Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 27s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Realization Of Farming Communities on Climate Crisis

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Cite this paper as: Dr N. Sukumaran, (2025) Realization Of Farming Communities on Climate Crisis, *Journal of Neonatal Surgery*, 14 (27s), 686-693

ABSTRACT

Realization of farming communities in the context of the climate crisis involves recognizing the profound challenges these communities face due to climate change and understanding how these impacts affect their livelihoods, food security, and overall resilience. The present research paper is an attempt to disclose the manifestations of the most important bio-spherical problem. Climate change is impact on lives and livelihood and ecological wealth. For this purpose the researcher collected the data from the agricultural communities of climate change, loss and damage on their livelihood and coping strategies for the stability of climate and preserving and conserving balanced ecosystem

Keywords: *Natural Disaster, Livestock, Food shortages, Extreme weather, Eco system.*

1. INTRODUCTION

Farmers are witnessing unpredictable shifts in weather patterns, such as longer dry seasons more intense rainfall, and unpredictable temperature changes. These disruptions affect crop yields, livestock health, and soil fertility, droughts, floods and storms increasingly threaten agricultural productivity, leading to food shortages and income loss. No other crisis in the history of humanity has been as all – encompassing and existentially threatening as the one cause by Climate Change. The real world is replete with discriminations and inequalities which find myriad manifestations in our everyday life. The question of social justice and social equilibrium in the context of climate change become more significant not only because it exacerbates existing inequalities, but it can also give rise to new form of inequalities and injustices.

Global average temperatures reached 1.45^0 C higher than pre-industrial levels, almost touching the 1.5^0 C limit set in the Paris Agreement (D.Raghunandan and Bindhu Bhuma, The Hindu, June 1, 2024). Rising temperatures and natural disasters are manifesting in to major crisis affecting livelihoods and food security, and exacerbating existing socio-economic inequalities. Economically, socially and even geographically the poor people are placed in far more vulnerable position with far greater exposure to the impacts of climate crisis. Climate change will lead to their further impoverishment leading to more social unrest.

Problem Settings: Unless people realize that agriculture in India is not just a food producing machine, but is the backbone of the livelihood of over 60 per cent of India's population, rural deprivation and suffering will not only continue to persist, but will get worse leading to severe social unrest . (M.S. Swaminathan, The Hindu, 2009). For the last two decades agricultural communities are severely experiencing these changes and the increasingly variable climate has been recognized by people as a formidable challenge of their livelihood.

In this context, the present research paper has made an attempt to analyze the loss and damage of climate crisis on lives and livelihood-security system of agricultural communities in the select villages of Cuddalore district. This district is one of the vulnerable districts in Tamilnadu which consecutively experiences the occurrence of flood (or) drought (or) cyclone frequently and exacerbates tensions and triggers conflict among local people.

This study aims at analyzing the extent of crop yield decline and economic loss consequent upon occurrences of drought, occurrence of floods, low rain fall and inadequate irrigation in cuddalore district. An analysis of farm households realization on climate change events, causes of climate variables and its impact on farm households deserve due attention on the part of the present study. This study also aims to focus on the defense mechanisms adopted in agriculture and deployed clean development mechanisms in their homes by farming people to stabilize the climate system and sustain the balanced eco-system. Cuddalore district in Tamilnadu is selected for the purpose of present study. The major reasons for this selection are the social, physical and physiological condition of the district.

In order to understand the farming community, 365 farm households are selected from four villages as sample under stratified random sampling method with a view to give relative importance to the farmers of different types of land holding. In this manner in total 176 small farmers are selected, constituting 48.22 per cent of the universe, 122 medium farmers are selected, constituting 33.42 per cent of the universe and 67 large farmers are selected, constituting 18.35 per cent of the universe. The

respondents are normally the heads of the household and they were adequate experience on agricultural activities. The responses were observed from the respondents by using a structured interview schedule

2. RESULTS AND DISCUSSION

In order to confirm and verify the symbiotic relationship between life supporting system and human livelihood system, the present research paper is an attempt to disclose the manifestations of the most important bio-spherical problem i.e climate change and its impact on lives and livelihood and ecological wealth. For this purpose the researcher collected the data from the agricultural communities of climate change, loss and damage on their livelihood and coping strategies for the stability of climate and preserving and conserving balanced ecosystem.

