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A STUDY ON ROLE OF EXTENSION AGENTS IN MITIGATING CLIMATE CHANGE

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ABSTRACT

The study investigated the categories considered and the constraints perceived by agricultural extension agents in Andhra Pradesh with regards to the role of extension agents in mitigating climate change for the improvement of farmers. A sample of one hundred and twenty (120) respondents randomly selected was used for the study. Data were collected using structured questionnaire and analyzed with percentage analysis. Statistical analysis of the data shows that eleven categories are essentially considered by the respondents. The respondents perceived nine important constraints during an extension activity in the framework of mitigating climate change. The work will paves researchers and policy makers in shifting both conventional agriculture and extension to climate resilient.

KEYWORDS: Mitigation, Constraints, Agricultural Extension Agents, Climate Change

INTRODUCTION

Agriculture in India is being considered as gambling to farming community where the key stacker will be the climate. The whole climate of the world and India is changing regularly because of the increasing global warming by the natural means and anthropogenic activities. All the changes have an enormous impact on the people's lives and ecosystems.

Climate change refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer, whether due to natural variability or as a result of human activity. - IPCC

The average global temperature has been raised by 1 degree in the last 30 years. Some predict positive impacts on agriculture from climate change like increased temperatures and higher carbon dioxide levels. It has been reported by the Intergovernmental Panel on Climate Change (IPCC) that average global temperature can be raised by 2 to 8.6 degrees F by 2100. The rate in increasing global temperature is because of the increasing emissions of heat-trapping gases called green house gases in the atmosphere. Increased concentrations of CO2 may boost crop productivity, only where moisture is not a constraint. Higher levels of CO2 can stimulate photosynthesis in certain plants (30-100 per cent). Increased CO2 tends to suppress photo-respiration in certain plants, making them more water-efficient.

A 10-15% increase in monsoon precipitation in many regions, a simultaneous precipitation decline of 5-25% in drought-prone central India and a sharp decline in winter rainfall in northern India are also projected. A decrease in number of rainy days (5-15 days on an average) is expected over much of India, along with an increase in heavy rainfall days in the

monsoon season (Indian Institute of Tropical Meteorology, Ministry of Earth Sciences, Government of India). These changes are expected to increase the vulnerability of Indian agriculture. This is particularly important in India, where agriculture is highly sensitive to monsoon variability as 65% of the cropped area is rain-fed. Changes in temperature and precipitation could have a significant impact on more than 350 million people who are dependent on rain-fed agriculture.

The agricultural sector is a driving force in the GHG emissions and land use effects. The three major causes of the increase in GHGs observed over the past 250 years have been fossil fuels, land use and agriculture. The agricultural processes (rice cultivation, enteric fermentation in cattle) comprise 54% of methane emissions, 80% of nitrous oxide emissions and major percentage of carbon dioxide.

Climate change will certainly affect agriculture but agriculture can also be harnessed to mitigate greenhouse gas (GHG) emissions. A key element in supporting agriculture's role is information. The costs of adapting agriculture to climate change can be large and the methods not always well known. Mitigation efforts will require information, education and technology transfer. Agricultural extension and advisory services both public and private thus have a major role to play in providing farmers with information, technologies and education on how to cope with climate change and ways to contribute to GHG mitigation. This support is especially important for resource-scarce smallholders who contribute little to climate change and yet will be among the most affected. Support from extension for farmers in dealing with climate change should focus on two areas: adaptation and mitigation.

RESEARCH METHODOLOGY

The present study was conducted in Andhra Pradesh through online mode. Extension agents working in State Agricultural department in different cadres were selected purposively as sample of respondents. A sample size of 120 respondents was randomly selected. A questionnaire was developed and administered for collecting responses from the respondents. A Simple percentage analysis was carried out to infer the data.

Table 1: Categories Considered by Extension Agents Regarding Mitigation of Climate Change. n = 120

Sl. No.	Categories	Frequency (Percentage)		
		Most Important	Important	Less Important
1.	Technologies and management information regarding : i. Climatic information ii. Forecasts iii. Adaptive technology innovations iv. Carbon markets	 120(100) 120(100) 120(100) 30(25.00)	 - - - 70(58.33)	 - - - 20(16.67)
2.	Capacity development to enhance farmers' abilities and finally making them proactive.	120(100)	-	-
3.	Facilitating, brokering and implementing policies and programmes in an effective manner for the benefit of farming community.	40(33.33)	60(50.00)	20(16.67)
4.	Coordination is required within the disciplines/specializations, between institutions and departments and in functional areas like research, extension and training.	120(100)	-	-

Table 1: Condt				
5.	Infrastructures/institutions development for mitigation of climate change.	90(75.00)	30(25.00)	-
6.	Materials i. Village library ii. Mobile demonstrations units iii. Testing kits	 100(83.33) 110(91.67) 80(66.67)	 20(16.67) 10(8.33) 30(25.00)	 - - 10(8.33)
7.	Use of technology demonstrations in disseminating the coping and adaptive measures that could reduce climate change risks among vulnerable communities.	120(100)	-	-
8.	Resilient Agriculture and Conservation Agriculture Practices (CAP).	100(83.33)	20(16.67)	-
9.	Information and communication technology (ICT) tools and initiatives.	120(100)	-	-
10.	Development of modules for Crop yield forecasting (i.e., DSSAT, GCM etc.).	80(66.67)	30(25.00)	10(8.33)
11.	Feed back to government and other interest groups.	120(100)	-	-

