Int.J.Curr.Microbiol.App.Sci (2025) *14*(06): 228-242

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 14 Number 6 (2025)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2025.1406.021

Factors Affecting the Distribution of Income Among Livelihood Strategies of Farming Household in the Gorakhpur and Deoria District, U.P. India

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Keywords

Income distribution, livelihood strategies, factor affecting household, multiple linear regression analysis

Article Info

Received:
20 April 2025
Accepted:
30 May 2025
Available Online:
10 June 2025

A B S T R A C T

Agriculture continues to be the main source of employment and income in the majority of developing nations. Food security, poverty alleviation, and human development are all significantly impacted by agriculture, which also employs the vast majority of people. The agricultural industry is becoming a more complex one, and farmers must carefully plan their operations to decide which crops and crop combinations to produce in order to improve their livelihoods. This is especially important given the fact that resources are limited. Many policy decisions heavily weigh the elements influencing the distribution of income among livelihood options and the possibility for growth in farming. For this purpose, the literature has been arranged chronologically under several subjects and sub-themes. The study's objective was to conduct a comparative analysis of the farmer's livelihood strategy in the eastern Indian districts of Gorakhpur and Deoria. The following were the study's particular goals: to identify the variables influencing the farming households' livelihood strategies and income distribution in the research region. Gorakhpur and Deoria districts were selected for the purpose. Both districts Gorakhpur and Deoria are located in the Tarai, or lowland, region of eastern Uttar Pradesh and have a sizable population. Data were gathered using structured questionnaires from 90 farmers in Gorakhpur and Deoria farming in, using mixed sampling strategies that used probability and non-probability sampling techniques. To achieve the goal of examining the elements influencing and affecting the farmers livelihood pattern and income distribution prospects status of the research area, a regression analysis was employed. The results of the study showed that each respondent's age, marital status, number of wage earners and non-earners in the family, various income sources and total family income, income distribution pattern, family size, land ownership, women's occupation, educational attainment, working hours, and other factors all have an impact on the development of their livelihood strategies. According to the regression results for both districts, the dependent variable of income among the respondents in the study area is significantly impacted by marital status, household size, and the number of working individuals. More farming strategies are required for the farmer respondents to proceed and work courageously to raise their revenue, as indicated by the positive association between the elements affecting income distribution and the pattern of livelihood strategies.

Introduction

The term "farmers' livelihood strategies" describes how they manage to provide for their basic needs, mostly through farming. It includes the money they make from farming as well as their overall well-being and food security. The structured collection of lifestyle decisions, objectives, principles, and pursuits that people or households make in order to ensure their financial stability is referred to as their livelihood strategy. Numerous elements, such as biophysical, political/legal, economic, social, cultural, and psychological aspects, have an impact on these tactics (Adams, 1999; *Adole, et al.,* 2024; Bhaskar, *et al.,* 2025). Put differently, it refers to the variety and combination of decisions and actions people take to fulfil their living objectives. More than 70% of the population is employed in agriculture, which holds a significant position in the chain of human development (Fabusoro and Agbonlahor, 2002; Gwandi, 2012; Gwandi, *et al*., 2014). To survive and earn a living, rural families in developing nations mostly depend on agricultural and natural resources. According to Tyagi (2012), agriculture plays a vital role in human development and national wealth in India, where it employs over 65% of the workforce and accounts for 22% of GDP.

