FACTORS INFLUENCING AGRICULTURURAL REVENUE IN RAMNAGAR VILLAGE OF BIRBHUM DISTRICT OF WEST BENGAL : AN ANALYSIS

Prepared by

SHREYA DEY

Student of Economics Honours

Of

Maharajadhiraj Uday Chand Women's College, Burdwan

To

THE UNIVERSITY OF BURDWAN

(For B.S.C Semester VI HONOURS Examination)

College Roll No. - 49 University Roll No. – 190311600132

Registration No. – 201901010039 of 2019-2020 Session - 2019-2020

Course Title – Field Survey and Project Report

Couse Code – CC-14

Under the Supervision of

Dr. HIRANYA LAHIRI

Assistant Professor,

Department of Economics,

Maharajadhiraj Uday Chand Women's College, Burdwan

CONTENTS

1 INTRODUCTION

Agriculture is the most important sector of the developing countries like India. It is the single largest sector in India and its relative share in the total national income has declined. The mass illiteracy of Indian people in general and rural people, in particular, compounded the problems of agricultural credit with around 70 to 80 percent of the farmers being illiteracy. As per Economic survey 2021, the share of agriculture in gross domestic product is 19.9 percent in 2020-2021 from 17.8 in 2019-2020 as compared to nearly 30 percent in 1990s, nearly 43 percent in 1977-1978, 51.9 percent in 1959-1960 and 54 percent in 1947-48. Our country's total export earnings include ¾ of agricultural and agro-based products and this sector supplies raw material to many major industries. The consumption of industrial goods in agriculture sector is almost 33 percent. It will, therefore, be seen that the problem directly inhabiting the agricultural production attains a degree of paramount importance because agriculture in India not only provides employment to the majority of the population but also supplies much needed raw material for the industrial sector as well. India's economy, in general, and agriculture sector in particular, have achieved significant development during the last decade especially in recent years. Agriculture sector, however, is still spring from a number of inherent and apparent problems. Water logging/salinity coupled with scarcity of irrigation water rank at the top of physical problem while inadequacy of credit, weak marketing mechanism and ineffective cooperative structure are prominent inherent problems.

The agriculture growth depends very much on improvement of infrastructural facilities, supply of enhanced irrigation water, land reclamation, transpiration, mechanical power and other critical form inputs like seeds, pesticides and fertilizers etc. The farmers of developing countries generally use traditional implements in contrast to the improved implements used in developed countries such as tractors, steel ploughs, sugarcane crushers, pumping sets, etc. Poor technique is one of the most important causes of low productivity in agriculture. Technological factors are also responsible for high/low productivity. Heavy dependency on climate leads to irregular crop productivity in the developing nations of Asia, Africa and Latin America. Due to lack of capital, the development of irrigation facilities is heavily impaired in these countries. However, after the success of the Green Revolution in some regions of the developing world, the dependence of cultivators on climate has been reduced to some extent.

Other than above mentioned factors there are several factors which affect agricultural productivity. Education of farmers, financial status, family size, land ownership, size of land, assets, hours spend by both men and women in farms and wages earned by both men and women in farms. Educated farmers have proper knowledge regarding high yielding variety of seeds and have proper decision-making ability and are have the ability to utilize their resources efficiently in order to protect their families from unexpected disasters. On the hand, uneducated farmers do not have these abilities. Farmers not having proper financial stability are not able to afford farming tools and instruments. Farm households with large family size are able to employ more family members in the agricultural farms which may lead to high productivity. Farm household with more land are able to produce more agricultural output as compared to those who own less agricultural land. Farmers with assets can use the assets as other source of income. If both men and women increase their working hours in farms, their agricultural output will tend to increase. If higher wages are paid to both men and women workers, they will increase their labour time in farms which will lead to higher productivity. Women are the drivers of economic growth over the past decade, and their role much increased but still remain largely invisible and undervalued in many economies. Women's access, control over resources and decision-making ability have received a very limited reorganization in sustainable agriculture initiatives despite their pivotal role and rapid economic growth.

Productivity levels in Indian agriculture in very low as compared to the productivity levels of other countries, in terms of global rank, the productivity levels of India in major agricultural crops are very disappointing. India being one the largest producers of most of the agricultural crops (both food grains and non- food grain) but ranks are very low in terms of productivity. India is the second largest producer of rice and wheat in the world, but in terms of productivity the ranks are and 38 respectively. India is the largest producer of pulses, but it is only 138 in the world. Thus, after the tremendous effect of Green Revolution, productivity (yield per hectare) has not improved much.

2 MOTIVATION

The farm household objectives are to primarily produce for home consumption and income generation is the second. This study comparatively analyses the role of men as well as women in agricultural activities by examining the number of hours spend by men as well as women in

farms and their wages. In addition to working in field both men and women are also engaged in household activities like cooking, collecting firewood, animal husbandry, taking care of children etc. It has been seen that women spend more time in household activities as compared to that of men and men spend more time in agricultural activities than that of women. The household activities of women have never been computed economically but are essential and significant aspects of women's work load. However, male and female farmers are working together in various farming activities. Yet the information regarding participation of male and female farmers in farming activities have not sufficiently been documented. Moreover, gender sensitive interventions are required to uplift the life styles of rural females who are traditionally being neglected despite of their multidimensional activities either in the household or in the filed level.

During pandemic situation a reverse took place from urban to rural. Workers especially male workers who are said to be migrant workers due to home bias have returned from their working place to their homes. In pre pandemic situation it was observed that family members of these migrant labours used to work in their agricultural fields, whereas male family members used to work outside in urban areas. During pandemic situation the male working members returned to their homes and started working in their own agricultural fields. Therefore, they have displaced the other family members especially females. This has affected the agricultural revenue of these rural households which becomes an important factor to study. The study shows how much the agricultural revenue and earning from agriculture becomes fruitful and also which factors affect the agricultural revenue after male workers have joined the agricultural fields.

The village Ramnagar in Birbhum district is a tourist spot. There is a jungle located nearby this village. So, the rural people collect firewood for cooking and other forests products from this jungle. During pandemic the tourism sector was highly affected. The tourism sector has faced recession which has affected the income of the people of Ramnagar which has been highlighted in this study. For all these reasons Ramnagar has been selected for the survey.

3 LITERATURE REVIEW

Landholding is an important factor influencing agricultural activities as crop production and livestock management. Families with less land cannot afford paid labour, so their family

members especially females are actively involved in crop production activities, whereas females of families with less land are heavily reliant on livestock management. Families with more land have a lesser intention of their female members working in farming. In rural families, females belonging to the above poverty line category are participating in agricultural activities with greater frequency than below poverty line families' women. Family size is another important factor which has influence on participation in farm activities. A large household represents an increase in labour force for households and can be expected to have positive relationship with agricultural output. On the other side a larger household means more mouths to feed which might well increase a risk. Age is also a major factor affecting the agricultural production. The elder farmer has more experience in farm operations which will help to increase his output, but he lacks the capacities or aspiration of younger farmer and that is expected to lower his MPP and the area cultivated. Assets also influence agricultural output. Farms households with assets may use these assts as an income generating source which increases their family income. Education also affects the agricultural revenue. A lower level of education hinders the process of idea transmission and a higher education level enhances innovation by opening new avenues. High level of education may help the farmers to utilize their resources efficiently. Financial status also has an influence on agricultural output. The farms households which have enough money to purchase farm implements, (tools etc., which are used in field cultivation) are able to increase their farm output. Households having more implements and tools for agricultural production are more likely to utilize them more efficiently to obtain higher output and consequently higher income. The long distance of markets from residing areas of farm households would make them avoid the high transportation costs to the marketplace and they would be selling their surplus products at farm or village level to the middlemen at low prices after harvest. Total agricultural revenue also depends on labour force of both men and women. If the working hours in farms are increased, they will earn more wages and the farm output will also rise. Wages earned by men and women are also major factors affecting the revenue. If they are offered higher wages they will be more willing to work in the farms. Rainfall, humidity, temperature, erosion and vegetation – these factors are location specific and they are important factors influencing the agricultural production. Good weather conditions have positive impact on the farms output. Similarly, bad whether condition have negative impact on the farm output.

Chavas et al. (2019), investigated the measurement of risk exposure in agriculture and its linkages with input and output decisions. They found that variable inputs were risk-increasing but that livestock is risk-reducing and that nonfarm income contributes to reducing the cost of risk. These effects can be large. The analysis showed that farmers have many options in managing their risk exposure. Neglecting such management options (e.g., in the evaluation of insurance) would provide an incomplete view of risk behaviour. The analysis helped refine our understanding of the role of management in risk exposure. By showing how farm management strategies can reduce risk exposure, it was documented that management and insurance can behave as substitutes, thus providing a possible explanation for why farmers do not express greater willingness to participate in crop insurance.

Haile et al. (2016), investigated the factors affecting women farmers agricultural extension services consisting of production related information in improving the production capacity of farmers in Dendi district. The study revealed that household income increases with the use of improved seed for both female and male headed households. Thus, it can be concluded that there is a need for agricultural extension services to focus on increased use of improved seeds for female headed households so as to increase their agricultural production. The study also showed that majority of the women farmers in the area participated actively in individual Services of extension except farmer field days while the women's participation in mass media activities, were relatively low except in TV advert and Radio where they participated actively.

Gideon et al. (2016), aimed at assessing participation of women farmers in agriculture extension activities. The results showed that women farmers participated highest in Radio Broadcast (4.0), home visit (3.6), crop activities (3.8), farmer educational meeting (3.6), establishing demonstration plots (3.09), method demonstration (3.12), formation of farmer group (3.8), and T.V. advertisement (3.7) respectively, while they participated low in activities like reading extension leaflets, newsletters, etc. methods of fertilizer \application (31%), and planting geometry (28%), ranked the highest in the type of messages disseminated by extension agents.

