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-Editor

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CONTENTS

Constraints Perceived by the Tribal farmers in cultivation of Buckwheat in Gurez, J&K

Bilal Ahmed Bhat[1], Parveen Kumar[2]

ABSTRACT

The present research paper identifies the socio-economic characteristics and constraints perceived by farmers involved in buckwheat cultivation. The paper also comes out with the future prospects of cultivation of this pseudo millet in selected villages of the tribal valley of Gurez, where the buckwheat is cultivated. The study was conducted in three villages of block Bagtore. The villages selected for the study had a sizeable number of farmers cultivating buckwheat; 30 farmers were selected randomly from the list of total 150 farmers from the three villages namely Tarbal, Dangan and Bagtore. The data was collected with the help of pre-structured interview schedule and the collected data was then subjected to appropriate statistical analysis to obtain the results such as the socio-economic status of the farmers involved in the cultivation of Buckwheat crop and the constraints as perceived by the concerned farmers in Buckwheat cultivation.

Keywords: Buckwheat, constraints, prospects, perceived

Introduction

Buckwheat, a pseudo-cereal contains protein of high nutritional value, dietary fibre, resistant starch, rutin, vitamins and minerals. Common buckwheat (Fagopyrum esculentum moench) has been a crop of secondary importance in many countries and yet it has persisted through centuries of civilisation and enters in to the agriculture of nearly every country where cereals are cultivated. Despite its name, the buckwheat crop is not related to wheat crop as the buckwheat crop is gluten free. It is used in preparation of buckwheat tea or processed in to groats, flour and noodles. Buckwheat has become popular as a health food due to its high mineral and antioxidant content. The buckwheat is now mainly grown in northern hemisphere especially in Russia, Kazakhstan, China and Central Eastern Europe. Buckwheat is the most important crop of the mountain regions lying 1600m above sea level both for grains and greens. It occupies about 90 per cent of cultivated lands in upper Himalayas with a solid stand. In India, the crop is widely grown in Jammu and Kashmir in the west and Arunachal Pradesh in the east. Therefore in the above context, the Gurez valley

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has ideal climate for the cultivation of this important crop as the valley lies at an average elevation of 2400 metres above sea level and the valley is flanked by the main range of the Himalayas on the northern India. The cultivation of buckwheat crop has shown a steep decline during the recent past, yet the crop is found to be grown by some farmers in hill and mountain agro-ecosystem in the Himalayan region of the country mostly in the parts of Jammu and Kashmir, ladakh and few areas of northeast India. This is despite the fact that Buckwheat is also emerging as the healthy food crop due to its richness in nutrients like protein, high content of lysine, vitamins and bio-flavoniodsrutin (Keli 1992).

Despite having high medicinal properties of the crop, the area under buckwheat showed a sharp decline substantially and it ranged from 60-92% during last two decades in the western Himalayas of India (Rana et al.2000). Low productivity of the crop is another matter of concern and a big challenge for the agricultural scientists as the farmers involved in the cultivation of said crop are shifting towards other high value cash crops. Therefore to make buckwheat an attractive farm crop, there is a need to provide more attention towards this precious crop for improving its productivity and to make the farming community aware about the value of this underutilized crop of the Indian Himalayan region and needs more attention for its revival in the area where the conditions are favourable for its cultivation.

The cold climatic condition of the Gurez valley is highly suitable for buckwheat cultivation and the being recognised as the most important nutraceuticals. The local tribes use buckwheat as a medicine to improve the blood flow and to prevent hardening of the arteries (Atherosclerosis) and it is also being used as a suitable diet for the people suffering from diabetes. Buckwheat being one of the richest sources of manganese, magnesium, copper and zinc which are regarded best for immune system can be used to boost the system against the infectious diseases like COVID-19. Tea is also being prepared from the buckwheat grains by the locals and is locally known as "Buckwheat Kehwa" which according to the locals helps in digestion, eliminating bloating and improves the overall immune system of the body. Buckwheat covers the crops, suppresses weed growth and attracts beneficial insects and pollinators with its abundant blossoms. Buckwheat flowers attract honeybees and other pollinators with their morning nectar flow, therefore it is suitable for beekeeping. Hence, good number of commercial beekeepers migrate to Gurez valley during the months of August-September and put their beehive boxes near buckwheat fields to get nectar for honeybees and the said beekeepers sell this white honey at very higher price in the market.

Objectives

Buckwheat being the heritage crop of the Gurez valley and has now remained confined to certain pockets in this tribal valley. Therefore keeping in mind the importance of the crop, the present study was undertaken to study the socio-economic status of the farmers involved in its cultivation and identification of main constraints in the cultivation of this heritage crop.

Materials and Methods

The present study was carried out during the year 2019-20 in the selected villages of Gurez valley where buckwheat crop is grown. A total of three villages of block Bagtore were selected for the study where buckwheat crop is still grown by a sizeable number of farmers and from each village. From the list of 150 farmers from these three villages, thirty (30) farmers were selected randomly from each village who are cultivating buckwheat. The three villages were Tarbal, Dangan and Bagtore. The data was collected by personal interview method with the help of pre-structured interview schedule. The data collected was then coded, tabulated and analysed in accordance with the objectives of the study. Appropriate statistical tools like frequency, percentage, mean, standard deviation and correlation co-efficient were also employed to interpret the collected data.

Results and Discussions

The data in table 1 depicts the socio-economic status of the concerned farmers studied in terms of certain selected variable.

Table 1: Socio-economic variables of farmers' involved in Buckwheat

Variable	Category	Tarbal	Bagtore	Dangan	Average	X2	P (0.05)
Age	Up to 25 years	06	09	12	09.00	0.31	NS
	26-50 years	21	25	19	21.70		
	Above 50 years	63	56	59	59.40		
Gender	Male	66	62	54	60.70	2.74	NS
	Female	24	28	36	29.40		
Family size	Up to 4 members	08	13	10	10.34	3.46	NS
	4-8 members	23	28	22	24.30		
	Above 8 members	59	39	58	52.00		

Land holdings	Up to 0.2 ha.	14	09	28	17.00	2.65	NS
	0.2-0.4 ha.	28	32	48	36.00		
	Above 0.4 ha.	48	49	14	37.00		
Land under Buckwheat crop	Up to 0.1 ha.	14	30	26	23.30	3.76	NS
	0.1-0.2 ha.	49	42	54	48.30		
	Above 0.2 ha.	27	18	10	18.30		

The results revealed that amongst the farmers, the elder one above 50 years of age with an average of 59.40 per cent were found involved in buckwheat cultivation as compared to farmers belonging to younger age group. This might be due to the fact that the younger people have low tendency towards the cultivation of buckwheat crop and the adult farmers are well versed about the nutraceuticals benefits of the crop. The data in the table also revealed that more male farmers are involved in buckwheat cultivation with an average of over 60 per cent as compared to women farmers. It was also observed from the findings that most of the farmers involved in buckwheat cultivation belong to the family having more than 8 members with 52 per cent. The data shown in the table further revealed that most of the farmers (37%) involved in the cultivation of buckwheat crop were having total land holding of more than 0.4 hectares and the majority of the farmers over 48 per cent involved in buckwheat cultivation have 0.1 to 0.2 land under the crop.

The data presented in Table 2 depicts the constraints perceived by the farming community in buckwheat cultivation. Further observation of the data given in table 2 clearly reveals that the farmers involved in buckwheat cultivation perceived the lack of awareness about the value addition of the crop as the major constraint (93.30%) followed by the lack of market in selling buckwheat (78.90%), non-availability of quality seed of the crop was perceived as the constraint by 75.60% of the respondents. Lack of awareness about the availability of improved seeds was perceived as another constraint by the 62.20% of the respondents.

Table 2: Constraints as perceived by farmers involved in Buckwheat cultivation.

Production constraints		Frequency	Percentage	Rank
1.	Changes in Weather	62	68.90	IV
2.	Lack of Market	71	78.90	II

3.	Lack of awareness about improved seed	56	62.20	V
4.	Low yield	46	51.00	VI
5.	Lack of awareness about value addition	84	93.30	I
6.	Non-availability of quality seed	68	75.60	III

Future Prospects of buckwheat crop in Gurez valley:

Since the Buckwheat crop requires short growing period, is adaptable to extreme cold temperatures, water stress conditions, less soil fertility and climate variability making it most suitable crop for the climatic conditions of Gurez valley. This crop has the capacity to meet the increasing food demands and grows well in higher altitudes. Due to its adaptability to marginal as well as infertile lands of the hilly and mountain agro-ecosystems, it can support livelihood of thousands of people living in these disadvantageous conditions. The only need is the introduction of high yielding varieties of the crop and by making people aware about its nutritional value and the health benefits of buckwheat crop.

The cold arid region of Gurez valley is very much suitable for the cultivation of buckwheat crop, thus the production of the crop can be increased substantially as the crop has been recognised as nutraceutical foods (a food that provides medicinal and health benefits) as reported by Jiang et.al. (1995), that the person who regularly consumes buckwheat cannot face the problems like high blood pressure, high cholesterol problems. The valley having high animal population can take the advantage of getting high quality fodder of buckwheat due to its palatability. Buckwheat forage can be fed to livestock that eat it readily as it can be fed green, as hay and silage can also be prepared from the buckwheat forage and it can work as a good cover crop and provides an opportunity as a green manure crop as well.

Buckwheat attracts insects like bees as the valley of Gurez provides best scope for bee keeping especially during the blooming of buckwheat crop and the bees are able to make good honey from the nectar of buckwheat as its long lasting flowering period is extremely helpful for the beekeepers who usually migrate to the valley along with bee hives to get the nectar of buckwheat crop and these migratory beekeepers then sell the honey made of buckwheat nectar at higher prices especially in the states of Gujarat and Maharashtra. Because the honey from this underutilized crop is incredibly rich and highly coveted among honey lovers as the honey made from buckwheat is packed with antioxidants and is known for being excellent honey for cough and cold.

Conclusion

Buckwheat being a multi-purpose crop which is widely grown at higher elevation in the Indian Himalayan region has a huge scope to be popularised. It can play an important role in ensuring food and nutritional security of the people living under hill and mountain agro eco-systems. The present study reveals that most of the farmers involved in buckwheat cultivation belong to adult age group with over 50 years of age as compared to younger farmers who are now reluctant to take up buckwheat cultivation in the valley of Gurez. Amongst the constraints perceived by the respondents, the most of the farmers reveal that lack of knowledge about the value addition followed by the marketing problem of the crop. Farmers engaged in cultivation of this heritage crop must be given support in terms of knowledge, inputs and marketing support.

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Insights into Sustainable Food Systems: Learnings from Odisha's Agricultural Officers

Shirisha Junuthula[1], Veenita Kumari[2], S.L. Kameswari[3]

ABSTRACT

Sustainable food systems stand as pivotal pillars in addressing global food security challenges, emphasizing the need for environmentally conscious agricultural practices. Within this context, this research study delves into the realm of sustainable food systems, focusing on the invaluable insights gleaned from the dedicated cadre of Odisha's Agricultural Officers. Their profound expertise and hands-on experience in agriculture form the bedrock of this investigation, offering a comprehensive understanding of sustainable agricultural practices and their implementation within the unique landscape of Odisha. The primary goal of this study is to unravel the intricate tapestry of sustainable agricultural practices through the lens of these proficient Agricultural Officers. Their perceptions, attitudes, and knowledge pertaining to crucial facets of sustainable agriculture-ranging from soil health, water management, integrated pest management, to organic farming and more-serve as fundamental keystones in this exploration. Through a structured methodology that involved pre-assessment questionnaires, exposure to sustainable agriculture concepts, and subsequent post-assessment evaluations, this research uncovers the transformative learnings and evolving perspectives of these esteemed officers. Their wealth of experience and nuanced understanding of sustainable agricultural principles and challenges significantly contributes to the broader discourse on achieving agricultural sustainability. By delving into the unique insights and experiences of Odisha's Agricultural Officers, this study aspires to shed light on actionable strategies and potential pathways to foster sustainable food systems. Ultimately, these findings not only enrich the understanding of sustainable agriculture but also hold the promise of guiding future towards a more sustainable and resilient agricultural landscape in Odisha and beyond.

Keywords: Agricultural Officers, Agricultural practices, Attitudes, Knowledge, Perceptions, and Sustainable food systems

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1. Introduction

In the contemporary world, the global community grapples with an array of interconnected challenges, spanning from environmental crises like climate change and global warming to economic strains, escalating debt, and geopolitical conflicts (World Bank, 2023; Rosegrant & Cline, 2023). These multifaceted issues not only hinder the trajectory of sustainable development but also jeopardize the attainment of critical milestones such as the Sustainable Development Goals (SDGs) set forth by the United Nations (UN) (UNDP, 2023).

Central to these concerns is the food system, an intricate network encompassing production, distribution, consumption, and waste management (World Farmer's Organisation, 2020). This system plays a pivotal role in ensuring human nourishment, health sustainability, and societal well-being. However, amidst these challenges, there remains a pressing global issue: hunger and malnutrition. The UN's SDGs, specifically Goal 2 - Zero Hunger, aim to eradicate hunger by 2030 through sustainable agricultural practices, equitable access to resources for small-scale farmers, and bolstering international cooperation for technological advancements in agriculture (UNDP, 2023; World Farmer's Organisation, 2020).

A critical aspect of addressing global hunger lies in the concept of Sustainable Food Systems (SFS). These systems emphasize the need to feed a burgeoning global population within the confines of environmental sustainability. Yet, prevailing research predominantly focuses on the environmental aspects of food system sustainability while often neglecting the broader scope of the entire food supply chain (Davis et al., 2022; World Farmer's Organisation, 2020).

Recent studies have underscored the shared aspirations of farmers and consumers for sustainable practices, highlighting a growing concern about environmental degradation and a willingness to embrace innovative technologies for enhanced food production (Corteva and Longitude, 2019). Despite this awareness, challenges persist, such as declining crop yields due to insufficient investment in research and deteriorating infrastructures (Rosegrant & Cline, 2023).

This introduction encapsulates the pressing issues surrounding global food security, sustainability and the urgent need for concerted efforts in addressing the multifaceted challenges within the food system, with this aim a training program was initiated by Odisha State Government in collaboration with National Institute of Agricultural Extension Management (MANAGE), Hyderabad. The current study was the outcome from the pre and post evaluation of the trainees.

2. Objectives of the Study

- To evaluate the current perceptions, attitudes, and knowledge of Odisha's Agricultural Officers regarding global food security challenges and the

factors contributing to food insecurity worldwide.

- To measure the familiarity of Agricultural Officers with the principles of sustainable agriculture and identify the principles perceived as most crucial for promoting sustainability in agricultural practices.

Methodology

I. Participant Selection and Recruitment

A purposive sampling method was employed to select participants with expertise in agriculture and working within the Department of Agriculture, Government of Odisha. Participants were identified based on their roles as Agriculture Officers, Engineers and related positions. Contact information, including names, addresses, office phone numbers, email IDs, and mobile numbers, was obtained for each participant. A total of 49 participants were selected for the study, ensuring representation from different districts in Odisha. Participants were provided with a detailed explanation of the study's purpose, procedures, and potential implications. An informed consent form was presented, emphasizing voluntary participation and the right to withdraw at any stage. Written consent was obtained from each participant, acknowledging their understanding and willingness to participate. Participants were assured of the confidentiality of their responses, and their identities were anonymized in the analysis.

II. Data Collection

Pre-assessment and post-assessment questionnaires were developed to gather information on participant's knowledge, perceptions and attitudes related to sustainable food systems. Questionnaires were designed based on scientific principles and previous literature on sustainable agriculture. Initially explained the study's objectives, and arrangements were made for questionnaire distribution and collection at National Institute of Agricultural Extension Management (MANAGE), Hyderabad, India from 25th September to 3rd November, 2023.

A structured questionnaire was designed to assess participants' baseline knowledge, perceptions, and attitudes related to sustainable food systems. The pre-assessment questionnaire covered global challenges, sustainable agriculture principles, soil health, water management, integrated pest management, disease resilience, and organic farming. Following the pre-assessment, participants were exposed to relevant information on sustainable food systems by training where they have learnt with 16 sessions and 2 field visits. Information dissemination was conducted through tailored training to enhance participants' understanding.

After the information exposure phase, participants were provided with

the post-assessment questionnaire, mirroring the pre-assessment questions. Post-assessment responses were collected to analyze changes in participants' knowledge and attitudes. Clear instructions were given, and arrangements were made for the distribution and collection of questionnaires.

III. Data Analysis

Quantitative data from both assessments were subjected to statistical analysis using appropriate tools (e.g., Excel). Open-ended responses from questionnaires underwent thematic analysis to extract qualitative insights. Themes and patterns in participants' perceptions and opinions were identified for a comprehensive understanding.

IV. Ethical Considerations and Confidentiality

Anonymization of participant identities was maintained throughout the study. All collected data were securely stored, and access was restricted to the research team. Participants were provided with a detailed explanation of the study's purpose, procedures, and potential implications. Written informed consent was obtained from each participant, ensuring their voluntary participation and right to withdraw.

Participants were acknowledged for their valuable contributions to the study. Findings were summarized to draw conclusions regarding changes in participants' knowledge and attitudes towards sustainable food systems.

Results and Discussion

The study aimed to investigate the demographic and professional characteristics of respondents working within the Department of Agriculture in the Government of Odisha. A total of 49 individuals participated in this survey, providing valuable insights into their gender distribution, age, professional experience, positions held, organizational affiliation, and expertise areas within agriculture details was given in the table 1.

Table 1 Characteristics of the respondents involved in the study

Characteristics of the respondents n=49	
Gender	29 men, 20 women
Age	On average 38 years (20 years min;58 years max)
Experience	On average 12 years (1 min; 34 max)

Position	Group-A (Rank of Assistant Director and above) - 19 Group-B (Rank below Assistant Directors) - 30
Organization	Department of Agriculture, Government of Odisha
Expertise Area	Agriculture-49

Among the respondents, there were 29 men and 20 women, indicating a slightly higher representation of men within the surveyed population. This observation aligns with broader trends often seen in agricultural sectors, where male participation historically outweighs female involvement. However, this ratio may also reflect the changing dynamics within the Department of Agriculture in Odisha. The average age of the respondents was 38 years, with a range spanning from 20 to 58 years. This diversity in age suggests a mix of experienced professionals and younger individuals contributing to the sector's workforce. The presence of individuals across different age groups could indicate a potentially balanced blend of fresh perspectives and seasoned expertise within the department. Respondents reported an average professional experience of 12 years, with a range from 1 to 34 years. This distribution signifies a considerable breadth of experience among the surveyed individuals. The varied tenure in the field could contribute to a rich knowledge base and diverse skill set within the Department of Agriculture, fostering an environment conducive to innovation and expertise sharing. Regarding professional positions, 19 respondents belonged to Group-A, holding ranks of Assistant Director and above, while the remaining 30 individuals were categorized in Group-B, comprising ranks below Assistant Directors. This distribution indicates a hierarchical diversity within the department, with a significant representation of individuals from both higher and lower professional tiers. All respondents were affiliated with the Department of Agriculture, Government of Odisha, indicating a focused study within a specific governmental body responsible for agricultural development and policy implementation in the region. All 49 respondents were associated with expertise in agriculture, signifying a cohesive focus on the core domain of the department. The unanimity in the expertise area underscores a collective dedication to agricultural development and highlights a shared professional interest among the surveyed individuals.

The survey presents a comprehensive overview of the demographic and professional landscape within the Department of Agriculture, Government of Odisha. The findings reveal a mix of gender representation, a wide age range, diverse professional experiences, hierarchical diversity, and a unanimous

dedication to agriculture among the respondents. These insights are pivotal in understanding the workforce composition and potential dynamics contributing to agricultural policies, innovations, and strategies within the department.

4.1 Pre-evaluation results:

The responses from the 49 respondents shed light on various perceptions regarding multiple factors contributing to the complexity of ensuring adequate and sustainable food supplies for a growing population. These perceptions can be broadly categorized into several key themes:

A. Global Challenges and Food Security:

When posed the question 'What are your current perceptions of global food security challenges', the respondent's opinions was expressed as below:

Climate Change and Environmental Factors: A predominant concern highlighted by respondents was the impact of climate change on agricultural practices and food production. Issues such as erratic weather patterns, water scarcity, land degradation, depletion of soil health, and the destruction of natural resources were frequently mentioned. Climate variability was linked to reduced yields, affecting the availability and quality of food globally. This aligns with scientific consensus that climate change poses significant risks to agricultural productivity and food systems.

Population Growth and Urbanization: The expanding global population and rapid urbanization were recurrently mentioned as factors straining food security. The rising demand for food due to increased population growth, coupled with limited cultivable land and land-use changes (such as conversion of agricultural land for other purposes), pose challenges in meeting the food requirements of a growing populace.

Resource Constraints and Agricultural Practices: Respondents highlighted inadequate irrigation, economic slowdowns, resource constraints, and poor agricultural practices as contributors to food insecurity. Factors such as inefficient nutrient and water management, inadequate pest control, and loss of biodiversity due to chemical use were mentioned. These issues reflect the challenges faced in optimizing agricultural processes to maximize yields sustainably.

Global Economic and Social Factors: Economic crises, high costs, affordability issues, and disparities in income were linked to food availability and accessibility. Modern food systems, food waste, and market inefficiencies were identified as contributors to global food insecurity. Additionally, challenges related to employment, poverty, and inequality were mentioned as interconnected aspects affecting food security.

Health and Nutrition Concerns: Nutrition-related concerns including malnutrition, inadequate access to quality and balanced food, unsafe food due to residual toxicity, and dietary shifts, were highlighted. Respondents recognized the need for access to nutritious food to ensure the health and well-being of populations globally.

Disruptions in Food Chain and Security Concerns: Disruptions in the food chain due to environmental shocks, changes in climatic conditions, and conflicts were mentioned as challenges impacting food security. Perceptions of security risks associated with the global food system were also evident.

The responses gathered from the survey participants for the question 'Can you identify key factors contributing to food insecurity around the world?' highlight several key factors contributing to food insecurity around the world.

Key factors contributing to global food insecurity, as identified by respondents, encompass environmental challenges like climate change, leading to erratic weather patterns and land scarcity. Socioeconomic factors such as poverty, income inequality, population growth, and conflicts disrupt food supplies. Unfair trade rules and geopolitical tensions impact food accessibility and prices. Inadequate agricultural practices, including poor post-harvest handling, pesticide misuse, and technological barriers, hinder production. Gender inequality, lack of education, and inefficient food distribution systems also play roles.

These multifaceted challenges require integrated solutions. Strategies should address climate resilience, sustainable agricultural practices, poverty reduction, equitable resource allocation, and education. Collaborative efforts between governments, organizations and communities are vital to ensure access to safe, nutritious food globally. Mitigating these complexities demands policy reforms, technology adoption, and cultural shifts toward sustainable practices, aiming to achieve food security and combat global hunger effectively.

B. Principles of Sustainable Agriculture:

The respondents' understanding of sustainable agriculture principles varied. Some recognized its essence, focusing on minimal soil disturbance, resource conservation, and ecosystem preservation. They highlighted integrated nutrient management, crop diversification, and efficient use of natural resources for sustainable yields. Several emphasized practices like integrated farming systems, biodiversity conservation, and holistic approaches to meet present needs without compromising future generations. Some acknowledged the importance of environmental stewardship, social responsibility, and economic viability in sustainable agriculture. However, a few admitted unfamiliarity with

these principles. Overall, the responses reflected a spectrum of understanding, showcasing recognition of the need for environmentally conscious, resource-efficient agricultural practices to ensure long-term food security while preserving ecosystems for future generations.

When asked the question 'What do you believe are the most important principles for promoting sustainability in agriculture?' The respondents expressed varied views on the key principles for promoting sustainability in agriculture. Many emphasized practices such as crop rotation, intercropping, and organic farming to conserve natural resources and enhance soil health. They highlighted principles like nutrient cycling, soil regeneration, and avoiding environmentally harmful inputs to sustain agricultural ecosystems. Integrated approaches and efficient utilization of resources, including water and soil, were emphasized for sustainability. The importance of biodiversity conservation, ecosystem balance, and reducing off-farm inputs to promote resource efficiency emerged as key principles. Some highlighted the significance of community engagement, economic viability, and climate resilience in sustainable agriculture. However, a few respondents expressed uncertainty or lacked specific insights into these principles. Overall, the responses underscored the importance of adopting eco-friendly practices, enhancing soil health, and conserving resources as fundamental principles for promoting sustainability in agriculture, albeit with varying degrees of understanding and emphasis.

C. Soil Health and Nutrient Management:

The respondents provided insights into soil health and effective nutrient management in agriculture. Soil health was defined as the combined physical, chemical, and biological well-being of the soil, crucial for sustaining plant health, productivity, and ecosystem balance. Its importance lay in supporting crop growth, maintaining biodiversity, and ensuring food quality.

Strategies for effective nutrient management varied, encompassing practices like Integrated Nutrient Management (INM), soil testing, and balanced fertilizer application. The 4 R's principle (right rate, right source, right time, right place) was highlighted as a guideline for optimized nutrient usage. Other strategies included organic farming, crop rotation, intercropping, and the use of bio-fertilizers to minimize chemical inputs, maintain soil health, and manage nutrient levels effectively.

These strategies aim to optimize nutrient application, minimize environmental impact, and sustain soil fertility. Integrated approaches, soil testing, and precision in nutrient application emerged as common themes among respondents, demonstrating a nuanced understanding of the need for balanced

nutrient management to enhance agricultural productivity while minimizing environmental degradation.

