INNOVATIONS IN AGRICULTURAL PRACTICES IN JANAGOAN DISTRICT, TELANGANA STATE

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ABSTRACTS

From time immemorial, India is an agrarian society and aptly said that India lives in the villages. The farmers characterise these villages, feeding 1.2 billion people with their produce facing myriad challenges. They can overcome such challenges only when they adopt innovations in their agricultural practices for mutual benefit. Pursuit of this understanding feeds the present study. In a district of telangana state, the one of the most rice producing one, called Jangaon is the study area in which four types of farmers from three mandals responded to a structured questionnaire containing standardised measures of innovation – adoption, diffusion and effectiveness. Descriptive statistics suggest that farmers perceived innovations in agriculture are at variance across types of farmers. Inferential statistics suggest that extent of adoption and diffusion contribute to more than 50 percent of results are quite surprising and providing input for policy implications and practice considerations.

Key words:

Introduction

India's agricultural system is one of the oldest in the world. It has been the backbone of India's economy for centuries, providing the majority of the population with their livelihoods. In recent years, India's agricultural sector has seen rapid growth in production and productivity, driven by increased investments in modern technologies, improved irrigation, and better access to markets (Kumar, and Meena,2019; Shukla and Shukla, 2018).

Agriculture is the mainstay of the Indian economy, providing employment to more than half of the population and contributing to over 15 percent of the country's GDP. India is the

world's second-largest producer of rice, wheat, and pulses, and the third-largest producer of fruits and vegetables. The country is also the world's largest milk producer and has seen a rapid increase in the production of other commodities, such as sugar, cotton, and oilseeds (Shyam and Verma, 2020).

The Indian government has implemented a number of initiatives to boost agricultural productivity and reduce poverty in rural areas. These include the National Food Security Act, the Pradhan Mantri Fasal Bima Yojana, the Pradhan Mantri Krishi Sinchayee Yojana, and the Pradhan Mantri Fasal Bima Yojana. The government is also encouraging the use of modern technologies, such as precision farming, in agriculture (Singh and Meena, 2017).

The Indian agriculture system is characterized by a variety of crops, livestock, and farming methods. According to the 2011 Census of India, over 58 percent of the total workforce is engaged in agriculture and allied activities. The major crops grown in India are rice, wheat, maize, pulses, oilseeds, fruits, and vegetables. Livestock and fisheries form an important part of the Indian agriculture system. The government provides incentives to farmers to help them improve the quality of their produce. It also supports rural development by providing credit, subsidies, and other assistance programs. Additionally, the government works to ensure food security by providing subsidized food grains to the poor (Jacob and Chattopadhyay, 2016).

Despite the progress made in recent years, there are still many challenges that need to be addressed in the Indian agricultural system. These include the limited access to markets, lack of capital and credit, and the limited use of modern technologies. There is also the need to improve access to irrigation, strengthen agricultural research and extension services, and reduce poverty and inequality in rural areas. All of these is possible only if innovations are identified, adopted, diffuses across the crops harvested. To this effect, the present study attempts to understand the extent to which the farmers adopted and defused innovations and consequent effectiveness of innovations in their agricultural practices (Kotwal & Prabhakar,2009).

Innovations in Agriculture

The concept of innovation in the context of "Innovations in agricultural practices in Jangaon District, Telangana State" refers to the adoption of new technologies, methods, and practices that lead to improvements in agricultural productivity, efficiency, and sustainability. Innovation in agriculture is critical for addressing the challenges of food security, environmental sustainability, and economic development, particularly in developing countries such as India (Reddy and Kumar, 2019).

In the context of Jangaon district, innovation in agricultural practices could refer to the adoption of new technologies such as precision agriculture, the use of drones for crop monitoring, and the adoption of climate-resilient crops. It could also involve the use of sustainable farming practices such as organic farming, conservation agriculture, and agroforestry.

The conceptualization of innovation in the context of "Innovations in agricultural practices in Jangaon District, Telangana State" is about identifying and adopting new and improved methods of farming that can lead to increased productivity, efficiency, and sustainability, while also addressing the challenges faced by farmers and the agricultural sector as a whole (Shyam and Verma, 2020).

