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-Editor

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Determination of the Policy Interventions to be Adopted to Enhance Youth Participation in Agriculture in Kajiado North Sub-County, Kenya

Lucy Karega Njeru, PhD

ABSTRACT

Agriculture in Kenya can develop gainful employment opportunities for youth that would enable them to exploit their economic innovation and enhance their opportunities for national economic growth. Improving youth participation in the agricultural sector is therefore important for the nation to develop. Youth's interest in agriculture is however likely to be influenced by several factors; for instance, access to land, finances, markets and negative perception towards agriculture. The Kenyan government and its development partners can enhance several policy intervention measures for promoting youth participation in agriculture. The study used a cross-sectional survey design to collect data from 397 randomly, selected youth and 22 youth and agricultural officers. Content validity of the youth and agricultural officers' questionnaires was ascertained by extension experts while reliability was determined through a pilot test involving 30 respondents. The reliability coefficients were 0.86a and 0.80a respectively, which were above the 0.70 threshold for acceptable reliability. The study revealed various intervention measures and strategies that could be adapted to enhance youth's participation in agriculture and suggested several measures that need to be put in place to ensure youth's participation in policy issues in the agricultural sector in Kenya. For instance advocated 34. 7% felt that adequate training for the youth was crucial while 33.7% called for improved land policies. The government and other development partners should come up with strategies and policy measures for enhanced youth participation in agricultural value chain development.

Keywords: Agriculture, Employment, Policy, Rural Youth.

Introduction

Agriculture contributes about 30% of Kenya's total Gross Domestic Product (GDP), accounts for 65% of national export earnings and caters for over 80% of employment opportunities. It provides a livelihood to about 80% of the population (Central Intelligence Agency (CIA) World Facts, 2014). Rural

Department of Agricultural Economics

University of Nairobi, Nairobi, Kenya

Corresponding Author: lucykarega@gmail.com; lnkarega@uonbi.ac.ke

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households rely on agriculture for most of their income mainly from smallholder farming, which produces the majority of Kenya's agricultural output. Kenya's government revised the Strategy for Revitalizing Agriculture (SRA) adopted in 2008 to create an improved agricultural legislation (GoK, 2013; Kangai, Mburu & Nyikal, 2011). In 2010 the SRA, originally intended to run from 2004-2014, was superseded by the Agricultural Sector Development Strategy 2010-2020 (ASDS) that foresees a food secure and prosperous nation by 2020 and aims to achieve a paradigm shift from subsistence to commercial agriculture.

Emphasizing agricultural growth, smallholder productivity as well as employment creation however in a bid to reducing the cycle of poverty raises a concern, especially given the ageing farmer population. The concern should address issues on whether Kenyan youth adequately participate in agriculture, whether youth are involved in policy dialogue and what intervention measures should be adopted to enhance their participation in agricultural value chain development. Studies by FAO (2014) and ILO (2013) revealed an ageing farming population with a mean of 60 years and a high unemployment rate of youth of 75% in Sub Saharan Africa (SSA). The Youth unemployment rate in SSA is related to higher levels of poverty. It is estimated that 20.1% of youth in SSA who are employed earn only USD 1.25 or less per day. This level is referred to as the 'working poverty rate implying that most young people in SSA work by necessity rather than by choice. This situation can be changed by encouraging them to fully participate in agriculture (AGRA, 2015; ILO, 2013; OECD, 2012).

The youth are the driving force behind economic prosperity in future decades, only if policies and programs are in place to enhance their opportunities (Brooks, Amy, Goyal, & Zorya, 2013). However, involving youth in policy dialogue is pertinent. All over the world, youth unemployment rates are higher than adult unemployment rates with Africa facing the world's greatest youth employment challenge (ILO, 2013). Modern agriculture can offer significant opportunities for job creation for youth (World Bank, 2014). However, in order to attract youth to the sector, an adequate enabling policy and regulatory environment is fundamental (ILO, 2013). It is increasingly recognized that youth participation has an important role in decision making and policy dialogue, thus policy-makers should work with the youth.

Too often youth participation in policy remains passive while seniority is frequently associated with authority, and youth are not expected to voice their concerns or have a role in policy development processes (Lintelo, 2011). In many developing countries, young women's participation in policy-making is particularly challenging as a result of traditional beliefs about the suitability of women to hold decision making positions and the persistence of gender

inequalities at the household level (World Bank & IFAD, 2013). Little information is available on the participation of youth in policy processes specifically related to agriculture and rural development.

A study by MIJARC, FAO and IFAD (2012) showed that rural youth rarely participate in the formulation of policies concerning them, and that in Africa and Latin America, the youth are often not seen as equal parties but rather as uninformed, indecisive and trouble makers. A report by IFAD (2014) confirmed that national policies related to youth in agriculture are often not implementable because they are designed by others who are unaware of the situation of youth in rural areas. Although some legal documents and policies, including the African Youth Charter, explicitly state youth's right to participate in policy design, many young women and men remain unaware of their rights in this regard. There is a lack of comprehensive data on rural youth as a distinct group, resulting in policies that do not respond to the real challenges faced by rural youth (IEG, 2013).

In order to be able to actively participate in policy dialogue, rural youth need the right skills and since not all rural youth are born leaders, UNCDF (2012) argued that organizations that can represent their interests and which can lobby on their behalf can have an important role to play. MIJARC, FAO and IFAD (2012) contend that rural youth are not sufficiently united thus a major reason for their limited voice in policy-making processes. There are only a small number of organizations representing rural youth, and those that do exist often lack financial resources, are rather small and informal, operate at the local level, and have little bargaining power in policy processes (IFAD, 2014). In developing countries, young women face particular constraints to participating in rural organization management for a variety of reasons; they generally have lower literacy levels than men; they often lack the confidence to defend their interests and they have limited mobility and time availability due to the need to combine household duties with a heavy workload (World Bank, 2015).

Governments need to formulate rural and agricultural development policies and strategies that seek to create an enabling environment for youth participation in agriculture. In Kenya, employment creation is emphasized in the National Youth Policy, where the creation of an environment enabling youth self-help initiatives for self-employment is recognized (FANRPAN, 2012). ASDS is the overarching national policy framework for the ministries and other stakeholders involved in Kenya's agriculture sector. This policy framework is anchored in the long-term development plan for Kenya, 'Vision 2030', whose main thrust is to transform Kenya into a middle-income country by 2030 and involve youth in agriculture by making it attractive to them (GOK, 2013, Kangai et al., 2011). In

an effort to achieve this commitment, the Government launched a 'Farming is Cool' campaign in 2012, which highlighted the possible monetary returns in farming that can accrue to youth and committed over USD 2 million in loans to youth groups for buying irrigation kits, greenhouses, water tanks, seeds, and fertilizers through the YEDF (Amenya, 2011). Subsequently, other programmes targeting youth in agriculture have come up for instance the ENABLE Youth Program Kenya that is currently ongoing (MOA, 2020).

It is not only the agricultural sector however that possesses untapped potential, but the youth themselves. As a result, facilitating and incentivizing youth participation in agriculture would not only provide their much needed employment opportunities, but may also help in driving the innovations and growth needed to reduce rural poverty among youth and adults alike (ILO, 2013). Unfortunately, many youth do not perceive agriculture as a viable or attractive means of earning a living. Noorani (2015) observed that the drudgery and low productivity of agriculture are simply not attractive to youth, who instead migrate to cities in search of higher productivity and better-remunerated employment. A concerted and coordinated effort is therefore required by the government, policy makers and development practitioners to develop a more modern agricultural sector to unlock the potential of the youth.

Njeru and Gichimu (2014) argue that the government could promote land reforms and ensure that arable government land is only used for agricultural purpose, fairly distributed among young male and female farmers and that mechanisms to be put in place to help youth have sustainable agriculture. FAO (2013) revealed that the creation of laws that ensure youth's access to production resources that ensure equal opportunities for young men and women should be adopted. The government ought to implement legally binding consultation mechanisms with rural communities and rural youth movements while drafting policies related to productive resources. Such policies should respect Mother Earth and its natural production cycles, and guarantee a healthy and sustainable environment for future generations.

A report by AGRA (2015) revealed that youth inherit small plots of land and lack access to finance to buy more land. In India, cooperative farming has proved to be successful in overcoming this constraint a phenomenon that Kenyan youth can borrow in order to improve their level of participation in agriculture (FAO, 2013). Family land transfer can be considered as a good option, where the elderly can transfer part of their land to the youth, where both parties can benefit since the elderly lack the necessary capacity to manage their lands in the most efficient way and the youth are keen to have their land and have better access to new technology.

Governments should adopt laws and public policies relevant to youth that will facilitate access to credit for productive resources according to their specific needs (Purvis, 2014). IFAD (2014) argued that governments and farmer's organizations should work out financial support programs specifically directed to young farmers and promote the work, creativity and innovative spirit of young people; for organizing contests, and the best projects can be rewarded with funding. According to Njeru and Mwangi (2015), agribusiness centers with storage and processing facilities should be created for young farmers to link them with traders and act as a venue for training, sensitization and capacity building; particularly on market actors, financing opportunities and new agricultural technologies. Youth ought to be trained on financial sustainability and management of membership-based organizations to encourage the creation of strong and sustainable young farmer's organizations (FAO, 2013). A report by Brooks et al. (2013) revealed that youth organizations can promote and facilitate youth participation in their structures and can consider the need for gender equity and understand the issues affecting rural youth.

Leavy and Hossain (2014) argued that the apparent disconnect between agricultural research system and farm operations needs to be addressed. Research could be organized in a way that the units responsible for a particular commodity are linked to the other institutions that are involved in the particular commodity so that information can flow directly from research to utilization through ICTs (Leavy & Hossain, 2014). Researchers require relevant training on how to package their research findings for the end user and post it into the appropriate communication channel for users to access (IFAD, 2014). Brooks et al. (2013) confirmed that the government should ensure the promotion of research-extension-farmer linkages to facilitate demand-driven research and increased use of improved technologies. Optimizing rain-fed agriculture and investing heavily in irrigation and other water harvesting technologies holds the key to increased productivity in semi-arid Counties (Brooks et al., 2013; Purvis, 2014). Counties could pick commodities in which they have a competitive advantage over others and create trade relations with neighbouring Counties (FAO, 2013).

Better production techniques and market-oriented strategies can generate a sustainable source of income while contributing to the supply of agricultural produce to satisfy the world's increasing food demands (Njeru & Mwangi, 2015). A report by Mkulima Young (2013) revealed that ICTs could play a role in countering youth migration to urban areas by enhancing access to market information, production techniques, new technologies and financing opportunities. The use of ICTs enables choice, the option to stay on farms and take full advantage of new technologies and farming techniques, while

incorporating valuable traditional practices and knowledge (Brooks et al., 2013).

A study by Purvis (2014) suggested that specialization needs to be encouraged in order to re-direct and train youth to specialize either on production, processing or marketing. This will be more effective than when one youth carry out all activities in a value chain. There is need to provide incentives for entrepreneurs in the sector by developing financial packages that are tailored to the diverse production, marketing conditions as well as risk factors (Mkulima Young, 2013). Investment in value addition through processing, branding, quality shelf life improvements would lead to higher prices, new jobs and will eventually increase aggregate incomes for the youth and in the rural community in general (Njeru & Mwangi, 2015). Swarts & Aliber (2013) observed that sufficient investment in irrigation and other water harvesting technologies to facilitate full time engagement of the youth and shorter waiting time for economic returns is necessary. This is noted could be very pertinent especially in the dominant marginal areas of Kajiado County. There is need to improve the performance of the agricultural value chains in Kenya in order to deliver reasonable returns to all actors (IFAD, 2014). Currently the value chains for the different commodities are long, un-transparent and cluttered with many players making them inefficient, slow and unresponsive to needs of particularly the producers. A comprehensive approach to value chains for various commodities should be undertaken in partnerships involving the youth.

Tadele and Gella (2012) showed that capacity building activities of rural youth often focus on generating leadership skills. Education and capacity building programs for rural youth should be defined in a more participatory way and focus on agricultural best practices, land laws and knowledge sharing (Tadele & Gella, 2012). Governments should review their youth policies and propose measures which are adapted to rural life, guarantee the rights of rural youth and provide them with a better and more decent life. Kangai et al., (2011) and Leavy and Hossain (2014) expressed the need to address the long held belief that agriculture and rural based activities are for those who cannot make a living anywhere else. Agriculture need to be rebranded as the new unexplored frontier for growth in business opportunities. A report by FAO (2013) confirmed that women and men should have equal access to training and education and that gender aspects should be taken into consideration while deciding the themes and setting the timing of these trainings.

The government and other actors should develop a coherent and integrated initiative to address the core challenges faced by youth when entering the agriculture sector. Njeru et al. (2015) confirmed that initiative should involve a

transparent multi-stakeholder mechanism that ensures coherence, coordination and cooperation across different national government institutions and agencies, at central and local level, private sector organizations, youth organizations and development partners. Its goal should be to increase youth's access to the agricultural sector that offers great opportunities for agricultural productivity gains as well as food security and sustainability. It is against this backdrop that the paper determines policy interventions to be used to enhance youth participation in agriculture.

Statement of the Problem

Youth in Kenya constitute about 45% of the total labour force. Some of these youth work mainly in agriculture, which supports over 80% of the population and contributes 30% to the GDP. Young people were estimated to comprise 80% of the Kenyan population by 2016. This tremendous youth population increase, rising unemployment and therefore high dependence ratio poses a great danger to Kenya's economy. Despite Government's efforts to make agriculture more attractive and profitable to the youth, their participation in the sector is declining as they increasingly migrate to cities in search of remunerative and decent employment. Furthermore, although the youth hold Kenya's future due to their enormous energy and aspirations, most of them in the study area considered agriculture to be less attractive compared to other professions. Reducing youth unemployment through participation in agriculture is a challenge in Kenya since the average age of a farmer is about 60 years and at this age bracket, farmers are less venturous, averse to risks and hesitant to adapt innovations making it difficult to transform agriculture from subsistence to income generating activity. Although youth engagement in agriculture could greatly reduce youth unemployment in the country, 70% youth in the study area were unemployed. The government and other actors should develop a coherent and integrated initiatives to address the core challenges faced by youth when entering the agriculture sector. This is a challenge in Kajiado North Sub-County since these initiatives were poorly understood and documented. This therefore made it difficult for Kenyan leaders and their development partners to formulate innovative strategies for enhancing youth participation in agriculture. This study has provided information that the Government and other leaders can use to make informed decision on how to improve and enhance youth participation in the sector.

Purpose and Objective of the Study

The study sought to determine the policy measures and innovative strategies to be adopted by government and other stakeholders for enhancing youth participation in agriculture in Kajiado North Sub-County.

Research Methodology

A cross-sectional design was used to collect data from 397 randomly selected youth and 22 youth and agricultural officers. This design provides self-reported facts about respondents, their feelings, attitudes, opinions and habits and is excellent for collecting original data (Kombo & Tromp, 2007; Kothari, 2008). It enables the researcher to study a large population with only a portion of it being used to provide the required data (Kothari, 2008).

Instrumentation and Data Collection Procedures

A self-administered questionnaire with information on the influence of the differences between male and female youth in their level of participation in agriculture, developed by the researcher with open and closed-ended items, was used for the youth and agricultural extension officers. The questionnaires' content validity was ascertained by five extension experts while a pilot test involving 30 youth was conducted to determine its reliability, which was 0.83 α . This was above the 0.70 minimum acceptable for educational research at a significance level of 0.05 set *a priori*.

Data Analysis

Data analysis involved qualitative and quantitative methods. In the qualitative data analysis, emerging trends were categorized based on research objectives. The data on gender difference was summarized into categories (males and females) and analyzed using a t-test at 0.001 α significance level. It found out if the mean difference between the level of participation in agriculture between the male and female youth was significant. Frequency tables and percentages were used to summarize and present quantitative data.

Results

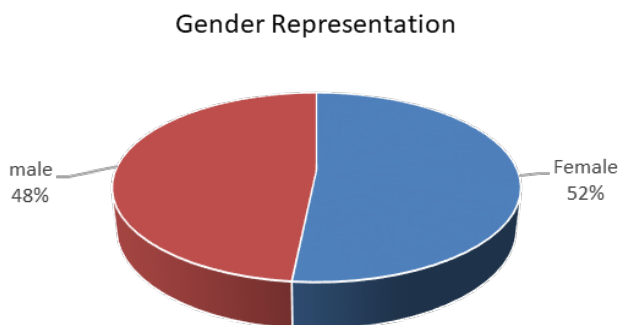
A respondent's age was important in determining the average age of youth involved agricultural production in the Sub-County. Most of the youth (63.4%) were 26-35 years while the rest (36.6%) were 18-25 years implying that agriculture in the Sub-County had attracted very few young people between 18 and 20 years. In terms of formal education, 60.2% had secondary (Form 4) to college (certificate or diploma) education. Of the remaining 39.8%, 7.3% had no formal education, 20.4% had primary education (standard 1-8) and only 12.1% had university education as shown in Table 1

Table 1: Age, Academic Level and Marital Status of the Youth (n=397)

Age (years)			Academic level			Marital status		
	F	%		F	%		F	%
18-20	53	13.4	No school	29	7.3	Married	217	54.7
21-25	92	23.2	Primary	81	20.4	Single	170	42.8
26-30	111	27.9	Secondary	132	33.2	Divorced	7	1.7
31-35	141	35.5	College	107	27.0	Widower	2	0.5
			University	48	12.1	Widow	1	0.3

Gender of Respondents

The youth engagement and participation in activities related to agriculture can be affected by gender. The sampling took this into consideration in order to maintain the gender balance. The frequency distribution of the variable gender is given in figure 1

**Figure 1: Gender Representation of the Respondents**

Relationship between Youth Access to Finances and their participation in Agriculture

The Hypothesis to test this relationship was, *there is no statistically significant relationship between youth access to finances and their participation in agriculture in Kajiado North Sub-County.*

Correlation analysis using the index of youth access to finances and their

participation in agriculture were used to test the hypothesis and the results are given in Table 2.

