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To analyze the nature and extent of diversification on marginal and small farms of Kanpur Dehat U.P.

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Abstract

The government can play a catalytic role in the process of crop diversification, basically, the pace of crop diversification envisaged in this strategy is to be guided by the market forces. The rigidities in cropping system and post-harvest process can be reduced by technology development and infrastructural support which has to be strengthened by the government so as to increase flexibility in agriculture production in its response to market signals. As regards non-diversified farms, 64 per cent were of 0-1 ha size group and 36 per cent farms were of 1-2 ha size group, out of total cultivated area of non-diversified farms, 36.50 per cent was under 0-1 ha size group and 63.50 per cent under 1-2 ha size group.

Keywords: catalytic role, flexibility, diversification, agriculture production and market etc.

Introduction

The concept of diversification conveys different meaning to different people at different levels. For example, at the national level it generally conveys a movement of resources, especially labour, out of agriculture to industry and services, a sort of structural transformation. Within agriculture, it means, shifting from subsistence farming to commercial farming to some, it implies shifting from low-value food/non-food crops to high value food/nonfood crops to others and it means switching over from local to high yielding varieties, the integration of animal husbandry, fisheries, horticulture; etcetera to still others. The economic and researchers have advocated evolving of an integrated system approach to the problem of rural diversification for a rapid, balanced and egalitarian growth of the rural economy. Diversification, of rural economy is considered essential for finding solutions to the problems of rural unemployment, poverty and hunger. Not only that, in a backward agrarian economy, diversification of agriculture is adopted as a strategy to minimize risk to cover crop failure where the immediate goal is not to make profits but to stabilize income for survival (Grish, 2004).

Research methodology

The present investigation was undertaken to study the diversification of Agriculture in Kanpur dehat and it satiated Geographic features: 26° n to 25° 55' n latitude : 79° 30' e to 80° e longitude : Marginal and Small Farms on Income and Employment, aspects adopted for selection of district, blocks, villages and farmers and different tools for analysis and interpretation of data collected for the aforesaid investigation. The crop diversification has been measured by both changes in cropping pattern and Simpson Index (S.I.) of diversity (Singh, 1996). The index is calculated for each farm household *i* for cropping year *t* and represents the sum of squared proportional areas allocated to each crop or field:

$$lit = \sum (Wijt)^2$$

Where *Wijt* equals the proportional area of crop '*j*' to gross cropped planted by household '*i*' in year '*t*'. The index approaches zero for perfect diversification and is equal to one for a farmer planting only one crop in one field.

Result and Discussion**Distribution of Agriculture holdings**

The distribution of agricultural holdings have been presented in table 1.

Table 1: Number of operational holdings and operational area in Kanpur dehat district

S. No.	Particulars	No. of operation holdings	Area in ha
1.	Marginal farmers (below 1 ha.)	126260	39509
2.	Small farmers (1-2 ha)	62146	45023
3.	Semi-medium farmers (2-4)	5446	29124
4.	Medium farmers (4-10 ha)	17756	48925
5.	Big farmers (10 & above)	176	2439
6.	Total holdings	254554	223593

Source: Statistical Bulletin of District Kanpur Dehat 2014.

Table 1 reveals that according to 2014 statistical bulletin the total number of holdings was 254554 and the area was operated 223593 ha. In the district the average size of holding came 0.88 hectare that shows the prosperity of farmers in the district.

Size of holdings and cultivated area

The number of sample farms by size groups, average size of holding and cultivated area have been presented in table 2.

Table 2: Number of farms, average size holdings and cultivated area

Size groups	Number of cultivators	Cultivated area (ha)	Average size of holding (ha.)	% of total holding	% to total cultivated area
Diversified farms					
Marginal	65	48.39	0.74	65	42.35
Small	35	65.86	1.88	35	57.65
Total/Average	100	114.25	1.14	100.00	100.00
Non-diversified farms					
Marginal	64	35.53	0.55	64	36.50
Small	36	61.80	1.72	36	63.50
Total/average	100	97.33	0.97	100.00	100.00

Table 2. reveals that average size of holding of diversified and non-diversified farmers came to 1.14 and 0.97 ha respectively. On diversified farms, 65 per cent farms belongs to 0-1 ha size group and remaining 35 per cent to 1-2 ha size group to the total farms. Out of total cultivated area of diversified farms, 42.35 per cent under 0-1 ha size group and 57.65 per cent under 1-2 ha size group of holdings.