In India, the main source of income is agriculture and related businesses. Approximately 70% of rural families rely primarily on agriculture, while 82% of farmers are small-scale or marginal farmers (Bell and Jack, 2005; Behera and Behera, 2013). India ranks third in terms of buying power parity and fifth in terms of nominal GDP. It is ranked 139th in terms of nominal per capita GDP ($2,134) and 122nd in terms of PPP ($7,783). 59% of the nation's workforce was employed in agriculture, which contributed 15% of GDP. The total number of operating holdings in Uttar Pradesh increased to 23.81 million in 2016, according to the most recent agricultural census. During the same period, the average holding length decreased to 0.76 hectares. In Uttar Pradesh, small and marginal farmers make up over 92% of the total number of farmers. At constant 2004-05 prices, Uttar Pradesh's agriculture-based gross state product (which includes livestock) fell to 19.59 in 2014-15. The basic needs of small and marginal farms cannot be met by agricultural income. Due to the shrinking agricultural area caused by population growth, it becomes more challenging to produce adequate food and other crops for the family. Failures to rain frequently exacerbate this issue (Bhaskar, *et al.,* 2017, 2018). Also, there isn't much room for land expansion, thus the only alternative is to enhance farming practices (Dia, *et al.,* 2010). Good agricultural policies are advised by the National Council of Farmers in order to advance agriculture and enhance livelihoods. Despite worldwide changes, agriculture has managed to endure in the modern era thanks to its systematic approach.

Factors Affecting Income Distribution and Livelihood Pattern Prospects

This scenario shows a society in which extreme income inequality and rising poverty coexist with prosperity and growth. The emergence of poverty has numerous underlying causes and complications. A thorough and comprehensive study that takes into account all the variables influencing farmers' lives, earnings, and social standing is required to face this challenge and offer chances to those facing a dismal and uncertain future. Though this is far from being empirically verified, there is growing recognition that agriculture plays a crucial and significant role in this integrated field study endeavor (Elbers, et al., 2003). Over the past 20 years, Asia's per capita income and food production have grown more slowly. Serious worries are raised by the various potential issues posed by current trends. Agricultural farmers, especially poor farmers, face many constraints including intense competing factors such as optimal use of land other than agriculture, distribution of income, domestic work, other sources of income, and use of capital for natural resources.

Materials and Methods

India's most populous state, Uttar Pradesh, was specifically chosen for this study because it ranks fourth in the National Multidimensional Poverty Index (NMPI), behind Bihar, Jharkhand, and Meghalaya. The districts of Deoria, Gorakhpur, Kushinagar, and Maharajganj make up the Gorakhpur division. Of these four districts, Gorakhpur and Deoria were specifically chosen.

District Deoria consists of 16 blocks with 2,161 villages, while District Gorakhpur consists of 19 blocks with 3,448 villages. One block from the Deoria district (Deoria Sadar) and one from the Gorakhpur district (Pipraich) were chosen at random. Three villages—Kaithwalia, Karmaina, and Ishlampur—from the Pipraich block of the Gorakhpur district and three villages—Mundera Mall, Parasia Mall, and Aura Chauri—from the Deoria Sadar block of the Deoria district were chosen at random from these two blocks chosen from both districts,

for a total of six villages from both districts. Schedules and specially created questionnaires were used to conduct in-person interviews in order to gather primary data. Pretesting of the schedule and questionnaires was conducted as normal, and any necessary adjustments were made prior to the final data collection. We gathered secondary data from Uttar Pradesh's District Statistics and Agriculture Departments on cropping patterns, land use, irrigation intensity, and general district data to supplement our reference data. The data was analyzed using both descriptive and inferential statistics.

Resource use Efficiency

For the purpose of achieving the objectives of the study, data were analyzed using tabular presentation and Multiple Linear Regression Analysis was used. The regression analysis was widely used in the estimation of the value of dependent variable from the value of the independent variable.

Regression analysis refers to the change that occurs in the value of one variable which is related with a unit change in the value of another variable in the model. The result of changes that occurs in the variable that are independent on the variable that are dependent is establish by the help of regression analysis. The general expression of a regression model is as:

$$Y = \int (X_1, X_2 X_3 X_4 X_5 X_6 X_7 X_8 .. X_n, \sum)$$

Where,

Y= the house hold per capita income (Rupee),

X_i = the matrix of independent/explanatory variables,

β = the regression coefficients,

ε = the error term.

More specifically, the variables specification was as follows:

Y= Household per capita income.

X_1= Age of household head.

X_2 = Gender of household head.

