Ann. For. Res. 66(1): 4803-4810, 2023
ISSN: 18448135, 20652445

ANNALS OF FOREST RESEARCH
www.e-afr.org

MITIGATING ROLE OF EXTENSION AGENCIES IN THE CONTEXT OF CLIMATE CHANGE IMPACT

Sangeetha S[1], Yamunarani, K[1*], Malini, N[1], Dhanushkodi,V[2] , K.Chitra[3] and K.Dhanalakshmi[1]

[1]Horticultural College and Research Institute for Women, Tamil Nadu Agricultural University, Tiruchirappalli 620 027, Tamil Nadu, India

2 ICAR – Krishi Vigyan Kendra, Tamil Nadu Agricultural University, Thiruvarur - 614404 Tamil Nadu, India

3 ICAR-Krishi Vigyan Kendra, Virunchipuram, Vellore,Tamil Nadu, India

*Corresponding author

ABSTRACT

Agriculture is one of the sectors that directly depends on climate conditions like rainfall and temperature, and thus adversely affected by climate change. The impacts of climate change are global, but countries like India are more vulnerable due to high population depending on agriculture. The role of extension agencies in mitigating the impact of climate change is significant. This study focused on the prevention activities, preparedness activities, response activities and recovery activities taken by the various extension agencies in mitigating the impact of the climate change. The data were collected from the farmers and the extension agencies. The result of the study revealed that the extension agencies involved in creating awareness on plant pests and diseases (1.600) followed by crop insurance (1.533) as prevention activities of climate change. Under preparedness activity, the extension agencies involved review and update of precautionary measures (1.733) and especially ascertain that adequate stock of seeds and other agro inputs are available in areas prone to natural calamities. During the disaster time the extension agencies actively involved in rapid assessment of the extent of damage (1.900) and report the assessment results for ensuring early supply of seeds and other agro inputs (1.900). Supply of agro inputs (2.000) to the affected area was the foremost activity taken by extension functionaries at the time of recovery phase.

Keywords: Climate Change, Mitigation, Extension Agency, Nagapattinam

INTRODUCTION

Climate is defined as the long-term pattern of weather in a particular area. Any change in the climate system leads to a great change in climate. There are many factors which cause changes in climate. Climate change is a major threat to agriculture as agricultural production activities are more vulnerable to climate change (Safdar, 2012) and the farmers are the most vulnerable group who are affected most by climate change. The impacts of climate change are global, but countries like India are more vulnerable due to high population depending on agriculture. Adaptation is the way to deal with the impact of climate change; that means anticipating the adverse effects of climate change, and taking appropriate action required to minimize the damage that can cause, or take advantages of opportunities that may arise (Sahu and Mishra, 2013). Many plants can

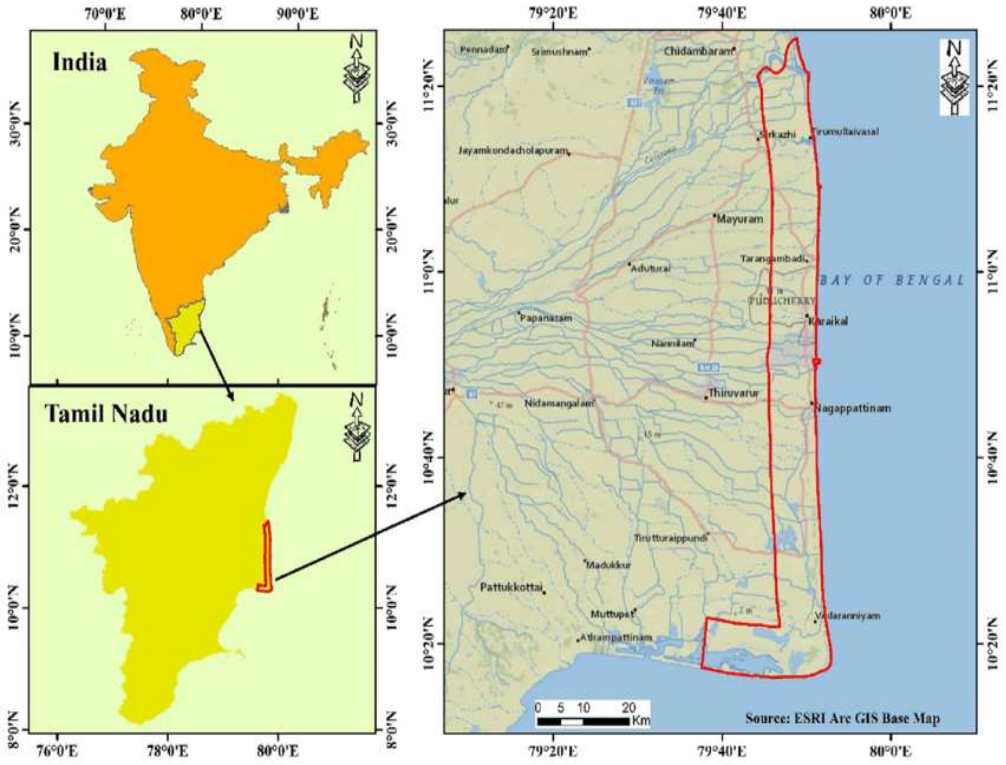
propagate and reproduce within explicit range of rainfall and specific temperature. The climate change can affect the ecosystems and the biodiversity in numerous ways (Qureshi and Ali, 2011). It also have significant effect on the livelihood of the people as it is difficult for the people especially farmers to adopt the practices according to climate change (IFPRI, 2011).

