Asian Resonance

Measurement of Agriculture Infrastructure Availability of Farmers in Adaptation to Climate Change in Vidarbha

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Abstract

Adapting to climate change requires an integrated approach, including socio-economic development, environmental conservation and disaster risk reduction. The farmers in Vidarbha region are very much susceptible to the changes in climatic conditions. Agriculture infrastructure availability with the farmers represents his potential to implement adaptation measures that help prevent likely impact and reduce their vulnerability to climate change and variability. This paper analyses the agriculture infrastructure availability with the farmers' under changed climatic conditions based on the information collected through a personal interview with the farmers. The data used in the analysis were obtained through 300 farmers scattered over 10 villages across 5 tahsils of 2 highly suicide prone districts of Vidarbha in 2012. Agricultural infrastructure availability index was developed for measurement. Findings revealed that farmers were in the mediocre of agriculture infrastructural availability. The findings of this study have important policy implications for taking thoughtful decisions about the availability of agricultural infrastructure at village level to farmers in adaptation to climate change.

Keywords: Agriculture infrastructure availability , climate change, adaptation, Vidarbha

Introduction

Climate change and its impact do have serious implications on rural livelihood of the farmers living in the Vidarbha region and it is now apparent that dealing with climate change is unavoidable. Adapting to it requires an integrated approach, including socio-economic development, environmental conservation and disaster risk reduction. There is urgent and immediate need of developing countries that are particularly vulnerable to the adverse effects of climate change, especially the least developed (Dwivedi**,** 2011). Climate change imposes constraints to development especially among small holder farmers' whose livelihood mostly depend on rain-fed agriculture (IPCC, 2007; Tanner & Mitchell, 2008). This poses a challenge of developing innovative technologies supported with adequate agriculture infrastructure availability to improve rural livelihoods and environmental conservation and ensuring adoption of such technologies. Agriculture infrastructure availability services includes 11 components that are; irrigation and public access to water, means of transportation, storage services, commercial infrastructure, processing infrastructure, public services, agricultural research and extension services, communication and information services, land conservation services, credit and financial institutions, and finally, health and education services (Fosu *et al*. 1995). All these components do have serious implications on the adaptive capacity of farmers in adaptation to climate change. It was therefore thought to study this variable independently to assess the extent of agricultural infrastructural availability (AIA) with the farmers in Vidarbha region to mitigate the impact of climate change and adoption of adaptation measures in combating climate change issues.

Methodologies

The study was conducted in two distress prone districts of Vidarbha namely Akola and Yavatmal based on the information collected through personal interviews with the farmers. The data used in the analysis were obtained through 300 farmers scattered over 10 villages across 5 tahsils of 2 highly suicide prone districts by applying Diagnostic design of social research in 2012. In present study, five important indicators of

agricultural infrastructure availability were selected. These are inputs, credit sources, information sources, transport availability and post harvest infrastructure availability. Hence operationally agriculture infrastructure availability refers to the various input, credit, information, transport and post harvest amenities available with farmer for his farming operations and in his village or nearby vicinity to reduce their vulnerability to climate change and variability for enhancing their adoption of adaptation measures in response to climate change and variability. For measurement of agricultural infrastructure availability, a schedule developed by Kale (2011a) was used and responses were obtained on three point continuum as adequate, inadequate and not available with scoring of 3, 2 and 1 respectively.

In input infrastructure, 14 items were selected. Related to availability of inputs, sources of credits include 4 items, information infrastructure includes 13 items, transport availability included 6 items and under post harvest infrastructure 6 items were selected. Thus, for agriculture infrastructure availability includes total 43 items under 5 main indicators. Hence, the minimum score of an individual farmer an individual farmer could obtain was 43 and maximum score was 129. The sum of score of all items of the agriculture infrastructure availability schedule administered to the farmer was computed which indicated the agriculture infrastructure availability score for particular selected farmer. The raw score such obtained was converted into AIAI index for the above 5 indicators separately and also in aggregate form, with the help of following formula.

$$\begin{matrix} Agriculture \\ Infrastructure \\ Availability \\ Index\ (AIAI) \end{matrix} \quad \frac{\begin{matrix} Obtained\ Agriclture \\ infrastructure\ availability\ score \end{matrix}}{\begin{matrix} Maximum\ obtainable\ Agriculture \\ infrastructure\ availability \\ score \end{matrix}} \ x\ 100$$

On the basis of equal interval of the agriculture infrastructure availability index, the farmers' were categorized in three categories as follows:

Sr. No.	Agricultural infrastructure availability category	Index range
1	Low	Up to 33.33
2	Medium	33.34 to 66.66
3	High	Above 66.66

3 Results and discussion

In the present research, five important basic indicators of agriculture infrastructure availability were selected and those were input, credit sources, information sources, transport availability and post harvest infrastructural availability. The agriculture infrastructure availability analysis of the data is presented in Table 1.