Table 2: Correlation Analysis for Youth Access to Finance and their Participation in Agriculture

Variables	r	p	n
Youth participation in Agriculture	0.197	0.01	397
Youth access to finances			

The results in Table 2 of the correlation analysis between youth access to finances (independent variable) and youth participation in agriculture (dependent variable) show there is a statistically significant positive relationship ($r=.197$, $p=.01$). We reject the null hypothesis and accept the alternative hypothesis that there is a statistically significant relationship between youth access to finances and their participation in agriculture. This means that youth access to finances was positively related to their participation in agriculture thus it was a dominant factor that influenced the level of their participation in Kajiado Sub-County. Youth who had easy and better access to finances had increased levels of engagement in agricultural activities than those who had no access or had difficulties in accessing the finances. This is in accordance with the study by Leavy and Hossain (2014) that confirmed that access to financial services such as savings and loans just like access to land is of fundamental importance in starting any agricultural activity. The findings support study findings by Atkinson and Messy (2012) which observed that youth require finances to cover the costs of planting and harvesting, as well as investments in improved productive capacities. Moreover, the agricultural sector is often exposed to adverse natural events that negatively affect production as underscored by Dalla Valle (2012), thus access to insurance schemes is crucial for young farmers in developing better agricultural risk management strategies for their farms. To improve such services, appropriate policies should be drafted and existing services revised to reach a younger clientele. However only 3.5% youth in the Sub-County had borrowed finances from microfinance institutions while only 2.3% used money from their own salary since majority lacked formal employment implying that youth access to finances influenced their level of participation in agriculture. Atkinson and Messy (2012) observed that collective action is crucial for rural youth and they need to be organized in self-help groups that could provide the means of generating savings and improving the borrowing power of both individual members and the group, something that could be really applicable to youth in Kajiado North Sub-County thus agreeing with the research findings.

Interventions that could Enhance Youth Participation in Agriculture

The respondents gave their opinion on various intervention measures and strategies that could be adapted to enhance youth participation in agriculture. They also suggested several measures that need to be put in place to ensure youth's participation in policy issues in the agricultural sector in the Sub-County.

Table 3: Interventions by Elders or Parents

Intervention	Frequency	Percentage
Help by formation of societies	64	16.6
Help by training/educating the youth	132	34.3
Encouraging and giving moral support to the youth	4	1.1
Adapting modern methods of farming	17	4.4
Assist the youth with capital	12	3.2
Ensure timely land allocation to the youth	126	32.8
Involve the youth in decision making	8	2.1
Mentorship of the youth	21	5.5
Total	384	100.0

Over one third of the respondents, 34.3% reported that parents should support them through training, especially in agricultural related disciplines. This was followed by 32.8% who indicated that land should be allocated to the youth in good time. 16.6% stated that parents could help in formation of groups which the youth can join, 5.5% indicated that mentorship programs were crucial, 4.4% stated that adoption of modern farming methods was important. Few respondents indicated that parents should assist the youth with the required capital, involve them in decision-making processes, encouraging and giving them moral support as required. This is in accordance with the report by FAO (2014) which revealed that the youth often lack access to finance to buy land.

Cooperative farming in some countries for instance India has proved to be successful in overcoming this constraint, a phenomenon that Kenyan youth could borrow to improve their level of participation in agriculture. However, this requires support from the elders. The study findings are also in line with those of Proctor & Lucchesi (2012) that efforts aimed at fostering youth involvement in agricultural activities and decision-making processes are pertinent and that

these efforts can seize on the youth's capacity and their propensity for taking higher entrepreneurial risks thus making them succeed in agriculture. Also Dalla Valle (2012) confirmed that organized self-help groups could provide the means of generating savings and improving the borrowing power of both individual youth members and the group, thus will help mitigate the issue of financial constraints faced by the youth.

Table 4: Government and other Development Partners Interventions

Interventions	Frequency	Percentage
Funding youth in agriculture and involving them in policy dialogues.	100	25.4
Improved land policies	132	33.5
Reduce interest rates by financial institutions	20	5.1
Improve the infrastructure	95	24.1
Ensure accessibility to markets	15	3.8
Training on use of ICTs in agriculture	20	5.1
Formation of youth organizations	12	3.0
Total	394	100.0

Over two thirds of the respondents, 33.5% wanted the government to come up with better land policies. This was followed by 25.4% who stated that funding youth in agriculture was of paramount importance. Others 24.1% reported that the government should improve the infrastructure while 5.1% said that they needed training on agriculture and ICTs skills and youth in agriculture could be assisted to access credits at a reduced interest rates. Few respondents, 3.8% and 3.0% indicated that markets accessibility should be enhanced and that support in formation of youth organizations was pertinent. These study findings agrees with those of Noorani (2015) who found that the government could ensure that arable government land is only used for agricultural purpose, fairly distributed among young male and female farmers and that mechanisms should be put in place to help the youth practice sustainable agriculture. FAO (2013) found that promotion of land reforms and creation of laws that ensure young people's access to production resources that ensure equal opportunities for young men and women should be adopted.

The study findings also concurs with those of Purvis (2014) that the government can adopt laws and public policies relevant to youth that facilitate access to

credit for production according to the specific needs of the youth and that governments and farmer's organizations should work out financial support programs specifically directed to young farmers. Studies by AGRA and Njeru and Mwangi (2015) supports the study findings that agribusiness centers with storage and processing facilities should be created for youth to link them with traders and act as venues for training, sensitization and capacity building, particularly on markets and financing opportunities as well as agricultural technologies. FAO (2013) found that youth ought to be trained on financial sustainability and management of membership-based organizations in order to encourage the creation of strong and sustainable young farmer's organizations.

Conclusions

Several policy guidelines and intervention measures could be adopted by the government and others stakeholders to enhance youth participation in agriculture. Over one third of the respondents, 34.3% reported that parents should support them through training, especially in agricultural related disciplines. 32.8% indicated that land should be allocated to the youth in good time. Others 16.6% stated that parents could help in formation of groups which the youth can join while 5.5% indicated that mentorship programs were crucial. 33.5% wanted the government to come up with improved land policies and 25.4% stated that funding youth in agriculture was of paramount importance. Others 24.1% reported that the government should improve the infrastructure while 5.1% said that they needed training on agriculture and ICTs skills and youth in agriculture could be assisted to access credits at a reduced interest rates.

Recommendations

Based on the conclusions of the study, the researcher recommends as follows:

- For an increased understanding of youth's challenges in the agricultural sector and the reflection of these challenges in policies, the government should ensure that data is aggregated concerning age, sex and geographical location, and the aspirations, needs and concerns of young people as a heterogeneous group should be taken into account in order to come up with policies that make agriculture more attractive to them.
- Coordination is needed between different ministries (ministry of youth, agriculture, labour etc.) at central and local levels to ensure that policies reflect youth and their engagement in agriculture.
- Civil society actors and the youth themselves should actively participate in the policy-making process so that policies are more sustainable and owned

by the target group.

- Rural youth representatives should be invited to agricultural meetings and events on a regular basis to make national authorities be aware of youth issues.
- The government should come up with a coherent and integrated response to address the core challenges faced by youth when entering agriculture. The government can work partnership, with a transparent multi-stakeholder mechanism ensuring coherence, coordination and cooperation across different national government institutions and agencies, at central and local level, private sector organizations, youth organizations and development partners.

Recommendation for Further Research

In order to determine whether the situation is different in other areas, other researchers can replicate the study in order to come up with a more coherent and integrated response to address the core challenges faced by youth when entering agriculture in Kenya.

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Regulatory Issues of Farmers Producers Companies in India

Shridevi V¹, K C Gummagolmath², Sachin V R³, and Bammidi Ujjwala⁴

ABSTRACT

In the recent past, a new model of aggregation in the form of Farmers Producers Company (FPC) has evolved. The instrument of Farmer Producer Company (FPC), registered under the Companies Act, 1956 is emerging as an effective Farmer Producers Organization (FPO) to cater to the aggregation needs of farmers at the grass roots level. The main objective of mobilizing farmers into member-owned producer companies, or FPCs, is to enhance the production, productivity and profitability of agriculturists, especially small farmers in the country. FPCs offers a wide range of benefits compared to other formats of aggregation of the farmers. These groups are democratically owned and run by management consisting of Board of Directors (BoD) drawn exclusively from farmer members while, the day to day activities are managed by Chief Executive Officers (CEOs), and a management professional who is responsible for overall development of FPCs. FPCs are promoted by many public and private agencies through several schemes and programs of the government of India and State governments. However, these FPCs are facing some regulatory issues as for running this model on joint stock company mode, mainly due to a lack of awareness about the same. Majority of the FPCs are failing to comply with legal provisions laid down in the Companies Act as amended in the year 2002. Hence, through this article, suggestions are made to ease the legal compliances for FPCs. It is suggested to create awareness through massive capacity-building programs and there is a need to relook into the legal compliances which attract hefty fines.

Keyword: Farmer Producer Organization (FPO), Farmers Producer Company (FPC), Aggregation, Policy-Making.

Introduction

The major constraint of Indian agriculture is the diminishing size of land holdings. As per the 2015 census, the proportion of small and marginal farmers is more than 86 per cent of total land holdings in the agricultural economy of

1. MANAGE Fellow, National Institute of Agricultural Extension Management (MANAGE), Hyderabad
2. Director (M&E), National Institute of Agricultural Extension Management (MANAGE), Hyderabad.
3. Assistant Professor, Sri Krishnadevaraya College of Agricultural Sciences, Anantapur, Andhra Pradesh
4. Consultant, MANAGE
Corresponding Author Email: vshridevimanage@gmail.com

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India. These small holders, with just 44 per cent of the total land, are producing 70 per cent of vegetables, 55 per cent of fruits and 52 per cent of cereals. Thus, given the importance of the smallholders, their problems are of prime concern for the sector. The concern is even more pronounced on the marketing front, as an assurance of remunerative price to the smallholder is a daunting challenge due to typical factors prevailing in the agricultural marketing scenario of the sector.

Hence, there is a need to aggregate these small holders to have a level playing field with large farms in terms of accessing land, water, inputs, credit, technology and markets and to attain economies of scale. In the past, various aggregation tools were tried by extension agencies by both, public and private in the form of Cooperatives, Commodities Interest Group (CIG), Farmer Interest Group (FIG), Self Help Groups (SHGs) etc. One such pioneering attempt was promotion of cooperatives performing various activities in agriculture including input supply. By and large, the experience of performance of cooperatives has been poor with the exception of co-operative sugar factories and dairy co-operatives (Paty and Gummagolmath, 2018).

In the recent past, the instrument of farmer producer organization, registered under the Companies Act 2013, is emerging as one of the most effective tool, of aggregation (Paty and Gummagolmath, 2018). These producer companies are designed in such a manner that they are professionally managed and are able to take care of total supply chain in general and marketing problem in particular. A producer company is basically a corporate body registered as a producer company under Companies Act, 1956, now 2013 (As amended in 2002). Amendments in Company's Act 2002 was done on the basis recommendation of Prof. Y.K. Alagh Committee (1998) to add a corporate muscle to cooperatives so that it can bring effective management and good governance. The same provisions have been retained for FPC after re-visiting the Companies Act, in 2013 (FPO Policy and Process guidelines, 2013).

What is a 'Producer Company?'

An expert committee led by noted economist, Y. K. Alagh recommended, the setting up of producer companies in 2002 by incorporating a new Part IXA into the Companies Act of 1956. The objective of the committee was to frame a legislation that would enable the incorporation of farmer groups and existing cooperatives in agriculture as producer companies for conversion of existing formal groups in the ambit of Companies Act. Accordingly, the then Companies Act, 1956 was amended to incorporate a group of farmers as a joint stock companies. For this, a separate chapter (Part IXA) was incorporated and

the same provisions have been retained in the amended Companies Act, 2013. This is a hybrid between cooperatives and joint stock companies. It imbibed best practices from cooperatives and best practices of joint stock companies. The committee recommendation took care of ensuring the unique elements of cooperative business with a regulatory framework similar to that of companies (Paty and Gummagolmath, 2018).

As per section 581A(i) of the Companies Act, a “Producer Company” means a body corporate having objects or activities specified in section 581B and registered as a Producer Company under Companies Act, 2013 (previously under the companies act 1956) (Paty and Gummagolmath, 2018).

Objectives of Farmer Producer Company

- a. Production, harvesting, procurement, grading, pooling, handling, marketing, selling, export of primary produce of members or import of goods or services for their benefit.
- b. Processing including preserving, drying, distilling, brewing, venting, canning and packaging of produce of its members.
- c. Rendering technical services, consultancy services, training, education, research and development and all other activities for the promotion of the interests of its Members.
- d. Generation, transmission and distribution of power, revitalization of land and water resources, their use, conservation and communications relatable to primary produce.
- e. Manufacture, sale or supply of machinery, equipment or consumables mainly to its members.
- f. Promoting mutual assistance, welfare measures, financial services, insurance of producers or their primary produce.

Benefits of incorporating a producer company?

1. Collective inputs purchase which reduces transaction cost
2. Collective marketing for enhancing bargaining power and thus leading to scientific price discovery
3. Benefit of vertical integration in the value chain
4. Increasing productivity through better inputs

5. Increasing knowledge of farmers

Status of Farmer Producer Organization in India

FPOs in India are mainly promoted by two apex agencies viz., SFAC and NABARD. Besides, by non-government agencies and state Govt. agencies are also promoting FPOs. However, there is no harmony among the models being implemented by these agencies for promotion of FPOs. For Example, NABARD is promoting several kinds of aggregation models such as cooperative groups, farmers clubs, Self- Help Groups and FPOs registered under companies Act. While, SFAC promotes group of farmers consisting of 15-20 members at the village level, which are federated at block/district level and the federation is registered as a producer company under the provisions of Companies Act, 2013. Extension agencies like ATMAs are promoting Common Interest Groups (CIGs) and Farmers Interest Groups formally registered under the Department of Agriculture & Cooperation, NCDC and other agencies are promoting cooperative groups, farmers clubs etc.

However, in the new scheme of promotion of 10,000 FPOs, nine agencies have been roped in for the formation and implementation of FPOs in the country by 2024-25. The list of nine agencies is furnished below (Ministry of Agriculture & Farmers Welfare, 2021):

1. Small Farmers Agri-Business Consortium (SFAC),
2. National Cooperative Development Corporation (NCDC),
3. National Bank for Agriculture and Rural Development (NABARD),
4. National Agricultural Cooperative Marketing Federation of India (NAFED),
5. North Eastern Regional Agricultural Marketing Corporation Limited (NERAMAC),
6. Tamil Nadu-Small Farmers Agri-Business Consortium (TN-SFAC),
7. Small Farmers Agri-Business Consortium Haryana (SFACH),
8. Watershed Development Department (WDD)- Karnataka & Foundation for Development of Rural Value Chains (FDRVC)
9. Ministry of Rural Development (MoRD)NABARD

For the promotion of FPOs, NABARD identifies the experienced Resource Institutes and Producers Organizations Promoting Institutions (POPIs) and supports these institutions in delivering the designated responsibilities for the formation and effective implementation of the FPOs

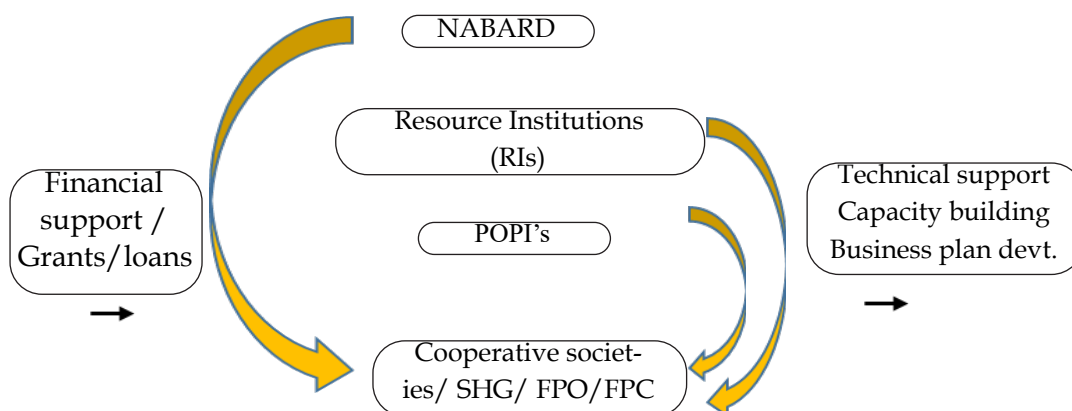


Figure-1 NABARD Model for promotion of FPOs/FPCs

The FPOs promoted by SFAC are having federated structure (Fig-2). SFAC has empanelled qualified and experienced Resource Institutions (RIs) which includes, NGOs and State govt. agencies. These RIs, identify and mobilize farmers into group (FIGs) of 15- 20 members at village levels and these groups are federated at a desired level (block/ district) depending upon the type of activities and scale of operations. These federations are registered as FPCs.

