PROBLEMS IN ADOPTION OF CLIMATE RESILIENT TECHNOLOGIES BY THE FARMERS OF TELANGANA STATE

ABSTRACT

Climate change refers to significant changes in global temperature, precipitation and wind patterns. Climate change as serious impact on the natural resources available on the earth. Climate change adversely affects human health and quality of life. A majority of population depends on agriculture directly or indirectly and it is more vulnerable to climate change. To mitigate the adverse effects of climate change, climate resilient agriculture has become a boon to the farmers in areas that are vulnerable to climatic effects like drought, floods etc., National Innovations on Climate Resilient Agriculture (NICRA), is a project launched by Indian Council of Agricultural Research (ICAR) with the aim to enhance resilience of Indian agriculture to climate change and climate variability through strategic research and technology demonstrations. *Krishi Vigyan Kendras* (KVKs) are the main implementing agency of NICRA. With the help of KVKs, the interventions of NICRA was accessible throughout the country. The present study was conducted in Nalgonda district and Khammam district of Telangana. The *ex-post-facto* research design was used for the study. A sample of 120 respondents from NICRA implemented villages and 60 farmers from non-NICRA implemented villages were selected randomly for the study. The major problems in adoption of CRA technologies were limited knowledge on CRA technologies (91.66%) followed by inadequate trainings regarding climate resilient practices (90.00%),inadequate weather based agro advisory services (88.33%), limited outreach of extension services about climate resilient technologies to (76.66%), non -availability of required implements in custom hiring centres at the time of heavy demand (73.33%) etc., In case of non-NICRA implemented villages, the major problems faced by the respondents were lack of confidence among the farmers to adopt the new CRA technologies due to the fear of failure (93.33%), lack of awareness on climate resilient technologies among non-NICRA farmers (90.00%), Difficulty in understanding of CRA technology (86.67%), adoption of CRA technologies demand more resources like water, labour and money (83.33%), less number of need based training on CRA technologies (75.00%), lack of access to improved crop varieties and other inputs (70.00%) etc.<…..>

Key words:Adoption, problems, climate resilient technologies, NICRA

Comment [A1]: Abstract sentence length should be 250 words. Please be brief again.

Notes:
Background. In this section, you need to provide summary information about the background or more specifically the subject matter you are dealing with in your research paper.

Research purposes. In this section you need to state the purpose of writing your scientific paper.

Method. In this section you will need to state the research method you used.

Results. In this section you present the findings that you made in your research.

Conclusion. State the final conclusion from your research

Recommendations/ Implications. In this section you present the practical implications of your research results.

Comment [A2]: In this section you need to add research conclusions.

The abstract should close with suggestions and managerial implications.

INTRODUCTION

The economy of India is rooted in agriculture and most of the farmers being small holders are highly correlated with the adverse effects of climate change.Climate change poses a threat to food access for both rural and urban populations by reducing agricultural production and incomes, increasing risks and disrupting markets. Poor producers, the landless and marginalised ethnic groups are particularly vulnerable (Olsson, *et al*. 2014). As agriculture sector has to face the hostile effects of climate change and climate variability, adaptation strategies are indispensable for farmers to deal with them (Chunera and Amardeep, 2018).Hence, a project called NICRA (National Innovations on Climate Resilient Agriculture) was launched by ICAR by Honourable Union Minister for Agriculture and Food Processing Industries Shri Sharad Pawarji on 2nd February 2011. The project consists of four components namely Strategic research on adaptation and mitigation, Technology demonstration on farmer's field to cope with current climate variability, Sponsored/Competitive research grants to fill critical research gaps and Capacity building of stake holders.

Among these four components, the technology demonstration component deals with demonstrating proven technologies for adaptation of crop and livestock production systems to climate variability(…). This component is implemented in selected vulnerable districts of the country through location specific interventions by *Krishi Vigyan Kendras*in participatory mode. In each village, the interventions of NICRA was made available through four modules *viz.*, Natural Resource Management, Crop production, Live stock & Fisheries and Institutional interventions.

Comment [A3]: Write the citation source here

Lack of knowledge about cultivation practices, lack of availability of seeds in market, resistance to change the conventional practices, high cost for construction of well or farm ponds, lack of adequate information on CRA technologies and weather status to plan their farming activities were some of the problems faced by beneficiaries of NICRA (Mohokar, 2019; Jasna, 2014; Nyasimi, 2017). The present study was conducted with an objective to unearth the problems in adoption of CRA technologies by the respondents in NICRA implemented villages and non-NICRA implemented villages of Telangana.

MATERIALS AND METHODS

Ex-post-facto research design was chosen for the investigation. This design was considered appropriate as the phenomena in the study was already occurred(…).The study was conducted in Climate Resilient village namely Nandhyalavarigudem village

Comment [A4]: Write the citation source here

of Atmakur (S) mandal of Nalgonda district and Nacharam village of Enkoor mandal of Khammam district of Telangana state where the NICRA interventions were implemented and two non-NICRA implemented village from Nalgonda district and the other from Khammam district were selected randomly. A sample size of 60 respondents from each Climate Resilient village and 30 respondents from each non-NICRA implemented village were selected randomly for the study, Thus, a total sample size of 180 farmers was selected for the study. The problems elucidated in the study were analysed by using frequencies and percentages.

Comment [A5]: Provide further explanation, what is the basis for determining the sample size. Include the citation source.