X_3 = Educational level of household head/number of years spent in school.

X_4 = Household size.

X_5 = Farm size.

X_6 = Number of crops planted.

X_7 =Full time farming (yes=1. 0 otherwise).

X_8 = Land ownership type

X_9 = Occupation (yes = 1, 0 otherwise).

$\sum$= the error term.

Operational definition of the variables of empirical multiple regression function for food crop farmers is as follows:

(a) Per Capita Income of Farmers' Households
(b) Age
(c) Level of Education
(d) Farmer Experience
(e) Family Size
(f) Occupation
(g) Other sources of income
(h) Type of land

Results and Discussion

The multiple regression approach is regarded as an explanatory technique that explains how a complex phenomenon change based on the variation of factors that are deemed independent or exogenous. For the purpose of creating econometric models, multiple regression analysis is helpful. The combined effect of multiple causes shapes a socio-economic phenomenon. By taking into account a number of explanatory factors for these phenomena, a model that replicates the real behavior in a way that is more accurate to reality is found. The hypothesis is that explanatory variables determine the consumption expenditures made by farmers.

Tables 1.1a and 1.2a show several linear regressions of the independent variables—total savings—on the dependent variables—total income, total spending (dependent variable), number of dependents, age of

farmers, and respondent occupational experience. Regression analysis was used to identify the variables influencing the income distribution of food crop producers in the districts of Gorakhpur and Deoria. According to the results of the multiple linear regression for Gorakhpur, the dependent variable of income among the farmers in the study region is significantly impacted by land ownership, farm size, number of crops farmed, and marital status. The positive correlation between household income and farm size suggests that raising farm size will only result in higher income.

In a similar vein, overall household income in the study area will rise in tandem with the amount of crops grown and land ownership. According to this, more crops that have varying price elasticity will be produced as the number of crops farmed rises, increasing the farmer's income.

The Gorakhpur's coefficient of multiple determination (R2), as shown in table 1.1b, was 0.238. According to this, the independent variable in the equation accounts for 24% of the variance in the farmers' logarithmic income. However, the remaining difference in gross income can be accounted by the elements that have not been considered.

Table 1.2a presents the regression results of the factors influencing the distribution of income among Deoria farmers. The results of the multiple regression analysis show that occupation, farm size, and education all significantly affect how the farmers in the study area divide their income. A higher degree of education is likely to result in a more fair distribution of revenue among food crop farmers, as seen by the positive correlation between household income and education.

The study area's total household income will rise in tandem with the quantity of crops grown and the amount of land owned. This suggests that as the number of crops farmed rises, more varieties of crops with varying price elasticity will be produced, increasing the farmer's income. The Deoria R2 coefficient of multiple determination was 0.382. It suggests that the independent variable in the equation accounts for 38% of the variation in the farmers' logarithmic income value. However, the factors that have not been taken into account for the remaining difference in gross income.

Table.1a Descriptive statistics of Gorakhpur

Descriptive Statistics			
	Mean	**Std. Deviation**	N
Expenditure	211378.4000	50140.14067	45
Age	54.7778	12.14101	45
Marital status	1.0222	.14907	45
Labor Type	2.2444	.67942	45
Household size	5.2000	2.33160	45
No. of Crops	2.2222	.55958	45
Total Farm size	6.3396	6.12622	45