D. Efficient Water Management in Agriculture:

The role of water management in sustainable agriculture was emphasised by the respondents as below:

Importance of Water: Respondents unanimously agreed that water is a fundamental resource for life and crop production. Water scarcity, excessive water, and its proper management significantly impact agricultural productivity.

Sustainability: Water management is considered crucial for sustainable agriculture due to its role in promoting efficient resource allocation, ecosystem preservation, and long-term farming practices. Efficient water utilization, avoiding wastage, and enhancing resource allocation efficiency were recurring themes.

Technological Innovation: Sustainable water management practices were linked to technological advancements, including innovative irrigation methods like drip and sprinkler systems, along with rainwater harvesting structures and farm ponds.

Climate Change Resilience: Given changing climatic conditions, proper water management becomes more critical. Respondents highlighted the need for adaptive practices in response to irregular rainfall patterns and decreased groundwater levels.

Crop Yield and Resource Preservation: Effective water management is essential for optimizing crop yield, ensuring nutrient absorption by plants at the right time, and preventing damage caused by water stress or excess water.

Impact on Ecosystem: Sustainable water management practices were recognized as integral to maintaining the ecosystem and minimizing negative impacts on soil, environment, and overall agricultural productivity.

The perceived techniques for efficient Water Use in Farming by the respondent's is given below:

Irrigation Methods: Drip and sprinkler irrigation were cited as efficient methods for water use, optimizing the application of water directly to crops, thus reducing wastage.

Rainwater Harvesting: Techniques for harvesting rainwater and storing it in farm ponds were highlighted as strategies to conserve water resources.

Soil Moisture Conservation: Practices such as mulching, cover cropping,

contour farming, and precision soil moisture monitoring help retain soil moisture, minimizing evaporation.

Crop Selection and Rotation: Selecting crops suitable for the available water resources and practicing crop rotation to optimize water use for varying plant needs.

Micro Irrigation and Farming Systems: Implementing micro-irrigation systems, using indicator plants, and employing integrated farming systems were suggested for efficient water use.

Technology Integration: Adoption of advanced technologies, such as weather forecasting, nanotechnology, and water budgeting, was highlighted for optimizing water use in farming.

Overall, the responses highlight the consensus on the vital role of water management in sustaining agricultural productivity while preserving natural resources and ecosystems. The diverse range of suggested techniques emphasizes the need for a holistic approach to address water scarcity challenges in farming for a sustainable agricultural future.

E. Integrated Pest Management (IPM):

Understanding of Integrated Pest Management (IPM) was asked through the question 'What is your understanding of integrated pest management (IPM)? The responses reflect a varied comprehension of IPM, with a prevalent notion of employing a combination of different methods for pest control:

Holistic Approach: Many recognize IPM as a holistic strategy encompassing biological, cultural, mechanical, and chemical methods to control pests below economic thresholds, integrating chemical and non-chemical practices.

Ecosystem-Based Strategy: Several respondents perceive IPM as an ecosystem-based approach, aiming for long-term pest prevention through practices like biological control, habitat manipulation, and the use of resistant varieties.

Reduced Dependency on Chemicals: The emphasis on reducing reliance on chemical pesticides and promoting alternative tools and strategies to manage pests is evident across several responses.

Combining Pest Management Methods: It involves combining physical, biological, cultural, and chemical methods of pest control, sometimes applying chemicals only when pest populations exceed economic thresholds.

Environmental Sensitivity: A notable understanding is the emphasis on minimizing environmental risks by utilizing IPM practices that are cost-effective, socially acceptable, and environmentally friendly.

When asked about any encountered IPM practices in agriculture respondents reported various encountered IPM practices, including the use of biological controls (natural predators and enemies), cultural methods (crop rotation, resistant varieties), and physical controls (traps).

Chemical & Non-Chemical Methods: These encounters encompass both chemical (use of pesticides, bio-pesticides) and non-chemical practices (light traps, sticky traps and cultural practices) for pest control.

Specific Pest Management Techniques: Instances include the use of trap crops, border crops, intercropping, and the employment of certain traps like yellow sticky traps, pheromone traps, and light traps.

Preventive Measures: Some practices involve preventive measures like draining fields, using resistant varieties, adopting summer plowing, and employing cultural techniques to reduce pest populations.

Adoption of ITKs (Indigenous Technical Knowledge): Traditional knowledge-based practices like using specific plants, natural predators, and altering cropping patterns were also reported.

E. Integrated Pest Management (IPM):

The respondent's response on 'How do you think farmers can enhance their resilience to agricultural diseases?' was given below:

Use of High-Quality Seeds: Emphasis on using quality seeds and soil treatment methods to enhance disease resilience.

Cultural Practices: Practices like clean cultivation, weeding, and crop rotation, along with optimal plant population, are considered important for disease management.

Reduced Chemical Usage: Encouragement for limited use of inorganic fertilizers, more use of organic products, and lower chemical application for better disease management.

Climate-Resilient Agriculture: Adoption of climate-resilient practices, including indigenous technical knowledge (ITK), crop diversification, intercropping, and changing planting times, to manage diseases effectively.

Integrated Pest Management (IPM): Several responses suggest adopting IPM practices, such as using resistant varieties, employing trap crops, and implementing pest monitoring systems. Wilby, A., et al. (2015) research evaluates the practical implications of integrated pest management (IPM), addressing its environmental and economic impacts, which could complement the study's focus on disease management strategies.

Whereas in this study respondents asked about 'Are there any specific diseases or challenges you are familiar with in this context?' the below response was received:

Paddy Diseases: Diseases like blast, bacterial leaf blight (BLB), brown plant hopper (BPH) infestations, stem borers, and sheath blight are commonly reported in paddy fields.

Pulses Challenges: Yellow mosaic virus (YMV) in pulses and various diseases like blast, brown spot, and stem borers are reported in pulse crops.

Other Challenges: Fall armyworm (FAW) in maize, fruit and shoot borers in brinjal, tobacco caterpillars, and bacterial wilt in ginger are other challenges reported by some respondents.

Preventive Measures: Many suggestions revolve around preventive measures like seed treatments, using resistant varieties, and adopting specific cultural practices to combat these diseases.

E. Organic Farming and Agroforestry:

When asked about 'What do you know about organic farming and agroforestry as sustainable agricultural practices?' as response received below:

Organic Farming: It involves minimal use of chemical fertilizers and pesticides, focusing more on biological and organic sources for plant nutrients. It promotes the use of natural waste, manures, and compost while avoiding synthetic substances.

Agroforestry: This practice integrates agriculture with trees, utilizing woody perennials alongside crops or animals on the same land units. It generates various products like food, fiber, fuel, and fodder, enhancing biodiversity and ecosystem services.

The Associated Benefits with these Practices perceived by the respondents as:

Organic Farming Benefits: Improved soil health, reduced chemical inputs, healthier food, resilience to climate change, reduced greenhouse gas emissions, and increased biodiversity.

Agroforestry Benefits: Enhanced soil health, increased biodiversity, better erosion control, increased productivity, and diversified income sources for farmers.

Altieri (2018) covers principles and practices of agroecology, emphasizing the importance of ecological processes in agricultural systems, aligning with the study's focus on sustainable agriculture practices. Food and Agricultural

Organisation (2022) report examines the role of organic agriculture in climate change mitigation, offering insights into how organic farming contributes to reducing greenhouse gas emissions, which could be relevant to the study's exploration of organic farming practices. Ponisio, L. C., et al. (2016) study explores the relationship between fire diversity and avian diversity, offering insights into biodiversity maintenance in agroecosystems, which might relate to the study's investigation of agroforestry practices and their impact on biodiversity.

4.2 Post-evaluation results:

Following the Sustainable Food Systems training, participants showcased an enriched comprehension of global food security challenges and the pivotal role sustainable agricultural practices play in addressing these issues. Their post-evaluation reflections indicate a profound shift in understanding and emphasis on sustainable solutions.

Enhanced Awareness of Challenges: The training enabled participants to delve deeper into the complexities of food security, encompassing aspects like food access, quality, market equilibrium, waste reduction, and post-harvest losses. They now grasp the interconnectedness of these challenges and their impact on global food security more comprehensively.

Hope through Sustainability: An overarching realization emerged post-training that adopting sustainable agricultural practices offers a beacon of hope in mitigating global food security threats. Participants acknowledge sustainable food systems as instrumental in combating challenges, demonstrating a newfound optimism despite the complexities.

Understanding Interconnected Issues: Respondents showcased a more profound understanding of interconnected factors such as climate change, soil health degradation, water scarcity, and market fluctuations and their significant contributions to food insecurity. They now grasp the multifaceted nature of these challenges more thoroughly.

Identifying Additional Factors Contributing to Food Insecurity: Participants recognized and internalized an extended array of factors contributing to global food insecurity beyond their preconceived notions. This included technological barriers, inadequate water supply, socio-economic instability, racial discrimination, and geographical constraints, among others.

Impact of Training: The training significantly augmented participant awareness, cultivating a broader comprehension of the complex interplay between agricultural practices, environmental factors, and socio-economic conditions shaping food security. There's a notable shift in emphasis towards sustainable

agricultural methods to confront food insecurity and establish a more resilient food system for the future.

Emphasis on Soil Health and Nutrient Management: The post-evaluation revealed an acute understanding of the criticality of soil health and nutrient management in sustainable agriculture among respondents. Key takeaways encompassed strategies like soil testing, conservation tillage, nutrient management techniques, biodiversity, organic farming, and integrated approaches, indicating a comprehensive understanding of fostering soil health.

Overall, the post-evaluation showcases a paradigm shift in participant's perspectives, reflecting a deeper comprehension of food security challenges and a strong emphasis on implementing sustainable agricultural practices to address these global issues effectively. Their learnings underscore the imperative nature of balancing environmental conservation, economic viability, and social equity within agricultural practices to ensure long-term food security.

The responses emphasize a growing recognition of the significance of water management in agriculture. Views have evolved, highlighting water's pivotal role in crop growth, sustainability, and food security. Respondents acknowledge the need for improved water management practices, linking it to increased crop yields and reduced environmental degradation.

Specifically, promising water-saving practices emerged, including micro-irrigation methods like drip and sprinkler systems, rainwater harvesting, mulching, and crop rotation. These techniques aim to conserve water, enhance soil moisture, and optimize irrigation schedules, ensuring better crop health and yield while minimizing water wastage.

The shift towards precision in water application, adopting drought-resistant crop varieties, and integrating technology for efficient water use showcases a holistic approach to address water scarcity challenges in agriculture. Additionally, emphasis on using water smart technologies, implementing conservation practices, and choosing appropriate irrigation methods based on local conditions emerged as notable strategies.

The responses highlight a progression in understanding Integrated Pest Management (IPM) in agriculture. Initially, some respondents expressed a basic understanding, emphasizing the need for multiple approaches to control pests. There was recognition of cultural, physical, biological, and chemical methods, though the specific implementation was not always clear. Pre-knowledge centered on methods like summer plowing, trap crops, light traps, and biological controls using predators and bio-pesticides. Some also mentioned the importance of not relying solely on chemical control and the significance of soil

health, ecosystem balance, and the risk of pest resistance to chemicals.

Post-knowledge, respondents showcased a deeper understanding of IPM's holistic approach. There was a more detailed articulation of various IPM techniques, including soil treatment, crop rotation, intercropping, the use of trap plants, bio-pesticides, cultural practices like sanitation and crop diversity, and mechanical controls like hand-picking or trapping. There was a notable shift towards emphasizing sustainable and environmentally friendly practices, reducing reliance on chemical pesticides, and promoting the conservation of natural predators and beneficial organisms.

Overall, the post-knowledge responses reflected a more nuanced understanding of how IPM techniques should be integrated and sequenced, emphasizing the importance of ecological balance, soil health and reducing the environmental impact of pest management practices. This evolution indicates a broader awareness of the interconnectedness of pest control, environmental sustainability and agricultural productivity among respondents.

Post-evaluation, the insights garnered from participant's responses reflect a comprehensive understanding of disease management strategies in agriculture. The knowledge acquired highlights a range of practical approaches encompassing cultural, agronomic, biological and technological methods to combat agricultural diseases and enhance resilience. Participants displayed an increased awareness of disease-resistant crop varieties, crop rotation, soil health management and the adoption of Integrated Pest Management (IPM) practices. Emphasis was placed on the significance of proper sanitation, timely planting and the utilization of organic and biological control measures to mitigate disease occurrences. There is a notable shift towards sustainable practices, including the use of organic inputs, integrated nutrient management and the reduction of chemical pesticides. The responses indicate an elevated preparedness among participants to address agricultural challenges, integrating traditional knowledge (ITK) with modern techniques. However, challenges such as disease identification, changing climate patterns, and the evolving nature of diseases remain pertinent.

Overall, the evaluation reveals a stronger grasp of diverse disease management strategies, emphasizing a holistic and sustainable approach that considers ecological, economic, and social aspects of farming. This knowledge empowers participants to navigate agricultural challenges more effectively while prioritizing environmentally friendly and resilient practices.

The responses from the participants after the training program showcase a more informed understanding of organic farming and agroforestry practices.

There is a heightened recognition of the manifold advantages these practices offer in terms of sustainability, soil health, biodiversity preservation, and overall environmental health. Participants highlighted the benefits of organic farming, emphasizing reduced dependency on agrochemicals, increased soil fertility, improved water retention, and the promotion of healthy produce. The discussions revolved around the advantages of agroforestry, such as erosion control, increased soil organic matter, carbon sequestration and the provision of multiple resources like food, fodder, fuel and medicines. Moreover, respondents outlined the interconnectedness between organic farming and agroforestry, acknowledging how these practices contribute to sustainable food systems, nutritional security and environmental sustainability. They expressed a clearer understanding of how these methods enhance soil health, biodiversity, ecosystem services and climate resilience while offering economic benefits to farmers. Ponisio, L. C., et al. (2015) study investigates the yield benefits of diversification practices in organic agriculture, suggesting reduced yield gaps between organic and conventional farming, which might align with the study's findings on organic farming and yield improvements.

Overall, the knowledge gained post-training reflects a holistic comprehension of how organic farming and agroforestry intertwine to create sustainable agricultural systems that not only ensure food security but also contribute to environmental conservation and socio-economic well-being.

5. Policy Implications and Conclusion

The overarching themes from the study, including Sustainable Agriculture, Climate Change Adaptation, Disease Management, and Organic Farming & Agroforestry, bear significant policy implications and conclusions for agricultural practices and policies:

Sustainable Agriculture: Encouraging and incentivizing farmers to adopt sustainable agricultural practices should be a policy priority. Government policies should support the dissemination of knowledge on sustainable techniques such as conservation agriculture, precision farming, and integrated crop-livestock systems. Investing in research, providing subsidies for eco-friendly inputs, and creating market incentives for sustainable produce can further promote these practices.

Climate Change Adaptation: Policies need to address the impact of climate change on agriculture. Implementation of climate-smart agricultural techniques, promoting drought-resistant crops, efficient irrigation methods, and incentivizing carbon-neutral practices can mitigate climate risks. Integrating indigenous knowledge with modern technology in policy frameworks will enhance adaptation measures.

Disease Management and Resilience: Policymakers must promote Integrated Pest Management (IPM) strategies. Investing in research for disease-resistant crop varieties and promoting diversified cropping systems can reduce dependence on chemical pesticides. Supporting farmer education programs for disease diagnosis and implementing biocontrol methods through incentives and subsidies will be crucial.

Organic Farming and Agroforestry: Policy frameworks should incentivize and support the transition towards organic farming practices and agroforestry. This includes providing financial assistance, technical training, and market access for organic produce. Land use policies should encourage agroforestry systems to enhance biodiversity, soil health, and carbon sequestration.

The study's findings underscore the urgency to reframe agricultural policies and practices towards sustainability, climate resilience, and eco-friendly methodologies. Implementing supportive policies that integrate traditional knowledge with modern techniques is pivotal. Collaborative efforts involving governments, agricultural institutions, and local communities are imperative to achieve a holistic and sustainable transformation in agricultural practices. These policy changes and collective actions will not only ensure food security but also contribute to environmental preservation and the overall well-being of farming communities.

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TOWS Matrix Analysis: A Strategic Framework to the Sustainability of Farmer Producer Companies (FPCs)

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ABSTRACT

In present scenario the sustainability and efficient management of Farmer Producer Companies (FPCs) are the biggest challenge to be answered for the promoting agencies. For that one has to frame strategic planning to pave a way forward for working and decisionsof FPCs. TOWS analysis includes creating a list of threats, opportunistic, weaknesses and strengths. It gives clues for examining a company and helps it to convert the challenges into opportunities and there by minimize threats by exploiting strengths and overcoming weaknesses. The matrix reveals about external threats in the form of competition from private companies, absence of risk mitigation procedure, policy changes, influential interference etc. FPCs are fortunate to have opportunities as credit support, training, future market, government schemes, value addition, retailing supporting institutions etc. The low level of participation, poor infrastructure needed for value addition and processing, lack of professional expertise have been weaknesses need to be overcome by harnessing the opportunities. The "we" feeling among the members and economies of scale are the biggest strength of FPCs. Strategies in the form of vertical integration, quality improvement, marketing in collectivism, developing infrastructure facilities, training for professional expertise, availing new technologies, competing in retail market with benefit of direct selling could be of great significance to them. The TOWS analysis of FPCs individually reveals that the factors vary with change in region and produce. Therefore, the strategies need to be developed identically for every FPC. There is wider scope for direct retailing and quality product with brand names. The FPCs not only provide monetary benefits to the member, but also enhance their confidence in farming.

Keywords: SWOT, TOWS, Threat, Opportunity, Weaknesses, Strength, FPOs, FPCs

Introduction

With average land holdings of 1.08 hectare (Agri. Census 2015-16) and majority

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of farmers having less than 1 hectare to cultivate, farmers cannot individually think about investing in modern farm technologies for enhancing farm productivity. Aggregation through FPOs is the only feasible option left for farmers to enjoy economies of scale to enhance their bargaining power and farm-related value accruals.

A producer company is basically a corporate body registered as a Producer Company under Companies Act, 1956 (As amended in 2002). Its main activities consists of production, harvesting, processing, procurement, grading, pooling, handling, marketing, selling, export of primary produce of the members or import of goods or services for their benefit. It also includes, promoting mutual assistance, welfare measures, financial services, insurance of producers or their primary produce.

The FPC model essentially focuses on common interest groups as the basic unit for aggregation, with neither a limit on the size of membership nor on the extent of the operational area. FPCs can accommodate only primary producers to participate in the ownership and management of FPCs, i.e., the members (individuals or SHGs) necessarily have to be "primary producers" – persons engaged in any activity connected with or related to primary produce. With regard to cooperatives, its architecture allows scope for political and government interference and control in management.

Objective

Like other companies, FPCs should also focus on regularly framing strategic plans for its continuous growth and development. Here, we have opted for TOWS matrix analysis to lay down the way forward pathway to be focused on using present internal and external situations. It is common to suggest that companies should identify their strengths and weaknesses as well as the opportunities and threats in the external environment; but, what is often overlooked is that combining these factors may require distinct strategic choices. To systematize these choices, the TOWS Matrix has been proposed, where T stands for threats, O for opportunities, W for weakness, and S for strengths. The TOWS model starts with the threats (T in TOWS), because in many situations a company undertake strategic planning as a result of perceived crisis, problem, or threat.

Methodology

The TOWS Matrix has been introduced for analyzing the competitive situation of the company or even a nation that leads to the development of four distinct sets of strategic alternatives. The TOWS Matrix is a conceptual framework for a systematic analysis that facilitates matching of the external threats and opportunities with the internal weakness and strength of the organization.

Four Alternative Strategies

- The WT strategy aims to minimize both weakness and threats and may be called the Mini-Mini (for "minimize-minimize") strategy. It may require that the company, for example, form a joint venture, retrench, or even liquidate.
- The WO strategy attempts to minimize the weakness and maximize the opportunities. Thus, a firm with weaknesses in some area may either develop those areas within the enterprise or acquire the needed competencies from outside, in order to enable it to take advantage of opportunities in the external environment.
- The ST strategy is based on using the organization's strengths to deal with threats in the environment. The aim is to maximize the former while minimizing the latter. Thus, a company may use its technological, financial, or marketing strengths to cope with the threats of a new product introduced by its competitor.
- The SO strategy, which capitalizes on a company's strengths to take advantage of opportunities, is the most desirable. Indeed, it is the aim of enterprise to move from other positions in the matrix to this one. If they have weaknesses, they will strive to overcome them, making them strengths. If they face threats, they will cope with them so that they can focus on opportunities.

	Internal Strengths (S)	**Internal Weaknesses (W)**
External Opportunities (O)	SO "Maxi-Maxi Strategy"	WO "Mini-Maxi Strategy"
	Strategies that use strengths to maximize opportunities.	Strategies that minimize weaknesses by taking advantage of opportunities.
External Threats (T)	ST "Maxi-Mini Strategy" Strategies that use strengths to minimize threats.	WT "Mini-Mini Strategy" Strategies that minimize weaknesses and avoid threats.

Fig.1: TOWS Matrix for strategy formulation and TOWS Worksheet

Conferring an application of TOWS Matrix in field situation, one has to be perform two TOWS analysis of FPCs with the development of suitable strategic plans. For this, FPCs were selected based on their popularity as renowned and success in the state of Gujarat

The FPCs included are:

- Rajeshwar Farmer Producer Company Limited, Banaskantha, Gujarat
- South Gujarat Progressive Farmers Self Reliant Producer Company, Surat and Bharuch, Gujarat

Result

Farmer Producer Companies (FPCs)

Strengths: It comprises of the internal characteristics and resources that contribute to successful functioning of an organization.

S_1: Produce is directly marketed exempting the commission of middlemen leading to more share of producer in consumer rupee.

S_2: Economies of scale helps in developing greater bargaining power which fetches better price of produce, saves transportation and storage cost per unit and also procurement of inputs at reasonable prices.

S_3: FPCs coordinates with many agencies such as input dealers, wholesalers, line departments, NGOs etc for procurement, selling, advices and training.

S_4: The staffs of FPCs are from among the member farmers. Thus, they are considered more relative and trustworthy by member farmers. The staff is also well acquainted with issues of farmers resulting in passionate collective working for common goal of betterment of member farmers.

S_5: FPCs have well defined organization structures with clearly laid down roles and responsibilities. This develops accountability, transparency and trust in the system.

S_6: Participatory approach is followed in forming and maintenance of FPCs leading to greater involvement and interest of farmers in its activities.

S_7: Many agencies and institutes work for promoting FPOs like NABARD, SFAC, SAUs, ICAR institutes, other government organizations, NGOs, private companies etc.

S_8: The marketing strategies or business model of FPCs are formed considering the market requirement and cultivation of crop accordingly. FPCs also promote maintaining quality, grading of produce, proper packaging, etc to fetch highest price possible for produce.

S_9: Many FPCs have started its retail outlet through online and offline mode especially in case of perishable products such as fruits, vegetable and dairy like Sahyadri Farms, DevBhumi and many more.

Weaknesses: The internal characteristics of the FPOs hinder the successful functioning of the organization.

W_1: The staffs of FPCs are among the farmers and they are not professionals. This leads to unprofessionalism and lack of efficient management of company.

W_2: FPCs generally suffer from lack of proper infrastructure in the form of poor storage facilities, transportation system, procurement units etc. The licensing procedure of FPCs is also very cumbersome.

W_3: Generally, FPCs are not able to fulfill the credit criterion in terms of proper documentation and their financial performance.

W_4: Lack of self realization among farmers for their ownership of FPCs results in their low participation

W_5: Poor networking and negotiation limits the expansion and profit of FPCs Generally, FPCs are commodity and area specific. Thus it limits access of FPCs in market competition.

W_6: Products are generally perishable and require good infrastructure facilities for storage and transportation

Opportunities: They are the external factors that an organization can use to give itself a competitive advantage over its peers. Opportunities create the favourable environment or reduce the obstacles in functioning of an organization to have an edge over its competitors.

O_1: Presently, the numbers of FPCs are very limited. Therefore, there is great scope for formation and expansion of FPCs throughout the country.

O_2: Inclusions of more than one commodity for marketing through single FPCs diversify its marketing strength.

O_3: Including post harvest processing and value addition by FPCs increases the profit per produce and leads to benefit of vertical market integration.

O_4: Branding of FPCs can lead to agri-startups for direct selling to consumers.

O_5: Contract farming for value addition industries or future selling through agencies such as NCDEX protects from price fluctuations.

O_6: Various institutes such as NABARD, SFAC, DAY-NRLM, Central Govt., line departments etc are working to promote and support FPCs.

O_7: Government policies in the form of National Policy for the Promotion of FPOs and Central Sector Scheme of Formation and Promotion of 10,000 FPOs.

O_8: Financial assistance through NABARD, SFAC, Regional Rural Banks and other banks at state and district level collectively works.

O_9: Training Programmes are regularly conducted for training farmers and extension personnel for formation and working of FPCs. Institutes like MANAGE, EEIs, NAARM, SAUs, KVKs and other promoting agencies organizes such trainings.

O_{10}: Public infrastructure facilities and hiring centers helps FPOs in formation stage to sustain and flourish.

Threats: They are the external factors that have the potential to harm an organization.

T_1: Formation of FPCs are given at most importance but after a time period it need to sustain on its own without assistance from outside agencies, which is a biggest challenge for FPCs sustainability.

T_2: Competition from private agencies.

T_3: Rotation of power need to maintain among the leaders of FPCs to avoid dominance of few.

T_4: No provision of insurance against loss due to FPOs

T_5: There are several challenges at the policy level due to which FPOs are unable to reap benefits due to lack of information asymmetry and understanding.

SO Analysis

S_1O_3: Direct marketing provides control to FPCs over vertical integration which if integrated results in increased profit margin.

