**Digital Technology in Agribusiness of North East India**

**ABSTRACT**

The Indian economy relies significantly on agriculture, employing around 42.3% of the workforce and contributing 18.2 % to the GDP in the financial year 2023-24. However, the sector faces challenges due to the fragmentation of farmlands, with 89.4% cultivated by small and marginal farmers who own less than 2 hectares of land. To address these issues for improving farmers' livelihoods, forming Farmer Producer Organizations (FPOs) has emerged as a promising solution. These organizations bring together individual farmers, enabling economies of scale and enhancing their income prospects. In recent years, the integration of digital technology has played a crucial role in strengthening FPOs and addressing various challenges. Moreover, digital services have facilitated capacity building among farmers but progress in digitization in the North East Region (NER) of India has been slow compared to other parts of the country. To gain insight into the usage of digital technology by FPOs and agripreneurs in the NER, a study was conducted during the 1stNorth East Conclave held at CPGS-AS, CAU (I), Umiam, Meghalaya. A sample of 22 respondents was selected based on convenience sampling. Primary data was collected through a semi-structured interview schedule and descriptive statistics was used to analyse the obtained data. To gain a better understanding of the prevailing scenario, various data from secondary sources were also studied. The study found that mobile phones were the participants most widely used digital tools. The SWOT analysis of digital technology highlighted strengths such as high mobile phone penetration. On the other hand, weaknesses included low e-literacy levels and limited internet connectivity. Opportunities identified were related to digital marketing, remote monitoring, and advisory services, while threats included rapid technological changes, duplication, and contradictory information flow. Based on the study's findings, the way forward involves investing in improving digital infrastructure, particularly internet connectivity, to ensure seamless access to digital solutions for farmers. Establishing regional e-commerce platforms can directly connect farmers with buyers, eliminating intermediaries and empowering farmers with better market access. These steps can contribute to the modernization and digitization of agricultural practices in rural India, ultimately leading to improved livelihoods and income augmentations for farmers in the NER.

Keywords: FPOs, Digital technology, SWOT Analysis, e-commerce

**INTRODUCTION**

India is primarily an agrarian economy, employing nearly 42.3 per cent of the country’s workforce and contributing 18.2 per cent to India’s Gross Domestic Product (GDP) in the financial year 2023-24. (Economic Survey, 2023-2024). 89.40 per cent of the country’s farmlands are cultivated by small and marginal farmers, with a land area of less than 2 hectares (GoI, 2023). Farm holdings in India are thus severely fragmented and scattered, and pose a mighty challenge to the government with respect to implementing policies and initiatives to improve the livelihood and income of these farmers (Cropin, 2019). Fragmented landholding, high cultivation costs, and limited access to resources make small holding agriculture unviable for small and marginal farmers. Small growers encounter issues such as low-tech adoption, insufficient support, poor infrastructure, poor business skills, financial constraints, and market inefficiency (Dubey, 2021). The changes like arising from export markets, local supermarkets and new processing firms allow farmers to get benefits from opportunities (Bijman, 2016). However, these new markets calls for higher production and food safety standards and the stronger coordination of sequential activities in the value chain (Mengesha *et al*., 2013).The requirements of high costs of compliance with these standards might ignore the small farm holder from these new markets (Latynskiy and Berger, 2015).To tackle agriculture sector challenges effectively, the formation of Farmer Producer Organizations(FPOs) is increasingly acknowledged as a viable solution (Cropin, 2019).

FPOs has been described as an entity that represents farmers in a given geographical area and deals with their agriculture enterprise-related needs (Esham, 2012). An FPO plays a significant role in mobilizing individual farmers under a structured system of their own to ensure better income and an enhanced livelihood for themselves as a result of economies of scale. In recent year digital technology adoption significantly boosts FPOs, aiding in market linkages, financial access, member management, and higher farm productivity. Digital technology has also enabled agripreneurs/entrepreneurs to use strategic ways to develop their enterprises as the technology help in expanding their connections across various platforms. Entrepreneur is defined as someone who identifies a need in the marketplace and works to fulfil it (Robinson, 2024). Their venture can be in farming, retails, manufacturing, the service sector etc. Digital technologies are having a significant impact on businesses' financial performance and innovative success (König *et al*., 2019).

