INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, ECONOMICS & MANAGEMENT

IJRCM

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FACTORS INFLUENCING TOTAL HOUSEHOLD INCOME OF FARMERS IN UTTAR PRADESH

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LUCKNOW

ABSTRACT

During last one decade there has been significant transformation in Indian agriculture. Farm size has declined but access to irrigation and credit has increased. Now large number of farmers has access to new technology due to strong network of technology dissemination system like KVKs, and KGKs, etc. There has been diversification of cropping system and income diversification in the state. The study highlights the resource base, level of education, and cropping system of farmers in tow contrasting regions namely Western and Eastern regions of Uttar Pradesh. The income of farmers in western region is considerably higher than in eastern region mainly because of sharp difference in the average size of holdings, access to irrigation, cropping system and earning members, etc. However, the study shows that many of the factors such as crop diversification, entrepreneurial ability, diversified sources of income and family size significantly affect the level of income. Caste, level of education, age as proxy of farming experience and number of milch animals, and farm size were not significant in explaining the level of income of the farmers.

KEYWORDS
Agripreneurs, income, technology.

INTRODUCTION

During last four decades, Indian agriculture witnessed significant change in the production pattern and new technological advancements but in the last decade it could not sustain its pace of development due to several institutional and non-farm price factors. Farming in India has been basically subsistence-oriented but due to increased commercialisation and advent of WTO farmers have started transforming their agriculture into a business proposition. However, there are several constraints that inhibit the growth of agriculture as a business enterprise. Besides, general constraints facing agricultural development such as preponderance of marginal and small land holding, low income and purchasing power of the farmers, stagnating agricultural productivity, lack of credit, lack of capital formation, insufficient infrastructure, and lack of well developed marketing network, etc., entrepreneurial ability and behaviour of farmers substantially affect the adoption of new farm enterprises as well as technologies. Rapid changes in the society and policies have forced farmers to be more flexible and able to develop market oriented strategies, diversify their product portfolio, enhance their networks, develop effective partnerships, upgrade their knowledge systems, and improve their personal skills and competences to the changing external conditions. In this age of modern agriculture, the farmers need to search new ways to increase their incomes through diversifying their cropping system and adding new enterprises that allow them greater value creation.

The nature of Indian agriculture indicates that resource base, especially land and water, for an average farmer has declined considerably mainly due to inappropriate and unscientific use of land and irrigation water. The prime land is being transferred to non-agricultural and industrial uses. Increasing demographic pressure has resulted into excessive exploitation of land and additional poor and degraded lands have been brought under cultivation resulting into low production. Besides, the agricultural productivity has stagnated and cost of inputs increased more than the prices of agricultural products. All these factors adversely affected the productivity and overall income of the farming community.

Moreover, a few of the studies also have shown that the quality of human capital is an important factor in explaining rural household income (Solow 1957) and Nelson (1964). In general, investment in education allows people to adapt more easily to both social and technical changes in the economy. Okurut et al. (2002) analysed data in Uganda and found that the higher the educational attainment of the household head the wealthier the household, while the larger the household size the poorer the household. Smith (2007) in a study on the determinants of Soviet household income found that human capital and demographic factors were the main determinants of income. The well-educated, middle-aged and self-employed people had relatively comfortable incomes. The study also concluded that location had strong influence on household incomes. Similarly, in Mozambique, Bruck (2001) analysed the determinants of rural income and poverty and the coping strategies during the post-war period. Using a reduced form linear welfare function to estimate the impact of hypothesised variables – including land, assets, social capital, war-effects, and village level endowments or characteristics – on indicators of household well-being, such as household consumption, the study indicated that a poverty trap existed in certain areas of the country. Nevertheless, households in the land-abundant northern parts of the country as well as those supplied with better social services were relatively richer (Bruck 2001).

In Tanzania, studies have found that because agriculture is mainly labour intensive expansion in rural smallholder agricultural production depends upon a bigger labour force (Kamuzora & Gwalema, 1998; Kamuzora & Mkanta, 2000; Kamuzora, 2001). Inadequate infrastructure has also featured prominently in rural poverty studies. In Argentina, a study on the rural poor found that the principal causes of income and poverty were low education, poor health facilities and inadequate infrastructure (Verner, 2006). Combined together, these factors severely constrained household income. A few of the studies have found that the availability of financial services is also as important explanatory variables affecting the income of the households. Kessy and Urio (2006) have shown that the provision of loans by micro-finance institutions boosted the livelihoods of poor Tanzanian households. The study also found that the lack of infrastructure, especially rural roads, was the main reason why micro-finance institutions failed to operate in rural areas.