S_1O_4: Brand naming the produce with direct selling provides assurance to consumer over quality and standards of product.

S_2O_5: Economies of scale provides better bargain for contract farming and future trading.

S_3O_6: FPCs coordinates with many agencies which in turn promote and support FPC formation and working.

S_6O_1: Participatory approach of FPCs motivates farmers to join it. Therefore, it promotes FPCs formation and expansion over time and space.

ST Analysis

S_1T_2: Direct marketing exempts commission which gives advantage to FPCs to sell their produce at a lower price compared to their private counterparts with

better profits.

S_5T_1: The well defined organizational structure of FPCs helps in its smooth functioning and long time sustainability.

S_8T_2:The marketing strategies of FPCs promote maintaining quality, grading of produce, proper packaging, etc which gives it strength against private competition of market.

WO Analysis

W_1O_9: The staff of FPCs should be regularly trained for its structure and function through various organization like MANAGE, EEIs, NAARM, SAUs, KVKs and other promoting agencies

W_2O_6: FPO promoting agencies always helps the farmers with technical and financial advices to acquaint with proper infrastructure and documentation work

W_3O_8:The credit guarantee scheme for FPOs and support from financing institutes with easier procedure can help FPCs in availing timely and sufficient credit.

W_5O_9: Training programmes are organized for farmers to understand their role in FPOs and develop self responsibility towards it.

W_5O_2: Diversification of produce helps in expansion of market.

W_5O_4: Raising the quality of single product and providing it a brand name in consumer market can help in building reputation for product and increasing its selling price.

W_6O_{10}: Public warehouses and hired cold chain transportation increases place and time utility of produce

WT Analysis

W_1T_1: As soon as the external support of promoting agency is retrieved, the FPCs staffs are not able to manage the functioning due to lack of professional expertise

W_2T_2: FPCs are not able to compete with private companies in market due to poor infrastructure facilities, limited credit and disaggregated produce.

W_4T_3:Concentration of power of FPCs in the hands of few influential farmers leads to disinterest and futility among member farmers.

	External Opportunities (O) • Future trading • Branding • Supported by IFFCO	**External Threats (T)** • Less water availability • Competition • Price fluctuations
Internal Strengths (S) • Direct selling • Procurement & Grading • Export	**SO Strategy** Direct selling to NCDEX or Export market fetches higher price than local market	**ST Strategy** Grading and cleaning increases its quality and profit margin
Internal Weaknesses (W) • Commodity specific • Lack of professional expertise • Credit	**WO Strategy** Public warehouses, collective transportation and credit support facilities of govt. can be availed.	**WT Strategy** No insurance policy against market loss

Fig.2:TOWS Matrix for Rajeshwar Farmer Producer Company Limited

	External Opportunities (O) • Tie up with Ambuja Exports • Supported by Reliance Foundation • Future Trading	**External Threats (T)** • Policy • Price fluctuations • Power concentration
Internal Strengths (S) • Graded Products • Directly to millers • Diversified products	**SO Strategy** Purchase of feed for cattle and selling of produce through economies of scale	**ST Strategy** Diversified product gives more selling option against price fluctuation and regular rotation of power
Internal Weaknesses (W) • Lack of professional expertise • Infrastructure facilities	**WO Strategy** Training and collective hiring through supporting organizations should be availed	**WT Strategy** Lack of awareness about present support and working of FPCs becomes a challenge

Fig. 3: TOWS Matrix for South Gujarat Progressive Farmers Self Reliant Producer Company

Conclusion

Self help is the principle of FPC. The matrix revealed that the FPOs face many external threats in form such as private companies, lack of risk mitigation procedure, policy changes, influential interference were major.They have many opportunities waiting in form of huge untapped potential, credit support, trainings, future market, government schemes, value addition, retailing supporting institutions which can be easily availed. The low level of participation, poor infrastructure needed for value addition and processing, lack of professional expertise were their weaknesses need to be overcome for harnessing the opportunities.

The strategies in the form of vertical integration, quality improvement, marketing in collectivism, developing infrastructure facilities, training for professional expertise, availing new technologies, competing in retail market with benefit of direct selling can provide significant advantage to them. The individual TOWS analysis of FPCs revealed they vary with change in region and produce. They have had great scope in direct retailing of quality product with brand names. The FPCs not only provide its member monetary benefits but also increases their confidence in farming.

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Strengthening Postharvest Technology Development and Improvement Through Feedback

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ABSTRACT

This inquiry is predicated on the datum or truism that all technologies have a gap and or become obsolete at some point, and the utilization of passé technologies and methods predisposes the agricultural sector to underdevelopment. It investigates technological paucities and fixes for NSPRI technologies (NSPRI Smoking Kiln (NSK), Parabolic-shaped Solar Dryer (PSSD), Ice Fish Box® (IFB®), Hermetic Steel Drum (HSD) and Ventilated Plastic Crate (VPC)) from the perspective of users of the technologies. The study adopted a cross-sectional research design using the in-person method as its feedback mechanism in 18 states across 6 geopolitical zones in Nigeria. Data were obtained through interview schedules supplemented with key informant interviews while a multi-stage sampling procedure was employed in the selection of respondents. Firstly, eighteen (18) States where NSPRI postharvest technologies have been disseminated and adopted were purposively selected. Secondly, users of improved NSPRI postharvest technologies were selected from diverse locations within the states earlier selected. Non-probabilistic techniques particularly snowballing were also employed at this stage. Frequencies, percentages, means and weighted averages were employed in the analysis of data components. Results showed that 70% of respondents have never provided feedback on NSPRI technologies. Executives of various associations was used by 45% of NSK users, 59% of IFB users, and 48% of VPC users to provide feedback while 43% of PSSD users and 40% of HSD users shared opinions through NSPRI extension staff. In general, there exists a strong (NSK: 94% PSSD: 95.2% IFB®: 91% HSD: 88.6% VPC: 74.5%) willingness to recommend technologies among respondents even as they provided positive feedback on use parameters and components of the technologies. However, respondents opined that the roller and chimney (NSK), durability of polypropylene cover (PSSD), draining of thawed ice (IFB®), and bolted ring (HSD) require improvement.

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Introduction

Feedback, known in innovation management parlance as review is a crucial component of technological development and improvement. It is the information, perceptions, and inputs shared by stakeholders about their experiences with utilization of technologies, products, protocols, or services; it provides insight about overall outcomes, characteristics and/or consequences of technologies, products, protocols, or services disseminated to clientele not leaving out their deficiencies and fixes. It is the process of relating information from end-users back to research after having received or used an innovation (Oyetoro and Akinbode, 2010).

Information gathered through feedback are reported to Research and Development (R&D) for making improvement to existing technologies or developing new ones from the scratch. The improvements made to agricultural technologies based on feedback have led to significant enhancement in user's satisfaction (Kimano, Mukandiwa, & Mario, 2010). Nonetheless, little or no consideration for feedback from end users have led to unrealistic, cost ineffective and sometimes culturally incompatible technologies.

The importance of feedback is heightened by the cavernous information gap existing between Research and Development (R & D), extension, and users of research results impacting negatively on overall agricultural development, especially development of agricultural technologies and practices (Omotayo, 2004). Add to the aforesaid, organizations at the frontlines of technological development in the agricultural sector especially in the Third World have had to stick with technologies long after their values have diminished because of huge financial investments that go into R & D which may not always give a tangible result. Even so, change is constant, and locking into technologies for unnecessary long period of time will not align with the ever-changing technology needed in modern agriculture.

Research by itself is not all knowing; feedback creates a relationship between research and consumers of agricultural technologies by fostering conversations around and about agricultural technologies. Feedback motivates change, as such creating avenues for feedback recognizes the fact that change is constant, and dynamic technology models are the bedrock of development in the agricultural sector. Feedback could be in the form of commendation (positive) for an innovation or commendation for some component of the innovation, it could also be disapproval (negative) for an innovation or disapproval for some of its components. Commendation gives credence while criticism offers ideas to make improvement to the innovation.

Nigerian Stored Products Research Institute (NSPRI) among others is in the business of delivering improved postharvest technologies to stakeholders in Nigeria. In spite of its contributions to combating food losses, large scale empirical studies (studies with national spread) have not been conducted in recent times at improving on design, production, as well as on increasing efficiency of these through feedback from clientele. Furthermore, all technologies have inadequacies and or become antediluvian at some time, therefore this investigation will be seeking to provide answers backed by scientific experimentation to the salient topical question: What are technological paucities and fixes for NSPRI technologies from the standpoint of users of such technologies? Consequently, the fact that the utilization of passé technologies and methods are rife in research and development domain, the need to stem this anomaly calls for an investigation whose objectives are to ascertain the gaps in selected Nigerian Stored Products Research Institute (NSPRI) technologies through feedback from relevant stakeholders, and generate data that will aid in improving deficient or obsolete NSPRI technologies based on feedback from users of such technologies. Furthermore, the findings would help make recommendations that would contribute to policy.

Methodology

The research design was cross-sectional. In-person surveys and technology-based engagement platforms are common mechanisms employed in generating feedback. This study, however, employed the in-person feedback method. Fundamentally, this method is usually done orally and most often than not uses standardized interview schedules whose intent is to bring to the fore perceptions, experiences, requirements and suggestions of users of a technology, product or service towards its improvement. The study was carried out in 18 states (Kwara, Kogi, Niger, Nassarawa, Osun, Ekiti, Lagos, Ondo, Ogun, Oyo, Delta, Rivers, Akwa Ibom, Edo, Abia, Ebonyi, Kano, and Borno) across the 6 geopolitical zones of the country.

Sampling Procedure and Sample Size

A multi stage sampling procedure was used for the study. At the first stage, eighteen (18) States where improved NSPRI postharvest technologies have been adequately disseminated and adopted in the past was purposively selected. The technologies of interest for this study were NSPRI Smoking Kiln(NSK), Parabolic-shaped Solar Dryer (PSSD), Ice Fish Box® (IFB®), Hermetic Steel Drum (HSD) and Ventilated Plastic Crate (VPC). Secondly, users of improved NSPRI postharvest technologies were selected from diverse locations within the eighteen (18) States earlier selected. Non-probabilistic techniques especially snowballing were also employed at this stage. Similarly, Agricultural Development Project (ADP), and

local resource persons in selected seventeen (17) states, and the Agro Processing, Productivity Enhancement and Livelihood Improvement Support (APPEALS) project in Kano State assisted in survey mapping and enumeration. Essentially, past and present users of improved NSPRI postharvest technologies identified via previous NSPRI empowerment and popularization programmes were the focus of this investigation. Members of groups earlier empowered in Kwara, Kogi, Niger, Osun, Lagos, Ogun, Oyo, Delta, Rivers, Akwa Ibom, Edo, Abia, Ebonyi States were interviewed on utilization and feedback for these technologies: Fish Smoking Kiln, Ice Fish Box®, Ventilated Plastic Crate, Hermetic Drum and Parabolic-shaped Solar Dryer. Ekiti, Ondo and Nassarawa States: Parabolic-shaped Solar Dryer. Kano State: Hermetic Drums and Parabolic-shaped Solar Dryer; Borno State: Fish Smoking Kiln, Ice Fish Box®, and Hermetic Drum. A total of 4,500 interview schedules were sent out (250 per State) across NSPRI technologies and along the women and youth divide based on the data sheets of users of improved NSPRI postharvest technologies obtained from NSPRI, ADPs and APPEALS, 3,017 were returned (67% return rate). For this investigation, total valid responses retrieved was 2,202.

Pre-Testing of Survey Instrument

Face and content validity of the research instrument was carried out by an assortment of experts from the Department of Agricultural Extension and Rural Development, and Department of Sociology, University of Ilorin, Nigeria. Using the Test-retest method, Pearson Product Moment Correlation was used to ascertain reliability of the survey instrument. With this in perspective, the instrument was considered consistent as a reliability coefficient of 0.71 was obtained.

Data Collection and Analysis

Items on the research instrument were developed to provide answers to the objectives of the study. This was also augmented with a qualitative data tool viz.: key informant interview. The data obtained were in nominal, ordinal, and interval levels. Feedback from respondents on postharvest technologies was obtained by means of a Likert-type scale and analyzed using the weighted mean known in some circles as a weighted average. This incorporates multiplying each data point in a set by a value which is determined by some characteristics of its contribution to the data point (Clark-carter, 2010).

Results and Discussion

Table 1a: Socio-economics information of respondents

	NSK			PSSD			IFB®			HSD			VPC		
	Freq	%	Mean	Freq	%	Mean	Freq	%	Mean	Freq	%	Mean	Freq	%	Mean
Sex															
Male	179	37.1		111	25.5		145	31.7		344	44.7		24	43.6	
Female	304	62.9		325	74.5		313	68.3		426	55.3		31	56.4	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	
Age															
20 years Below	16	3.3		-	-		4	.9		25	3.2		2	3.6	
21- 30 years	39	8.1		18	4.1		51	11.2		56	7.2		5	9.1	
31- 40 years	123	25.5		118	27.1		142	30.7		242	31.5		16	29.1	
41- 50 years	181	37.5		160	36.7		166	36.4		249	32.4		23	41.8	
51- 60 years	103	21.3		100	22.9		70	15.4		160	20.8		8	14.5	
61 Years and above	21	4.3		40	9.2		25	5.5		38	4.9		1	1.8	
Total	483	100.0	44	436	100.0	46	458	100.0	43	770	100.0	45	55	100.0	40
Marital Status															
Single	22	4.6		75	17.2		23	5.1		27	3.5		7	13.0	
Married	415	86.1		328	75.2		390	84.9		665	86.4		40	74.1	
Widowed	28	5.8		13	3.0		30	6.7		47	6.1		3	5.6	
Divorced	6	1.2		5	1.1		11	2.4		12	1.6		-	-	
Separated	12	2.5		15	3.5		4	.9		19	2.5		4	7.4	
Total	483	100.0		436	100.0		458	100.0		770	100.0		54	100.0	
Major Enterprise															
Fish processing	457	94.6		21	4.8		105	23.1		4	.5		1	1.8	
fish retailing	26	5.4		-	-		345	75.2		2	.3		-	-	
grain processing/storage	-	-		159	36.5		7	1.5		725	94.2		-	-	
fruit & vegetable farmer/processor	-	-		79	18.1		1	.2		14	1.9		31	56.4	
fruit & vegetable marketer	-	-		-	-		-	-		-	-		22	40.0	
root & tuber farmer/processor	-	-		177	40.6		-	-		25	3.2		1	1.8	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	

Source: Field survey 202

Table 1b: Socio-economics information of respondents

	NSK			PSSD			IFB®			HSD			VPC		
	Freq	%	Mean	Freq	%	Mean	Freq	%	Mean	Freq	%	Mean	Freq	%	Mean
Household Size															
5 and below	170	35.3		161	37.2		191	41.9		298	38.5		23	41.8	
6 -10	270	55.7		254	58.0		220	48.2		383	49.9		30	54.5	
11 -15	36	7.5		21	4.8		35	7.2		73	9.5		2	3.7	
16 -20	4	0.8		-	-		12	2.6		16	2.1		-	-	
20 and above	3	0.6		-	-		-	-		-	-		-	-	
Total	483	100.0	7	436	100.0	6	458	100.0	6	770	100.0	7	55	100.0	6
Level of Education															
No formal education	43	8.9		96	22.0		68	14.9		87	11.3		6	10.9	
Primary	161	33.3		84	19.2		48	10.1		115	14.9		5	9.1	
Secondary	48	9.9		98	22.5		136	29.8		218	28.3		22	40.0	
Vocational/technical	43	8.9		24	5.5		24	5.3		55	7.1		7	12.7	
OND/NCE	76	15.7		72	16.5		108	23.7		176	22.9		8	14.5	
HND/BSC	94	19.5		47	10.8		63	13.8		99	12.9		6	10.9	
MSC	17	3.5		15	3.4		11	2.4		17	2.2		-	-	
PhD	1	0.2		-	-		-	-		3	0.4		1	1.8	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	
Membership of Association															
No	137	28.4		117	26.9		106	23.1		158	20.5		6	10.9	
Yes	346	71.6		319	73.1		352	76.9		612	79.5		49	89.1	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	
Number of Association															
1	262	75.7		199	47.4		266	75.6		501	81.9		24	49.0	
2	69	19.9		136	32.4		78	22.2		100	16.3		22	44.9	
3	13	3.8		16	3.8		7	2.0		11	1.8		3	6.1	
4	2	0.6		69	16.4		1	0.2		-	-		-	-	
Total	346	100.0		420	100.0		352	100.0		612	100.0		49	100.0	
Types of Association															
Cooperative society	174	39.4		199	47.4		185	41.5		308	41.9		38	40.3	
Processors association	152	34.4		136	32.4		67	15.0		100	13.6		4	5.2	
Marketer's association	37	8.4		16	3.8		116	26.0		134	18.3		25	32.5	
Farmer's association	79	17.8		69	16.4		79	17.5		192	26.2		17	22.0	
Total	442	100.0		420	100.0		447	100.0		734	100.0		77	100.0	

Source: Field survey 2022

Table 1c: Socio-economics information of respondents

	NSK			PSSD			IFB®			HSD			VPC		
	Freq	**%**	**Mean**	**Freq**	**%**	**Mean**	**Freq**	**%**	**Mean**	**Freq**	**%**	**Mean**	**Freq**	**%**	**Mean**
Access to Credit															
No	302	62.5		328	75.2		317	69.2		479	62.3		31	56.4	
Yes	181	37.5		108	24.8		141	30.8		291	37.7		24	43.6	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	
Source of Credit															
Institutional	53	29.3		38	35.2		31	22.0		66	22.8		16	66.7	
Non institutional	128	70.7		70	64.8		110	78.0		225	77.2		8	33.3	
Total	181	100.0		108	100.0		141	100.0		291	100.0		24	100.0	
Years of Experience in the Enterprise															
10 years Below	317	65.4		255	58.9		269	58.9		408	53.1		37	68.5	
11-20 years	92	19.2		115	25.9		99	21.7		214	27.6		13	24.1	
21-30 years	37	7.7		55	12.7		48	10.5		89	11.6		3	5.6	
31-40 years	30	6.3		6	1.4		33	7.0		48	6.3		1	1.9	
41-50 years	7	1.5		5	1.2		9	2.0		11	1.4		-	-	
Total	483	100.0	11	436	100.0	12	458	100.0	12	770	100.0	13	54	100.0	11
Mode of Technology Acquisition															
Given by government	429	88.8		398	91.3		401	87.5		656	85.3		42	76.4	
Gifted	3	0.6		15	3.4		-	-		-	-		2	3.6	
Purchased	18	3.7		-	-		8	1.8		12	1.6		7	12.7	
Hired/leased	3	.6		11	2.5		-	-		-	-		2	3.6	
NGO	30	6.2		12	2.8		49	10.7		102	13.1		2	3.6	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	

Source: Field survey 2022

Table 1d: Socio-economics information of respondents

	NSK			PSSD			IFB®			HSD			VPC		
	Freq	%	Mean	Freq	%	Mean	Freq	%	Mean	Freq	%	Mean	Freq	%	Mean
Mode of Technology Utilization															
Personal	112	23.2		37	8.5		172	37.4		273	35.5		27	49.1	
Group	169	35.1		275	63.1		149	32.6		230	29.9		12	21.8	
Both	202	41.7		124	28.4		137	30.0		267	34.6		16	29.1	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	
Level of Technology Utilization															
Subsistence	30	6.2		32	7.4		36	7.9		92	12.0		8	14.5	
Commercial	180	37.3		179	40.9		199	43.4		295	38.4		24	43.6	
Both	273	56.5		225	51.7		223	48.7		383	49.7		23	41.8	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	
Contacts with Extension Agents in the Past 12 Months															
No	88	18.0		65	15.1		97	21.2		145	18.9		12	21.8	
Yes	395	82.0		371	84.9		361	78.8		625	81.1		43	78.2	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	
Number of Contacts with Extension Agents in the Past 12 Months															
5 times and below	326	82.5		328	88.4		283	78.4		525	84.1		40	93.0	
6-10 times	46	11.6		29	7.8		67	18.5		73	11.7		3	7.0	
11-15 times	16	4.1		14	3.8		9	2.5		18	2.9		-	-	
16-20 times	6	1.5		-	-		2	.6		7	1.0		-	-	
21 times and above	1	0.3		-	-		-	-		2	.3		-	-	
Total	395	100.0	4	371	100.0	3	361	100.0	4	625	100.0	4	43	100.0	1
Region of Residence															
Rural	185	38.2		214	49.1		154	33.6		242	31.5		7	12.7	
Urban	129	26.8		79	18.1		122	26.7		262	34.1		14	25.5	
Sub-urban	169	35.1		143	32.8		182	39.7		266	34.5		34	61.8	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	
Region of Business Operation															
Rural	158	32.8		162	37.2		125	27.3		233	30.3		8	14.5	
Urban	146	30.1		115	26.4		153	33.4		234	30.4		15	27.3	
Sub-urban	179	37.1		159	36.5		180	39.3		303	39.3		32	58.2	
Total	483	100.0		436	100.0		458	100.0		770	100.0		55	100.0	

Source: Field survey 2022

Demographics of the Respondents

As shown in Table 1a, the distribution of stakeholder (users) along sex divide reflects the focus of previous NSPRI empowerment programmes male 36.5, female 63.5 (disaggregated: NSK; male 37.1, female 62.9; PSSD; male 25.5, female 74.5; IFB®; male 31.7, female 68.3; HSD male; 44.7, female 55.3; VPC; male 43.6, female 56.4). Youths are persons between the age of 15 and 35 years (African Union, 2006). Be that as it may, the mean age of users of these technologies is estimated at 44 years (disaggregated: NSK; 44; PSSD; 46; IFB®; 43; HSD; 45; VPC; 40), showing that respondents are relatively young. This might not be unconnected to the fact that major recipients of NSPRI empowerment programmes are women; womenfolk is not devoid of the aged. Across the technology divide, majority of the respondents are married. Marriage exerts influence on stakeholders in the agricultural sector to embrace improved technologies (Ajala, Kolawole, Owolabi & Faseyi, 2017). Users (the crux of this investigation) of NSK, PSSD, IFB®, HSD and VPC have fish processing, grain processing and storage, fish retailing, grain processing and storage, and fruit & vegetable farming and processing as their major enterprises respectively.

Aggregated mean household size (Table 1b) is 6 (disaggregated household size for user of: NSK; 7, PSSD; 6, IFB®; 6, HSD; 7, VPC; 6). Majority of the respondents (i.e. users of PSSD, IFB®, HSD, and VPC) for this investigation are secondary school graduates. On the other hand, majority (33.3%) of NSK users are recipients of primary school education. However, further scrutiny of data presented in Table 1b suggest that across board, respondents are educated; education is an important explanatory factor that positively influences the decision to utilize improved technologies (Namara, Weligamage and Barker, 2013). A large majority of respondents belong to a group, membership of this is however skewed towards cooperative society. Membership of group/ association are known to provide opportunities for accessing information and knowledge, credit, input and improved technologies (Owojaiye, 2022).

Among users of these technologies (Table 1c), an estimated 65% do not have access to credit facilities while majority of those that do rely chiefly on non-institutional sources. That said, access to credit is a key to rural development as it is essential for promoting Small and Medium Enterprise (Attah, Annan, and Ironbar, 2018), non-access however decreases income by inhibiting productive investments (Akinlo, 2014). Table 1c also shows the aggregated average years of experience in the enterprise to be 12 (disaggregated years of experience: NSK; 11, PSSD; 12, IFB®; 12, HSD; 13, VPC; 11) implying that respondents are relatively well experienced. Long years of experience enhances respondents' understanding and aid utilization of technologies of concern. Add to the aforementioned,

experienced users would have a lower level of uncertainty about technology performance, and have full information and better knowledge; are able to evaluate the advantages of improved technologies (Adegbola, 2019). Also, Table 1c shows an overwhelming majority of respondents received technologies from government (NSPRI empowerment and popularization projects).

As shown in Table 1d, the pre-eminent mode of technology utilization for IFB® and VPC (transportation and handling technologies) is personal. For the first the least mode of utilization is personal and group (i.e. both) while group mode of utilization is the least for the other. The lowest mode of technology utilization for NSK and PSSD (processing technologies) is personal. For the former the most prominent mode of utilization is personal and group (i.e. both) while group mode of utilization is foremost for the latter. For HSD, given its peculiarity as a low to medium storage technology, the principal mode of utilization is personal. Apart from VPC that is principally used at commercial level, respondents majorly utilized technologies for both subsistence and commercial purposes (i.e. both). Public extension system represents the most common source of information for stakeholders in Nigeria (Adegbola, 2019). Put in perspective, majority of respondents have had contact(s) with extension agents in the past 12 months with an estimated average of 3 contacts. Most users of NSK and PSSD (processing technologies) live in rural areas, however majority of respondents who use the IFB®, HSD and VPC live in suburbs. Finally, all respondent categories except users of PSSD have their business in the suburban.