The digitization of agriculture holds immense potential for sustainable growth, increased productivity and improved livelihoods for farmers, making it a cornerstone of India’s agricultural development(Paswan, 2023) and the adoption and use of digital technology, or "digitalization," is regarded as one of the most promising changes for sustainability with revolutionary potential that could lead to progress toward achieving the Sustainable Development Goals (Fuerst *et al*., 2023).The internet penetration rate in India went up to nearly 52 percent in 2024, from just about 14 percent in 2014 (Basuroy, 2024).So, it meant that more than half of the population of 1.4 billion people had internet access and the increase penetration of internet can benefit businesses and entrepreneurs. The Ministry of Agriculture and Farmers Welfare launched Digital Agriculture Mission (DAM 2021-25) for initiating projects which involve digital technologies such as Artificial Intelligence (AI), Block Chain, Remote Sensing (RS) and GIS, Drones/UAV and Robotics. The Digital India initiative and rising internet penetration led to around 692 million active users as of February 2023 and one of the most popular reasons for using the internet was to use social media (Basuroy, 2023). Therefore, it holds potential for the FPO and the entrepreneurs to utilize online platforms like social media for digital marketing to reach potential customers more effectively and cost efficiently.

Digital technology means electronic tools, devices, systems, and resources organizations utilize as they process or store data and complete many other functions, increasing employee productivity and efficiency. Digital technologies—including the Internet, mobile technologies and devices, data analytics, artificial intelligence, digitally-delivered services and apps—are changing agriculture and the food system (OECD, 2023).

**Emerging and potential digital tools**

|  |  |
| --- | --- |
| **DIGITAL TOOLS**  | **PURPOSE** |
| Collaboration Platforms | Cloud-based collaboration tools like Microsoft Teams, Slack, and Google Workspace are increasingly popular for real-time communication, file sharing, and project management in teams and organizations (Froehlich, 2023). |
| Video Conferencing  | Zoom, Google meet, Microsoft Teams and Webex surged in popularity during the pandemic, becoming essential for remote communication, virtual meetings, and webinar. (Evans, 2020; Peters, 2020) |
| AI-Powered Chatbots  | AI-driven chatbots are becoming increasingly prevalent in customer service and support, enabling businesses to provide quick responses, automate interactions (Rafalski, 2024). |
| E-commerce Platforms  | With the surge in online shopping, e-commerce platforms are enabling businesses to establish and manage their digital storefronts effectively. (Parikshith and Natesan 2023) |
| Mobile Payment Solutions  | Mobile payment apps like Paytm, Google Pay, and PhonePe are gaining widespread adoption, revolutionizing transactions and promoting cashless payments (Dang, 2025). |
| Document Management Systems  | Document management software like Google Drive, and Microsoft OneDrive are helping organizations organize, share, and collaborate on documents securely (Pell, 2024). |

**Services provided by digital technology**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sl. No. | Services | Subject | Findings | Author and year |
| 1 | Information & Advisory services | Farmers of Bihar | Reveals that 91% of respondents had mobile phone access, and 80% used the internet, including Google for marketing and weather information | Anand *et al*., 2020 |
|  |  | Farmers of Assam | The study found that farmers use radio, television and mobile phones to access agricultural information.  | Lahan and Deka, 2019 |
| 2 | Market Linkage | Farmers of Meghalaya | Mobile phones are extensively utilized by farmers for marketing their produce. | Syiem and Raj, 2015 |
| 3 | Market Updates | Farmers of Manipur | Farmers access market updates via mobile phones, television, and radio. | Singh *et al*., 2023 |
| 4 | Weather forecast | Farmers of Manipur | Through mobile phone, Television, radio farmer access weather forecast  | Singh *et al*., 2023 |
| 5 | Monitoring | - | * In their study revealed that digital technologies enable remote monitoring and automation of their farming operations.
* In their study observed that Drone is employed to monitor crop conditions and carry out improved fertilization plans for higher harvests.
 | Subeesh and Mehta, 2021Hafeez *et al.,* 2022 |
| 6 | Demand and supply forecasting | Entrepreneurs | It was revealed that digital innovations empower Farmizen to predict demand, leveraging historical data to anticipate customer preferences and seasonal variations | Agarwal and Bhuvana, 2023 |
| 7 | Capacity building | Farmers | Study observed that digital services play a vital role in capacity building of farmers. | Kumar *et al.,*2021 |
| 8 | Traceability | Customers | in their study revealed that through the Farmizen app, customers can place orders, access information about the farm’s location, and gain insights into the cultivation process. | Agarwal and Bhuvana, 2023 |

Keeping in view of the above point, an effort has been made to study the digital technology usages by FPOs and agripreneurs with the following objectives

**OBJECTIVES**

1. To assess the use of digital technology by FPOs and Agribusinesses of North-East India.
2. To conduct a SWOT analysis.
3. To conduct a case study of the application of digital technology.

