharif season, Groundnut crop replaced by Soybean crop, Darna variety of paddy replaced by Phule samrudhi, local and MACS-123 variety of soybean replaced by JS-335, Panchganga variety of Maize (fodder) replaced by African tall, Grass replaced by Phule Jayawant variety of Hybrid Napier. In case of Rabi season, Wheat crop replaced by Onion crop, HD-2189 variety of wheat replaced by NAIW-301, local / Vijay variety of chickpea replaced by Digvijay variety.

Effect of diversification on the productivity and returns of different crops

The per hectare productivity of existing and diversified crops have been worked out and compared with each other so as to assess the effect of diversification. The productivity and returns of existing and diversified crops are presented in Table 4. The per hectare productivity and gross returns of existing crops paddy, soybean, groundnut, maize (fodder), wheat, onion and chickpea was 23.00 qtl. and Rs.38800, 18.00 qtl. and Rs.37500, 17.39 qtl. and Rs.28600, 263.20 qtl. and Rs.39020, 21.00 qtl. and Rs.43200, 210.00 qtl. and Rs.14000, 22.40 qtl. and Rs.55400, respectively and after diversification per hectare productivity and gross returns of crop paddy, soybean, groundnut, maize (fodder), wheat, onion and chickpea was 29.51 qtl. and Rs.72836, 21.66 qtl. and Rs.56024, 18.19 qtl. and Rs.72759, 380.00 qtl. and Rs.43000, 34.64 qtl. and Rs.66181, 240.75 qtl. and Rs.184815, 29.81 qtl. and Rs.77509, respectively.

As regards percentage increase in productivity and gross returns, it was 28.30 and 87.72, 20.33 and 49.40, 4.60 and 154.40, 44.38 and 10.20, 64.95 and 53.20, 14.64 and 62.12, 33.08 and 39.91 in case of paddy, soybean, groundnut, maize (fodder), wheat, onion, chickpea crop due to diversification, respectively.

Gross returns from the crop component before diversification was Rs.360670 and after provision of technical knowledge about package of practices, it increased by 62.65 per cent (Rs.586624.40).

Table 3 Existing and diversified cropping pattern of sample farmers

Sr. No.	Existing cropping pattern				Diversified cropping pattern			
	Kharif		Rabi		Kharif		Rabi	
	Name of crop	Variety	Name of crop	Variety	Name of crop	Variety	Name of crop	Variety
1	Groundnut	SB-11/Jalgaon/Lal banduk	Onion	Puna Fursungi	Soybean	JS-335	Onion	N-2-4-1
2	Paddy	Darna	Chickpea	Vijay/local	Soybean	JS-335	Chickpea	Digvijay
3	Soybean	MACS-123	Wheat	HD-2189	Soybean	JS-335	Wheat	NIAW-301
4	Paddy	Darna	-	-	Paddy	Phule Samrudhi	-	-
5	Soybean	Local	-	-	Soybean	JS-335	-	-
6	Grass	Local	-	-	Hybrid Napier	Phule Jayawant	-	-
7	Maize (fodder)	Panchganga	-	-	Maize (fodder)	African tall	-	-

Table 4 Effect of diversification on the productivity and returns of different crops

Sl. No.	Name of crop	Existing		Diversification		Percentage increase	
		Average Productivity (Qty./ha)	Gross Returns	Average Productivity (Qty./ha)	Gross Returns	Average Productivity	Gross Returns
1	Paddy	23.00	38800	29.51	72836	28.30	87.72
2	Soybean	18.00	37500	21.66	56024	20.33	49.40
3	Groundnut	17.39	28600	18.19	72759	4.60	154.40
4	Maize (fodder)	263.20	39020	380	43000	44.38	10.20
5	Wheat	21.00	43200	34.64	66181	64.95	53.20
6	Onion	210.00	114000	240.75	184815	14.64	62.12
7	Chickpea	22.40	55400	29.81	77509.43	33.08	39.91
8	Grass	41.50	4150	-	-	-	-
11	Hy.napier	-	-	24.00	13500	-	-
Total		-	360670	-	586624.4		62.65