Table 1:
Distribution of the respondents according to the availability of agriculture infrastructure availability

Agriculture Infrastructure category	Availability of agriculture infrastructure											
	Input		sources		Information		Transport		Post harvest		Total	
	No	%	No.	%	No.	%	No.	%	No.	%	No	%
Low(Upto33.33)	20	06.67	105	35.00	34	11.33	32	10.67	92	30.67	00	00
Medium (33.34 to 66.66)	132	44.00	63	21.00	178	59.33	155	51.67	114	38.00	239	79.67
High (Above 66.66)	148	49.33	132	44.00	88	29.34	113	37.66	94	31.33	61	20.33
Total	300	100	300	100	300	100	300	100	300	100	300	100

The data accessible in Table 1 revealed that nearly half of the farmers' (49.33 %) were found to have high input infrastructure, followed by 44.00 per cent had medium input infrastructure and only 6.67 per cent respondent farmers had low input infrastructure.

While considering availability of credit sources it was found that farmers' (44.00%) had high availability of credit sources infrastructure, followed by 35.00 and 21.00 per cent had low and medium credit sources infrastructure respectively.

Regarding availability of information infrastructure, it was noted that nearly two third respondents (59.33%) had medium availability of information infrastructure, followed by 29.34 and 11.33 per cent having high and low information infrastructure respectively.

The availability of transport availability as infrastructure when studied, it was observed that over half (51.67%) farmers' had medium availability of transport availability, followed by 37.66 per cent had high availability of transport availability while only 10.67 per cent had low availability of transport infrastructure.

As regards availability of post harvest infrastructure it was noted that almost one third farmers' falls in category of low, medium and high post harvest infrastructure availability.

While considering total agriculture infrastructure availability of five components, majority (80.00 %) of the respondents were having medium agriculture infrastructure availability for their farming business in adapting to climate change and variability, and one fifth farmers' (20.33%) had high agriculture infrastructure availability. It was also noticed that not a single farmer was found in low agricultural infrastructure availability.

The overall scenario regarding availability of agriculture infrastructure indicates that, total infrastructure of five components when considered; majority of farmers' were in medium infrastructure

availability. While considering individual component, it could be inferred that farmers' were in dearth of easy availability of credit and adequate post harvest storage structures were lacking in combating climate change. Kale (2011b), while studying the causes of farmer's suicides in Vidarbha also noted the similar observations, that low agriculture infrastructure availability of farmers indicated his low economic status restricted him to implement innovative technologies on his farm. Phuong (2011) noted that equipments for agricultural production of surveyed households were quite limited and poor, which may increase negative impacts and limit the adaptive capacity to change conditions in agricultural production. Nyong (2005) also noticed that low flexibility of Nigerian farmers' to allow for substitution in production practices, especially for export crops, cereals and other agriculture is a major limiting factor which results from low human capital, technological capacities, credit market access and infrastructure.

Conclusion:

The study brought in to picture that the farmers in distress prone districts of Vidarbha were in the mediocre of agriculture infrastructure availability and were in scarcity of easy availability of credit. Likewise adequate post harvest storage structure were lacking in coping to climate change. The findings of the study have an important policy implication for enhancing the availability of agriculture infrastructure at village and at farmers' level, along with creating adequate post harvest storage structures with easy accessibility of credit to farmers to implement adaptation measures that help prevent likely impacts and reduce their vulnerability to climate change and variability.

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Appendix

Schedule to quantify Agriculture Infrastructure facilities

Please indicate at what extent following infrastructural facilities available to you

Sr No	Agriculture Infrastructure availability	Response Continuum		
		3	2	1
A	**Input**			
1.	Good quality seed			
2	Compost/ FYM			
3	Fertilizers			
4	Bio-fertilizers			
5	Insecticides			
6	Weedicides			
7	Labours			
8	Bullocks			
9	Farm implements (Plough, harrow etc.)			
10	Farm machinery (Tractor, Thresher, Tractor,			
11	Sprayer and Dusters			
12	Irrigation water			
13	Electricity for farm operation			
14	Watershed Development work (Natural & man made water structures such as lakes, tanks, ponds etc.)			
B.	**Sources of Credit**			
1	Co-operative society			
2	Land development Bank			
3	Nationalized Bank			
4	Money lender			
C.	**Information**			
1	Radio			
2	Television			
3	Library			
4	Information from V.E.W			
5	Availability of technical knowledge of agril. through KVK,ARS/Other insti.			
6	Availability of information from veterinary clinic/ AI centre			
7	Krishi Seva Kendra			
8	Health care & information from PHC.			
9	News papers			
10	Shetkari Mandal/ SHG			
11	Computer (Internet)			
12	Telephone			
13	Mobile phone			
D.	**Transport Infrastructure**			
1	Pacca Road			
2	Govt. S.T. Buses			
3	Private Vehicles			
4	Own bullock cart			
5	Own tractor			
6	Own Tempo/ Auto			
E.	**Post Harvest Infrastructure**			
1	Gowdowns			
2	Cold storage facilities			
3	Rural Agrobased Industries			
4	Good Market availability			
5	Soil testing facility			
6	Milk collection centre			

* 3- Adequate Score, 2- Inadequate Score, 1- Not available Score

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