Table.1b Correlation

Correlations								
		Expenditure	**Age**	**Marital status**	**Labor Type**	**Household size**	**No. of Crops**	**Total Farm size**
Pearson Correlation	Expenditure	1.000	.235	-.203	-.204	.407	.091	.050
	Age	.235	1.000	-.424	-.076	.385	-.243	-.145
	Marital status	-.203	-.424	1.000	.170	-.144	-.061	-.078
	Labor Type	-.204	-.076	.170	1.000	-.261	-.027	-.085
	Household size	.407	.385	-.144	-.261	1.000	-.192	-.243
	No. of Crops	.091	-.243	-.061	-.027	-.192	1.000	.127
	Total Farm size	.050	-.145	-.078	-.085	-.243	.127	1.000
Sig. (1-tailed)	Expenditure	.	.060	.091	.089	.003	.277	.373
	Age	.060	.	.002	.310	.004	.054	.171
	Marital status	.091	.002	.	.133	.173	.346	.305
	Labor Type	.089	.310	.133	.	.042	.431	.289
	Household size	.003	.004	.173	.042	.	.104	.054
	No. of Crops	.277	.054	.346	.431	.104	.	.202
	Total Farm size	.373	.171	.305	.289	.054	.202	.
N	Expenditure	45	45	45	45	45	45	45
	Age	45	45	45	45	45	45	45
	Marital status	45	45	45	45	45	45	45
	Labor Type	45	45	45	45	45	45	45
	Household size	45	45	45	45	45	45	45
	No. of Crops	45	45	45	45	45	45	45
	Total Farm size	45	45	45	45	45	45	45

Table.1c Variables Entered/Removed[a]

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Total Farm size, Marital status, No. of Crops, Labor Type, Household size, Age[b]	.	Enter
a. Dependent Variable: Expenditure			
b. All requested variables entered.			

Table.1d Model Summary[b]

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.488[a]	.238	.118	47100.57747	.238	1.977	6	38	.093	1.530
a. Predictors: (Constant), Total Farm size, Marital status, No. of Crops, Labor Type, Household size, Age										
b. Dependent Variable: Expenditure										

Table.1e ANOVA[a]

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26315835957.666	6	4385972659.611	1.977	.093[b]
	Residual	84301647127.134	38	2218464398.082		
	Total	110617483084.800	44			
a. Dependent Variable: Expenditure						
b. Predictors: (Constant), Total Farm size, Marital status, No. of Crops, Labor Type, Household size, Age						

Figure.1a Histogram Regression Standardized Residual of Gorakhpur

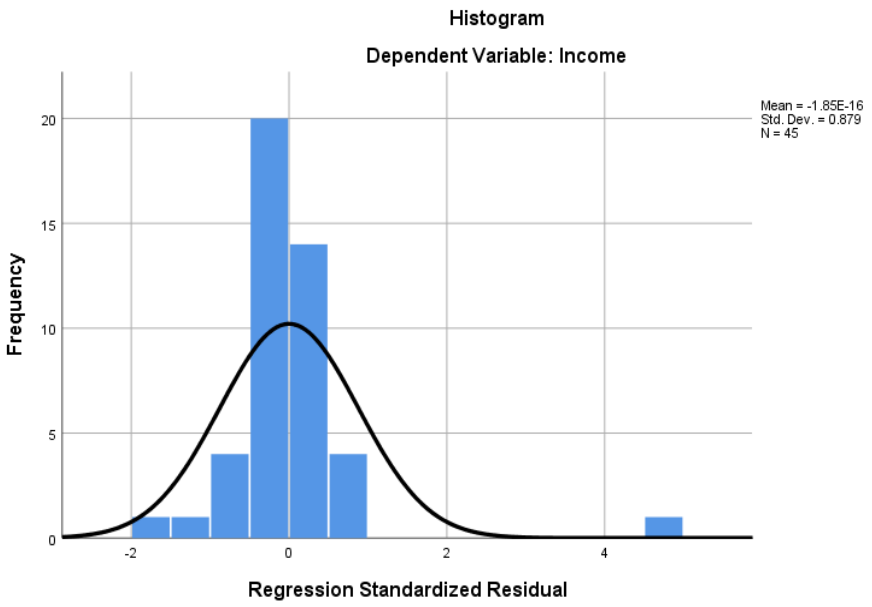


Table.1f Coefficients[a]