Opinions/Feedback Channels

Limited feedback hinders the development, improvement, and advancement of technologies which have potential to increase productivity and improve livelihood. According to Table 2, about 70% of respondents for this survey have never provided feedback(s) on NSPRI technologies. For those who have, these categories of respondents NSK users (45 %), IFB users (59%), and VPC users (48 %) have majorly shared their opinions through the executives of various association they belong to. However, users of PSSD (43%) and HSD (40%) shared opinions through NSPRI extension staff. The high percentage of respondents who have never provided feedback mirrors the low premium placed on feedback in the sector. This phenomenon however is not untypical of the agricultural sector in developing countries Nigeria inclusive, where stakeholders' reliance on extension staff in transmitting and receiving information has been ineffective due to low extension agent to farmer ratio. This dearth of feedback in the technology development space creates a chasm between subject matter specialist and end users of a technology; it leaves the former in the dark as to required improvement while the latter are sometimes stuck with obsolete technologies or

Table 2: Distribution of respondents according to feedback channels

	NSK		PSSD		IFB®		HSD		VPC	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Sharing opinions about NSPRI technologies in the past										
No	340	70.7	307	70.4	366	79.9	465	60.5	34	61.8
Yes	143	29.3	129	29.6	92	20.1	305	39.5	21	38.2
Total	483	100.0	436	100.0	458	100.0	770	100.0	55	100.0
Channels of sharing about opinions on NSPRI technologies										
ADPs	32	22.4	40	31.0	13	14.1	56	18.3	3	14.1
NGO	-	-	7	5.4	2	2.2	16	5.3	1	4.7
Association Executives	64	44.8	26	20.2	54	58.7	111	36.4	10	47.7
NSPRI extension staff	47	32.8	56	43.4	23	25.0	122	40.0	7	33.5
Total	143	100.0	129	100.0	92	100.0	305	100.0	21	100.0

Source: Field survey 2022

those not in sync with current needs and realities of the time.

Feedback on NSPRI Technologies

NSK is a technology for smoking/drying fish and meat. Its major components are the drying chamber with drying trays, a combustion chamber, and an oil collector. This kiln may be classified based on size and or heat source (charcoal, gas, and electricity). The charcoal variant was the focus of this investigation. Table 3a shows the opinion of respondents to be that the following components of the NSK; charcoal tray, door, oil extractor, fish tray, and metal sheet do not require improvement. In the same vein, these opine that drying time using the NSK is optimal (this may not be unconnected to the quality of metal sheet (primary material) and lagging of the NSK) and needs no further improvement in this regard. They however hold that the roller and chimney components require improvements; the rollers are quick to get detached and the chimney needs a mesh and a cone-shaped covering.

PSSD is a form of confined solar dryer. It consists of transparent materials that provide a covering and transmit heat from the sun into the drying chamber. It also has an insulated black floor that stores heat from the sun to prevent its loss due to conduction. Table 3b shows the opinion of respondents to be that the following components of the PSSD: tray, frame, and aspirator do not require improvement. Similarly, respondents opine that drying time using the PSSD is ideal and products retain their natural color (this may not be unrelated to the fact that the ultraviolet-treated polypropylene cover transmits heat and the insulated black floor forestalls heat loss). Nevertheless, they view the durability

of polypropylene cover has suspect as it is quick to tear after a few months of use; it therefore requires improvement. A higher gauge of polypropylene cover would enhance its durability.

IFB® is used to extend the shelf-life of fresh fish. It is a means of handling fish for transporting, distributing and marketing. The IFB® consists of a double-wall food-grade plastic with insulation between the walls. The box has a tight-fitting lid that is also insulated. The insulation reduces heat transfer from the surroundings and conserves the ice's cooling effect. The technology has a draining outlet for the water that could arise from the defrosting ice placed in it. As shown in Table 3c, respondents perceive that the size/capacity of box, roller/wheel, tightness of lid/cover do not require improvement. Nonetheless, they opine that the draining of thawed ice requires improvement. The outlet for draining should be constructed to be at the same level with the floor of the box to allow for complete draining.

HSD are rigid airtight structures used to store durable agricultural produce both at domestic and commercial levels. They provide moisture and insect control without pesticides. These have tight-fitting lids, creating a barrier between the produce and the outside atmosphere to prevent oxygen and water movement between the environment and the stored produce. Table 3e reveals the opinion of respondents to be that the following components of the HSD; capacity of drum lid/cover, and material (steel) do not require improvement. They however hold that the bolted ring require improvement; its bolt and nuts are fitted too close to the drum and requires other devices (spanner) to fasten and unfasten.

VPC are strong, rigid, easy to clean, stackable, nestable and reusable plastic crates for handling of fruits and vegetables. These crates allow for cross ventilation of air to prevent heat build-up when loaded with fruits and vegetables. They have a maximum loading level to prevent mechanical damage when stacked. Utilization of this technology reduces overall transportation costs because they can be stacked and re-used. As presented in Table 3d, respondents' feedback shows that strength of crate handle, holding capacity, ventilation of produce, durability of crate, and strength of the base (all aspects of use/ components of the technology) function as desired and do not require improvement.

Table 3a: Respondents' perceptions of NSK

	Very Good (5) Frequency (%)	Good (4) Frequency (%)	Average (3) Frequency (%)	Poor (2) Frequency (%)	Very Poor (1) Frequency (%)	WS/N	Weighted Mean Score (WMS)	Decision
Door Air Tightness	130 (26.9) 130x5=650	225 (46.6) 225x4=900	81 (16.8) 81x3=243	32 (6.6) 32x2=64	15 (3.1) 15x1=15	1872/483	3.88	DNRI
Roller	15 (3.1) 15x1=15	28 (5.8) 28x4=112	70 (14.5) 70x3=210	238 (49.3) 238x2=476	132 (27.3) 132x1=132	945/483	1.96	RI
Chimney	39 (8.1) 39x5=195	96 (19.9) 96x4=384	131 (27.1) 131x3=393	142 (29.4) 142x2=284	75 (15.5) 75x1=75	1331/483	2.75	RI
Holding Capacity (Charcoal Tray)	79 (16.4) 79x5=395	249 (51.4) 249x4=996	124 (25.8) 124x3=372	21 (4.4) 21x2=42	10 (2.1) 10x1=10	1815/483	3.76	DNRI
Steel Strength of Kiln	183 (38.0) 183x5=915	261 (53.4) 261x4=1044	32 (6.7) 32x3=96	3 (0.6) 3x2=6	4 (0.8) 4x1=4	2065/483	4.28	DNRI
Oil Extraction	171 (35.6) 171x5=855	257 (53.0) 257x4=1028	49 (10.2) 49x3=147	2 (0.4) 2x2=4	4 (0.8) 4x1=4	2038/483	4.22	DNRI
Drying of Fish Smoking Kiln	257 (53.3) 257x5=1375	188 (38.9) 188x4=752	29 (6.0) 29x3=87	7 (1.4) 7x2=14	2 (0.4) 2x1=2	2230/483	4.62	DNRI
Fish Tray	176 (36.4) 176x5=880	258 (53.4) 258x4=1032	33 (6.9) 33x3=99	11 (2.3) 11x2=22	5 (1.0) 5x1=5	2038/483	4.22	DNRI

Source Survey: Field Survey 2022. *DNRI= Does not require improvement, *RI= Requires improvement, *WS= Weighted score, *N= Number of respondents.

Table 3b: Respondent perceptions of PSSD

	Very Good (5) Frequency (%)	Good (4) Frequency(%)	Average (3) Frequency (%)	Poor (2) Frequency (%)	Very Poor (1) Frequency (%)	WS/N	Weighted Mean Score (WMS)	Decision
Capacity of Tray	165 (37.8) 165x5=825	160 (36.7) 160x4=640	89 (20.4) 89x3=267	9 (2.1) 9x2=18	13 (3.0) 13x1=13	1763/436	4.04	DNRI
Durability of Polypropylene Cover	18 (4.1) 18x5=90	78 (17.9) 78x4=312	207 (47.5) 207x3=621	108 (24.8) 108x2=216	25 (5.7) 25x1=25	1264/436	2.90	RI
Strength of the Frame	151 (34.6) 151x5=755	206 (47.2) 206x4=824	64 (14.8) 64x3=192	15 (3.4) 15x2=30	-	1801/436	4.13	DNRI
Drying Time	223 (51.1) 223x5=1115	163 (37.4) 163x4=652	31 (7.1) 31x3=93	16 (3.7) 16x2=32	3 (0.7) 3x1=3	1895/436	4.35	DNRI
Aspirator	128 (29.4) 128x5=640	197 (45.1) 197x4=788	87 (20.0) 87x3+261	19 (4.4) 19x2=38	5 (1.1) 5x1=5	1732/436	3.97	DNRI

Source Survey: Field Survey 2022. *DNRI= Does not require improvement, *RI= Requires improvement, *WS= Weighted score, *N= Number of respondents.

Table 3c: Respondent perceptions of IFB®

	Very Good (5) Frequency (%)	Good (4) Frequency (%)	Average (3) Frequency (%)	Poor (2) Frequency (%)	Very Poor (1) Frequency (%)	WS/N	Weighted Mean Score (WMS)	Decision
Capacity of Tray	165 (37.8) 165x5=825	160 (36.7) 160x4=640	89 (20.4) 89x3=267	9 (2.1) 9x2=18	13 (3.0) 13x1=13	1763/436	4.04	DNRI
Durability of Polypropylene Cover	18 (4.1) 18x5=90	78 (17.9) 78x4=312	207 (47.5) 207x3=621	108 (24.8) 108x2=216	25 (5.7) 25x1=25	1264/436	2.90	RI
Strength of the Frame	151 (34.6) 151x5=755	206 (47.2) 206x4=824	64 (14.8) 64x3=192	15 (3.4) 15x2=30	-	1801/436	4.13	DNRI
Drying Time	223 (51.1) 223x5=1115	163 (37.4) 163x4=652	31 (7.1) 31x3=93	16 (3.7) 16x2=32	3 (0.7) 3x1=3	1895/436	4.35	DNRI
Aspirator	128 (29.4) 128x5=640	197 (45.1) 197x4=788	87 (20.0) 87x3+261	19 (4.4) 19x2=38	5 (1.1) 5x1=5	1732/436	3.97	DNRI

Source Survey: Field Survey 2022. *DNRI= Does not require improvement, *RI= Requires improvement, *WS= Weighted score, *N= Number of respondents.

Table 3d: Respondent perceptions of VPC

	Very Good (5) Frequency (%)	Good (4) Frequency (%)	Average (3) Frequency (%)	Poor (2) Frequency (%)	Very Poor (1) Frequency (%)	WS/N	Weighted Mean Score (WMS)	Decision
Strength of Crate Handle	28 (50.9) 28x5=140	21 (38.2) 21x4=84	6 (10.9) 6x3=18	-	-	242/55	4.40	DNRI
Holding Capacity	29 (52.7) 29x5=145	22 (44.0) 22x4=88	3 (5.5) 3x3=9	1 (1.8) 1x2=2	-	244/55	4.44	DNRI
Ventilation of Produce	33 (60.0) 33x5=165	18 (32.7) 18x4=72	4 (7.3) 4x3=12	-	-	249/55	4.53	DNRI
Durability of Crate	21 (38.2) 21x5=105	31 (56.4) 31x4=124	3 (5.5) 3x3=9	-	-	238/55	4.33	DNRI
Strength of the Base	34 (61.8) 34x5=170	20 (36.4) 20x4=80	1 (1.8) 1x3=3	-	-	253/55	4.6	DNRI

Source Survey: Field Survey 2022. *DNRI= Does not require improvement, *WS= Weighted score, *N= Number of respondents.

Table 3e: Respondent perceptions of HSD

	Very Good (5) Frequency (%)	Good (4) Frequency (%)	Average (3) Frequency (%)	Poor (2) Frequency (%)	Very Poor (1) Frequency (%)	WS/N	Weighted Mean Score (WMS)	Decision
Size/Capacity of Drum	207 (27.0) 207x5=1035	368 (47.9) 368x4=1472	181 (23.3) 181x3=543	6 (0.8) 6x2=12	8 (1.0) 8x1=8	3070/770	3.99	DNRI
Bolted Ring	59 (7.7) 59X5=295	101 (13.1) 101x4=404	192 (24.9) 192x3=576	345 (448) 345x2=690	73 (9.5) 73x1=73	2038/770	2.65	RI
Lid/Cover	259 (33.6) 259X5=1295	394 (51.3) 394x4=1576	83 (10.8) 83x3=249	23 (2.9) 23x2=46	11 (1.4) 11x1=11	3177/770	4.13	DNRI
Material (Steel)	430 (55.9) 430x5=2150	261 (33.9) 261x4=1044	61 (7.9) 61x3=183	11 (1.4) 11x2=22	7 (0.9) 7x1=7	3406/770	4.42	DNRI

Source Survey: Field Survey 2022. *DNRI= Does not require improvement, *RI= Requires improvement, *WS= Weighted score, *N= Number of respondents.

Advantages of using NSPRI Technologies

As shown in Table 4a, b, c, d and e, major advantages associated with the use of these technologies are as follows NSK: fast drying time, hygienic output, and extension shelf life; PSSD: fast drying time, dried products look better, saves stress; IFB®: durability of technology, extension of shelf life of commodity, portable; HSD: improved shelf-life, insect free products, prevents rodent attacks; VPC: protection of produce during transport, extension of shelf life, and easy to handle.

Table 4a: Advantages of NSK

	Frequency	Percent
Fast drying time	110	39.1
Hygienic output	88	31.3
Less stressful	14	4.9
Increased patronage	30	10.7
Extension of shelf-life	32	11.4
Removable tray	7	2.6
Total	281	100.0

Table 4b: Advantages of PSSD

	Frequency	Percent
It saves cost	8	2.9
Products dry faster	84	30.9
It protects products against animal incursion and contamination	11	4.1
Dried products are neater and hygienic	48	17.6
Dried products look better	63	23.2
Saves stress	58	21.3
Total	272	100.0

Table 4c: Advantages of IFB®

	Frequency	Percent
Keep ice from defrosting for a longer period	7	2.3
Durability of technology	40	13.4
Simple to operate	6	2.0
Extension of shelf life of commodity	190	64.2
Easy to move from one point to another	17	5.6
Portable	36	12.5
Total	296	100.0

Table 4d: Advantages of HSD

	Frequency	Percent
Durable	100	15.1
Easy to use	33	5.0
Increases patronage	3	0.5
More hygienic products	4	0.6
Improved shelf-life	199	30.1
Insect free products	130	19.7
It can store variety of grains	4	0.6
It is chemical free	51	7.7
It prevents rodent attacks	112	16.9
It reduces storage treatment cost	13	2.0
It stores more quantity	5	0.8
Mobile	5	0.8
Not stressful	2	0.2
Total	661	100.0

Table 4e: Advantages of VPC

	Frequency	Percent
Durability of crates	6	10.9
Protection of produce during transport	20	36.5
Extension of shelf life	9	16.3
Easy to handle	20	36.3
Total	55	100.0

Challenges Associated with usage of NSPRI Technologies.

As shown in Table 5a, b, c , d and e, major challenges associated with the use of these technologies are as follows NSK: roller, capacity of fish tray, and quality of charcoal tray material; PSSD: Fastening bolts piercing the polypropylene cover, polypropylene cover susceptible to tear, and the structure as a whole lacks protective barrier against domestic animals; IFB®: Scarcity and cost of ice, and small holding capacity; HSD: It is expensive, scarce, and not compatible with dominant practices in the sector; VPC: does not allow flexible arrangement during transportation, not a unit of measurement, and small holding capacity.

Table 5a: Major challenges with the use of NSK

	Frequency	Percent
Heat regulation	10	4.4
Roller	88	39.1
Quality of steel	14	6.2
Oil collector	2	0.9
Capacity of fish tray	68	30.2
Quality of charcoal tray material	43	19.2
Total	225	100.0

Table 5b: Major challenges with the use of PSSD

	Frequency	Percent
Aspirator not functioning optimally	26	6.8
Fastening bolts piercing the polypropylene cover	61	15.9
High cost of technology	42	11.0
Polypropylene cover susceptible to tear	105	27.4
Rusting of tray mesh	18	4.7
Difficulty in replacing worn out/damaged part	30	7.8
It lacks protective barrier against domestic animals	53	13.8
Mesh removing from tray	12	3.1
Small capacity	15	3.9
Not readily availability for group members due to rotational usage	21	5.6
Total	383	100.0

Table 5c: Major challenges with the use of IFB®

	Frequency	Percent
Scarcity and cost of ice	17	8.3
Incomplete drain of thaw ice	7	3.4
Small holding capacity	181	88.3
Total	205	100.0

Table 5d: Major challenges with the use of HSD

	Frequency	Percent
It is expensive	60	12.9
Inner part of the drum and cover prone to rust	5	1.1

Difficulty in tightening and loosening bolted ring	47	10.1
Airtight rubber seal not stable	27	5.8
Scarce	110	23.6
Small capacity	4	0.9
Not compatible with dominant practices in the sector	213	45.6
Total	466	100

Table 5e: Major challenges with the use of VPC

	Frequency	**Percent**
Does not allow flexible arrangement during transportation	14	25.5
Scarce	8	14.5
Not a unit of measurement	19	34.5
Small holding capacity	14	25.5
Total	55	100.0

Respondents' Willingness to Recommend Technology

Willingness to recommend is a strong research approach that captures interpersonal communication as one of the most powerful means to increase adoption of technologies by both current and would be users (Aksoy, Buoye, Cooil & Keiningham, 2011). Put in perspective, Table 6 revealed an overwhelming majority of users of these technologies (NSK: 94% PSSD: 95.2% IFB®: 91% HSD: 88.6% VPC: 74.5%) were willing to make a recommendation to potential users. This suggests that the advantages of the technologies far exceed the seeming challenges accompanying use of these technologies.

Table 6: Distribution of respondents according to their willingness to recommend Technology

	NSK		PSSD		IFB®		HSD		VPC	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Will not recommend	4	0.8	-	-	5	1.1	24	3.1	5	9.1
Indifferent	25	5.2	21	4.8	36	7.9	64	8.3	9	16.4
Will recommend	454	94.0	415	95.2	417	91.0	682	88.6	41	74.5
Total	483	100.0	436	100.0	458	100.0	770	100.0	55	100.0

Conclusion

Little or no consideration for feedback from end users have led to impracticable, incompatible, and cost ineffective technologies in the agricultural sector. This investigation revealed that most users of postharvest technologies have never provided feedback that could aid improvement of technologies or the development of new ones from scratch. The executives of various associations these users belong to, NSPRI Extension Staff and ADPs represent the most popular channels of providing feedback among respondents. Feedback garnered showed that four of the five technologies of interest had at least one component requiring improvement. Despite the desire for these improvements, respondents' satisfaction with technology components and use parameters is reflected in strong willingness to recommend these technologies. The positive feedback on most components of these technologies gives credence while negative feedback from the perspective of end-users on a few components call for further research to improve these technologies.

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Emerging Trends in Financing of Micro Enterprises: AC&ABC Telangana Model Policy Review and Recommendations

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ABSTRACT

Agriculture and Indian economy are essentially the two sides of the same coin. This is due to the agriculture sector providing a livelihood for more than half of the population and contributing roughly 20.0 percent to the Indian economy. Further, important point to note is that India has the unique distinction of being one of the few countries in the world where the working-age population will outnumber those dependent on them, and according to the World Bank (Word Bank Overview Oct 04, 2021), this will continue until 2040, with 70.0 percent of the population living in rural areas. It is a challenge to retain these youth in rural areas by providing self-employment opportunities with credit support. Equally, the Indian Government has launched numerous initiatives over the years to strengthen the country's economy. A number of Government flagship programs have been launched to create massive opportunities for unemployed Agri-professionals in India. Amidst, is the Agri-Clinics and Agri-Business Centers Scheme (AC&ABC), which has been in place for the past 20 years, being implemented in all the States of India. The ultimate goal of AC&ABC Scheme is to provide gainful self-employment opportunities to unemployed agricultural professionals and convert them into Agripreneurs. AC&ABC scheme's main draws also are credit availability and re-finance. However, the financial situation demonstrated insignificant progress. To bridge the financial gap and ensure the availability of credit & re-finance to agripreneurs a tripartite Memorandum of Agreement (MoU) was made between the financial institutions and private/national organizations in Telangana State that was termed as AC&ABC Telangana Model. This article is focused on the progress and performance of AC&ABC Telangana Model in Telangana State with reference to AC&ABC Scheme of India.

Key word: Agripreneurs, Micro-enterprise, Agri-Clinics & Agri-Business Centers Scheme, tripartite agreement etc.

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Introduction

Agri-Clinics & Agri-Business Centers (AC&ABC) scheme is a grant-in-aid project run by the Ministry of Agriculture and Farmers Welfare, GoI, since 2002 in all the States of India and Agripreneur is the ultimate beneficiary of the scheme. In the context of AC&ABC scheme, Agripreneur is a term used to describe an unemployed Agri-professional who completed AC&ABC training program and started his/her own Agri-enterprise. Agripreneur is classified under Micro-Enterprise owner because their initial investment does not exceed Rs. 1 Cr. (Ni-MSME- 1st July 2020). Financial assistance in the form of bank loans and subsidies from NABARD is the major attraction of the scheme. Trained agripreneurs are eligible to get a loan to start their agri-ventures after undergoing a residential training program of 45 days. The project cost ceiling under AC&ABC scheme for the purpose of subsidy is Rs.20.00 lakhs for individual projects and Rs.100.00 lakhs for group projects (5 members). The subsidy for general candidates is 36.0 percent of the Total Financial Outlay (TFO) and 44.0 percent for women candidates/SC/ST beneficiaries and candidates from North Eastern and Hilly States. The loans are provided through banks, and credit-linked back-ended composite subsidy is routed to barrowers account through NABARD. Current progress revealed that a total of 82,000 (+ more) candidates were trained and 36,000 (+ more) ventures were established in various agri-enterprises all over India. However, the sanctioned percentage of bank loans and subsidies is very negligible as the main role of the scheme was to provide financial assistance to the agripreneurs. In order to bridge the "financing gap" that exists for certain categories of agri-enterprises and to reduce the increased financial crisis, MANAGE. Hyderabad organized a series of dialogues on credit support with various social and financial institutions in Telangana State. As a result, a tripartite agreement was made for setting up agri-ventures and financial assistance to agripreneurs, in which institutions like Telangana State Agro Industries Development Corporation Limited, State Bank of India, National Bank for Agriculture and Rural Development (NABARD) and National Institute of Agricultural Extension Managemnet (MANAGE) Hyderabad had key roles. This tripartite agreement was named AC&ABC Telangana Model. This article explains in detail the entire Telangana model of financial assistance to Agripreneurs trained under Agri-Clinics and Agri-Business Centers Scheme.

Objectives of the Study:

- To study the description of AC&ABC Telangana Model in terms of financing micro-enterprises.
- To study the progress and performance of AC&ABC Telangana Model in terms of training program, status of credit availability and re-finance.

- To study the knowledge gain of Agripreneurs in entrepreneurship skills after training program.

Methodology:

The study was divided into two parts; to meet the first and second objectives; an in-depth secondary data based on available financial reports, annual reports of MoA&FW, Nationalized banks, NABARD and MANAGE Hyderabad was analysed. To assess the third objective, snowball sampling method of non-probability was used in selecting the respondents for the study. The selection of the respondents was done based on bank loan final sanctions. A list of 50 agripreneurs who got bank loan sanctioned was prepared with the help of National Institutes of Agricultural Extension Management, (MANAGE) Hyderabad. The study was carried out in 50 blocks of the 10 districts of Telangana State. The mean score percent, standard deviation and 't' value were worked out to draw inferences. The secondary data was used to gets details about AC&ABC Telangana Model, progress and performance with respect to training and success in disbursing credit and re-finance.

Review of Literature:

The very first entrepreneurship class kept in 1947 the academic technique of entrepreneurship's development is described utilizing a chronology of 3 domains-- training courses, supplemental facilities and also publications (Katz, J. A. (2003). Despite the discussion whether entrepreneurs are born or made, most accept that entrepreneurship, or certain facets of it, can be taught, or at least encouraged, by entrepreneurship education (Kuratko, 2005). Entrepreneurial activities in both formal and informal sectors are immensely significant for economic growth and national development (Al-Mamun et al., 2016). Micro and small enterprises, as the engines of indigenous entrepreneurship, play a critical role in the development of the global economy by improving technological capability building, innovation diffusion, and capital formation. (Nabiswa and Mukwa, 2017). According to Garavan and Barra (1994), the most commonly referred to goals of entrepreneurship education and training programmes are as follows: i) to get useful knowledge of entrepreneurship; ii) to acquire skills in the use of techniques, in the analysis of business atmospheres, and in the synthesis of action plans; iii) to identify and stimulate entrepreneurial skills; iv) to develop empathy and support for all aspects of entrepreneurship; v) to develop attitudes towards change and uncertainty; and vi) to encourage new start-ups. These entrepreneurship training programmes will contribute to the stimulation of entrepreneurial abilities. Lichtenstein and Lyons (2001) argued that it is important for service providers to recognise that entrepreneurs come to entrepreneurship with different levels of skills and therefore each entrepreneur

requires a different 'game plan' for developing his or her skills. Furthermore, they suggested that skill development is a qualitative, not quantitative, change which demands some level of transformation on the part of the entrepreneur. Many countries and international organisations (such as the EU) have attempted to encourage growth-oriented entrepreneurship, either directly or indirectly through policy instruments (European Commission, 2002). It is therefore understandable that policy actors are most eager to benchmark and compare the national government policies for entrepreneurship. They want to find examples of best practices in entrepreneurship policy design and make recommendations to national Governments.

Description of AC&ABC Telangana Model:

The main objective of creating the Telangana model was to provide financial assistance to eligible candidates trained under Agri-Clinics and Agri-Business Centers Scheme in Telangana State. The Telangana model is a product of the tripartite agreement between MANAGE, State Bank of India and NABARD. The Telangana model is operated by various organizations. The tripartite institution does its individual work to operate the scheme in a successful manner. The main functions of all the organizations are given below in detail. A diagrammatic explanation of the roles and responsibilities of each unit in the flow of the Telangana Model AC&ABC plan is given below.

