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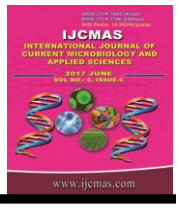

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Climate Change Impact on Socio-Economic Status and Communication Pattern of the Paddy Farmers of Tamil Nadu, India

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A B S T R A C T

The study was conducted in Erode and Tiruchirappalli districts of Tamil Nadu, find out the climate change impact on socioeconomic status of the Paddy farmers. Totally 200 Paddy farmers were selected for the study. Study revealed that majority of farmers belonged to medium socio-economic status in both Kalingarayan and Ponnaniyaru basin. The majority (61.00 %) of the respondents in Kalingarayan basin belonged medium level of extension agency contact followed by high (24.00 %) and low (15.00 %). Similarly in Ponnaniyar basin 63.00 per cent of the respondents had medium level extension agency contact followed by high and low with 23.00 per cent and 14.00 per cent respectively. The medium level of extension agency contact might be due to the regular visits made by the officials of development departments and high involvement of progressive farmers. The conclusion made from the study timely providing climate change related information through ICT tools for quick and low cost communication for small and marginal paddy farmers for better livelihood security.

Introduction

Climate change and agriculture are interrelated processes, both of which take place on a global scale. Agriculture is extremely vulnerable to climate change. Higher temperatures eventually reduce yields of desirable crops while encouraging weed and pest proliferation. Changes in precipitation patterns increase the likelihood of short-run crop failures and long-run production declines. Although there will be gains in some crops in some regions of the world, the overall impacts of climate change on agriculture are expected to be negative, threatening global food security. Agriculture is sensitive to short-term changes in weather and to seasonal, annual and longer-term variations in climate. For the long-term changes, agriculture is able to tolerate moderate variations in the climatic mean. Changes beyond these bands of tolerance may require shifts in cultivars and crops, new technologies and infrastructure or ultimately

conversion to different land uses. Agriculture is inherently sensitive to climate conditions and is the most vulnerable sector to the risks and impacts of climate change (Sagun, 2009).

Climate change is the long term conspicuous deviation from usual prevailing climate bringing variations in normal temperature, rainfall and atmospheric circulation. Thereby the problem is not with the climate in essence but the variability of it. That too when the variability factor gets to become unpredictable with the uncertain turn out of events, the seriousity of the problem grows with it. There is an urgent need to understand the effects of climate change on agricultural sector both at global and as well as at regional levels, especially from the point of view of providing food to vulnerable section of the population. The implications of climate change are found to be varying among different regions and different crops. Nevertheless paddy, being a water intensive crop, is found to be the most vulnerable crop. Sinha and Swaminathan (1991) have showed that an increase of 2^{o}C in temperature would decrease rice yield by about 0.75 ton/ha. This would only mean that the small and marginal farmers with literally low yield levels, lesser investment opportunities and still lesser resources to cope would be most seriously affected to the onslaught of climate variability.

Thereby without taking socioeconomic status of the farmers, it would be highly irrelevant to devise suitable adaptation strategies to counter the harmful effects of climate change. This paper analysis the small and marginal paddy farmers socio economic status and communication pattern on agricultural information access from extension agencies for mitigate and ill effect of climate change in Erode (Kalingarayan basin) and Tiruchirappali (Ponnaniyaru basin) districts of Tamil Nadu.

Materials and Methods

Paddy is the staple food crop of Tamil Nadu and is heavily exposed to the extreme and extraneous events of climate change. Erode and Tiruchirapalli districts were purposively selected for the study as the district has high range of variability in both rainfall and temperature. Kalingarayan (Erode) and Ponnaniyar (Tiruchirapalli) basins were then chosen as they have maximum acreage under paddy with majority of the farmers being small (2.5 to 5 acres) and marginal (< 2.5 acres). Canal irrigation was also found to be prominent in these basins resulting in farmers becoming more vulnerable to climate change events. Based on the discussions with the officials and subject matter specialists of the agricultural department one block was selected from each basin. For the selection of villages, an inventory of revenue villages in each block was collected. Then ten villages from each block were randomly chosen. The total sample size was 200 with randomly selecting 100 paddy farmers (comprising 50 male farmers and 50 female farmers) from each of the blocks.