One of the earliest social science theories is the Diffusion of Innovation (DOI) Hypothesis, which was created by E.M. Rogers in 1962. It first appeared in communication to describe how an idea or product gathers steam and diffuses (or spreads) within a particular population or social system over time.

To understand how farmers employ the innovations they have learnt, Rogers' Diffusion Theory was applied as a conceptual framework. Rogers made an effort to describe how people learn new things, put them into practise, and eventually turn them into persistent practises.

Effectiveness is understand as agricultural innovation helps the agricultural industry, farmers, and rural entrepreneurs quickly adapt to obstacles and seize new opportunities, such as those in the realms of markets and technology.

In Telangana, Jangaon district is considered to be one of the leading agricultural districts. According to the Telangana State Agricultural Statistics 2018-19, the total area under cultivation in Jangaon district was 1,23,046 hectares. Out of this, 83,126 hectares were under food crops, 26,376 hectares were under non-food crops, and 13,544 hectares were under vegetables. The total food grain production in the district during 2018-19 was around 1,12,040 metric tonnes(Department of Agriculture, 2023).

In India, Jangaon district is not among the top agricultural districts in terms of production or area under cultivation. However, the district has shown steady growth in agricultural production in recent years, thanks to the adoption of new technologies and practices. In 2020, the district administration launched the 'Rythu Vedika' program to encourage farmers to adopt modern agricultural practices, improve their productivity, and increase their income.

Innovation in agricultural practices can lead to a range of benefits for farmers, including increased yields, reduced input costs, and improved soil health. Innovation can also improve the resilience of farming systems in the face of climate change and other environmental challenges(World Bank,2019).

Innovation in agriculture is not limited to the use of new technologies and practices. It can also involve new business models, policies, and institutional arrangements that help to support and incentivize the adoption of new practices. For example, the establishment of farmers' cooperatives, government subsidies, and incentives for the adoption of sustainable farming practices can all be considered forms of innovation in the agricultural sector.

In recent years, technology has played an increasingly important role in agriculture in the Janagaon district, as it has in other parts of India. Various government and private organisations have introduced new technologies and techniques to improve agriculture productivity and efficiency in the district. Here are some of the key technology developments and their adoption in agriculture in the Janagaon district

Drones are being used for mapping and monitoring crops, identifying pest attacks and diseases, and assessing soil moisture levels. Drones are also used for spraying fertilizers and pesticides in crops in a targeted manner, which helps to reduce the usage of chemicals and labour costs(Venkatesh and Reddy, 2017).

Modern farm machinery such as tractors, combine harvesters, and cultivators has been introduced to increase efficiency in farming. Jangaon district has a high density of tractors, which helps in land preparation, sowing, and inter-cultivation operations(Bhat and Prakash, 2018).

Several mobile applications have been developed to help farmers with decision-making in crop management, weather forecasting, and marketing of their produce. One such mobile application is 'e-Panta', which provides farmers with real-time market prices, weather forecasts, and other agricultural information (Reddy and Kumar, 2019).

Soil testing laboratories have been set up in the district to provide farmers with soil health cards, which help them in selecting the appropriate fertilizers for their crops. This helps in improving the productivity of the land and reducing the usage of chemicals(NABARD,2018).

Drip irrigation and sprinkler irrigation systems have been introduced to conserve water and increase water use efficiency. Micro-irrigation systems are used in vegetable cultivation to reduce water wastage and improve yield(NABARD,2018)

Biotechnology has been used to develop hybrid seeds, which have higher yields and better resistance to pests and diseases. Biotechnology is also being used to develop crops that can tolerate drought, salinity, and other environmental stresses(NABARD,2018)

Drip irrigation is a modern irrigation technique that delivers water directly to the roots of crops through a network of pipes and emitters. This method is more efficient than traditional irrigation methods and can help reduce water usage. In Jangaon district, many farmers have adopted drip irrigation techniques, especially for growing high-value crops like vegetables

and fruits(NABARD,2018)

High-yielding varieties are crops that have been selectively bred to produce higher yields. In Jangaon district, farmers have been adopting HYVs of crops such as paddy, cotton, maize, and red gram. These HYVs require less water and are more resistant to pests and diseases, leading to higher yields and improved crop quality (Srinivasarao and Reddy, 2019)

Various mobile apps have been introduced in Jangaon district to help farmer's access market information, weather forecasts, and crop-related information. The Rythu Bandhu mobile app, for example, provides real-time information on the prices of different crops, weather forecasts, and expert advice on crop management().

