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Digital pathways in agriculture: Understanding the profile of rural youth in contemporary agriculture

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Abstract

The present study aims to analyze the socio-economic, digital literacy, and behavioural profile of rural youth in the Waraseoni block of Balaghat district, Madhya Pradesh on the basis of literacy rate. From each selected village, 10 rural youth respondents were chosen. Data were collected from 120 respondents, who were selected via simple random sampling using a structured interview schedule. The study revealed that more than half of the respondents were educated up to graduate level and above (51.68%), while a majority belonged to the medium category in terms of annual income (79.17%), digital literacy (77.50%), information-seeking behaviour (79.17%), access to ICT (82.50%), exposure to social media (80.83%), risk orientation (60.83%), economic motivation (75%), migration behaviour (68.33%), and innovativeness (69.17%) further, most respondents had not attended digital agriculture training (73.33%). The results provide an in-depth understanding of the characteristics of rural youth, which are essential for designing interventions to enhance their engagement in agriculture.

Keywords: Digital agriculture, rural youth, digital literacy, ICT access, innovativeness

Introduction

Over the last few decades massive technological development and opportunities have transformed people's lives (Sahana *et al.*, 2019) ^[7].

It is well known that the contribution of agriculture to the Indian economy is less than 20% and the other sectors like services and industry have marched ahead in their contribution. Industry and service sectors which contribute most to the national gross domestic product (GDP) have progressed well in the use of digital technologies, while agriculture has lagged behind. Modern food systems in India need digital technologies to take Indian agriculture to the next paradigm. Digital technologies have made inroads into developing better crop varieties, good agronomic practices, efficient animal management, agricultural finance and marketing, processing and value chain management, 'Block Chains' for traceability. Digital agriculture, generally referred to as Agriculture 4.0, is an evolution of precision agriculture and is set to create a new paradigm in India in the complete food systems cycle. It refers to use of internet of things (IoT), sensors, big data, artificial intelligence (AI), satellites, and robotics (Rao, 2022) ^[6].

A National Youth Policy, 2014 modified the previous National Youth Policy 2003 and defined 'youth' as a person in the age group of 15-29 years (Khan *et al.*, 2023) ^[4].

Youth play a vital role in the successful transformation of agricultural sector in India. Youth will be interested in

taking the agriculture as a profession only if agriculture becomes both economically and intellectually attractive. The rural population is about 70%, and the indications are that the migration of rural youth to cities is around 45% in the country, which is quite alarming (Chander, 2013) ^[3]. Attracting and retaining youth in agriculture is critical for Indian Agriculture (Pulla and Nisha, 2024) ^[5].

Digital agriculture could promote greater inclusion of youth

Digitalization is rapidly transforming economies around the world and youth are greatly influenced by digital solutions and services. Digitalization is set to influence the way agrifood systems operate. However, the digital transformation process is uneven in geographic and socioeconomic terms, and in many areas, youth have restricted access to information and communications technologies (ICTs), including smart phones and the internet.

In order to correct the disparities and help youth, there is an urgent need to improve access to and knowledge of digital innovations. To address this, at the launch of a digital skills programme, the then FAO Representative for Rwanda, Gualbert Gbehounou, said, —Youth like innovations, new ways of doing things, using electronic gadgets, interacting online. Actually, they like a business that keeps them connected. We need to make sure that we introduce all the

digital approaches they prefer along the food chain, from farm to table Anonymous, (2025) ^[1].

Methodology

The Balaghat district of Madhya Pradesh was purposively selected for the study due to its higher literacy rate (77.09%) compared to the state average of 69.32% (Census of India, 2011) ^[2]. The district comprises 10 blocks out of which Waraseoni block was selected using the lottery method of simple random sampling. According to Census 2011, Waraseoni block consists of 78 villages, from which 15% (12 villages) were selected through the lottery method to ensure a representative sample (Census of India, 2011) ^[2].

From each selected village, 10 rural youth respondents were chosen randomly, constituting a total sample size of 120 respondents. Primary data were collected using a semi-structured interview schedule prepared in accordance with the study objectives. Secondary data were collected from research articles, books, government reports, policy documents, and authenticated websites. The data were analyzed using frequency, Percentage, arithmetic mean, standard deviation, Pearson's coefficient of correlation, and regression analysis to ensure accurate interpretation of the study findings.