Percentage analysis was used in descriptive analysis for making simple comparisons. For calculating percentage the frequency of the particular cell was multiplied by 100 and divided by the total number of respondents pertaining to particular cell. Percentage was corrected to two decimal places.

Results and Discussion

Socio-economic status of the paddy farmers

Socioeconomic status of paddy farmers plays a significant role in crop cultivation. Further the small and marginal Paddy farmers are trying to secure livelihood by mitigate and ill effect of climate change through appropriate coping mechanism.

Distribution of the respondents according to their age

Age would reflect the mental maturity of an individual to take decision for achieving the needs at various stages of one's life. Hence age has been considered as one of the factors and included in this present endeavor. Majority (50.00 %) of the respondents in Kalingarayan basin comes under old age group followed by middle and young with 37.00 per cent and 13.00 per cent respectively, whereas in Ponnaniyar basin 41.00 per cent of the respondents belonged to old age group followed by middle (38.00 %) and young (21.00 %). In the present day situation, most of the youth in rural area prefer non- farming sector rather than doing farming though they have their own lands. They want to migrate to city and town for employment even though their job profile is not worth enough to their qualification. Further, the farmers who are having agriculture as their primary occupation also did not want to engage their children in farming occupation, since it is perceived as a risky occupation. This may be the probable reason for the less number of farmers in the young aged category.

Distribution of the respondents according to their educational status

From table 2, majority (29.00 %) of the Kalingarayan basin respondents had middle education followed by secondary education (25.00 %), primary (15.00 %), collegiate (14.00 %), illiterate (11.00 %) and functionally literate (6.00 %). In Ponnaniyar basin majority of the respondents belonged to middle education (35.00 %) followed by primary education (25.00 %), secondary education (19.00 %), collegiate (12.00 %), illiterate (5.00 %) and functionally literate (4.00 %). While comparing Kalingarayan basin with Ponnaniyar basin, Kalingarayan basin respondents were higher in educational status and higher income status. Apart from farming they were also engaged in other business activities, whereas Ponnaniyar basin respondents were only engaged in wage earning.

Distribution of the respondents according to their annual income

Table 1 reveals that 43.00 per cent of the respondents in Kalingarayan basin had high level of income followed by medium and low with 41.00 per cent and 16.00 per cent respectively. Whereas in Ponnaniyar basin majority (55.00 %) of the respondents were medium level income followed by high (27.00%) and low (18.00 %). Majority of the Ponnaniyar basin respondents were under medium level income, since most of them involved only in wage earning activities apart from agriculture. In case of Kalingarayan basin majority of them involved in businesses like mandy business, contract business etc. In additions to this, the farmers also involved in livestock rearing such as cow, goat and back yard poultry for supplementary earnings. Even if monsoon fails, farmers would cope up with their livelihoods with additional income from these enterprises.

Distribution of the respondents according to their occupational status

Occupational status of the respondents decides their extent of involvement in farm operations. Agriculture as a full time occupation makes an individual to allocate more time in farming. It is clear from table 1 that 74.00 per cent of the respondents in Kalingarayan basin were in agriculture alone as their primary occupation, while 14.00 per cent were in agriculture and agricultural labour as their occupation followed by 7.00 per cent under agriculture and agri business and the rest of 5.00 per cent depends on agriculture and government services.