Agricultural extension has a critical role to play in helping farmers in adapting to climate change. At present, extension services are being provided mainly by the public sector through a two-tier system. Besides the existing public extension service system, there are several private players, civil-society organizations including farmer-based organizations and NGOs that play a major role in financing and providing extension services (Birner, 2006). Enhancing agricultural innovation is considered a key process for adapting the agricultural sector to climate change (FAO, 2018; Leeuwis C et al., 2013). This process involves an interactive, dynamic, collaborative, and flexible way of dealing with the complex nature of agriculture under the continual effects of climate change (World Bank, 2012). Keeping this wider perspective in mind, the investigation entitled "Mitigating role of extension agencies in the context of climate change impact"

RESEARCH METHODOLOGY

The choice for selection of the district had fallen on coastal ecosystems of Tamil Nadu state for the conduct of the present study (Fig. 1). Coastal belts are more prone to devastating impact of climate change. The geographical setting of Tamil Nadu makes the state vulnerable to natural disasters such as cyclones (Mascarenhas & Jayakumar, 2007) floods and earthquake-induced tsunami. Among the 29 districts of Tamil Nadu, Nagapattinam district is very often subjected to natural calamities which were mainly reflected on the paddy cultivation to the worst status. Since 10 years, the district has high range of variability in rainfall and temperature .The district is one among those districts having more area under paddy cultivation. The district has eleven blocks, of which five blocks viz, Thalainayar, Kuttalam, Mayiladuthurai, Kilvelur and Sembanar Koil were selected based on the maximum area covered under paddy cultivation and high range of variability in rainfall and temperature. In order to select the villages for the study, the list of revenue villages in each of the five selected blocks was collected. Five villages from each of the selected blocks were identified purposively based on the maximum area under paddy cultivation. The respondents for the present study were paddy farmers from the selected villages. A sample size of 200 was fixed for the study. Sample of 40 paddy farmers were selected from each of the 5 blocks by adopting simple random sampling method. As the study focused to elicit responses from extension personnel, 30 extension functionaries were selected from Government and Non government organizations, who had fallen in the cadre of Agricultural Officer, Agricultural Development Officer, Assistant Director of Agriculture and Project co-ordinator.

Fig.1. Location map of the research area



Mitigation role in the study was operationalized as the interventions made by extension agencies to eliminate or to reduce the impact of climate change among paddy farmers. Mitigation role of extension agencies was collected under four headings such as prevention activities, preparedness activities, response activities and recovery activities. There were two response categories as 'Yes' and 'No' with a score of 1 and 0 respectively. The scoring procedure developed for the study.