As regards non-diversified farms, 64 per cent were of 0-1 ha size group and 36 per cent farms were of 1-2 ha size group, out of total cultivated area of non-diversified farms, 36.50 per

cent was under 0-1 ha size group and 63.50 per cent under 1-2 ha size group.

Family size

The average number of members in a family and number of farm workers available on per farms and per ha basis have been shown in table V-2 for the purpose of standardization of family workers, the figures have been given as adult male equivalent. One & half female and two children respectively have reckoned as equivalent to one adult male.

Table 3: Total number of family members, workers and average number of family members and workers per farm and per ha.

Size groups	Number of Farmers	Cultivated area (ha)	Total Number of family members	Total Number of workers	Average Number of family members and workers			
					Family members		Workers	
					Per farm	Per ha	Per farm	Per ha
Diversified farms								
Marginal	65	48.39	410	188	6.30	8.47	2.89	3.88
Small	35	65.86	415	198	11.85	6.30	5.65	3.01
Total/average	100	114.25	825	386	8.25	7.22	3.86	3.38
Non-diversified farms								
Marginal	64	35.53	439	202	6.85	12.91	3.15	5.68
Small	36	61.80	437	195	12.13	7.07	5.41	3.15
Total/average	100	97.33	896	397	8.96	9.20	3.97	4.08

Table 3: that the average size of family member per farm came to 8.25 and 8.96 on diversified and non-diversified farms, respectively. The average number of family members per ha. came to 7.22 and 9.20 on respective category of farms. Average number of workers came to 3.86 and 3.97 per farm on diversified and non-diversified farms respectively, while the per ha. worker members came to 3.38 and 4.08 on respective categories. The per farm number of family members and worker were higher on small farms as compared

to marginal farms on both category of farms. The per ha number of family member and worker were higher on marginal farms as compare to small farms.

Number of draft, milch animal & machinery

Draft animal: The average number of draft animals per farm and per ha. on diversified and non- diversified farms have been given in table 4.

Table 4: Number of draft animal per farm and per ha

Size groups	Number of farmers	Cultivated area (ha)	Total Number of bullock pairs	Average Number of bullock pairs per farm	Average Number of bullock pairs per ha
Diversified farms					
Marginal	65	48.39	17	0.26	0.35
Small	35	65.86	9	0.24	0.14
Total/average	100	114.25	25	0.25	0.22
Non-diversified farms					
Marginal	64	35.53	15	0.23	0.42
Small	36	61.80	13	0.36	0.21
Total/average	100	97.33	28	0.28	0.29

Table 5 reveals that the number of draft animal was slightly higher on non-diversified farms as compared to diversified farms. The average number of draft animal was 0.22 and 0.29 per ha on diversified and non-diversified farms respectively, while on per farm basis, the average number of draft animal

came to 0.25 and 0.28 on diversified and non-diversified farms respectively. The number of bullock pair are higher on non-diversified farms and number of tractor are higher on diversified farms. It is symble of diversification is the study area.

Table 5: Number of tractor per farm and per hectare

Size groups	Number of farmers	Cultivated area (ha)	Total Number of Tractors	Average Number of Tractor per farm	Average Number of Tractor per ha
Diversified farms					
Marginal	65	48.39	09	0.14	0.18
Small	35	65.86	27	0.77	0.41
Total/ average	100	114.25	36	0.36	0.31
Non-diversified farms					
Marginal	64	35.53	1	0.015	0.03
Small	36	61.80	9	0.25	0.14
Total/ average	100	97.33	10	0.10	0.09

Table 5: regards the number of machinery (Tractor) was higher on diversified farms as compared to non- diversified farms. The average number of tractor was 0.36 and 0.10 per farm on diversified and non- diversified farms respectively, while on per ha basis, the average number of tractor, came to 0.31 and 0.09 on diversified and non-diversified farms respectively. The reason for higher number of tractor on diversified farms was because of the fact that the financial assistance was provided by different Banks to the diversified sample farms of diversified area for the purchase of machinery (Tractor)

Milch Animal

Livestock production is the complementary enterprise on the sample farms because by-product of crop production is used for feeding the milch animals and get additional income from selling of livestock and the dung of the milch animals is used for improving the fertility and soil health of the farm. The number of milch animal per farm of per ha. on the sample farms is given table 6.

Table 6: Number of milch animals per farm and per ha on the sample farms.