Table 1 depicts that, the categories to be considered by the extension agents regarding mitigation of climate change. Cent per cent of respondents considered that climatic information over the period, forecast of the weather and climatic data and adaptive technology innovations developed by agricultural department are most important in effective management and about 58.33 per cent of respondents considered that providing information and creating awareness about carbon markets will substantiate the present and future agriculture developments. Capacity development of farmers in order to make them proactive and enhance their abilities in mitigation of climate change for productive agriculture was considered by cent per cent of respondents. For the benefit of the farming community the extension agents of the state agricultural department should act as better facilitating agents rather than money making brokers while implementing programmes and policies developed by the government was considered as important by half of the respondents (50 percentage). Hundred per cent of respondents considered that coordination and synergy should exist between line departments in functional areas like research, extension and training in the context of climate change and its mitigation. Majority of the respondents (75 percentages) deliberated that development of infrastructure and institutions for mitigating climate change are indispensable.

The requirement for the extension work in different areas was low cost indigenous audio-visual aids may be preferred over expensive communication gadgets. A village library may be promoted where extension publications in local language could be available for atleast those who can read and write; the latter can function as extension agents for others was considered by 83.33 percentage of respondents. The concept of mini-farmers fair in villages can be promoted. Mobile exhibition van and soil testing kits can prove useful and effective for promoting different agriculture systems approach was reproduced by 91.67 and 66.67 percentages of respondents respectively. ICT and its application is the promising approach

for the present extension system. About cent per cent of respondents revealed that by adopting new demonstration methods and dissemination technologies there will be immediate action in adapting and mitigating climate change by the vulnerable groups. About 83.33 percentages of respondents contemplated that due to dynamic changes in climate there was a shift from conventional agriculture to resilient and conservative agriculture for the advantage of farmers. ICT tools and initiatives should be developed by focusing on the efficient measure to adapt and mitigate the climate change as cogitated by 100.00 per cent of respondents. Yield forecasting in real crop situation is not appreciable. In order to cope up this, virtual real-time decision supportive crop yield forecasting modules like DSSAT, GCM etc. should be developed as given by 66.67 per cent of respondents. When a programme /activity carried out, the main step for reconsideration is the feedback. Feedback to government and other interest groups is mandatory in a state of climate change and its mitigation was another important category considered by cent per cent of respondents.

Table 2: Constraints Perceived By Extension Agents Regarding Mitigation of Climate Change. n = 120

Sl. No.	Constraints perceived by Extension Agents	Frequency (Percentage)	Rank
1.	Poor Extension to Farmer ratio	120 (100.00)	I
2.	Early warnings from concerned department	110 (91.67)	II
3.	Co-ordination between Inter-departments/ Institutions/ Organizations	110 (91.67)	II
4.	Inadequate ICT facilities	107 (89.17)	III
5.	Inadequate Capacity building in the area of climate change	98 (81.67)	IV
6.	Poor training in the area of climate change	90 (75.00)	V
7.	Fund allocation for mitigation measures	85 (70.83)	VI
8.	Disasters surpasses the new innovation/technology	70 (58.33)	VII
9.	Establishment of Emergency units during adversity	65 (54.17)	VIII

Table 2 shows that the constraints perceived by the extension agents regarding climate change mitigation should considered to utmost. About cent per cent of extension agents perceived that, population was growing more in India therefore less number of extension workers are there to satisfy farmers in meeting their needs. Near about 91.67 percentage respondents said that there was lag in early warnings from the meteorological department. Majority of the respondents (91.67 %) noticed that there is dearth in coordination between inters linking departments /Institutions /Organizations in the obligation of mitigating climate change. Around 89.17 per cent of respondents perceived that ICT facilities were lacking in delivering mitigation measure in time. 81.67 percentages of respondents distinguished about inadequate capacity building in the area of climate change and its mitigation. About 75.00 percentage of respondents remarked that there was poor training for extension agents in the pertained field of climate change. Funds are needed for establishing, developing and accomplishing mitigation measures. More than half i.e., 70.83 per cent of respondents professed that funds are not allotted copiously in the perspective of mitigating climate change. As a mitigation measure a new technology/innovation was developed and diffused for the benefit of farmers. But climate change creates snags in diffusion of the appropriate technology and challenges the agricultural department and extension agents. This was perceived as a constraint by 58.33 per cent of respondents. About 54.17 per cent of respondents witnessed that establishing emergency units during adversity is not materialized because of insufficient funds and infrastructure.

CONCLUSIONS

Indian Agriculture always depends on climate and its factors. A sudden change in the climate will bets the agriculture and its production. Carrying out extension activities without the knowledge on climate and its effects will always leads to develop ineffective strategies in mitigating climate change. The study explored different categories as considered by extension agents in the perspective of climate change and its mitigation strategies. In developing and implementing the mitigation strategies there are subsequent constraints as perceived by the extension agents. The analysis of the study will help the researchers and policy makers to identify and understand the concept of climate change and its mitigation. Laterally extension system can be reformed, reshaped and restructured for mitigating climate change and its consequences for making conventional agriculture into climate resilient and conservative agriculture.

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