**METHODOLOGY**

The Study was conducted during the1stNorth-East FPO and Associated Investors’ Conclave 2023, which was held at College of Post Graduate Studies in Agricultural Sciences, Umiam, Meghalaya during 24th to 26th June 2023. The programme was organised in collaboration with Indian Council of Agricultural Research-Research Centre for North East Hill Region (ICAR-RC for NEH Region), Umiam, Meghalaya, Deendayal Research Institute (DDI), New Delhi, ICAR ATARI Zone –VI, Guwahati, ICAR ATARI Zone –VII, Umiam, Meghalaya and NABARD. Mainly organised for the benefit FBOs and other agripreneurs, the conclave was attended by different Central and State agricultural institutions, traders, investors, innovators, NGOs, Start-ups, progressive farmers and students. The study was conducted on a sample of representatives of 14 FPOs and 8 agri-preneurs who were sampled according to their willingness to participate in the study and availability for interaction during the conclave. Data were collected using a pre-tested questionnaire consisting of structured and semi-structured questions and stimuli. Various data from secondary sources were also studied to gain better understanding of the prevailing scenario Data were analysed using descriptive statistics and narrative analysis through case studies.

**RESULTS AND DISCUSSION**

Table 1: List of Invited FPOs And Entrepreneurs

|  |  |  |  |
| --- | --- | --- | --- |
| Sl. No. | FPOs  | INVITED | ATTENDED |
| 1 | Meghalaya  | 30 | 21 |
| 2 | Assam  | 15 | 13 |
| 3 | Manipur  | 7 | 1 |
| 4 | Sikkim  | 9 | 4 |
| 5 | Nagaland  | 3 | 1 |
| 6 | Arunachal Pradesh  | 23 | 6 |
| 7 | Mizoram  | 12 | 0 |
| 8 | Tripura  | 20 | 0 |
|  | TOTAL  | 119 | 45 |
|  | ENTREPRENEURS  | INVITED | ATTENDED |
| 1 | Meghalaya  | 20 | 20 |
| 2 | Manipur | 12 | 6 |
| 3 | Arunachal Pradesh | 9 | 6 |
| 4 | Assam | 12 | 11 |
| 5 | Mizoram  | 22 | 0 |
|  | Total  | 75 | 43 |

From the above Table 1, it can be seen that in the 1st North-East FPO and Associated Investors’ Conclave 2023, FPO and entrepreneurs were invited from all the 8 North Eastern State and out of 119 invited FPOs only 45 attended and out of 75 entrepreneurs invited only 43 entrepreneurs attended the conclave.

**Profile of the sampled participants**

**Table 2: Distribution of participants according to their type and location (n=22)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **CATEGORIES**  | **FREQUENCY**  | **PERCENTAGE**  |
| Participant type | FPO  | 14 | 64% |
|  | Agri-preneurs  | 8 | 36% |
| State | Meghalaya  | 12 | 55.55% |
|  | Manipur  | 4 | 13.64% |
|  | Assam  | 6 | 27.27% |
|  | Arunachal Pradesh  | 1 | 4.55% |

**Table 3: Profile of Agri-preneurs**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sl. No.**  | **Name of entrepreneurs** | **State** | **Started in** | **No. of shareholder** | **No. of employees** | **Promoting Institution** | **Crops/Products** |
| 1 | North East Bamboo Allied Organisation, Kamrup Assam | Assam | 2022 | 5 | 25 Bamboo growers | RKVY RAAFTAR | Bamboo shoot pickle, Bamboo fibre Towel, Bamboo brush, Bamboo candle, bamboo fibre sanitary pad, Bamboo charcoal soap, bamboo charcoal face scrub, |
| 2 | Wubitu Agritech | Assam | 2009 | 6 | 23 farmers | RKVY RAAFTAR | Stevia dry leaves, stevia capsule, stevia powder |
| 3 | Sanajing Sana Thambal Pvt. Ltd | Manipur | 2018 | 2 | 50 weavers | Niti Hub | Lotus fabric clothes, Lotus Tea, Lily Tea |
| 4 | HQI (Health Quotient Inspired), Nongmynsong, Shillong Meghalaya | Meghalaya | 2019 | 10 | - | Self-finance | Millet cakes, millet biscuits and millet cupcakes |
| 5 | Dianthe Private Ltd | Meghalaya | 2021 | 2 | 30-50 flower growers | RKVY RAAFTAR, KIIT TBI | Dry Flowers, Fresh cut bouquet and wedding decor |
| 6 | Rida Stem Food cottage, Ri-BhoiMeghalaya | Meghalaya | 2022 | 2 | - | - | Jackfruit chips, banana chips, Jackfruit seed, coffee bean |
| 7 | Midot M Binong, Ri-Bhoi Meghalaya | Meghalaya | 2013 | 3 | - | Spices Board | Cinnamon, stone flower, Medicinal Black Turmeric, Black Ginger |
| 8 | Bhrigu, Kamrup, metroAssam | Assam | 2019 | 2 | - | NRL ideation, Guwahati Incubated AAGL | Rosemary, Parshy, fish, mutton |