Coefficients[a]											
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	135297.769	97037.549		1.394	.171					
	Age	436.746	719.827	.106	.607	.548	.235	.098	.086	.660	1.515
	Marital status	-22982.368	54581.644	-.068	-.421	.676	-.203	-.068	-.060	.762	1.313
	Labor Type	-4658.221	11090.764	-.063	-.420	.677	-.204	-.068	-.059	.888	1.126
	Household size	8691.513	3532.308	.404	2.461	.019	.407	.371	.348	.743	1.345
	No. of Crops	15359.198	13420.817	.171	1.144	.260	.091	.183	.162	.894	1.119
	Total Farm size	1069.072	1223.796	.131	.874	.388	.050	.140	.124	.897	1.115
a. Dependent Variable: Expenditure											

Table.1g Collinearity Diagnostics[a]

Collinearity Diagnostics[a]										
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions						
				(Constant)	Age	Marital status	Labor Type	Household size	No. of Crops	Total Farm size
1	1	6.212	1.000	.00	.00	.00	.00	.00	.00	.01
	2	.477	3.608	.00	.00	.00	.00	.02	.00	.77
	3	.164	6.157	.00	.00	.00	.12	.44	.02	.10
	4	.068	9.570	.00	.01	.00	.37	.01	.46	.06
	5	.043	12.064	.00	.50	.02	.13	.42	.00	.01
	6	.032	13.870	.01	.00	.27	.35	.09	.28	.01
	7	.004	39.753	.99	.47	.70	.02	.01	.24	.05
a. Dependent Variable: Expenditure										

Table.1h Residuals Statistics[a]

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	144744.0000	265919.5000	211378.4000	24455.82100	45
Residual	-109003.60156	130849.71094	.00000	43771.52643	45
Std. Predicted Value	-2.725	2.230	.000	1.000	45
Std. Residual	-2.314	2.778	.000	.929	45
a. Dependent Variable: Expenditure					

Table.2a Descriptive Statistics Deoria

Descriptive Statistics			
	Mean	Std. Deviation	N
Income	716040.3333	506252.44029	45
Age	54.7778	12.14101	45
Education	2.5556	1.07778	45
Marital status	1.0222	.14907	45
Experience	31.2000	10.96814	45
Other Occupation	1.6444	.48409	45
Expenditure	211378.4000	50140.14067	45
Labor Type	2.2444	.67942	45
Household size	5.2000	2.33160	45
No. of Crops	2.2222	.55958	45
Total Farm size	6.3396	6.12622	45
Main Occupation	1.3556	.48409	45

Table.2b Correlations

Correlations													
		Income	Age	Education	Marital status	Experience	Other Occupation	Expenditure	Labor Type	Household size	No. of Crops	Total Farm size	Main Occupation
Pearson Correlation	Income	1.000	.008	-.378	-.030	.076	.218	-.297	.053	-.203	-.217	.299	-.218
	Age	.008	1.000	-.230	-.424	.907	-.110	.235	-.076	.385	-.243	-.145	.110
	Education	-.378	-.230	1.000	.204	-.285	-.310	.131	.431	.000	.318	-.051	.310
	Marital status	-.030	-.424	.204	1.000	-.364	.112	-.203	.170	-.144	-.061	-.078	-.112
	Experience	.076	.907	-.285	-.364	1.000	-.068	.266	-.071	.308	-.193	-.092	.068
	Other Occupation	.218	-.110	-.310	.112	-.068	1.000	-.083	-.144	-.077	.047	-.118	-1.000
	Expenditure	-.297	.235	.131	-.203	.266	-.083	1.000	-.204	.407	.091	.050	.083
	Labor Type	.053	-.076	.431	.170	-.071	-.144	-.204	1.000	-.261	-.027	-.085	.144
	Household size	-.203	.385	.000	-.144	.308	-.077	.407	-.261	1.000	-.192	-.243	.077
	No. of Crops	-.217	-.243	.318	-.061	-.193	.047	.091	-.027	-.192	1.000	.127	-.047
	Total Farm size	.299	-.145	-.051	-.078	-.092	-.118	.050	-.085	-.243	.127	1.000	.118
	Main Occupation	-.218	.110	.310	-.112	.068	-1.000	.083	.144	.077	-.047	.118	1.000
Sig. (1-tailed)	Income	.	.480	.005	.423	.309	.075	.024	.364	.090	.076	.023	.075
	Age	.480	.	.064	.002	.000	.235	.060	.310	.004	.054	.171	.235
	Education	.005	.064	.	.089	.029	.019	.195	.002	.500	.017	.370	.019
	Marital status	.423	.002	.089	.	.007	.232	.091	.133	.173	.346	.305	.232
	Experience	.309	.000	.029	.007	.	.329	.038	.322	.020	.103	.274	.329
	Other Occupation	.075	.235	.019	.232	.329	.	.294	.172	.309	.381	.221	.000
	Expenditure	.024	.060	.195	.091	.038	.294	.	.089	.003	.277	.373	.294
	Labor Type	.364	.310	.002	.133	.322	.172	.089	.	.042	.431	.289	.172
	Household size	.090	.004	.500	.173	.020	.309	.003	.042	.	.104	.054	.309
	No. of Crops	.076	.054	.017	.346	.103	.381	.277	.431	.104	.	.202	.381
	Total Farm size	.023	.171	.370	.305	.274	.221	.373	.289	.054	.202	.	.221