Presently, around 10,000 FPOs (including FPCs) are in existence in the country, which was formed under various initiatives of the Govt. of India (including SFAC), State Governments, NABARD and other organizations over the last 8-10 years.

The Majority of these FPOs are in the nascent stage of their operations with shareholder membership ranging from 100 to over 1000 farmers and require not only technical handholding support but also adequate capital and infrastructure facilities including market linkages for sustaining their business operations.

The comparative analysis of the FPOs promoted by different agencies, revealed that NABARD, along with FPCs is promoting other forms of aggregation such as farmers club, cooperatives, watershed groups and SHGs. On the other hand, SFAC is exclusively promoting FPCs since initiation of the scheme. Due to presence of country wide network, NABARD is able to promote more number of FPOs compared to SFAC.

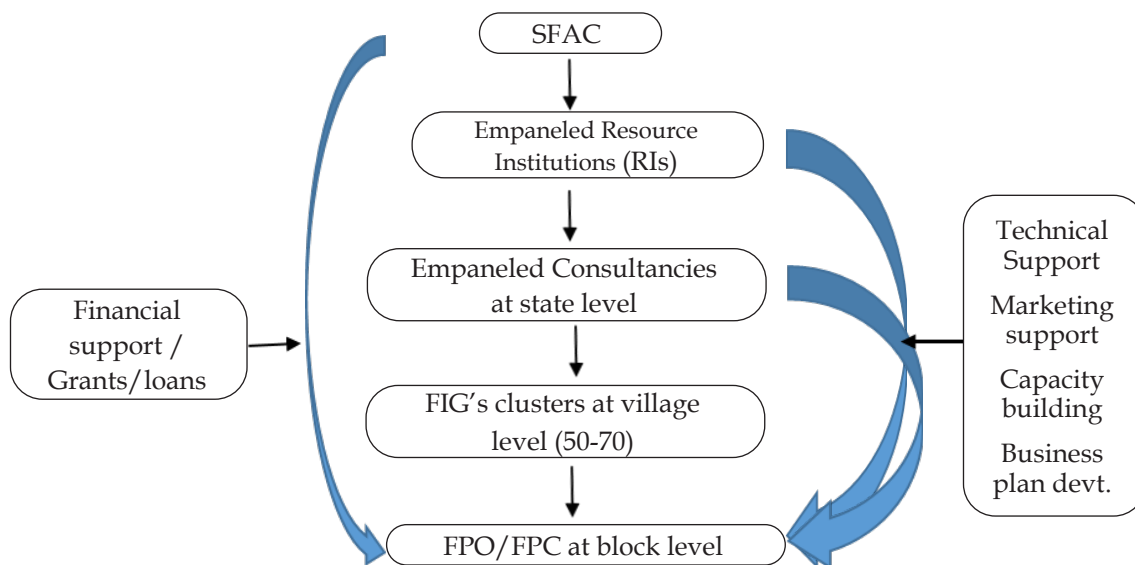


Figure-2: SFAC Implementing Model for Promotion of FPOs/FPCs

The very first producer company registered in India was Farmers Honey Bee India Producer Company Ltd. In the first financial year after notification of the amendment, namely financial year (FY) 2004 (April 1, 2003 to March 31, 2004), a total of five producer companies were registered (Table 1). In the first 10 years after notification of the act (FY 2004 through FY 2013), a total of only 445 companies were registered. The pace of registration accelerated during FY 2014, when 497 producer companies were registered, a number that exceeded all previous 10 years combined. The number of companies registered crossed 1,000 for the first time in FY 2016. In the most recent three financial years (FY 2017, FY 2018, FY 2019), 4,190 producer companies were registered, amounting to an average of almost four companies per day with one of the four being registered in Maharashtra. This massive jump in registrations in recent years as observed in the MCA data coincides with various state and central government schemes. Most such schemes for the promotion and support of FPOs in general, and FPCs in particular, came into effect in FY 2013, FY 2014, and FY 2015. There was an observable drop in producer company registrations in FY 2018, which appears to be correlated with the completion of the term of NABARD's PRODUCE Program (Neti, et.al, 2019, SFAC, 2019).

Table.1 Financial Year wise register Farmer Producer Companies

Financial year (FY)	Number
FY 2004-05	5
FY 2005-06	16
FY 2006-07	24
FY 2007-08	32
FY 2008-09	18
FY 2009-10	41
FY 2010-11	28
FY 2011-12	52
FY 2012-13	78
FY 2013-14	151
FY 2014-15	497
FY 2015-16	551
FY 2016-17	1691
FY 2017-18	1477
FY 2018-19	909
FY 2019-20	1804
FY 2020-21	554
FY2021-22	437
FY2022-23*	2913
Total	10,558

*As of as on 30-11-2022, Source SFAC

Legal Framework for formation of Farmer Producer Companies (FPCs)

Farmer Producer Company (FPC) is a legal form of the company. These FPCs promoted by the farmers, will be run by farmers and for the benefit of the farmers. Paid staff can be employed to assist in the management of the company. The share capital of Producer Company shall consist of equity shares contributed by members only and member's equity cannot be publicly traded but can be transferred. The profits generated from the business of the company would be shared among the farmer members only in terms of dividends. Producer company is to have at least 10 members of which a minimum five board of directors and a full time Chief Executive should be appointed by the Board of Directors who shall be entrusted with substantial responsibilities of running the FPCs professionally.

Table. 2 Types of FPCs based on the legal status

Parameters	Section 8 Company	Society	Trust
Objectives	Non-Profit activities	Charitable, Literary, Scientific, etc.	Charitable, Socially beneficial
Statute/Law	Indian Companies Act, 1956	Societies Registration Act 1860	Indian Trust Act, 1882 or Bombay Public Trusts Act
Alternations of objectives	Complex legal procedures	Simple procedure	Normally only settlor can modify
Formation	Complex procedure, 3-6 months	Simple procedure	Simple and easy
Management	Formalities of Company Law have to be observed	Few restrictions imposed under the Act	Very few restrictions under the Act
Meetings	To be held as per provisions of law which are quite extensive	Annual Meeting as per law and Rules of the society	No provisions laid down
Penalties	Various offences and lapses attract severe penalties	Few offences and penalties have been prescribed	Very negligible
Legal status	Full legal status	Legal status with certain limitation	Legal status with limitation
Statutory regulation	Exhaustive but mature	Very limited	Nominal
Removal of members	Not possible without consent	Possible without consent	Not applicable
Dissolution or takeover by state	Very difficult	Possible	Possible

The main aim of the formation of FPC is to establish basic business principles within farming communities, to bring industry and agriculture closer together, and to boost rural development by the collectivization of the farmer's, especially small and marginal farmers. The collectivization of farmers also aims at capacity building, access to investments, technology, inputs, and markets and addresses many other challenges faced by the farming community.

Legal Provisions Governing the Producer Companies in the Companies Act

1. Memorandum of Association (MoA)

Helps to understand the nature of the company and its relationship with external environment

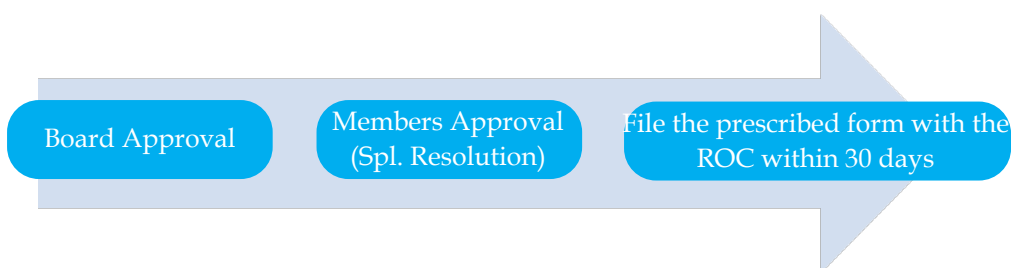
MOA consists of the following information.

- Name Clause – Should end with “Producer Company Limited”
- Situation Clause
- Object Clause
- Liability Clause
- Capital Clause
- Subscriber Clause
- Subscriber who shall act as Directors
- Territories of the operation and objectives extended

2. Articles of Association (AoA)

- AOA will provide the information regarding, who can be a member, their voting rights, appointment of Directors, CEO and chairman their duties and responsibilities, tenure in office and rotation and reappointment, usage of surplus funds in the company and relationship with other producer companies and institutions.
- The AOA also has the procedure for transferability of shares, cancellation of membership; ascertaining who is an active member, allotment of shares, the credit, loans or advances which may be granted to a Member and the conditions for the grant of the same. The members can also include any other condition by passing a special resolution.

3. Amendment of MoA & AoA



4. Membership and Voting Rights

- There shall be only a single vote for every Member irrespective of his shareholding. If the member is an institution, then the voting will be based on their participation in the Business.
- Any Producer Company may, if so authorized by its articles, restrict the voting rights to active Members, in any special or general meeting.

5. Patronage bonus

- Every member can receive in the form of cash or shares from the company for the products they provide to the company.
- The company can Issue patronage bonuses to the members who have participated actively in the company other than normal dividends usually paid.
- Patronage bonus can be either in a way to cash or Shares.

6. Loans to members, directors and their relatives:

- Loan to members shall be given only after the board approves. If the loan is given to a member for business purposes, it should not be for a period exceeding 6 months. Secured loans to a member shall be for a minimum of 3 months and a maximum of 7 years.
- Loans to any Director or his relative shall be given only after the members approval in a general meeting.

7. Option to inter-state co-operative societies to become producer companies

- Any inter-state co-operative society with objects not confined to one State may make an application to the Registrar for registration as a Producer Company.
- On conversion the society name will be removed from the books of the society registrar and will be registered as a producer company under the companies Act.
- All the rights, benefits, receivables, liabilities, legal proceedings, grants, concessions, licenses etc. will be deemed to be the rights, benefits, receivables, liabilities, legal proceedings, grants, concessions, licenses etc. of the producer company.
- All the employees remain the same including benefits.

8. Investment in other companies

- A producer company can invest in any other company after the members approve such investment through a special resolution.
- However when a producer company invest in a non-producer company, it can only invest up to 30% of its paid-up and free reserves, further investment in such non-producer companies will require central government approval.

9. Annual Compliance

- Every year the company has to file following:
- Annual accounts – With the Registrar of Companies (ROC) within 30 days from the conclusion of the Annual General Meeting (AGM)
- Annual Return – With the ROC within 60 days from the conclusion of the AGM
- Event based filing with ROC.
- The company is also required to maintain all records including its statutory register and Minutes book up to date to avoid penalty.

10. Charges

- Whenever the company borrows funds from NABARD or any financial institution by giving security, it is required to create a charge on the movable or immovable property which is given as security.
- Intimation Within 30 days to ROC in Form CHG 1.
- Charge can/has to be modified in case of any increase or decrease in limits.
- Once the charge is satisfied the company has to intimate it to the ROC within 30 days in the form CHG 4.

11. Dispute Settlement

- As per section 581ZO of the Companies Act, any dispute between the Directors or members or a combination of Both or another stakeholder of the company with such producer company shall be resolved only through conciliation or by arbitration as provided under the Arbitration and Conciliation Act, 1996 (26 of 1996).

12. Management of Producer Company

Level-1	• Board of Directors (They manage day today activities of the company)
Level-2	• Equity shareholders (members are actual owners of the company)
Level-3	• CEO and Managing Directors
Level-4	• Head of the department
Level-5	• Staff
Level-7	• Sub-Staff

13. Number of Directors

- Min – 5 and Max – 15
- Exception – Interstate co-op can have more than 15 directors for a period of one year from incorporation.

14. Appointment

- First Directors – members signing the MoA and AoA
- Elections to be conducted within 90 days of registration for electing new Board of Directors and within 365 days in case of Interstate co-op

15. Vacation of Office of Directors

Personal criteria

- Convicted by Court for moral turpitude and sentenced to imprisonment for not less than 6 months
- Defaults in payment of loan taken from PC in which he is Director

16. Official capacity

- The PC in which he is director:
- Defaults in repayment of loans and default continues for more than 90 days

- Not filed annual accounts/returns – continuous 3 FY
- Failed to repay deposits/withheld price or patronage bonus / interest / pay dividend – continues for 1 year
- Defaults in holding election for the office of director
- AGM / EGM not called according to provisions of the Act – exceptions of natural calamity or other reasons.

17. Powers & Functions of Board

Board can limit – Act & AoA

1. Board can decide extent of dividend payable
2. It can take a decision on inclusion of new members
3. Formulating objectives and strategies
4. Appointment/superintendence/control of CEO & other officers
5. Make sure the books of accounts are maintained properly; Prepare annual accounts (present in AGM with Auditor's report & reply to qualifications)
6. Buy and sell properties in the ordinary course of business
7. Investment of funds in the ordinary course of business
8. Sanction loans to members not being the directors or his relatives.
9. Other such acts – in discharge of its functions/exercise its powers
10. Approval of budget and adoption of annual accounts
11. Approval of patronage bonus
12. Issue of bonus shares
13. Declaration of limited return & distribution of patronage
14. Conditions and limits of loans to Directors
15. Matters specified by AoA

18. Liability of Directors

- Any act done in contravention of Act/law/ AoA – jointly & severally liable
- Producer Company can recover from Director
- Profit made as result of above mentioned contravention
- Loss incurred by PC as a result of such contravention
- Additional liability

19. Committee of Directors

- Purpose – assist the Board
- No delegation of Board's powers or assign CEO's powers
- Member can be included with permission of Board
- Should include CEO / Director
- Under control of Board for a period determined by the Board
- Fee / allowance – determined by the Board
- Minutes placed before the Board

20. Frequency Meetings of Board

Once in every three months and at least four meetings should be conducted every year

Illustration:

Date of Meetings	
Jan-Mar	: 27th March
Apr-June	: 08th April
July-Sept	: 02nd Sept
Oct-Dec	: 04th Oct

- Notice in writing – given by CEO – 7 days in advance – to Directors in India at address in India
- Quorum – 1/3 of total strength – min of 3
- Fees/allowance for attending meeting – decided by Members in GM

21. Chief Executive Officer – governed by section 581W

- Appointment is mandatory and on full time basis
- CEO will be other than Members
- Ex officio Director and not retire by rotation
- Qualification/experience/terms & conditions of appointment – determined by Board
- Entrusted with substantial powers of management
- Under general superintendence, direction and control of Board
- Accountable for the performance of the PC

a) Powers of CEO in FPOs

- Manage affairs of Producer Company
- Operate/authorize to operate bank account
- Safe custody of cash/assets
- Sign docs as authorized by the Board
- Maintain books of accounts, prepare annual accounts, present audited accounts to Board & Members in AGM
- Inform Members about operations & functioning of PC
- Make appointments subject to delegated powers
- Assist Board in formulation of policies / objectives / strategies
- Advise Board on legal & regulatory matters
- Exercise powers required in ordinary course of business
- Any other functions / powers as delegated by the Board

DIRECTOR Vs CEO Comparison

Nature	Director	CEO
Appointment	By members	By Board
Tenure	Not less than 1 year and not more than 5 years	Determined by Board
Retirement	By rotation in AGM & eligible for re-appointment	Does not retire by rotation. Tenure determined by the Board
Scope	Limited by AoA & Act	Limited by terms and conditions specified by Board
Vacation of office	Contravention to provisions of the Act / AoA	As provided in terms of appointment
Accountability	Representative of interest of Members.	Entrusted with substantial management powers

22. General Meetings

- Mandatory every year and gap of not more than 15 months between two AGMs subject extension given by ROC (except for 1st AGM) – not more than 3 months
- First AGM – within 90 days from incorporation
- Resolution – Ordinary and Special
- Ordinary – simple majority
- Special – 3 / 4th of the Members present and voting

a) Notice for AGM

- Not less than 14 days prior notice
- During business hours on a day other than public holiday – at registered office or any place in city / town / village where registered office is situated
- Contents of notice should include date , time and place
- Addressed to – every member & auditor
- Annexure's to notice

Capacity Building of Members of FPOs/FPCs

Gradual growth inducing sustainability in the functioning growth of the FPOs/ FPCs should be the approach of the promoters rather than expecting the quick results. Capacity Building of any form of farmer organization assumes greater importance to enhance the efficiency and bring peer group pressure among members of the group to effective functioning. The role of promoters is crucial in orienting and capacity building of these organizations. Just introducing the aggregation of members or formation of groups will not serve the purpose. Capacity building for promotion of leadership and motivation among the elected Board of Directors is crucial. The members of the Executive Committee should be given training in Leadership, federation concept, federation Management, financial Management, linkages, input and output management etc. It is also equally important to build the capacity of grass root functionaries i.e. members of FPCs/FPOs. Capacity building of members on issues such as attendance of at least 80-85% members, transparency in accounts, accountable behavior, regular internal auditing, quality management, development of business plan including access to local and international market, etc. The entire philosophy of human capacity building is to encourage rural communities to understand their personal and group styles of managing themselves and to improve their

planning, implementation, and monitoring skills. Capacity Building is also given in (a) understanding the PC rules and regulations, (b) statutory requirements to the RoC, (c) business plan of the PC, (d) Government schemes, (e) leadership, (f) basic accounting and record keeping and several such aspects as the need is felt (Paty and Gummagolmath, 2018).