**Table 4: Profile of the FPOs**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl. No.**  | **Name of the FPO** | **State** | **Year of inception** | **Promoting Institution** | **No. of members** | **Crops/Product** |
| 1 | Dalmikkang Farmer Producer company limited | Meghalaya | 2022 | ATMA, Dept of Horticulture, NERAMAC | 300 | Bayleaves, Black pepper, Cashewnut, Jackfruit, mango, Turmeric |
| 2 | Kalpani Farmer Producer Company limited | Assam | 2022 | NABARD | 500 | Mustard, Joha rice/paddy, Maize, King Chilli |
| 3 | Rilajong FPO | Meghalaya | 2013 | CAU | 500 | Black pepper, Lakadong, Turmeric, Black Turmeric |
| 4 | Risen Fed Agro Producer Company Limited | Meghalaya | 2023 | MCA | 170 | Ginger, Turmeric, Local Ginger, Honey |
| 5 | West Jaintia Hills FPC ltd | Meghalaya | 2021 | SFAC | 300 | Turmeric, Ginger, Black pepper, Schizwen Pepper, tomato, potato |
| 6 | Namsai organic Spices and Agricultural Products Producer Company Ltd. | Arunachal Pradesh | 2018 | NABARD, MOVCDNER | 300 | Rice, Turmeric, King Chilli, Black pepper, Wine, Pickles |
| 7 | Uttaran Krishi Producer Company Ltd. | Assam | 2017 | World Bank funded APART Project | 500 | Rice, mustard oil |
| 8 | Brinbanee food product | Meghalaya | 2022 | NABARD CTRD | 300 | Jackfruit, Turmeric powder, Arecanut, Cashewnut, Black pepper, Ginger |
| 9 | ChakhaoPoreiton Organic Producer Company | Manipur | 2017 | MOVCD-NER, MOMA | 300 | Black aromatic Rice |
| 10 | Amlighat Banana Producer Company Limited | Assam | 2016 | SFAC and APART | 500 | Banana Chips |
| 11 | Bonewari FPO Multipurpose | Meghalaya | 2020 | - | 400 | Mango, Banana, |
| 12 | Mawhati Cluster FPO | Meghalaya | 2021 | - | 104 | Ginger, Broom |
| 13 | Mawring Keng Farmer Producer Cooperative Society | Meghalaya | 2022 | - | 131 | Tomato, Green Vegetable |
| 14 | Thupki Nongrep Producer Cooperation Society Ltd. | Meghalaya | 2022 | - | 101 | Potato, Squash |

a. Participants:

As seen from the Table 2, it was found that more than half (64%) of the participants were from FBO and 36% were agri-preneurs.

b. State:

From the Table 2, it was found that half (50%) of the participants were from Meghalaya State, 27 percent from Assam, 18 percent from Manipur and 5 percent from Arunachal Pradesh.

Figure 1: Year of Establishment

From the Figure 1, we can see that 32% of the respondents started their venture in the year 2022 and 14% of the respondents started in 2021.

**USAGE OF DIGITAL TOOLS BY THE FBOS AND AGRIBUSINESS FOR VARIOUS ACTIVITIES**

Table 5: Distribution of the respondents according to their frequency of usage of digital tools

|  |  |  |
| --- | --- | --- |
| **Sl. No.** | **Digital tools** | **Frequency of Usage** |
| **Always** | **Sometimes** | **Rarely** | **Never** |
| **f** | **%** | **f** | **%** | **f** | **%** | **f** | **%** |
| 1 | Radio | 2 | 9 | 1 | 5 | 6 | 27 | 13 | 59 |
| 2 | TV | 1 | 5 | 6 | 27 | 11 | 50 | 4 | 18 |
| 3 | Texting & SMS | 3 | 14 | 4 | 18 | 15 | 68 | 0 | 0 |
| 4 | Mobile Telephony | 16 | 73 | 6 | 27 | 0 | 0 | 0 | 0 |
| 5 | E-Commerce | 7 | 32 | 6 | 27 | 3 | 14 | 6 | 27 |
| 6 | Google | 15 | 68 | 4 | 18 | 1 | 5 | 2 | 9 |
| 7 | Video conferencing | 5 | 23 | 4 | 18 | 6 | 27 | 7 | 32 |
| 8 | WhatsApp | 16 | 73 | 5 | 23 | 1 | 5 | 0 | 0 |
| 9 | Facebook | 4 | 18 | 10 | 45 | 6 | 27 | 2 | 9 |
| 10 | Instagram | 2 | 9 | 5 | 23 | 10 | 45 | 5 | 23 |
| 11 | LinkedIn | 2 | 9 | 2 | 9 | 3 | 14 | 15 | 68 |
| 12 | ChatGPT | 2 | 9 | 1 | 5 | 1 | 5 | 18 | 82 |
| 13 | Email | 9 | 41 | 6 | 27 | 5 | 23 | 2 | 9 |
| 14 | E-magazine | 0 | 0 | 1 | 5 | 1 | 5 | 20 | 91 |
| 15 | YouTube | 12 | 55 | 6 | 27 | 4 | 18 | 0 | 0 |
| 16 | Excel | 3 | 14 | 15 | 68 | 4 | 18 | 0 | 0 |
| 17 | Tally | 11 | 50 | 3 | 14 | 3 | 14 | 4 | 18 |