Socio-economic Status: In this study out of the total 365 respondents 12.60 percent of them are forward communities, 13.15 percent of them belong to Backward Caste formers, 47.12 percent of the rural respondents are Most Backward communities and 27.13 percent of them are Scheduled caste people. The data reveals that 38.36 percent of them belong to the below 30 years old and 30.14 percent of them come under the age group of 31 - 40 years, 16.16 percent of the farmers are come under the age group of 41- 50 years and the rest, 15.34 percent of them belong to the age group of 51and above years. It is observed that 35.89 percent of educated up to primary level education, 14. 25 percent of them have middle school level education, 23. 56%, 13.42% and 12. 88% of them educated up to high school, higher secondary and College level respectively. It could be noted that 48.22% of them are small farmers i.e having below 2.5 acres of land, 33.42% of them are medium farmers (2.6 to 5 acres of land) and 18. 36 % of them are having above 5.1 acres of land i.e large farmers. The investigation could be estimated that 16. 99% of them earn income below Rs 3000, 22.74% of them have a monthly income in the range of Rs 3001 – 4000, and 21.64% of them earn monthly income in the range of Rs 4001 – 5000, 15.34 % of them belong to the monthly income range of Rs. 5001 – 6000, 9.86 % of them belong to the income group of Rs 6001 – 7000 and the rest 13.43% of them earn as monthly income of beyond Rs 7001.

Consciousness on Climate Change:

Climate Change is literally fossil – fueled by human activities, and today it has taken to shape of an impending, collective catastrophe. The findings of respondents' attributed reasons for climate change reveal the following facts. The respondents have high level attributed reasons for climate change in terms of deforestation consequent upon climate change. i.e. unsustainable life style, modernization, over use of chemical fertilizer, intensification of agriculture, farm mechanization impact. The respondents have moderate level attributed reason and changes in the land use pattern the burning of fossil fuels as a primary contributor to the increasing content of CO_2 in the atmosphere,

The farming Community's self knowledge and realization on climate crisis reveal the following facts. The respondents have high level self knowledge and perceptions on climate change with reference to diversion in position of seasonal cycle, deficient rain fall, disruptions in equilibrium of ecosystem , disease outbreaks by insects, increased variability in precipitation, extreme of weather , and increased natural disasters. The respondents have moderate level self knowledge and perceptions on impact of climate change with reference to sea level rise, depleted water table, affected flora and fauna, decreased precipitation, increased risk of floods, and increased droughts. The respondents have low level perceptions on climate change with reference to decreased groundwater recharge, increased variability in runoff, declining groundwater quality, and soil health unreliable rain fall, changes in temperature, and changes in solar radiation.

Table No 1, Farm wise Respondents Perception on Climate Change

Variables	Small	Medium	Large	Mean
Increased Natural Disasters	2.91	2.99	3.84	**3.25**
Decreased precipitation	2.15	3.30	3.80	**3.08**
Increased variability in precipitation	2.68	3.55	3.76	**3.33**
Extreme of the Weather	3.60	2.40	3.86	**3.29**
Increased Drought	2.41	3.01	3.62	**3.01**
Increased variability in run-off	2.59	2.42	3.55	**2.85**
Disruption in equilibrium of Eco-system.	2.38	2.65	3.78	**2.94**

Increased groundwater recharge	2.49	3.87	3.96	**3.44**
Declining groundwater quality and soil health	2.29	2.56	3.49	**2.78**
Diversion in position of seasonal cycle.	2.78	2.52	3.86	**3.05**
Decreased risk of floods	3.79	3.86	3.96	**3.87**
Sea level rise	2.49	3.37	3.76	**3.21**
Affected Flora and Fauna	2.42	3.28	3.66	**3.12**
Disease outbreaks by insects	3.19	3.4	3.58	**3.39**
Depleted water table	2.55	3.44	3.45	**3.15**
Deficient rain fall	3.77	3.79	3.88	**3.81**
Changes solar radiation	2.55	2.62	2.62	**2.60**
Changes in temperature	2.67	2.7	2.59	**2.65**
Unreliable rain fall	2.44	2.23	3.50	**2.72**
Mean	**2.71**	**3.15**	**3.66**	**3.13**

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*F crit*
Rows	6.592484	18	0.366249	2.379131	1.898622
Columns	7.24994	2	3.62497	23.54758	3.259446
Error	5.541926	36	0.153942		
Total	19.38435	56			

The result of farm wise analysis reveals that the large farmers rank the first position in their overall self knowledge and perceptions on climate change, maximum farmers the second, and the small farmers the last. It is indicated that the farmer's level of land size is correlated with their level of knowledge and consciousness on climate crisis.