OBJECTIVE OF THE PAPER

The paper examines the profile of various types of households and identifies the factors influencing his total income in two contrasting regions of Uttar Pradesh. It is to be mentioned here that farmers in these two regions have different type of resources and earn income from varied sources depending upon his personal characteristics, resource base, agroclimatic condition, infrastructure development, access to institutional credit as well as marketing network, etc. The income of a farmer is the outcome of all the efforts he/she makes in farming.

RESEARCH METHODS

This paper is based on the farm level data collected from more than 600 sample households (farmers) representing different categories of farmers in two contrasting agroclimatic regions of Uttar Pradesh namely Eastern and Western Uttar Pradesh. In the present study, the net income of a farmer has been estimated as gross receipt net of total cost incurred in various farm as well as non-farm activities. The major source of income of farmers include, crops, livestock, horticulture, wage earning, small trade, remittances, etc.

PROFILE OF SELECTED FARMERS

CASTE STRUCTURE

It is clear from Table 1 that there was no significant difference in the caste structure of the two regions namely Eastern and Western Uttar Pradesh. Almost 40 percent of the sample households belong to backward caste (38 percent in Eastern Region and 43 percent in western region) followed by upper case (28

percent), scheduled caste (25 percent) and scheduled tribe (6.5 percent). Proportion of upper caste and backward caste was marginally higher in western Uttar Pradesh compared to eastern Uttar Pradesh while proportion of scheduled caste and scheduled tribe was relatively more in eastern region compared to western region (Table 1).

The average family size in both the regions was about 7 to 8 members of which about 38 percent were earning members. Though there was no much difference in the average family size in two regions but there was sharp difference in the proportion of earning members. In eastern region, the family size was about 8 members but the proportions of earning members were only 32.2 percent while in western region the family size was relatively small (about 7 members) but the proportion of earning members was 46.6 percent. This shows that dependency ratio in eastern region was considerably high compared to western region. This higher dependency ratio has a strong bearing on the income level of farmers (Table 1).

TABLE 1: DISTRIBUTION OF SAMPLE HOUSEHOLDS ACCORDING TO CASTE GROUP IN BOTH THE REGIONS OF UTTAR PRADESH (% of total households)

Particular	Eastern region	Western region	Both regions
Upper caste	26.3	30.0	28.0
Backward caste	38.1	42.7	40.3
Scheduled caste	27.7	22.3	25.2
Scheduled tribe	7.9	5.0	6.5
Family size (No.)	7.75	7.20	7.45
Proportion of earning members in the family (%)	32.2	46.4	38.3

AGE OF THE HEAD

The age structure of the sample shows that nearly half (48 percent) of the sample households were middle aged person between the age group of 30 to 50 years. About 36 percent of households were in the age group of 50 to 70 years of age. But, about 8 percent of the households were young with less than 30 years of age and equal number of households were more than 70 years old (Table 2). There was no sharp difference in the age structure of the head of households in the two regions. Age of the households plays a very important role in explaining the income of the households as has been observed that young head of households are able to adopt improved/new technologies more easily compared to old age heads who are apply more traditional approach their farming and are reluctant to accept change their method of farming or cultivation practices soon and easily.

TABLE 2: DISTRIBUTION OF SAMPLE HOUSEHOLDS ACCORDING TO AGE GROUP (YEARS) IN BOTH THE REGIONS OF UTTAR PRADESH (% of total households)

Particular	Eastern region	Western region	Both regions
Less than 30 years	6.9	9.0	8.0
31-40 years	22.5	19.3	21.0
41-50 years	26.6	26.7	26.6
51-60 years	19.4	22.8	21.1
61-70 years	17.0	13.2	15.0
Above 70 years	7.6	9.0	8.3

EDUCATION LEVEL OF THE HEAD

Table 3 indicates that literacy rate in both the regions was quite low as about 35 percent of the household heads were illiterate while 21.5 percent ere able to read and write. However, the proportion of illiterate were high in eastern region (37.3 percent) compared to western region (33.3 percent). The proportion of household heads, who can read and write, was more (23.3 percent) in eastern region than in the western region (19.5 percent). In general, proportion of household heads having more than primary level education was higher in western region compared to eastern region. However, there were about 9.4 percent household heads were graduate and even about 3 percent household heads had education more than graduate level. But there were sharp difference between the levels of education in these two regions. Household heads were more educated in western region compared to eastern region (Table 3).