Profitability from existing and diversified animal component

Before diversification, there was unavailability of improved semen for improved breed semen for artificial insemination of Phule Triveni. Milk yield was low and farmers were not aware about animal nutrition/ housing/ health/ cattle shed management/ hygienic milk production. The profitability from existing and diversified animal component are presented in Table 5. Before diversification, the per animal per year milk production of cow and buffalo was 1400 litre and 720 litre, gross returns and net returns was Rs.19600 and Rs.23040 and after diversification i.e. provided improved breed semen for artificial insemination of Phule Triveni the and goat kid of Sangamneri / Osmanabadi, per animal per year milk production of cow, buffalo and goat was 1562 litre, 851 litre and 210 litre, respectively. The gross returns and net returns from cow, buffalo and goat were Rs.29687 and Rs.18324, Rs.28914 and Rs.20436, Rs.13000 and Rs.4300, respectively.

As regards percentage increase in milk production, gross returns and net returns, it was 2.61, 3.41 and 1.49 per cent due to diversification in animal component. Net returns from the animal component before diversification was Rs.25284 and after provision of technical knowledge about package of practices, it increased by 70.31 per cent.

Table 5 Profitability from existing and diversified animal component
(Rs./animal/year)

Existing						
Sr. No.	Name of animal	Milk (litre/year/animal)	Gross Returns	Cost of Rearing	Net Returns	B:C ratio
1	Cow	1400	19600	10184	9416	1.92
2	Buffaloes	720	23040	7172	15868	3.21
3	Goat	-	-	-	-	-
Total		2120	42640	17356	25284	2.46
Diversified						
1	Cow	1562	29687	11363	18324	2.61
2	Buffaloes	851	28914	8478	20436	3.41
3	Goat	210	13000	8700	4300	1.49
Total		2623	71601	28541	43060	2.51
Per cent increase over existing						
1	Cow	11.57	51.46	11.58	94.60	-
2	Buffaloes	18.19	25.49	18.21	28.79	-
3	Goat	-	-	-	-	-
Total		23.73	67.92	64.44	70.31	-

PROFITABILITY FROM PRODUCT DIVERSIFICATION

Technology related factors covering not only seed, fertilizers, marketing, storage but also processing. There was not equipment for grading the foodgrains and for making the ghee from milk. Farmers get the low price for foodgrain and also lack of technical knowledge about value addition. To adopt the product diversification, farmers are provided knowledge for use of grading foodgrain sieve by supply of grading sieves to them and also provided equipment for ghee making for preparation of ghee. The profitability from product diversification is indicated in Table 6.

Before the processing of soybean and milk, the gross returns from soybean and milk was Rs.23598.00 and Rs.24262. After the processing of soybean and milk, the gross returns from soybean and milk was Rs.28118.00 and Rs.31392. Gross returns from soybean and milk was increased by 19.15 and 29.38 per cent due to product diversification. Total returns from soybean and milk was increased by 24.34 per cent due to product diversification

Table 6 Profitability from product diversification

Sr.	Name of product	Existing			Diversification			Gross returns increased due to product diversification (Per cent)
		Quantity of product	Price Rs /kg	Total Value (Rs)	Total product obtained after processing (kg)	Price of the processed product (Rs/kg/lit.)	Total Value (Rs)	
1	Soybean	874 kg	27.00	23598	827	34	28118	19.15
2	Milk	1347 litre	18.00	24262	Ghee : 28.94	366	10592	
					Butter milk : 1040 litre	20	20800	
3				24262	Milk by product		31392	29.38
4	Total			47860			59510	24.34

Livelihood and nutritional security through diversification approach

The livelihood and nutritional security through diversification approach is depicted in Table 7. Generally edible oil, Wheat, Jowar, Paddy, Green gram, Pigeon pea, Potato, Chicken/ Meat, Egg and Ghee were daily consumed by sample households. The expenditure on consumption of paddy is more (26.84 per cent) and followed by edible oil (16.13 per cent), wheat (13.96 per cent), greengram (16.13 per cent), jowar (10.16 per cent), chicken/meat (6.92 per cent), pigeon pea (6.18 per cent), potato (3.84 per cent), ghee (2.57 per cent) and egg (1.02 per cent)

