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From Field to Future: Analysis on the role of ICT awareness among FPO's in Dang, Gujarat

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Abstract
Technology driving the activities of mankind is the current trend in the world. The innovations in Information, Communication & Technology (ICT) field penetrating, perpetuating and proliferating in various sectors of Indian economy is the reality. The innovations sparking in terms of IR 5.0, Artificial Intelligence (AI), big data, automation, machine learning and the like are pronouncing more than ever before. However, there are some geographical areas which are far from reality and one such region is Dang region of Gujarat, India where the community has not seen the lights of economic and digital developments. In what way the ICT developments can create an impact on ushering agricultural development ensuring progress in their quality of live has been addressed in this study. This paper is intended to discuss the importance of ICT for development of agriculture sector solving problems of small and marginal farmers, role of Farmer Producer Organization (FPO) in educating farmers enhancing their digital skills for improving economic status of farmers specifically in the Dang region of Gujarat have been discussed. Strategies and interventions are suggested for digital inclusion of farmers along with exploring innovative technology in farming and cultivation for promoting farmers' convenient, compatible and competitive business acumen in the contemporary market. The necessity of awareness and adoption of ICT for small and marginal farmers is highlighted.

Keywords: ICT, Farmer, Farmer Producer Organization, Agriculture

I. Introduction:
The proposition of agricultural development adopting innovation remains undisputed. By the year 2023 approximately 42.6 percent of India's workforce was engaged in agriculture, making it the country's largest sector of employment (Ministry of Statistics and Programme Implementation, 2023; World Bank, 2023) . For the rural population that has limited access to alternative jobs, it remains one of the most significant sources of income and sustenance (NITI Aayog, 2023). This sector supports the livelihoods of millions, including farmers, agricultural workers, and merchants, and has significantly reduced poverty and income inequality in rural areas (FAO, 2023; ILO, 2023). The country's social peace and inclusive development depend on the socio-economic stability that agriculture sector provides (Economic Survey of India, 2023). With a population exceeding 1 billion, it's challenging to feed the population, and agriculture plays a very important role in this regard (United Nations,

2023). Post the Green Revolution of the 1960s and 1970s, when India faced an acute food crisis, the country emerged as a global leader in grain production, especially in rice and wheat (FAO, 2021; Planning Commission, 2013). The agricultural sector not only ensures food security but also proved resilient during the COVID-19 crisis, continuing to serve as a pillar of the economy (Food & Agriculture Organization, 2021). Agriculture forms the backbone of the rural areas in India, where 65 percent of the population resides and a majority are engaged in agricultural activities (Ministry of Rural Development, 2023). The expansion in agriculture promotes non-agricultural ventures and services and also diversifies income sources and creates additional employment opportunities within the rural areas (International Labor Organization, 2023). Adopting sustainable agriculture techniques is crucial for conserving the country's natural resources like water, soil, and bio-diversities (Ministry of Agriculture and Farmers' Welfare, 2023). Practices like agroforestry, crop rotation, and organic farming help preserve ecological balance, while sustainable methods such as integrated pest management and conservation tillage are vital for maintaining environmental health. Excessive use of chemical pesticides and fertilizers, groundwater depletion, and deforestation are few of the problems faced by Indian agriculture (Indian Council of Agricultural Research, 2023). Unfortunately, the problems that threaten agricultural and environmental health have no permanent solutions; they can only be solved through environmentally sustainable approaches (International Food Policy Research Institute, 2023). Nestled in the southeastern corner of Gujarat, Dang district is a region renowned for its lush greenery, rugged terrain, and vibrant tribal cultures. This area, primarily inhabited by indigenous communities like the Warli, Bhil, and Kokna, is characterized by its hilly landscapes and dense forests. The Dang farmers, who have lived and farmed in this unique environment for generations, have developed a set of agricultural practices that reflect their deep connection to the land and their adaptation to the region's challenges. The Dang district, ranked as India's most backward by the Planning Commission (2003), has a 94.6% tribal population, with 79% living below the poverty line. The district is home to 13 tribes, with Bhils and Kokana forming two-thirds of the population, alongside Primitive Tribe Groups like Kotwalia, Kathodi, and Kocha. Dang experiences heavy rainfall, averaging 2491 mm annually between June and October. Irrigation relies on wells, lift irrigation, and mobile pump sets, with only 6% benefiting from flow irrigation. Farmers' income is split between agriculture (52%) and other sources (48%), with an average household earning Rs. 86881. Many farmers own buffaloes for farming (65%) and televisions (47%), though only 12% own bicycles due to the terrain. Motorcycles, jeeps, and tractors are owned by 35%, 6%, and 6% of farmers, respectively, indicating the economic effects of irrigation. The following Figure 1 is the geographical information related to Dang Region.

