Monsoon and Farm Income: Different Aspects and Their Impacts

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ABSTRACT

India's growth and development is largely dependent on its farm income being a farm based economy. The change in climate specifically deviation in temperature, rainfall pattern (change in number of rainy days, change in on set of monsoon, deviation in amount of rainfall, erratic raining etc.) have a significant impact on the farm production and farm economy. The present study was conducted in Ghoragachha village under Saguna gram panchayet, Nadia, West Bengal. The number of respondents were 60 and were selected randomly.The data were collected trough pilot survey, structured interview and focused group interview.The statistical tools used for data analysis were correlation coefficient, step down regression, path analysis and factor analysis. It has been observed that the variables like size of holding(X4), homestead land(X5), livestock(X10), farm family income(X6)werethe most significant variables. The impact of monsoon on farmers' income and farm economy are mostly dependent on these aspects.

Key Words: Economy,Farm,Income, Monsoon.

INTRODUCTION

India is a country of both rivers and monsoon. The rivers are the life blood of the people beside the banks; it affects their agriculture and economy, culture and rituals, livelihood and sustenance. These rivers and canals are mainly fed with sweet water by monsoon rain. The year in which the rain is adequate and usual, rivers and canals are full of water for irrigating the agricultural fields, producing hydrological power, carrying out industrial and household works but when the rainfall is scanty, over, untimely or scattered, there is a devastating impact on all aspects of modern civilized life. Todkari (2012) said that irrigation is identified as a decisive factor in Indian agriculture due to high variability and inadequacy of rainfall. Irrigation is essential for successful agriculture particularly in the area, where rainfall is inadequate uncertain, and unpredictable. The monsoon rain deviation in several parts in India is a reason for differences in lifestyle, rituals, income and agriculture.

Despite the strong link between climate and society, our knowledge of the long-term monsoon variability is incomplete over the Indian sub continent having 600 m of farmers(50% of the total population) and being an agriculture based economy, the income of farmers if hampers, would create a devastating impact on the overall GDP(gross domestic product) of the country.T h e objectives of the present study were to identify various factors and their interaction with monsoon rainfall in terms of socio-economic components and functions, estimate the impact of monsoon rainfall on farm income from the socio-cultural, agro-economic and techno managerial variables and to generate micro level policies based on the empirical data in order to delineate the possible interventions to deal with the sociology of monsoon.

MATERIALS AND METHODS

The state of West Bengal in eastern India has a unique social and ecological background which

Table 1. Coefficient of Correlation (r): Income and monsoon(Y) vs. 15 independent variables(x1-x15).

Sr. No.	Variable	Coefficient of correlation (r)
1	Age	0.001
2	Education	0.127
3	Family size	0.083
4	Size of holding	-0.419**
5	Homestead land	-0.289*
6	Family income(farm)	-0.976**
7	Family income(off farm)	-0.144
8	Cropping Intensity	-0.225
9	Crop mix	-0.112
10	Livestock	-0.361**
11	Yield of Rice	-0.068
12	Yield of Pulses	-0.036
13	Yield of vegetables	0.220
14	Exposure to media	0.144
15	Disease pest incidence	0.143

$P<0.05$ and ** $P< 0.01$ level of significance.

influence the living standard and behavioural patterns of the people in many ways. The area of investigation was Haringhata block and village Ghoragachha under Rautari gram panchayat. Sixty respondents were selected through random sampling technique. Fifteen independent variables against one dependent variable that is monsoon and income(Y) were considered for the study.

First of all 5 per cent of the total sample population was selected randomly for pilot study. These respondents were eventually discarded from main sample to reduce the sampling error. All other respondents were interviewed with the help of an interview schedule with some specific and relevant questions. The qualitative data was quantified using specific numerical procedure and put under five statistical analysis i.e., co-efficient of co-variance, step down regression, path analysis and factor analysis.

RESULTS AND DISCUSSION

Correlation between independent variable and family income

The data (Table 1) revealed that the size of holding homestead land, farm family income and livestock had a significant correlation with the dependent variable. The results indicated that income has been affected due to delayed monsoon and it has got proportionate impact on farm family income as well as livestock enterprises and worst sufferers were those having small size of holding and homestead land.