Extreme Weather and Loss of Crop Yield:

Owing to the abnormalities in heat waves and, drought continues to be a frequent phenomenon over many parts of the country. The frequency of occurrence of drought in these regions has made very heavy loss and damage on crop yield. This division discusses loss and damage of crop yield due to drought in the study area.

Table No 2, Farm wise Respondents' Extent of Crop Yield Loss during the Last Five Years due to Drought

Farm	**Upto 25 percent**	**26-50 percent**	**51-75 percent**	**76-100 percent**	**Total**
Small	57 (32.39)	33 (18.75)	51 (28.98)	35 (19.88)	176 (100)
Medium	12 (9.84)	21 (17.21)	39 (31.97)	50 (40.98)	122 (100)

Large	8 (11.94)	12 (17.91)	25 (37.31)	22 (32.84)	67 (100)
Total	77 (21.10)	66 (18.08)	115 (31.50)	107 (29.32)	365 (100)

Chi-Square Summary Result

Chi-Square Calculated value	Degrees of freedom	Chi-Square table value at 5%
33.09	6	12.6

Data presented in above table indicate the farm size wise respondents' crop yield loss due to the adverse effect of drought condition. It could be noted that more than one fourth of the small farmers (32.39%) state that they have 25 percent crop yield decline consequent upon drought condition. Majority of the medium farmers (40.75%) express that they have 76-100 percent crop yield reduction, owing to drought condition. A considerable number of the large farmers (37.31%) and more than a half of the large farmers report that they have 51-75 percent crop yield decline consequent upon drought condition and desertion in position of seasonal cycle.

The findings of respondents' views on crop yield loss and damages consequent upon extreme weather occurrence reveal the following facts. It could be estimated seen from the result of the study that the crop yield loss of 76-100 per cent occupies the first position, crop yield decline in the range of 51-75 per cent the second, crop yield reduction of up to 25 per cent the third and crop yield decline in the range of 26-50 per cent the last consequent upon drought condition. The respondents of Virupatchi village and Karaikadu village have high level crop yield decline owing to drought condition ,and vagaries of weather.

This bulk of India's population lives in reverie and coastal plains, which are often prone to floods. Flood in these areas affects a large number of people and their livelihood. This division estimates the loss and damage of crop yield due to floods. It could be noted that out of the total 365 respondents, 20.55 percent of the respondents report that they have 25 percent crop yield reduction owing to occurrence of flash flood. In this study, 17.26 percent of the respondents have 26-50 percent crop yield decline, 30.68 percent of the respondents have 51-75 percent crop yield decline and the rest 31.51 percent of the respondents have 76-100 percent crop yield decline owing to occurrence of flash flood.

Table No 3, Farm wise Respondents Extent of Crop Yield Loss during the Last Five Years due to Flood

Farm	Upto 25 percent	26-50 percent	51-75 percent	76-100 percent	Total
Small	53 (30.11)	30 (17.05)	51 (28.98)	42 (23.86)	176 (100)
Medium	13 (10.66)	22 (18.03)	35 (28.69)	52 (42.62)	122 (100)
Large	9 (13.43)	11 (16.42)	26 (38.81)	21 (31.34)	67 (100)
Total	75 (20.55)	63 (17.26)	112 (30.68)	115 (31.51)	365 (100)

Chi-Square Summary Result

Chi-Square Calculated value	Degrees of freedom	Chi-Square table value at 5%
25.19	6	12.6

The crop yield loss and damages in the range of 76-100 per cent occupies the first position, crop yield decline in the range of 51-75 per cent the second, crop yield decline below 25 per cent, the third and crop yield decline below 26-50 per cent the last consequent upon heavy floods during cropping season in the study area.

The result of farm wise analysis reveals that the large farmers and medium farmers occupy the first position with respect to high level crop loss and damages due to flash floods. Majority of the small farmers have below 50 per cent crop yield decline consequent upon flash floods during rainy season.

The pattern of rainfall in different parts of country has direct impact on the production potential of agricultural crops. The farmers consider monsoon rainfall as a critical factor for all the farm activities. This division deals with how inadequate irrigation and deficient rainfall affect the crop yield and become economic hardship to the agricultural community.

The collected data indicate respondents' extent of crop yield decline consequent upon low rainfall and inadequate irrigation. It could be noted that out of the total 365 respondents, 21.10 percent of the respondents report that they have 25 percent crop yield decline consequent upon low rainfall and inadequate irrigation. In this study, 21.01 percent of the respondents have 26-50 percent decline in their crop yield, 28.77 percent of the respondents have 51-75 percent decline in their crop yield and the rest 27.12 percent of the respondents incur 76-100 percent decline in their crop yield consequent upon low rainfall and inadequate irrigation.