1.1 Inevitability of Agriculture sector in India

The development of small-scale agriculture business is a factor to the three dimensions of Sustainable Developmental Goals (SDGs) viz; Eliminate poverty (SDG1), Zero hunger (SDG2) and Sustainable consumption and production (SDG3) has been highlighted (FAO, 2015). Agenda 2030 is for sustainable development being adopted in the UN in 2015, selecting agriculture as one vital goal out of 17 Sustainable Developmental Goals contemplates the importance of agriculture sector. Agriculture sector having potential to create new jobs necessity of digitalization for strengthening Agricultural Value Chains, new digital economy providing numerous solutions to agriculture problems (FAO, 2021), using ICT for improving food production are some of the key findings. The need of strong political will, active participation of farmers along with their family members in the digitization of agricultural activities is discussed. The development of agriculture sector is vital for the world

not only from the present need but also to meet the threat of food crisis (Ernawatiningsih *et al.* 2021). Agricultural development provides support for the welfare of the rural people (Usman, and Ayustia, 2019). However, the gradual shrinking of grain area per person), bureaucratic and financial constraints in agriculture sector necessitating leading agricultural extension of services

Figure 1: Geographical information of Dang region as published by Govt. of Gujarat (2022)

(Pranadji, 2016), inadequate pre-harvesting and post-harvesting services and credit facilities are the problems of farmers in India which need to be addressed. It is pertinent to strengthen agricultural sector globally. The development of identification technology and automated harvesting tools by Eldert Van Henten is helpful in identification of ripening level of pears, bananas and peaches in Netherlands has multifarious advantages. This tool is helpful in detecting the levels of chlorophyll and anthocyanin pigments by connecting to the fruits along with determining fruit size with accuracy with a well-equipped color combination detective camera. The detecting time of fruits, ripening level, plant health information, present and projected life span of fruits, real time monitoring of plants can be done by applying innovative tools. Technological innovations in terms of machines, equipment, tools are beneficial to farmers in Indonesia was delineated (Pranadji, 2016). It is cost effective as well as less time consuming for management of crop production processes and activities. The successful implementation of any innovative and technological measures is dependent on farmers' perception and characteristics of technological measures. Simple, user friendly, cost effective, adequate strength, durability, accuracy and quality assurance are the features of technology expected by farmers and other users (Rogers, 2003) being essential in agriculture sector.

1.2 Problems of small and marginal farmers in India

The small and marginal farmers in developing countries including India have multifaceted challenges (Nagaraju and Shubha, 2024). The farmers having problems in market accessibility, awareness of agricultural schemes, agricultural credits and adopting to ICT (Information, Communication and Technology) are the key areas of concern. The availability of, quality seeds, proper irrigation system, availability of labor for cultivation & crop production, inadequacy in power, lacking modern machinery & equipment, less awareness regarding use of pesticides, crop diseases, market linkages, inadequate storage facilities have been highlighted as the problems of small and marginal farmers in India (Amitha *et al.* 2021). Further, the adverse impact of climate change and erratic weather were the challenges for Indian farmers (Dubey and Singh, 2022). Goyal *et al.* (2016) discussed how Indian agriculture is subsistent in character. The population growth and increasing industrialization and urbanization exerting pressure on agriculture sector has to be addressed by State through appropriate policy measures to bring developmental parity among all sectors has been suggested. The use of primitive technology by farmers in rainfed areas, inadequate irrigation facilities, poor economic status of farmers and lack of infrastructure facilities are problems of farmers in India. The loss of agricultural land, scarcity of capital, lacking proper storage facilities, soil erosion especially in coastal areas, fragmentation of land holdings, lacking modern machinery for small farmers and land ownership disputes are the issues persist in Indian agricultural sector. The Indian Government has introduced various schemes applying production-centric approach as well as income centric approach for the development of agricultural sector (Nagaraju and Shubha, 2024).