Results and Discussion

Table 1: Profile of the rural youth

S. No.	Categories	frequency (f)	Percentage (%)	
Education				
1.	Illiterate	00	00.00	
2.	Can read only	01	00.83	
3.	Can write only	01	00.83	
4.	Up to Primary school (5 th class)	05	04.17	
5.	Up to Middle school (8 th class)	07	05.83	
6.	Up to High school (10 th class)	22	18.33	
7.	Higher secondary school (12 th class)	22	18.33	
8.	Graduate and above	62	51.68	
Annual income				
1.	Low income (<55,136)	04	03.33	
2.	Medium income (55,136-1,80,248)	95	79.17	
3.	High income (>1,80,248)	21	17.50	
Digital literacy				
1.	Low digital literacy (<75)	21	17.50	
2.	Medium digital literacy (75-101)	93	77.50	
3.	High digital literacy (>101)	06	05.00	
Digital Agriculture Training				
1.	Have you attended any training related to digital agriculture?	No	88	73.33
		Yes	32	26.67
2.	Types of training	Basic	27	84.37
		Advance	05	15.63
3.	Mode of training	Online	06	18.75
		Offline	26	81.25
4.	Who was organizer of the training?	Private	13	40.63
		Govt.	19	59.37
5.	Duration of training	Less than 1 month	32	100.00
		2 months	00	00.00
		More than 2 months	00	00.00
6.	Satisfaction	No	17	53.13
		Yes	15	46.87
7.	Was certificate provided for training?	No	23	71.88
		Yes	09	28.12
Information seeking behaviour				
1.	Low Information seeking behaviour (<12)	11	09.17	
2.	Medium Information seeking behaviour (12-18)	95	79.17	
3.	High Information seeking behaviour (>18)	14	11.66	
Access to information communication technology				
1.	Low access to ICT (<36)	07	05.83	
2.	Medium access to ICT (36-46)	99	82.50	
3.	High access to ICT (>46)	14	11.67	
Exposure to social media				
1.	Low Exposure to social media (<18)	09	07.50	
2.	Medium Exposure to social media (18-20)	97	80.83	
3.	High Exposure to social media (>20)	14	11.67	
Risk Orientation				
1.	Low Risk Orientation (<15)	15	12.50	
2.	Medium Risk Orientation (15-21)	73	60.83	
3.	High Risk Orientation (>21)	32	26.67	
Economic Motivation				
1.	Low Economic motivation (<19)	14	11.67	
2.	Medium Economic motivation (19-25)	90	75.00	

3.	High Economic motivation (>25)	16	13.33
Migration behaviour of rural youth			
1.	Low migration behaviour (<28)	11	9.17
2.	Low migration behaviour (28-46)	82	68.33
3.	Low migration behaviour (>46)	27	22.50
Innovativeness			
1.	Low innovativeness (<20.2)	17	14.17
2.	Medium innovativeness (20.2-25.4)	83	69.17
3.	High innovativeness (>25.4)	20	16.66

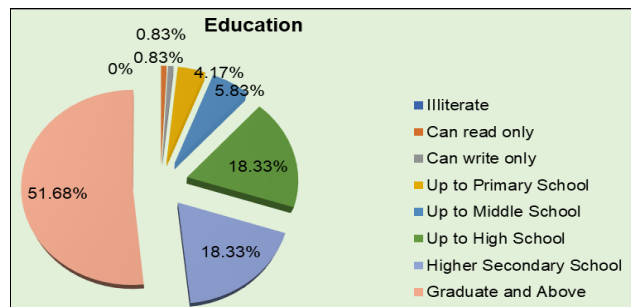


Fig 1: Percentage Distribution of the rural youth according to their Education

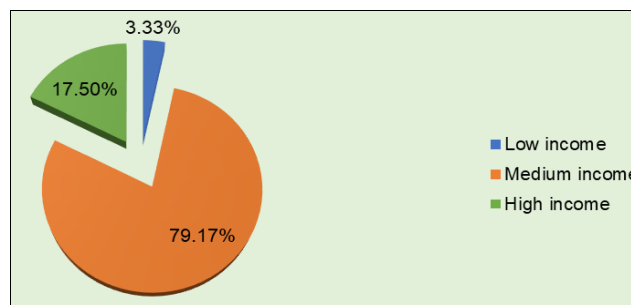


Fig 2: Percentage Distribution of the rural youth according to their Annual Income