Figure 2: Usage score of digital tools by FBOs/Agribusiness

From the Figure 2, it was found that mobile telephony is the most widely used digital tools followed by Google, WhatsApp and YouTube by the participants of the 1st North-East FPO and Associated Investors’ Conclave. The reason behind majority of the participants using mobile telephony could be because mobile phones are widely accessible and have become an integral part of people's lives. They are often the primary device for communication and internet access, especially in regions where other digital tools may not be as readily available. Google provides access to a vast repository of information, making it a valuable tool for research, learning, and finding answers to questions. This could explain its popularity among participants who may need information for their work. Social media platforms like WhatsApp and YouTube enable participants to connect with others, share ideas, and network with potential investors or business partners. These platforms play a crucial role in professional and social interactions.

Table 6: Purpose of usage of digital tools

|  |  |  |
| --- | --- | --- |
| Sl. No.  | Digital Tools  | Purpose |
| 1 | Radio | * News
* Wider Audience Reach
* Cost-Effective Marketing
 |
| 2 | TV | * Entertainment Shows
* News and Current Affairs
 |
| 3 | Texting & SMS | * Transaction Alerts
* OTP Authentication
 |
| 4 | Mobile Telephony | * Inquiry and Information
* Retrieval Placing Orders
* Communication with Business Dealers and Suppliers
 |
| 5 | E-commerce | * Sell product

 Eg.: Amazon, Meesho, My store, e-NAM, India Mart  |
| 6 | Google | * Information Retrieval
* Business Idea Generation
* Awareness and Knowledge and Company Websites
 |
| 7 | Video conferencing | * Online meeting
 |
| 8 | WhatsApp | * Create Group for Information Sharing and Q&A
* Selling and Marketing of Products
* Advertising and Receiving Orders
* Connecting and Collaborating with Stakeholders
 |
| 9 | Facebook | * Promotion of Products or Services
* Sharing Success Stories
 |
| 10 | Instagram | * Promotion of Products or Services
* Expanding Audience Reach Receiving Orders
 |
| 11 | LinkedIn | * Job Advertisements
* Showcase Success Stories
* Networking and Building Connections
 |
| 12 | ChatGPT | * To inquire any information, Write Blog and for Graphic design
 |
| 13 | Email | * Reporting Progress
* Receiving order
* Formal communication
 |
| 14 | E-magazine | * Success Stories and Case Studies,
* Brand Promotion and Visibility
 |
| 15 | You Tube | * Awareness and Knowledge
* Capacity Building
* Expert Insights
* Observing Performance and Strategies
 |
| 16 | Excel | * Accounting and Bookkeeping
* Data Analysis
 |
| 17 | Tally | * Bookkeeping and Accounting
* Financial Analysis
* Auditing and Compliance
 |

**SWOT ANALYSIS**

 Table 7: SWOT analysis of usage of digital technology

|  |  |
| --- | --- |
| STRENGTH  | WEAKNESSES  |
| * High penetration of mobile user
* Social network among farmers
* Accessing innovation in farm practices
* ICT tools and service reduce workload
* Increased efficiency
* Better access to service/information
* Market linkage
* Capacity building
 | * Inability of the farmer to effectively utilize digital technology
* Expertise or knowledge in using IT resources is low among farmers
* Limited internet connectivity
 |
| OPPORTUNITIES  | THREATS  |
| * Digital marketing
* Data analytics and decision making
* Financial inclusion
* Remote monitoring and advisory services
* Government thrust on digital India
* Focus on Women empowerment
 | * Fast changes in technology
* Cyber security risks
* Technology dependence
* Cost and affordability
* Duplication and contradictory information flow
* Frequent shut down of internet service due to law and order issues
* High Listing fee
 |