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1.3 Information, Communication & Technology (ICT) and Agricultural Development

The Information Technology (IT) is a tool or medium to enable transfer of knowledge among people (Riyadi *et al.* 2021). Information and technology encompass a wide range as a set of technologies, including microcomputers, for the gathering, storage, retrieval, processing and distribution of information, as well as presentation of data in various formats such as text, audio, video, graphics, pictures etc. (Isjoni and Ismail, 2008). ICT is such a technological evolution which serves as a helping hand in the process of presentation, visualizations, discussion or execution on a particular innovation or activity (Mosher, 1991). The economic and technical benefits of agricultural innovation were emphasized (Rogers, 2003; Edwina and Maharani, 2010; Siregr, 2006), examined the significance of smart farming technologies in helping Australian farmers to address the production and environmental concerns (Reichelt and nettle, 2023). Electronic Nation Agricultural Marketing (e-NAM) as an innovative initiative for marketing agricultural products ensuring accessibility by farmers and traders digitally being analyzed by (Dubey and Singh, 2022). The benefits of online trading platform for agricultural products and commodities are essential in India are being highlighted. Out of 6600 regulated wholesale markets in India, 1000 Agricultural Produce Market Committees (APMC) markets have been integrated with e-NAM operating in 18 States and 3 Union Territories as of 2022. The e-NAM beneficial to farmers and traders in India, lacking adequate technical and digital application awareness among Indian farmers especially small and marginal farmers (Reddy, 2018; Rose and Chilverse 2018) ; inadequate digital and physical infrastructure, non-availability of technical man power to transfer skills to small and marginal farmers, need of financial and digital inclusion of Indian farmers (Dubey and Singh, 2022) are the findings reflecting the importance of technology and the real scenario of farmers in India. And peculiarity is that agriculture is still considered as one of the low-profile activities in some regions of India though such assessment is driven by regional culture.

(Smidt and Osden, 2021) in their study identified social, economic and political as three components affecting the implementation of digital technology by small level farmers in various stages of agriculture chain of value starting from production to final consumption. The important role of Government in providing developmental implementational framework and farmers' participation were highlighted for facilitating digital technology in agriculture sector in South Africa. The researchers having passionate pertaining to bright future of farmers using technology was highlighted referring 36 selected studies from 2014 to 2019 was analyzed. The developments in technology being useful in agriculture sector has been collated and tabulated in Table 1.

Table 1: Advantages of ICT for Agriculture sector and Depending Factors. Compiled using different articles.

Advantages	Depending Factors
Improving from low productivity to high productivity, high competitiveness, recovery of national economy and able to complete globally. It is in US context (Priyanto, 2018)	Farmers' attitude, awareness, comfortability, adoptability to use technology