FINDINGS AND DISCUSSION

Consequences of climate change increase the severity, intensity and unpredictability of weather-related disasters. Climate change impact has been very negative for the whole humanity and emerged as one of the most important global challenges. Extension agency plays a vital role in the rescue and recovery operations during the time of disaster. In this section, the details of mitigating role of extension agencies were collected from extension officials under four headings such as prevention, preparedness, response and recovery activities and the result has been presented in the following tables.

Prevention activities

The first important step towards reducing disaster impact is to correctly analyse the potential risk and identify measures that can prevent, mitigate or prepare for emergencies. The phase of prevention involves early warning of impending disasters and their effective dissemination by using various alternative communications. The details of prevention activities taken by extension agencies were collected and presented in Table 1.

Table 1. Prevention activities taken by extension agencies

(n = 30)

S.No.	Activities	Mean score
1.	Awareness creation regarding	
	a) Various plant pests & diseases	1.600
	b) Alternate cropping practices	1.500
	c) Crop insurance	1.533
	d) Provision of credit facilities	1.433
	e) Proper storage of seeds	1.400
2.	Hazard area mapping	
	a) Identification of areas endemic to disease & pest infections	1.533
	b) Drought	1.667
	c) Flood	1.733
3.	Database development	
	a) Village -wise general information	2.000
	b) Crop wise details	2.000
	c) Irrigation source details	2.000
	d) Insurance details	1.667
	e) Details of credit facilities	1.733
4.	Regular monitoring of distribution & rainfall variation.	1.567
5.	Prepare the farmers and department officers to adopt contingency measures	1.800
6.	Advise the farmers on cropping practices and precautionary measures to be undertaken during various disasters.	1.867

7.	Improving soil and water conservation measures	1.933
8.	Promotion of alternative crop species and cropping patterns	1.500
9.	Encourage the farmers on early reporting of surveillance for pests and crop diseases	1.567

It could be observed from Table 1 that most of the respondents opinioned that extension agencies involved in creating awareness on plant pests and diseases (1.600) followed by crop insurance (1.533). Under the hazard area mapping, drought (1.667) and flood (1.733) prone area has been identified by all kind of extension agencies. Cent per cent of the respondents expressed that data base regarding village -wise general information (2.000), crop wise details (2.000) and irrigation source (2.000) details were developed. Other than this, most of the extension agencies involved in improving soil and water conservation measures (1.933), advise the farmers on cropping practices and precautionary measures (1.867) to be undertaken during various disasters.

Preparedness activities

In the preparedness phase, plans of action are developed when the disaster strikes. Common preparedness measures include communication plans, maintenance and training on emergency services, warning methods etc. The details of preparedness activities taken by extension agencies were collected and presented in Table 2.

Table 2. Preparedness activities taken by extension agencies

(n = 30)

S.No.	Activities	Mean score
1.	Review and update precautionary measures	1.733
2.	Conducting exercises to test and implement emergency measure plans	1.400
3.	Review proper functioning of rain gauge stations	1.400
4.	Implementation of an emergency communication system	1.500
5.	Installation of warning devices	1.433
6.	Creation of back-up life-line services (e.g., power, water, sewage)	1.500

Table 2 infers that, review and update of precautionary measures (1.733) and especially ascertain that adequate stock of seeds and other agro inputs are available in areas prone to natural calamities, Implementation of an emergency communication system, Creation of back-up life-line services (1.500) were also taken by the majority of the extension agencies.

Response activities

The response phase includes the mobilization of the necessary emergency services to the disaster area. Pre disaster response plan intended to reduce the impact of disaster on the life and property of the society by setting up control room, evacuation of people etc. Response phase during disaster is to ensure that steps are being taken to alleviate and minimize the loss of life and property while post response phase is to achieve rapid, enduring and sustainable recovery.

Table 3. Response activities taken by extension agencies

(n = 30)

S.No.	Activities	Mean score
1.	Following control activities crop damage, disease and pest infestation to minimise losses	1.833
2.	Collection of infected plant samples for laboratory testing to ensure their control	1.600
3.	Pre-positioning of seeds and other agro inputs in strategic points	1.833
4.	Rapid assessment of the extent of damage	1.900
5.	Report the assessment results for ensuring early supply of seeds and other agro inputs	1.900
6.	Establishment of public information centres	1.567

It could be seen from Table 3 that during the disaster time the extension agencies actively involved in rapid assessment of the extent of damage (1.900) and report the assessment results for ensuring early supply of seeds and other agro inputs (1.900). Other than this all kind of extension agencies involved in the control activities crop damage, disease and pest infestation to minimise losses (1.833) and pre-positioning of seeds and other agro inputs in strategic points (1.833).