Adekunle et al. (2013), aimed at determining agricultural extension service in among rural Women, using Odeda local government area of Ogun State as a case study. The findings presented in this study showed those women farmers are not a homogeneous group. They represented different socio-economic situations with different needs for extension contact and the use of extension methods. Women's access to agricultural inputs has not improved proportionately. Therefore, agricultural extension has little or not improved technology to

extend to women farmers who grow the traditional food crops. In other cases, technology is available, but women are unable to obtain the credit to purchase the inputs needed to utilize the new technology. The findings in the study revealed that majority of the women were agile and actively involved in Agricultural activities, and that the high level of illiteracy among the respondents was responsible for their negative attitude to extension service. The study also revealed that "Demonstration of improved technologies" and "Distribution of subsidized seeds" were the most factor affecting extension services.

Varkey et al. (2019), examined the factors affecting agricultural output for the fifteen general category states for the time period 1991 to 2013. The variables like gross sown area, gross irrigated area, fertilizer consumption, government expenditure, agricultural credit is found to influence agricultural output positively. On the other hand, variable like Forest cover was found to be negative and significant.

Badar et al. (2007), attempted to figure out the that factors that affect agricultural production in the province of Punjab. The results of the study indicated that wheat price support have contributed significantly in increasing agricultural output of the Punjab province. Further, findings of the study suggested that the contribution of food trading services towards agricultural output is not positive. The results of the study established a significant relationship between the distribution of improved seed and agricultural output in the province of Punjab. The findings of the study indicated that contribution of agricultural labour in increasing agricultural production of the province of Punjab has been quite significant in spite of the fact labour in the country is not equipped with modern techniques used in agricultural sector.

Kannan et al. (2012), discussed the trends in crop sector growth at national and sub-national in India. The results of the crop output growth model indicated that enhanced capital formation, better irrigation facilities, normal rainfall, and improved fertilizer consumption will help boost crop output in the country.

Mohapatra et al. (2019), conducted the study to analyse the changing cropping pattern in Odisha along with growth rates in key indicators of development in the state. The cropping pattern revealed that the major crops of the state are paddy, maize, black gram, green gram and groundnut.

Narayanmoorthy et al. (2013), made an attempt in this study to find out the trends in profitability of different crops over a period utilising the data from cost of cultivation survey on six important crops covering period from 1975-76 to 2006-07. It is found that the farmers

have suffered losses both due to increased cost of cultivation in some crops and due to reduction in value of output in some other crops. This is also reflected from the data on Situation Assessment Survey (SAS), where 40 per cent of the farmers have reported their longing to quit agriculture citing poor remuneration as the reason (NSSO, 2005a). In most of the States, the income from crop cultivation is not even enough to meet the annual cultivation expenditure, which is also proved beyond doubt by SAS data (NSSO, 2005b).

Tripathy et al. (2009), extensively evaluated the performance and progress of Indian agriculture since Independence. Besides comparing facts and figures, the researchers have also examined sources of agricultural growth and instability of Indian agriculture for evaluating performance and progress of Indian agriculture. The paper also found out determinates of agricultural production by using production function approach and verifies the results of decomposition of agricultural growth. The study indicated that there is scope to increase both net sown area and gross sown area. The study also highlighted that only 39 percent of net sown area is irrigated area. After evaluating the changes in agrarian structure, input use pattern and growth trend of agriculture, this paper pointed outs some points. These are: agricultural workforce shifted from cultivators to agricultural labours, the number of uneconomic holdings has an increasing trend, area under food crops shifted towards non-food crops, and within food crops area under cereals has been shifting towards non cereals, growth trend of aggregate agriculture as well as all sub sector of agriculture except forestry is showing declining trend during post-WTO period. It was also observed in this study that production and yield instability declined for almost crop during post reform period while, area instability increased in the same period. This further indicated that instability in area became major responsible factor for production instability. The decomposition analysis indicated that rising output per hectare is the predominant source of agricultural growth for most of the crops and crop groups. Disaggregating of reference period in four sub periods shows that expansion of agricultural land was the main source of agricultural growth during the period before 1965/66 after that the contribution of increased land area under agricultural production has declined over time and increase in productivity became the main source of growth in agricultural production. The estimation of aggregate agricultural production function with both intercept and slope dummy indicates that land significantly affected the agricultural output growth during 1950/51-1964/65 and after that land became less significant and now labour and capital are significantly affecting the agricultural output growth. Thus, the result of the aggregate agricultural production function verified the results of decomposition analysis.

McArthur et al. (2017), estimated the role of agroeconomic inputs in cereal yield improvements and the consequence for countries' processes of structural change. The results suggested a clear role of fertilizer, modern seeds and water in boosting yields. The result further suggested a strong role for agricultural productivity as a driver of structural change.

Kuriachen et al. (2019), undertook the study at the ICAR-Indian Agricultural Research Institute, New Delhi (2017) to readdress the economic productivity of agricultural system in India with in-depth scrutiny of productivity differentials. It was observed that market concentration, Wholesale price index of high value crops and land fragmentation are the decisive factors for explaining productivity differentials across the regions. The study revealed that increase in per capita NSDP contributed substantially to productivity of the agriculture sector across regions indicating that benefits of economic growth are trickling down to the agriculture sector.

Hasan et al. (2006), determined the extent of participation of conventional farmers (male and female) in farming activities and to explore the relationships between selected characteristics of farmers and their extent of participation. Data revealed that most of the male and female conventional farmers had medium participation in farming activities and male farmers had significantly higher participation than female farmers. The findings of the study demonstrated that there was further scope to increase participation of male and female farmers in farming activities and potential scope to disperse their responsibilities towards helping each other regarding farming activities.

Gohain et al. (2019), focused on the growth trend of agricultural production since independence and elaborates the effects of some of the important determinants implicit to the growth of the sector. In the study, data showed that since independence, production and yield per hectare of selected crops have been increasing at a decreasing rate. The agricultural growth rate was not satisfactory as it was at the time of independence. Factors affecting agricultural growth are analysed over the decades and found that till mid-sixties area expansion was the major driver of growth but after then productivity began to be the major driver of growth accompanied by better irrigation systems, fertiliser usage, credit facilities etc.

Hasan et al. (2015), investigated the farm income with which the farm household must decide how much capital to spend. The data revealed that the household size had a coefficient, with a positive sign. These indicates that large size of household is more productive in term of labour force and has a better chance and opportunities to diversity work in order to get higher income

from farm and off-farm activities to invest in the agricultural process and animal raising. The research further implied that the household with more labour or those who are affluent to put more land under cultivation using family labour or/and hired labour are better off. The study also indicated that households having more implements and tools for agricultural production are more likely to utilize them more efficiently to obtain higher output and consequently higher income. The study revealed that the long distance of markets from residing areas of farm households would make them avoid the high transportation costs to the marketplace and they would be selling their surplus products at farm or village level to the middlemen at low prices after harvest. The study also indicated that the land size is a major determinant in the traditional agricultural production areas for farm income, because, the effects of other variables on output could appear through the land variable coefficient as a media on which all other inputs act.

Tiwari et al. (2021), conducted the study in Umaria and Anuppur districts of Madhya Pradesh with the specific objective viz. to examine the factors influencing farm income of the respondents. The results of the present study helped in increasing the farm income by the enhancement of the factors which found significant during the study period and the policy makers can also7 plan accordingly for the betterment of both the respondents.

Daoud et al. (2016), investigated the differential impact of employment in agriculture on rural and non-rural wages using the quarterly labour force survey (LFS) collected by the Palestine Central Bureau of Statistics (PCBS). The results suggested that employment in agriculture lowers the average wage by a range from 26 to 34 % for the non-rural population and 30–37 % for rural population. Meanwhile, Israeli closures tend to raise the probability of selecting agriculture as a sector for employment. Among other findings, the results also show that returns to education are lower for rural workers than for non-rural workers.

Andrews et al. (2014), examined several possible factors determining the profitability of small-scale crop farmers in Trinidad and Tobago in the Caribbean. The study found a significant negative impact of wage rates on profitability. Also, the age of the farmer negatively affected profitability, while the number of years farming had a positive effect. This latter variable also significantly influenced both the one-sided error and idiosyncratic error terms. However, IFOUR measuring industrial/urban influence did not significantly affect the profitability. The farmers had a mean profit efficiency of 48.4%, which was low in international comparisons.

Tuchitechi et al. (2018), aimed at identifying the factors influencing the performance of agricultural projects for small farmers in Malawi. The results indicated that farmers'

socioeconomic factors, including high illiteracy and poverty rates, poor participation regarding project implementation, and high dependency syndrome, significantly affected the performance of agricultural projects. Within the projects themselves, this study discovered that there was no consistent flow of funds. This greatly affected the schedule of project activities, thereby compromising performance. The study recommends that the government and all relevant stakeholders work jointly to alleviate poverty. It is especially important to ensure that smallholder farmers are equipped with self-help capabilities. In addition, it is critical to examine the issues of funding disbursement.

Maniriho et al. (2021), attempted to examine the role of institutions in boosting rural and agricultural development in the region of the Volcanic Highlands of Rwanda. Results from crop output function revealed a positive and significant effect of cooperative membership, a negative but significant effect of extension services, and a negative non-significant effect of land tenure, credit access, and market access on farm production, respectively. In terms of net farm income function, the results demonstrated that farmer cooperation, land tenure, extension services, and access to output markets have a positive, non-significant influence, but that access to finance has a negative non-significant effect. Results also pointed to a positive and significant effect of some household characteristics, namely family size, farming experience, land size, and farm yield, on farm production. As for net farm income, education of the head, family size, farm experience, land size, farm yield, selling price, and cattle proved to be among primary determinants.

From the preceding analysis, we observed that neither any survey has been conducted nor anyone has studied in this particular area of Birbhum district. Further, no study on the contribution of both male and females have been conducted so far in Ramnagar. This is a major literature gap which has been filled up in this study.