Precision agriculture uses technologies such as remote sensing, geographic information systems (GIS), and global positioning systems (GPS) to optimize crop management practices. In Jangaon district, precision agriculture is being used to map soil characteristics, monitor crop growth, and optimize fertilizer and pesticide use().

Agroforestry involves the integration of trees and crops in farming systems to improve soil health, water management, and biodiversity. In Jangaon district, agroforestry is being adopted as a sustainable farming practice, with farmers growing fruit trees and other crops together in the same plot().

Thus, technology adoption in agriculture in Jangaon district is increasing, and farmers are recognizing the potential benefits of these innovations. While some challenges remain, such as access to resources and training, the trend towards modernization and innovation in agriculture is likely to continue in the coming years. However, there is still a long way to go, and more efforts need to be made to provide access to technology to all farmers in the district.

Review of Literature

The review of literature on agricultural innovations in India shows that the country has made significant progress in agricultural development. Various innovative approaches have been adopted to improve the productivity and profitability of farming in the country.

This study explores the role of precision farming technologies in enhancing crop productivity in India. It examines various precision farming techniques such as remote sensing, GPS, and GIS, and their applications in agricultural practices. The review highlights the benefits of precision farming, including improved resource management, reduced environmental impact, and increased crop yields. The study emphasizes the need for wider adoption of precision farming technologies to achieve sustainable agricultural practices and address food security challenges in India (Gupta, Sharma, & Singh, 2019).

Drip irrigation has gained significant attention as a water-efficient irrigation technique in Indian agriculture. This review examines the factors influencing the adoption of drip irrigation systems among farmers in India. It discusses the benefits of drip irrigation, such as water conservation, improved crop yields, and reduced labour requirements. The study also addresses challenges related to cost, maintenance, and farmer awareness. The findings highlight the importance of policy support and extension services to promote widespread adoption of drip irrigation in Indian agriculture (Kumar & Singh, 2017).

Mobile applications have emerged as valuable tools for delivering agricultural extension services to farmers. This review evaluates the effectiveness of mobile applications in disseminating information, providing advisory services, and facilitating knowledge exchange in the Indian agricultural context. It examines the impact of mobile apps on farmer decision-making, adoption of best practices, and access to market information. The study emphasizes the potential of mobile applications to enhance agricultural productivity, reduce information asymmetry, and promote sustainable farming practices in India (Sharma & Mohapatra, 2020).

Nanotechnology has shown immense potential in revolutionizing agricultural practices. This comprehensive review explores the diverse applications of nanotechnology in Indian agriculture, including crop improvement, nutrient management, pest control, and soil remediation. It examines the benefits and challenges associated with nanotechnology adoption, considering its implications for human health and the environment. The study underscores the need for responsible nanotechnology development and highlights the role of regulatory frameworks in ensuring safe and sustainable implementation in Indian agriculture (Kumar & Mondal,2018)..

Smart farming technologies, encompassing automation, sensor networks, and data analytics, have the potential to transform agriculture towards sustainability. This review provides an overview of smart farming technologies and their applications in the Indian agricultural sector. It discusses precision agriculture, IoT-based monitoring systems, and data-driven decision-making processes. The study evaluates the environmental and economic benefits of smart farming technologies and emphasizes the importance of knowledge dissemination and infrastructure development for their successful implementation in India (Singh, ET al.2021)

Organic farming practices offer sustainable alternatives to conventional agriculture, addressing concerns of environmental degradation and food safety. This review examines innovative organic farming practices adopted in India, such as integrated pest management, organic fertilization, and crop rotation. It evaluates their impact on soil health, biodiversity conservation, and farmer livelihoods. The study emphasizes the need for policy support, capacity building, and market linkages to promote organic farming as a viable and sustainable

option for Indian farmers (Kumar, et al. 2019).