	Main Occupation	.075	.235	.019	.232	.329	.000	.294	.172	.309	.381	.221	.
N	Income	45	45	45	45	45	45	45	45	45	45	45	45
	Age	45	45	45	45	45	45	45	45	45	45	45	45
	Education	45	45	45	45	45	45	45	45	45	45	45	45
	Marital status	45	45	45	45	45	45	45	45	45	45	45	45
	Experience	45	45	45	45	45	45	45	45	45	45	45	45
	Other Occupation	45	45	45	45	45	45	45	45	45	45	45	45
	Expenditure	45	45	45	45	45	45	45	45	45	45	45	45
	Labor Type	45	45	45	45	45	45	45	45	45	45	45	45
	Household size	45	45	45	45	45	45	45	45	45	45	45	45
	No. of Crops	45	45	45	45	45	45	45	45	45	45	45	45
	Total Farm size	45	45	45	45	45	45	45	45	45	45	45	45
	Main Occupation	45	45	45	45	45	45	45	45	45	45	45	45

Table.2c Variables Entered/Removed[a]

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Main Occupation, No. of Crops, Expenditure, Total Farm size, Marital status, Labor Type, Experience, Household size, Education, Age[b]	.	Enter
a. Dependent Variable: Income			
b. Tolerance = .000 limit reached.			

Table.2d Model Summary[b]

Model Summary[b]										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.618[a]	.382	.200	452874.07263	.382	2.098	10	34	.053	.581
a. Predictors: (Constant), Main Occupation, No. of Crops, Expenditure, Total Farm size, Marital status, Labor Type, Experience, Household size, Education, Age										
b. Dependent Variable: Income										

Table.2e ANOVA[a]

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4303599992970.347	10	430359999297.035	2.098	.053[b]
	Residual	6973227472371.651	34	205094925657.990		
	Total	11276827465341.998	44			
a. Dependent Variable: Income						
b. Predictors: (Constant), Main Occupation, No. of Crops, Expenditure, Total Farm size, Marital status, Labor Type, Exeperience, Household size, Education, Age						

Table.2f Residuals Statistics[a]

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	156975.1719	1635577.8750	716040.3333	312744.44959	45
Residual	-861153.81250	1372655.75000	.00000	398098.53372	45
Std. Predicted Value	-1.788	2.940	.000	1.000	45
Std. Residual	-1.902	3.031	.000	.879	45
a. Dependent Variable: Income					