TABLE 3: DISTRIBUTION OF SAMPLE HOUSEHOLDS (PERCENTAGE) ACCORDING TO LEVEL OF EDUCATION IN BOTH THE REGIONS OF UTTAR PRADESH (% of total households)

Level of education	Eastern region	Western region	Both regions
Illiterate	37.3	33.3	35.3
Read and write	23.5	19.5	21.5
Upto primary level	16.4	18.5	17.5
High school	12.5	14.6	13.5
Graduate	8.4	10.4	9.4
More than graduate	1.9	3.7	2.8

SIZE OF FARMS AND LAND HOLDING DETAILS

The average holding size of sample households indicates that more than 67 percent of holdings were either marginal or small holdings in these two regions. However, proportion of marginal holdings in eastern region was quite high (40 percent) than in western region (27 percent). While proportion of smaller holdings (1 to 2 ha) accounted for nearly 29 percent in eastern region compared 37 percent in the western region. Proportion of medium farmers (2-4 ha) was almost same in both the regions. But, proportion of large holdings was higher (20 percent) in western region than in eastern region (15 percent). This shows that land holdings were more inequitably distributed in eastern region compared to western region (Table 4).

TABLE 4: DISTRIBUTION OF SAMPLE HOUSEHOLDS ACCORDING TO FARM SIZE IN BOTH THE REGIONS OF UTTAR PRADESH

Particular	Eastern region	Western region	Both regions
Size of farm	**Percentage of total farms (%)**		
Marginal farmers	40	27	33
Small farmers	29	37	34
Medium Farmers	16	16	16
Large farmers	15	20	17
Land Holding Details			
Cultivated area (Ha)	1.16	2.15	1.65
Proportion of gross cropped area irrigated (%)	60	90	75
Cropping intensity (%)	150	220	185

The average size of holding in the two regions was about 1.65 hectares being higher (2.15 ha) in western region compared to eastern region (1.16 ha). Similarly, proportion of irrigated area to total cropped area was about 75 percent but higher (90 percent) in western region than in eastern region (60 percent). This shows that farmers in western region had not only larger holdings but also higher access to irrigation also. This has impact on intensive use of land. The cropping

intensity (times net cultivated area is cropped in whole year) was 2.2 times in western region compared to 1.5 times only in eastern region. Farmers in western region not only cultivate land more intensively but also grow more crops (Table 4).

CROPPING PATTERN

The cropping pattern of farmers in both the regions is quite different. Farmers in western region have more diversified cropping system than in eastern region as is clearly reflected by the crop diversification index. Farmers in eastern region grow more cereals and pulses while farmers in western region devote relatively more area for sugarcane, horticultural crops and many other crops such as groundnut, oilseeds crops, and fodder, etc.(Table 5).

TABLE 5: CROPPING PATTERN (PERCENTAGE OF GROSS CROPPED AREA) OF SAMPLE HOUSEHOLDS IN BOTH REGIONS OF UTTAR PRADESH (% of total cropped area)

Crops	Eastern region	Western region	Both regions
Cereal	57.8	50.8	54.3
Pulses	12.3	5.2	8.8
Oilseeds	4.9	3.9	4.4
Sugarcane	13.3	18.2	15.8
Horticulture	5.3	12.2	8.8
Medicinal and aromatic plants	3.2	2.4	2.7
Others*	3.2	7.3	5.2
Crop diversification index**	0.3471	0.5482	0.4476

* includes crop such as fruits, vegetables, floriculture, etc.

**Crop Diversification Index has been calculated as: 1- Sum of squared ratio of (area under a particular crop divided by Gross cropped area). For example, Area under paddy is 2 ha and area under Wheat is 2 ha. The gross cropped area comes to 4 ha. Hence, Crop Diversification Index = 1- (square of (2/4) + square of 2/4)). i.e. 1-(.25+.25). Hence, Crop Diversification Index =1-0.5 = 0.5

ACCESS TO CREDIT

It is evident from Table 6 that on average sample farmers had about 2 milch animals (cows and buffaloe). Farmers in western region had more milch animals (2.6) compared to eastern region (1.5). On average, little more than half (about 54.4 percent) Sample farmers were able to avail credit of average amount of about Rs 35,000. However, there was sharp difference in the access to credit and amount of credit availed by the farmers in these two regions. In western region about 66 percent of the farmers had access to credit and availed credit of Rs 38,000 against about 43 percent farmers in eastern region availed credit of Rs 16,500. This shows that not only more number of farmers had access to credit in western region but availed more amount of credit also (Table 6).