Increase in the efficiency and effectiveness of production process, improves decision making, enables farming activities easy and faster, facilitates farming transaction process (O' Brien, 2006)	Farmers' awareness and extent of using technology
The Agricultural revolution is propelled by the introduction of new machinery and methodologies which enhance the processes and end results of the farming output (Nuryanti and Swastika, 2011)	Farmers' awareness and ability of adopt technology
Application of pesticides, accuracy in plantation, crop farming, farm maintenance, assessing crop health, cultivation, collection, storage, distribution, harvesting activities are facilitated by technology (Garnet *et al.* 2013)	Farmers' awareness about modern farm-based technology
Waste management in agriculture sector, retaining fertility power of soil determined by technology, advisory role and guiding instruction by innovative technology (Pranadji, 2016)	Farmers' awareness about modern technology
Managing farm-based enterprise, welfare of farmers by technology in South Asian nations in general and Indonesia in specific, (Pranadji, 2016)	Farmers' awareness and interest in adopting to innovative technology, training imparted to farmers, education level of farmers
Enhancing farm management (Gumbira and Harizt, 2001)	Farmers' education and perception about technology
Farming culture and farming needs determined innovatively, minimizing region-wide disparity in agricultural development globally (Ernawatiningsih *et al.* 2023)	Level and extent of training imparted to farmers, education level of farmers
Value added in production process (Priyanto, 2018)	Farmers' education and interest using technology
Suitability of machinery and equipment high potentiality to yield more agricultural production (Edwina and Maharani, 2010)	Scale and type of business, financial ability of farmers
Enhancing quality and quantity of production, effective management of land, value added to production process and ensuring food security in Thailand and Indian context (Dabukke and Iqbal, 2014)	Efforts of Government and other stakeholders participating in technological innovation and its management
Better management of agricultural farms and improving farmers' income by using technology as part of "Seven-echoes of revitalization" in Indonesia (Dan, Hui-wei, Zi-min and Qiao, 2021)	Implantations of long-term strategy of Government, quality of research and farmers' skill development programs, dissemination of appropriate technology to farmers by awareness
Improving quality of working and social life of farmers (Adriani *et al.* 2018)	Farmers' perception and interest using technology, decision to join cooperatives

Increasing productivity of rice and welfare of farmers in Ghana and other nations of Africa (Tanko, Ismaila and Sadiq, 2019)	Implementation of food and employment programs of Government
Managing production and managing environment in eco-friendly manner in Bali, Indonesia context (Wayan and Sri, 2021)	Farmers' awareness on use of fertilizers and cultivating superior rice varieties
Farmers' decision-making ability in South-East Asian nations in general and Indonesia in particular (Nuryanti and Swastika, 2011; Rahmat and Izudin, 2018)	Facilitating role of farmers' groups (*Gopaktan*) and Govt. support system availed to groups (*Kapokutan*)
Incurring more profits and improving farm productivity (Wayan and Sri, 2021)	Farmers' intention using technology
Attaining operational excellence in terms of effective management of water, pesticides, land, energy, waste and insurance of farm products (Lee *et al.* 2017)	Political willingness and digital infrastructure provided by Government
Improving supply chain management viz; food security, marketability of produce, value added in intermediaries, linkage of buyers with sellers, transparency in price fixation in South-Africa especially in Sudan, Kenya and Nigeria in particular (Lee *et al.* 2017)	Digital infrastructure developed by Government
Profitability to farmers in USA context, managing environment	Perception and adopting level of farmers towards use of technology

II. Materials and Methods:

The small and marginal farm households constitute around eighty per cent of total farm households delineating a significant portrait of farmers in India (Singh and Vatta, 2019). The problems of small-farm households viz; lacking capital to invest in large enterprising activities, lacking market channels to sell their products in State and national level market, entering into global agricultural value chains and their networks have been identified as areas of concern (Reardon and Barrett, 2000). The need of creating market linkages for farmers (Dev, 2012; Trebbin, 2014), importance of agriculture & food production technology and adopting to such technology by farmers have been analyzed (Kirsten and Sartorius, 2002; Singh, S. 2012). The research findings illustrate the lack of infrastructure of small and marginal farm households, selling products at less competitive prices by farmers, less economic gain by *mandi system* for small and marginal farmers, inadequate technical services of farmers (Govt. of India, 2013). The basic focus of this study is investigating the challenges faced by small and marginal farmers, particularly in adopting technology. This research evaluates the role of Farmer Producer Organizations (FPOs) in addressing these challenges and enhancing technological adoption. This study centers on Subir, Ahwa and Waghai village in the Dang District of Gujarat, where data is collected from farmers who are active members of an FPO. Additionally, field staff from Non-Governmental Organizations (NGOs) associated with the FPO participated in an opinion survey, contributing valuable perspectives that enrich the findings.