Table.1 Distribution of the respondents according to their socio-economic status

S. No.	Parameters	Kalingarayan basin (n =100)		Ponnaniyar basin (n =100)	
		Number	Per cent	Number	Per cent
1.	**Age**				
	Young (Up to 35 years)	13	13.00	21	21.00
	Middle (Above 35 to 45 years)	37	37.00	38	38.00
	Old (More than 45 years)	50	50.00	41	41.00
2.	**Educational status**				
	Illiterate	11	11.00	5	5.00
	Functionally literate	6	6.00	4	4.00
	Primary education	15	15.00	25	25.00
	Middle education	29	29.00	35	35.00
	Secondary education	25	25.00	19	19.00
	Collegiate education	14	14.00	12	12.00
3.	**Annual income**				
	Low (Up to Rs.30,000)	16	16.00	18	18.00
	Medium (above Rs. 30,000 to 60,000)	41	41.00	55	55.00
	High (Above Rs. 60,000)	43	43.00	27	27.00
4.	**Occupational status**				
	Agriculture	74	74.00	64	64.00
	Agriculture + business	7	7.00	6	6.00
	Agriculture + labour	14	14.00	26	26.00
	Agriculture + government/private job	5	5.00	4	4.00
5.	**Farm size**				
	Marginal farmer (Up to 2.5 acres)	49	49.00	32	32.00
	Small farmer (From 2.51 to 5.00 acres)	51	51.00	68	68.00
6.	**Farming experience**				
	Low (Up to 5 years)	20	20.00	17	17.00
	Medium (Above 5 to 10 years)	14	14.00	22	22.00
	High (More than 10 years)	66	66.00	61	61.00
7.	**Cropping pattern**				
	Mono cropping	13	13.00	25	25.00
	Double cropping	38	38.00	38	38.00
	Mixed cropping	49	49.00	27	27.00
8.	**Irrigation source**				
	Canal	74	74.00	52	52.00
	Open well	5	5.00	24	24.00
	Bore well	15	15.00	22	22.00
	Open + Bore well	6	6.00	2	2.00
9.	**Training undergone**				
	Participated	45	45.00	63	63.00
	Not participated	55	55.00	37	37.00
10.	**Social participation**				
	Low	13	13.00	14	14.00
	Medium	44	44.00	52	52.00
	High	43	43.00	34	34.00

Table.2 Distribution of respondents according to their extension agency contact

(n = 200)

S. No.	Categories	Kalingarayan basin (n =100)		Ponnaniyar basin (n =100)	
		Number	Per cent	Number	Per cent
1.	Low	15	15.00	14	14.00
2.	Medium	61	61.00	63	63.00
3.	High	24	24.00	23	23.00
	Total	**100**	**100.00**	**100**	**100.00**

Table.3 Distribution of the respondents according to extension agency contact frequency visit

(n= 200)

S. No.	Particulars	Kalingarayan Basin (n=100)			Ponnaniyar Basin (n=100)		
		Regularly	Occasionally	Never	Regularly	Occasionally	Never
1.	DAO/AAO	66.00 (per cent)	27.00 (per cent)	7.00 (per cent)	55.00 (per cent)	33.00 (per cent)	12.00 (per cent)
2.	Agriculture Officer	60.00 (per cent)	26.00 (per cent)	14.00 (per cent)	68.00 (per cent)	20.00 (per cent)	12.00 (per cent)
3.	Horticulture officer	36.00 (per cent)	24.00 (per cent)	40.00 (per cent)	58.00 (per cent)	18.00 (per cent)	24.00 (per cent)
4.	Asst. Director of Agriculture	24.00 (per cent)	18.00 (per cent)	58.00 (per cent)	20.00 (per cent)	12.00 (per cent)	68.00 (per cent)
5.	Agriculture university scientists	38.00 (per cent)	40.00 (per cent)	22.00 (per cent)	46.00 (per cent)	18.00 (per cent)	36.00 (per cent)
6.	Allied department scientists	12.00 (per cent)	17.00 (per cent)	71.00 (per cent)	25.00 (per cent)	16.00 (per cent)	59.00 (per cent)
7.	Bank officials	36.00 (per cent)	27.00 (per cent)	37.00 (per cent)	42.00 (per cent)	18.00 (per cent)	40.00 (per cent)
8.	NGO's	32.00 (per cent)	38.00 (per cent)	30.00 (per cent)	18.00 (per cent)	27.00 (per cent)	55.00 (per cent)
9.	Input dealers	75.00 (per cent)	13.00 (per cent)	12.00 (per cent)	66.00 (per cent)	17.00 (per cent)	17.00 (per cent)