TABLE 6: ACCESS TO CREDIT TO SAMPLE HOUSEHOLDS IN BOTH REGIONS OF UTTAR PRADESH

Particular	Eastern region	Western region	Both regions
Milch animals (cows and buffaloes) (No.)	1.50	2.60	2.10
Proportion of sample households availing credit (%)	42.6	66.2	54.4
Amount of loan (Rs/household actually availing credit)	16,500	38,000	27,250

INCOME PROFILE

On average, per household annual net income in western region was about Rs 93,000 compared to Rs 69,250 in eastern region. This comes to Rs 10,035 per capita in eastern region and Rs 12,560 in western region. There was sharp difference in the major sources of income of farmers in these two regions. Contribution of crops in total income was almost same in both the regions but in case of other sources of income there were sharp differences. In eastern region, wage earnings contributed about 4.6 percent of total income compared to 1.8 percent in western region. Farmers in western region received more income from livestock and horticulture compared to farmers of eastern region who received higher income from other miscellaneous sources such as remittances, and petty trade activities, etc. Farmers have more diversified source of income in eastern region than in western region. Farmers in western region focused more on farming and livestock while farmers in eastern region tried to have income from various sources (Table 7).

TABLE 7: INCOME PROFILE OF SAMPLE HOUSEHOLDS IN BOTH REGIONS OF UTTAR PRADESH

Particular	Eastern region	Western region	Both regions
Per household total income (Rs)	69250	92950	83090
Per capita income (Rs)	10035	12560	11540
Proportion of total income by source (%)			
Crops	61.4	62.5	64.2
Horticulture	27.7	30.1	27.3
Wage earnings	4.6	1.8	2.9
Livestock	1.7	2.8	2.3
Others	4.6	2.7	3.3
Income diversification index*	0.4256	0.2916	0.3586

Source: Field survey data

*Income Diversification Index can be calculated as: 1- Squared sum of ratio of each source of income to total income. For example, if total income is Rs 5000 and income from crops is Rs 3000, from livestock Rs 1000 and from wages Rs 1000, then Income Diversification Index is calculated as : 1- sum of (square of 3000/5000 i.e. 0.6X0.6=0.36) + (square of 1000/5000 i.e. 0.2X0.2=0.04)+ (square of 1000/5000 i.e. 0.2X0.2=0.04)). Thus total comes to 0.36+.04+.04= 0.44. Hence, Income Diversification Index=1-0.44= 0.56.

FACTORS INFLUENCING INCOME

The foregoing tabular analysis indicates that the farmers in these two regions have different resource base and have diversified source of income, hence an attempt was made to estimate the contribution of various important factors that influence total income of farmers in these two regions. Two separate regressions using least square method were used to examine determinants of total net income and also per capita net income (adjusted for the size of family).

SELECTION OF VARIABLES/DETERMINANTS

Before using the regression analysis, an attempt was made to select the important variables that clearly explain the income of the farmers. The variables having multi co-linearity were dropped from the model. In the present analysis, simple linear model of regression was used to see the effect of different variables. However, before selecting the linear model an attempt was made to examine the pattern of response of variables through scatter diagram. After a careful scrutiny and based on the field experience, a number of variables were selected which directly and indirectly influence the income of the farmers. However, a few of the variables, which were purely endogenous and not relevant, were dropped from the regression, while a few of the important variables, though were not significant in all situations were included in the regression.

LIST OF EXPLANATORY VARIABLES/DETERMINANTS

The description of variables/determinants of the total and per capita income is given in the following Table 8.