4 OBJECTIVE

The farmers of West Bengal participate in various farming activities essential to their livelihoods. Participation between male and female varies greatly with various characteristics of the farmers like location, age, educational status, income, etc. In general, male workers participate in field activities, whereas female workers participate in field work along with household activities of farming. Male workers are also engaged in various other work in addition to farming activities. But for fruitful farming activities, both men and women have to

dispersed into general activities of one another to cooperate each other. The extent of participation of male and female farmers in different farming activities needs to be explored. The present study has been undertaken to fulfil the following objectives:

(i) To check the level of participation of male and female farmers in farming activities.
(ii) To check the difference between the time (hours) spend by male and female in farming activities.
(iii) To check the difference between wages of male and female working in the field.
(iv) To see the number of hours men and women spend in household work

5 METHODOLOGY

A primary survey has been conducted in village Ramnagar of Birbhum District. The data used in the analysis was collected through a structured interview schedule from the District Birbhum of West Bengal. The survey involved first-hand information obtained through. Illambazar was selected randomly and Ramnagar village was selected for sampling.

Descriptive Statistics has been used to know the Mean, Median, Mode, Standard Error, Standard Deviation, Skewness, Kurtosis, Sample Variance, etc of dependent and independent variables taken in our regression model. The collected data of the variables have been represented thorough pictorial representations using Histograms and Pi-Charts. T-Test has been performed to check whether the overall regression is statistically significant or not.

Three - variable regression model has been used in the study. Revenue earned from agriculture has been considered as the dependent variable. Hours spend by men on firms and hours spend by women on farms are considered as the independent / explanatory variables. The model specification is as follows:

$Y_i = \alpha + X_{1i}.\beta_1 + X_{2i.}\beta_{2+} \varepsilon_i$

Where Y_i =Total Revenue earned from agriculture,

X_{1i} = Hours women daily spend in farms,

X_{2i} = Hours men daily spend in farms,

ε = Disturbance Term

α = Intercept Term

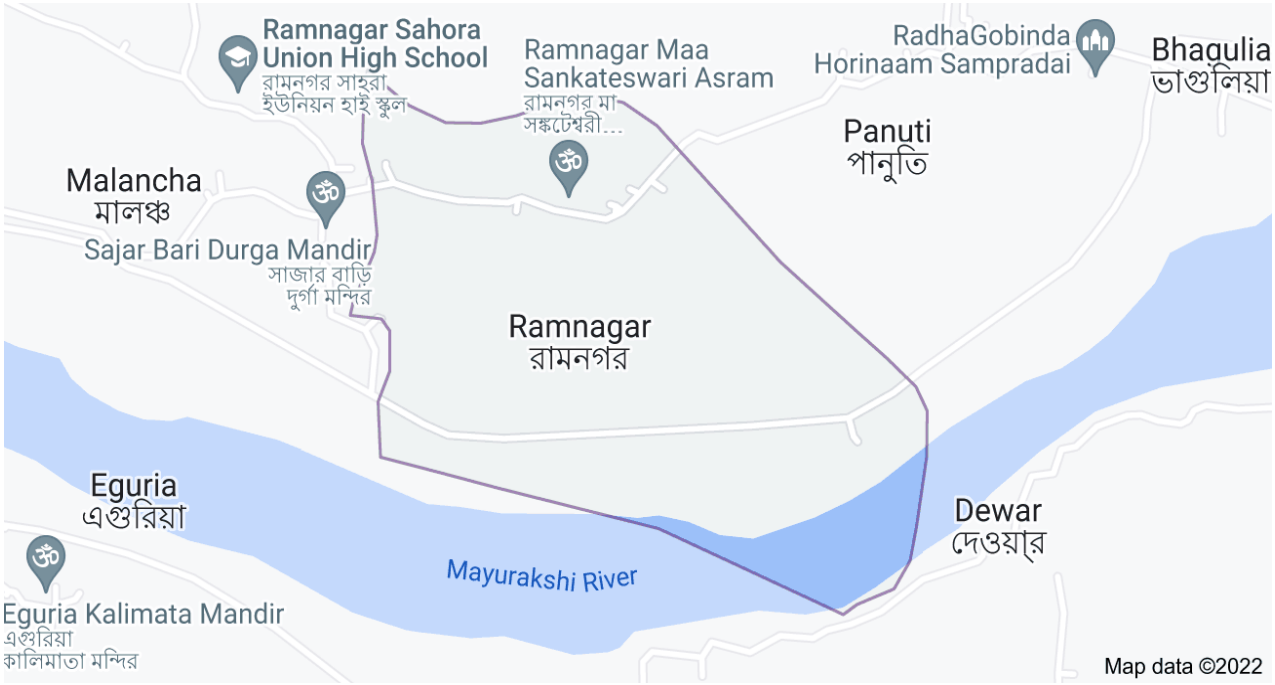
β_1 and β_2 are slope coefficients,

i = 1, 2, 3, …, n

*6 **RESULTS***

The survey was conducted in village Ramnagar in Birbhum District. According to 2011 Census Birbhum District consists of a population of 3,502,387 roughly equal to the nation of Lithuania or the US State Connecticut. This gives it a ranking of 84th in India. The district has a population density of 771 inhabitants per square km. The data was collected through Sampling Method. Administratively, Birbhum District is divided into eight community development blocks. Out of these eight blocks, one block viz. Illambazar was selected randomly and Ramnagar village was selected for sampling. Ramnagar village is located in Illambazar subdivision of Birbhum District in West Bengal, India. It is situated 9.4 km away from Sub-District Headquater Illambazar (Tehsildar Office) and 38.8 km away from the District Headquarters Suri. As per 2009 stats, Illambazar is the gram Panchayat of Ramnagar village.

Google Map of Ramnagar



The Map data on this website is provided by Google Maps, a free online app service, one can access and view in a web browser.

For this study we have randomly drawn a sample of 30 villagers from Ramnagar village. Then we have calculated the Descriptive Statistics (Mean, Median, Mode, Standard Error, Standard Deviation, Skewness, Kurtosis, Sample Variance, Range, Minimum, Maximum, Count, Sum) individually for both the Dependent variable and the Independent Variables.

Descriptive Statistics of the variables taken during the survey.

Y is our dependent variable which represents Total Revenue earned from agriculture. X_1 and X_2 are our explanatory/dependent variables which represents hours women daily spend in farms and hours men daily spend in farms. β_1 and β_2 are our regression coefficients.

Total Revenue earned from Agriculture (Y)		Hours Men daily spend in farms (X_1)		Hours Women daily spend in farms (X_2)	
Mean	9666.67	Mean	5.23	Mean	2.2
Standard Error	624.38	Standard Error	0.63	Standard Error	0.48
Median	9000	Median	6	Median	1.5
Mode	9000	Mode	0	Mode	0
Standard Deviation	3419.85	Standard Deviation	3.45	Standard Deviation	2.63
Sample Variance	11695402.3	Sample Variance	11.91	Sample Variance	6.92
Kurtosis	0.30	Kurtosis	-0.49	Kurtosis	2.23
Skewness	-0.04	Skewness	-0.10	Skewness	1.59
Range	15000	Range	13	Range	10
Minimum	1000	Minimum	0	Minimum	0
Maximum	16000	Maximum	13	Maximum	10
Sum	290000	Sum	157	Sum	66
Count	30	Count	30	Count	30

The above table represents the Mean, Median, Mode, Standard Error, Standard Deviation, Sample variance, Kurtosis, Skewness, Range, Minimum, Maximum, Sum, and Count of the variables taken.

From the Descriptive Statistics data table, the Mean of Total Revenue earned from agriculture (Y) is 9666.67. We see that the Mean of Hours spend by Men daily on farms (X_1) is 5.23 and the Mean of Hours spend by Women daily on farms (X_2) is 2.2. Therefore, we find that the Mean of Hours spend by Men daily on farms is greater than the Mean of Hours spend by Women daily on farms. Hence we conclude that on the Average Revenue of 9666.67, Men spend more working Hours in farms daily than that of Women.

Median is the middle value of the given list of data. We see that the Median of Total Revenue earned from agriculture (Y_1) is 9000. The Median of Hours spend by Men daily on farms (X_1) is 6 and the Median of Hours spend by Women daily on farms (X_2) is 1.5. Therefore, we find that among 30, half the values are less than or equal to the median value and rest half of the values are greater than or equal to Median value.

The Mode refers to the most frequent, repeated, or common number in the data. From the above table we see that the Mode on Total Revenue earned from agriculture (Y_1) is 9000. The Mode of Hours spend by Men daily on farms (X_1) is 0 and the Mode of Hours spend by Women daily on farms (X_2) is also 0. This implies that the daily working hours for Men is often 4 to 6 hours and the daily working hours for Women is often 0 to 4 hours.

The Standard Deviation is the Square Root of the Variance. It indicates how close the data is to the Mean. From the above table we see that the Standard Deviation of Total Revenue earned from agriculture (Y_1) is 3419.85. The Standard Deviation of Hours spend by Men daily on farms (X_1) is 3.45 and the Standard Deviation of Hours spend by Women daily on farms (X_2) is 2.63. Therefore, we conclude that the Standard Deviation of Hours spend by Men daily on farms is greater than the Standard Deviation of Hours spend by Women daily on farms. Hence it is concluded that men's work is diversified i.e., men are engaged in various types of work

along with agricultural work on farms. Whereas women are not engaged in various work other than agricultural work and household work.

The Sample Variance tells us about the degree of spread of data in a table. Two samples can have the same Mean but they may be distributed differently. Sample Variance is a process to qualify this difference. From the above table we see that the Sample Variance of Total Revenue earned from agriculture (Y_1) is 11695402.3. The Sample Variance of the Hours spend by men daily on farms (X_1) is 11.91 and the Sample Variance of Hours spend by Women daily on farms is (X_2) 6.92.