Significant features of AC&ABC Telangana Model: To counter the issue of credit support, the AC&ABC Telangana model is playing an important role in strengthening the credit linkages among Agripreneurs in the Telangana State. The significant features of the model are as follows;

- The Telangana model is a product of the tripartite agreement between MANAGE, the regional headquarter of SBI, and NABARD.
- Telangana State Agro Industries Development Corporation Limited (TSAICDL) has established a network of 1000 Agro Raythu Seva Kendram-ARSK (Farmers Advisory Centers) at different Mandal of Telangana State to supply Agri-Inputs to the farming community.
- Trainees is manned by unemployed Agricultural and Biological science graduates.
- To build up the Agri-entrepreneurship skills among ARSK entrepreneurs TSAICDL has tie-up with MANAGE and allowed ARKS entrepreneurs to be trained under ACA&BC Scheme through existing Nodal Training Institutes in Telangana State.
- During the 45 days training program, on 30th day of the training program,

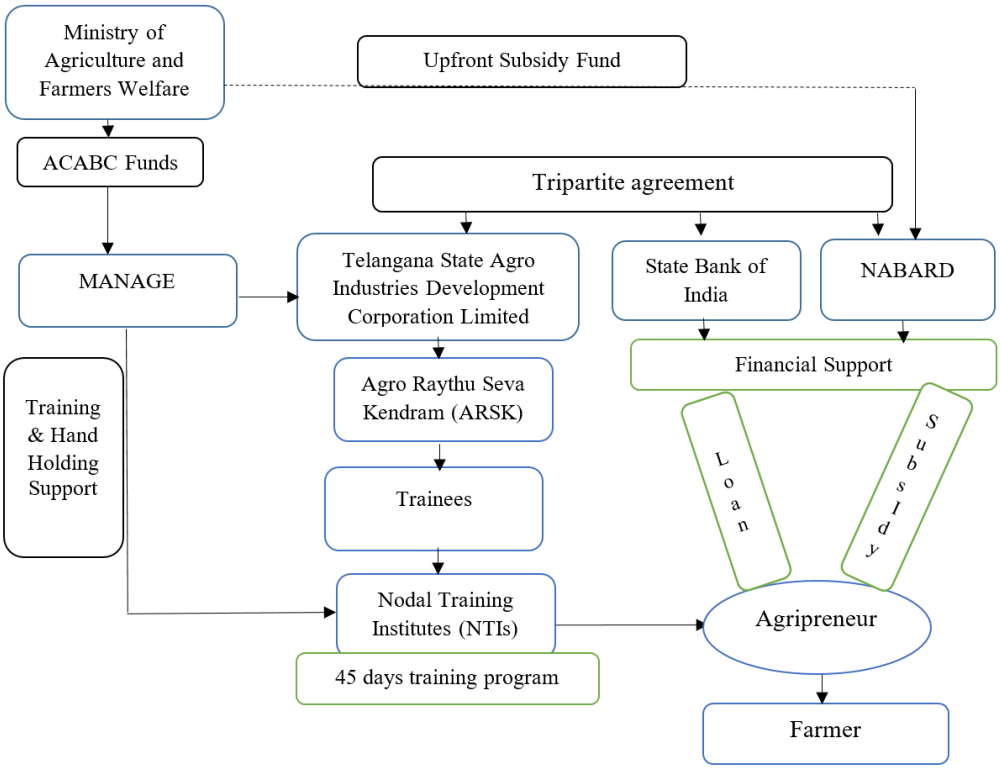

Fig-1 : AC&ABC Telangana Model

Figure-1 : Modified by the author

ARSK entrepreneurs prepared their Detailed Project Report (DPR) and sends for appraisal to the respective Bank branch of SBI of their locality.

- Within a span of 15 days, a bank loan appraisal is done.
- On the 45th day of the training program, trainees are given in principal loan sanction certificate of Rs. 10 lakh from State Bank of India.
- Subsequently after completing the formalities, loan is disbursed within a period of 2-3 months
- NABARD will release the subsidy.

Progress of training program under ACABC Telangana Model (2021-22):

In the financial Year 2020-2021, there were a total of 6 batches consisting of 164 AC&ABC trainees, out of which 113 were male and 51 female. The details are as mentioned in table-1

S. No	No. of candidates trained	Male	Percentage	Female	Percentage
1	32	22	68.75	10	31.25
2	20	15	75.00	5	25
3	28	21	75.00	7	25
4	30	22	73.33	8	26.67
5	30	23	76.67	7	23.33
6	24	10	41.67	14	58.33
Total	164	113	68.90	51	31.10

Table-1: Total number of candidates trained under AC&ABC Telangana Model during 2020-2021

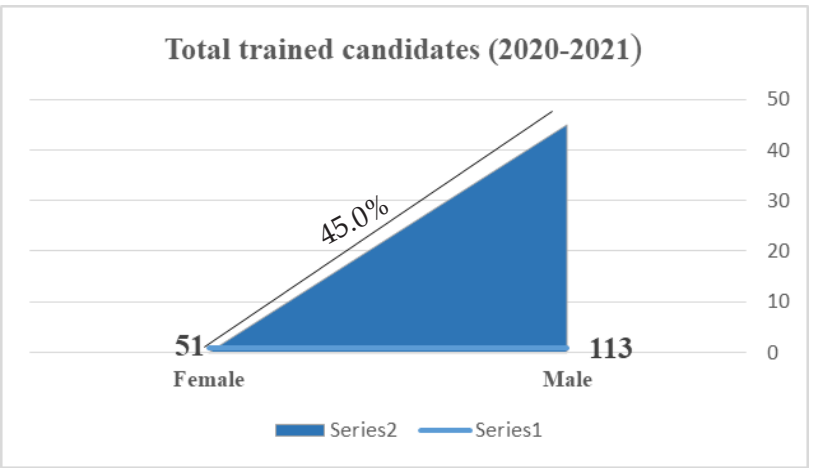

Table-1 presents the total number of programs conducted and gender wise profile of the agripreneurs. Total 164 candidates had undergone training program under AC&ABC scheme in the financial year 2020-2021. Out of that, 113 (68.90%) were male and 51 (31.10%) were female Agripreneurs occupied the entrepreneurial skills during the 45 days of residential training program.

Credit and Re-finance: One of the main benefits of AC&ABC scheme is credit support. The maximum subsidy for an individual project is Rs. 20.0 lakh (Rs. 25.0 lakh for extremely successful individual projects) and Rs. 100.0 lakh for a group project (Established by a group comprising of at least 5 trained persons under the scheme). However, subject to their own satisfaction, the bank may finance groups formed by two or more trained people under the scheme, with a TFO ceiling of Rs. 20.0 lakh per trained person and an overall ceiling of Rs. 100.0 lakh, whichever is less for the purpose of subsidy. NABARD will provide 100.0 percent re-financing assistance to commercial banks, RRBs, SCBs, SCARDBs, and other such eligible institutions.

Table no. 2: Status of credit and refinance under ACABC Telangana Model

Batch.	Total trained candidates	Total Principal loan sanction certificates received	Total no. of loan sanctioned	Total no. of Subsidy released	Remark
1	32	30	22	9	Subsidy release process is based on the certification of extension services extend by Agripreneurs
2	20	20	18	8	
3	28	28	16	6	
4	30	28	18	8	
5	30	27	21	12	
6	24	22	15	10	
Total	164	158	110	53	

Table -2 revealed that a total of 164 candidates were trained under AC&ABC training program. However, 158 respondents got in-principal loan sanction certificates and only total 110 (69.26%) of the respondents got bank loan sanctioned. Out of which only 53 (48.18%) got subsidy. Subsidy release process depends on the certification of extension services provided by Agripreneurs to the farmers.

Table-3: Demographic profile of the Agripreneurs

Particulars	Frequency	Percentage
Age (years)		
18-25	15	30
26-35	15	30
36-45	10	20
46-55	7	14
above 56	3	6
Gender		
Male	36	72
Female	14	28
Caste		
SC	11	22
ST	10	20
Other Backward caste	29	58
Marital Status		
Single	6	12
Married	40	80
Divorced		
Qualification		
Intermediate Agriculture	4	8
Diploma in Agriculture	22	44
Degree	13	26
Post Graduate	6	12
Allied Science	5	10

To study the third objective, the impact of training program on knowledge level of the respondents after AC&ABC training program was assessed. A robust survey was conducted in 50 blocks of 10 districts in Telangana State. Table -3 shows the details demographic profile of the agripreneurs selected for the said study. Majority of the respondents were young and categoriesed under the age group of 18-25 years (15%) followed 26-35 years (15.0%). A total of 36 male (72.0%) were male and 14 female (28.0%) were selected for the study. Majority of the respondents 29 (58.0%) belonged to other backward caste. A total of 80.0% percent of the respondents were married and the remaining 12.0% were unmarried. 44.0 percent of the respondents were studied diploma in agriculture sciences, 26.0 percent had degree and 12.0 percent respondents were qualified post-graduates. 10.0 percent Biological sciences candidates were chosen for the study.

Capacity building under AC&ABC training program:

The data in table 4 reveals knowledge level of AC&ABC trainees in Agri-entrepreneurship skill before and after the training program. The data in

table-1 before training reveals that more than 76.0 percent of the respondents had knowledge regarding business design strategies, 70.0 percent of the respondents had knowledge on crop husbandry/Animal husbandry, 60.0 percent in Introduction of interpersonal relationship and Identification of Agri-project respectively, 26 percent in Ledger & Book keeping, total 18.0 percent had knowledge on GoI scheme and their implementation and farm mechanization and use. However, 98.0 percent of the respondents showed that they had knowledge in small enterprise management, 96.0 percent entrepreneurship skill, 84 percent in Stress and risk management, a details study on crop husbandry/ Animal husbandry and Identification of Agri-project. 72.0 percent of the respondents showed that they had knowledge in Market survey/Hands on experience. 50.0 percent in GoI scheme and their implementation. This indicates that the training had positive and significant impact on the respondents. The reason for this was that they all were qualified in agriculture and allied sciences; they underwent hands on experience and market survey and multi-learning facilities on field. The other reason might be that the interaction with other entrepreneurs, dealers, farmers, customers etc. during the training period might have influenced the increased knowledge. Another reason might be that the increased exposure to visit the demonstration models on crop and animal husbandries might have led to the increased knowledge of the respondents.

Table-4: Impact of AC&ABC training program on knowledge level of the respondents

S. No.	Topic covered in training program	Before Training		After Training	
		Frequency	%	Frequency	%
1	Knowledge gain in entrepreneurship Skill	28	56.0	48	96.0
2	Introduction of interpersonal relationship	32	64.0	32	64.0
3	Stress and risk management	29	58.0	42	84.0
4	Small enterprise management	32	64.0	49	98.0
5	Business design strategies	38	76.0	31	62.0
6	A details study on crop husbandry/Animal husbandry	35	70.0	42	84.0

7	Farm mechanization and use	18	36.0	28	56.0
8	Identification of Agri-project	32	64.0	42	84.0
9	Market survey/Hands on experience	30	60.0	36	72.0
10	Ledger & Book keeping	26	52.0	28	56.0
11	Knowledge on GoI scheme and their implementation	18	36.0	25	50.0
12	Preparation of Detailed Project Report	17	34.0	41	82.0

Table-5: **Difference between knowledge level of Agripreneurs before and after AC&ABC training program**

t-Test: Two-Sample Assuming Unequal Variances		
	Variable 1	*Variable 2*
Mean	27.91666667	37
Variance	47.90151515	65.81818182
Observations	12	12
Hypothesized Mean Difference	0	
df	21	
t Stat	-2.950652246	
P(T<=t) one-tail	0.00381719	
t Critical one-tail	1.720742903	
P(T<=t) two-tail	0.007634379	
t Critical two-tail	2.079613845	

In table 5, the mean score for knowledge level at the respondents before and after training was 27.91 and 37.00 respectively. This establishes the fact that after training the respondents had better knowledge compared to before training program. The 't' critical value for the one tailed test - score of 1.720 is 0.05

indicating significant difference. This highlight that the knowledge level of the agripreneurs after training program was significantly higher than that before training program. Hence the findings of this study, indicated that training had a definite positive impact of the knowledge level of the respondents.

Recommendations

The performance of the Nodal Training Institutions of Telangana State should consistently be satisfactory. On reviewing the performance of the work, MANAGE should delist the non-performing Nodal Training Institutions. An expert committee of MANAGE should be constituted to conduct surprise inspections of nodal institutions, through which the available resources (manpower / physical) in the institute can be verified; which will be helpful in the successful implementation of Telangana - AC&ABC scheme. A comprehensive selection process should be devised to shortlist the trainees for interviews, for which an agro-professional can be selected. There should be wide publicity of AC&ABC Telangana model so that more and more unemployed agricultural professionals in the State can take advantage of the scheme and serve the farmers. To promote Telangana AC&ABC model more, the Nodal Training Institutes of various States should try to tie up similar memorandum of agreements with their State lead banks and regional NABARD offices, MANAGE need to be at the forefront of making this process easier.

Conclusion

AC&ABC Telangana Model Scheme has been successfully implemented in 4 Nodal Training Institutes of Telangana State. In a way, 164 agricultural agripreneurs were ready to serve the farming community. A total of 51 women agricultural agripreneurs were ready to serve both male and female farmers. These are the attractive features of the scheme. There will be valuable agricultural advice from Rythu Seva Kendra in 164 blocks of Telangana State which will benefit the farmers of 164 Blocks (approximately 10 villages in each Mandal) of Telangana State. It clearly shows the impact of the scheme. A total 110 candidates got bank loan sanctioned, out of which 53 candidates got subsidy. Rest of the DPR was under progress as the delivery of extension services shall be the main component of AC&ABC projects for availing of the benefit of subsidy. Besides, rural employment will be created, migration of rural youth will be stopped. In light of the above facts, it is recommended that Telangana model AC & ABC scheme should be continued in other States of India for financing micro-enterprises

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A Study on the Socio-Economic Status of the Fishery-Based Self-Help Groups in Jagatsinghpur, Odisha, India

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ABSTRACT

The study was conducted in Jagatsinghpur district of Odisha State on the status and performance of women's Self-Help Groups in the fisheries sector. Two blocks i.e., Jagatsinghpur Sadar and Earsama, block were selected for the study. A survey and group discussions were conducted to interview 150 respondents from two Self Help Groups (SHGs) each. Despite the fact that majority of the women being illiterate, participation in Self Help Groups had a significant impact on their empowerment (30.85%). The effectiveness of each SHG's Group Dynamics was measured using a 12-sub-dimension index called the Group Dynamics Effectiveness Index (GDEI), which included participation, influence and styles of influence, decision-making procedures, task functions, maintenance functions, group atmosphere, membership, feelings, norms, empathy, interpersonal trust, and SHG accomplishments. Therefore, it has been determined that the women's SHGs in the study area have a greater influence and benefit their members socially and economically which indicates that the fisherwomen SHGs are doing well in exploring and repaying microloans.

Keywords: Self-Help Groups, Women Empowerment, Fisheries, Performance

Introduction

The State has a 480-kilometer coast line and abundant water resources in the form of 1.16 lakh hectares of ponds/ tanks, 2.56 lakh hectares of reservoirs, 1.80 lakh hectares of lakes, swamps, and jheels, and 1.55 lakh hectares of rivers and canals, all of which can be used for fisheries development through SHGs (Department of Fisheries, Odisha) (World Fish, 2019). In the fisheries sector of India's maritime

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States, the Self Help Groups (SHG's) run by fishermen play an important role (Arora et al., 2017). A widespread method of empowering women and lifting them out of poverty has been organizing women into Self-Help Groups across India. SHGs have been important in the empowerment of disadvantaged rural women and are increasingly considered as a tool of alleviating poverty. The State of Chhattisgarh is also playing a vital role by producing self-employment in rural areas through fishery women SHGs, which gives income and improves their living (Ahmed et al., 2012). The Government's Mission Shakti program has helped more than 600,000 women in Odisha's coastal State since 2001. Odisha's community aquaculture effort makes use of the state's estimated 60,000 community tanks, 80.0 percent of which are in disrepair or aren't being used. While the initiative's major goal is to boost rural earnings by raising fish such as the carp-like rohu, the aquaculture programme also intends to enhance household nutrition by increasing access to nutritious tiny fish such as mola. Pradhan Mantri Matsya Sampada Yojona, the Department of Fisheries, Govt. of India to implement the initiative. World Fish, a global research organisation, offers technical assistance in the form of training and capacity building. Along with Government's assistance, members of Self Help Groups utilized credit and project loans. The subsidy for pisciculture contributed substantially to the development of the family. Fish culture empowers women SHG members in several ways: it increases employment, income, purchasing power, lifestyles, food security, and the sustainability of fish culture. In order to maximize profit from catches or produce, it is necessary to support basic infrastructures, financial support, and institutional arrangements for fishing, marketing, and caring policies for the fishing community. Each SHG had at least one pond. Women's empowerment and the development of small scale fisheries have been linked under the Pradhan Mantri Matsya Sampada Yojana, which focuses on small-scale fisheries (Jayasankar, 2018).

According to reports, SHGs in Jagatsinghpur district of Odisha have aided in the reduction of poverty in rural regions and the improvement of impoverished people's living standards. The current study underlined that women empowerment through fisheries SHG is only attainable through conscious planned effort carried out in a systematic manner, and there have been very few studies done so far in the study region connected to women SHG in fisheries (Odisha Fisheries Policy, 2015).

Methodology

The study focused on two blocks in Jagatsinghpur district of Odisha, India: Earsam and Jagatsinghpur, Sadar. A total of 10 women SHGs in fisheries from each block were chosen at random for the survey. A total of 20 people were surveyed at random utilizing a semi structured questionnaire and a focus group discussion. The members' achievement motivation and innovativeness were measured using a three-point continuum scale created by Harackiewicz et al., 1997, on a Likert scale of 3 (agree), 2 (neither agree nor disagree), and 1 (strongly disagree). The overall score for a person was calculated by adding the scores for each statement. The performance of the selected fishery SHGs was assessed using a NABARD-recommended check list. The constraints analysis was done using Garrett's ranking technique (Garrett and Woodworth, 1969).

Percentage position = 100 (Rij-0.5)/Nj

Where, Rij = Rank given by ith item to jth individual Nj = Number of items ranked by jth individual

Results and Discussion

Fishery-based SHGs' Socio-Personal Profile

The socio-personal details of the respondents are given in Table 1. It was found that 67.0 percent of the members of Fishery based SHGs belonged to young age category (up to 34 years); whereas 33.0 percent were in middle age (up to 34 years) category in Jagatsinghpur Sadaar and 60.0 percent of members of the Fishery based SHGs belonged to young age category (up to 34 years) whereas 40.0 percent were in middle age (up to 34 years) category in Earsama. Majority (93.0 and 80.0)of the respondent members were found to be literate (high school) 93.0 % and 80.0 % in Jagatsinghpur Sadaar and Earsama respectively. 6.6 percent and 20.0 percent of the respondents were middle school literate.

Majority of the respondents(80.0 % each block) were engaged in fishery as their primary occupation; wherein they are also doing agriculture (13.0% and 7.0% in Jagatsinghpur Sadaar and Earsama respectively) as secondary occupation. remain worked as tailors and as housewife. It is well established that income affects the living standard of people and therefore it was observed that 47.0% and 67.0% of the respondents from low income group in the two places respectively which may be due to small land holding. 53.0 and 33.0 percent of the respondents in Jagatsinghpur Sadaar and Earsama made an earning of Rs. 10,000 to 50,000 per month but none were in higher income group. 87.0 & 93.0 percent of the respondents from Jagatsinghpur Sadaar and Earsama participate regularly in various extension work conducted by the Government department.

It is worth mentioning here that with such involvement, their exposure to mass media also increased as 54.0 & 73.0 percent of the SHG members from Jagatsinghpur Sadaar and Earsama were in high category mass media exposure. Majority of the respondents had very low level of achievement motivation and innovativeness, which might be due to illiteracy and inadequate awareness among the members.

Table 1. Socio-personal profile of fishery based SHGs (N= 150)

Variable		Jagatsinghpur Sadaar (n=150)	Mean	SD	CV (%)	Earsama (n=150)	Mean	SD	CV (%)
Age									
	Young (up to 34 years)	100 (67.0%)	50	50	100	90 (60.0 %)	50	45.83	91.65
	Middle (35-45 years)	50 (33.0 %)				60 (40.0%)			
	Old (> 45 years)	0 (0)				0 (0)			
Education									
	Illiterate	0 (0)	50	78.11	156.2	0 (0)	50	62.45	124.9
	Primary School	10 (7.0 %)				120 (80.0 %)			
	High School	140 (93.0 %)				30 (20.0 %)			
Occupation (Primary)									
	Agriculture	20 (13.0 %)	50	60.83	121.65	10 (7.0 %)	50	60.83	121.66
	Fisheries	120 (80.0 %)				120 (80.0 %)			
	Others	10 (7.0 %)				20 (13.0 %)			

Income									
	Low (10,000)	70 (47.0 %)	50	43.59	87.18	100 (67.0 %)	50	50	100
	Medium (10,000-50,000)	80 (53.0 %)				50 (33.0 %)			
	High(>50,000)	0 (0)				0 (0)			
Extension Participation									
	Regularly	130 (87.0 %)	50	70	140	140 (93.0 %)	50	78.1	156.2
	Occasionally	20 (13.0 %)				10 (7.0 %)			
	Never	0(0)				0(0)			
Mass Media Exposure									
	High	81 (54.0 %)	50	31	62	110 (73.0 %)	50	52.92	105.83
	Medium	50 (33.0 %)				30 (20.0 %)			
	Low	19 (13 %)				10 (7 %)			
Achievement motivation									
	High	0 (0)	50	78.1	156.2	0 (0)	50	70	140
	Medium	10 (7.0 %)				20 (13.0 %)			
	Low	140 (93.0 %)				130 (87.0 %)			
Innovativeness									
	High	10 (7.0 %)	50	60.83	121.7	20 (13.0 %)	50	43.59	87.18
	Medium	20 (13.0%)				30 (20.0 %)			
	Low	120 (80.0 %)				100 (67.0 %)			

Performance Evaluation of Fishery Based SHGs

The performance of the SHGs examined is presented in Table 2. 35.0 percent of the SHGs group women's were found to have very good performance. 55.0 percent of them had good performance and the remaining 10.0 percent had unsatisfactory performance that can be improved with appropriate awareness and exposure. Therefore, it can be inferred from these results that the overall SHGs performance of the fishery in the study area was found to be good. Das (2016) while assessing the impact of the participation of women in Self-Help Groups based on microfinance, reported a positive impact on the increase in income. Mishra et al., 2016 reported that when evaluating the impact of women's Self-Help Groups based microfinance; the researchers found that it had a favorable influence on income, assets, savings, and literacy, as well as a reduction in rural household migration in India (Srinivas et al., 2019).

Table 2: Performance of SHGs

Performance of SHGs	**No.**	%
Very good	15	35.0
Good	11	55.0
Unsatisfactory	04	10.0
Total	30	100.0

Constraints Faced by the SHGs

SHGs based on fisheries are subject to a variety of constraints, which can differ depending on the type of fish farming methods and practices. The results presented in Table-3 indicates that political biasness in the area was the greatest constraint faced by the respondents (34.86%), followed by lack of adequate capital (20.12%) as their sources of funds are their own contributions or middlemen. Lack of information among members has also been a limitation, as more than half of them were unaware of the various Governments initiatives related to fishing and the benefits of the State Government's SHG-Bank linkage programme. 11.02 percent of the respondents considered non- cooperation among group members and the consequent conflict in management to be a significant limitation. Non-participation by members during meetings and association gatherings had been identified as a factor that hinders SHG's operation because they are unable to voice their concerns

Table 3: Constraints faced by fishery based SHGs (N=15)

Constraints	(%)	Rank
Political biasness	34.86	I
Inadequate capital	20.12	II
Lack of awareness	10.12	III
Conflict during decision making	11.02	IV
Non participation	10.0	V

Conclusion

The SHG concept has now become one of the most effective microfinance programmes for rural women, allowing them to gain without having to spend a lot of time or money. State Governments have also introduced programmes to promote and encourage the formation of SHGs in order to increase their income levels by making loans available to start small businesses. The current findings suggest that SHGs in fisheries aided in the empowerment of women in the research region, with overall positive results. As a result, increased knowledge and support from the State Government will further assist them in developing larger elements of activities that are productive. Furthermore, regular supervision by extension personnel and well-organized training on various elements of fisheries might improve performance.

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Mass Contacts Behaviour of rice growers under Seed Village Programme in District Baramulla (J&K)

K. Naresh[1], Veenita Kumari[2]

ABSTRACT

The participation and the extent to which they used the mass contact methods in sharing their knowledge and experience of rice growers under seed village programme was conducted in five purposively selected Divisions of Baramulla district, which have the Seed Village Program under the rice crop. Data was personally collected by researcher through well-structured interview schedule. The majority of rice growers having medium level of mass contact were in sub-division Tangmarg (83.33%), followed by sub-division Sopore (68.90%), sub-division Pattan (68.57%), sub-division Rohamma (65.00%) and sub-division Baramulla (61.64%). However, the overall mass contact of the rice growers (67.42%) from all the five sub-divisions had medium level of mass contact.

Keywords: Mass contact, Behaviour, Rice, Growers, Seed Village.

Introduction

The backbone of the Indian economy is still agriculture, with rice being one of the most important staple products that support rural livelihoods and food security. Growing rice is a significant component of the agricultural sector in the Union Territory of Jammu and Kashmir, especially in the Baramulla area. Improving rice farming's sustainability and productivity requires making sure high-quality seeds are available and used.