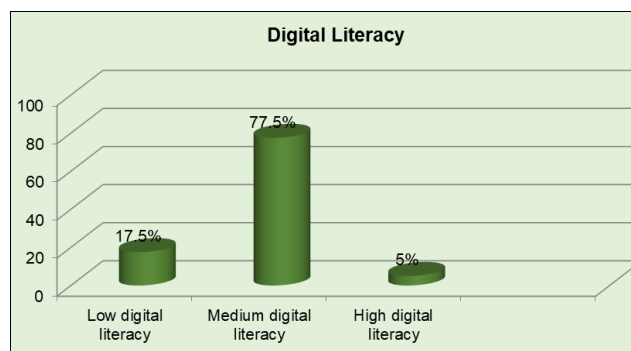


Fig 3: Percentage Distribution of rural youth according to their Digital Literacy

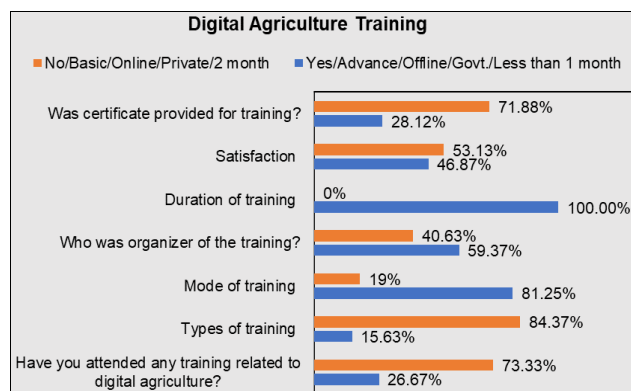


Fig 4: Percentage Distribution of rural youth according to their Digital Agriculture Training

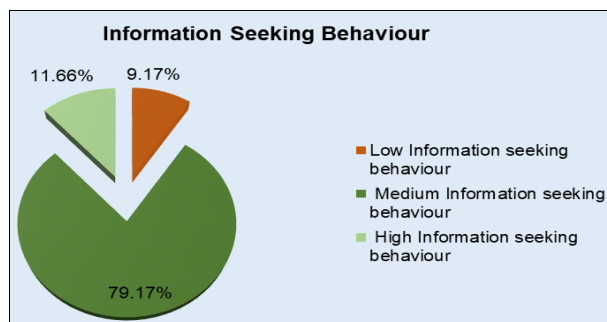


Fig 5: Percentage Distribution of rural youth according to their Information Seeking Behaviour

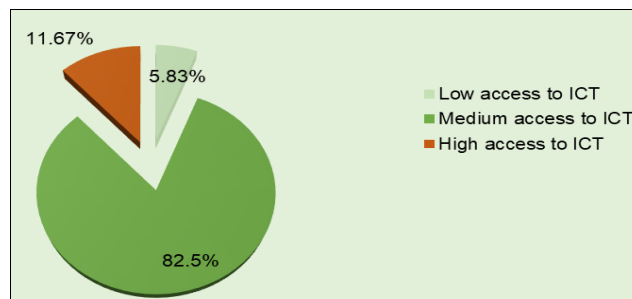


Fig 6: Percentage Distribution of rural youth according to their Access to Information Communication Technology

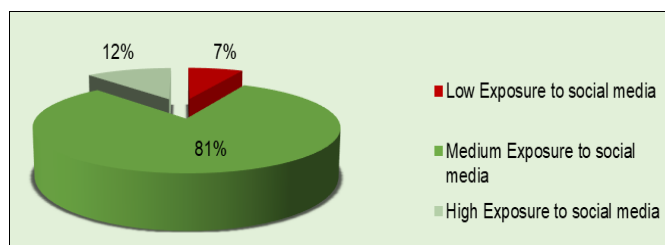


Fig 7: Percentage Distribution of rural youth according to their Exposure to Social Media

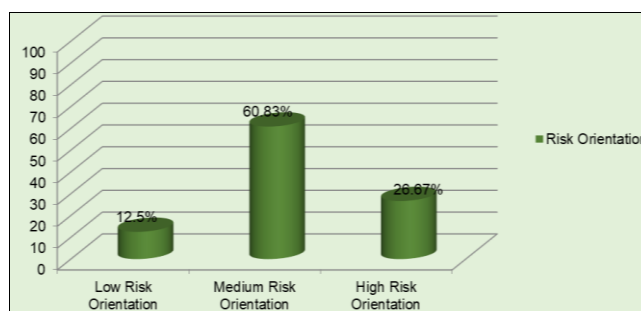


Fig 8: Percentage Distribution of rural youth according to their Risk Orientation