TABLE 8: DESCRIPTION OF VARIABLE USED FOR REGRESSION ANALYSIS

Name of the variable	Description
AGE	Age of the head of household in years
CASTED1	Caste dummy for
CASTD2	Caste dummy as reference
CASTD3	Caste dummy 1
EDU1	Education dummy as reference (Illiterate as zero)
EDU2	Read and write=1
EDU3	Education up to primary=2
TYPED1	Farm type dummy (Traditional farms) as reference=0
TYPED2	Farm type dummy (Beginner/Early adopter)=1
TYPED3	Farm type dummy (Innovators as adopter of new technologies and farm practices) =2
TYPED4	Farm type dummy (Trendsetters as adopter of new technologies and farm practices)0=3
CDI	Crop diversification index
INCDIV	Income diversification index
TOTFAM	Total family size (in number)
EARNER	Number of male and female earning members in the family
MILCH	Number of milking animals (buffalo and cows)
PCINC	Per capita total income of a household from all the sources
AGINCHA	Per hectare agricultural income (in rupees) from crops and horticulture

Age of the head of household was used as proxy of experience which can explain the process of adoption of new technologies and improved farm practices. Besides, it may also explain the risk behaviour of the farmers in dealing with various types of risks associated with agriculture. Similarly, the caste of the farmers was expected to play an important role in adoption of new farm technologies and improved farm practices. Besides, many farmers of a particular caste largely practice specialized commercial farming of high value crops such as vegetables and have developed expertise in this field over time. These are very much specific to their caste. However, farmers have been grouped in three major traditional caste categories prevalent in the village. They have been given a score of 1 to 3 for different caste group. Instead of using caste code as a continuous variable, it was felt that use of a caste dummy would be more helpful in indicating the clear effect of different caste groups. The schedule caste has been used a reference caste dummy.

It is known fact that literacy in these villages is quite low and most of the farmers are illiterate and while other can hardly red and write. There are a very few household heads who can read and write and the proportion of literate farmers up to high school or graduation is very small. Instead of using the simple code of a household head as illiterate and educated, they have been assigned three dummies for different level of education, illiterate as reference dummy.

The farmers have been divided into four categories, depending upon the level of per capita total income from all sources (as a proxy for the degree and level of entrepreneurship). Traditional farmers were assigned the value of one; the late adopter or beginners as 2; early adopters or innovators as 3; and trendsetters as 4. To examine the pure effect of each class, a farm type dummy was also used and traditional farmers were used as reference for making comparison with other categories of farmers.

CDI and INCDIV are the two other variables used as indices, indicates the degree of diversification of cropping system and income. The values of these two variables vary between zero to one; Zero value indicates no diversification while one indicates perfect diversification. It was assumed that farmers diversify their cropping system and practice different enterprises to gain income from different crops as well livestock and other income generating activities. They can also minimize the risk by spreading the risk to other enterprises.

TOTFAM indicates the total number of family members of sample households. However, this was not adjusted for the sex and age, etc. This variable also indicates that larger the family, there is more availability of family labour but at the same time more number of people in the family, especially children and females also increases the dependency ratio. Besides, another variable such as **EARNER** was used to examine the effect of total earning male and female members in the family. It was assumed that higher the number of earning members in the family would increase the income the household.

Similarly **MILCH** animal (both cows and buffaloes) was included in the regression. It was assumed that higher the number of milch animals will significantly contribute to the income of the farmers. **AGINCHA** refers to agricultural income (income from crops and horticulture) per hectare of gross cropped area. This was used as a determinant and also as a dependent variable in some regression to examine the effect of land productivity. It was assumed that the cropping is the major activity of a farmers and agricultural productivity would greatly influence the per capita total income of a farmer. However, this was used a dependent variable also and several important variables mentioned earlier were used to explain the level and variability in agricultural income/productivity per hectare.

TOTINC and PCINC were used as dependent variable and a proxy indicator for entrepreneurship. This indicates the total income of a household from all the sources/enterprises and also on per capita basis, adjusted for the size of family.

RESULTS

The results of regression analysis is presented in Table 9 shows all the variables were not equally important in explaining the income of the farmers in both the regions while the effect of a few of the variables was quite strong in explaining the variability in income across groups of farmers in both the agro-climatic regions. Age as a proxy to years of experience was not all important variable in explaining the size of income of farmers. In fact, this variable has negative sign in both the regions indicating that young farmers were more entrepreneurs compared to old-aged household heads, who had more experience of farming but practice more traditional method of cultivation. Similarly, caste was an important variable in explaining income of the farmers in eastern region, where a particular group of farmers, especially “Kurmi” as traditional vegetable growers had significantly higher level of income than other caste people.