Kurtosis is defined as a "peakiness" is measured relative normal distribution. In other words, showing a sharper peak in the frequency curve. From the above table we find that the Kurtosis of Total Revenue earned from agriculture (Y_1) is 0.30, which implies that there is moderate peak in the frequency curve. The Kurtosis of Hours spend by Men daily on farms (X_1) is -0.49, which implies that the frequency curve has low peak. The Kurtosis of Hours spend by Women daily on farms (X_2) is 2.23, which implies that the frequency has high peak.

Skewness is the extent to which the data is not symmetrical. From the above table we find that the Skewness of Total Revenue earned from agriculture is -0.04. So here we conclude that the Total Revenue earned from agriculture (Y_1) is negatively skewed and it is less than 0 which implies that the tail of the distribution points to the left. The Skewness of the Hours spend by Men daily on farms (X_1) is -0.10, which is negatively skewed and less than 0 and implies that the tail of the distribution points to the left. The Skewness of the Hours spend by Women daily on farms (X_2) is 1.59, which is positively skewed and greater than 0 and implies that the tail of the distribution points to the right.

Descriptive statistics of other factors (i.e., Wages earned by Men and Women on farms) that affect agricultural revenue are as follows:

	Wages earned by Men on farms	Wages earned by Women on farms
Mean	4890	2576.67
Standard Error	989.89	491.55
Median	4000	1750
Mode	0	0
Standard Deviation	5421.88	2692.35
Sample Variance	29396793.1	7248747.13
Kurtosis	16.39	-0.76
Skewness	3.54	0.68
Range	30000	8000
Minimum	0	0
Maximum	30000	8000
Sum	146700	77300
Count	30	30

The above table represents the Mean, Median, Mode, Standard Error, Standard Deviation, Sample Variance, Kurtosis, Skewness, Range, Minimum, Maximum, Sum, Count of the Wages earned by Men and Women on farms.

From the Descriptive Statistics data table, mean of wages earned by men on farms is 4890 and the Mean of Wages earned by women on farms is 2576.67. Here we see that the mean of wages earned by men on farms is greater than that of the mean of wages earned by women on farms. Hence, we conclude that on the Average Revenue of 9666.67, men earn more wages than that of women.

Median is the middle value of given list of data. Here we see that the median of the wages earned by men on farms is 4000 and the median of the wages earned by women on farms is 1750. Therefore, we find that among 30, half the values are less than or equal to the median value and rest half of the values are greater than or equal to median value.
The Mode refers to the most frequent, repeated, or common number in the data. From the above table we see that the mode of wages earned by men on farms is 0 and the mode of wages earned by women farms is also 0. This implies that the daily wages of men on farms is often Rs.0 to Rs.5000 and the daily wages of women on farms is often Rs.0 to Rs.1000.

Standard Deviation is the square root of the Variance. It indicates how close the data is to the Mean. From the table we see that the Standard Deviation of the wages earned by men on farms is 5421.88 and Standard Deviation of wages earned by women on farms is 2629.35. Therefore, we conclude that the standard deviation of wages earned by men is greater than that of the standard deviation of wages earned by women on farms.

The Sample Variance tells us about the degree of spread of data in a table. Two samples may have the same mean but they may be distributed differently. Sample Variance is a process to qualify this difference. From the above table we see that the sample variance of wages earned by men farms is 29396793.1 and the sample variance of wages earned by women on farms is 7248747.13.

Kurtosis is defined as a “peakiness” is a measured relative normal distribution. In other words, showing a sharper peak in the frequency curve. From the above table we see that the kurtosis of wages earned by men on farms is 16.39, which implies that the frequency curve has low peak. The kurtosis of wages earned by women on farms is -0.76, which implies that the frequency has high peak.

Skewness is the extent to which the data is not symmetrical. From the above table we see that the skewness of wages earned by men is 3.54, which is positively skewed and greater than 0 and implies that the tail of the distribution points to right. The skewness of wages earned by women is 0.68, which is positively shewed and greater than 0 and implies that the tail of the distribution points to right.

Other than all these factors agricultural revenue is influenced by factors like lack of adequate rainfall, no multicropping, lack of water, drought, insects and pests. These are major problems faced by farmers in agricultural production process.

The survey has been conducted in a village named Ramnagar in Birbhum district. In our sample we have chosen those observation for which respondent owns agricultural land and both the man his spouse work on the farms. We have interacted with the people of Ramnagar. The maximum number of family size is 8 and minimum is 3 among the respondents.

Here are the pictorial representations of the collected data.

Figure-1: Number of family members

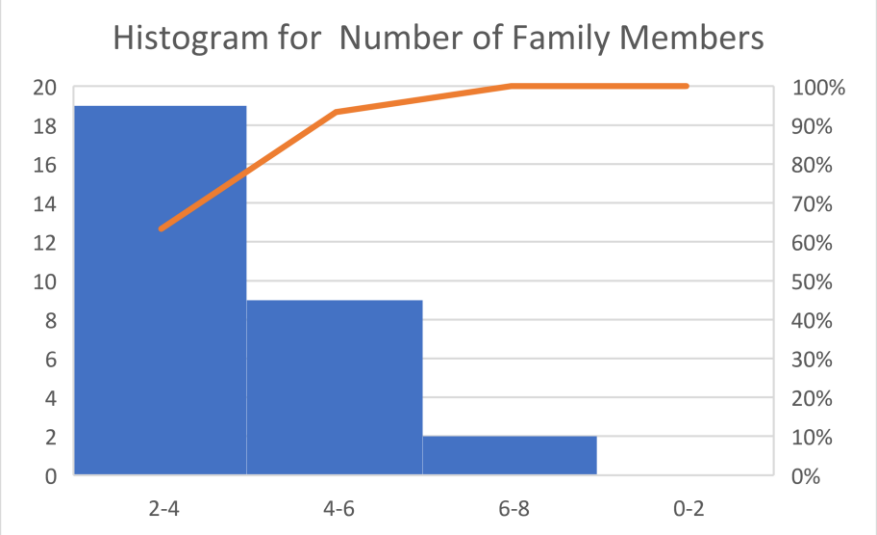


Figure-1 represents total number of members in the family. The highest number of family members is 8 and lowest number of family members is 3. Most of the families consists of 2 to 4 members e.i., More than 90% families consist of 2 to 4 members and 10% families consist of 6 to 8 members.

Figure-2: Total Revenue earned from Agriculture

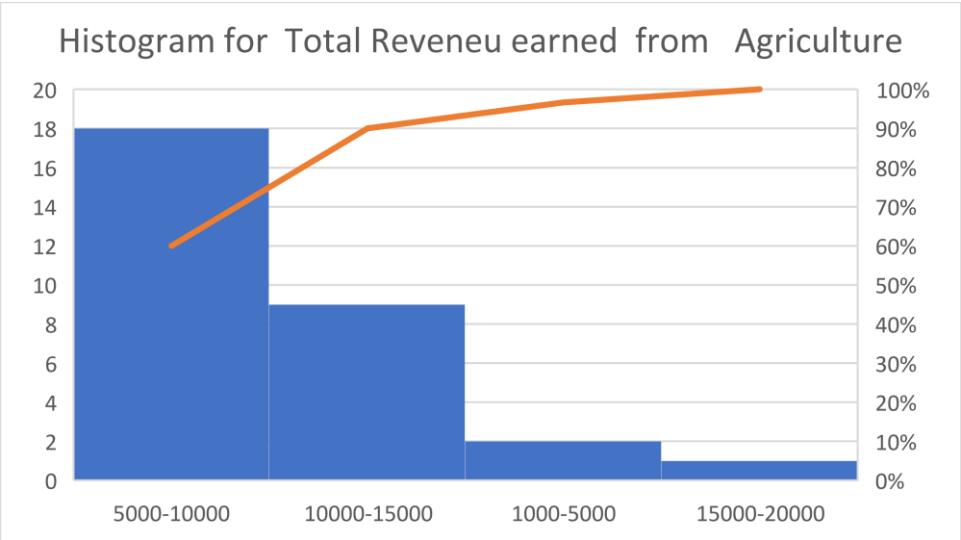


Figure-2 represents total revenue earned from agriculture. We see that most of families' revenue earning range is Rs.5000-Rs.10000. Very few numbers of families' revenue earning range is Rs.15000- Rs.20000 e.i., 90% of the families earn Rs. 5000 to Rs. 10000 from agriculture and less than 10% families earn Rs. 15000 to Rs. 20000 from agriculture.

Figure-3: Hours Men daily spend in farms

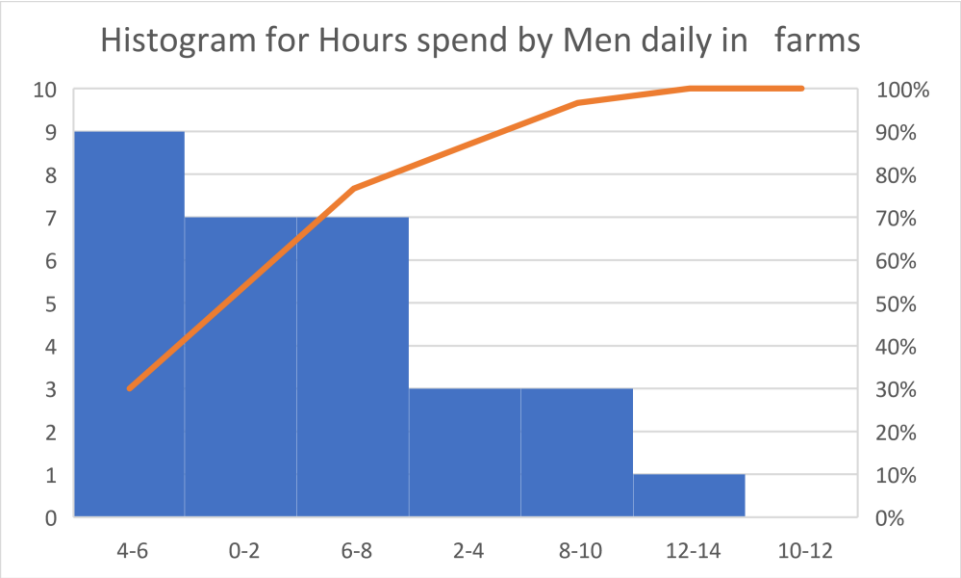


Figure-3 represents hours spend by men daily in farms. From the figure it is concluded that highest and lowest number of hours spend by men on farms is 13 hours and 0 hours respectively. Maximum number of men spend 4 to 6 hours in farms. Very few numbers of men spend 12 to 14 hours in farms i.e., 90% men spend 4 to 6 hours daily in farms and 10% men spend 12 to 14 hours daily in farms.