2.1 Participants

The research focuses on three regions within the Dang district of Gujarat: Subir, Ahwa, and Waghai. These areas are chosen for their socio-economic and agricultural diversity, which makes them representative of the broader challenges and opportunities within the district. Subir is characterized by its higher tribal population and traditional farming practices, Ahwa serves as the administrative hub with relatively better infrastructure, and Waghai showcases a mix of small-scale commercial agriculture and subsistence farming. These regions collectively provide a robust platform for analyzing the interplay between ICT adoption, FPO activities, and agricultural development.

2.2 Research Design

A **descriptive and Exploratory research design** is employed to systematically describe the current status, challenges, and opportunities related to ICT adoption and FPO involvement among farmers in the Dang district. This design is particularly suitable for capturing diverse perspectives and providing a comprehensive understanding of the research problem.

2.3 Sampling Method

2.3.1 Population

The study is focusing on farmers who are active members of FPOs in Subir, Ahwa, and Waghai. These farmers represent small and marginal agricultural households that are critical to the study's objectives.

2.3.2 Sample Size

Data collection is conducted over a two-month period (15th November 2024 to 15th January 2025). A total sample size of 300 farmers (100 from each region viz. Subir, Ahwa and Waghai) is selected. This size ensures manageable data collection while providing sufficient representation for meaningful analysis.

2.3.3 Sampling Technique

A **purposive technique** is used for ensuring inclusion of farmers with varying levels of ICT adoption and agricultural practices. This approach is instrumental in capturing a diverse range of experiences and insights relevant to the research questions.

III. Results:

3.1 Quantitative Analysis: The analysis is being done using SPSS Software in that Kruskal Wallis test and Mann Whitney U Test is used for 300 samples as shown in the Table 2.

Table 2: **Consolidated table of Kruskal Wallis Test and Mann-Whitney U test from SPSS**

Age (Kruskal Wallis Test)		
Chi-square	1.390004	
Degree Of Freedom	3	
Asymp. Sig.	0.707880	H_0 is accepted
Annual Income (Kruskal Wallis Test)		
Chi-square	7.206154	

Degree Of Freedom	3	
Asymp. Sig.	0.065609	H_0 is accepted
Land Ownership (Kruskal Wallis Test)		
Chi- Square	14.360531	
Degree of freedom	3	
Asymp. Sig.	0.002453	H_0 is rejected
Gender (Mann Whitney U Test)		
Mann-Whitney U	6078.000000	
Wilcoxon W	26581.000000	
Z	-5.451078	
Asymp. Sig.	5.0065E-8	H_0 is rejected
Experience (Kruskal Wallis Test)		
Chi-Square	22.016	
Degree of Freedom	3	
Asymp. Sig.	.000	H_0 is Rejected
Qualification (Mann Whitney U Test)		
Mann-Whitney U	9988.000000	
Wilcoxon W	17491.000000	
Z	-1.185324	
Asymp. Sig.	0.235889	H_0 is accepted

The variables were tested using SPSS software and the figures in the table generates the values derived from the software and is not manually written. As the p-value is less than 0.05 the null hypothesis is rejected and as a result variable viz. Age, Annual Income and Qualification has no significant difference with the level of awareness of technology among the respondents. As the p-value is more than 0.05 the null hypothesis is accepted and as a result variable viz. Land Ownership, Gender and Experience indicates the significant difference with the level of awareness of technology among the respondents. This result suggests that the demographic variables like Age, Annual income and Qualification has no substantial difference among groups, therefore they are considered as critical determinants. Furthermore, Land ownership and Experience plays a significant role in technological awareness as observed from the data collected 244 among 300 respondents are doing farming for 10-20 years which signifies that farmer who owns the land has more experience in farming so their level of understanding the technological aspect is more and even, they are more likely to accept the change. They do know the day-to-day problems being occurred and that can be decreased or nullified by the technology than they are willing to accept the change.