Recovery activities

The aim of the recovery phase is to restore the affected area to its previous state. It differs from the response phase in its focus; recovery efforts are concerned with issues and decisions that must be made after immediate needs are addressed. Recovery efforts are primarily concerned with actions that involve damage clearance, immediate rehabilitation, reconstruction planning and implementation.

Table 4. Recovery activities taken by extension agencies

(n = 30)

S.No.	Activities	Mean score
1.	Arrange for early payment of compensation and crop insurance dues	1.400
2.	Facilitate provision of seeds and other agro inputs	2.000
3.	Promotion of drought and flood tolerant seed varieties	1.933
4.	Review with the affected people to identify risks for crops, specific species, areas which are vulnerable to natural hazards	1.933
5.	Facilitate sanctioning of soft loans for crop cultivation and farm implements	1.367
6.	Establishment of a larger network of soil and water testing laboratories	1.500
7.	Establishment of pests and disease monitoring system	1.733
8.	Training in agricultural practices which will minimise crop losses during future disasters	1.767

From the Table 4, it is clear that facilitate provision of seeds and other agro inputs (2.000) scores highest mean value, it indicates that supply of agro inputs to the affected area was the foremost activity taken by extension functionaries at the time of recovery phase. Promotion of drought and flood tolerant seed varieties (1.933) and review with the affected people (1.933) to identify risks for crops, specific species, areas which are vulnerable to natural hazards were also the major activities taken by extension agencies.

CONCLUSION

The result of the study revealed that the extension agencies involved in creating awareness on plant pests and diseases (1.600) followed by crop insurance (1.533) as prevention activities of climate change. Under preparedness activity, the extension agencies involved review and update of precautionary measures (1.733) and especially ascertain that adequate stock of seeds and other agro inputs are available in areas prone to natural calamities. During the disaster time the extension agencies actively involved in rapid assessment of the extent of damage (1.900) and report the assessment results for ensuring early supply of seeds and other agro inputs (1.900). Supply of agro inputs (2.000) to the affected area was the foremost activity taken by extension functionaries at the

time of recovery phase. Early warning system may be strengthen environmental changes would help the farmers in the better understanding with adapting to climate change.

REFERENCES

1. Food and Agriculture Organization (FAO). FAO0 s Work on Agricultural Innovation: Sowing the Seeds of Transformation to Achieve the SDGs; Food and Agriculture Organization: Rome, Italy, 2018.
2. Leeuwis, C.; Hall, A.; van Weperen, W.; Preissing, J. Facing the Challenges of Climate Change and Food Security: The Role of Research, Extension and Communication for Development; Food and Agriculture Organization: Rome, Italy, 2013.
3. World Bank (WB). Agricultural Innovation Systems: An investment Sourcebook; World Bank: Washington, DC, USA, 2012
4. Sahu, N. C. and Mishra, D. (2013). Analysis of perception and adaptability strategies of the farmers to climate change in Odisha, India. APCBEE Procedia, 5, 123-127
5. Birner, R., Davis, K., Pender, J., Nkonya, E., Anandajayasekeram, P., Ekboir, J. and Benin, S. (2006). From best practice to best fit: A framework for designing and analyzing pluralistic agricultural advisory services worldwide. DSGD discussion paper 37, IFPRI Research Paper
6. Safdar, U. 2012. Securing livelihoods in the realm of climate change and food insecurity: A case study of Kaghan valley. M.Sc. (Hons.) Thesis, Institute of Agri. Extension and Rural Development, University of Agriculture, Faisalabad, Pakistan
7. Qureshi, N.A. and Z. Ali. 2011. Climate change, biodiversity Pakistan scenario. J. Anim. Plant Sci. 21: 358-363.
8. IFPRI. 2011. International Food Policy Research Institute (IFPRI) Annual Report 2010. Washington DC, US.