Table No. 7 Livelihood and nutritional security through diversification approach

Sr. No.	Name of Items	Quantity used/year (kg)	Price (Rs/kg)	Total Expenditure (Rs)	Per cent
1	Edible oil	56	85	4760	16.13
2	Wheat	206	20	4120	13.96
3	Jowar	100	30	3000	10.16
4	Paddy	233	34	7922	26.84
5	Green gram	43	85	3655	12.38
6	Pigeon pea	25	73	1825	6.18
7	Potato	42	27	1134	3.84
8	Chicken/ Meat	7	292	2044	6.92
9	Egg	60	5	300	1.02
10	Ghee	3	253	759	2.57
Total				29519	100.00

Capacity building on different component

The capacity building on different component indicated in Table 8. Activities involved in capacity building for crop component were training of farmers on field crop production, providing technical knowledge of improved package of practices/ through folders/ krishi dairy, balance use of chemical fertilizers, arranging farmers' visits to various agriculture exhibitions, visits to agriculture college farm, visits to mushroom production plant, visits to biofertilizer production plant, conducting field days, providing improved varieties of crops to selected farmers.

Activities involved in capacity building for animal component were supply of Phule triveni semen for Artificial Insemination, supply of mineral mixture and goat kids of improved breed like sangamneri / osmanabad, providing technical knowledge of animal housing /nutrition/ breed/ health. Providing grading sieve /ghee making equipment to selected farmers for capacity building for product diversification. In case of capacity building for crop component, capacity building for animal component and capacity building for product diversification pre evaluation score (out of 100) before training was 45, 49 and 43 while post evaluation score (out of 100) after training was 73, 75 and 68, respectively.

Gross income before training was Rs.360670, Rs.42640 and Rs.47860 in case of capacity

building for crop component, capacity building for animal component and capacity building for product diversification, respectively and after training it was increased by 62.65, 67.92 and 24.34 per cent, respectively.

Table 8 Capacity building on different component

Sr. No	Capacity building on different component	Title of training	Pre evaluation score (out of 100) before training	Post evaluation score (out of 100) after training	Gross income (Rs) before training	Gross income (Rs) (after 6 months) after training	Gross income increased due to training (Per cent)
1	Capacity building for crop component	a.Field crop production, b.Visits to various agriculture exhibitions c.Visits to agriculture college farm, d.Visits to mushroom production plant, e.Visits to biofertilizer production plant, conducting field days	45	73	360670	586624	62.65
2	Capacity building for animal component	Technical knowledge of animal housing /nutrition/ breed/ health	49	75	42640	71601	67.92
3	Capacity building for product diversification	Grading sieve /ghee making	43	68	47860	59510	24.34

Constraints in crop, animal and product diversification

The major problems and constraints in crop diversification are primarily due to following reasons.

- 1.Unavailability of improved variety seed
- 2.Imbalance fertilizer use by the farmers
- 3.Unavailability of mineral mixture.
- 4.Unavailability of improved breed.
- 5.Lack of technical Knowledge about feeding/ animal nutritional housing

CONCLUSIONS:

Groundnut crop replaced by Soybean crop, Darna variety of paddy replaced by Phule samrudhi, local and MACS-123 variety of soybean replaced by JS-335, Panchganga variety of Maize (fodder) replaced by African tall, Grass replaced by Phule Jayawant variety of Hybrid Napier. In case of Rabi season, Wheat crop replaced by Onion crop, HD-2189 variety of wheat replaced by NAIW-301, local / Vijay variety of chickpea replaced by Digvijay variety. Gross returns from the crop component, animal component and product processing increased by 62.65, 67.92 and 24.34 per cent after diversification. The expenditure on consumption of paddy is more and followed by edible oil, wheat, greengram, and jowar. Providing technical knowledge of improved package of practices through folders/ krishi dairy, supply of Phule triveni semen for Artificial Insemination, supply of mineral mixture and goat kids of improved breed like sangamneri / osmanabad, providing technical knowledge of animal housing /nutrition/ breed/ health, Providing grading sieve /ghee making equipment for crop, animal and product diversification.



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