Table No 4, Farm wise Respondents' Extent of Crop Yield Loss During the Last Five Years due to Inadequate Irrigation and Low Rainfall

Farm	Upto 25 percent	26-50 percent	51-75 percent	76-100 percent	Total
Small	51 (28.98)	47 (26.70)	50 (28.41)	28 (15.91)	176 (100)
Medium	15 (12.30)	24 (19.67)	31 (25.41)	52 (42.62)	122 (100)
Large	11 (16.42)	13 (19.40)	24 (35.82)	19 (28.36)	67 (100)
Total	77 (21.10)	84 (23.01)	105 (28.77)	99 (27.12)	365 (100)

Chi-Square Summary Result

Chi-Square Calculated value	Degrees of freedom	Chi-Square table value at 5%
33.02	6	12.6

It could be noted that majority of the medium farmers (42.62%) determine that they have 76-100 percent crop yield decline consequent upon low rainfall and inadequate irrigation. Majority of the large farmers (35.82%) estimate that they have 51-75 percent crop yield decline consequent upon low rainfall and inadequate irrigation. A considerable number of small farmers (28.98%) have below 25 percent crop yield decline consequent upon low rainfall and inadequate irrigation.

This division estimates the vicious cycle of crop yield decline with economic loss and damage of farming community's progress. The collected information estimate the village wise respondents' economic loss consequent upon low crop yield

due to climate change. It could be noted that out of the total 365 respondents, 27.40 percent of the respondents have lost Rs.10,000 income per hectare consequent upon climate change induced low yield of crops. In this investigation, 19.45 percent of the respondents have lost Rs.10,001-20,000 income per hectare, 23.56 percent of the respondents have lost Rs.20,001-30,000 income per hectare consequent upon climate change induced low yield of crops and the rest 29.59 percent of the respondents have lost above Rs.30,001 income per hectare consequent upon climate change induced low yield of crops.

Table No 5, Farm wise Respondents' Extent of Economic Loss Consequent upon Decline in Crop Yield in the Context of Climate Crisis.

Farm size	Economic loss (in Rs.)				
	Upto 10000	10001-20000	20001-30000	Above 30001	Total
Small	73 (41.47)	46 (26.14)	46 (26.14)	11 (6.25)	176 (100)
Medium	21 (17.22)	18 (14.75)	32 (26.23)	51 (41.80)	122 (100)
Large	6 (8.95)	7 (10.45)	8 (11.94)	46 (68.66)	67 (100)
Total	100 (27.40)	71 (19.45)	86 (23.56)	108b(29.59)	365 (100)

Chi-Square Summary Result

Chi-Square Calculated value	Degrees of freedom	Chi-Square table value at 5%
111.7	6	12.6

Data presented in the above table indicate farm size wise respondents' economic loss due to low yield of crops in the context of climate crisis. It could be assessed that majority of the small farmers (41.47%) have lost Rs.10,000 income per hectare consequent upon climate change induced low yield of crops. A more than half of the large farmers (68.46%) and majority of the medium farmers (41.80%) have lost above Rs.30,001 income per hectare consequent upon climate change induced low yield of crops.

Agriculture is a timely operation, ploughing and transplanting of crops require certain amount of minimum rain at particular time. Total rainfall is a misleading indicator. This season cycle of rainfall periodicity and intensity during the monsoon determine the fate of millions of farmers. This cycle is changing due to climate change and it leads to affect irrigation and water management. This section deals with loss and damage of monsoon failure and compulsion of supplementary irrigation facilities to the farmers.

Table No 6, Farm wise Respondents' Extent of Supplementary Irrigation Consequent upon Monsoon Failure

Farm	20 percent	21-30 percent	31-40 percent	41-50 percent	Total
Small	42 (23.86)	32 (18.18)	63 (35.80)	39 (22.16)	176 (100)
Medium	22 (18.03)	41 (33.61)	37 (30.33)	22 (18.03)	122 (100)

Large	12 (17.91)	10 (14.93)	9 (13.43)	36 (53.73)	67 (100)
Total	76 (20.82)	83 (22.74)	109 (29.86)	97 (26.58)	365 (100)

Chi-Square Summary Result

Chi-Square Calculated value	Degrees of freedom	Chi-Square table value at 5%
42.63	6	12.6

Above table presents data on the farm size wise respondents' supplementary irrigation due to monsoon failure. It could be noted that a more than half of the large farmers (53.73%) have 41-50 percent of their total land area under supplementary irrigation consequent upon monsoon failure. A considerable number of the small farmers (35.80%) have 31-40 percent of their total land area under supplementary irrigation consequent upon monsoon failure. A one third of the medium farmers (33.61%) have 21-30 percent of their total land area under supplementary irrigation consequent upon monsoon failure.