Policy Support for Capacity Building

SFAC is supporting these FPOs through empanelled Resource Institutions (RIs), which provide various inputs of training and capacity-building, and linking these bodies to input suppliers, technology providers and market players. The investment in the capacity of FPOs will be spread over years. SFAC is also monitoring the project on behalf of DAC and the states and reporting on its progress.

Credit Support by NABARD is also available for capacity building & market interventions. Capacity building should broadly cover any activity relating to the functioning of a producer organization. Broadly the various types of capacity building initiatives which can be supported under the fund are as follows:

- Skill development in order to enable the members produce goods both in farm and non-farm sector,
- Business planning
- Technological extension through classroom training,
- Exposure visits, agricultural university tie ups, expert meetings, etc.
- Any other capacity building initiative which directly benefits the P.O.

Strategy Paper for promotion of 10,000 Farmer Producer Organizations (FPOs)

Aims and Objectives of the Scheme

1. To provide holistic and broad-based supportive ecosystem to form new 10,000 FPOs to facilitate the development of vibrant and sustainable income oriented farming and for overall socio-economic development and wellbeing of agrarian communities.
2. To enhance productivity through efficient, cost-effective and sustainable resource use and realize higher returns through better liquidity and market linkages for their produce and become sustainable through collective action.
3. To provide handholding and support to new FPOs up to 5 years from the

year of creation in all aspects of management of FPO, inputs, production, processing and value addition, market linkages, credit linkages and use of technology etc.

4. To provide effective capacity building to FPOs to develop agriculture entrepreneurship skills to become economically viable and self-sustaining beyond the period of support from the government.

Strategy for Formation of FPO and Identification of Cluster Area

Formation and promotion of FPO is based on the Produce Cluster Area, which is broadly defined as: "Produce Cluster area" for purpose of FPO formation and management herein means a geographical area wherein agricultural and allied produce is grown / cultivated; therefore, an FPO can be formed for leveraging economies of scale in production and marketing. This will also cover Organic Produce and Natural Farming. Produce cluster area is to be identified with the input of District Level Monitoring Committee (D-MC), State Level Consultative Committee (SLCC), other Ministries/Departments of Government of India and the States as well as with recommendations of Implementing Agencies with the input from Cluster- Based Business Organization (CBBO) and suggestions of relevant Government of India Organizations.

Regulatory issues faced by the FPCs and Suggestions for favourable regulatory eco-system FPCs;

- a. The Producer Companies Act 2002 envisions PCs as businesses with a potential to grow and sustain. However, most PCs face multiple challenges such as: small number of shareholders, low procurement volumes, sub-scale operations, limited value addition capabilities, poor Market linkages, inability to attract talent and lack of strategic thinking and planning (Valamannavar, 2019).
- b. Policy framework needed to overcome these challenges and considerations in envisioning, promoting and supporting PCs.
- c. A simple legal approach to address issues is the need of the hour for the overall health of PCs
- d. Promote producer companies in a two-tier model at a block or district level, collectively handling multiple commodities and value-addition and marketing
- e. A two-tier model also facilitates procurement and value-addition of multiple commodities better than a single-tier model

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- f. Producer Companies Act 2002 to allow PCs to raise external capital through a different class of shares with no voting rights, and with restrictions on the maximum amount of equity per external investor
 - g. To help create such structures, and practitioners should adopt a two-pronged PC promotion strategy
 - h. bring in business expertise from social enterprises, start-up incubators, funding agencies and entrepreneurship-oriented fellowships to with adequate talent and skill
 - i. A separate identifier be created in the Company Identification Number (CIN) for producer companies as CIN is the same with joint stock companies in other sectors
 - j. This will help in tracking and regulation of producer companies
 - k. Data on producer companies should be made available to researchers and practitioners to better inform the design of future policies and interventions.
 - l. Access to reliable data is also important for regulatory purposes for introducing differentiated regulatory requirements for different categories of companies
 - m. Compliance requirements for producer companies should be re-examined keeping in mind the context and capabilities of small producers
 - n. Regulations can be modified either by amending company regulations to allow exemptions for PCs from certain requirements and/or by creating PC specific rules
 - o. The Ministry of Corporate Affairs (MCA) should explore the possibilities of differential compliance requirements for PCs
 - p. Lower registration charges should be there for registration of FPOs
 - q. Compliance filings such as director registration and geotagging should be simplified and wherever possible be allowed to be submitted in paper form
 - r. The policy should offer protection for shareholders, similar to SEBI's provisions for shareholder protection in publicly traded companies as the producers are neither aware of their rights nor implications of final decision
 - s. PC shareholders should be recognized as a separate category whose rights must be protected through stronger governance and regulatory mechanisms by amending relevant sections of the Companies Act 2013.

- t. To address the issue of undercapitalization, the Companies Act 2002 should be modified to enable the infusion of external equity through a different class of shares with no voting rights.
- u. To minimize the potential for undue influence of external investors, restrict the maximum amount of equity per external investor relative to total farmers' equity

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Assessment of Edu-Communication Strategies in Agricultural Extension Services Delivery on Adoption of Improved Sesame Production Practices in Niger State, Nigeria

Ibrahim M.

ABSTRACT

The study examined edu-communication strategies used by agricultural extension service agencies in the dissemination of improved sesame production practice among sesame farmers in Niger State Nigeria. Two hundred and Eighty (280) sesame farmers were sampled and structured questionnaires along with discussion guide were used to elicit primary data from respondents. The Primary data were collected and analysed with SPSS 16.0. The results showed that, mean age was 35years. The majority (61.4%) were male, and 85.7% were married. Additionally 71.4% had no formal education. Audio-visual aids and face-to-face contact ranked 1st and 2nd among edu-communication strategies deployed by extension agents. Traditional town criers ($\bar{x}=3.9$) and market square announcements ranked 1st and 2nd as a major indigenous tools used in disseminating improved sesame production practices. The Innovative edu-communication strategy exposes sesame farmers to the types of chemicals to use in their farms ranked 1st and the quantity of seed used by sesame farmers to cultivate a hectare of farm land was made known by AEOs ranked second in terms of Respondents' perception on the role of edu-communication strategies on adoption. Majority (71%) of the respondents view farmer's field visits by AEOs as the most important medium that have effects on the adoption behaviour among sesame farmers. Low educational status ($\bar{x}=3.36$) ranked first indicating that their low educational backgrounds significantly impedes their understanding and subsequent adoption decision. It was recommended that western education in addition to indigenous knowledge should be pay more emphasis to broaden their knowledge of agriculture extension services approaches for the high rate of adoption.

Key words: Agricultural Extension, Entertainment-Education, Sesame

Department of Agricultural Extension and Rural Development
Federal University of Technology, Niger State, Nigeria
Corresponding Author Email: m.ibrahim@futminna.edu.ng

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Introduction

Agricultural communication is the effective transfer of improved agricultural technological innovations from technology generating institutions to the ultimate users (Ibrahim et al., 2018). Education is a process of training individuals or group of individuals to develop positively mentally, physically, morally, socially, politically and technologically (Onwubuya et al., 2015). This means that communication and education are uniquely interrelated. A common argument that runs through the literature is that, one of the concepts cannot occur without the other. One central argument that was established from the literature is that communication and education are intertwined and remain essential components for extension service delivery in rural agricultural communities of developing countries. Effective communication is a pre-requisite to every aspect of human society. Communication, therefore, as it was used in this study connotes the joint transmission and exchange of ideas, opinions and information through networks and symbols commonly understood by the individuals involved in the communication process (Hovland, 2005; Stone, 2002 and Onwubuya et al., 2015).

To adopt and use improved farm techniques and technologies in sesame farming efficiently and shift attention from the traditionally known crops farmers produced to modern cropping system, they must comprehend the complex scientific knowledge of sesame farming. This requires an effective platform for dialogue, the exchange of knowledge and ideas in ways that can easily be understood and the sharing of new technologies in friendly environments between Agricultural Extension officers and farmers or farmer groups. Consistent with the foregoing arguments, Adereti and Ajayi (2005) conclude that extension education transcends only teaching and securing the adoption of an improved practice, but also largely consist of transforming the outlook of the farmer and encouraging an effective initiative that can improve the living standards of the farmer and the farmer households. From these perspectives, therefore, AEOs consider education and communication as the to most significant service delivery tools for rural farmers.

The literature generally delineates entertainment-education as one of the core strategies of Edu-Communication. Entertainment-education involves the use of entertainment as a communicative practice strategically designed to communicate development issues in ways that can range from the more narrowly defined social marketing on individual behaviour to the liberating and citizen-driven articulation of social change agendas (Dutta, 2006). Effective use of entertainment-education in the adoption process of an innovation has

managed to transcend traditional dichotomies and is found to be a strategic tool in the diffusion and adoption of innovations processes especially among farmers from poorer communities.

For the purposes of this study, the study examined the core tools of entertainment-education including but not limited to radio drama, field demonstrations, audio-visual aids and local drama that has been in use as extension facilities to aid adoption by AEOs in the study area. These tools are examined in relation to their use in the promotion of adoption of good production practices and innovations among sesame farmers and farmer groups in Katcha and Lapai LGAs. This study, therefore, investigates the use of edu-communication strategies, including entertainment-education, in the dissemination of educational, innovation and pro-social messages on production to sesame farmers in Katcha and Lapai LGAs. It also examines the structural barriers that impede the use of edu-communication as a medium for dissemination and its resultant effects on adoption among sesame farmers.

Specifics research objectives are to

- Examine socio-economic characteristics of the respondents
- Identify the edu-communication tools AEOs use in the adoption process to sesame farming.
- Ascertain the role edu-communication play in the adoption of improved sesame production practice.
- Examine how existing indigenous strategies complements modern edu-communication strategies in the adoption process of improved sesame production practices and.
- Determine the barriers that hindered the use of edu-communication strategies in the adoption of sesame farming innovations.

Methodology

The study was conducted in Katcha and Lapai Local Government Area (LGAs) of Niger State due to the prevalence of sesame farmers. The target population for the study were sesame farmers. There are 2,114 registered sesame farmers under Katcha and Lapai LGAs. A multistage sampling technique was used to select respondents for the study. First, the LGAs were zoned based on the extension blocks. The LGAs comprised seven Extension Blocks (EB); Lapai, Gulu, Azza, Badeggi, Katcha, Kataeregi and Bisanti. Purposive sampling was then applied to each blocks to select the extension cells where sesame farming innovations were deployed. Finally, a simple random sampling technique was

used to sample forty (40) sesame farmers from each block giving a total of two hundred and eighty 280 sesame farmers. Moreover, Seven (7) locally trained AEOs from each of Extension Blocks (EB) were purposively sampled for FGDs because they were directly involved in deploying innovations to sesame farmers in their respective Blocks. Seven Block Extension Supervisors (BES's) were also purposively sampled for the study as key informants (KI) due of their special knowledge in designing training manuals, innovative materials and providing skills training for the AEOs who are involved in the deployment of innovations to sesame. A Mixed methods of research design that allowed the use of survey, interviews and focus group discussions in gathering data for the study was used. Structured questionnaire with four-point Likert scale type of questions was used in collecting data from 280 Sesame farmers sampled. The four-point Likert scale was weighted from 4 strongly agree (SA), 3 agree (A) 2 disagree (D) and 1 strongly disagree (SD). The interpretation is that any mean score below 2.5 read as not an important communicative strategy and above 2.5 as important communication strategy. Focus group discussions were held with 49 AEOs who were put into 7 Blocks consisting of 7 officers each. Key informant interviews were conducted with 7 BES's in the study area. Percentages, frequency counts and mean scores were used for the data analysis using SPSS 16.0.

Result and Discussions

Socio economic characteristics of respondents

Table 1 reveals that the mean age of the respondents was 35 years. This indicates that they are within the active age to withstand risk of adopting new practices. This signifies that the respondents for the study are relatively young in age. Age is an important variable in innovation adoption because of its significant influence on people's behaviour, attitude, adaptation to skills and aspirations (Okolo, 2004). The age of the respondents could be highly responsive to edu-communication strategies deployed by AEOs in connecting with farmers. This youthful active age bracket explains the preparedness of respondents to adopt various edu-communication strategies. The data shows that majority (61.4%) Sesame farmers were male, this corroborates with Wongnaa (2013) who found similar biographic data in his study. The result indicates that more men than women are involved in sesame production. Majority (85.7%) were married. This result corroborate with Khan (2010) who argued that married people have more family burdens and obligations and are therefore less mobile when compared to people who are not or are yet to be married. Married farmers are in a better position to make sesame innovation adoption decisions since they are most likely to be independent from external influence. A Majority (71.4%) had no formal education indicating they did not have any form of formal education. This

implies that AEOs need to adapt user-friendly and enticing edu-communication strategies in the dissemination of innovations particularly the use of local language. Thus, low levels of education tend to foster unfavorable attitudes towards the acceptance of improved innovative farm practices (Momodu, 2010).

Table 1: Distribution of respondents according to socio-economic characteristics (n=280)

Variables	Frequency	Percentage	Mean
Age (in years)			
0-20	60	21.4	35
21-40	90	35.7	
41-60	100	32.2	
>60	30	10.7	
Gender			
Male	172	61.4	
Female	108	38.6	
Marital Status			
Married	240	85.7	
Single	40	14.3	
Level of Education			
Formal	80	28.6	
No Formal	200	71.4	

Source: Field survey data, 2022

Edu-communication strategies deployed by AEOs in LGAs

Table 2 reveals Edu-communication strategies used by AEOs in the dissemination process indicate that audio-visual aids comes top with 35.7% and face to face interaction between AEOs and sesame farmers follows with 21.4% as the most frequently used edu-communication tool in technology dissemination to Sesame farmers. Audio-visual aid strategy was the most preferred communication strategy by AEOs because respondents were entertained and at the same time educated without any hitches. These findings corroborates with Brown (2015) and Arroyave (2018) who emphasized on the effects of edu-entertainment on public discourse on the adoption of new practice and indicated that enter-education messages produced measurable knowledge, attitudinal and behavioural changes in audiences (Brown, 2015; Arroyave, 2018). Increasingly, audio-visual aids are becoming critical tools for the delivery of extension services in developing communities like Nigeria.

Table 2: Edu-communication strategies deployed by AEOs in the adoption process (n=280)

Tools/ Strategies	Frequency (F)	Percentages (%)	Ranks
Audio-visual aids	100	35.7	1st
Face to face	60	21.4	2nd
Demonstration	50	17.9	3rd
Group discussion	40	14.2	4th
Local radio	16	5.7	5th
Leaflets	10	3.8	6th
Lectures	4	1.3	7th

Source: Field Survey data, 2022

Table 3 reveals that edu-communication strategies resonates with sesame farmers in deprive communities. The variables that ranked 1st 2nd and 3rd were; the role of edu-communication in exposing sesame farmers to the use of right chemicals in treating diseases in sesame field ($\bar{x}=3.86$); The quantity of seed used by sesame farmers to cultivate a hectare of farm land was made known by the edu-communication interaction with AEOs ($\bar{x}=3.64$); Edu-communication strategies used by AEOs help sesame farmers to adopt improved sesame seed ($\bar{x}=5.61$). This mean that these three variables were the most agreeing to in terms of perception while Sesame farmers are expose to sources of capital to expand their farm hectares through interactive process with AEOs. Ranked 7th with the mean below cut off point ($\bar{x}=2.28$). It is, however, not surprising that the issues of farm credit are not well captured in the curriculum of extension services even though it plays a significant role in smallholder agricultural development. Lack of access to farm credits and inputs constitutes a threat in some extension literatures (Hananu et al, 2015; Dzadze et al, 2012). The implication of these high scores across all the 6 variables is that enter-education strategy is useful in the promotion of skills development and innovation sharing. Enter-educate further has unintended positive effects due to uncontrolled variables. The literature on enter-education is unanimous that enter-educational messages produces measurable knowledge. Brown (2015) and Arroyave (2018) argue that effective edu-communication strategies have led to attitudinal and behavioural changes in audiences.