In Ponnaniyar basin majority (64.00) of the respondents had agriculture alone as their primary occupation followed by agriculture and agricultural labour (26.00), agriculture and agribusiness (6.00 %) and agriculture and government services (4.00 %). The respondent under agriculture and agricultural labour for their primary occupation was found to be more in Ponnaniyar basin (26.00 %).

Distribution of the respondents according to their farm size

It is generally observed that farm size is another important factor in the acceptance or rejection of improved farm practices, since large size of farm provides a favourable condition for the perception and adaptation of climate change. Also the farm size possessed

by a farmer may reveal the socio-economic conditions of the individual. Kalingarayan basin 51.00 per cent of the respondents belonged to small farmers category followed by marginal farmer's category (49.00 %). Similarly in Ponnaniyar basin majority (68.00 %) of the respondents belonged to small farmers category followed by marginal farmer's category (32.00 %).

Most of respondents were involved in agriculture continuously even though they got income from other subsidiary activities, which may be due to the fact that almost a similar percentage of the farmers were having small and marginal sized holdings.

Distribution of the respondents according to their farming experience

Majority (66.00 %) of the respondents in Kalingarayan basin had a high level farming experience followed by low and medium with 20.00 per cent and 14.00 per cent respectively. Similarly in Ponnaniyar basin 61.00 per cent of the respondents having high level farming experience followed by medium (22.00 %) and low level (17.00 %).

Distribution of the respondents according to their cropping pattern

Cropping pattern may play a key role in identifying the effectiveness of a farmer in practicing agriculture.

Nearly half (49.00 %) of the respondents in Kalingarayan basin practiced mixed cropping pattern followed by double cropping (38.00 %) and mono cropping (13.00%), whereas in Ponnaniyar basin majority (38.00 %) of the respondents had double cropping pattern followed by mixed cropping and mono cropping with 27.00 per cent and 25.00 per cent respectively.

Distribution of the respondents according to their irrigation source

Majority (74.00 %) of the respondents in Kalingarayan basin used canal alone as primary irrigation source followed by bore well (15.00 %). Only meager percentage of farmer (6.00 %) had open + bore well which is followed by open well (5.00 %). Likewise in Ponnaniyaru basin 52.00 per cent of the respondents were under canal irrigation followed by open well (24.00 %), bore well (22.00 %) and open and bore well (2.00 %). Ponnaniyar basin farmers had high percentage of open well (24.00 %) and bore well (22.00 %) than Kalingarayan basin. The reason behind this is that Kalingarayan basin received irrigation water throughout the year ranging from ten to eleven months, whereas the Ponnaniyar basin is dry which receives irrigation water only for 3 months and they depend on open and bore well for irrigation during rest of the period. Farmers' livelihood depends on the availability of water in the canal. Some of the big farmers had well to give supplement irrigation for their crops. Due to economic problem and unavailability of credit linkage farmers could not mobilize sufficient fund to find out alternate source of irrigation.

Distribution of the respondents according to their training undergone

Nearly half (45.00 %) of the respondents participated actively in trainings and 55.00 per cent had not participated in any training programmes. The reason might be due to that most of the respondents were old aged to middle age and they were not interested in attending trainings in Kalingarayan basin. In Ponnaniyar basin 63.00 per cent of the respondents participated in trainings and 37.00 per cent did not participate in any training. This shows that the farmers of Ponnaniyar basin had shown more interest in trainings than Kalingarayan basin farmers.