RESULTS AND DISCUSSIONS

The major problems faced by the respondents in adoption of CRA technologies in NICRA implemented villages were limited knowledge on CRA technologies (91.66%) followed by inadequate trainings regarding climate resilient practices (90.00%),inadequate weather based agro advisory services (88.33%), limited outreach of extension services about climate resilient technologies to (76.66%), non-availability of required implements in custom hiring centres at the time of heavy demand (73.33%), lack of availability of markets for adopted varieties or hybrids (70.83%), absence of regular committee meeting to appraise the members about required information (68.33%), inadequate community activities to promote CRA technologies (64.16%).

<…….>.The results were presented in Table 1.

Comment [A6]: Your findings should be compared with the results of previous similar studies.Authors should provide relevant and current references during discussion

You can write it in this part of the line.

In case of non-NICRA implemented villages, the major problems faced were lack of confidence among the farmers to adopt the new CRA technologies due to the fear of failure (93.33%), lack of awareness on climate resilient technologies among non-NICRA farmers (90.00%), difficulty in understanding of CRA technology (86.67%), adoption of CRA technologies demand more resources like water, labour and money (83.33%), less number of need based training on CRA technologies (75.00%), lack of access to improved crop varieties and other inputs (70.00%), insufficient access to weather related information by agro advisory services (58.33%), high capital investment is needed for farm machinery and land developmental activities (55.00%), less expertise of field staff on climate change and its management practices (50.00%).

<…….>.The results were presented in Table 2.

Comment [A7]: Your findings should be compared with the results of previous similar studies.Authors should provide relevant and current references during discussion

You can write it in this part of the line.

Table 1. Problems faced by the respondents of NICRA implemented villages in adoption of CRA technologies (n=120)

S.No.	Problems faced by the NICRA farmers	Frequency*	Percentage
1.	Limited knowledge on CRA technologies	110	91.66
2.	Inadequate trainings regarding climate resilient practices/technologies	108	90.00
3.	Inadequate weather based agro-advisory services	95	79.00
4.	Absence of regular committee meeting to appraise the members about required information	82	68.33
5.	Non-availability of required implements in custom hiring centres at the time of heavy demand	88	73.33
6.	Inadequate community activities to promote CRA technologies	77	64.16
7.	Lack of outreach of extension services about all the climate resilient technologies to individual farmers	92	76.66
8.	Lack of availability of markets for adopted varieties or hybrids	85	70.83

*Cumulative response

Table 2. Problems faced by the respondents of non NICRA implemented villages in adoption of CRA technologies (n=60)

S. No	Problems faced by non-NICRA farmers	Frequency*	Percentage
in1.	Lack of awareness on climate resilient technologies among non-NICRA farmers	54	90.00
2.	Difficulty in understanding of CRA technology	52	86.67
3.	Less number of need-based training on CRA technologies	45	75.00
4.	Insufficient access to weather related information by agro advisory services	35	58.33
5.	Lack of confidence among the farmers to	56	93.33

	adopt the new CRA technologies due to the fear of failure		
6.	Lack of access to improved crop varieties and other inputs	42	70.00
7.	Less expertise of field staff on climate change and its management practices	30	50.00
8.	High capital investment is needed for farm machinery and land development activities	33	55.00
9.	Adoption of CRA technologies demand more resources like water, land and money	50	83.33

*Cumulative response

CONCLUSION

Although, the CRA technologies were proven to be efficient in the areas where it is implemented the major problems faced by the respondents in adoption of CRA technologies were limited knowledge on CRA technologies, inadequate trainings,inadequate weather based agro advisory services etc.,whereas in case of areas where NICRA is not implemented, the major problems faced were lack of confidence, lack of awareness, difficulty in understanding CRA technology etc. The present study suggests a suitable strategy for upscaling for adoption of CRA technologies.

Comment [A8]: It is worth mentioning some examples of concrete suggestions.

What are the managerial implications for answering the following problems:

1. inadequate training,

2. inadequate weather-based agricultural consulting services,

3. lack of self-confidence,

4. lack of awareness,

5. difficulty in understanding CRA technology

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

REFERENCES

Comment [A9]: The total number of references is 15, the composition for journal sources is 70%.

Chunera and Amardeep (2018). Information Needs for Climate Change Adaptation among Farmers of Uttarakhand, India, *Indian Journal of Extension Education*, 54(2). 41-47.

Jasna V.K.; S. Som; R.R. Burman; R.N. Padaria and J.P. Sharma. 2014. Socio Economic Impact of Climate Resilient Technologies. *International Journal of Agriculture and Food Science Technology*, 5(3):185-190.

Mohokar, S.D.; V.V. Gohad; P.A. Ingawale and V.V. Holkar.2019. Impact of National Innovations on Climate Resilient Agriculture (NICRA) project on beneficiaries. *Agriculture Update*,14(3): 220-223.

Comment [A10]: The writing of the year in the bibliography must be consistent. The year is enclosed in brackets

Comment [A11]: The writing of the year in the bibliography must be consistent. The year is enclosed in brackets

NICRA (2013). National Initiative on Climate Resilient Agriculture AICRIPAM Component: Annual Report-2013. Central Research Institute for Dryland Agriculture, Hyderabad, India.

Nyasimi, M.; P. Kimeli; G. Sayula; M. Radeny; J. Kinyangi and C. Mungai. 2017. Adoption and dissemeination pathways for climate-smart agriculture technologies and practices for climate-resilient livelihoods in Lushoto, Northeast Tanzania. *Climate,* 5(3): 63.

Olsson, L., M. Opondo, P. Tschakert, A. Agarwal, S.H. Eriksen, S. Ma, L.N. Perch, and S.A. Zakieldeen(2014). Livelihoods and poverty. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 793-832.

Comment [A12]: The writing of the year in the bibliography must be consistent. The year is enclosed in brackets