The Seed Village Programme (SVP) was started by the Indian government to address issues with low seed replacement rates and limited availability of certified seeds. By encouraging farmers to grow, store, and distribute premium seeds at the village level, this program seeks to advance decentralized seed production. Effective communication strategies, as well as farmers' attitudes toward mass contact methods like agricultural exhibitions/Kisan Melas, Kisan Goshti, radio and television programs, attending ZREAC meetings, and scientific advisory committees, are just as important to the success of such initiatives as

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technical support.

To evaluate the success of the Seed Village Program in achieving its goals, it is crucial to understand the mass contacts behavior of rice growers—how they obtain, react to, and act upon information supplied through various mass communication channels. The purpose of this study is to examine the patterns, preferences, and effects of mass contact techniques on rice farmers in the SVP's Baramulla district. The results can help development organizations, policy planners, and agricultural extension services improve methods of communication and increase farmer involvement in seed-related activities.

Objective

To assess the extent and pattern of mass contact methods used by rice growers for obtaining information related to the Seed Village Programme.

Methodology

The research design utilized in this study was ex-post-facto because phenomena had already occurred. The current research was conducted in the Kashmir valleys district of Baramulla, which was selected for a seed village programme under rice from 2018 to 2020. In District Baramulla, totally six Agricultural Sub Divisions, out of which five Agricultural Sub Divisions namely Baramulla, Pattan, Sopore, Rohamma and Tangmarg from the twelve selected agricultural zones in twenty five villages of District Baramulla. The study had a total of 310 growers that were part of the Seed Village Program. The data was collected on a well-organized schedule and the findings were analysed using percentage, frequency, mean and standard deviation methods.

The participation and the extent to which they used the mass contact methods in sharing their knowledge and experience.

Mass contact was measured by asking the rice growers the way they react to the received information. Different scores have been rated on the four point continuum i.e. regularly, occasionally, rarely and never. Scores 3, 2, 1 and 0 were assigned respectively. On the basis of scores obtained, the respondents were categorized as:

S. No.	Mass contact	Score
1.	Low	Below Mean - SD
2.	Medium	Between Mean ± SD
3.	High	Above Mean + SD

The final score for mass contact was calculated by summing up all the corresponding response scores. Then, the respondents were grouped into three categories on the basis of mean and standard deviation.

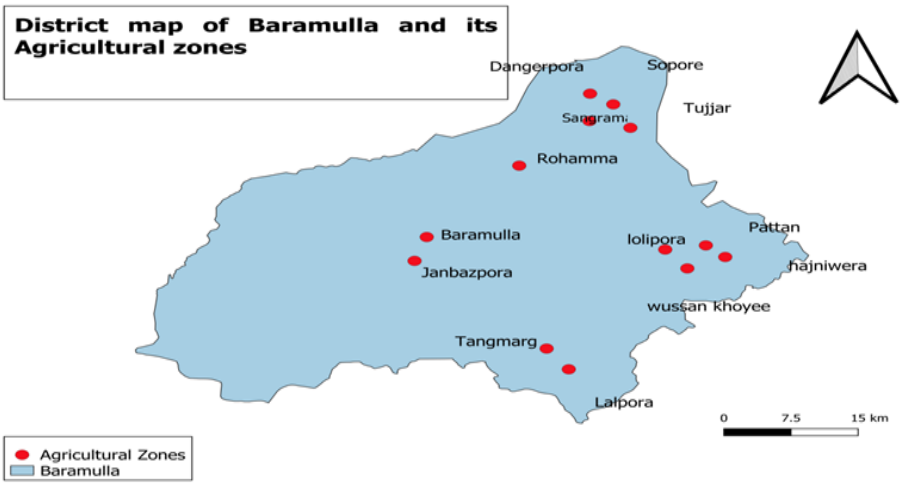

Fig. 1: Map of district Baramulla.

Table 1: Distribution of rice growers according to their Mass Contacts

Mass contacts	Sub-Division					N=310
	Pattan (n1=70)	Sopore (n2=135)	Tangmarg (n3=12)	Baramulla (n4=73)	Rohamma (n5=20)	
Low	08 (11.43)	19 (14.07)	00 (00.00)	11 (15.07)	02 (10.00)	40 (12.90)
Medium	48 (68.57)	93 (68.90)	10 (83.33)	45 (61.64)	13 (65.00)	209 (67.42)
High	14 (20.00)	23 (17.03)	02 (16.67)	17 (23.29)	05 (25.00)	61 (19.68)
Mean±S.D	10.70±2.92	10.81±2.86	9.83±3.40	12.25±2.99	11.80±2.70	11.08±2.97
Observed Range	3-15	5-15	6-14	6-17	7-16	3-17

Figures within parenthesis indicate respective percentage.

Results and Discussions

According to Table 1 and Figure 2, the majority of rice growers in the Pattan sub-division (68.57%) had a medium level of mass contacts, followed by 20.00 per cent of the rice growers having high level of mass contacts and only 11.43 per cent of the rice growers had low level of mass contacts. In sub-division Sopore,

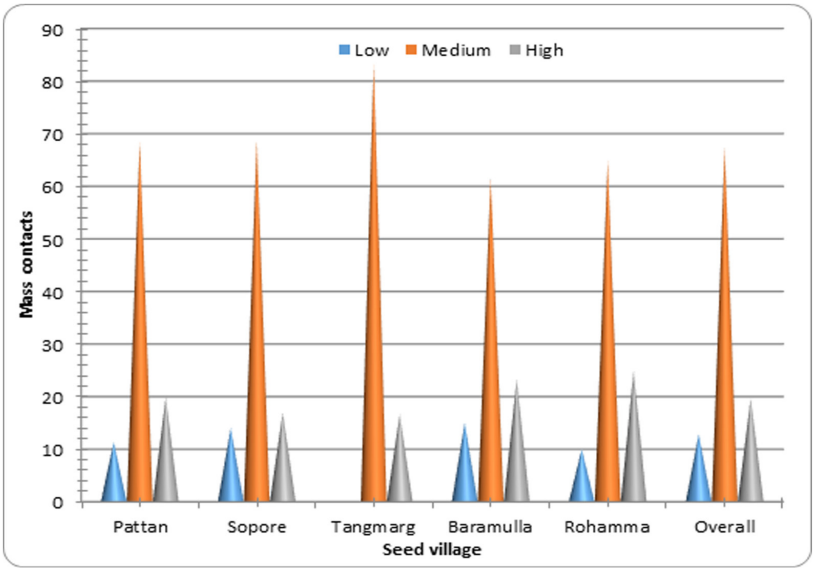

Fig. 2: Mass Contacts of rice growers under seed village programme

a majority (68.90%) of the rice growers had medium level of mass contacts, followed by 17.03 per cent of the rice growers having high level of mass contacts and only 14.07 per cent of the rice growers had low level of mass contacts. In sub-division Tangmarg, a majority (83.33%) of the rice growers had medium level of mass contacts, followed by 16.67 per cent of the rice growers having high level of mass contacts. In sub-division Baramulla, a majority (61.64%) of the rice growers had medium level of mass contacts, followed by 23.29 per cent of the rice growers having high level of mass contacts and only 15.07 per cent of the rice growers had low level of mass contacts. While as, in case of sub-division Rohamma, a majority (65.00%) of the rice growers had medium level of mass contacts, followed by 25.00 per cent of the rice growers having high level of mass contacts and only 10.00 per cent of the rice growers had low level of mass contacts. However, the overall mass contact of rice growers from all the five sub-divisions, it was found, that a majority (67.42%) of the rice growers had medium level of mass contacts followed by 19.68 per cent of the rice growers having high level of mass contacts and only 12.90 per cent of the rice growers had low level of mass contacts. So, it is clear from the data, that majority of the rice growers had medium level of mass contacts.

According to Table 2, the present study assessed the mass contact behaviour of rice growers under the Seed Village Programme across various sub-divisions of District Baramulla (J&K). The mass contact methods examined included participation in Agricultural Exhibitions/Kisan Melas, Kisan Goshtis, radio and

television programmes, ZREAC meetings, and Scientific Advisory Committee meetings. The responses were categorized as Regularly, Occasionally, Rarely, and Never.

1. Agricultural Exhibitions / Kisan Melas

Overall, a high level of participation in agricultural exhibitions or Kisan Melas was observed among rice growers. About 41.90% of the respondents participated regularly, while 44.80% participated occasionally. The highest regular participation was reported from Baramulla (52.10%), followed by Pattan (45.70%). Interestingly, no respondent from Tangmarg and Rohamma reported never attending these events, indicating general awareness and outreach of such programmes. These findings highlight that agricultural exhibitions are effective extension tools for disseminating improved technologies and seed information.

2. Kisan Goshtis

The participation in Kisan Goshtis was comparatively low, with only 1.90% of respondents attending them regularly, while 20.00% participated occasionally. A significant proportion (42.60%) reported rare participation, and 35.50% never attended. This suggests a limited reach or acceptance of Kisan Goshtis as an extension method, possibly due to poor scheduling, low awareness, or logistical constraints. Notably, Tangmarg showed no regular participation, with 66.70% of farmers never attending.

3. Radio Programmes

The study indicated that 32.60% of farmers regularly listened to radio, 43.50% occasionally, and 22.30% rarely, making it a highly used mass contact medium. 1.60% of respondents never used it. Higher regular usage was observed in Sopore (38.50%) and Pattan (31.40%), showing the radio's continuing relevance in rural communication, particularly in areas with limited access to TV or the internet.

4. Television Programmes

40.00 percent of farmers regularly watched television, and 49.70 percent watched it occasionally, making it a highly preferred mass contact source. None of them reported to have never used it, and just 10.30% said they used it rarely. Baramulla (47.90%) and Sopore (41.50%) had the highest score on a regular basis. This suggests that one of the best ways to reach farmers with agricultural messages, such as those related to the Seed Village Program, is through television.

5. Attending ZREAC Meetings

Attendance at ZREAC (Zonal Research and Extension Advisory Committee)

meetings was found to be low overall, with only 5.80% of farmers attending regularly, 22.30% occasionally, and 51.30% rarely. Around 20.60% of respondents never attended such meetings. Lack of awareness or perceived importance might be the cause of the lack of participation. The largest proportion of farmers who never attended was reported by Tangmarg (75.00%).

6. Scientific Advisory Committee (SAC) Meetings

Participation in Scientific Advisory Committee meetings was the lowest among all mass contact methods, with only 2.30% attending regularly, 9.70% occasionally, and a significant 55.80% never attending. Pattan (75.70%), Sopore (53.30%), and Tangmarg (83.30%) had the highest percentage of farmers who never participated. This indicates that SAC meetings have limited farmer involvement, possibly due to their technical nature or institutional barriers.

However, the overall information dissemination through mass contact by the respondents of rice growers from all the five sub-divisions, It was found, that the respondents regularly visited agricultural exhibitions/kisanmelas (41.90%), followed by TV programmes (40.00%), radio programmes (32.60%), attended ZREAC meetings (05.80%), scientific advisory committee meetings (02.30%) and kisan Goshtis (01.90%). The respondents occasionally watched TV programmes (49.70%), followed by agricultural exhibitions/kisanmelas (44.80%), radio programmes (43.50%), attended ZREAC meetings (22.30%), kisan Goshtis (20.00%) and scientific advisory committee meetings (09.70%). The respondents rarely attended ZREAC meetings (51.30%), followed by kisan Goshtis (42.60%), scientific advisory committee meetings (32.30%), radio programmes (22.30%). Whereas, agricultural exhibitions/kisanmelas (11.60%) and TV programmes (10.30%). The respondents never attended scientific advisory committee meetings (55.80%), followed by Kisan Goshtis (35.50%), attended ZREAC meetings (20.60%), agricultural exhibitions/kisanmelas (01.60%) and radio programmes (01.60%). These findings revealed, that most commonly used mass contacts for information dissemination by the respondents were agricultural exhibitions/ kisanmelas, followed by kisan Goshtis, radio programmes, TV programmes, ZREAC meetings and scientific advisory committee meetings.

These findings are in line with Kasidurai and Vengatesan (2017), Prashanth et al. (2012) and Ravi Goud and Daya Ram (2018).

Table 2: Distribution of rice growers according to their Mass Contacts

Mass contacts	Sub-Division											
	Pattan (n1=70)				Sopore (n2=135)				Tangmarg (n3=12)			
Regularity of contact	Regularly	Occasionally	Rarely	Never	Regularly	Occasionally	Rarely	Never	Regularly	Occasionally	Rarely	Never
Agricultural exhibitions/ Kisan Melas	32 (45.70)	27 (38.60)	10 (14.30)	01 (01.40)	46 (34.10)	61 (45.20)	25 (18.50)	03 (02.20)	04 (33.30)	08 (66.70)	00 (00.00)	00 (00.00)
Kisan Goshti	01 (01.40)	14 (20.00)	30 (42.90)	25 (35.70)	03 (02.20)	34 (25.20)	57 (42.20)	41 (30.40)	00 (00.00)	01 (08.30)	03 (25.00)	08 (66.70)
Radio programmes	22 (31.40)	38 (54.30)	08 (11.40)	02 (02.90)	52 (38.50)	50 (37.00)	31 (23.00)	02 (01.50)	01 (08.30)	07 (58.30)	04 (33.30)	00 (00.00)
TV programmes	26 (37.10)	37 (52.90)	07 (10.00)	00 (00.00)	56 (41.50)	63 (46.70)	16 (11.90)	00 (00.00)	02 (16.70)	06 (50.00)	04 (33.30)	00 (00.00)
Attending to ZREAC meetings	22 (04.30)	29 (11.40)	15 (52.90)	04 (31.40)	02 (01.50)	23 (17.00)	83 (61.50)	27 (20.00)	01 (08.30)	00 (00.00)	09 (75.00)	02 (16.70)
Scientific Advisory Committee	00 (00.00)	04 (05.70)	13 (18.60)	53 (75.70)	00 (00.00)	10 (07.40)	53 (39.30)	72 (53.30)	00 (00.00)	01 (08.30)	01 (08.30)	10 (83.30)

Figures within parenthesis indicate respective percentage

Mass contacts	Sub-Division											
	Baramulla (n4=73)				Rohamma (n5=20)				N=310			
Regularity of contact	Regularly	Occasionally	Rarely	Never	Regularly	Occasionally	Rarely	Never	Regularly	Occasionally	Rarely	Never
Agricultural exhibitions/ Kisan Melas	38 (52.10)	33 (45.20)	01 (01.40)	01 (01.40)	10 (50.00)	10 (50.00)	00 (00.00)	00 (00.00)	130 (41.90)	139 (44.80)	36 (11.60)	05 (01.60)
Kisan Goshti	01 (01.40)	12 (16.40)	33 (45.20)	27 (37.00)	01 (05.00)	01 (05.00)	09 (45.00)	09 (45.00)	06 (01.90)	62 (20.00)	132 (42.60)	110 (35.50)
Radio programmes	24 (32.90)	27 (37.00)	21 (28.80)	01 (01.40)	02 (10.00)	13 (65.00)	05 (25.00)	00 (00.00)	101 (32.60)	135 (43.50)	69 (22.30)	05 (01.60)
TV programmes	35 (47.90)	36 (49.30)	02 (02.70)	00 (00.00)	05 (25.00)	12 (60.00)	03 (15.00)	00 (00.00)	124 (40.00)	154 (49.70)	32 (10.30)	00 (00.00)
Attending to ZREAC meetings	09 (12.30)	32 (43.80)	21 (28.80)	11 (15.10)	03 (15.00)	06 (30.00)	09 (45.00)	02 (10.00)	18 (05.80)	69 (22.30)	159 (51.30)	64 (20.60)
Scientific Advisory Committee	05 (06.80)	13 (17.80)	21 (28.80)	34 (46.60)	02 (10.00)	02 (10.00)	12 (60.00)	04 (20.00)	07 (02.30)	30 (09.70)	100 (32.30)	173 (55.80)

Figures within parenthesis indicate respective percentage.

Conclusion

The study revealed that the majority of rice growers under the Seed Village Programme in District Baramulla had a medium level of mass contact. Among the various mass contact methods, agricultural exhibitions/Kisan Melas, television, and radio programmes were the most frequently used and preferred sources of information. In contrast, participation in Kisan Goshtis, ZREAC meetings, and Scientific Advisory Committee meetings was relatively low. These findings highlight the need to strengthen and better promote underutilized extension channels to enhance farmer engagement and knowledge dissemination.

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Motivational and Success Factors of Agripreneurs: Insights from Andhra Pradesh and Telangana

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ABSTRACT

The research study explores the motivational factors, and success strategies of agripreneurs in the study area i.e., Andhra Pradesh and Telangana. With a sample size of 34 respondents, the study delves into the demographic distribution, investment preferences, marketing strategies, and sources of funding for agricultural entrepreneurs. Key findings indicate a predominance of male agripreneurs, a preference for single production activity, and significant reliance on seed funds from individuals and grants from the government. This paper also highlights the importance of strategic location, infrastructure investment, and effective networking for entrepreneurial success in agripreneurship. The study underscores the vital role of agripreneurship in promoting rural development, food security, and economic sustainability in India.

Keywords: Agripreneurship, entrepreneurial success, motivational factors, success strategies, funding sources

Introduction

Agriculture has long been the backbone of the Indian economy, contributing significantly to employment and GDP. According to the Reserve Bank of India (2020), agriculture and allied activities accounted for around 18.6% of India's GDP in 2020. The sector has been a major source of employment, with around 54% of the country's workforce engaged in agriculture (National Statistical Office, 2020). The agricultural sector has also been a significant contributor to India's exports, with agricultural products such as spices, tea, and coffee being major export earners (Ministry of Commerce and Industry, 2020).

Agripreneurship, the practice of integrating entrepreneurship into agriculture, has gained momentum in recent years, driven by the need for innovation,

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sustainability, and enhanced productivity. Entrepreneurs see potential in these markets, hence, agripreneurship is gaining momentum in the country (Kumar et al, 2019). The term "Agripreneur" was defined by various authors in many ways. However, in this paper, this term is used to denote entrepreneur involved in agriculture and food sectors. Entrepreneurial motivation often stems from a desire for independence and control over one's work, allowing individuals to set their own schedules and make key business decisions. Motivation is very important pull factors for young people to get into entrepreneurship career. In spite of agriculture being considered low paying enterprise, many new entrepreneurs are venturing into this sector on business mode due to huge potential due to the obsolete technologies still predominant in this sector. In the present times, there are instances that people from non-farm and urban background are venturing into agriculture purely out of passion. These individuals come with disruptive thinking and armed with advanced technology which already is showing its impact on agriculture.

Agripreneurs find innovative ways to develop new products or solutions to the problems and are motivated to adopt eco-friendly methods and contribute to environmental sustainability (Singh et al., 2018). Encouraging agripreneurs in India is indispensable considering the daunting issues faced by Indian agriculture. Government of India's initiatives and subsidies for agriculture, such as credit facilities, crop insurance, and technology support, encourage individuals to engage in agripreneurship (Government of India, 2019). Additionally, supportive entrepreneurial ecosystems, including incubators, accelerators, and funding options, further inspire individuals to start agribusinesses (Kumar et al, 2019). In this context, the present study investigates motivational factors that drive individuals to pursue entrepreneurial activities in the agricultural sector. This paper explores the motivational factors influencing agripreneurs, their success strategies, and the broader implications for rural development and economic growth in Andhra Pradesh and Telangana.

Data & Methodology

The study was undertaken in Andhra Pradesh and Telangana states of India during 2022-24. The newly formed state, Telangana, was bifurcated during 2014 from Andhra Pradesh. These states have many common traits like Telugu language, strong rural agricultural base, crops cultivated, festivals, cuisine, arts, etc. After bifurcation, Andhra Pradesh is the 10th most populous state in India, with 26 districts and a population of 4.94 crore as of 2011 (Census of India, 2011; Government of Andhra Pradesh, 2024). Andhra Pradesh has been promoting sustainable agricultural practices, with a focus on natural farming practices

that reduce the use of chemical inputs and enhance soil fertility (Directorate of Economics and Statistics, 2024). The state has a significant role in India's economy, with a Gross State Domestic Product (GSDP) of 175.75 billion USD in 2023-24 (Directorate of Economics and Statistics, 2024). Telangana has a population of about 40 million. It comprises 33 districts, with Hyderabad as its capital. Telangana's economy is rapidly expanding, with a GSDP of approximately USD 170 billion (Government of Telangana, 2023).

For this study, the primary data was collected from 34 agripreneurs from Andhra Pradesh and Telangana who were drawn through random sampling method. These agripreneurs who are basically founders of start-ups working in projects related to agriculture and food sectors and successfully conducting their business or surviving for more than two years were selected for this study. Data was collected through structured questionnaire and compiled for analysis using MS Excel. Simple tools of analysis such as summary statistics, frequencies and percentages were used for drawing useful inferences on agripreneurship.

Results and Discussions

Impact of entrepreneurial attributes for success

The opinion on the attributes for success of entrepreneurship in agriculture and food sectors as captured from 34 respondents is given below:

1. Success Factors

Age of the entrepreneur

The age distribution data provides insights into the entrepreneurial tendencies of different age groups in years. The age of entrepreneurs, at which the chance of success is high, was grouped into four, viz., 15-30 years (Young age); 31-45 years (early middle age); 56-60 years (late middle age) & Greater than 60 years (Old age). The opinion survey showed that the early middle age group (59%) was predominant among the agripreneurs, suggesting that this age bracket is the most active and possibly the most risk takers (Figure 1). Younger individuals (15-30 years) make up 29% of the respondents, indicating a growing interest in agripreneurship among the youth, driven by factors such as innovation, technology adoption, and the desire for success in business. Further, the low representation of late middle age entrepreneurs (12%) and absence of old age agripreneurs (greater than 60 years) indicate that, innovation in agriculture sector also brought by young brains.

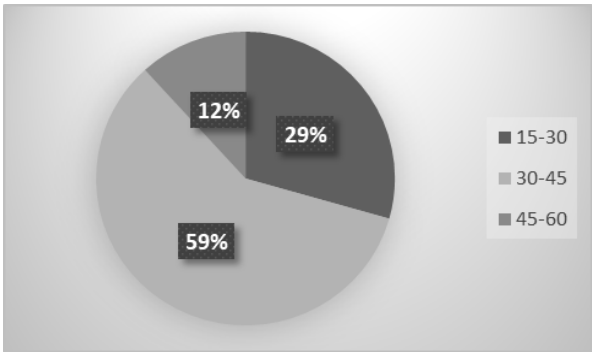

Fig. 1: Entrepreneur's Age-group (in years) for high chance of business success

Educational background

The data presents the opinion on educational backgrounds for increase the chances of becoming successful entrepreneurs. Around 35% opined that the management degree would be highly helpful for the successful conduct of the entrepreneurship (Figure 2). Almost equal number of respondents (23%) opined that engineering degree, other professional degrees like agriculture, veterinary, etc., would enhance the chances of better business conduct. "Up to 12th is enough" was opined by 12% of the respondents. The "science and arts degree" requirement was the smallest segment (5%) among all the educational qualifications considered for success of entrepreneurs. The data indicates a significant representation of individuals are suggesting that advanced degrees, would enable the individuals towards better business conduct. Overall, the data reveals a strong concentration of higher academic education for smart business handling of entrepreneurship process.

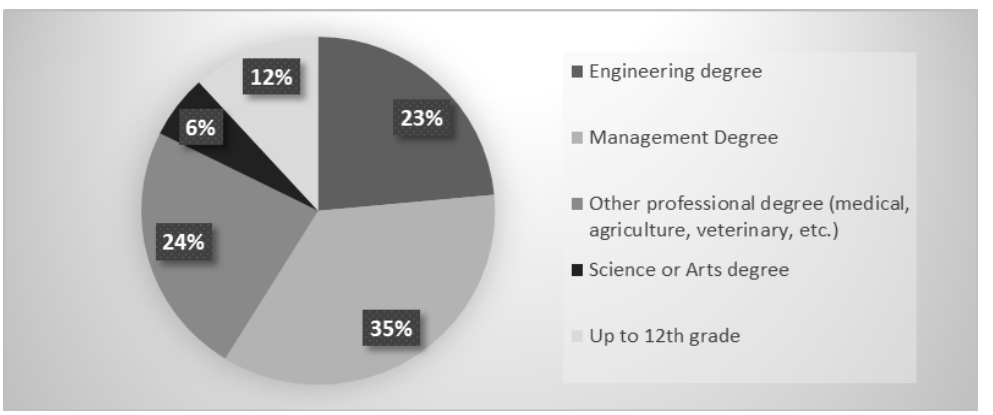

Fig. 2: Educational background for becoming a successful entrepreneur

Experience and leadership attributes

The analysis of the entrepreneurs' prior job experience yielded surprising insights regarding the relationship between work experience and entrepreneurial success. It was found that 44% of successful entrepreneurs have more than two years of employment experience (Figure 3). This significant share shows that a lengthy time of professional engagement prior to entrepreneurial attempts favourably contribute to entrepreneurial success. This could be attributed to the entrepreneur's building up skills, industry knowledge, and network connections, which can improve his or her ability to handle hurdles and exploit opportunities. However, there are cases where entrepreneurs with less or no work experience also succeeded in their entrepreneurship venture.