Figure-4: Hours spend by Women daily in farm

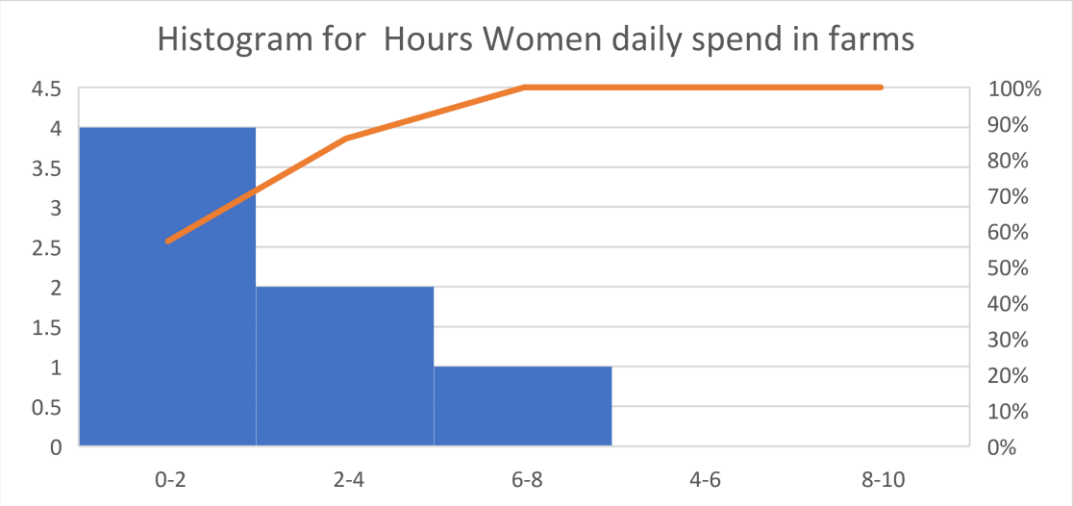


Figure-4 represents hours spend by women daily on farms. From the figure we can conclude that the highest and lowest number of hours women spend in farms is 10 hours and 0 hours. Maximum number of women spend 4 to 6 hours in farm. Very few of them spend 12 to 14 hours in farm i.e., 90% women spend 0 to 4 hours daily in farms and 20 % women spend 6 to 8 hours daily in farms.

Figure-5: Wage earned by men on farms

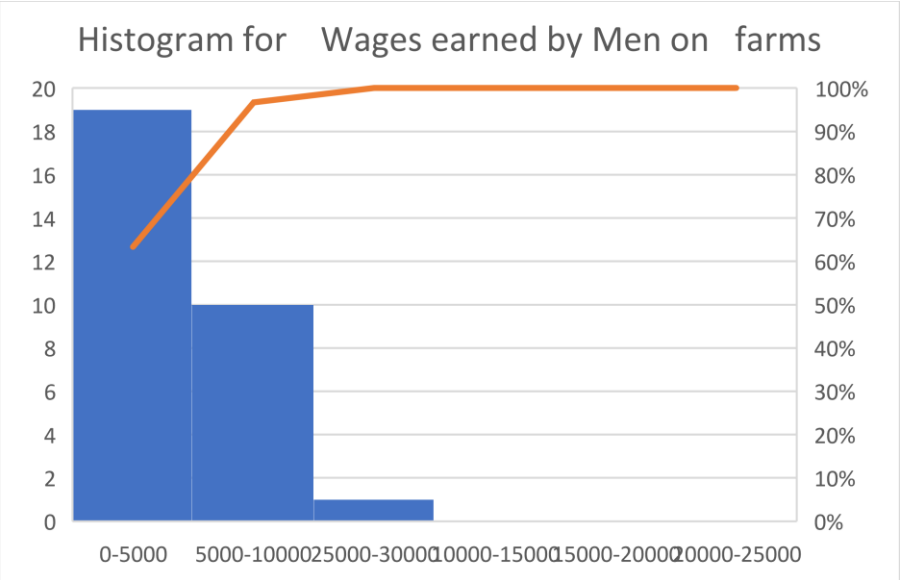


Figure-5 represents wages earned by men on farms. Highest wages earned by men on farm is 30,000 and lowest wage is 0. From the figure we can conclude that the maximum number of men earn Rs.0 to Rs.5000 on farms. Very few among them earn Rs.25,000 to Rs. 30,000 on farms i.e., More 90% men earn Rs. 0 to Rs. 5000 from agriculture and less than 10% men earn Rs. 25000 to Rs. 30000 from agriculture.

Figure-6: Wage earned by women on farms

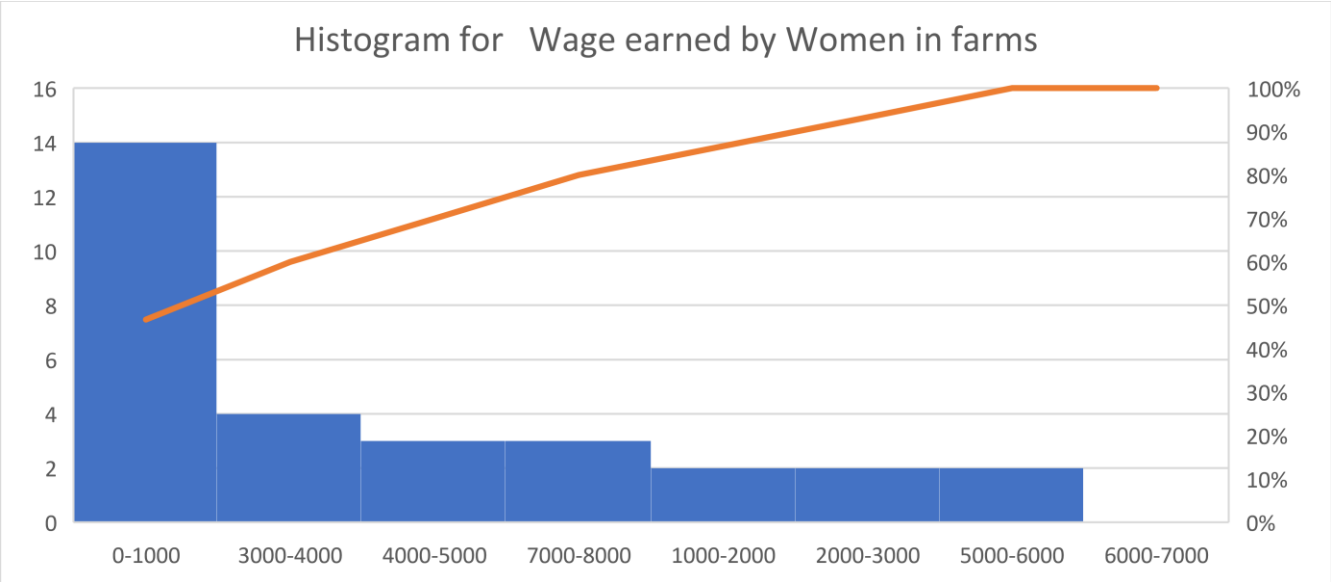


Figure-6 represents wages earned by women on farms. The highest wages earned by women is Rs.8000 and lowest wage earned by women is Rs.0. Maximum women earn Rs.0 to Rs.1000 in farms. Very few among them earn Rs.5000 to Rs. 6000 i.e., 90% women earn Rs. 0 to Rs.1000 from agriculture and 10% women earn Rs.5000 to Rs.6000 from agriculture.

Figure-7: Hour men spend on household work

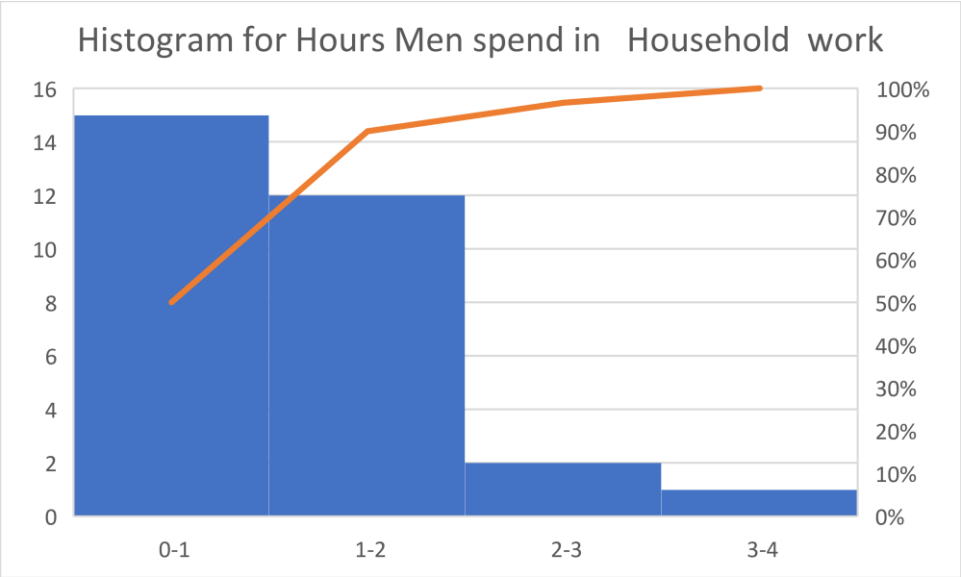


Figure-7 represents hours men spend in household work. Highest number of hours spend by men in farms is 4 hours and lowest number of hours spend by men on farms is 0 hours. Maximum men spend 0 to 1 hours in household work. Very few among them spend 3 to 4 hours in farms i.e., more than 90% men spend 0 to 1 hour in household work and less than 10% men spend 3 to 4 hours in household work.