Remote sensing and geographic information systems (GIS) play a crucial role in crop monitoring and yield prediction. This review explores the applications of remote sensing and GIS technologies in the Indian agricultural context. It discusses the use of satellite imagery, aerial photography, and spectral analysis for monitoring crop health, estimating yield potential, and identifying stress factors. The study highlights the benefits of remote sensing and GIS in facilitating timely decision-making, optimizing resource allocation, and improving overall agricultural productivity in India (Kumar,et al. 2018).

Genetic engineering has revolutionized crop improvement, enabling the development of high-yielding and stress-tolerant varieties. This review provides an overview of recent advances in genetic engineering for crop improvement in India. It discusses the applications of biotechnological tools, such as gene editing, transgenic technology, and molecular markers, in enhancing crop traits, disease resistance, and nutritional content. The study emphasizes the potential of genetic engineering to address food security challenges and improve crop productivity in the Indian agricultural sector (Gupta, et al. 2018).

Water scarcity poses a significant challenge to Indian agriculture, necessitating innovative approaches for efficient water management. This review examines various innovative water management techniques adopted in Indian agriculture, including rainwater harvesting, drip irrigation, and wastewater reuse. It evaluates their impact on water conservation, crop productivity, and farmer income. The study emphasizes the importance of integrated water management strategies, policy interventions, and farmer education to ensure sustainable water use in Indian agriculture (Venugopal, et al. 2019).

Blockchain technology has emerged as a promising tool for enhancing traceability, transparency, and trust in agricultural supply chains. This review explores the potential applications of blockchain technology in the Indian agricultural context. It discusses the benefits of blockchain in ensuring secure transactions, provenance verification, and quality assurance. The study examines the challenges associated with blockchain implementation, such as scalability, interoperability, and farmer adoption. The findings underscore the transformative role of blockchain technology in improving efficiency and accountability in Indian agriculture (Singh, et al. 2021).

The review of literature on agricultural innovations in India shows that there is still much work to be done in order to ensure that the country achieves its goal of doubling farmers' incomes in the coming years. The successful implementation of various innovative approaches and initiatives will be critical to achieving this goal.

Statement of the Problem

The use of technology in Agriculture in India has grown rapidly in recent years. This includes the use of modern farm equipment, the introduction of high yielding varieties, the use of GPS and GIS systems for precision farming, the use of drones for crop monitoring, the use of hydroponic systems for crop production, and the use of mobile applications for better management of farm operations. The way that farmers cultivate their crops has changed thanks to the introduction of automated harvesters, drones, autonomous tractors, sowing, and weeding(). They can concentrate on more important activities because the technology handles tedious and repetitive duties.

Technology has also enabled farmers to access data, information and services that can help them increase their yields and incomes. Furthermore, the government of India has launched several initiatives to promote the use of technology in agriculture, such as the Pradhan Mantri Fasal Bima Yojana, the e-NAM platform, and the Soil Health Card Scheme. These initiatives will help farmers to better utilize the resources available to them and improve the overall productivity of their farms (Mishra and Sahoo, 2019). Thus Innovation in agricultural practices are of cardinal concern to all the stake holders of food production in the country which includes, farmers, consumers, suppliers, distributors and the government supported by the NGOs(Pattanaik, 2014).

Thus, the research idea includes innovation variables namely adoption, diffusion and effectiveness of innovation in agricultural practices in Jangaon district. Further, these variables are examined for their variations accounted for by the land holding and the expectation that farmers may vary in their innovation practices according to the land holding.

Here by 'innovation' means change in the established method of pursuing agriculture using technology and high yielding varieties of seeds. Technology includes any improved methods of using implements, electronic and electrical devices that help in agricultural practices, and 'Adoption' means use or utilisation of changing methods of Agricultural Innovations to modernise agriculture Marlook et al. (2014). Modernisation refers to the knowledge used in production to improve the productivity (Falahee and Sinha,2008)

The 'diffusion' stage occurs when new products and processes are spread across potential markets (Stoneman, 1995). In Schumpeter's innovation analysis, the diffusion and imitation processes have a much greater influence in the growth of an economy, and is especially relevant in the case of growing economies (Freeman, 1987).