Table 3: Respondents' perception on the role of edu-communication strategies on adoption (n=280)

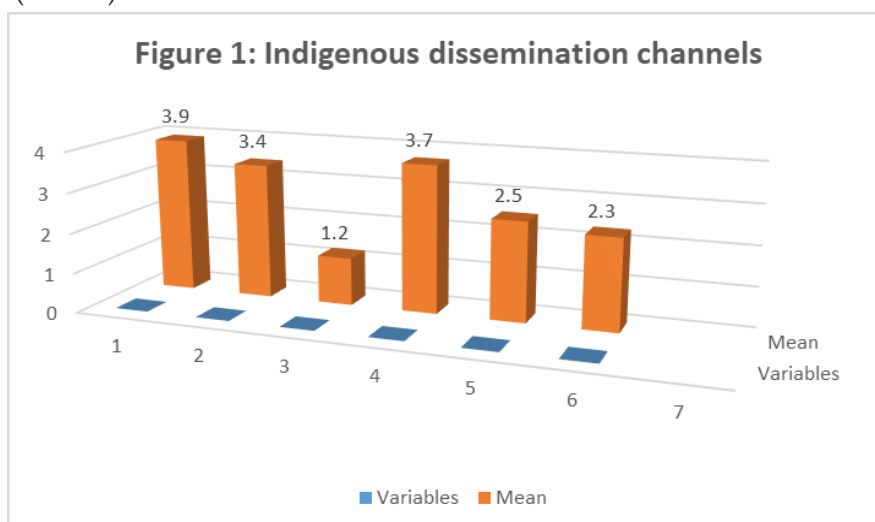
Variables	SA*4	A*3	DA*2	SD*1	WS	WM	D	Rank
Innovative edu-communication strategy has expose sesame farmers to the types of chemicals to use in treating insects and diseases affecting their farms	240	40	-	-	1080	3.86	A	1st
The quantity of seed used by sesame farmers to cultivate a hectare of farm land was made known by the edu-communication interaction with AEOs	220	30	20	10	1020	3.64	A	2nd
Edu-communication strategies used by AEOs help sesame farmers to adopt improve sesame seeds	200	60	16	4	1016	3.63	A	3rd
The edu-communication strategies used by AEOs in this LGAs were participatory and satisfactory	160	80	30	10	950	3.39	A	4th
Effective edu-communication has influence sesame farmers to adopt improved sesame farming technologies	80	180	20	-	900	3.21	A	5th
Edu-communication strategies have led to the regular use of television, flyers, radio programming, traditional durbars as the most popular mass media tools to adopt innovative sesame farming technologies	46	134	20	80	706	2.52	A	6th
Sesame farmers are expose to sources of capital to expand their farm hectares through interactive process with AEOs	16	50	210	4	638	2.28	D	7th

Source: Field survey data, 2022

Keys: SA=Strongly Agree; A=Agree, D=Disagree; SD=Strongly Disagree

Indigenous dissemination channels and modern edu-communication strategies in adoption processes

Figure 1 reveals that examination of how existing indigenous dissemination strategies are complemented with the modern edu-communication strategies of the AEOs in the adoption processes of sesame innovations. To achieve objective three, three key variables were examined. First is the analysis of the effectiveness of existing indigenous dissemination channels in the adoption process. These channels were identified through Key Informant Interviews (KII) during Focus Group Discussion (FGDs) with the AEOs. Six strategies were identified as indigenous ways of disseminating innovations in sesame production. These are the traditional town criers, local drama, folktales, market square announcements, traditional village meetings and group discussions. From the analyses of the data obtained from the sesame farmers, traditional town criers had a mean ($\bar{x}=3.9$), an indication that it was the most effective indigenous dissemination strategy that had significant impacts on the adoption of improve sesame practices. Market square announcements of innovation had mean ($\bar{x}=3.7$).



The effect of edu-communication on the adoption of good sesame production practices. The study examined three categories of modern edu-communication strategies deployed in farming communities during extension service delivery. These categories are mass media communication, interpersonal communication and small group communication strategies. These categories and the edu-communication tools in each category were examined to determine which categories and tools had the effect on adoption most and what the implications were for extension service delivery in Niger State. Edu-communication

approaches that rely on the use of mass media communication tools including local radio broadcasting, television, audio-visuals, leaflets and newspapers, audio-visuals were adjudged as the tool that significantly had effect on sesame farmers adoption behaviour because 50% of respondents expressed the view that AEO's use of audio-visual aids facilitate the adoption of innovation among sesame farmers. This means that audio-visual aids are cardinal tool for extension services in sesame production. This finding is in line with Van et al (2007) who found that audio-visual aids play a flexible role in extension and farmer education; and can be used or modified as one sees fit and can have a greater or lesser effect. Interpersonal communication as an edu-communication strategy affects adoption of improved sesame farming practices among sesame farmers. The data indicate that majority (71%) of the respondents view farmer field visits by AEOs as impactful on adoption behaviour among sesame farmers. The farmers indicated that farmer field visits do not only promote adoption of good sesame production practices, but also, contribute to increase in farm yields. Small group communication approach came second to interpersonal communication approaches with a cumulative mean value score of 35 ($\bar{x}=35$). This means that small group communication approaches impact on sesame farmer's adoption behaviours and decisions more than mass media communication approaches, but are behind interpersonal communication approaches. According to the farmers, they learn more useful innovation adoption practices when just a small group of sesame farmers are brought together to share ideas and experiences about an innovation.

Table 4: Effects of edu-communication strategies on the adoption improved sesame production practices

Edu-communication strategy	Frequency (n=280)	Percentage	Mean ($\bar{x}$)
Mass media communication			
Local radio	80	28.6	28
Television	50	17.9	
Audio-visual aids	140	50	
Leaflets	10	3.6	
Interpersonal communication			
Farm visit	200	71.0	46.7
Meeting	16	6.0	
Home visit	64	23.0	

Small group communication			
Farmer group discussion	120	42.9	35
Field demonstration	100	35.7	
Workshop	20	7.1	
Agriculture shows	40	14.3	

Source: Field Survey data, 2022

Barriers to edu-communication strategies in the adoption of improved sesame production practices

Economic factors, ethnic considerations, religious factors, educational status and gender dimensions were the five main variables that were examined to see how each impedes the successful implementation of edu-communication approaches in extension service delivery. Table 6 reveals that education, economic and religious factors are significant considerations in the choice of an edu-communication approach to extension service delivery. Educational status had the mean of ($\bar{x}=3.36$) and rank 1st indicating that their low educational backgrounds significantly impedes their understanding and subsequent adoption decision. This means that for AEOs and BESs, educational levels of farmers should be considered when designing edu-communication strategies for extension work for higher rates of adoption. These results are in contrast with Ibrahim (2015) who found in a study on the role of farmer groups network in the adoption of selected technologies in the Upper Mgeta Morogoro. Economic factors and religious considerations were next factors with the mean of ($\bar{x}=2.79$) and ($\bar{x}=2.55$) which ranked 2nd and 3rd with the statement that “economic factors impede the use of edu-communication strategies” and “religious factors impede the use of edu-communication strategies by AEOs” in extension service delivery respectively. From the interviews, the BESs disclosed that much consideration is given to affordability when deciding on a strategy to use for extension education. Ethnicity ($\bar{x}=1.86$) and gender ($\bar{x}=1.28$) dimensions were not significant because their mean value were below the cut-off mean the statements “ethnic factors impede the use of edu-communication strategies by AEOs” and “gender issues impede the use of certain edu-communication strategies in innovation dissemination and adoption” respectively. This means that while the ethnicity and gender of farmers are considered when designing edu-communication strategies that promotes adoption of good sesame production practices, the two factors neither impedes nor influence farmer’s decision.

Table 5: Constraining Factors hindering edu-communication strategies by AEO's (n=280)

Barriers	VS*4	S*3	UD*2	NS*1	WS	WM	D	Rank
Economic factors impede the use of edu-communication strategies	120	110	30	20	780	2.79	S	2nd
Ethnic factors impede the use of edu-communication strategies	40	20	80	140	520	1.86	NS	4th
Religious factors impede the use of edu-communication strategies	30	154	36	60	714	2.55	S	3rd
Level of education is a factor that impedes the use of some edu-communication strategies in innovation adoption processes	160	80	20	20	940	3.36	S	1st
Gender issues impede the use of certain edu-communication strategies in innovation dissemination and adoption.	10	30	60	180		1.28	NS	5th

Source: Field survey data, 2022

Key:VS=Very severe, S=Severe, NS =Not severe

Policy Implications

In view of the major findings it was recommend that enter-education as an approach of extension service should be strengthened since it has great potentials of influencing behavioural change and increasing adoption decisions among farmers. Other approaches including audio-visual aids, face to face interaction, local radio broadcasting, farmers group discussions and farmer field demonstrations must be intensified by AEOs since these tools enhances adoption of good sesame farming practices. Finally, the integration of indigenous edu-communication approaches into modern edu-communication strategies in the promotion of adoption. This will not only foster better understanding of innovations or technologies being promoted, but will reduce the cost of designing, producing and promoting innovations by the BESs and the AEOs on the one hand, and in procuring extension services by the farmers in rural communities who are already living in poverty and cannot afford the high cost of agriculture extension services delivery.

Conclusion

The study concludes that various edu-communication strategies were used by AEOs in the Katcha and Lapai LGAs to promote the adoption of good Sesame production practices among 280 Sesame farmers sampled across 7 Extension Block (EB). The role of edu-communication strategies in promoting adoption was established and how existing indigenous dissemination strategies complements modern edu-communication strategies was examined. The study illustrates the role of edu-communication approaches in innovation adoption in two LGAs. The study examines the effectiveness of indigenous dissemination strategies in promoting adoption among farmers and particularly locates the relevance of the use of local language in promoting adoption of innovations among non-educated farmers.

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Acceptability of PGDAEM Distance Program Among Extension Professionals in India

Ms.S.L.Kameswari¹, Dr.Veenita Kumari² and Ragini Modi³

ABSTRACT

Distance education, or distance learning, is an educational approach that relies on the Information technology, and instructional systems that plan to provide learning to students who are physically not present in a class room setting. Instead of attending courses personally, teachers and students communicate at times of their convenience and choosing and exchange printed or electronic materials through any suitable technology. Distance education is becoming more and more demanding in the recent times as the latest techniques and technologies can be easily spread to the farthest part of the world easily and connect between organizations as well as the universities to collaborate in different fields. Distance learning will remain as part of e-learning , web based learning through virtual classrooms and digital teamwork, where contents will continue to be delivered through internet, audio, video tape, and conferencing through video; satellite and etc. (Hedge 2004:128-145)

The National Institute of Agricultural Extension Management (MANAGE) established in 1987, is an apex level autonomous institute under the Ministry of Agriculture & Farmers Welfare, Government of India. MANAGE is the Indian response to challenges of agricultural extension in a rapidly growing and diverse agriculture sector. Realizing the paramount importance of public and private extension system, MANAGE has launched a one-year Post-Graduate Diploma in Agricultural Extension Management (PGDAEM) in distance learning mode during 2007, under the Centrally Sponsored Scheme "Support to State Extension Programme for Extension Reforms." This study conducts, a feedback analysis to assess the effectiveness and the constraints faced by the SAMETIs and candidates in the PGDAEM Program.

The study employed a detailed survey designed as an appropriate tool to generate the vital facts of the people under study. Conducted online and data was collected online by inviting educators to fill the online questionnaire, irrespective of the geographical

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1. Consultant, National Institute of Agricultural Extension Management (MANAGE), Hyderabad.
 2. Deputy Director (Gender Studies), National Institute of Agricultural Extension Management (MANAGE), Hyderabad.
 3. PhD Research Scholar, College of Home Science
- Corresponding Author Email: directoraem@manage.gov.in

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location. A set of questions were posted in Google form on issues such as the admission procedure, course fee, funds to the SAMETIs, sponsorship, assignments, project work, examinations, study material, evaluation, backlog policy, medium of instruction, monitoring process, honorarium to resource persons and coordinator, lodging and boarding, institutional charges and suggestions for improvements. As a result, it was found that the respondents expressed that PGDAEM Program is very useful for them to improve their skills in latest extension technologies and techniques in their field situation where they are working. They express and suggest that they need the study material in the colloquial languages, more number of classes for orientation about the program and time for contact classes. They opine that they require update of the latest knowledge time to time which is helped through PGDAEM. They feel only that the busy work schedule is a limitation for them to pursue PGDAEM Program.

Key words: PGDAEM, Extension Professionals, Distance Education, e-learning.

Introduction

Distance learning is not a substitute for formal education but rather an experience oriented education. The distance learning gives opportunity to the learners simultaneously with their profession on the field, through training and also helps in improvement of careers. It also contributes to the higher educational opportunities as well as helps to those who cannot leave their work and continue to pursue their higher studies in accredited or high standard universities or institutions for further development of their careers at their own convenience.

The information technology boom has facilitated many learners to proceed and the barriers are removed such as to connect them through online classes or write examinations, download the study material and go for study from the convenience of their homes or work place. This type of learning has become part and parcel of any formal organizations without any hassle of paying or applying for visa etc.

Still there are limitations in distance education like there will not be much physical contact or interaction among the learners, not much of placement options will not be there. It is a bit costlier than the formal education because there is a need of sophisticated equipment and services since it involved information technology. There is not much of spoken communication involved in the learning process. Only advantage is the employer's point of view is give due consideration as the workload will not be disturbed.

Distance education is becoming more and more demanding in the recent times

as the latest techniques and technologies can be easily spread to the farthest part of the world easily and connect between organizations as well as the universities to collaborate in different fields. (Hedge, 2004)

The National Institute of Agricultural Extension Management (MANAGE) established in 1987, is an apex-level autonomous institute under the Ministry of Agriculture & Farmers Welfare, Government of India. MANAGE is the Indian response to challenges of agricultural extension in a rapidly growing and diverse agriculture sector. The policies of liberalization and globalization of the economy and the level of agricultural technology becoming more sophisticated and complex, called for major initiatives towards reorientation and modernization of the agricultural extension system. MANAGE is involved in major initiatives towards reorientation and modernization of the agricultural extension system, for evolving effective ways of managing the extension system through professional guidance and training of critical manpower.

A strong, vibrant and responsive extension with an expanded mandate is a prerequisite for achieving faster, sustainable and more inclusive growth through agriculture and agricultural extension services need to assume new challenges and reform itself in terms of content, approach, structure and processes and their delivery and implementation.

There are around one lakh public extension functionaries in India. These extension functionaries shoulder a challenging responsibility in providing extension support to a large population of farmers. They can play a crucial role in addressing the serious concerns in Indian agriculture such as major percentage of small holding farmers, significant yield gaps, disparity in input usage and deterioration of natural resources. The public extension system is indispensable and needs strengthening to match the scale and diversity of agriculture in India. (MANAGE, 2022)

Besides this, there are a large number of private extension players like agribusiness companies, farmers' organizations, agripreneurs, input dealers, NGOs and cooperatives which complement, supplement, and partner with the public extension system at the grassroots level. There is a need to encourage and empower them through capacity building for improving their effectiveness in extension delivery system.

Realizing the paramount importance of public and private extension system, MANAGE has launched a one-year Post-Graduate Diploma in Agricultural Extension Management (PGDAEM) in distance learning mode during 2007 under the Centrally Sponsored Scheme "Support to State Extension Programme

for Extension Reforms.” The programme has completed fifteen years and the fifteenth batch is in progress. Over this period, more than 20,000 candidates from agriculture and allied sectors have been enrolled in PGDAEM. The PGDAEM being a unique intervention for strengthening the capacities of extension personnel, has gained a lot of interest and popularity in recent times.

Since its inception in 2007, the programme received full support of the Government of India (GoI) untill the Financial Year 2014-15. With effect from Financial Year 2015-16, the States are getting the support of the Department of Agriculture and Cooperation & Farmers Welfare (DAC & FW), Ministry of Agriculture and Farmers Welfare (MOA&FW), Govt. of India under Extension Reforms Scheme to the tune of 60%,90% and 100% for General States, North-Eastern States & three Himalayan States and Union Territories respectively. The remaining amount (matching share) 40% and 10% for the General States and North Eastern & three Himalayan States respectively, is contributed by the concerned State Governments.

The PGDAEM Program completed 15 years, and the admissions of the 16th batch are in progress. In this context, a feedback analysis is done online to understand the effectiveness and the constraints faced by the SAMETIs and candidates in the PGDAEM Program.

Objectives:

- To study the effectiveness of PGDAEM Program from MANAGE among the studied candidates in their work situation
- To realize the constraints in running and studying PGDAEM Program
- To extract suggestions for better implementation of the program

Methodology:

A google form was generated by the PGDAEM section for evaluating the effectiveness of PGDAEM and constraints faced by the SAMETIs and candidates who studied the program. It was conducted similar to a study to identify areas of strengths and weaknesses in universities in Spain during the pandemic. (García Peñalvo, 2021).