The data (Table 2) showed that variable farm family income has contributed to the substantive variance embedded with the consequent variable y2. The R^2 value being 0.9601, it is to infer that 96.01 per cent of variants in the consequent variable has been explained by the combination of these 15 causal variables. The data (Table 3) present the step wise regression and it has been depicted that one causal variable that is farm family income has been retained at the last step. The R^2 value being 0.9572, it is to infer that 95.72 per cent of variants in the consequent variable has been explained by the combination of this one causal variable. The perceived loss of income due to delayed monsoon

Table 2. Step down Regression Analysis, Income and monsoon(Y) vs15 causal variable(x1-x15):

Sr. No.	Variable	Beta	Beta x R	Regression coefficient B	S.E. of B	t value
1	Age	0.009	0.001	0.000	0.001	0.228
2	Education	-0.071	-0.942	-0.008	0.023	0.357
3	Family size	-0.019	-1.162	-0.005	0.024	0.203
4	Size of holding	-0.070	3.048	-0.095	0.168	0.565
5	Homestead land	0.082	-2.454	0.318	0.618	0.514
6	Family income(farm)	-0.964	98.251	-0.002	0.000	24.572
7	Family income (off farm)	0.033	-0.496	0.000	0.000	0.947
8	Cropping intensity	-0.014	0.324	0.000	0.000	0.348
9	Crop mix	-0.008	0.099	0.000	0.002	0.251
10	Livestock	0.012	-0.457	0.007	0.029	0.247
11	Yield of rice	0.068	0.487	-0.049	0.161	0.302
12	Yield of pulses	0.000	-0.002	0.014	5.334	0.003
13	Yield of vegetables	0.018	0.413	0.011	0.003	0.463
14	Exposure to media	2.660	39.934	0.733	1.042	0.704
15	Disease pest incidence	-2.553	-38.044	-4.928	7.187	0.686

R-SQ=96.01%   and   S.E=0.27

Table 3. Regression Analysis, Income and monsoon(Y) vs causal variable(x6):

Sr. No.	Variable	Beta	Beta x R	Regression coefficient B	S.E. of B	t value	VIF
1.	Family income(farm)	-0.978	100.00	-0.002	0.00	36.02	1.00

R2 value-95.72%   S.E-.41

has well been affected by the one functional variable, farm family income which implied that if delayed monsoon or over monsoon is there, the crop loss would occur and substantial farm income of the family would have hampered.

Factor Analysis

Factor 1

The family resource has accommodated five variables and has rightly been associated with the income impacted by the monsoon. Resource endowment helps and supports transformation of monsoon behaviour into a tangible resource generation. For example, only higher farm size can harvest the benefit of good rainfall and can be elucidated through better yield in field crops or livestock produces as well.

Factor 2

Perception proficiency means that older the person, higher would be the experience which helps him in developing his overall perception about monsoon. As far as the education is concerned, it is not only refers to formal or institutional education but is basically a progressive learning process. Hence, more the learning more would be the

Table 4. Factor Analysis: Conglomeration of 15 explanatory variables into 5 factors.

Factor	Variable	Factor loading	% of variance	Cumulative %	Factor renamed
Factor 1	Family size	-.899	29.495	29.495	Family resource
	Homestead land	.844			
	Livestock	.552			
	Yield of Rice	.924			
	Yield of Pulses	.900			
Factor 2	Age	-.620	23.918	53.413	Perception proficiency
	Education	.927			
	Exposure to media	.927			
	Perception on Disease pest incidence	.927			
Factor 3	Size of holding	.639	12.301	65.714	Farm resource
	Cropping Intensity	.752			
Factor 4	Family income(farm)	.580	9.157	74.871	Family enterprise
	Yield of vegetables	-.670			
Factor 5	Family income(off farm)	.584	7.164	82.035	Agro ecological proficiency
	Crop mix	.734			

understanding about the monsoon behaviour and its impact on farm yield. Exposure to media added on extra benefits in the perception about monsoon, for example the farmers having higher exposure to hot, cold or both the media can forecast the weather more accurately or can be more aware of the dreadful diseases and pests and can act accordingly.