Figure-8: Kind of household work done by men

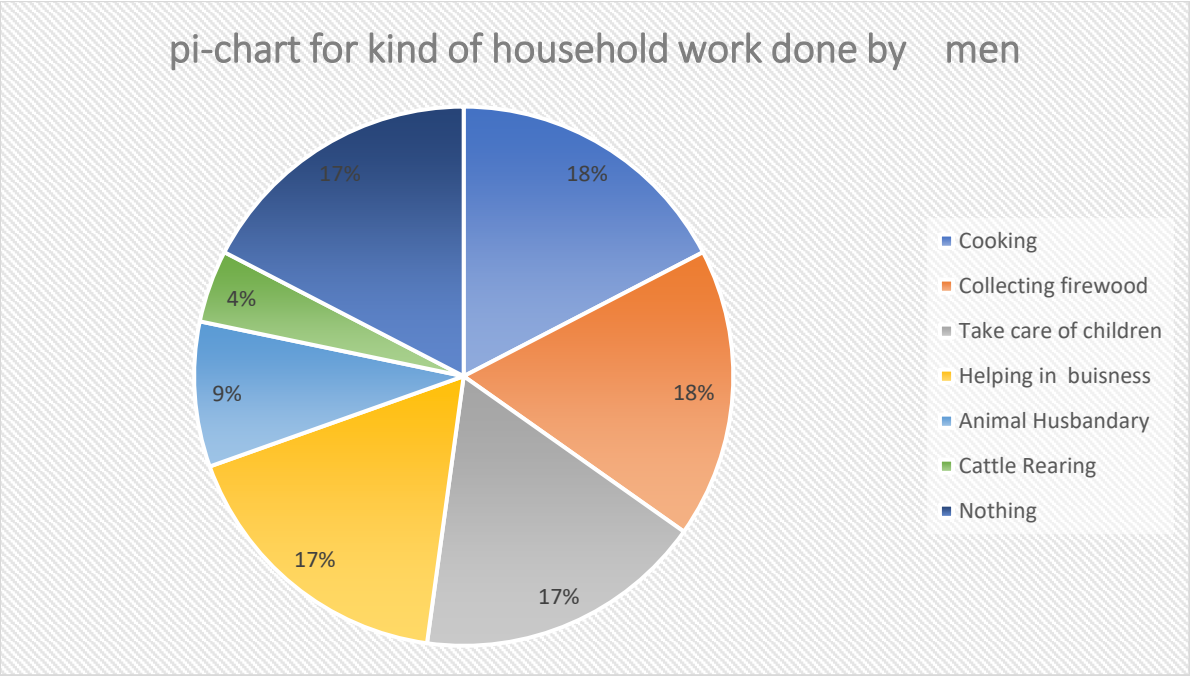


Figure-8 represents kind of household work done by men. Men also help women in their household work like cooking, collecting firewood, taking care of children, helping in business, animal husbandry and cattle rearing. Some of the men do not help women in household activities. Most of the men spend their time in cooking and collecting firewood. Very few among them spend their time in cattle rearing. 18% men are engaged in household work like cooking. Again 18% men are engaged in collecting firewood. 17% men are engaged in household work like taking care of children. Again 17% men are engaged in helping the spouse in business activity. 9% men are engaged in no household work. 4% men are engaged in cattle rearing.

Figure-9: Major problems faced in Agriculture

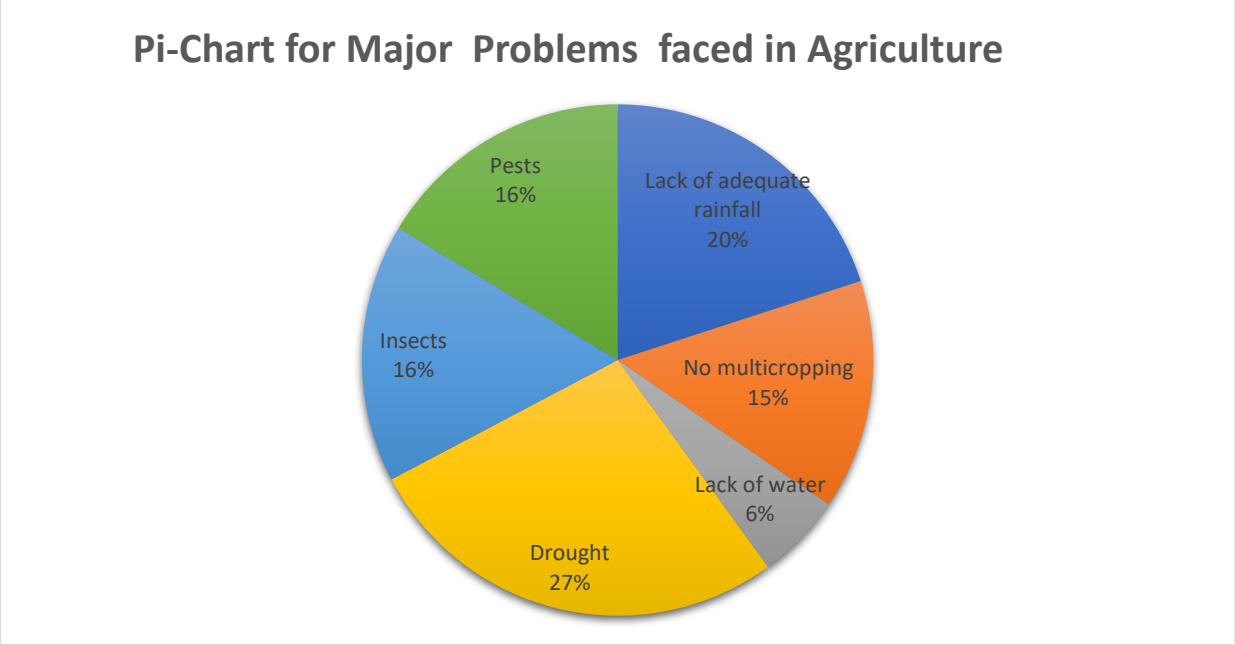


Figure-9 represents major problems faced by the farmers in agriculture. There are several problems faced by the farmers in agriculture such as lack of adequate rainfall, no multi-cropping lack of water, drought, insects and pests. The most common problem faced by most of the farmers is lack of adequate rainfall and drought which can be concluded from the figure. Farmers depend mainly on monsoon for water. 27% of the total problems faced by the people in agriculture is due to Drought. 20% of the total problems faced is due to Lack of adequate rainfall. 16% of the total problems faced is due to Insects. 16% of the total problems faced is due to Pests. 15% of the total problems faced is due to No multicropping. 6% of the total problems faced is due to Lack of water.

Result of Regression –

Regression Statistics	
Multiple R	0.47
Adjusted R Square	0.17
Standard Error	3122.47
Observation	30

ANOVA

	df	**SS**	**MS**	**F**	**Significance F**
Regression	2	75920799.98	37960399.99	3.89	0.03
Residual	27	263245866.7	9749846.91		
Total	29	339166666.7			

	Coefficients	**Standard Error**	**t-Stat**	**P-value**	**Lower 95%**	**Upper 95%**	**Lower 95.0%**	**Upper 95.0%**
Intercept	7517.83	1055.63	7.12	1.17E-07	5351.85	9683.80	5351.85	9683.80
Hours men daily spend in farms	234.65	185.14	1.27	0.22	-145.22	614.52	-145.22	614.52
Hours women daily spend in farms	418.56	242.80	1.72	0.09	-79.63	916.76	-79.63	916.76

Here the study is about the Total Revenue earned from agriculture which depends on the working hours of Men and Women in farms.

We take a three variable regression model where Total Profit earned from agriculture is the dependent variable and regressed on hours men spend in farms and women spend in farms which are explanatory/independent variables. The model specification is as follows:

$Y_i = \alpha + X_{1i}.\beta_1 + X_{2i}.\beta_2 + \varepsilon_i$ .....(1)

Where Y_i =Total Revenue earned from agriculture,

X_{1i} = Hours women daily spend in farms,

X_{2i} = Hours men daily spend in farms,

ε = Disturbance Term

α = Intercept Term

β_1 and β_2 are slope coefficients,

i = 1,2,3,…,n

Estimating equation (1) by OLS method, we get

$\hat{Y}_i = \hat{\alpha}+X_{1i}.\hat{\beta}_1+X_{2i}.\hat{\beta}_2. + e_i$ …….(2)

$\hat{\alpha}$, $\hat{\beta}_1$ and $\hat{\beta}_2$ are the numerical estimates of α, β_1 and β_2 respectively

$\hat{Y}_i$ gives the estimated values of Y_i for different values of X_1 and X_2 and obtained the estimated residual $e_i = \varepsilon_i$.

$e_i = Y_i-\hat{Y}_i = Y_i - \hat{\alpha}- \hat{\beta}_{1i}.X_{1i} - \hat{\beta}_{2i}.X_{2i}$ ---------- (3)

In the above table, Goodness of Fit (R^2) = 0.224, which implies that out 100% variation 22.4% variation can be explained by the two explanatory variables X_1 and X_2. The value of Adjusted R^2 = 0.17, which implies that out of 100% variation 16.7% variation is explained by the explanatory variables. Here the value of R^2 is greater than the value of Adjusted R^2 which implies that as the number of explanatory variables increases, the Adjusted R^2 increases than the R^2.