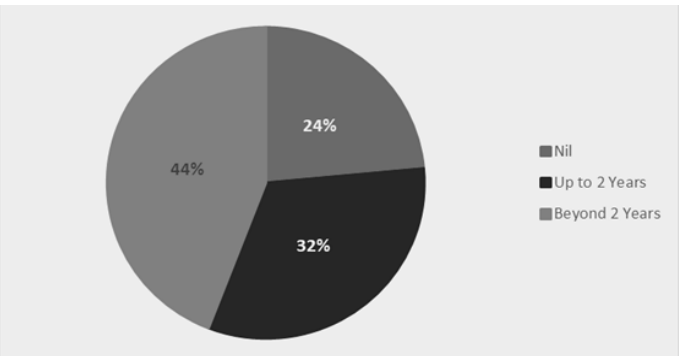

Fig. 3: Previous work experience of the founder

Leadership styles

Impact of leadership styles on entrepreneurial achievement by examining the prevalence and outcomes of different leadership approaches. The results revealed varying percentages of each leadership style within the entrepreneurial context: Transactional at 3%, Pacesetting at 6%, Autocratic at 12%, Laissez-Faire at 16%, Democratic at 22% and Transformational at 41% of success (Figure 4). Interestingly, the transformational leadership style emerged as the most dominant and impactful, indicating a substantial correlation with entrepreneurial success. This style, characterized by its ability to inspire innovation and change, significantly outperformed other styles, emphasizing its pivotal role in fostering a dynamic and adaptive entrepreneurial environment. In contrast, while other leadership styles exhibited varying levels of presence, they demonstrated a comparatively lower success rate, suggesting a potentially limited influence on entrepreneurial outcomes.

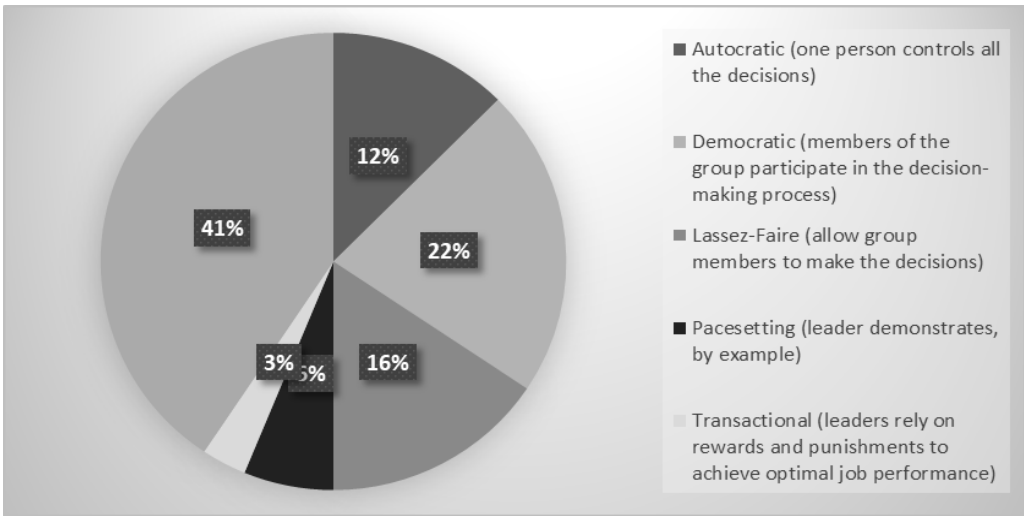

Fig. 4: The impact of leadership styles on entrepreneurial achievement

Team size

Based on team size, the success rates of entrepreneurial endeavours were examined. Teams with more than six participants had a success rate of 27%, whereas groups with three to six participants had a success rate of 49% (Figure 5). Teams comprising less than three members had a success rate of 24%. The results of the study show a clear pattern in the correlation between team size and entrepreneurial performance.

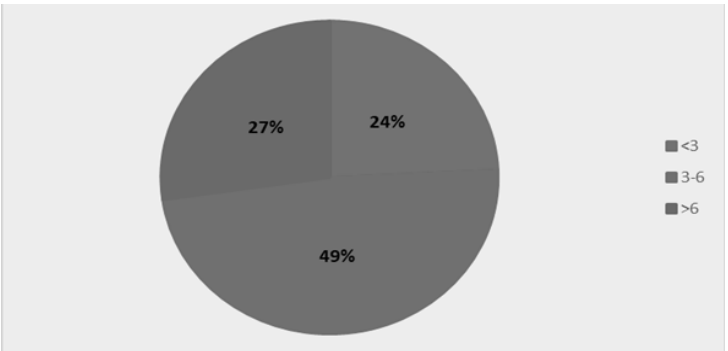

Fig. 5: Impact of team size on entrepreneurial success rates

Team diversity

Teams characterized by high diversity, encompassing members from production, management, and marketing sectors, exhibited an impressive 67% success rate

(Figure 6). In contrast, moderately diversified teams, consisting of members from any two sectors, displayed a success rate of 24%, while teams with the lowest diversity levels, limited to a single sector, demonstrated a mere 9% success rate.

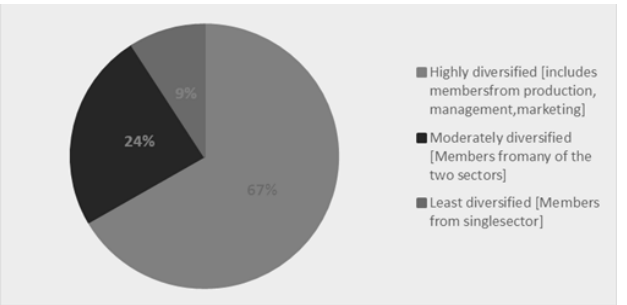

Fig. 6: The impact of team diversity on entrepreneurial success

Skillset of team

The skillset of team members plays a critical role in the success of entrepreneurship. Successful entrepreneurship often requires a combination of various skills and competencies within a team like technical skills, team skills, business skills, communication skills, negotiation skills, financial skills, problem solving and adoptability, etc. The data indicate that the team members with no skills in same domain activity of the entrepreneurship has less relevance as opined by 53% (Figure 7). A team lacking similar skills in tune with the start-up activity is less relevant as opined by 56%. High percentage (68%) opined that the differential skill set of the team members can significantly impact the success of entrepreneurship. A well-rounded team with a diverse set of skills is more likely to navigate challenges effectively, seize opportunities, and adapt to changing market conditions. It is contributed to the success of the entrepreneurship. Therefore, assembling a team with complementary skills and a shared vision is a key factor in the success of any entrepreneurial venture.

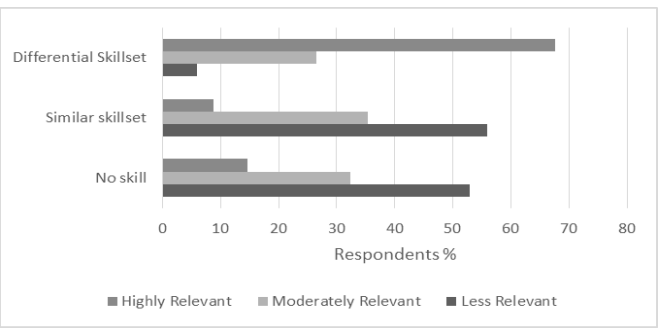

Fig. 7: Skill set of the Team Members for success of entrepreneurship

Capacity building of Team

Training and Skill Development is the key component for success of any start-up. All the respondents (100%) unanimously opined that the team members should be highly trained in order to meet the business demands. They are seeking help of government and private institutions who offer training programs and workshops to help start-up founders and employees acquire essential skills. The founders are also of the opinion that team members need specialized training or knowledge in technical fields as well. Further, a majority of the respondents (62%) felt that management is the key area wherein their team should be trained for under capacity building activity (Figure 8). Marketing, Production and other areas follow in terms of priority. It is observed that in a start-up, where there may be limited initial infrastructure and a high level of uncertainty, strong management skills can be the difference between success and failure. That is the reason why it's a founder with strong management skills or a dedicated management team, the ability to plan, organize, and lead is crucial for navigating the challenges of entrepreneurship and building a sustainable business.

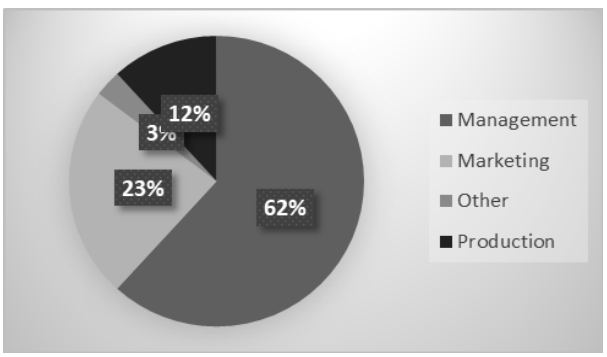

Fig. 8: Areas of capacity building for team members

Trying innovative ideas

Agripreneurs are motivated by diverse market opportunities in agriculture and food sectors, including food production, horticulture, floriculture, and agro-processing. There is also a growing awareness of sustainable and organic farming practices, which add value to agricultural produce through processing, packaging, and branding. The study aimed to identify the impact of different innovation ideas on the likelihood of becoming a successful entrepreneur. The findings revealed that entrepreneurs with product innovation ideas had a success rate of 53%, while those with business model innovation ideas had a success rate of 38% (Figure 9). In contrast, entrepreneurs pursuing process innovation ideas exhibited a lower success rate of 9%. The higher success rate

observed among entrepreneurs with product innovation ideas suggests that novel and unique products have a stronger appeal to consumers and markets, thereby increasing the likelihood of success.

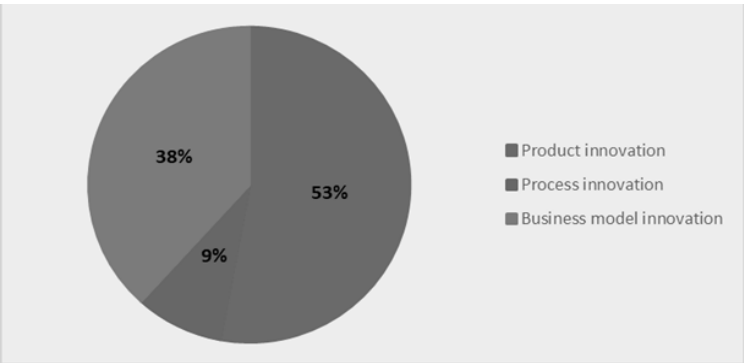

Fig. 9: Impact of different innovation ideas on becoming a successful entrepreneur

Goals and objectives

The study examines whether the goals and objectives are good motivational factors and found that, not only they motivate, but also influence the success of the organization. Among the various goals and objectives pursued, entrepreneurs aiming for customer satisfaction emerged as the frontrunners, boasting an impressive success rate of 47% (Figure 10). In contrast, those prioritizing profit maximization stood at 13%, while individuals focused on social responsibility and sales maximization exhibited success rates of 16% and 9%, respectively. Surprisingly, aspirations for recognition within society and customer acquisition exhibited relatively lower success rates at 9% and 6%, respectively. These resulted in the profound impact of customer-centric approaches, emphasizing the pivotal role of customer satisfaction as a driver of entrepreneurial success.

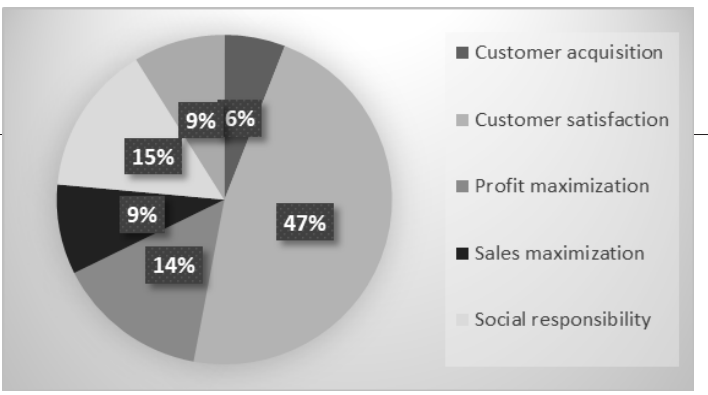

Fig. 10: The Impact of Goals and objectives of Entrepreneurship on Success

Business model

A well-defined business model helps a start-up clarify its purpose and understand how it will create, deliver, and capture value in the market. B2C/D2C is the most prevalent business model among entrepreneurs with about 41 per cent of the respondents adopting it (Figure 11). It indicates that the entrepreneurs want to reach out to customers in large defined market and directly reaching them. This is followed by D2C (27%) and B2B (24%). The business model defines how the start-up will acquire and retain customers which includes customer acquisition channels, marketing strategies, and customer relationship management approaches, etc.

It's important to note that while B2C has these advantages like simplified sales process, faster sales, easy marketing, etc. But it also comes with its own challenges, such as intense competition, the need for robust customer support, and potentially lower profit margins in certain businesses. The choice between B2C, B2B, B2G, or D2C depends on the specific business goals, target audience, industry, and market conditions of the start-up.

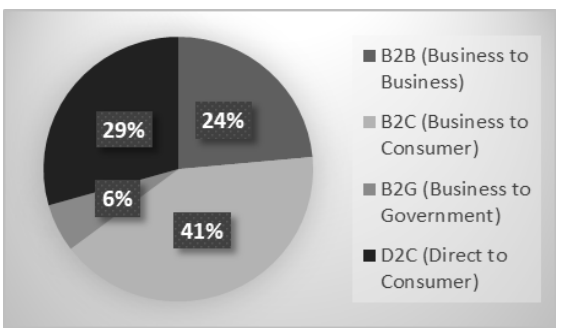

Fig. 11: Type of Business plan/Business model that improves the success of the entrepreneurship

Existence of contingency/alternate plan

The business model should be flexible and adaptable to changing market conditions. Over 94% of the respondents have the contingency plan for their survival (Figure 12). It is imminent to have an alternate plan for business existence in the market. It is noteworthy that young entrepreneurs are adopting a unique or innovative business model that can provide a competitive advantage in the marketplace. It allows start-ups to differentiate themselves from competitors and create a compelling value proposition for customers. It can be attributed that the entrepreneurs are ready to make adjustments based on customer feedback and market feedback, and a clear business model can facilitate those changes.

Only few respondents (6%) have no contingency plan which means they are positioned in high risk, and business is volatile.

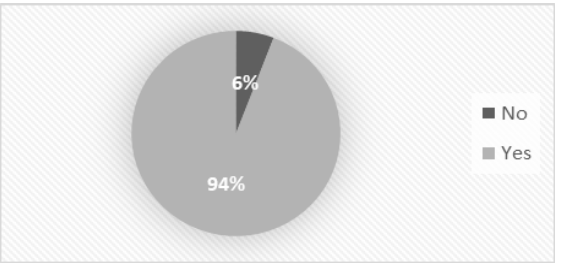

Fig. 12: Existence of contingency/alternate plan

Timing of the launch of product or service

It enables the entrepreneur to position the business appropriately. Most of the entrepreneurs (71%) are cautious about the time of launch of their products (Figure 13). Before launching, they were pretty much cautious to conduct pre-trials and tests which is essential for any business launch. It indicates that they wanted to have a firm foot in the market without having any loose ends, and business fails. Only 29% are ready to launch just after the product development.

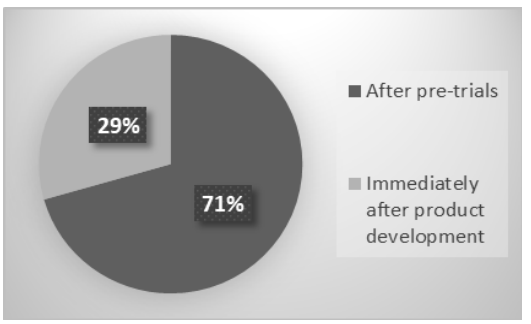

Fig. 13: Timing of product launch

Incubation period from idea to final product

The incubation period typically refers to the initial phase during which a start-up is founded, developed, and prepared for market entry. The incubation period of a start-up can vary widely based on various factors, and there is no fixed duration that applies to all start-ups. Incubation period of 6 months to 2 years is mostly prevalent for 70% of the start-ups followed by less than 6 months (18%) (Figure 14). Very less number (12%) have set up their ventures in more than 2 years. The economic conditions, industry trends, and technological advancements, might have impacted on their incubation period. The incubation period of a start-up is highly variable and depends on a combination of internal

and external factors. It is indicated that the founders and stakeholders should carefully plan and adapt their incubation strategy based on their specific goals and circumstances. It's also essential to remain flexible and open to adjustments as the start-up progresses and market conditions evolve.

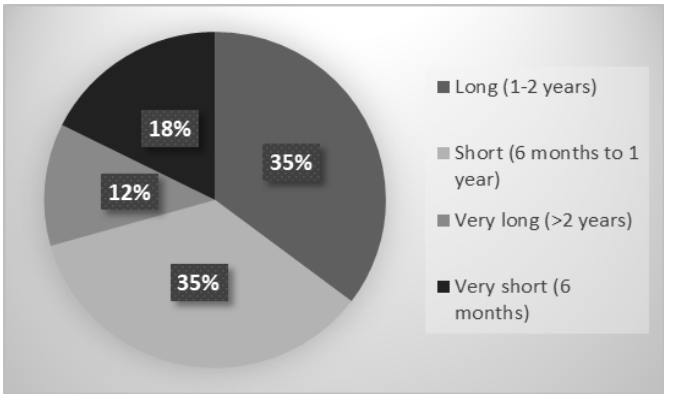

Fig. 14: Idea to final product/Market of an innovation

Long term business vision

All the incubates (100%) have long term vision with respect to their venture. Long term plan is very much essential for long term existence of the venture in the market, and also it further enables expansion of the venture. It clearly indicates that the entrepreneurs are entering into the start-up arena with clear-cut vision, and looking forward to the longer business stand. This kind of motive would also encourage others to follow the suit.

Collaboration and support for entrepreneurs

To encourage the start-up ecosystem, government organizations often offer grants, subsidies, and low-interest loans to start-ups, helping them access capital for their business development. They also provide research grants or funding for specific projects that align with their areas of interest or expertise. Private institutions, such as venture capitalists and angel investors, can invest in start-ups in exchange for equity or convertible debt. The entrepreneurs are benefitting from government-sponsored business incubators and accelerators who offer start-ups access to office space, mentoring, networking opportunities, and other resources. Research institutions with incubation programs also provide start-ups with access to specialized labs and equipment, as well as expertise in specific technical areas (Figure 15).

It is to note that these organizations connect start-ups with experienced mentors

and advisors who can provide guidance and industry knowledge. These entities often host events, conferences, and workshops, facilitating networking opportunities with potential partners, customers, and investors. That's why start-ups want to connect with the eminent organizations.

That's why by leveraging the support and resources offered by these organizations, entrepreneurs are keen to accelerate their growth, mitigate risks, and overcome challenges on their path to success. The start-ups are keen to explore partnerships with a combination of government, research, and private institutions to tap into a wide range of opportunities and support as well.

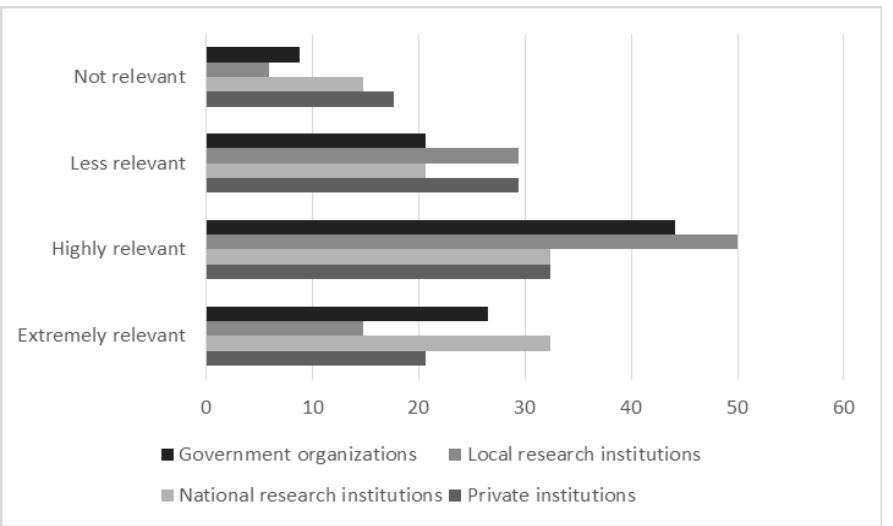

Fig. 15: Association with which increases the probability of success of entrepreneurs

Networking with Ecosystem Partners

Networking is a powerful tool that can open doors to opportunities, provide critical support, and contribute to the growth and success of a start-up. Around 70% of the respondents (Figure 16) felt that investors are highly important followed by channel partners. Both bankers and government officials are equally very important as opined. A less opined that the networking partners are not important. Building and maintaining a strong network is a continuous process that requires effort and relationship-building skills, but it can yield substantial benefits for entrepreneurs and their ventures. It is a key entity for business longevity.

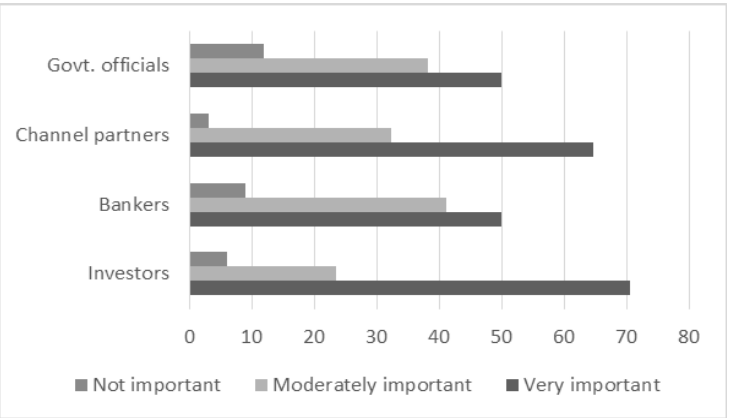

Fig. 16: Networking with ecosystem partners to increase the success of an entrepreneurship

Funding dynamics in agripreneurship: Source of fund

Securing adequate funding is a critical challenge for agripreneurs. The study reveals a reliance on seed funds from individuals and government grants for initial investments, highlighting the need for accessible and affordable financing options. Almost equal no. of respondents opined that high net-worth individuals, grants, angel investors and equity funds (24%, 23%, 23%, 21% respectively) are providing the necessary financial support (Figure 17). A very few are raising funds through debt funds and other loans. It is noted that they are utilizing every source to raise initial funds. These initial funds received are mainly spent on product development, hiring people, operational costs such as marketing, infrastructure development, R&D, design, prototype development, etc.as opined by majority of the respondents.

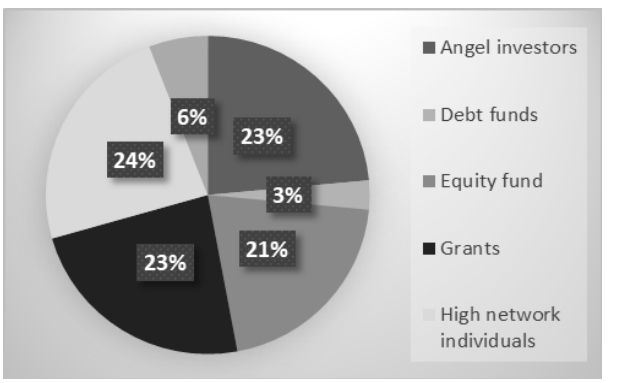

Fig. 17: Source of fund which makes a successful entrepreneur

Initial investment for success of start-up (Raising seed capital and grants)

The initial investment is the lifeblood of a start-up. The initial investment, often referred to as "seed capital," provides the necessary funds for starting agripreneurial ventures. Majority of the respondents felt the seed funds from individuals are very much needed to build a prototype, conduct market research, etc. (Figure 18). The study shows that agripreneurs heavily rely on seed funds from individuals and grants from the government to cover essential expenses such as product development, marketing, legal fees, and infrastructure. The respondents are utilizing the seed capital to cover essential expenses such as product development, marketing, legal fees, and initial infrastructure, etc. This initial investment is vital for research and development as opined by the majority of respondents who are involved in developing a service or product. They also opined that an equal match of grants from governments also would boost up the start-up activity covering initial operational costs such as office space, equipment, salaries, utilities, and other overhead. Further, this initial investment can act as a buffer against unexpected challenges or setbacks, if any.

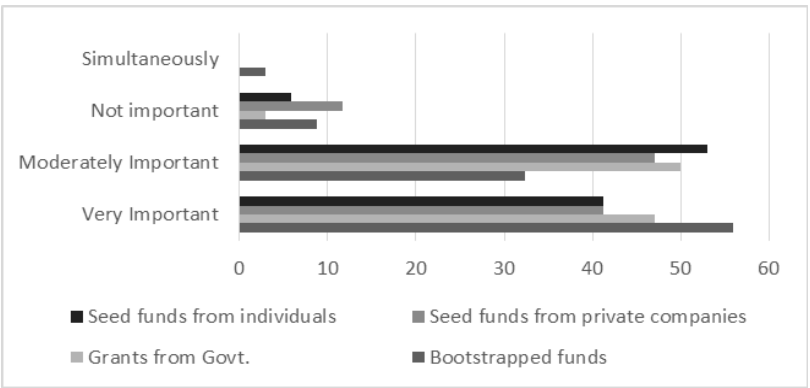

Fig. 18: Initial investment for success of start-up

Strategic importance of infrastructure investment

Investing in infrastructure for production & marketing is crucial for the operational success and scalability of agripreneurial ventures. The respondents of the study are unanimous in calling the raising the capital as the most important input invested in entrepreneurial activity for set up and expanding operations, reaching new markets, and scaling the business. It is a well-known fact that capital is essential for entrepreneurial activity. The new capital helps cover day-to-day operational expenses, ensuring that a start-up has the necessary cash flow to meet its obligations, pay employees, and continue its operations without interruptions. Furthermore, this survey shows that it is critical and linked to

the success of the venture. Thus, start-ups often aim to grow rapidly, and new capital provides the financial resources necessary to fund that growth.