Size groups	Number of farmers	Cultivated area (ha)	Number of milch animals	Average number of milch animals per farm	Average number of milch animals per ha
Diversified farms					
Marginal	65	48.39	188	2.90	3.88
Small	35	65.86	82	2.34	1.24
Total/ average	100	114.25	270	2.70	2.36
Non-diversified farms					
Marginal	64	35.53	106	1.65	2.98
Small	36	61.80	52	1.44	0.84
Total/ average	100	97.33	158	1.58	1.62

Table 6: reveals that, on an average, the number of milch animals were found 2.70 and 1.58 per farm on diversified and non-diversified farms respectively, on the per ha basis, the average number of milch animals came to 2.36 and 1.62, on diversified and non-diversified farms respectively.

Poultry bird

Poultry production is the complementary enterprise on the

sample farms because by-product of crop production is used for feeding the poultry bird and get additional income from selling of poultry and the poultry bird was used for improving the fertility of soil health of the farm. The number of poultry bird (100) per farm and per ha on the sample farms is given table 7

Table 7: Number of poultry unit per farm and per ha on the sample farm (1 unit=100 bird)

Size groups	Number of holding	Cultivated area (ha)	Number of poultry unit	Average number of poultry unit per farm	Average number of poultry unit per ha
Diversified farms					
Marginal	65	48.39	35.00	0.54	0.72
Small	35	65.86	85.00	2.42	1.29
Total/ average	100	114.25	120.00	1.19	0.92
Non-diversified farms					
Marginal	64	35.53	10.50	0.16	0.29
Small	36	61.80	34.75	0.96	0.43
Total/ average	100	97.33	45.25	0.45	0.34

Table 7: reveals that, on an average, the number of poultry unit were found 1.19 and 0.45 per farm on diversified and non-diversified farms respectively, on the per ha. basis, the average number of poultry unit came to 0.92 and 0.34, on diversified and non-diversified farms respectively.

Irrigation

Irrigation is one of the important factor of agricultural production, which determine the level of resources use, adoption of cropping pattern, intensity of cropping and level of production and income of farms. Table 8 shows the source wise irrigated area on diversified and non-diversified farms.

Table 8: Source wise irrigated area on the sample farms. (In ha.)

Source	Size groups		
	Marginal	Small	Total
Diversified farms			
1- Canal	19.31 (42.82)	28.34 (46.27)	47.90 (45.09)
2- Tube walls	22.03 (48.86)	29.78 (48.63)	51.11 (48.11)
3- Wells	1.15 (2.56)	1.17 (1.92)	4.31 (4.06)
4- Other	2.60 (5.78)	1.87 (3.06)	4.31 (4.06)
Total irrigated area	45.09 (100)	61.25 (100)	106.34 (100)
Net cultivated area	48.39	65.86	114.25
% of irrigated area to cultivated area	93.18	93.43	93.30
Non-diversified farms			
1- Canal	11.21 (38.20)	22.06 (43.53)	33.60 (41.99)
2- Tube walls	14.80 (50.54)	23.43 (46.25)	40.71 (50.74)
3- Wells	1.20 (4.09)	1.31 (2.59)	2.19 (2.74)
4- Other	2.13 (7.26)	1.73 (3.42)	3.61 (4.52)
Total irrigated area	29.34 (100)	50.68 (100)	80.04 (100)
Net cultivated area	35.53	61.80	97.33
% of irrigated area to cultivated area	82.57	83.01	82.79

(Figures in brackets shows percentage of respective values)

Table 8: indicates that the percentage area under irrigation was higher on diversified farms being 93.30 per cent as compared to 82.79 per cent on non- diversified farms. They borrowing from different Bank has helped the diversified farms to develop their owned irrigation facilities. The size group wise analysis shows that percentage irrigated area was higher on small farms as compared to marginal farms on both the categories of sample farms.

The source wise observation of irrigated area reveals that tubewell was the main source of irrigation and accounted for

48.11 per cent of the total irrigated area on the diversified farms and 50.74 per cent on non- diversified farms followed by canals which accounted for 45.09 Per cent on diversified farms and 41.99 Per cent on non- diversified farms.

Investment on fixed capital

Investment on fixed capital is the value of assets on the farms. Table 9 shows the value of fixed assets on per farm and per ha. Basis respectively for diversified and non-diversified categories of the sample farms.