This current research was mainly based on collecting people’s beliefs, opinions, attitudes, motivation, and behaviors towards the PGDAEM Program using a survey design. A detailed survey was designed and adopted in the study as an appropriate tool to gather vital facts of the people under study. The study was conducted online, and data were collected online by inviting educators

to fill the online questionnaire, irrespective of the geographical location. A set of questions was posted in Google form on issues such as the admission procedures, course fee, funds to the SAMETIs, sponsorship, assignments, project work, examinations, study materials, evaluation, backlog policy, medium of instruction, monitoring process, honorarium to resource persons and coordinators, lodging and boarding, institutional charges and suggestions for improvement. The participants in the study were briefed about the purpose of the survey at the beginning and related consent. Responses were collected over a period of one month for which 60 respondents actively responded. Statistical tools such as frequency, percentage, mean and Mean Percentile Score (MPS) were used to analyzed the data.

Feedback forms link:

https://docs.google.com/forms/d/e/1FAIpQLSdZ8PCuyUH3OT2hGuhlo-XarI4G8jRAAEF-iP_grNWGzIzEqw/viewform

Results and Discussion:

The PGDAEM Program completed 15 years, and the admission of the 16th batch is in progress. Therefore, a review of the functioning and implementation of the programme, review of the structure of the study material and knowledge gained from the course material was done to attain feedback from the SAMETIs of all the states to assess the effectiveness of the programme at the field level. The respondents were requested to fill a Google form generated by PGADEM section, MANAGE in order to extract feedback about the PGDEAM Program in order to understand whether the programs' objectives were achieved. A link was sent to the SAMETIs to send their feedback regarding the programme, which ran over fifteen years and submitted the information.

Out of all the SAMETIs, 60 percent responded immediately and the remaining SAMETIs could not answer due to various reasons such as

- Limited staff in the SAMETI
- Lack of understanding regarding the issues that are included in the form.

The results and Discussion were presented under headlines as follows:

- i. General profile of PGDAEM Course and Candidates
- ii. Effectiveness of PGDAEM Program
- iii. Constraints in running and studying PGDAEM Program
- iv. Suggestions for better implementation of the program

I) General Profile of PGDAEM Course and Candidates

1. Sector-wise coverage of PGDAEM candidates

The sector wise coverage of PGDAEM course covered candidates from first (2014-15) batch to 14th batch (2021-22). It was evident from figure 1, that more (43.00%) number of candidates, were from ATMA institutes, followed by 35% were from the Agriculture sector, 12% from Animal husbandry and rest from SAUs, KVK, SVASUs, Horticulture, Fisheries, Forestry and other sectors such as cooperatives, banks, NGOs, coffee, rubber, tobacco, spice, Dairy boards and ICAR institutions. Another SAMETI opined that it was not suitable for veterinary personnel. They also expressed that they were too busy and, were unable to spare much time for the studying the study material.

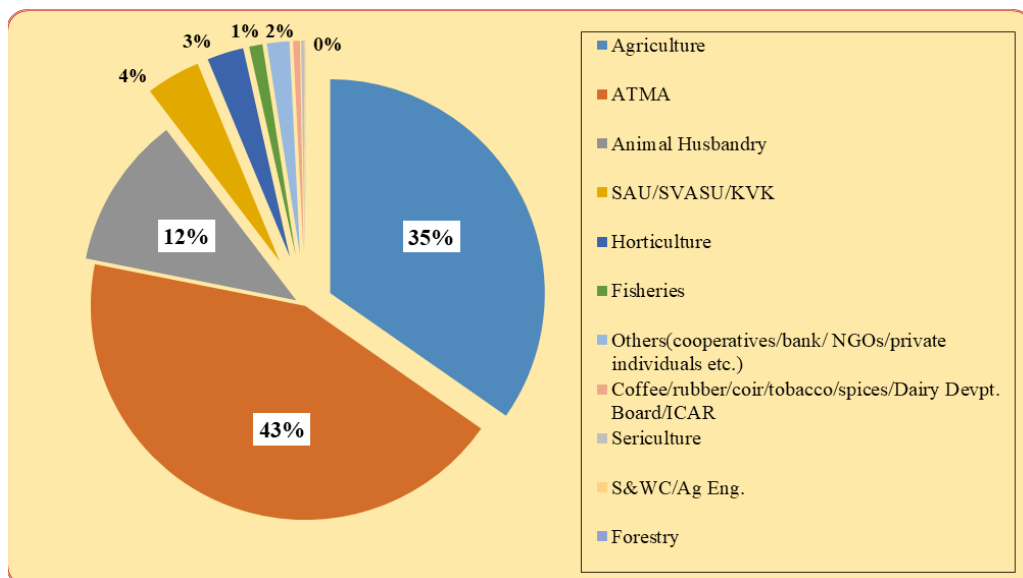


Figure 1: Sector-wise coverage of PGDAEM candidates from 2014-15 to till date

2. Age wise data of candidates studied PGDAEM Program

It was observed from figure 2, that there are more no. of candidates aged in between 20-30 years and 40-50 years. Followed by the candidates who were between age (30-40) years and 50-60 years of age.

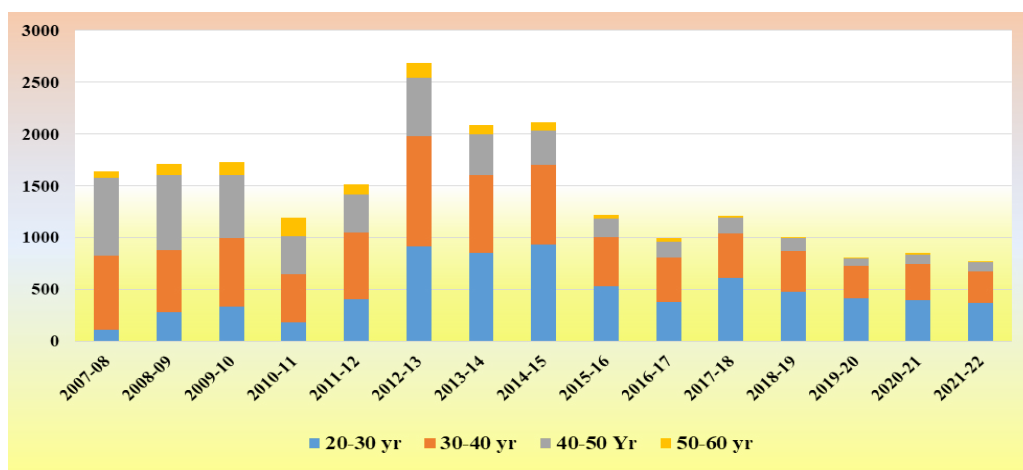


Figure 2: Age wise date of candidates studied PGDAEM program

3. Male and Female Ratio

The figure 3 revealed that there were more number of male candidates than the female candidates who pursued PGDAEM program and needed to be encouraged to pursue the program. The female candidates are busy with their families and also with their work place which is hindering them to attend the program.

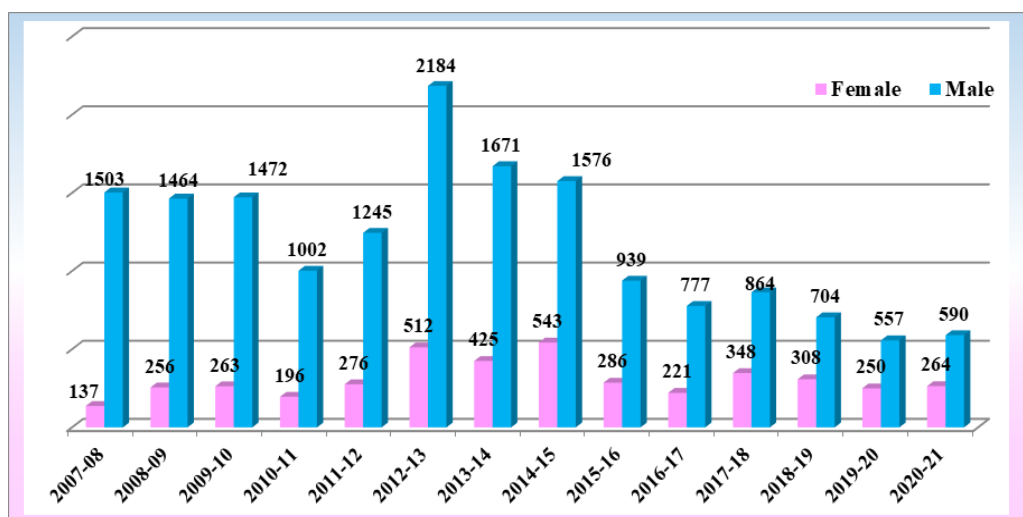


Figure 3: Male and Female Ratio of PGDAEM candidates

II) Effectiveness of PGDAEM Program

a) Usefulness of PGDAEM program

Table 1: Usefulness of PGDAEM program to the extension functionaries

n=60

Response from SAMETIs	Frequency	Percentage
Useful	55	91.67%
Not Useful	05	08.33%
Total	60	100.00%

From the table 1 it was observed that the respondents were asked to provide feedback on the usefulness of PGDAEM program, around 91.67 per cent of the respondents expressed that it is useful and rest (8.33%) of them felt that it is not useful. They felt that the course was apt to the aspirants with respect to the collection and analysis of basic data and also effectiveness of the course to their field situation. Two of them expressed that the PGDAEM course was useful to the field extension functionaries only.

b) Applicability of PGDAEM program in field situation

Muthu Prasad et al. (2021) conducted a survey to study the Agricultural Student's perception and preference towards the online learning. The authors explored student's preferences for various attributes of online classes. This study focused on how students perceive online learning, and which format they prefer. There was no inclusion of the pinion of instructors. In another work (Paudel, 2021) surveyed the point of view of both teachers and students on the benefits and challenges of online education amid COVID-19 in Nepal. The study identified several benefits of the situation such as promoting online research, connecting participants to the community worldwide, and having more freedom.

Table 2 : Applicability of PGDAEM program in field situation

n=60

S. No.	Response from the SAMETIs	Frequency	Percentage
1.	Very much applicable	32	53.34%
2.	Quite Applicable	23	38.33%
3.	Can't say	05	08.33%
	Total	60	100.00%

From the above table 2 it is clearly evident that more than half (53.34%) of the respondents felt the program was very much applicable in the field situation and knowledge is quite applicable (38.33%) to everyone but some were not sure (08.33%). They suggested that the candidates can be given field assignments because it suits in their field experience.

c) Difference in delivery of extension services

The SAMETIs were asked about their observation of the officers' nature of work, whether after the completion of PGDAEM program the services delivery was improved or not. All of them except HAMETI, Haryana opined that they improved in the delivery of services and was good. They said they were with better managerial skills, organizing training programs and obtaining good feedback through their approach. They also said to be more competent in communication of information among the farmers, extension officers and the researchers regarding the updated knowledge. They were good in identifying the key communicators, the proper selection of the print and electronic media to avoid the barriers of communication.

Table 3: Difference in delivery of extension services by the officers before and after program

n=60

Response of the SAMETIs	Frequency	Percentage
There is a difference	51	85.00%
There is no difference	09	15.00%
Total	60	100.00%

The SAMETIs were asked about whether there is a difference in the delivery of services by the officers when compared before and after learning the programme. In this context, they were majority 85.00 per cent of respondents expressed that there was difference in delivery of extension services information, followed by no difference (15.00%) in delivery of extension services by the officers before and after program.

d) Course content of the PGDAEM program

Many of the respondents felt that they were more confident because they were well acquainted with the latest concepts of extension management and thus were productive in getting good results in their field. They agreed that those who completed the PGDAEM program were more capable and yielded good and encouraging results since they were knowledgeable in the extension modules.

But few of them expressed that the program is not much advantageous to them because they are not applying in their extension activities in the field.

From the table 4, it was perceived that Agribusiness Management (MPS 95.00) was ranked first among all the course contents followed by 2nd rank for Communication techniques (MPS 93.33), 3rd rank for PRA and Interactive techniques (MPS 91.67), 4th rank for Biodiversity (MPS 90.00), 5th rank for Sustainable Agriculture (MPS 86.67) respectively. Rest followed as order from 6th rank to 13th rank as Entrepreneurship development, Market Led Extension, Supply Chain Management, Market intelligence, Information Technology, Research Methodology and Planning for Agriculture, respectively.

Table 4: Course content of the PGDAEM program:

n=60

S. No.	Course Content	Frequency	MPS	Rank
1.	Extension techniques	53	88.33	V
2.	Information Technology	45	75.00	XI
3.	PRA and Interactive techniques	55	91.67	III
4.	Communication techniques	56	93.33	II
5.	Market intelligence	46	76.67	X
6.	Market Led Extension	48	80.00	VIII
7.	Agribusiness Management	57	95.00	I
8.	Entrepreneurship development	51	85.00	VII
9.	Supply Chain Management	47	78.33	IX
10.	Research Methodology	44	73.33	XII
11.	Planning for Agriculture	41	68.33	XIII
12.	Biodiversity	54	90.00	IV
13.	Sustainable Agriculture	52	86.67	VI

MPS – Mean Percentile Score

It was observed participants were more productive and good in community mobilization. They felt that in time of any problem situation, they dealt with it more practically and implemented the activity efficiently according to the needs of local people. The officers established a favorable environment in the field during the delivery of extension services and they also were in with good rapport with the farmers.

The SAMETIs opined that after completing this programme, field functionaries could motivate the unemployed rural youth towards entrepreneurship, started giving importance to market intelligence, supply chain management and emphasize contract farming for deeper penetration into the agricultural extension management and product value addition.

e) Contact classes:

Table 5: Percentage of candidates who attended contact classes

n=60

Attendance of the Candidates	Frequency	Percentage
1%-20%	08	13.33
21%-40%	03	05.00
41%-60%	04	06.67
61%-80%	22	36.67
81%-100%	23	38.33
Total	60	100.00

When the SAMETIs were enquired about the percentage of candidates who attended the contact classes, 38.33 per cent of the respondents had (81- 100%) of attendance followed by 36.67 per cent of respondents had (61-80) of attendance to contact classes. About 13.33 per cent attended with (1-20%) rest followed 6.67 per cent had (41- 60%) and 5.00 per cent had (21-40%) of attendance to the contact classes.

III) Constraints faced by candidates in attending the contact classes:

When enquired with regard to the constraints in organizing the contact classes in physical mode, 50 per-cent did not face any constraints and the rest of them expressed that there are some constraints faced.

Table 6: Constraints faced by candidates in attending the contact classes:**n=60**

S. No.	Constraints	Frequency	Percentage
1.	Practicality of the subjects	09	15.00%
2.	The practical classes	03	5.00%
3.	Update knowledge	04	6.67%
4.	Going through the content	23	38.33%
5.	COVID situation	22	36.67%
6.	Medium of study material and instruction in colloquial/ local language	34	58.20%

Constraints faced by the candidates to attend contact classes:

The constraints faced by the SAMETIs were such as

- The COVID-19 situation and the social distancing that is prevalent in the country and hence the candidates were irregular in attending the contact classes.
- With regard to the number of classes, they felt that they should be increased. They wished for 5 contact classes per each subject.
- They feel they are a need for providing more time to go through the content and understanding the practicality of it.
- They expressed that there should be contact classes for Project work as it is more apt to the field situations.
- They wanted more orientation connected to extension oriented research, farmer producer company or farmer groups formation, farmers' field schools, high tech machinery execution, case studies' analysis and progressive bank which are helpful to the farmers in the field.
- They desired an extra day for practical exposure on Participatory Development, process of PRA and project management.

a) Mode of attending contact classes

According to table 7, Majority 58.33 per cent of the respondents attended contact classes through online mode while 41.67 per cent of candidates attended contact classes through Physical mode.

Table 7: Mode of contact classes**n=60**

Response of SAMETIs	Frequency	Percentage
Physical Mode	25	41.67%
Online Mode	35	58.33%
Total	60	100.00%

As per the table 7, Majority 58.33 per cent of the respondents attended contact classes through online mode, while 41.67 per cent of candidates attended contact classes through Physical mode.

b) Study material:

When the respondents were requested to rate the content of the PGDAEM study material, most of 66.67 per cent expressed that the program content was relevant to their daily work at field, where as 28.33 per cent opined that it was the most relevant to them to learn. Only 5.00 per cent SAMETI felt the content was irrelevant. They wanted the PGDAEM program content to be updated frequently through incorporating the latest courses such as the media related and importantly about social media.

Table 8: Study Material Content Rating of PGDAEM**n=60**

Response of the Respondents	Frequency	Percentage
Irrelevant	03	5.00%
Relevant	40	66.67%
Most Relevant	17	28.33%
Total	60	100.00%

The SAMETIs strongly expressed their deep concern regarding

- If the study material could be prepared in local/ regional language to increase the effectiveness of the program would more easily to the candidates as they are not well versed in English and Hindi.
- The candidates are unable to attend the classes due to their heavy office workloads in their work places.
- With regard to the constraints faced in distribution of study material to the candidates, thirty eight percent of the SAMETIs express their difficulty.
- They received the study material late and sending the study material to the candidate is difficult because they are scattered in throughout the state.

- They want the course material to be distributed at the commencement of the course itself in order to have sufficient time to study for the examinations.