**CASE STUDIES OF THE SUCCESSFUL APPLICATION OF DIGITAL TECHNOLOGY**

**CASE 1**



Image 1. Making fibers from lotus stem

Image Courtesy: The Indian Express, 2020

Bijiyashanti Devi, the visionary founder of Sanajing Thambal Pvt. Ltd., embarked on her entrepreneurial journey in 2018 in Bishnupur District, Manipur. She makes fibers from lotus stem gathered from the Loktak Lake, then she spins this yarn into scarves, stoles, Saree, neckties & other apparels. Her innovative approach has caught the attention of many, including the state Chief Minister N Biren Singh & Prime Minister Narendra Modi. An admirable aspect of her endeavor is the employment opportunities it has created for 50 women, thereby contributing to local economic empowerment. A pivotal moment in Bijiyashanti's journey occurred in 2020 when her innovation gained nationwide recognition during the "Mann Ki Baat" session, where the Prime Minister commended her remarkable contributions. This momentous event not only celebrated her dedication but also opened up new markets for her lotus stem fiber products.

In her quest for business growth, Bijiyashanti leverages modern tools like Google, Youtube, Radio, and Instagram. She started her innovative journey by leveraging tools like Google and Youtube as she said that she started researching about the lotus fibre by reading varoius papers and also watching Youtube videos. Instagram serves as a potent promotional platform for her products. Through her strategic use of Instagram, she has effectively reached a wider audience, showcasing the unique qualities of her lotus stem fiber products and attracting customers beyond her local market.

Bijiyashanti Devi's inspiring journey underscores the transformative power of entrepreneurship, female empowerment, and the strategic use of digital platforms in modern business endeavors.

**CASE 2**



Image 2. Production and processing of dry flowers

Image Courtesy: Chokhone Krechina

Chokhone Krechina, the founder of Dainthe Pvt. Ltd., embarked on her entrepreneurial journey in 2021, She is from Rikhumai Taphou Village, Senapati District, Manipur. Her enterprise specializes in the production and processing of dry flowers, a venture fueled by her passion for floral variety and creative craftsmanship. In her quest for knowledge and innovation, Chokhone leverages digital tools like Google and YouTube to extensively research various flower varieties and the intricate art of dry flower processing. These platforms serve as invaluable resources, enriching her expertise and product offerings.To streamline her business operations and enhance customer engagement, Chokhone used WhatsApp Business. This enables customers to conveniently browse her product catalog and place orders directly through the platform, ensuring efficient order management and improved customer satisfaction.

For effective product promotion and expanding her market reach, Chokhone also utilizes Instagram. Through captivating visuals and strategic content, she showcases her exquisite dry flower creations, attracting a growing audience of flower enthusiasts and potential customers.Her story serves as a compelling case study in embracing digital tools for business growth.

**CASE 3**

Pankaj Kalita, the founder of Wubitu Agritech, established the enterprise in Guwahati in 2009. His company specialize in the production and processing of Stevia, where various value added product of Stevia are produces and sold. Over the years, the company has embraced innovative technologies to enhance its operations. Notably, the adoption of AI tools like ChatGPT has brought about a remarkable transformation in Pankaj's approach to blog writing on Stevia advantages and related topics. ChatGPT, a cutting-edge AI language model has revolutionized the content creation process by accelerating idea generation and optimizing the quality of blogs. The tool has proven to be a game-changer, boosting productivity and significantly contributing to the success of their written content.

Through the integration of ChatGPT, Wubitu Agritech has positioned itself as a forward-thinking player in the agritech industry. Pankaj's experience underscores the profound impact that AI-driven solutions can have on traditional business practices, demonstrating how technology can empower entrepreneurs to stay competitive and innovative in their respective fields.

**CASE 4**

Established in 2016, Amlighat Banana Producer Company Limited has harnessed the power of technology to support local farmers effectively. They employ user-friendly tools like GPS map cameras and WhatsApp to simplify farming practices. These tools remotely monitoring the conditions of the fields and offering valuable advice to farmers. Through virtual consultations, the company connects with farmers, providing timely guidance and solutions.

This approach has transformed farming by making it more accessible and efficient. Farmers receive real-time support and expert advice, improving crop management and yields. Also enhancing the knowledge and capabilities of local farmers. This, in turn, contributes to the overall growth and prosperity of the agricultural sector in their region.

Midot Binong, the founder of Midot Binong Spice and Medicinal Plant Processing, established his enterprise in 2013 in Purangang Marngar, Ri-Bhoi District, Meghalaya. His journey has been significantly influenced by the strategic use of WhatsApp as a pivotal tool for communication and business growth.

