

Climate Smart Agriculture and Advisory Services: Approaches and Implications for Future

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Introduction: Climate change is emerging as a prominent issue in the world in current times. Changing climatic conditions are most severely affecting agriculture as it depends on local weather parameters like temperature, rainfall, humidity, etc. in long term. Climatic change could affect agriculture in several ways: productivity, in terms of quantity and quality of crops; agricultural practices, through changes in irrigation and agricultural inputs such as herbicides, insecticides and fertilizers; environmental effects, in particular in relation to frequency and intensity of water drainage, soil erosion, reduction of crop diversity; rural space, through loss and gain of cultivated lands, land speculation, land renunciation and hydraulic amenities; adaptation, as plants may become more or less competitive, such as flood resistant or salt resistant varieties of rice. World agriculture faces a serious decline within this century due to global warming. Since agriculture makes up roughly 16 per cent of India's GDP, a 4.5 to 9 per cent negative impact on production implies a cost of climate change to be roughly up to 1.5 per cent of GDP per year. To alleviate some of the complex challenges posed by climate change, agriculture has to become "climate smart", that is, sustainably increase agricultural productivity and incomes, adapt and build resilience to climate change, and reduce and/or remove greenhouse gas emissions, where possible. Climate-Smart Agriculture (CSA) contributes to the achievement of sustainable development goals. It integrates the three dimensions of sustainable development (economic, social and environmental) by jointly addressing food security and climate challenges. Extension providers can play a major role in supporting CSA through the following: technology development and information dissemination, strengthening farmers' capacity, facilitation and brokering, and advocacy and policy support. It contributes to achieving CSA by disseminating climate

information and technologies on production practices for climate change adaption through innovative approaches, such as plant clinics and participatory video (Digital Green, case from India), climate smart villages, climate trainings or workshops, etc. So it is necessary to know the role of extension in CSA and what are the different extension methods used in CSA to help the farmers.



Fig. 1: Researcher exploring the drought area in Baramati

Methodology: Study was conducted in Ahmednagar and Pune districts of Maharashtra state of India because from pre-existing literature it was found that the state is one of the most vulnerable in the country. Two districts Pune and Ahmednagar were selected because three projects, National Innovations on Climate Resilient Agriculture (NICRA) by Indian Council of Agriculture Research (ICAR), Climate Change Knowledge Network in India (CCKN IA) by GIZ (technical cooperation with German development cooperation), GOI (Government of India, Ministry of Agriculture and Farmers Welfare), and Climate Change Adaptation (CCA) by Watershed Organisation Trust (WOTR) were working there. These three projects were selected to study the different extension approaches used by them to cope up with changing climatic conditions. KVK

Narayangaun, KVK Baramati, KVK Babhaleshwar, WOTR head office Pune and Ahmednagar were visited for data collection.

Data Collection: Data was collected in three phases-

First phase- Data or information on the different agricultural extension methods or approaches used in CSA for farmers was collected after reviewing the annual reports, research papers and online published reports, books, magazines, etc.

Second phase- Field extension agents were interviewed in groups or/and individually in the selected study areas with the help of semi-structured interview guide. For CCA project, deputy director of WOTR office Pune, project in-charge and field staff at the Ahmednagar and Sangamner offices was interviewed. For NICRA and CCKN IA projects, KVK head or project coordinator of Narayangaon, Baramati, Bhabaleshwar were interviewed to collect the information.

Third Phase- Farmers were interviewed in groups/ individually, using semi-structured schedule to find out their opinion on performance of various extension approaches used by various extension service providers. Focus group discussion (FGD) and observation method were also used to support collected data.

Result and Discussion: Different forms of climate information help farmers to make informed farming decisions. As we know, extension is the main department which directly deals with the farmers to give them information or enhance their capacity to increase their productivity, so that they adapt to climate change. It was found that these three projects used different location specific extension approaches with different clients. Some of them were common in all projects (Table 1).



Fig. 2: Focus Group Discussion with the women farmers in Varulwadi village of Narayangaon



Fig. 3: Rapport building with the farmers



Fig. 4: Automated weather station established in established in Warudipathar village under CCA project

Table 1: Extension and advisory methods used under various projects for CSA

S. No	Type of methods	Operational description	Who uses it
1.	Climate Awareness programmes/Campaigns, Exhibitions	<ul style="list-style-type: none"> It is used to sensitise people about climate change, its consequences and effects on farming. Introduction about the different activities of the project 	CCA NICRA CCKN-IA
2.	Climate workshops	<ul style="list-style-type: none"> Awareness creation for use of System of Rice Intensification (SRI) method of rice cultivation, preparation of crop plan for the season, water budgeting to know the availability of water, resource mapping, promotion of poultry and goat farming particularly for women's income generation. Persuade farmers in adoption of technologies (SRI method of rice cultivation, preparation of crop plan for the season, water budgeting, resource mapping, promotion of poultry and goat farming particularly for women) 	CCA NICRA CCKN-IA