IV) Suggestions for better implementation of the program

The respondents were asked for suggestions to improve the programme and they responded with the following points:

Table 9: Suggestions for improvement of PGDAEM program

n=60

S. No.	Suggestions from the SAMETIs	Frequency	Percentage
1.	Revision of Course Content	15	25.00%
2.	Increase in Number of contact classes	17	28.33%
3.	Increase in number of field based practical classes	18	30.00%
4.	Study material in local language	03	05.00%
5.	Reward of increment to candidates after completion	02	03.33%
6.	Need for orientation meeting from MANAGE	06	10.00%
	Total	60	100.00%

Suggestions as perceived by the respondents:

- The course content needs to be revised or updated.
- It would also be convenient if the hard copies of reading materials can be sent well ahead of the contact classes and examinations.
- There is requirement for a contact person continuously available for the candidates.
- Physical contact classes may be conducted through offline mode more than one day than each subject in one day.
- Additional hour or contact classes will organize for another 5 days, then it will helpful for the students to get better understanding of the subject matter.
- An extra one day class for practical exposure for Participatory/ Approach/ study material in local language/ examination writing in local language/ PGDAEM Contact Class in online mode along with 2 day physical practical

class per Semester for relevant section hands on practice. If possible Practical/ field work to be included for the extension functionaries for this course.

Conclusion

From this evaluation of PGDAEM the respondents expressed that the program is very useful for them to improve their skills in latest extension technologies and techniques in their field situation where they are working. They noted the need for study material in the colloquial languages, more number of classes for orientation about the program and time for contact classes. They opined that they require update of the latest knowledge time to time which is helped through PGDAEM. They feel only that the busy work schedule is a limitation for them to pursue PGDAEM program.

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Decoding the Implementation of ICT Interventions in Agriculture: A Study Among Officials from Selected Developing Nations

Divyata Joshi¹, B. Shilpa², B. Gopichand³, Manisha Ohlan⁴ and Mahantesh Shirur⁵

ABSTRACT

The information communication technologies are playing major role in transforming the way the agricultural extension services are delivered across the globe. However, extension systems in many developing nations are yet to witness the impact of ICTs in the field of agricultural extension delivery due to the slow pace of ICT adoption in these countries. This paper presents a case of Government of India initiative to facilitate the dissemination of ICT interventions as means of agricultural extension advisory delivery through field extension functionaries in developing countries. The paper presents the details of the types of Back at Work Plans identified by the respondents post-training and associated strategies and constraints in implementing the back at work plans of ICT interventions as part of their job role. The broad themes on which the respondents identified their problems were; data management in extension services, post-harvest management or market led extension, production system management and resource management in crop production/protection. Mobile based application was the highest preferred solution by the respondents to address the problems of agriculture extension delivery system. Coordination among stakeholders and budgetary support are identified as major constraints for integrating the ICT interventions in the extension service delivery.

Keywords: Information and Communication Technologies, ICTs, Agriculture, Agricultural Extension, Developing Countries.

Introduction

Sustainable growth of agriculture is very critical for the socio-economic development of many Asian and African nations. Plenty of land in under

1. Consultant, National Institute of Agricultural Extension Management (MANAGE), Hyderabad
 2. Consultant, MANAGE
 3. Consultant, MANAGE
 4. Consultant, MANAGE
 5. Principal Scientist (Extension Policy and Management) · ICAR-National Academy of Agricultural Research Management (NAARM), Hyderabad
- Corresponding Author Email: gopiext8025@gmail.com

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developed countries remains underutilized for several reasons. Lack of access to land with the people, inadequate resources, lack of knowledge on the latest technologies and delay in their adoption are the most often cited reasons for this. Transforming subsistence agriculture into a sustainable means of livelihood or agripreneurship is the need of the hour. Agriculture holds huge potential as a driver of growth and development provided the agricultural extension plays its expected role of delivering extension services to the farmers in a cost-efficient manner. Information and Communication Technologies (ICTs) has made major inroads in transforming agricultural extension system across the globe. However, use of ICT interventions in developing countries is uneven and inadequate. This problem has to be addressed holistically keeping in mind the availability of financial resources, IT infrastructure and trained manpower.

There are several experiments and initiatives across the globe to augment using the ICT interventions in the field of agriculture. In this line, the Government of India under the aegis of Indian Technical and Economic Cooperation (ITEC) took the responsibility of training field extension functionaries from selected developing nations on using ICT interventions in the field of agriculture based on innovations and experiments found successful in India. The field extension functionaries then trained at National Institute of Agricultural Extension Management (MANAGE), Hyderabad during 13-27th September, 2022 on 'Computer Applications in Agricultural Extension'. As a part of training, the study was undertaken to sensitize the officials trained on computer application to the extent of knowledge and skill enhancement, their ability to identify the challenges in the field of agriculture in their country through a solution identified during the training and exposure to ICT interventions in India. The problems and solutions identified by the respondents underscore the type and nature of ICT interventions in their respective countries. The study on 'Decoding the implementation of ICT interventions in agriculture: A study among officials from selected developing nations' helps in critically understanding the strategies that have potential to enable a positive change in the outlook of agricultural extension services in the developing countries. The study also elicits challenges faced by the respondents representing the ICT interventions as part of their job role. The insights and the observations of the study will facilitate in identifying policy enablers to fast-track the ICT initiatives as means of effective extension advisory and service delivery.

Methodology

Extension intervention and participant selection:

The International Training Programme on "Computer Applications in Agricultural Extension" organized under Indian Technical and Economic

Cooperation (ITEC) component of Ministry of External Affairs, Government of India is the extension intervention to bring desirable changes among the extension functionaries working for agriculture sector in different countries. The training was organized during 13-27th September, 2022 at National Institute of Agricultural Extension Management (MANAGE), Hyderabad. All the 25 participants representing 14 countries of Asia, Africa and South America were respondents of the study. The data from all the candidates attending the training were collected.

Identification of BAWP and solutions

The trainees were asked to identify atleast one challenge which they wish to take up for working upon as part of their job role after the completion of training. The trainees were expected to mention a solution based on their learning during the training to address the challenge they have decided to work upon. All the trainees presented their Back At Work Plan (BAWP) at the end of training program. The BAWP model suggested by Shirur et al, (2020) was adopted for the study. The model included three interconnected factors; learning experience of participant in the training program, identifying local specific problem from their workplace in their respective country and the action-oriented solution that can potentially solve the problem they identify.

Data collection and analysis

A structured interview schedule was prepared and administered to the participants of the training to collect the data. The questions related to their profile characteristics, description of the problem, Indian experience learnt during training, objectives, possible solution through ICT application, perceived challenges to achieve the objective and expected change against the set objectives was developed. The response of the candidates was analysed and tabulated by grouping the similar observations/activities/ challenges. Descriptive statistics was used for analysis of data collected from the respondents.

Results and discussion

The major findings of the study are discussed under five sub-heads. These include the profile characteristics and nationality of participants, problems identified by the participants in their respective countries, ICT based solutions from Indian experience, expected duration of completion of BAWP, expected changes from implementation BAWP and challenges in completion of BAWP.

Profile and country of participation

The profile characteristics were studied under personal and professional profile of the trainees (Table 1). It included their nationality, age, educational qualification, gender, major sector, nature of institute and professional experience.

The participants of the international ITEC training programme belonged to 14 different countries representing three continents Asia, Africa and South America (Figure 1). Four each official from Mozambique and Sudan, three participants from Kenya and two participants each from Colombia, Eritrea and Morocco attended the training. One candidate attended the training from Ethiopia, Iraq, Jordan, Myanmar, Niger, Sri Lanka, Tajikistan and Uganda each. A total of 25 candidates attended the training. Majority of the candidates (64%) were in young (<36 years), possessing a post graduate degree (64%) and were males (56%).

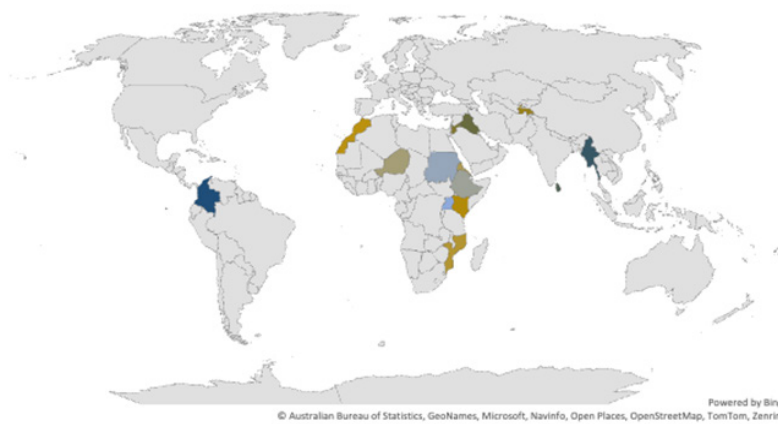


Figure 1: Country wise distribution of participants

Most of the participants (96%) were working in public sector and belonged to agriculture sector and almost all (96%) of the candidates were working in public sector. Among these executives, majority (60%) of them had less than 11 years of professional experience in agriculture or allied sector. The details of the participants profile are mentioned in table 1.

Table 1: Profile characteristics of the participants (n=25)

Profile characteristics	Frequency	Per cent
Age (years)		
Young (<36 years)	16	64
Middle (36-44 years)	6	24

Old (>44 years)	3	12
Educational qualification		
Post-Graduation	16	64
Graduation	9	36
Gender		
Male	14	56
Female	11	44
Major sector		
Agriculture	21	84
Agriculture Engineering	2	8
fisheries	1	4
Engineering and Business Administration	1	4
Nature of institute		
Public/Government	24	96
Private	1	4
Professional experience (Years)		
<11	15	60
11-19	7	28
>19	3	12

Problems identified by the participants in the respective countries

The problems identified by the participants were categorised into four broad areas; agriculture production system and management (including allied sector), resource management and crop protection, data management and extension services and post-harvest management and market led extension. The categories were made based on the nature of responses given by the participants (Figure 2).

More than one third (36%) of the respondents identified data management and extension services as a major issue. The trainees highlighted the issue of poor and traditional way of extension services, poor access to information and extension services at the last mile, lack of awareness among farming community about ICT's, traditional methods being followed in extension services, lack of reliable data at government level, lack of timely information for the farmers and also sometimes farmers not being able to provide sufficient information to the extension agents. World Bank (2011) report also suggests that there is an emerging need of the ICT intervention in developing countries landscape. ICTs are therefore being considered as potential game changer in empowering

farmers with relevant and timely knowledge on agricultural production.

The second major issue identified by nearly one fourth (24%) of the respondents was post-harvest management and market led extension. Market related information is one of the crucial information required by the farmers and many a times extension personnel lag in providing market related information. Historically, marketing has been characterized by information asymmetry between the stakeholders and leading to several challenges (Daum, 2019). Most often, these include information related to real time market price of the commodity, nearby market procurement and storage related issues etc. the lack of which leads to poor price for their produce and poor decision to sell their produce. Limitation of extension workers arise this problem up to a higher extent as listed by the participants.

The issue related to agricultural production system and management was identified as important by one fifth (20%) of the participants. Challenge of lack of resources, soil health, negative impact of the climate change on production and lack of financial resources and indebtedness of the farmers and availability of animal vaccines were listed among the agriculture production system and management.

Remaining 20 per cent participants identified resource management and crop protection as major problem for their BAWP. Pest and disease infestation, improper use of plant protection chemical by the farmers, lack of fast diagnosis of the disease and pests in the farmers' fields, lack of information on optimum usage of plant protection chemicals were the major areas where the farmers lack information.

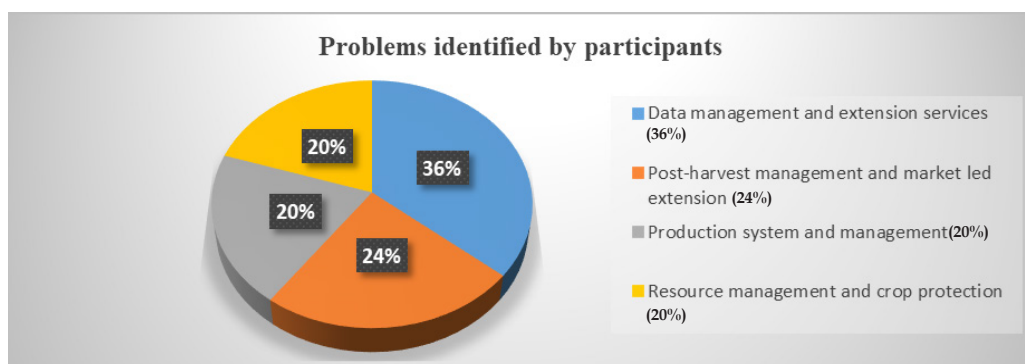


Figure 2: Problems identified by participants

ICT based solutions from Indian experience:

The participants of this study attending the international training program

identified solutions based on their experiences of addressing a similar challenge through ICT interventions in India. Accordingly, ICT based solutions were identified by the participants as strategies and categorised. Important solutions given by the participants are depicted in the Figure 3.

Majority (60%) of the trainees considered mobile application based agriculture advisory services for the farmers at their doorstep as most important strategy to address the challenges faced in their country. The mobile based applications are easy to use by the farmers and are helpful in providing timely and reliable information on weather forecast, crop prices, market intelligence etc. The Indian experience quoted the respondents were ICT applications such as Plantix, eSAP, Kisan app, Kisan Call Centre (KCC) etc. These applications establish convergence among different stakeholders of agriculture including farmers, extension personnel, policy makers and researchers to interact in real time setting, diagnosing on-field problem and find-out tailor made solution to the problems. Fu and Akter (2011) emphasized that mobile based applications have the advantage over other ICT tools in terms of its appropriateness for the under- developed local conditions as mobile phone penetration has been growing rapidly even in the remote rural areas. The unprecedented speed of usage of mobile phones has raised the general expectations on its potential to dissemination of innovative farming technologies.

Eight percent of the participants felt the need to generate website or portal for one step geo-localized information on land, soil and production management, technological innovations, availability and accessibility of farm machinery, plant protection and market related information for the extension functionaries and government departments. Further, a many participants envisaged Management Information System (MIS) for easy access to information with accuracy and reliability. MIS portal used in government of Indian schemes, Drones and Bhoomi project were some of the examples quoted by the participants.

Use of social media such as WhatsApp and Facebook group with the farmers was one of the solutions given by eight per cent of the participants. Message delivery through audio, video and text message is more convincing to the farmers. According to Nain et al (2019) WhatsApp has been a potential source of exposure to knowledge, socialization hence promoting a creative forum for farmers for learning exchange. A session on social media and use of advanced audio-visual tools during the training enabled the participants to choose these platforms for solving farmers problems.

To develop an ICT tool specifically for mapping the potential livestock producers, scientific management, information on vaccine, disease diagnosis, farm record,

health care and for connecting livestock farmers with marketing was proposed by eight percent of the respondent trainees.

Similarly, eight per cent of the participants identified digital marketing solutions to shift from production led agriculture to market led agriculture. Several ICT applications help farmers in not only in marketing of the produce but also during planning and production stage (Baumuller, 2015). The Indian experience behind such a sensitization were portals such as eNAM and AGMARKNET. eNAM unifies the nationwide agricultural markets by creating a central online platform for agricultural commodity price discovery. The scheme envisages deployment of a common e-market platform, information network for speedy collection and dissemination of price and market related information to farmers and other related organizations through AGMARKNET portal.

One of the participants emphasized on the need for an exclusive climate/ weather advisory application based on the experience of Project of Climate Resilient Agriculture (POCRA) initiative in Maharashtra, India. Further, another participant identified digital platform and digital value chain specifically for coffee growers of that particular country. The platform should include barcode system to track the produce in the market making marketing system more efficient. An experience on disruptive innovations in extension advisory services, digital start-ups to digital value chain from India helped identifying the solution to the participants. The project is built around a comprehensive, multi sector approach that focuses specifically on building climate resilience in agriculture through scaling up tested technologies and practices.