Figure.1b Normal P-P Plot of regression standardized residual

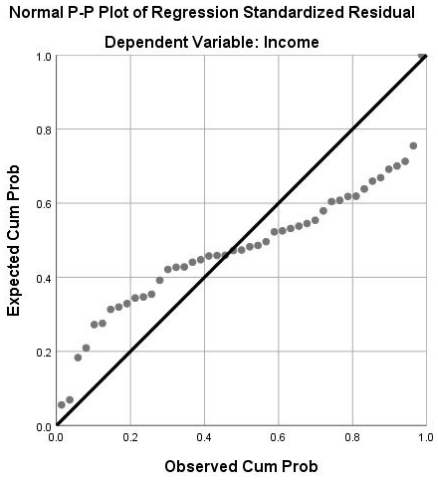


Table.2g Collinearity Diagnostics[a]

Collinearity Diagnostics[a]													
Model	Dimension	Eigenvalue	Condition Index	Variance Proportions									
				(Constant)	Age	Education	Marital status	Experience	Expenditure	Labor Type	Household size	No. of Crops	Total Farm size	Main Occupation
1	1	9.853	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.493	4.472	.00	.00	.00	.00	.00	.00	.00	.01	.00	.72	.00
	3	.239	6.419	.00	.00	.10	.00	.01	.00	.03	.07	.01	.04	.01
	4	.126	8.858	.00	.00	.06	.00	.02	.01	.06	.35	.00	.03	.01
	5	.100	9.941	.00	.00	.00	.01	.00	.01	.00	.00	.08	.00	.59
	6	.064	12.389	.00	.00	.01	.00	.00	.02	.29	.16	.21	.13	.20
	7	.056	13.322	.01	.00	.43	.07	.05	.01	.01	.03	.00	.02	.11
	8	.033	17.199	.00	.00	.00	.01	.00	.70	.00	.24	.28	.02	.00
	9	.026	19.334	.00	.01	.28	.18	.01	.16	.53	.06	.15	.00	.02
	10	.008	35.492	.09	.37	.01	.22	.50	.00	.02	.06	.06	.00	.05
	11	.003	61.757	.90	.62	.10	.51	.39	.09	.06	.00	.20	.02	.02
a. Dependent Variable: Income														

Figure.2a Histogram Regression Standardized Residual of Deoria

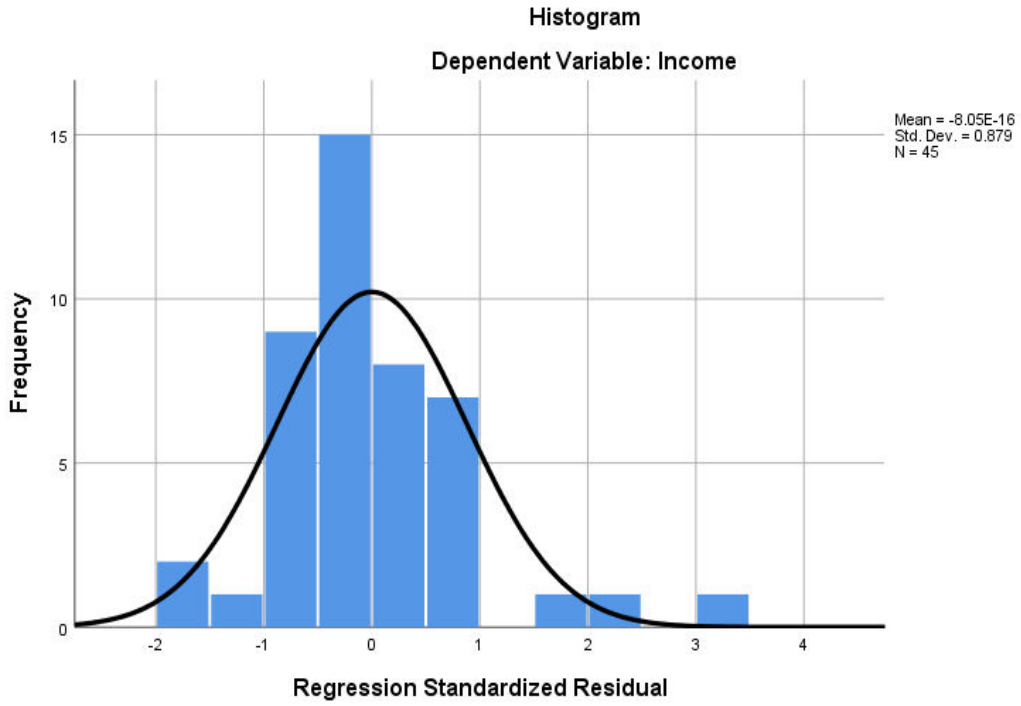
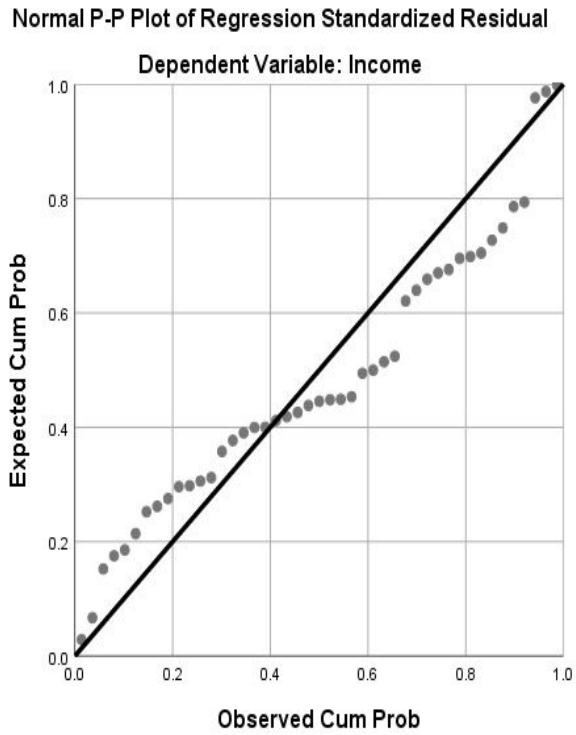