3.	Climate Trainings	<ul style="list-style-type: none"> Provide various adaptation and mitigation practices to the farmers and to develop their skills, trainings of field extension worker is also done to make them familiar about the project and its activities. Extension agents were trained and provided tablet applications for effective and timely dissemination of advisories. 	CCA NICRA CCKN-IA
4.	Climate Farmers field schools (FFS),	<ul style="list-style-type: none"> Location specific climate-smart interventions like use of drought-resistant variety, use of mulching, cultivation of less water intensive crop, goat and poultry rearing, polyhouse cultivation was promoted. 	CCA NICRA
5.	Field visits to progressive farmers	<ul style="list-style-type: none"> Visits to progressive farmer's field who were using different adaptation practices like in-situ moisture conservation technique, mulching, integrating farming system, doing polyhouse cultivation. 	CCA NICRA CCKN-IA
6.	Demonstration on different adaptation or mitigation practices,	<ul style="list-style-type: none"> Method demonstration was conducted on the farmers field to orient them the method of that particular practice like System of Rice Intensification, preparation of organic slurry to improve the soil pH and organic carbon, in situ soil moisture conservation, mulching, use of water lock chemical, silage making, etc. 	CCA NICRA CCKN-IA
7.	Dissemination of appropriate climate resilient technology (such as portable soil testing kits, farm mechanization equipment for small holdings, grain storage bags, improved crop varieties etc.), irrigation management	<ul style="list-style-type: none"> Promotion of zero tillage. Use of pheromone trap. Various farm implements were given to the different farmers in group like grass cutter, tiller, harrow, etc. Custom hiring centre was established in the village to provide mechanical support to the farmers. Some drought tolerance varieties of sorghum, bajra or rice was given to the farmers. Hybrid breed of poultry vanraja, shrinidhi or khadaknath were distributed among the women farmers for income generation. Bhagava variety of pomegranate and PKM 1 variety of drumstick were given to the farmers of Gogalgaon or Pimprilokai village of Rahata block under CCKN- IA project 	CCA NICRA CCKN-IA
8.	ICT supported network	<ul style="list-style-type: none"> It was a important tool used in CSA. NICE platform. Use of mobile phone for SMS. 	CCA NICRA CCKN-IA
9.	Contingency crop planning	<ul style="list-style-type: none"> Contingency crop plans are technical documents containing integrated information on agriculture and allied sectors, i.e., horticulture, livestock, poultry, fisheries and technological solutions for all major weather-related aberrations, including extreme events viz., droughts, floods, heat wave, cold wave, untimely and high intensity rainfall, frost, hailstorms, pest and disease outbreaks. 	CCA NICRA
10.	Jaldoot - community level extension professional	<ul style="list-style-type: none"> He acts as a local extension worker who has knowledge on all water related activities. He helped the farmers in different activities involved in water budgeting, construction of water ponds, bore wells, etc. 	CCA
11.	Community Based Disaster Management (CBDM) approach	<ul style="list-style-type: none"> To build capacity of communities to reduce the impacts and to cope with disasters more effectively. Under this Disaster Risk Reduction (DDR), map of a village was prepared under which the points or places of the villages which are sensitive to climatic disaster were identified and then trainings conducted for the villagers to make them aware of it and mock safety drill trainings were given to the school children and villagers for their safety. 	CCA
12.	Agro-meteorological Advisory Service	<ul style="list-style-type: none"> It provides location specific agro advisories on weather forecasting, associated agricultural advices and a phone-in help-desk for farmers. 	CCA
13.	Village level custom hiring centres (CHCs)	<ul style="list-style-type: none"> It successfully empowers farmers to tide over the shortage of labour and improve efficiency of agricultural operations. 	CCA NICRA CCKN

Conclusion: In this study some extension methods and approaches were identified in Maharashtra region which have been implemented, but there are many more which need to be implemented to make the farmers more climate smart. Therefore, climate smart extension approaches need to be considered as part of a broader set of adaptation measures and policies for agricultural systems at a range of scales. Climate change is an ongoing phenomenon, thus the objective of the project was not to find any one solution, but first to develop communities and groups of farmers into active researchers. So, CSA policies should promote both practices and services, such as financial services (crop insurance, subsidies, credits, etc.) and strategies for knowledge sharing and management (strengthening of extension services, early warning system, etc.).

Recommendations

- Need for Extension Reforms – some immediate priority actions are needed for developing climate-smart rural advisory systems and services.
- Need for a Gender specific approach - An inclusive approach to CSA is needed, one that both empowers women and generally reflects differing gender roles and deliberately aims to involve rural youth.
- Use of ICTs should be promoted to deal with climate change.
- Training or re-training of the extension staff to acquire new capacities in climate change management.
- Promote farmer to farmer extension linkage for climate smart information delivery.
- Need to cover more number of farmers under the projects.
- Need to increase the number of working extension professionals in the working area.
- Need to promote more climate smart extension approaches like development of Climate Smart Villages (CSVs), Plant clinics, appointment of monsoon manager at village level, etc.

Complete report on 'Climate Smart Agriculture and Advisory Services: Approaches and Implications for Future' is available at www.manage.gov.in

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