The Present Study

The present study focuses on the Janagaon district of Telangana state as reason for choosing this area as we have chosen this area. Janagaon district is one of the leading agricultural

cultivation districts in Telangana and India. It is the second largest producer of rice in the state after Adilabad district. According to the district profile of Janagaon, it produces more than 57% of the total rice production in the state. The district is ranked 11th in India in the production of rice. It is also one of the top producers of pulses, oilseeds, maize, jawar, bajra, groundnut, cotton, chillies and turmeric in Telangana.

In terms of agricultural cultivation, Jangaon district is known for its production of paddy, cotton, maize, and red gram. Other crops grown in the district include groundnut, sunflower, and vegetables.

In view of the challenges of agriculture for higher yields and productivity besides, profitability, in this study, the extent to which farmers have adopted innovations in technology for agriculture is examined, followed by the extent to which it is diffused in their lands and in their crops, lastly, the effectiveness of innovations used in their agricultural practices also are examined . Their relationships are finally examined to find out how much adoption and diffusions of innovative technologies in agriculture would contribute to the effectiveness of innovations to the farmers and finally to the end users.

Objectives

1. To assess extent of Adoption of innovation in agricultural practices
2. To understand the extent of Diffusion of innovation in agricultural practices
3. To explore the effectiveness of Innovation in agricultural practices
4. To examine the effect of size of land holding and extent of adoption, diffusion and effectiveness of innovation in agricultural practices.
5. To examine the relationships between adoption, diffusion and effectiveness of innovation in agricultural practices.

Hypotheses

1. Adoption of innovation in agricultural practices do not vary according to size of land holding
2. Diffusion of innovation in agricultural practices do not vary according to size of land holding
3. Effectiveness of Innovation in agricultural practices do not vary according to size of land holding
4. To examine the relationships between adoption,, diffusion and effectiveness of innovation in agricultural practices.

The Method

The study area for this study is Janagaon district of Telangana state and three mandals namely, palakurthi, raghunathapally and bachhannapet. These mandals were chosen for higher concentration of farmers involved in agricultural practices involving innovations.

There is a total of 24807 farmers were identified from the database of farmers maintained at the mandal office. Using the sample size formula suggested by Krejcie and Morgan (1970), it is estimated that the size of sample should be 378 for given population. This was divided by three blocks resulting in 126 per block. A systematic random Sampling method is used to select representative sample farmers from different villages which fall under 3 top agriculture growing blocks of Jangaon district. This approach is used for selecting farmers randomly from a list of all farmers in 9 villages from 3 blocks of the district. All of the 378 farmers were requested to participate in the study. However, only 300 were found to have completed the questionnaires. Thus, the total sample size is 300. Details of sampling are presented in table 1.

Table 1 : Sampling Details

Sno	Mandal	Sample Contacted	Sample Responded
1	Bachannapeta	126	98
2	Palakurthi	126	107
3	Raghunathpalli	126	95
	Total	378	300

Method and Tool of Data Collection : A structured questionnaire was prepared to include an 11-item scale is used to measure adoption of innovation(Rogers, 1962) . These items reflect the farmer's level of adoption of new technologies and practices, such as precision agriculture, use of drones for crop monitoring, and adoption of climate-resilient crops. A 7-item scale was used to measure diffusion of innovation(Rogers, 1962). A 10-item scale was used to measure effectiveness of innovation(Jong and Hartog, 2010). All the items were measured with 5-point Likert type response pattern (where 5= strongly agree and 1=strongly disagree). In addition, Demographic information like age, gender, education level, and landholding size of the farmer and the like were also included. All the three scales yielded higher coefficients of alpha presented in the table 2 suggesting that they are highly internally consistent and therefore qualified for father analysis.

Table 2: Scale Details and Reliabilities

Sno	Scales	N of Items	Cronbach's Alpha
1	Adoption of Innovation	11	0.883
2	Diffusion of Innovation	7	0.901
3	Effectiveness of Innovation	10	0.952

It is evident from the table 2 that all the scales used in this study are found highly reliable which is evident from the cronbach alpha coefficients that are above .70 (Nunnally, 1972). Thus, the data of these variables qualify for the next level analysis and for testing of the hypotheses.

The data collected from the farmers is analysed with the help of SPSS for windows v25. Further, to test the hypotheses, statistical tests like coefficient of correlation and multiple regression analysis were used.