Properly planned and executed infrastructure investments can help businesses operate efficiently, reach a broader customer base, and ultimately increase profitability. The willingness of 44% of respondents to invest in production and marketing infrastructure underscores its importance in enhancing efficiency and profitability (Figure 19). Around 23% are willing to invest heavily on the infrastructure which indicates that the business infra investment reaps best results. However, infrastructure investments should align with one's business strategy and customer needs. Well-planned infrastructure investments enable agripreneurs to streamline their operations, reduce costs, and improve product quality and delivery times. Moreover, such investments can facilitate access to larger markets and better meet customer demands, thereby, intended investment derives financial benefits.

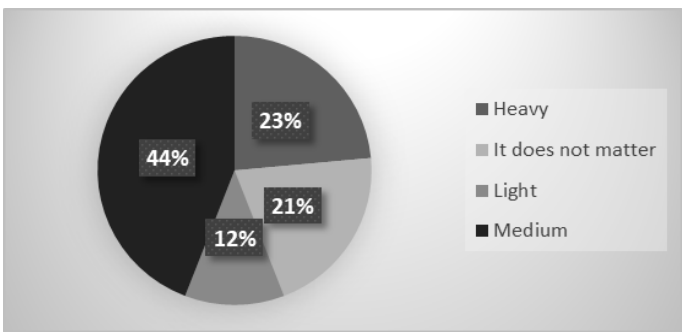

Fig. 19: Investment on infrastructure for production & marketing for entrepreneurship success

Role of location of the startups

The strategic location of agripreneurial ventures plays a significant role in their success. While metropolitan cities offer vibrant entrepreneurial ecosystems with ample resources, mentorship, and funding opportunities, semi-urban and rural areas provide unique advantages such as lower competition and the ability to carve out niche markets. The study reveals that 29% of respondents believe location does not matter, indicating a confidence in their ability to succeed regardless of their base (Figure 20). However, the specific advantages of semi-urban areas, as indicated by 26% of respondents, highlight the potential for agripreneurs to thrive in less saturated markets

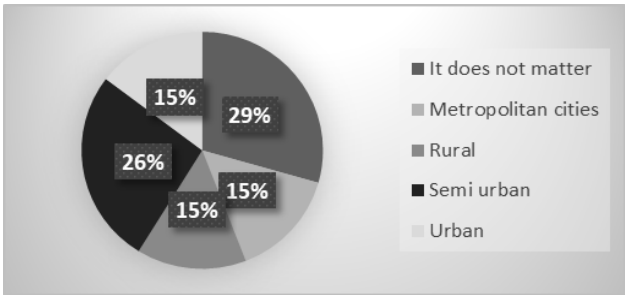

Fig. 20: Startup's response on the location of start-up

Production activities undertaken by the entrepreneur

Single or multiple production activities depend on various factors, including the nature of the business, its resources, market opportunities, and strategic goals. But the majority of the entrepreneurs (56%) are focussing on single production activity (Figure 21); whereas the other 44% are taking up multiple production activities. It is observed that some businesses may start with a single focus and gradually expand into related areas. While expanding so, market research, resource availability and planning, strategy goals and risk tolerance are being considered for business viability of the respondents. concentrating on one product can be a successful strategy if the product has a stable and growing market, and the company can maintain its competitive edge. However, it also comes with significant risks, especially if the product's market is highly competitive or subject to rapid changes. Diversification is often considered a risk-mitigation strategy, but it's essential to carefully assess the specific circumstances and market dynamics before deciding whether to focus on a single product or pursue diversification. Additionally, some businesses may benefit from a hybrid approach, where they have a core product but also explore related product lines or services to diversify their revenue streams.

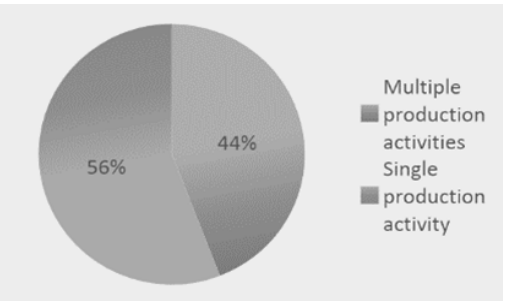

Fig. 21: Production activities undertaken by the entrepreneur

Pricing strategies and market penetration

Pricing strategies are pivotal in determining the market success of agripreneurial products. The study shows an equal preference (32%) for penetration pricing and cost-plus pricing among the respondents (Figure 22). Penetration pricing, where products are introduced at lower prices to attract customers, is particularly effective for new entrants looking to establish a foothold in the market. In contrast, cost-plus pricing ensures that all costs are covered while providing a reasonable profit margin, making it a safer approach for established businesses. The choice of pricing strategy depends on various factors, including market conditions, competition, and the entrepreneur's long-term goals. Whereas other segments of respondents followed bulk and skimming pricing mechanisms. However, the respondents want to make their presence felt in the market, and hence, they are entering into the market with both their pricing strategies.

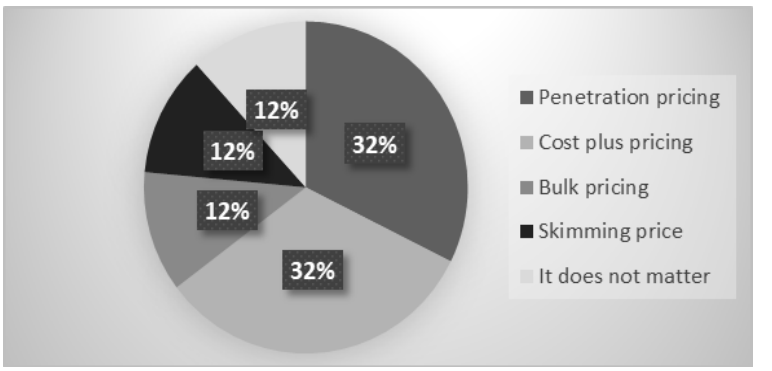

Fig. 22: Pricing of the product

Marketing strategies adopted by the entrepreneur

Effective marketing strategies are crucial for agripreneurs to reach and engage with their target audience. The study highlights the importance of advertising, direct selling, and online marketing (Figure 23) in the order of preference. Advertising helps create brand awareness and attract potential customers, while direct selling allows agripreneurs to build personal relationships with their clients, fostering loyalty and trust. Online marketing, leveraging digital platforms and social media, offers a cost-effective way to reach a wider audience and engage with customers in real-time. These strategies, when implemented effectively, can significantly enhance the market presence and sales of agripreneurial products.

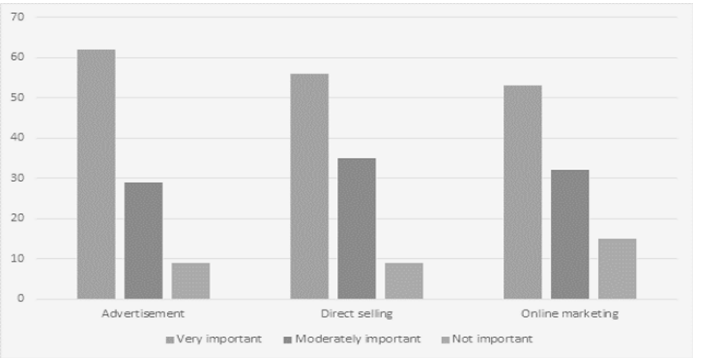

Fig. 23: Marketing strategy adopted by the entrepreneur

Impact of Multiple Entrepreneurial activity on entrepreneurial success

Focus on single entrepreneurial activity derives best results in terms of business as opined by the 44% of the respondents (Figure 24). It enables the start-up to concentrate its efforts, resources, and expertise on perfecting that product. This can lead to a higher level of quality and innovation.

Specializing in one product can help a company become known as an expert in that particular niche, which can be a competitive advantage for the agripreneurs. It can also lead to a stronger and more recognizable brand. On the contrary, 50% of the respondents opined that two or more than two activities can be taken up simultaneously. Probably, they don't want to Rely solely on one product that makes the company highly susceptible to market fluctuations and changes in consumer preferences. If any venture is focussing on a single product, then growth potential is limited. Once the market is saturated, it may be challenging to expand further without diversification. Hence, this sect of respondents might be of the opinion that if the product becomes obsolete or faces a decline in demand then the business is at significant risk. They are minimizing the business risk.

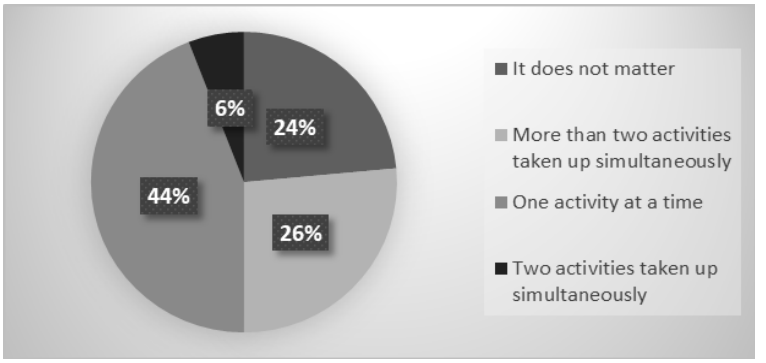

Fig. 24: Entrepreneurial activity that propels the start-ups toward success

2. Motivational Factors

The study showed that various motivational factors influence an entrepreneur venture into agribusiness and food sector (Table-1). Among all the factors, the chief factor is passion to innovate and find solution to the problems confronting Indian farmers. The pursuit of financial success and wealth is also a significant driver, with the potential for high financial returns acting as a strong incentive. Passion for agriculture or idea also fuels entrepreneurship, as individuals seek to turn their interests and hobbies into viable businesses. Many new age agripreneurs are venturing into innovative fields like terrace farming, hydroponics, aeroponics, vertical farming, etc. The opportunity to innovate and create new products or services appeals to those who are driven by creativity and problem-solving.

Entrepreneurs are often motivated by the challenge of building something from the ground up, finding satisfaction in overcoming obstacles and achieving milestones. The potential for personal growth and development is another factor, as running a business requires the acquisition of new skills and knowledge. Many agripreneurs have ventured into retailing of fruits and vegetables, organic products, etc. Many are inspired by the stories of successful entrepreneurs and the possibility of leaving a legacy. The desire to make a social impact and contribute positively to society can also drive individuals to start businesses that address social, environmental, or community issues. Flexibility and the ability to balance work and personal life attract those who seek a better work-life balance. Finally, dissatisfaction with traditional employment, such as limited career advancement opportunities or a lack of fulfilment, can push individuals towards entrepreneurship as an alternative career path. For most of the agripreneurs, there are more than one motivational factors for choosing this profession.

Table 1: Motivational factors for agripreneurs

S.No	Factors	Respondents (%)
1.	Supportive ecosystem (guidance, grant, etc.)	97.1
2.	Passion to try innovative ideas	91.2
3.	Challenging career	88.2
4.	Recognition in the society	85.3
5.	Solving farmers' problems	85.3

6.	Financial benefits	73.5
7.	Dissatisfaction with traditional employment	61.8
8.	Social objective	38.2
9.	Independent job nature and flexible timings	20.6

Conclusion

Under the study surveyed 34 agripreneurs, and found a large gender imbalance (74% male, 26% female). The early middle age is the right age for the stepping into agripreneurship. The study recommended for supporting women entrepreneurs with special scheme targeting them. The other important factors that determines the success of agripreneurs are innovative ideas, Funding, leadership, team competencies, goals achievement, work independence and financial rewards. Customer-centric entrepreneurship aimed at customer satisfaction yielded better results, and work experience before venturing into agripreneurship helped to increase the success rate. The study also revealed that the most important motivational factors are supportive ecosystem for startups and passion to try innovative ideas. The motivational factors combined with a supportive ecosystem make agripreneurship an appealing and viable choice for many individuals.

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Assessment of Digital and Financial Inclusion of women farmers/ entrepreneurs/ women-led agri startups

Pragati Shukla[1], Veenita Kumari[2] and P. Sai Charitha[3]

ABSTRACT

Financial literacy is defined as a combination of financial awareness, knowledge, skills, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial well-being. A few G20 countries like Australia, Canada, France, Japan and the United Kingdom (UK) have achieved close to 100 percent financial inclusion of women in certain parameters such as account ownership and use of debit/ credit cards. India, in 2021, had an insignificant gender gap in terms of account ownership with around 77 percent of women (almost equal number as men) having an account with a financial institution. Skill in the use of digital device and tools is affected by due to lack of access & awareness, less exposure to digital literacy and less skill in the use of digital devices/ gadgets.Purchasing a device/ gadget is still a household decision and women are generally neither a user or a dormant user nor an influencer in the decision making process of purchase of these devices. Womens' didn't know the difference between a PAN card and an ATM card. They prefer to withdraw money through Aadhaar Card from Community Service Center (CSC), which was more convenient to them. Trained women were better knowledgeable of digital and financial inclusion. It is therefore necessary to give hands-on skill to women on digital and financial inclusion so that they become more confident in the use, access and knowledge on these technologies.

Key words: Financial Inclusion, digital Inclusion, women

Introduction

India is a country that is endowed with enormous natural resources, different climates, variety of agricultural landscapes and boasts a distinct environmental and cultural diversity. India is also currently the world's 4th largest producer of agrochemicals and has the largest livestock population of around 535.8 million—which translated to approximately 31 percent of the world's livestock population in 2019. Additionally, India has the largest land area under irrigation

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globally. (Times of India, 2020). Down to Earth magazine reported that around 80 percent of the farm work is undertaken by women in India, which is astonishing and goes against the popular narrative of farmers being largely men. Strange as it may seem, women constitute over 42 percent of agricultural labor in the country but own less than two percent of farmland, which could be attributed to several social norms and rights-related issues. This is an alarming figure and raises several questions on land rights and social inequalities persisting in rural India. Women are not given their share of recognition in Indian farm sector and, therefore, have limited entitlements. While recognition is a key issue, another crucial matter of concern is that of control. Even if a woman owns the land, she does not have control over it; instead, it will be in the hands of a male— her husband or father.

During brief interaction of farm women at Dharmapur village of Jaunpur, one woman said that women in and around her village perform all the agricultural activities, starting from seed production, sowing, reaping/harvesting, conversion of primary produce to secondary products, to selling the crop in the market. The whole agricultural life cycle, thus, can be performed by women, which establishes the fact that women have a crucial role in agriculture sector and possess the knowledge and skill to run agriculture system by themselves.

Digital Inclusion: Digitalization is an important component of an economy's economic development, but it does have an impact on public financial services (Sehrawat and Giri, 2016). Digitization may help foster high and sustainable development; it will transform the face of Agriculture sector in future, ensuring higher profit for farmers and reducing harm (Upadhyaya, 2019). A study conducted in Gujarat expressed that Akodara Village is recognized as the "firstIndian digital village." The ICICI Bank sponsored this Village and transformed it into a fully digital village with appropriate infrastructure, guiding the Village towards online transactions, and he says digitalization is the need of the era (Saxena and Joshi, 2017). The expansion of bank branches has not reached the internal part of in the Uttar Pradesh and Bihar which is most important for awareness of financial inclusion education (Pandey and Raman, 2012-2013).

In today's increasingly connected world, women are being left behind. A significant gender gap in mobile phone ownership and usage in low-and middle-income countries is hindering growth for the mobile industry that means women are missing out. Successfully targeting women not only advances women's digital and financial inclusion, but unlocks significant growth potential for the mobile industry. (GSMA, 2023)

Financial Inclusion- Financial inclusion is considered as a key enabler of

economic growth and poverty reduction. The term financial inclusion is broadly defined as the access to and use of formal financial services by households and firms, those without such access are financially excluded. Having access to financial services allows firms to invest and households to smoothen their consumption and build capital over time, which leads to improvement in the business environment as well as in people's livelihoods. Around 2 billion adults across the globe remain unbanked and women remain more financially excluded than men, especially in developing countries (World Bank, 2014; Ghosh and Vinod, 2017)

According to Organization for Economic Co-operation & Development (OECD) financial literacy is defined as a combination of financial awareness, knowledge, skills, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial well-being (OECD, 2012). A study conducted by NABARD and CRIER in 2021, a few G20 countries like Australia, Canada, France, Japan and the United Kingdom (UK) have achieved close to 100 percent financial inclusion of women in certain parameters such as account ownership and use of debit/credit cards. India, in 2021, had an insignificant gender gap in terms of account ownership with around 77 percent of women (almost equal number as men) having an account with a financial institution. This can be attributed to the schemes such as PMJDY. As of August 2022, approximately 55 percent of Jan Dhan account holders were women.

The gender gap in women's access to financial inclusion persists at reprehensible levels. The 2021 Global Findex report indicates a 12.0% gap in the usage of bank accounts, with many women using their accounts only for direct benefit transfers. (Time of India, 2023).

Objective of the study:

- To study knowledge of farm women/ entrepreneurs/ women-led agri startups on digital and financial literacy.
- To analyze the determinants of digital and financial inclusion.

Research Methodology

For data collection, Uttar Pradesh was purposively selected. Out of 75 districts of Uttar Pradesh, 6 districts were selected puposively i.e. Jaunpur, Pryagraj (previously known as Allahabad), Kanpur Nagar, Kanpur Dehat, Kannauj, Barabanki and Behraich. Respondents were 62 farmwomen, 2 women led agri start-up and 21 FPO member. Data was collected with the help of a semi-structured interview schedule. Data was collected through Focused Group Discussion with farm-women.

Result and Discussion

For the data collection 20.0 percent of the respondents were from Jaunpur district, 11.0 percent were from Pryagraj, 5.88 percent from Kanpur Nagar, 29.41 percent from Kanpur Dehat, 25.88 percent from Barabanki and 7.05 percent from Behraich district.

Socio-personal Attributes of Respondents

Majority of the respondents (41.17%) were middle aged, followed by old age and young age with 34.13 percent and 24.73 percent respectively. Mostly (56.47%) respondents were married. Mostly (27.05%) of the respondents were illiterate.The deep routed culture of male domination and lack of awareness is the main cause for female illiteracy. The result is low literacy rate among women farmers in India. Majority (84.0%) of the respondents were members of Self Help Groups (SHGs). SHG playing a crucial role for achieving the women economic empowerment.

Knowledge of farm women/ entrepreneurs/ women-led agri startups on digital and financial literacy

Only 31.76 percent of the respondents had access to smart phone, while only 3.52 percent of the respondents had access to both smart phone and basic mobile. They are using their husband's or children's mobile. A negligible percentage (4.70%) of the respondents had access to radio and television because low levels of infrastructure, network quality, and coverage disproportionally affect access for women and girls. Their choice of network is often restricted by various factors, such as using basic handsets, fewer choices of SIM, and the cost of data. Women and girls are more price-sensitive than men. Women often have lower levels of income and they almost always come second in a patriarchal social order.

Skill on use of Digital Devices/tools

SI. No.	Statement	Response	
		Yes	No
1	Can use a basic mobile	61 (71.76%)	24 (28.23%)
2	Can make/ receive a call on smart phone	53 (62.35%)	32 (37.64%)
3	Can read and reply a SMS on smart phone	39 (45.88%)	46 (54.11%)
4	Aware of all the features of a smart phone	23 (27.05%)	62 (72.94%)

5	Can switch on and off a PC / Laptop	17 (20%)	68 (80%)
6	Can search content through internet	19 (22.35%)	66 (77.64%)
7	Can create an email-id	17 (20%)	68 (80%)
8	Can open , read and reply to email	12 (14.11%)	73 (85.88%)
9	Can compose and send emails	10 (11.76%)	75 (88.23%)
10	Familiar with these social medias: a. Whatsapp b. Facebook c. Instagram d. Linkedin e. Twitter	26 (30.58%) 17 (20%) 8 (9.41%) 3 (3.52%) 0 0	64 (75.29%)
11	Do you use any of the social networking apps? If yes, list them.	Whatsapp (34.11%) 40Facebook (15.29%) Instagram(3.5 %)	4 0
12	Can interact on discussion forum using internet	16 (18.82%)	69 (81.17%)
13	Can download a video from internet through mobile and or desktop/ laptop	20 (23.52%)	65 (76.47%)
14	Can upload a video on internet through mobile and or desktop/ laptop	25 (29.41%)	60 (70.58%)
15	Knows how to withdraw money from ATM	16 (18.82%)	69 (81.17%)
16	Can print passbook from kiosk	0	85 (100%)
17	Awareness about these digital payment apps Phonepe G-Pay Paytm Bharatpe	22 (25.88%) 12.0(%) 10.0(%) 3.60(%) 0.28(%)	63 (74.11%)

18	Have you ever used any digital payment method?	15 (17.64%)	70 (82.35%)
19	Can check balance through Net banking/Paytm/ Phonepe/G-Pay/ ATM	30 (35.29%)	55 (64.70%)
20	Recording videos on mobile videos	21 (24.70%)	64 (75.29%)
21	Recording audio and sharing on social media	20 (23.52%)	65 (76.47%)
22	Knows how to scan a Barcode	19 (22.35%)	66 (77.64%)
23	Knows how to generate a barcode	0	85 (100%)
24	Have you heard about Rice Doctor IRRI Plantix App?	23 (27.05%)	62 (72.94%)

62.35 percent women can make and receive call on smart phone while, 45.88 percent respondents can read and reply a SMS on smart phone. This may be attributed to lack of access, lack of awareness, less exposure on digital literacy. Factors responsible for digital gender gap was inequitable access to education and discriminatory social norms that exist in the "offline" world and impact digital realities and potential benefits for women. The respondents mentioned that they don't need smart phone, basic mobile is sufficient for them as they only make and receive calls. 27.05 percent women were aware about crop doctor applications. They didn't know any application name but they knew the feature of the application.

Only 32.94 percent respondents can afford smart phone followed by basic mobile phone i.e. 18.82 percent because, owning a digital device viz. Computer/ laptop, tablets, modem, television or smart phones, is still a household decision and women are generally neither the end user nor an influencer in the decision making process of purchase of these devices. Vishvanath (2017) conducted a study which supports the current study findings that digital access and literacy can go a long way in empowering women through meaningful outcomes like self-employment opportunities, access to education and information on health issues in a patriarchal State like Uttar Pradesh.

The respondents were asked about PAN card. 35 percent of the respondents didn't know about it and 16.77 respondents didn't know the difference between

PAN card and ATM card. Only 48.23 percent women had PAN Card. It is clear that women lag behind in economic activity and financial transaction due to poor financial literacy. Majority (57.64%) of the respondents save their money in public sector bank because public sector banks provide services in rural areas and through multiple branches, followed by co-operative banks and post office i.e. 18.82 percent and 17.64 percent respectively. Majority (49.41%) of the respondents visit bank occasionally because they preferred withdrawal of money through Aadhaar card from the Community Service Center (CSC), which was more convenient to them. This may be due to their low literacy rate and lack of confidence in handling financial activities independently. Other reason was that they had trust on the local people operating the CSCs.

Majority (54.11%) of the respondents had more than 5 years of relationship with bank because of some government schemes, in which money was credited only in woman's' account. 20.0 percent of the respondents had applied for loan but only 3.52 percent of them were aware about interest rate on their loan and loan repayment amount etc. But very few percentage of the respondents preferred loan from SHGs due to less interest rate i.e. 2.0 percent. 12.94 percent of the respondents had attended a training on digital and financial literacy. These women were from Barabanki District and the training was given by an NGO-Trust Community Livelihood (TCL). These women were well acquainted of the online digital transaction, knew how to scan a QR code? UPI ID and how to check balance and transaction history. 41.17 percent of the respondents opened their bank account under 'Pradhan Mantri Jan Dhan Khata Yojana', because of Direct Benefit Transfer (DBT).The Pradhan Mantri Jan Dhan Yojana (PMJDY program) has proven to be a game-changer, not only for including a higher proportion of the population in formal banking channels, but also for reducing the gender gap in account ownership. This has led to the activation of dormant women accounts and a spate of new accounts being opened by women. Families now want women to have and use their accounts, since they want to receive government benefits being sent to women.

Determinants of Digital and Financial Inclusion

The study measured the accessibility and usage of digital financial inclusion in relation to selected demographic characteristics such as age, income, education and social-participation. The findings of the study revealed that individual's socio-demographic factors such as age, education, income and social-participation have found a significant influence on the accessibility of digital financial inclusion. In addition, these factors have effect on usage of digital mode of financial transactions such as payments made and receipts through mobile phone or using the internet.

Conclusion

This study reports that poor access & affordability, lack of education coupled with inherent biases and socio-cultural norms curtail women and girls' ability to benefit from the opportunities offered by the digital transformation. In addition, girls' have relatively lower educational enrolment in disciplines that would allow them to perform well in a digital world – such as science, technology, engineering and mathematics, as well as information and communication technologies – coupled with women's and girls' limited use of digital tools, could lead to widening gaps and greater inequality. Individual's socio-demographic factors such as age, education, income and socialparticipation have found a significant influence on the accessibility of digital financial inclusion.

Today the digital transformation provides new avenues for the economic empowerment of women and can contribute to greater gender equality. The Internet, digital platforms, mobile phones and digital financial services offer "leapfrog" opportunities for all and can help bridge the divide, by giving women the possibility to earn additional income, increase their employment opportunities, and access knowledge and general information. We need to seize this opportunity to foster greater gender equality in the labour market, boost economic growth and build a more inclusive, digital world.

Financial literacy in India is a crucial issue, as many people struggle with basic financial concepts such as budgeting, saving, and investing. Low levels of financial literacy, lack of access to formal financial services, and a lack of financial education in schools and universities are some of the main challenges facing India. The Indian government has launched various initiatives to promote financial literacy, and digital financial services have increased in popularity. However, many people may lack the knowledge or skills to use these services effectively. Non-governmental organizations (NGOs) are working towards improving financial literacy in India through social and behavior change communication strategies, education programs, and outreach initiatives.

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