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Knowledge and adoption of climate-resilient mango production technologies: A relational analysis

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Abstract
The current study was conducted in the South Konkan coastal zone, which is divided into two districts: Ratnagiri and Sindhudurg. A ex post facto method was used in this study. A simple random sampling technique was employed to get the sample size of 156 respondents. Data were collected through a structured interview and analyzed using appropriate statistical techniques. It was revealed that the respondent's age was negatively associated with their knowledge. However, annual income, operational landholding, area under mango, ownership of mango orchards, access to crop loan, resource availability, input source, extension participation, distance of orchards from seashore, planting density, and adoption were found to be positively and significantly correlated with knowledge. Further, education, soil type, orchard age, crop insurance coverage, climate vulnerability was non-significantly associated with knowledge. The respondent's age was negatively associated with their adoption. Annual income, operational landholding, area under mango, ownership of mango orchards, access to crop loan, input source, knowledge, and extension participation were found to be positively and significantly correlated with adoption. Soil type, orchard age, crop insurance coverage, planting density, education, climatic vulnerability, resource availability, orchard distance from the seaside, and topography were not shown any relationship with the adoption of climate resilient technology.

Keywords: Knowledge, adoption, climate-resilient, mango, relational

Introduction
Climate change's effects can now be seen on every continent on the globe. Unpredictable weather, increasing sea levels, and melting glaciers are all contributing to the altering of cultures around the planet. The environment and climate change have been identified as the most significant challenges for world leaders during the third decade of this century (Martin, 2006; Cohen and Waddel, 2009). Climate change is also wreaking havoc on the global South continent, causing chaos in agricultural production and agrarian livelihoods (Eze and Onokala, 2020; Islam and Kieu, 2020; Call *et al*., 2019). Climate change makes developing economies, such as India, more vulnerable. India is addressing climate change via a mix of tactics, legislation, collaborations, and investment. Farmers in India have devised their own methods of adjusting to shifting weather patterns, but these have proven ineffective in dealing with extreme weather occurrences. The 'National Innovations in Climate Resilient Agriculture (NICRA)' initiative, which would involve 151 Krishi Vigyan Kendra (KVKs)-Farm Science Centers across the country, was launched by the Indian Council of Agriculture Research (ICAR) in New Delhi. By showcasing resilient technologies to address district-specific climate vulnerabilities and scaling up proven innovations in a convergence and collaboration strategy, the NICRA made a significant effect. Horticulture is a vital contributor to India's economic prosperity. Horticulture accounts for 30.00 percent of the overall value of agricultural output. Mango, banana, lime, lemon, papaya, and fenugreek are among the world's most popular fruits (Horticulture Statistics, 2018). The Konkan region's Alphonso mangoes are prized for their beautiful look, nutritious value, delightful taste, and unique flavour. India's "National Fruit" is the mango, and the alphonso is known as the "King of Mangoes." On the other side, Alphonso is particularly vulnerable to climate change. Mango farmers place a premium on building resilience to weather extremes. As a result, farmers must be well-versed in climate-resilient technologies. In this context, the present research was carried out with the following specific objectives:

Objective
- To find out the relationship between profile of the mango growers and their knowledge

about climate resilient technologies
- To find out the relationship between profile of the mango growers and adoption of climate resilient technologies.

Methodology

The research was conducted in the Ratnagiri and Sindhudurg district. The tehsils of Lanja and Rajapur in Ratnagiri district, as well as Devgad and Vengurle in Sindhudurg district, were carefully chosen. A total 156 respondents were selected for the investigation. The "ex-post-facto" approach of social research was applied by a researcher. Field data were gathered by the 'personal interview' method in an informal setting. The data from the respondents was scored, collated, and analyzed using statistical procedures including frequency, percentage, mean, standard deviation and Correlation Coefficient.

Result and Discussion

Table 1: Coefficient of correlation between the independent variable to knowledge

Sl. No.	Name of variable	Correlation Coefficient (r)	Sl. No.	Name of variable	Correlation Coefficient (r)
1	Age	-0.222**	10	Access to crop loan	0.178*
2	Education	0.040 NS	11	Source of inputs	0.362**
3	Annual income (INR)	0.190*	12	Extension participation	0.289**
4	Operational landholding	0.274**	13	Soil type	0.094 NS
5	Area under mango	0.308**	14	Topography	0.022 NS
6	Ownership of mango orchards	0.184*	15	Distance of orchards from seashore	0.255**
7	Age of orchards	-0.033 NS	16	Planting density	0.232**
8	Resource availability	0.225**	17	Climatic vulnerability	0.068 NS
9	Access to crop insurance	0.147 NS	18	Adoption	0.557**