**CASE 5**

By leveraging WhatsApp's video call feature, Midot took a proactive approach in presenting his spice and medicinal plant products to potential business partners. This personal and visual interaction not only showcased the quality of his offerings but also

Image 3. Medicinal Plant Processing

established trust and credibility in the eyes of these partners. This foundation of trust is critical for fostering strong business relationships and lays the groundwork for potential future collaborations. Furthermore, WhatsApp has served as an essential platform for Midot to sell his products. It has allowed him to reach a broader audience, transcending geographical boundaries and expanding his market presence. This accessibility has been instrumental in boosting sales and ensuring the success of his enterprise.

Midot Binong's story is a testament to the transformative power of modern communication tools in entrepreneurship. WhatsApp has not only facilitated direct sales but has also played a key role in building lasting business connections, demonstrating the profound impact of technology on business strategies and growth.

**SUMMARY**

Mobile telephony is the most widely used digitals tool followed by Google and WhatsApp. Most used them for Inquiry and Information Retrieval, Placing Orders, Communication with Business Dealers and Suppliers. The SWOT analysis highlighted strengths such as high mobile phone penetration, ICT tools and services reduce workload. On the other hand, weaknesses included low e-literacy levels and limited \*internet connectivity. Opportunities identified were related to digital marketing, remote monitoring and advisory services. Threats included rapid technological changes, duplication and contradictory information flow.

**WAY FORWARD**

**Infrastructure Development**: Invest in improving digital infrastructure, including mobile internet connectivity and electricity, to ensure seamless access to digital solutions

**Awareness and Training**: Conduct awareness programs and training workshops to familiarize FBO members and agribusinesses with the benefits and functionalities of digital technologies

**E-commerce Platforms:** Support the establishment of regional e-commerce platforms to connect farmers directly with buyers and eliminate intermediaries.

Digital/AI based Agri-technology solutions to empower FBO resolving market linkages, financial services access, member management, and enhancing farm productivity.

**CONCLUSION**

Global population is expected to increase by about 40% and reach 9.6 billion by 2050.Therefore, the overall food production needs to double to meet the rising demand for food. The importance of digital technology in agriculture cannot be understated. It offers numerous benefits, such as increased productivity, optimized resource usage, better market access, and reduced food losses. In the context of North East India, where agriculture is a significant contributor to the economy and livelihoods, embracing digital technology can play a transformative role. Improved digital infrastructure will empowers farmers with real-time data, improves decision-making, and boosts market competitiveness. Therefore, embracing digital technology in Northeast India's agriculture sector is not just a matter of innovation but a necessity to ensure food security, sustainable growth, and inclusive development

**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during writing or editing of this manuscript.

**COMPETING INTERESTS**

Authors have declared that no competing interest exist.

**COMPETING INTERESTS DISCLAIMER:**

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

**REFERENCES**

Agarwal, S., & Bhuvana, N. (2023). Fostering Traceability and Trust in the Organic Produce Value Chain. Agricultural Extension in South Asia. <https://www.aesanetwork.org/fostering-traceability-and-trust-in-the-organic-produce-value-chain/>

Anand, S., Prakash, S., Singh, A.K., & Yedida, S. (2020). Access and availability of ICT tools used by farmers for crop practice in Bihar, India. Journal homepage: http://www. ijcmas. com)

Basuroy, T. (2023). Digital population in India as of February 2023. <https://www.statista.com/statistics/309866/india-digital-population-by-type/>

Basuroy, T. (2024). Internet penetration rate in India from 2014 to 2024. Statista. <https://www.statista.com/statistics/792074/india-internet-penetration-rate/>

Bijman, J. (2016). The changing nature of farmer collective action: introduction to the book. In: J. Bijman, J. Schuurman and R. Muradian (eds.), Co-operatives, economic democratization and rural development, Cheltenham, UK: Edward Elgar, pp. 1 – 22.

Cropin. (2019). How Is Technology Pivotal In Strengthening FPOs?<https://www.cropin.com/blogs/how-is-technology-pivotal-in-strengthening-fpos>

Dang, K. (2025). India’s Mobile Payments Revolution: Innovations, Challenges, and the Road Ahead. ETBFSI From the Economics Times. <https://bfsi.economictimes.indiatimes.com/blog/indias-mobile-payments-revolution-innovations-challenges-and-the-road-ahead/117267808>.

Dubey, L.R., Sharif, M., Hiremath, D., & Meena, D.K. (2021). Generalised status of Farmer producer organisations (FPO's) in India- a review*. International Journal of Research and Development*, 6, 7.