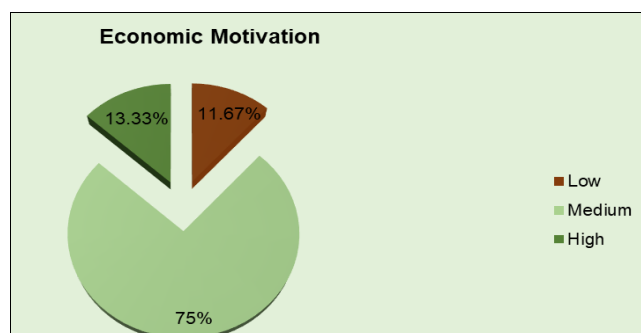


Fig 9: Percentage Distribution of rural youth according to their Economic Motivation

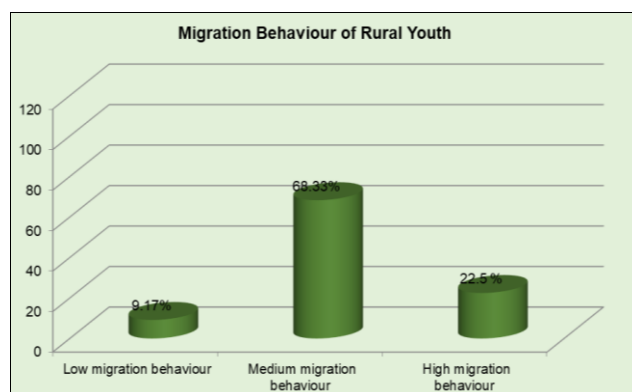


Fig 10: Percentage Distribution of rural youth according to their Migration Behaviour

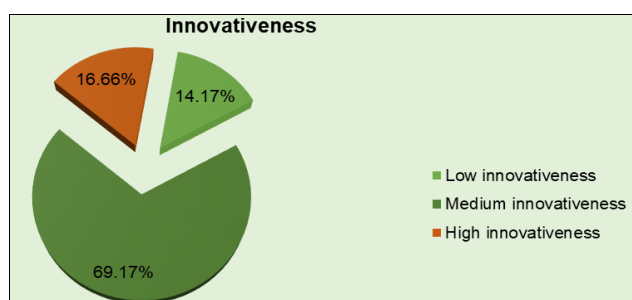


Fig 11: Percentage Distribution of rural youth according to their Innovativeness

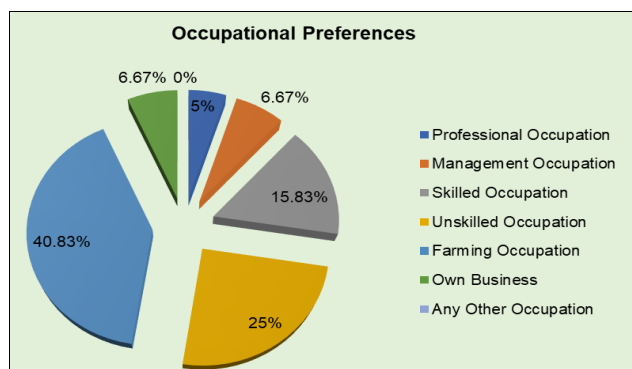


Fig 12: Percentage Distribution of rural youth according to their Occupational Preferences

A comprehensive analysis of the profile of rural youth revealed that the majority (51.68%) were graduate and above. 79.17% had medium level of annual income. A large proportion (77.50%) exhibited a medium degree of digital literacy, 73.33% rural youth had not attained digital agriculture training and 26.67% had attained digital agriculture training, 79.17% rural youth showed medium information seeking behaviour, 82.50% medium access to information communication technology, 80.83% rural youth had medium exposure to social media, 60.83% were observed to have medium risk orientation, 75.00% demonstrated medium economic motivation, 68.33% rural youth had partially migrate, Additionally, 69.17% rural youth had medium level of Innovativeness followed by 16.66% of rural youth who had high level of Innovativeness.

Conclusion

This study concludes that rural youth largely exhibit a moderate socio-economic and digital profile. More than half (51.68%) were graduates and above, while 79.17% belonged to the medium income group. A majority showed medium digital literacy (77.50%), information-seeking behaviour (79.17%), ICT access (82.50%), and social media exposure (80.83%). However, most (73.33%) had not received digital agriculture training, indicating a skill gap. Medium levels of risk

orientation (60.83%), economic motivation (75.00%), migration behaviour (68.33%), and innovativeness (69.17%) suggest cautious yet potential readiness for digital agriculture.

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