3.2 Qualitative Analysis

A qualitative analysis was used to help respondents in answering freely what they feel about technological advancements in agriculture sector. They were asked 2 questions which are as follows and the model was made based on the responses given by the respondents which are as follows:

3.2.1 What are the primary barriers to using ICT in your farming practices?

This question talks about the problems the farmers are facing while using technology in their farms. The Figure 2 shows the responses given by the respondents and as it can be seen that all of them faces different problems like language, electricity, also the major problem observed is lack of awareness among the farmers. They don't even know that such kind of

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technologies do exists. So, more awareness needs to be created so as to make dang digitalized. But one thing should also be noticed that Dang is a region where there is no proper infrastructure for using technology**.**

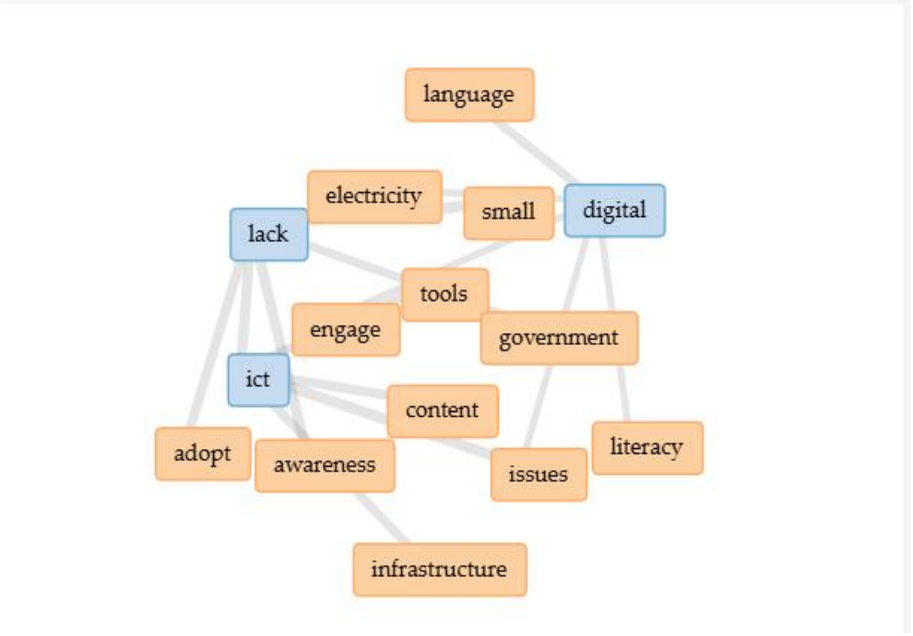

Figure 2: Barriers relationships in using ICT for farming practices in Dang region

3.2.2 How can ICT and FPO collaboration improve your farming outcomes?

Figure 3: Answers obtained from the farmers for using ICT in farming practices

The respondents were asked that whether usage of ICT will improve farm practices and how can it improve. So, the respondents gave so many answers which can be seen in the Figure 3. Most of the respondents gave answers like improved access to market, improved crop health, weather monitoring etc. The farmers do know the importance of technology in agricultural

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advancements but the awareness of usage and moreover the awareness regarding advanced farming tools is missing which can be created by organizing various camps, improving the infrastructural facilities are the suggestive measures which can be applied for the betterment of farmers.