Economic Survey 2023-2024. (2024). Agriculture and Food Management: Plenty of upside left if we get it right. Ministry of Finance, Government of India. <https://www.indiabudget.gov.in/economicsurvey/>.

Esham, M. (2012). Lessons for Farmer Based Organisations (FBO) in Sri Lanka: Experiences from Agricultural Cooperatives (JA) in Japan A Journey in Harmony Sixty Years of Japan - Sri Lanka Relations, Eds Karunaratne, H. D., University of Colombo and JAGAAS, pp 316-335

Evans, B. (2020). The Zoom Revolution: 10 Eye-Popping Stats from Tech’s New Superstar. <https://cloudwars.com/news/the-zoom-revolution-10-eye-popping-stats-from-techs-new-superstar/>.

Froehlich, A. (2023). What are team collaboration tools? <https://www.techtarget.com/searchunifiedcommunications/definition/team-collaboration-tools#:~:text=The%20primary%20types%20of%20team,provide%20access%20to%20other%20members>.

Fuerst, S., Sanchez-Dominguez, O., and Rodriguez-Montes, M.A. (2023). The Role of Digital Technology within the Business Model of Sustainable Entrepreneurship. Sustainability, 15(14):10923.

GoI. (2023). Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi. <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1910357>

Hafeez, A., Husain, M.A., Singh, S.P., Chauhan, A., Khan, M.T., Kumar, N. Chauhan, A. & Soni, S. K. (2022). Implementation of drone technology for farm monitoring & pesticide spraying: A review. Information processing in Agriculture.

Kumar, G.N., Singh, V.K. Mishra, M., & Rathaur, A. (2021). Role of Digital Services in Capacity Building of Farmers in the Central Zone of Uttar-Pradesh. *International Journal of Current Microbiology and Applied Sciences,* 10, 2.

Lahan, R.R., & Deka, N. (2019). Information and Communication Technology (ICT) in farm management decision: Status of Jorhat district. *International Journal of Marketing and Technolog*y, 9(4), 1-8.

Latynskiy, E. & Berger, T. (2015). Networks of rural producer organizations in Uganda: What Can be done to Make Them Work Better? Elsevier-World Development, 78:572– 586.

Leivon, J. (2020). Spinning a success story: How a Manipur women is getting noticed for her lotus fibre products. The Indian Express. <https://indianexpress.com/article/north-east-india/manipur/how-a-manipur-woman-is-getting-noticed-for-her-lotus-fibre-products-6716389/>.

Mengesha, W.A., Demissew, S., Fay, M. F., Smith, R. J., Nordal, I., & Wilkin, P. (2013). Genetic diversity and population structure of Guinea yams and their wild relatives in South and South West Ethiopia as revealed by microsatellite markers. *Genetic resources and crop evolution,* 60, 529-541.

OECD. (2023). Technology and digital in agriculture. <https://www.oecd.org/agriculture/topics/technology-and-digital-agriculture/>. Accessed May 24 2023.

Parikshith, G. & Natesan, G. (2023). Exploring the Benefits of E-commerce Applications for Efficient Online Operations. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, *10*(2), 158-162.

Paswan, P. (2023). Revolutionizing Indian Agriculture: Modernizing Through the Digital India Scheme. <https://patimes.org/revolutionizing-indian-agriculture-modernizing-through-the-digital-india-scheme/>. Accessed July 27 2023.

Pell, A. (2024). OneDrive vs. Google Drive: Which cloud storage option is best?. <https://zapier.com/blog/onedrive-vs-google-drive/>.

Peters P. (2020). Google’s Meet teleconferencing service now adding about 3 million users per day. The Verge. <https://www.theverge.com/2020/4/28/21240434/google-meet-three-million-users-per-day-pichai-earnings>.

Rafalski, K. (2024). How AI Chatbots are Improving Customer Service. Netguru. <https://www.netguru.com/blog/ai-chatbots-improving-customer-service> .

Robinson, S. (2024). What is an entrepreneur (entrepreneurship)?. TechTarget. <https://www.techtarget.com/searchcio/definition/entrepreneur>.

Singh, B., Prasad, A., Ram, D., Feroze, S.M.,& Gopimohan, N. (2023). The extent of mass media utilization of farmers in Imphal East district. *The Pharma Innovation Journal*, 12 (7).

Subeesh, A., & Mehta, C.R. (2021). Automation and digitization of agriculture using artificial intelligence and internet of things. *Artificial Intelligence in Agriculture*, 5, 278-291.

Syiem, R., & Raj, S. (2015). Access and usage of ICTs for agriculture and rural development by the tribal farmers in Meghalaya state of North-East India.  *Journal of Agricultural Informatics*, 6(3), 24-41.