*Significant at 0.05 level (2-tailed).
** Significant at 0.01 level (2-tailed).
NS – Non Significant

It was found that the age of the respondent was negatively significantly correlated with their knowledge (Veeraiah 1991 and Samuel 1993) [18, 13]. As the age of the respondent increases with decreasing their level of knowledge decreases. It was revealed that the annual income (INR), operational landholding, area under mango and ownership of mango orchards were found to be positively significantly correlated with knowledge. As the annual income increases, the knowledge level of the respondent also increases (Mehta et. Al. 1989 and Anchule 1996) [10, 2]. In a similar vein, as the landholding of the respondent's increases, their knowledge level also increases (Kanade 1998, Manvar 1999 and Jadhav 2000) [8, 9]. the knowledge level also increases with increasing per unit of area under mango, (Bhosale 2004) [4], and those mango growers who have their own orchard ownership also possess high levels of knowledge. It was found that as the increase per unit of resource availability, the knowledge level of the respondents also increased. It was found that those respondents who borrowed crop loans had more knowledge. However, increasing the source of inputs also increased the respondents' knowledge level. It was discovered that respondents who had high extension participation had more knowledge. Similarly, with the increasing per unit distance of orchards from the seashore, the knowledge level also increases. It was found that those respondents who adopted the recommended planting density had more knowledge. Similarly, the knowledge level also increased with increasing levels of adoption. It was observed that education, age of orchards, access to crop insurance, soil type, topography, and climatic vulnerability were not found to be significantly correlated with knowledge.

Table 2: Coefficient of correlation between the independent variable to adoption

Sl. No.	Name of variable	Correlation Coefficient (r)	Sl. No.	Name of variable	Correlation Coefficient (r)
1	Age	-0.158*	10	Access to crop loan	0.250**
2	Education	-0.117NS	11	Source of inputs	0.202*
3	Annual income (INR)	0.239**	12	Extension participation	0.297**
4	Operational landholding	0.297**	13	Soil type	0.042 NS
5	Area under mango	0.308**	14	Topography	0.035 NS
6	Ownership of mango orchards	0.163*	15	Distance of orchards from seashore	0.102 NS
7	Age of orchards	-0.007 NS	16	Planting density	0.066 NS
8	Resource availability	0.094 NS	17	Climatic vulnerability	0.122 NS
9	Access to crop insurance	0.100 NS	18	Knowledge	0.557**

*Significant at 0.05 level (2-tailed).
** Significant at 0.01 level (2-tailed).
NS – Non Significant

It was found that the age of the respondent was negatively significantly correlated with their adoption (Jawale and Nachane 1994) [7]. This revealed that as the age of the respondent was increased; the level of adoption was decreased. It was revealed that the annual income (INR), operational landholding, area under mango and ownership of mango orchards were found to be positively significantly correlated with adoption. The adoption of climate resilient technology was increased with increasing annual income (Manvar 1999 and Patil 2000) [9, 12]. The landholding of the respondent's increased with increasing their adoption level (Ahire 1997, Manvar 1999 and Bhosale 2004) [1, 9, 4]. The adoption level also increased with increasing per unit of area under mango (Bhosale 2004) [4], and those mango growers

who have their own orchard ownership also possess high levels of adoption. It was found that those respondents who borrowed crop loans had more adoptions. However, increasing the source of inputs also increased the respondents' adoption level. It was discovered that respondents who had high extension participation had more adoption levels. Similarly, with increasing levels of knowledge, the adoption level also increases. It was observed that education, age of orchards, resource availability, access to crop insurance, soil type, topography, distance of orchards from the seashore, planting density and climatic vulnerability were not found to be significantly correlated with knowledge.

Conclusions

The study revealed that respondents' age was negatively associated with their knowledge and adoption of climate resilient mango production technologies. Annual income (INR), operational landholding, mango area, and ownership of mango orchards were all found to be positively significantly predictive of knowledge and adoption. Additionally, it was discovered that the availability of resources was positively significantly correlated with their knowledge. Access to crop loans, input sources, and extension participation were found to be positively significant predictors of knowledge and adoption of climate resilient mango production technology. The distance of orchards from the seashore, plantation density, and adoption were all found to be significantly correlated with their knowledge of climate resilient mango production technologies. Additionally, mango growers' knowledge was found to be positively and significantly correlated with the adoption of climate resilient mango production technologies.

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