Figure.2b Normal P-P Plot of regression standardized residual



Policy Implication

Based on the findings of this research the following recommendation are proffered.

- ✓ The application of laws designed to lessen the disparity in income amongst farmers and to give them better access to markets, credit, and technology, especially for those who work in low-income industries.
- ✓ Determining the barriers to high-income-generating activities, such as a lack of knowledge and skills, and creating solutions to overcome these limitations.
- ✓ All things considered, the goals of the research have significant ramifications for the creation of laws and initiatives that can enhance farmers' socioeconomic standing and encourage sustainable agricultural growth in the research region.

In Conclusion, the dependent variable in income among the farmers in the study area is significantly impacted by land ownership, farm size, number of crops farmed, and marital status, according to the multiple linear regression results for Gorakhpur and Deoria. The positive correlation between household income and farm size suggests that raising farm size will only result in higher income. In a similar vein, overall household income in the study area will rise in tandem with the amount of crops grown and land ownership. This suggests that when more crops are planted, more varieties of crops with varying price elasticity will be produced, increasing the farmer's income. In both the Gorakhpur and Deoria multiple regression analyses, the explanatory variable included in the model accounts for 24% and 38% of the variation in farmers' income, respectively, according to the R^2 value of 0.238 and 0.382.

Author Contributions

Ayush Mishra: Investigation, methodology, formal analysis, writing—original draft. Dr.Dheeraj Kumar Verma: Validation, writing—review and editing. Dr.Satish Chandra Verma:Reviewing. Dr. Pratibha Bhaskar: Validation, methodology—reviewing and editing.

Data Availability

The corresponding author can provide the datasets created and/or examined during the current investigation upon reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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How to cite this article:

Ayush Mishra, Dheeraj Kumar Verma, Satish Chandra Verma and Pratibha Bhaskar. 2025. Factors Affecting the Distribution of Income Among Livelihood Strategies of Farming Household in the Gorakhpur and Deoria District, U.P. India. *Int.J.Curr.Microbiol.App.Sci.* 14(06): 228-242. **doi:** https://doi.org/10.20546/ijcmas.2025.1406.021