Loss and damage of social well-being

The scope of loss and damage of climate change defines the nature and level of social hazards/ social distress and they dislodge their social equilibrium and social structures towards stress and strain of mind, body social equality and culture. This section deals with the loss and damage of social well being and social equality of agricultural community due to climate change.

The investigation could be found that out of the total 365 respondents, 9.32 percent of them realize the social hazards of climate crisis in terms of dislocation of home life, 8.77 percent of them observe the social hazards and social equilibrium of climate change through migration and change of life style, and 34.79 percent of them visualize the acute economic stress as their social hazards of climate change. In this study out of the total 365 respondents, 7.40 percent of them observe the change of social customs as their social hazards of climate change, 11.78 percent of them see it as change of food habits and the rest 27.94 percent of them visualize health deterioration as their social hazards of climate crisis.

Table No 7, Farm wise Respondents' and Loss and Damage of Social Well Being due to Climate Crisis.

Farm size	Dislocation of home life	Migration and change of life style	Acute economic stress	Change of social customs	Change of food habits	Health deterioration	Total
Small	18 (10.23)	21 (11.93)	80 (45.45)	8 (4.55)	18 (10.23)	31 (17.61)	176 (100)
Medium	9 (7.38)	6 (4.92)	36 (29.50)	9 (7.38)	15 (12.30)	47 (38.52)	122 (100)
Large	7 (10.44)	5 (7.46)	11 (16.42)	10 (14.93)	10 (14.93)	24 (35.82)	67 (100)
Total	34 (9.32)	32 (8.76)	127 (34.79)	27 (7.40)	43 (11.78)	102 (27.95)	365 (100)

Chi-Square Summary Result

Chi-Square Calculated value	Degrees of freedom	Chi-Square table value at 5%
39.29	10	18.3

The investigation could be noted that majority of the small farmers respondents visualize the health deterioration (45.45%) and acute economic stress (17.61%) as their social distress of climate change. Majority of the medium farmers (38.52%) visualize the health deterioration as their social hazards of climate change. A considerable number of the large farmers (35.82%) realize the health deterioration as their social hazards of climate change.

Adoption of Defense Mechanisms: Farming communities have always been coping to challenges through their own defense mechanisms. The data on coping and adaptation practices to overcome and relief from the adverse effect of climate crisis are presented as follows. It could be various defense mechanisms and mitigation practices in their lives and livelihood activities such as increased water as a efficiency judicious use of chemicals and efficient soil management to restore the soil equality. Out of the total 365 respondents about 65 percent of the respondents are cultivated the new drought tolerant and climate conduced crop varieties to deal the climatic crisis. It is informed that about 50 percent of the respondents are adopted organic farming, efficient irrigation system, crop rotation and plantation method. The other coping strategies adapted by the respondents are livelihood diversification, crop diversification and traditional indigenous mixed cropping pattern. It is significant to note that the respondents have high level coping strategies adopt against the impact of climate change in their home with reference to stocking fodder during good cropping season, crop insurance, eco friendly activities in terms of using CFL and LED-bulbs, bio-gas, saving electricity, avoid plastic materials and deployed rain water harvesting structure.

3. CONCLUSION

It is concluded from the study that despite the vulnerabilities and catastrophe of climate risks posed to people and their livelihoods especially that of agricultural community towards social distress, economic loss and damages of natural capital and ecological wealth, they adapt certain coping mechanisms in ameliorating and stabilizing the climate variability. The farmers have agreed that the risk of climate crisis are high and warrants action. They also convinced about the coping strategies needed to reduce these risks which are socially sustainable, politically feasible and economically affordable. It is observed that democratic and integrated approaches to climate risk reduction would be not only product but also profitable for agriculture community. Such approaches with for right towards bio remedial methods and clean development mechanisms ensure sustainable environment with smart climate.

The difference in experiences of climate crisis, however, is not limited to the division between rich and poor. gender, race, tribe, community, culture – all these factors demand a more nounced and inclusive approach towards climate action. The crisis brought about by a uniform yet uneven vision of human progress cannot be cured by the same kind of uniform response. It is important that the agricultural community realize that the consequences of climate crisis will not hit them all in the same way

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