Education as a dummy variable shows that compared to illiterate farmers, literate farmers who can read and write or have education up to primary level had no significant impact on the income of the farmers. This is not unexpected as most of the head of households had very low level of education. The education of the head of the family *per se* was not very important in explaining the level of income of the households but education and exposure to outside world of other family members had better effect on improving their income level. This has already been experienced in several development projects like DASP and NATP, implemented by the World Bank in Uttar Pradesh and other seven states of India.

The type of farms was also used an important determinant of income and shows that compared to traditional farmers, agripreneurs have considerably higher income. However, there was consistently significant increase in the income of different types of farms compared to traditional farmers. The effect was quite strong and might have depressed the effect of other important variables.

TABLE 9: DETERMINANTS OF HOUSEHOLD TOTAL INCOME IN BOTH THE REGIONS OF UTTAR PRADESH

Determinants	Both Regions	Eastern region	Western region
Constant	53143.84***	17208.06	83809.88***
	(4.80)	(1.18)	(4.80)
ZONE2	-2243.50		
	(-0.63)		
AGE	-44.34	18.53	-42.34
	(-0.43)	(0.14)	(-0.26)
CASTD2	-4515.33	-8673.79**	-719.59
	(-1.54)	(-2.16)	(-0.17)
CASTD3	-8364.66	-9709.23	-11111.91
	(-1.37)	(-1.37)	(-1.02)
EDU2	-3536.96	-5576.91	-7003.43
	(-0.78)	(-0.96)	(-0.99)
EDU3	2692.65	2432.60	868.70
	(0.77)	(0.53)	(0.16)
TYPED2	35965.56***	38701.86***	32553.65***
	(10.58)	(8.98)	(6.19)
TYPED3	82646.12***	86352.13***	74907.72***
	(19.00)	(16.31)	(10.61)
TYPED4	180683.36***	181683.71***	173532.28***
	(39.90)	(30.32)	(24.17)
AGINCHA	0.05	0.18	0.04
	(0.60)	(1.90)	(0.34)
INCDIV	7864.41	15703.77	25131.40**
	(0.92)	(1.26)	(2.02)
CDI	28963.11***	7681.53	52859.06***
	(3.51)	(0.69)	(4.02)
TOTFAM	1131.43	613.98	1598.18
	(1.91)	(0.77)	(1.75)
EARNER	-65.65	1405.51	-1364.73
	(-0.06)	(1.11)	(-0.72)
MILCH	283.78	857.71	-669.51
	(0.37)	(0.91)	(-0.54)
2 Adjusted R	0.81	0.84	0.78
Number of observations	289	311	600

Figures in parentheses are "t" values. *, **, *** indicate the level of significance at 0.05, 0.10 and 0.01 level of significance.

Agricultural productivity, measured as agricultural income per hectare, was not very important variable in explaining the total income of the farmers because agripreneurs concentrated not only on agricultural activities but tried several other activities, both agricultural and non-agricultural activities, to increase their income. This is clearly reflected by income diversification index, which has positive impact. However, it was not significant in eastern region but in western region, farmers had more diversified sources of income and adopt various micro-enterprises compared to farmers in eastern region. This is expected result and shows that farmers in western region or more enterprising than the farmers of eastern region.

Similarly, crop diversification index also shows that those farmers who had more diversified cropping system had higher income. Again, the results show that farmers in western region adopt more diversified cropping system than the farmers in eastern region. In western region, crop diversification index significantly affect the income of the farmers compared to the farmers' income in eastern region. Size of family of farmers and number of livestock (milch animals) in both the regions had positive effect on income but was not significant. While number of earners (both male and female workers) does not significantly add to the total income of households (Table 9).

DETERMINANTS OF PER CAPITA INCOME

Table 10 shows that there was significant difference in the per capita income of farm households across regions. Farmers in western region had significantly higher income than the farmers in the eastern region. This is not unexpected as the development of infrastructure such as markets, roads, supply of electricity, access to credit was well developed in western region compared to eastern region. Effect of age as a proxy of experience, caste group and level of education was positive but not significant variable in determining level of per capita income.

Type of farms was an important determinant of per capita income as compared to traditional farmers, trendsetters had significantly higher income. This shows that entrepreneurial ability of farmers strongly influence the level of income of the farmers. Moreover, this was an important determinant in both the regions but the effect of this variable was stronger in western region than in eastern region (Table 10).

Agricultural productivity alone was most significant factor in determining the per capita income in both the regions. However, income diversification overall significantly affects the per capita income of farmers, but more specifically in western region compared to eastern region. But, crop diversification strategy was more important in determining per capita income in western region than in eastern region.