Results and Discussion

In this section, the results of the study are presented followed by the discussions. Firstly, the profile of the farmers is presented, followed by the results relating to the study variables and also hypotheses testing.

Table 1 : Profile Of The Respondents

Sno	Profile	Mean	Std. Deviation
1	Age	48.40	10.48
2	Annual Income	Rs.199683.33	Rs.143037.92
3	Family Size	4.46	1.13
4	Acres of Land Owned – Dry	3.4439	3.85543
5	Acres of land owned – Wet	2.0677	1.88440

It is evident from the table above that the average age of the farmers is 48 years, followed by their average annual income is Rs. 19,9583. Their average family size is 4.4, followed by average dry land owned is 3.44 acres and wet land is 2.06 years.

Size of Land Holding and Innovation

It was hypothesised that the adoption, diffusion and effectiveness of innovations in agricultural practices do not vary according to the size of land holding by the farmers. In order to test this hypothesis, means, standard deviations were computed on all these variables according to the size of land holding. Further to examine the significance of variation in the mean scores, f-values were computed. Results in this regard are presented in the following table.

Table 2: Innovation Variables And Size Of Land Holding

S.No			N	Mean	Std. Dev	F-Value (d.f=3,296)	P=
1	Adoption	1.00-2.00 hectare	52	29.17	2.32	3.501	0.016
		2.00-4.00 hectare.	104	28.21	1.6		
		4.00-10.00 hectare.	112	28.44	1.94		
		10.00 hectare and above.	32	28.06	1.86		
2	Diffusion	1.00-2.00 hectare	52	23.13	2.93	2.46	0.063
		2.00-4.00 hectare.	104	22.15	2.02		
		4.00-10.00 hectare.	112	22.57	2.03		
		10.00 hectare and above.	32	22.31	1.65		
3	Effectiveness	1.00-2.00 hectare	52	41.8654	3.66	1.999	0.114
		2.00-4.00 hectare.	104	40.7115	3.13		
		4.00-10.00 hectare.	112	41.0089	3.29		
		10.00 hectare and above.	32	40.3438	1.97		

As regards adoption, farmers with less than 2 hectors scored more on adoption (mean =29.17), than the others surprisingly, the f-value suggestions that the mean variation is statically signifiant. With regard to diffusion, a similar trend is observed. That is farmers with less hectors of land scored more on the diffusion than those who have more land. However, the f-value does not support the mean vairation. Lastly, with regard to effectiveness of innovation, farmers each with less land (mean=41.86) or 4 to 10 hectors of land perceived more effectiveness than the others. Nevertheless, the f-value did not support such mean variations. Therefore, it is safe to state that the null hypothesis stands accepted which further indicted that diffusion and effectiveness do not vary significantly according to the size of land holding by the farmers.

Table 3: Intercorrelation Matrix Of The Study Variables

		Adoption	Diffusion	Effectiveness
Adoption	Pearson Correlation	---	.633**	.754**
	Sig. (2-tailed)		0.000	0.000
Diffusion	Pearson Correlation		---	.641**
	Sig. (2-tailed)			0.000
Effectiveness	Pearson Correlation			---
**. Correlation is significant at the 0.01 level (2-tailed).				

Results of the Pearson correlation indicated that there is a significant large positive relationship between Adoption and Effectiveness, ($r (298) = .754$, $p < .001$). Similarly, results of the Pearson correlation indicated that there is a significant large positive relationship between Diffusion and Effectiveness, ($r (298) = .633$, $p < .001$). These values indicate that all the

variables are qualified for next level analysis of relationships among them. Thus, multiple regression analysis is carried out to finally test the hypothesised relationship between independent and dependent variables.