Table 9: Investment on fixed capital (Rs./ farm)

Particulars	Size groups		
	Marginal	Small	Average
Diversified farms			
1-Land	437540.46	1115516.70	675041.13
2-Farm building	17927.41	47680.54	28157.39
3- Live stock	21110.66	56246.53	31182.29
(a) Draft animal	11028.16	29860.54	17454.99
(b) milch animal	10082.50	26385.98	15727.30
4-irrigation structure	4222.13	11730.91	6758.15
5- Implement & machinery	18047.29	47714.94	28273.81
6- Other	4315.36	5125.82	5133.09
Total including land	503190.35	1284015.48	776610.13
7-Total excluding land	65649.88	168498.78	101569.01
Non-diversified farms			

1-Land	323245.19	1017593.95	571539.31
2-Farm building	12710.68	41716.95	22842.42
3- Live stock	14716.12	49657.14	26739.79
(a) Draft animal	7620.68	26084.73	13927.11
(b) milch animal	7095.44	23572.41	12813.59
4-Irrigation structure	2874.46	9832.17	5251.73
5- Implement & machinery	13944.37	41375.77	22913.93
6- Other	4106.38	9987.25	6625.07
Total including land	370497.25	1170163.24	655912.23
7- Total excluding land	47252.03	152569.29	84372.92

Table 9: indicates that on an average the investment on fixed capital including land was Rs. 776610.13 per farm and excluding land it was observed Rs. 1015690.01 per farm on diversified farms which was higher than Rs. 655912.23 including land and Rs.84372.92 per farm excluding land on non-diversified farms. The borrowing from different Bank helped the diversified farms to possess more assets as compare to non-diversified farms. The main items of fixed capital responsible for higher investment on diversified farms were

milch animals, draft animals, farm buildings and farm machineries etc. The size group wise analysis shows that the investment on fixed capital was higher on small farms as compared to marginal farms on both categories of farms, because they were much prosperous and utilized more capital on farms.

The per ha. investment on fixed capital on diversified and non-diversified sample farms is given in table 10.

Table 10: Investment on fixed capital on the farms. (per ha.)

Particulars	Size groups		
	Marginal	Small	Average
Diversified farms			
1. Land	591270.90 (50.71)	593359.95 (50.02)	592141.34 (50.83)
2- Farm buildings	24226.24 (13.46)	25361.99 (13.86)	24699.47 (13.67)
3- Live stock	28527.93 (15.85)	29918.37 (16.35)	29107.28 (16.06)
(a) Draft animal	14902.92 (8.28)	15883.27 (8.68)	15311.40 (8.43)
(b) milch animal	13625.01 (7.17)	14035.10 (7.67)	13795.88 (7.60)
4- irrigation structure	5705.59 (3.17)	6239.85 (3.41)	5928.20 (3.27)
5- Implement & machinery	24388.23 (13.55)	25380.29 (13.87)	24801.59 (13.68)
6- Others	5831.58 (3.24)	2726.50 (1.49)	4537.80 (2.50)
Total including land	679986.96 (100)	682986.96 (100)	681236.96 (100.00)
7- Total excluding land	88716.06	89627.01	89095.62
Non-diversified farms			
1- Land	587718.54 (50.52)	591624.39 (50.81)	589215.78 (50.64)
2- Farm building	23110.33 (13.31)	24254.04 (13.45)	23548.89 (13.36)
3- Live stock	26756.59 (15.41)	28870.43 (16.01)	27566.80 (15.64)
(a) Draft animal	13855.78 (7.98)	15165.54 (8.41)	14357.85 (15.64)
(b) milch animal	12900.81 (7.43)	13704.89 (7.60)	13209.89 (7.60)
4- irrigation structure	5226.30 (3.01)	5716.38 (3.17)	5414.16 (3.07)
5- Implement & machinery	23353.41 (13.45)	24055.68 (13.34)	23622.61 (13.40)
6- Others	7466.15 (4.30)	5806.54 (3.22)	6829.97 (3.89)
Total including land	673631.32 (100.00)	680327.47 (100.00)	676198.18 (100.00)
7- Total excluding land	85912.78	88703.08	86982.4

(Figures in brackets shows percentage of respective values)

Table 10: portrays that, the per hectare investment on fixed capital including land came to Rs. 681236.96 on diversified farms as against Rs 676198.18 on non-diversified farms. The per hectare investment excluding land came to Rs 89095.62 and Rs. 86982.40 on diversified and non-diversified sample farms respectively. The per hectare investment was also higher on small farms as compared to marginal farms on both categories of sample farms.