TABLE 10: DETERMINANTS OF PER CAPITA TOTAL INCOME OF FARMERS IN BOTH THE REGIONS OF UTTAR PRADESH

Determinants	Both regions	Eastern region	Western region
Constant	21477.40***	12993.97***	30365.80***
	(9.48)	(4.98)	(8.09)
ZONE2	1642.21**		
	(2.26)		
AGE	6.17	9.90	19.79
	(0.29)	(0.42)	(0.57)
CASTD2	-1010.14	-1772.69	-246.84
	(-1.69)	(-2.48)	(-0.27)
CASTD3	-1571.86	-1651.88	-2110.09
	(-1.26)	(-1.31)	(-0.90)
EDU2	324.10	-455.47	-474.66
	(0.35)	(-0.44)	(-0.31)
EDU3	529.44	821.61	-32.43
	(0.74)	(1.00)	(-0.03)
TYPED2	6164.29***	6490.54***	5406.24***
	(8.87)	(8.44)	(4.78)
TYPED3	13599.31***	14306.48***	11969.19***
	(15.29)	(15.14)	(7.88)
TYPED4	27318.27***	26191.31***	26231.43***
	(29.50)	(24.50)	(16.99)
AGINCHA	0.02	0.03	0.04
	(1.03)	(1.65)	(1.49)
INCDIV	3983.19**	2013.42	7952.55**
	(2.27)	(0.91)	(2.97)
CDI	2500.57	370.46	7729.66**
	(1.48)	(0.19)	(2.73)
TOTFAM	-1898.35***	-1504.81***	-2168.41***
	(-15.64)	(-10.54)	(-11.07)
EARNER	1.25	245.01	-27.42
	(0.01)	(1.08)	(-0.07)
MILCH	133.76	100.78	153.45
	(0.85)	(0.60)	(0.57)
2 Adjusted R	0.72	0.79	0.69
No. of observations	289	311	600

Figures in parentheses are "t" values. *, **, *** indicate the level of significance at 0.05, 0.10 and 0.01 level of significance.

Family size was the most significant determinants of per capita income as farmers with larger families had significantly lower income than those with smaller families. This shows that higher dependency ratio in larger family was much more than those with smaller families. Many other variables though are very important but do not indicate significant effect on per capita income because the effect of crop and income diversification and entrepreneurial behaviour of the farmers. It is to be noted that farmers in western region are more enterprising than the farmers in eastern region (Table 10).

CONCLUSION

The study shows that farmers in western region had relatively larger holdings and grow more high value crops. They have well developed infrastructure like roads, electricity and markets, better and assured irrigation facility and smaller family size. The head of family is relatively more educated and have access to credit facilities from the commercial banks. They have more diversified cropping system and varied sources of income. However, the results of regression analysis indicate that all the variables are not equally important in explaining the total income of the households. Age as a proxy to years of experience was not an important variable. In fact, this variable has negative sign in both the regions indicating that young farmers were more entrepreneurs compared to old-aged household heads, who had more experience of farming but follow traditional method of cultivation. Similarly, caste was an important variable in explaining income of the farmers in eastern region, where a particular group of farmers, especially "Kurmi" as traditional vegetable growers.

Education of the head of the family also shows no significant impact on the income of the farmers. This is not unexpected as most of the head of households had very low level of education. However, other educated members in the family and exposure to outside world had better effect on level of income. The type of farms shows that compared to traditional farmers, agripreneurs have considerably higher income. However, there was consistently significant increase in the income of different types of farms compared to traditional farmers. The effect was quite strong and might have depressed the effect of other important variables.

Income diversification index has strong influence on the total income of the farmers of western region compared to eastern region. In western region farmers have more diversified sources of income and adopt various micro-enterprises. This is not unexpected result and conforms the general observation that farmers in western region or more enterprising than the farmers of eastern region. Similarly, crop diversification index also shows that those farmers who had more diversified cropping system had higher income. Size of family of farmers and number of livestock (milch animals) in both the regions had positive effect on income but was not significant. While number of earners (both male and female workers) does not significantly add to the total income of households. Entrepreneurial ability of farmers strongly influences the level of income of the farmers, having stronger and significant effect in western region than in eastern region. Family size was also the most significant determinants of per capita income as farmers with larger families had significantly lower income than those with smaller families. This shows that higher dependency ratio in larger family was much more than those with smaller families.

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