Table 4: Multiple Regression Analysis

	Coif	SE	t-stat	lower t0.025 (297)	upper t0.975 (297)	Stand Coif	p-value	VIF
b	4.36	1.72	2.53	0.97	7.75	0.00	0.01	
Adoption	0.97	0.08	12.49	0.82	1.12	0.58	0.00	1.67
Diffusion	0.40	0.07	5.86	0.27	0.53	0.27	0.00	1.67

Dep.Var= Innovation Effectiveness.
Adjusted R Square=0.611, F-value =236.136 D.F.=2,297, P=.000b

Results of the multiple linear regression indicated that there was a strong collective significant effect between the Adoption, Diffusion, and Effectiveness of Innovation, ($F(2, 297) = 236.14$, $p < .001$, $R2 = 0.61$, $R2adj = 0.61$). The individual predictors were examined further and indicated that Adoption ($t = 12.486$, $p < .001$) and Diffusion ($t = 5.862$, $p < .001$) were significant predictors in the model. R square (R2) equals 0.613921. It means that the predictors (Xi) explain 61.4% of the variance of Effectiveness of Innovation. The variance inflation factor (VIF) for both adoption and diffusion are well below the standard score of 10. And hence there is absence of multicolinieartiy in the model. Overall regression: right-tailed, $F(2,297) = 236.136003$, p-value = 0. Since p-value < α (0.05), we reject the H0.

Adoption of agricultural innovations plays a key role in growth of agricultural production. If better techniques are adopted other measures too will have to be taken to improve Indian Agriculture. It raises not only complex technical and economic problems but also social and cultural issues of utmost importance. As cultivable land is limited in supply and is less fertile in some regions, introduction of new technology has resulted in very high returns to resources as compared to costs. In the second stage the adoption level of agricultural innovations, factors influencing on adoption of agricultural innovations and constraints in adoption of agricultural innovations have been assessed on the basis of primary data collected from the study area. It was observed that farmers do vary in their adoption of innovation in agriculture according to the size of land holding. However, they did not significantly vary in diffusions of innovation and effectiveness of innovations. This could be explain in view of the size of land holding particularly the dry land that they were holding wherein it would be unwise to think of adoption and diffusion of innovations and therefore effectiveness also could not be found influenced by the land holding. However, there is significant variation in the adoption of innovations since they might be used to it in their wet lands.

Implications

The study identified innovative practices that have been successful in improving the productivity and yields of crops grown in Janagoan district. This information could be used by farmers to adopt similar practices, which could lead to increased agricultural productivity and income.

By promoting sustainable and innovative agricultural practices, the study could help improve food security in the Janagoan district by increasing the availability and quality of food crops. The study could promote the adoption of environmentally sustainable agricultural practices that can help reduce the negative impact of farming on the environment, such as soil erosion, depletion of groundwater resources, and overuse of fertilizers and pesticides.

Innovative practices could enable farmers to produce higher quality crops that meet the demands of local, regional, and global markets. This could lead to increased market access and higher prices for agricultural produce. By promoting innovative agricultural practices, the study could help improve the livelihoods of farmers in Janagoan district by increasing their incomes and reducing their vulnerability to climate change and other external shocks.

The findings of the study could be used to inform policy decisions and guide the allocation of resources to support the development of agriculture in Janagoan district. This could include the development of targeted interventions to support the adoption of innovative practices, the provision of credit and other forms of financial support, and the strengthening of extension services.

In sum, a study on "Innovations in agricultural practices in Janagoan District, Telangana State" could have significant implications for the development of sustainable agriculture in the region, and could contribute to broader efforts to promote sustainable and inclusive economic growth in rural areas of India.

Conclusion

A study on "Innovations in agricultural practices in Janagoan District, Telangana State" could have important implications for improving the agricultural productivity, food security, and rural livelihoods in the region. The study could identify the most effective and efficient agricultural practices in the region and the factors that contribute to their success. It could also help to identify the main challenges faced by farmers in the region, such as water scarcity, lack of access to credit, and market access.

By promoting innovative and sustainable agricultural practices, the study could help to improve agricultural productivity, increase market access, and enhance food security in the region. It could also help to promote the adoption of environmentally sustainable agricultural

practices, which can reduce the negative impact of farming on the environment. Additionally, by improving the livelihoods of farmers in the region, the study could contribute to broader efforts to promote sustainable and inclusive economic growth in rural areas of India.

In conclusion, a study on "Innovations in agricultural practices in Janagoan District, Telangana State" has the potential to provide valuable insights into the challenges and opportunities facing the agriculture sector in the region. By identifying best practices and promoting innovation, the study could help to improve the productivity, sustainability, and resilience of agriculture in the region, which could contribute to the long-term development and prosperity of the region.

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