Hypothesis Testing:

T-Test:

For testing the significance of β_1 and β_2 we have to test the validity of the null hypothesis (H_N) that the value of β_1 and β_2 is equals to zero against the alternative hypothesis (H_A) is not equal to 0. We set our hypothesis as:

$H_N: \beta_1 = 0$

$H_A: \beta_1 \neq 0$

Now, under Null Hypothesis, we have to compute the t-value which is denoted by t*. The formula for computing t* is

$|t^*| = \beta_1 / SE(\beta_1)$

Here X_1 i.e., the Coefficient of β_1 = 234.65 and the Standard Error (SE) = 185.14

$|t^*| = \beta_1 / SE(\beta_1) = (234.65) / (185.14) = 1.27$

where $SE(\beta_1)$ is the Standard Error of β_1

For a two-sided test, we compute the level of significance as, $\lambda/2$ or 0.1/2 = 0.05 where $\lambda = 0.1$. The value of associated with a probability of 0.05 and 27 degrees of freedom is $t_{\lambda/2, (n-3)} = t_{0.05, 29} = 2.052$

Estimated value of |t*| is 1.27. Now we have to compare the value of |t*| with the critical value of t from the t-table for the significance of $\lambda/2$ and degrees if freedom n-k-1. Here n is the number of observations i.e., 30.

At 10% level of significance $\lambda/2$, (n-3) is 2.052

We see that $|t^*| < t_{\lambda/2, (n-3)}$, i.e., absolute value of computed t is lesser than the value of critical-t at 10% level of significance $\lambda/2$ and degrees of freedom i.e., 27. So H_N is accepted and we can conclude that β_1 i.e., the slope coefficient is statistically insignificant at 10% level of significance.

Similarly, $H_N: \beta_2 = 0$

$H_A: \beta_2 \neq 0$

Now, under Null Hypothesis, we have to compute t value which is denoted by t*. The formula for computing t* is

$|t^*| = \hat{\beta}_2 / SE(\hat{\beta}_2)$

In case of X_2 i.e., the Coefficient of $\hat{\beta}_2 = 418.56$ and the Standard Error (SE) = 242.80

$|t^*| = \hat{\beta}_2 / SE(\hat{\beta}_2) = (418.56) / (242.80) = 1.72$

Now we have to compute t value which is denoted by t*. The formula for computing t* is

where $SE(\hat{\beta}_2)$ is Standard Error of $\hat{\beta}_2$.

Estimated value of |t*| is 1.72. Now we have to compare the value of |t*| with the critical value of t from the t-table for the significance of $\lambda/2$ and degrees if freedom n-3. Here n is the number of observations i.e., 30.

At 10% level of significance $\lambda/2$, (n-3) is 1.704

We see that $|t^*| < t_{\lambda/2}$, (n-3), i.e., absolute value of computed t is lesser than the value of critical-t at 10% level of significance $\lambda/2$ and degrees of freedom 27. So, H_N is accepted and we can conclude that $\hat{\beta}_2$ i.e., the slope coefficient is statistically insignificant at 10% level of significance.

Therefore, from T-Test, we conclude that the variable X_2 (Hours spend by women daily in farms) is statistically less insignificant than that of X_1 (Hours spend by men daily in farms) at 10% level of significance.

We know that a p-value less than 0.05 is typically considered to be statistically significant and in that case the null-hypothesis is to be rejected. A p-value greater than 0.05 means that deviation from the null-hypothesis is not statistically significant, and the null-hypothesis is not rejected. From the ANOVA table we see that the calculated p-value of X_1 is 0.21. So, we accept the H_N and conclude that $\hat{\beta}_1$ i.e., the slope coefficient is statistically insignificant at 10% level of significance. From the ANOVA table again, we see that the calculated p-value of X_2 is 0.09. So, we accept H_N and conclude that $\hat{\beta}_2$ i.e., the slope coefficient is statistically insignificant at 10% level of significance.

Therefore, we conclude that the variable X_1 (Hours spend by men daily on farms) is more statistically insignificant that the variable X_2 (Hours spend by women daily in farms) at 10% level of significance.

F-Test:

For examining the overall significance of the estimated multiple regression model, we perform F-Test.

The calculated value of F is denoted by F*.

So, we our hypothesis as

$H_N : \beta_1 = \beta_2 = 0$

H_A : At least one of the β's is not equals to 0

From the ANOVA table we get F*= 3.89

The table value of F at 10% level of significance with [k,(n-k-1)] degrees of freedom is $F_{0.1}(2,27) = 2.511$. So, $F^* > F_{0.1}(2,27)$ and H_N is rejected. Therefore, we conclude that there is overall significance in the estimated regression model.

From the above relationship we can say that there is proportional relation between dependent variable and independent variable. The relations are statistically significant.

Therefore, we conclude that though the number of hours spend by men is more as compared to that of women i.e., men spend more time in agricultural activities than that of women, the agricultural activities of women have greater impact on the total revenue earned from agriculture as compared to that of the men. This means that the total agricultural revenue is mostly depended on women's farm activities and partly on men's farm activities.

We further find that the income of women increases as they are working in the fields.

Hence, as women's working hours in fields increases, the income of men statistically significantly increases.

Now, we will study wages earned by women on farms which depends on hours women spend on farms.

Results of Regression –

Regression Statistics	
Multiple R	0.24
R Square	0.06
Adjusted R Square	0.02
Standard Error	2659.16
Observations	30

ANOVA

	df	**SS**	**MS**	**F**	**Significance F**
Regression	1	12222169.32	12222169.32	1.73	0.19
Residuals	28	197991497.3	7071124.91		
Total	29	210213666.7			

	Coefficients	**Standard Error**	**t-Stat**	**P-value**	**Lower 95%**	**Upper 95%**	**Lower 95.0%**	**Upper 95.0%**
Intercept	2033.89	637.29	3.19	0.003	728.46	3339.35	728.46	3339.35
Hours women daily spend in farms	246.71	187.66	1.31	0.19	-137.68	631.11	137.68	631.11

For this we take a two variable regression model where wages earned by women on farms is taken as the dependent variable and hours women daily spend on farms is taken as the independent/explanatory variable. The model specification is as follows:

$Y_i = \alpha + X_{1i}.\beta_{1+} \varepsilon_i$ …..(i)

Where Y_i = Wages earned by women on farms,

X_{1i} = Hours women spend daily on farms,

α = Intercept term,

β = Slope coefficients,

ε_i = Disturbance term

i = 1,2,3,…,n

In the above table, Goodness of Fit (R^2) = 0.06, which implies that out 100% variation, 6% variation can be explained by the explanatory variable X_1. The value of Adjusted R^2 = 0.02, which implies that out of 100% variation, 2% variation is explained by the explanatory variables. Here the value of R^2 is greater than the value of Adjusted R^2 which implies that as the number of explanatory variables increases, the Adjusted R^2 increases than the R^2.

For testing the significance of β_1 we have to test the validity of the null hypothesis (H_N) that the value of β_1 is equals to zero against the alternative hypothesis (H_A) is not equal to 0. We set our hypothesis as:

H_N : $\beta_1 = 0$

H_A : $\beta_1 \neq 0$

For a two-tailed test, under Null-Hypothesis, the t-statistics is denoted by t*.

From the ANOVA table, we see that the computed value of t-statistics is 1.31. From the t-table we see that the critical value of t is 2.048 at 10% level of significance with n-2 degrees of freedom. So, so see that $|t^*| < t_{\lambda/2, 28}$ i.e., the absolute value of computed t is less than the value of critical -t at 10% level of significance and 28 degrees of freedom. Therefore, we accept H_N is and conclude that β_1 i.e., the slope coefficient is statistically insignificant at 10% level of significance.

From the ANOVA table, we see that the p-value is 0.19. We know that a p-value less than 0.05 is typically considered to be statistically significant and in that case the null-hypothesis is to be rejected. A p-value greater than 0.05 means that deviation from the null-hypothesis is not statistically significant, and the null-hypothesis is not rejected. As the calculated p-value is greater than the 0.05, H_N is accepted and we conclude that β_1 i.e., the slope coefficient is

statistically insignificant at 10% level of significance. This implies that the variable X_1 is statistically insignificant at 10% level of significance.

Hence, we conclude that as women are working in farms their wages are increasing. This means that women's farms activities have a great impact on total agricultural revenue. In other words, we can say that the total agricultural revenue depends greatly on women's work i.e., the number of hours women spend in farms. If women spend more hours in farms activities, the total agricultural revenue will increase.

7 POLICY SUGGESITIONS

Findings of the study revealed that women participation in the post-harvest operations, vegetable cultivation, fruit culture, livestock care, etc. had great contribution to the family income. Women had a larger contribution to the country's economy but their contribution was not considered objectively. Participation of both male and female farmers in farming activities is crucially important. Therefore, the extent of participation of both male and female farmers in different farming activities needs to be explored. The following suggestions can be useful:

- Arrangement of special training programs on organic farming separately for the male and female farmers.

- Arrangement of awareness campaign for the farmers about harmful effects of chemical pesticides and fertilizers to the soil, environment and health.

- Provision of micro-credit facilities to the farmers on livestock rearing and taking initiatives to disseminate organic farming technologies by government / non-government organizations.

- Participation in farming activities by the farmers was influenced by their farm size, social cooperation, access to community facilities and knowledge on organic farming. The helping attitude among male and female and other social groups should be encouraged through awareness campaign. Initiatives should be taken by different organizations to increase the community facilities like marketing of farm products, availability of farm inputs, irrigation water etc.

- Concerned government and non-government organizations should realize the existing problems of the farmers and should take necessary steps like demonstrations, workshops and other educational programs etc. specially designed for the farmers to overcome the problems through changing their knowledge and perception to the desired levels.

- To establish institutions, that will import improved seeds and/or develop research farms for producing certified and hybrid seeds in the State.