Distribution of the respondents according to their social participation

The respondents under medium and high level of social participation in Kalingarayan basin were almost equal with 44 per cent and 43.per cent. Similarly in Ponnaniyar basin more than half (52.00 %) of the respondents had medium level of social participation followed by high and low with 34.00 per cent and 14.00 per cent respectively. Compared to Kalingarayan basin Ponnaniyar basin respondents were actively involved in group activities. Majority of the farmers tend to become members in social organizations, such as Co-operative agricultural credit societies, Farmers Discussion Groups, SHGs and NGOs etc., mainly to avail the benefits given by the organization irrespective of their interest in such organizations. This might be the probable reason for the medium level of social participation among majority of the respondents.

Communication behavior of the paddy farmers

Extension agency contact

Extension agency contact refers to the contact of the respondents with extension functionaries. Extension workers help the farmers to become aware of the relevant new technologies and also keep them to gain adequate knowledge about the technologies. Hence, more the contact by the farmers with extension agency the participation in the innovative programmes by the farmers would also be high.

A scan over the table 2 reveals that majority (61.00 %) of the respondents in Kalingarayan basin belonged medium level followed by high (24.00 %) and low (15.00 %). Similarly in Ponnaniyar basin 63.00 per cent of the respondents had medium level extension agency contact followed by high and low with 23.00 per cent and 14.00 per cent respectively. The medium level of extension agency contact might be due to the regular visits made by the officials of development departments and high involvement of progressive farmers. This finding is in line with the findings of Subramaniyan (2000) who reported that 41.33 per cent of the respondents had medium level of extension agency contact.

From the table 3 revealed that majority (66.00 %) of the respondents in Kalingarayan basin and Ponnaniyar basin (55.00 %) regularly visited Assistant agriculture officers for information regarding paddy cultivation and climate change coping mechanism. Majority (60.00 %) of the respondents in Kalingarayan basin comes under regularly meet agriculture officer followed by occasionally (26.00 %). Whereas in Ponnaniyar basin 68.00 per cent of the respondents were under regularly meet agriculture officer followed by occasionally 20.00 per cent. In Kalingarayan basin 36.00 per cent of the respondents were regularly meet horticulture officer. Whereas in Ponnaniyaru basin more than half (58.00 %) of the respondents were regularly meet horticulture officers. Kalingarayan basin 24.00 % of the respondents are comes under regularly meet assistant director of agriculture officer. Whereas in Ponnaniyar basin 20.00 per cent of the respondents were under regularly meet assistant director of agriculture officer. 38.00 % of the respondents in Kalingarayan basin come under regularly visited agriculture university scientists. Whereas in Ponnaniyar basin nearly half (46.00 %) of the respondents were under regularly meet agriculture university scientists. Only 12.00 % of the Kalingarayan basin farmers are regularly visit allied department scientist. Whereas, in Ponnaniyaru basin 25.00 % of the respondents regularly visit allied department scientists. In Kalingarayan basin 36.00 % of the

respondents are regularly visit bank officials. Whereas in Ponnaniyaru basin 42.00 % of the respondents are regularly visits bank officials. In Kalingarayan basin 32.00 per cent of the respondents regularly visit NGOs. Whereas, in Ponnaniyaru basin only 18.00 per cent. Most of the respondents (75.00 %) visit input dealers regularly in Kalingarayan basin. More than half (66.00 %) of the respondents are regularly visit input dealers for their needs and information regarding paddy cultivation in study area.

In conclusion, adverse effects of climate change in study area were made farmers want to leave from farming activities and migrate them to urban areas as daily wage earners. This is a lightning call for policy makers and development departments to implement suitable programmes to reverse the scenario so as to build confidence and to improve status of farmers by making farming as a profitable occupation.

The action needed for farmers to mitigate ill effects of climate change were, early warning has to be given about environmental changes, creating awareness about appropriate adaptation measures against climate change. Departments need to make supporting price, insurance to all crops and subsidies has to be given to paddy farmers in order to sustain their livelihood security under adverse climatic change. These supportive measures taken by the government through respected and line department people will help the farmers to develop and adopt themselves from the climate change impacts.

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