IV. Discussions:

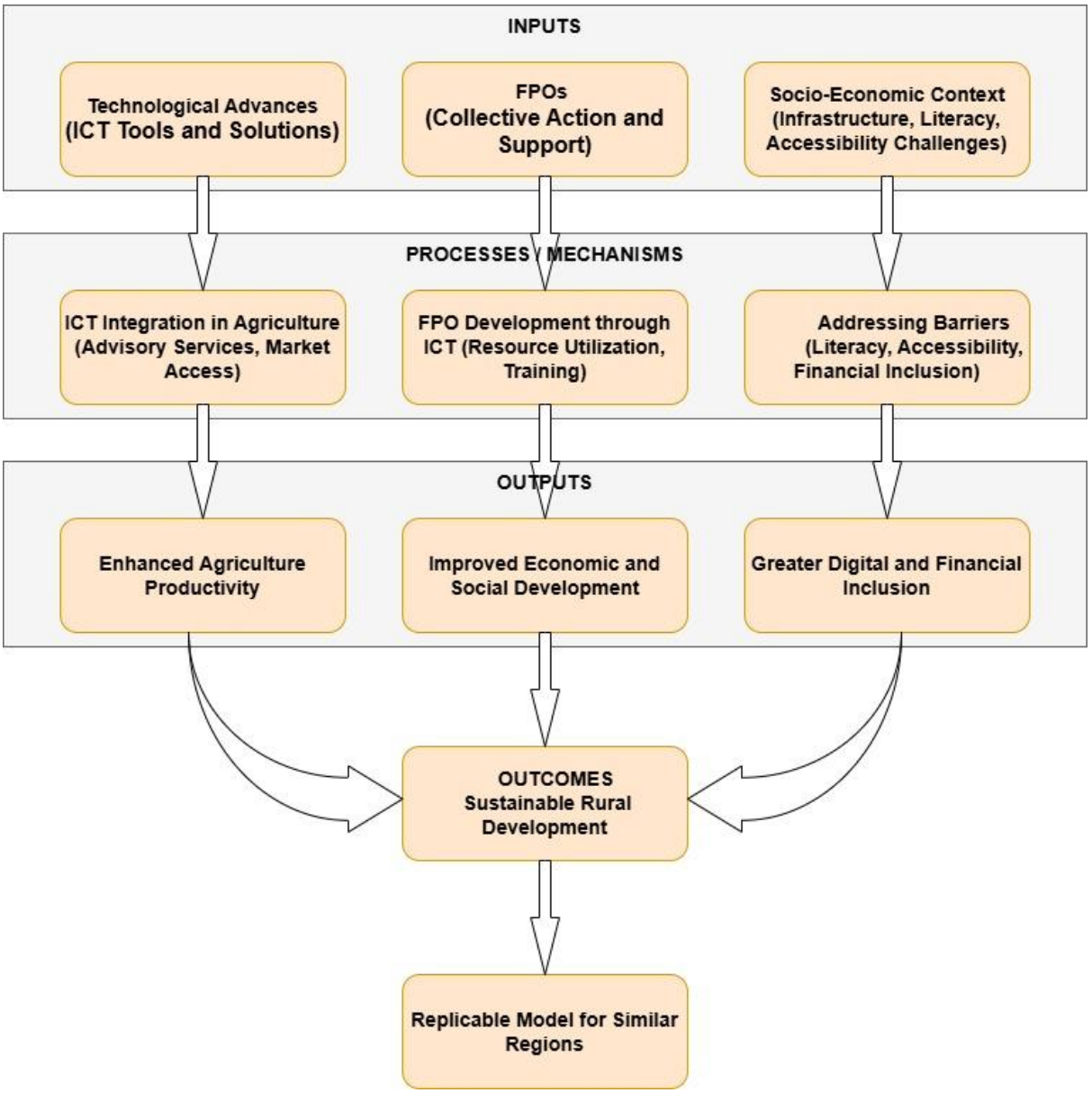

Figure 4: ICT-Driven Mechanisms for Sustainable Rural Development: A Holistic Framework made using Python

Fig. 4 depicts the holistic framework of Dang Region that with the help of ICT the region can grow more and can generate more agricultural productivity, market utilization, social development, Infrastructure etc. And this framework is not only helpful for the Dang region but for all the other regions as well having FPOs. This figure serves as a catalyst in agricultural development through ICT. Each of the elements in this figure are explained below:

A. Inputs:

The framework begins with the 3 input categories:

- Technological advances (ICT tools and solutions): This refers to digital tools, platforms and different services than will enhance the agricultural productivity and market access.
- FPOs (Collective action and support): FPOs play an important role in enhancing cooperation, resource sharing and collective decision making among farmers.
- Socio-economic Context (Infrastructure, Literacy, Accessibility Challenges): External socio-economic factors, including available infrastructure, literacy levels and accessibility constraints, influence the success of agricultural initiatives.

B. Processes/ Mechanisms:

These inputs contribute to 3 key processes that enable agricultural and economic transformation:

- ICT integration in Agriculture (Advisory services, Market access): The use of digital technology to provide farmers with essential information, market opportunities and advisory services, which will help them to market their own products and make them self-reliant.
- FPO Development through ICT (Resource Utilization, Training): Digital tools help FPOs with better resource management, training and overall development. That will enable farmers to develop and learn new technologies.
- Addressing Barriers (Literacy, Accessibility, Financial Inclusion): ICT solutions are leveraged to overcome challenges related to literacy, accessibility and financial inclusion, ensuring wider participation.

C. **Outputs:**
These processes lead to tangible outcomes in 3 main areas:

- Enhanced Agricultural Productivity: Improved farming practices, increased yields and better resource efficiency due to ICT driven solutions.
- Improved Economic and Social Development: Economic upliftment through better market access, financial inclusion and capacity building.
- Greater Digital and Financial Inclusion: More farmers gain access to digital platforms and financial services, reducing socio-economic disparities.

D. **Outcomes:**
- Sustainable Rural development: The combined effect of enhanced productivity, economic growth, and financial inclusion contributes to the overall development of rural areas.
- Replicable Model for similar regions: The framework serves as a scalable and adaptable model that can be implemented in other regions with similar socio-economic conditions.
- The diagram visually represents the flow of inputs leading to structured processes, resulting in key outputs, which ultimately drive sustainable rural development. The interconnected pathways highlight how ICT and FPOs work together to address challenges and create replicable models for agricultural and rural progress.

Conclusions:

Agricultural sector of India is a major contributor to the country's total gross domestic product (GDP). According to the estimate of the World Bank, agriculture has about 16 percent of the GDP of India in 2023 (World Bank, 2023) though its proportion is gradually coming down from years because of the growth of the service and industrial sectors (Ministry of Finance, 2023). This significant accomplishment highlights the sector's lasting significance. For that matter, many other categories of industries have agriculture products as their principal source of raw materials (FICCI, 2023). These outputs play a very important role in the agro-based industries which include the food processing industry, sugar industry and textile industry (FAO, 2023) [29]. For instance, the cotton produced in the Indian farms plays a crucial role in the textile sector which is among the major sources of export for the country (IBEF, 2023). Therefore, the performance of such sectors and economy in general, depends on the condition of the agriculture sector (Economic Survey of India, 2023). This study highlights various problems which farmers face while adopting technology during farming, with lack of awareness being the most crucial variable amongst all. Many farmers are unaware about the technological advancements which took place in the market due to many barriers like language, infrastructure in the Dang Region. Despite of these challenges farmers do recognize the benefits which ICT can bring to their lives, making it more accessible and easier. To achieve this more and more awareness needs to be created. The statistical analysis reveals that the age, annual income and qualification do not significantly impact technological awareness whereas gender, land ownership and experience do affect significantly to the technological awareness. Experienced farmers those who do own the land are more adaptable to the technological change as they better understand the farming challenges and potential of technology to lessen the farming challenges. To bridge the gap more campaigns, infrastructure facilities and training programs can be arranged to improve the same.

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Declaration of Interests:

We declare no conflict of interests in this research.

Ethical Considerations

The study ensures the informed consent from all participants, maintaining confidentiality and anonymity of responses.

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