- The government needs to arrange an intensive agriculture extension programme to improve women's skills who are just involved in household management on one side and for developing essential skills and farm management skills of already involved women.
- The government should focus on a women's programme related to operational holdings, enhancing with a liberal lease in/out terms and giving more cheap credit.

- Women having education above senior secondary are showing their interest in non-farming activities, so for more educated women, the government should be focused on training programmes and extension services in non-farming agriculture.

8 CONCLUSION

The present analysis shows how agricultural revenue is affected by participation of both men and women in agricultural farms in village Ramnagar of Birbhum District, West Bengal. People of Ramnagar village mainly depend on agriculture, animal husbandry, cattle rearing, poultry and fishery for their livelihood. These farms household possess their own agricultural land. It has been observed that hours spend by men and women in agricultural farms and wages earned by men and women in agricultural farms affect the total agricultural revenue of the farm households. Further, major problems like adequate lack of rainfall, drought, no multicropping, insects, pests and lack of water also influence farm outputs. Whether conditions also affect the agricultural production. No survey regarding the participation of both men and women in

agricultural activities has been conducted in Ramnagar so far. This is the reason Ramnagar has been selected for our survey.

We have collected primary data mainly on the factors affecting agricultural revenue. The farming systems in the study area are predominantly rainfed, traditional, and operate with limited resources. The farmers are dependent on manual family labour, and using few or no external inputs such as fertilizers, chemicals or seeds. Farmers have poor access to information and relevant research results, and yields obtained are low. The agricultural activities are categorized into farming, non-farming, and household activities. Participation in farming activities is related to crop cultivation, participation in non-farming activities includes livestock management, and household activities denotes no participation in agricultural activities. While conducting the survey it was seen that large size of household is more productive in term of labour force and has a better chance and opportunities to diversity work in order to get higher income from farm and off-farm activities to invest in the agricultural process and animal raising. The study also revealed that at pre-pandemic male family members used to work outside whereas the female family members used to work on their farms. During pandemic, the male members returned to their homes and started working in farms which displaced the women members. Therefore, women spend more time in household work and men spend more working hours in farms as compared to that of the women. The findings reveal that education, age, and land size affect women's participation in farming and non-farming agricultural activities significantly negatively. The results further indicate that middle-aged women, having schooling up to senior secondary levels exhibit more probability of participating in farming activities when compared to non-farming and household activities. On the contrary, highly educated women tend to participate more in non-farming activities when compared to farming and household activities. The study also advocates for improvement of women's education, especially higher than the senior secondary level, for enhancing their increased participation in economic activities, particularly in non-farming activities, which will be useful not only for raising their income level but will also assist them in reducing the dependency burden in the agriculture sector. The findings of the study indicate that the majority of selected respondents are illiterate or have education up to only senior secondary in both farming and non-farming activities. Therefore, there is a dire need to improve the status of literacy of women in rural areas as education is a vital factor for improving their ability for acquiring and processing information. Educated women can easily grasp the input-output relation of farming, updated

and cost-effective techniques of agriculture. The findings of the study demonstrated that there was further scope to increase participation of male and female farmers in farming activities and potential scope to disperse their responsibilities towards helping each other regarding farming activities. The results of the study showed the farms activities of women have greater impact on agricultural activities than that of men though men spend more time in agricultural activities. As number of hours spend by women in farm activities increases, their wages tend to increase. So, if women participate more in farms activities, the total agricultural revenue will increase significantly. Hence, it is concluded that the total agricultural revenue and farm output mainly depends on women's labour force in agriculture. In this survey we worked with three variables. If more variables were added, then we would get more results. But we were bound to work with not more than three variables. This study is limited in finding the influence of some socio-economic determinants of women's participation in agriculture. There may be several other determinants impacting the participation of women in farming and non-farming activities of agriculture. This study is also confined to a limited area in Birbhum District of West Bengal, so research can be further conducted by considering a wider region and more respondents by other researchers

9 BIBLIOGRAPHY

Chavas, Jean-Paul and Cooper, Joshep and Wallender, Steven. "Impact of Input and Output Decisions on Agriculture Production Risk." Journal of Agricultural and Resource Economics; Volume 44(3): 513–535, ISSN 1068-5502 Copyright 2019 Western Agricultural Economics Association DOI: 10.22004/ag.econ.292329; September 2019: 21-22.

Haile, Firafis. "Factors Affecting Women Farmers' Participation in Agricultural Extension Services for Improving the Production in Rural District of Dendi West Shoa Zone, Ethiopia." Home Science Extension And International Communication Management Journal; Volume 3, Issue 2, DOI: 10.15740/HAS/IJHSECM/3.2/59-71; July 2016: 59-71.

Onekwesi and C., Gideon and Chukwu and C., Miriam. "Women Farmer's Participation in Agricultural Extension Activities in Ikwuano L.G.A., Abia State Nigeria." Asian Journal of Social Sciences and Management Studies; Volume 1, No. 1; June 2016: 63-69.

Adekunle, Ogundiran Oluwasola. "Analysis of Effectiveness of Agricultural Extension Service in among Rural Women: Case study of Odeda Local Government, Ogun State, Nigeria."

Journal of Agricultural Science; Volume 5, No. 12, 2013 ISSN 1916-9752 E-ISSN 1916-9760 Published by Canadian Center of Science and Education; November 2019: 5-6.

Panda, Prasant Kumar and Varkey, Rittu Susan. "Factors Determining Agricultural Outputs in Indian States: An Analysis." International Journal of Applied Business and Economic Research; Volume 17, No. 1, 2019, ISSN: 0972-7302; 2019: 6-7.

Badar, Hammad and Ghafoor, Abdul and Adil, Sultan Ali. "Factors Affecting Agricultural Production of Punjab (Pakistan)." Pakistan Journal of Agriculture Sciences; Volume 44(3), 2007: 3-4.

Kannan, Elumalai. "Trends in India's Agricultural Growth and its Determinant." Asian Journal of Agriculture and Development; Volume 8, No. 2; 2012: 19-20.

Mohapatra, Upasana and Mishra, Raj Kishore. "Scenario of Changing Cropping Pattern and Key Indicators of Agriculture in Odisha-An Economic Analysis." Indian Journal of Pure and Applied Bio Sciences; Volume 6, No. 7; September 2019: 71-76.

Narayanmoorthy, A. "Profitability in Crops Cultivation in India: Some Evidence from Cost of Cultivation Survey Data." Indian Journal of Agricultural Economics; Volume 68, No. 1; March 2013: 16-17.

Tripathy, Amarnath and Prasad, A.R. "Agricultural Development in India since Independence: A Study on Progress, Performance and Determinants." Journal of Emerging Knowledge on Emerging Markets; Volume 1, Issue 1, DOI: 10.7885/1946-651X.1007; November 2009: 30-31.

Mc, Jhon Arthur and McCord, Gordon. "Fertilizing Growth: Agriculture Inputs and their Effects in Economic Development." Journal of Development Economics; Volume 127; July 2017: 133-135.

Kuriachen, Philip and Sen, Biswajit and K. V., Praveen. "Factorization of Agricultural Production in India: A Quantile Regression Approach." Agricultural Economics Research Review; Volume 30 (Conference Number) 2017 pp 257-268, DOI: 10.5958/0974-0279.2017.00039.8; July 2019: 10-11.

Hasan, M. K. and Rahman, M. Z. and Kashem, M. A. "Participation of Male and Female Conventional Farmers in Farming Activities." Bangladesh Journal of Extension Education; Volume 18, Issue 1 & 2, Article Identifier: 1419; 2006: 57-65.

Gohain, Lekharani. “Trend and Performance of Indian Agriculture in Post-Independence Period Era: An Analysis of Determinants.” Indian Journal of Economics and Development; Volume 7 (2), ISSN (online): 2320-9836 ISSN (Print): 2320-9828; February 2019: 8-9.

Hassan, Thabit Ahmed. “Economic Analysis of Factors Affecting the Farmer Income Under Traditional Farming System in South Darfur State – Sudan.” Journal of Agricultural Science and Engineering; Volume 1, Number 3; June 2015: 114-119.

Tiwari, Yogesh and Sharma, H.O. and Awasthi, P.K. and Kolar, Prasanna. “Factors Affecting Farm Income of Different Farming System in Madhya Pradesh.” Asian Journal of Agricultural Extension, Economics and Sociology; Volume 39(2):107-110, 2021; Article No. AJAEES.67165 ISSN: 2320-7027, DOI: 10.9734/AJAEES/2021/v39i230535; April 2021: 3-4.

Daoud, Yousef and Fellah, Belal. “The Differential Impact of Employment in Agriculture on Wages for Rural and Non-Rural Palestine.” IZA Journal of Labour and Development; Volume 5(1), DOI:10.1186/s40175-016—0063-9; December 2016: 16-19.

Andrews, Hazel Patterson and Pemberton, Carlisle A. “Factors Affecting Profitability of Small-Scale Farming in Southern Trinidad and Tobago.” International Journal of Food and Agricultural Economics; Volume 2, Issue 3, DOI: 10.22004/ag.econ.186263, ISSN: 2147-8988; July 2014: 15-18.

Tuchitechi, Hawonga and Lee, Misook. “Factors Affecting the Performance of Agricultural Project from the Perspectives of Agricultural Extensions – A Case Study of Malawi.” Journal of Agricultural Extension & Community Development; Volume 25 Number 2, 111-120 ISSN 1976-3107(print), 2384-3705(online) http://doi.org/10.12653/jecd.2018.25.2.0111; June 2018: 8-9.

Maniriho, Aristide and Musabanganji, Edouard and Lelailly, Philippe. “Factors Affecting Farm Performance Among Small-Scale Farmers in the Volcanic Highlands of Rwanda: What is the Role of Institution.” Asian Journal of Agriculture and Rural Development; Volume 4, Issue 13, ISSN: 2304-1455, DOI: 10.18488/jounal.ajard.2021.114.262.268, Corpus ID: 240128155; October 2021: 262-268.