Factor 3

Higher is the size of land, the more benefit is reaped from monsoon. Also, the higher cropping intensity can act as a safe gourd from the fatal impact of monsoon in one side and can increase the income on other.

Factor 4

Higher vegetable yield means higher income from farm, which can be the ensuing investment for opening a farm based enterprise.

Factor 5

More the diversity of crops in a certain field, less would be the chances of drastic crop loss. For example, if a field comprises of cash crops like coriander, it could then easily compensate the main crop loss due to heavy rain. As far as the income sources other than farming can add more to this risk lowering process. Thus agro ecological proficiency for a certain zone can be configured.

The variable exposure to media has enrooted the highest indirect effect (for 11 times) on the consequent variable. Table 5 present the path analysis to decompose the total effect (TE) into direct, indirect and residual effect. It has been found that the variable exposure to media (2.659) has highest direct effect , while the variable perception on disease pest incidence(2.659) has exerted the highest indirect effect on the perception of income

Table 5. Path analysis: Decomposition of total effect (r) into direct, indirect and residual effect.

Sr. No.	Variable	Total effect	Direct Effect	Indirect Effect	Highest indirect Effect
1	Age (X1)	0.001	0.008	-0.007	X15(1.512)
2	Education (X2I)	0.127	-0.070	0.197	X14(2.619)
3	Family size (X3)	0.083	-0.018	0.101	X14(-0.455)
4	Size of holding (X4)	-0.419	-0.0698	-0.349	X6(-0.400)
5	Homestead land(X5)	-0.289	0.0820	-0.371	X6(-0.283)
6	Family income(farm) (X6)	-0.976	-0.9642	-0.011	X14(-0.326)
7	Family income(off farm) (X7)	-0.144	0.033	-0.177	X14(-0.270)
8	Cropping Intensity (X8)	-0.225	-0.018	-0.207	X14(-0.272)
9	Crop mix (9)	-0.112	-0.008	-0.104	X14(0.272)
10	Livestock (X10	-0.361	0.012	-0.373	X14(-0.513)
11	Yield of Rice (X11)	-0.068	-0.068	0	X14(0.288)
12	Yield of Pulses(X12)	-0.036	0.0005	-0.036	X14(0.398)
13	Yield of vegetables (X13)	0.220	0.018	0.202	X14(0.398)
14	Exposure to media (X14)	0.144	2.659	-2.515	X15(-2,552)
15	Disease pest incidence (X15)	0.143	-2.552	2.695	X14(2.659)

Residual-3.99%

and monsoon. The exposure to media has highest direct effect on the dependent variable income and monsoon rightly suggests that, the more of the exposure to media, the more relevant market information would be received. which creates a positive impact on income. Similarly perception on disease pest incidence has contributed highest associative impact on this consequent variable as, if the respondents can predict the disease pest incidence or are well aware of the control techniques, then crop loss would be minimized and subsequently income would be more. The residual effect being 3.99 per cent denote that even with the combination of these 15 exogenous variables, 3.99 per cent of variance cannot be explained. This suggests the inclusion of more numbers of relevant and consistent variables for this framework of study.

CONCLUSION

The climate change and income of the people of affected regions are more or less interrelated. The Indian economy largely depends on agriculture which is highly influenced by the spatio-temporal variability of precipitation. The *kharif* and *rabi* are the two main crop growing seasons which require major proportion of rainfall. It can be concluded that the income of farming community was largely dependent on the monsoon rainfall. The farmers with higher landholding, higher exposure to media, higher resources (like livestock) were affected less by the deviated monsoon. As the Indian economy is very much dependent on farming, the reduction in farmers' income can create a swashbuckling impact on overall GDP and this can down strain the growth of the country. So, to minimize this loss we have to go for policy regulation, information dissemination, adaption and mitigation and of course reduction in fragmented holding.

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