On an average the highest investment was made on land followed by implements and machineries, farm buildings, live stock and irrigation structure on both categories of the sample farms. The per hectare investment was also higher on sample farms. The per hectare investment was also higher on small farms as compare to marginal farms on both categories because of the fact that small farmers could afford higher investment due to their better economic position.

Conclusion

Diversification of agriculture which envisages changes in production activities is being suggested as one of the means for increasing income and employment on farms, to stabilize farm income over the season, to reduce risk and uncertainties in agriculture and conservation and enhancement of natural resources. In the context of Indian agriculture diversification has occurred both across and within crops. Livestock. In more recent times, especially with the General Agreement on Tariffs and Trade (GATT), throwing open several opportunities for agriculture exports, diversification towards high-tech, innovative enterprises within the agriculture sector such as commercial crop and towards agro/food processing and rural non-farm sector has gaining momentum.

References

1. Anonymous. Ministry of Agriculture and Cooperation Govt. of India, 2011-12.

2. Anonymous. Office of the Registrar General of India, Ministry of Home Affairs & Economic Survey, 2012-13.
3. Athar Jalil, Manzoor Ahmad, Azhar Abbas, Sheikh AD. Economic factors responsible for net income variation on small farms in southern Punjab, Pakistan. *Journal of Agricultural Research (Lahore)*. 2011; 49(3):419-427
4. Behera UK, Jha KP, Mahapatra IC. Integrated management of available resources of the small and marginal farmers for generation of income and employment in eastern India. *Agricultural Research Information Centre Hisar* 2004; 27(1):83-89.
5. Berker SC. Small formers production constraints and implications for agriculture diversification in the Caribbean. *Tropical agriculture*. 2002; 79(4):247-253.
6. Dharam Pal, Gian Singh. Magnitude and determinants of indebtedness among small and marginal farmers: a case study of Patiala District in Punjab. Ministry of Agriculture and Cooperation, Directorate of Economics and Statistics. New Delhi. 2012; 69(3):143-151.
7. Fami HS, Veerabhadraiah V. Participation of rural women of marginal, small and big farm families in crop farming activities in Tafresh area of Iran. *University of Agricultural Sciences (Bangalore)*. 2002; 31(9/10):162-165.
8. Hari R, Sharma NK, Hema Tripathi. Analysis of the training needs, preference and constraints of marginal and small poultry farmers of Bareilly District. *Journal of Animal Husbandry and Dairy Science Muzaffarnagar*. 2014; 5(2):88-91.
9. Kavita Pal, Srivastava SK. Impact of crop financing on income and employment on marginal and small farm households: a study of borrowers of Prathama Bank, the First R. R. B. of India. Ministry of Agriculture and Cooperation, Directorate of Economics and Statistics New Delhi. 2012; 69(9):541-550.
10. Krishna Pal, Vinod Prakash, Prajapati MK, Singh KK. Cost and returns of the production of paddy. *Journal of Interacademia*. 2004; 8(3):476-479.
11. Krishnakumar V, Reddy DVS, Thamban C, Sairam CV. Restructuring of homestead farms for sustainable income and employment opportunities. *Indian Coconut Journal kochi*. 2008; 51(5):2-7.
12. Singh RP, Bodra Seema. Economic Analysis of crop Diversification. A Comparative study of food grain and vegetable crops. *Indian Journal of Agricultural Economics*. 2008; 63(3):361-362.
13. Singh Sukhpal. Contract forming for agricultural diversification in the Indian Punjab: a study of performance and problem. *Indian Journal of Agricultural Economics*. 2000; 55(3):283-294.
14. Temjenzulu Jamir. Income and employment generation in rural non-farm sector. *International Journal of Social Science and Interdisciplinary Research*. Kurukshetra. 2014; 3(9):74-85.
15. Toor MS, Sidhu AS, Sukhpreet Singh. Integrated farming systems for income and employment increasing possibilities on small farms in Punjab State. Ministry of Agriculture and Cooperation, Directorate of Economics and Statistics New Delhi. 2009; 66(9):519-524.
16. Uddin MT, Takeya H. Employment patterns and income generation of farm households integrated farming of Bangladesh. *International Journal of Agricultural Research; Bangladesh*. 2010; 5(6):377-385.
17. Wahiduddin, Mahmud, Rahman SH, Sajjad Zohir. Agricultural diversification a strategic factor for growth.

Out of the shadows of famine evolving food in Bangladesh. 2000, 232-240.