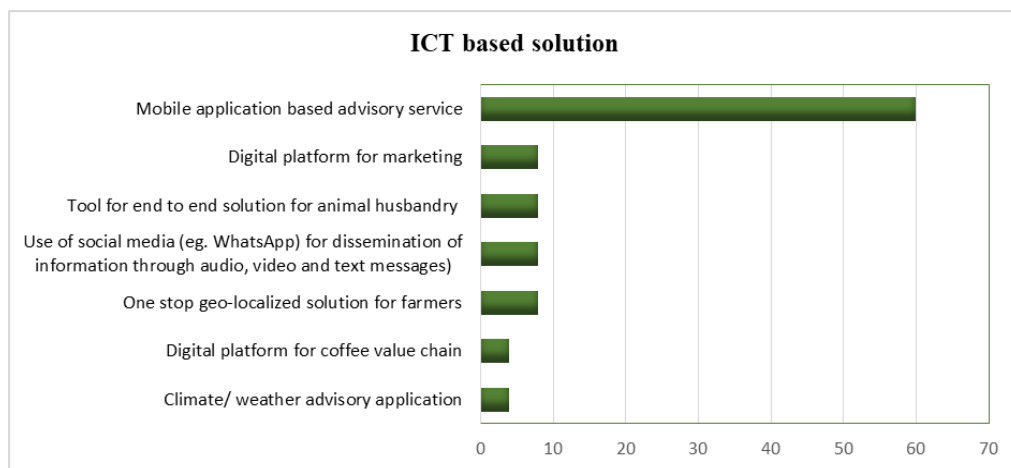


Figure 3: ICT based solutions from Indian experience

Expected duration of completion of BAWP:

The duration of completion of Back At Work Plan largely depends on the nature of the plan, job responsibilities, availability of resources and administrative support. The duration anticipated by the participants to complete the task is given in the Figure 4. The expected time of completion for majority of the participants (60%) was between six months to one year. The observations are in line with the study conducted by Shirur et al (2022) as more number of the trainees proposed same time to complete BAWP. Twenty per cent of the respondents expected more than two years and other 12 per cent expected 1-2 years to complete the BAWP. Since it is challenging to sensitize the need for ICT interventions to the stakeholders the variation in time duration appears logical. It is apparent from the results that majority of the participants predicted 6 months to 2 years of time to complete the training activity translating into actions. Only 12 per cent of the participants suggested less than six months to complete the activity. The activities such as information dissemination through social media is one such activity identified by the participant for which they can expect less than half a year to complete.

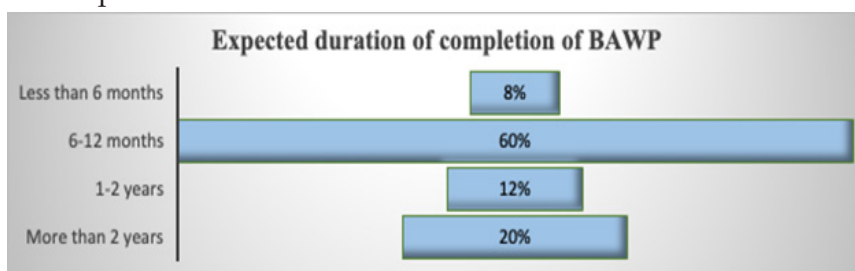


Figure 4: Expected duration of completion of BAWP

Expected change due to planned intervention:

Implementation of Back At Work Plan is a reflection of knowledge and skills acquired during the training. Also, the true success of the training program is determined by the change brought from application of BAWP. The participants identified expected changes they can foresee as the end result of planned intervention. The responses given by the participants were diverse and integrating in nature. The changes were categorised and tabulated based on the responses given by participants (Table 2).

The data revealed that one fifth (20%) of the respondents expected change in knowledge of farmers and positive attitude for trying new technology. Sixteen per cent of the participants expected improved decision on plant protection through ICT intervention. Similar number of respondents revealed their expectation for improved market infrastructure through ICTs which will ultimately lead to remunerative prices to the farmers. Another sixteen per cent of the trainees expected delivery of reliable, open and easily accessible agricultural information

for the people at the last mile as the outcome of their BAWP intervention.

Creating ICT intervention to elicit information to enable data backed policy making was expected outcome of twelve per cent of the participants. Often, lack of accuracy of data hinders the effective policy making. ICT interventions as part of BAWP certainly can help in reducing such a constraint.

Few participants (8%) expected the innovations covering various aspects of livestock production and management as an outcome whereas similar percentage of participants expected introduction of the concept of eNAM and POCRA like interventions in their respective countries. One participant anticipated improvement in whole coffee value chain from their BAWP intervention.

Table 2: Expected changes due to planned intervention:

S. No.	Expected changes	Frequency	Percentage
1.	Farmers' knowledge upgradation and improved use of ICT	5	20
2.	Enabling decision on plant protection through ICT intervention	4	16
3.	Remunerative prices to the farmers with improved market infrastructure	4	16
4.	Platform for reliable, open and easy access to agriculture information to people at the last mile	4	16
5.	Creating ICT intervention to elicit information as to facilitate policy making	3	12
6.	Increased technological innovations in livestock	2	8
7.	Introducing concepts such as eNAM and POCRA to the policy makers	2	8
8.	Strengthening and advancement in coffee value chain	1	4

Challenges in completion of the BAWP:

In order to identify feasible and reliable workable work plan, the respondents

were asked to list the challenges that they foresee in implementing the BAWP. With this question it was expected that the participants will be keen to shortlist most viable BAWP with a realistic expectation. The data on probable challenges identified by trainees which may hinder the effective implementation of BAWP were elicited. One fifth of the candidates anticipated the coordination among the stakeholders and budgetary constraints as major challenge in implementation of the plan. Sixteen per cent of the participants highlighted lack of availability of basic infrastructure eg. electricity, network connection, cost of internet communications, expenditure for trainees (subordinates), daily allowance etc. Similar per cent of participants highlighted the absence of support from government or policy in favour of new technologies and innovations as the major barrier.

Other major challenges were resistance to change by extension workers who are not up to date with current ICT tools, lack of awareness or research on digital interventions, challenge of time allocation with existing job role as identified by 12 per cent of the participants each. Further, lack of skills among the stakeholders, lack of resources to implement the project, and high initial cost at farmers' end were other major challenges expressed by 8 per cent of the participants. One participant revealed the challenge of shortage of sufficient data to implement the strategy. The details of the challenges expected the respondents are presented in Table 3.

Table 3: Challenges in completion of the BAWP (multiple responses)

S. No.	Challenges	Frequency	Percentage
1.	Coordination among the stakeholders to implement the plan	5	20
2.	Shortage of budget/ finance	5	20
3.	Availability of basic infrastructure (eg. electricity, network connection, Cost of internet communications and expenditure for trainees (subordinates) and daily allowance.)	4	16
4.	Government/ policy support	4	16
5.	Resistance to change by some extension workers who are not up to date with the current ICT tools.	3	12
6.	Lack of awareness or research on digital intervention	3	12
7.	Challenges in time allocation	3	12
8.	Lack of skills among the stakeholders	2	8

Conclusion

Training is not an end in itself, it is a means to achieve an end. Back At Work Plan in the International training programme is an important innovation to lead participants for some action. A training is successful if this exercise is well planned and implemented by the participants after completion of the training. The capacity development interventions of training programme provided exposure to the participants about Indian experience regarding ICTs. At the end of the training programme, executives representing fourteen different countries of three continents were in the position to address major issues and emerging needs in agriculture in their respective countries. The identification of problem under BAWP exercise made the participants to learn keenly, about new technologies. The trainees conceived solutions to the problems based on their experience during the training programme. The respondents were able to anticipate the challenges as well as the changes due to these interventions. The thorough Back At Work Plan at the end of the training brought some innovative solutions for the identified problem through a comprehensive methodological approach. It can be inferred that learning is facilitated with real-time experiences and enable the participants replicate the innovative technologies in their job setting and for bringing desirable change in the field of agriculture. However, policy support, infrastructural constraints, and coordination among the stakeholders are some of the necessities for a successful implementation of the need-based ICT solutions to facelift the extension service delivery systems to boost growth in agriculture.

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DAESI Facilitator's Opinion on Input Dealers as Para-extension Agents: A Q-sort Method

Balusu Gopichand¹, Mahantesh Shirur², Naveenkumar G³ and Divyata Joshi⁴

ABSTRACT

The need for input dealers as para-extension professionals is more evident from the pressure the public extension system face in delivering advisory services and implementing agriculture development and farmers welfare programs. The DAESI program is particularly designed to improve the knowledge and skills of the input dealers to provide quality extension services. The facilitators who plans the program and implement it at the NTI level are always keen on observing the input dealers. The facilitator's opinion is most important in this regard to investigate the most agreeable extension services delivered by input dealers and the vice-versa. The Q-sort method was employed to know the opinion where the facilitators are forced to choose the specified number of agreed, neutral and disagreed activities.

Keywords: Private Extension System, Q-Grid, Farm Advisory, DAESI Course

Introduction

The Agriculture and allied sectors extension system of India has been funded by the public sector, similar to other developing countries extension services. The extension delivery by the public sector is always questioned by experts in economics. The extension was treated essentially as a public good and focused to spread extension through extension staff and an increased number of programs (Sulaiman & Ban, 2003). After 1980s the agro-input manufacturers, NGOs, agro-processors, cooperatives societies and others initiated to approach farmers through extension services. However, due to the dryness in funding for individualistic extension approaches as experienced in T & V system, the group approach and pluaristic extension with the involvement of KVKs, research institutes and SAUs of ICAR system, line department of agriculture &

1. Consultant, National Institute of Agricultural Extension Management (MANAGE), Hyderabad
 2. Principal Scientist (Extension Policy and Management) · ICAR-National Academy of Agricultural Research Management (NAARM), Hyderabad
 3. Academic Associate (Agricultural Extension), MANAGE
 4. Consultant, MANAGE
- Corresponding Author Email: gopiext8025@gmail.com

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allied sectors, Cooperative societies, farmers associations, commodity boards, input dealers, NGOs, AC&ABC centers. The institute that coordinates to bridge the gap between research and extension service delivery including all players mentioned above at the district level is the Agricultural Technology Management Agency (ATMA) through Strategic Research & Extension Plan (SREP).

Among the extension services delivered by different players, input dealers are more approachable and trusted service providers of the farmers. The importance of the utilization of input dealers felt with the less time for the public extension system to deliver advisory services due to the increased level of programs of Central and State governments in agriculture and allied sectors. The input dealers practicing the agro-input delivery are 2.82 lakhs (DAESI, 2014). The quality of the services to be given by such a big number of input dealers will have a great impact on Indian agriculture production. Therefore, to address this need a course named Diploma in Agricultural Extension Services for Input Dealers (DAESI) was started in the year 2003 by the National Institute of Agricultural Extension Management (MANAGE).

The DAESI Program is an one-year course for 48 weeks, including 40 theory class weeks (80 sessions) and eight field visits. The course covers all the basics in agriculture from soil and seed to harvest and marketing considering the local agro-ecological situations. The facilitators are appointed to organize the training programs at Nodal Training Institutes (NTIs) under the monitoring of ATMA, SAMETI and MANAGE. The NTIs here may be KVKs, College of Agriculture, Research Stations, ATMA, NGOs and other institutes of Government and non-governments that trains on Agriculture.

The Agriculture provide Horticulture graduates are appointed as facilitator to run the program for one year. The facilitators should have adequate knowledge in training on agricultural activities undertaken in the district. The facilitators responsibilities includes publicity, liasoning with agri business companies and state government, identification of resource person, organizing class, study material, conducting examination, documentation of success stories, maintenance of records and submitting reports. Furthermore, the facilitators need to be proactive and understand the program as well as input dealers roles as a para-extension professional. To inculcate the knowledge and skills required a National Level workshop on “Capacity building of facilitators of DAESI Program” was organized in the month of June and July 2023. The input dealer as para-extension professional is one of the core objectives of this program. The

present paper designed to know the facilitators opinion on the probable para-extension services that an input dealer can provide.

Methodology

Q Methodology was designed and developed by William Stephenson in the 1930s to bring scientific frame works to describe subjectivity (Herrington & Coogan, 2011). It is used to find out the range of opinions on a topic of importance. It includes three stages i.e., developing a set of statements, sorting the set of statements by participants/respondents and data analysis and interpretation in the final stage.

The research instrument was developed to comprehensively the various ways of representing a topic of importance in participants own language. The set of statements collected from the different sources such as interviews, group discussions, printed publications, photo graphs etc.. In the present study, group discussion and expert opinion used to finalize the set of 32 statements in the concourse.

The Facilitators attending the workshop entitled “Capacity Building of DAESI Facilitators in Effective Implementation of DAESI Program” are the respondents of the present study selected purposively. The facilitators are from the 15 states of DAESI program implementation. Further, they have experience ranging from seven years to one year. The statements should be given to the participants to rank order the statements (agree to disagree) which forces the respondents to represent their opinions in a quasi-normal distribution in the answer sheet. This is also known as Q-grid. The resultant statements were matters of opinion, not the facts (Valenta & Wigger, 1997)

The best possible extension activities that an input dealer can do were picked and presented before the Facilitators to place each statement in the Q grid with Most disagreed from the extreme left, neutral in the middle and the most agreed to the extreme right. They were also instructed to sort the statements 13 disagreed, 13 agreed and 6 were neutral. The disagreed and agreed statements are further arranged from right to left and left to right respectively in ascending order. The facilitators are also instructed to consider the input dealer’s time, business, skills and other parameters while the judgement of the level of disagreement and agreement. The facilitators took 30 minutes to sort the items and place them accordingly. Further, the facilitators were made into groups to discuss and come up with the three most disagreed and agreed-on items as a group after the group discussion

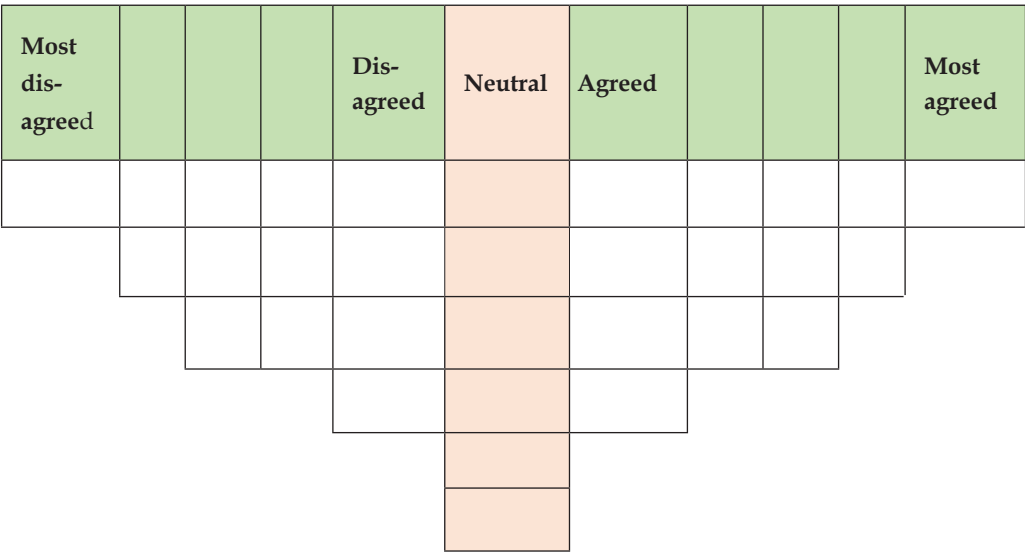


Fig. 1: Q-Grid for 32 items

Results

The facilitators choose the input dealer can guide farmers in collecting the soil sample as the most agreed extension activity they can implement in the current situation followed by utilizing them in the creation of awareness on safety precautions in chemicals-based inputs application and display boards, leaf lets and other literature to improvise the sales shop into an extension corner. The facilitators concluded that the input dealer inclusion in extension activities organising Government programs at the village level, incapable of differentiating pests & diseases and dissemination of information about animal health and livestock management practices through camps were most disagreed by them as evident from Table 1. The group-wise opinion of the input dealer showed that the opinions of groups are more or less similar and near to the weighted average ranks except for a few deviations in groups A, B and I in one of the statements.

Table: The cumulative scores of Q sort items sorted by DAESI Facilitators

Sl. No.	Items	Weighted Aggregate Score	Groups										
			A	B	C	D	E	F	G	H	I	J	K
1	The input dealer can guide farmers in collecting the soil sample	630	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	The input dealer creates awareness on safety precautions for utilization of different chemicals based inputs	541	✓	✓	✓				✓	✓	✓		
3	The input dealer shop/store should be with display boards, leaflets and other literature to make it as an extension corner	534				✓		✓			✓		
4	The input dealer guides the farmers in better quality seed selection	510		✗		✓	✓		✓	✓		✓	✓
5	Input dealer should intimate the KVKs and other institutions about new unidentified pests/diseases	500									✗		
6	Input dealer should promote the usage of Bio-fertilizers in the farmers field	461											
7	The recommended seed treatment practices demonstrated by input dealers	459											
8	The new technologies learnt from trainings, scientists, private agencies, progressive farmers... can be shared with his/her customer farmers	432					✓	✓					
9	Input dealers can visit the field of the farmers to examine the growth and recommend solutions accordingly	421		✓				✗					
10	The Farm machinery services can be provided by input dealers	421		✗									
11	The input dealer can facilitate the farmers in availing benefits of different schemes of Central and State Governments	420											

Sl. No.	Items	Weighted Aggregate		Groups										
		Score	Rank	A	B	C	D	E	F	G	H	I	J	K
12	The information about animal health and live-stock management practices can be advertised by input dealers through camps...	402	XII											
13	Input dealer demonstrates the farmers on IPM practices to avoid indiscriminate use of pesticides	394	XIII	✖				✖		✖			✓	✓
14	The input dealer is made responsible for recommendation given by them	381	XIV											
15	Input dealer emphasize the importance of IFS for the year round income	373	XV											
16	The Post-harvest management, grading requirements and handling tools can be elaborated to farmers by input dealers	369	XVI											
17	The input dealer should be aware of storage facilities available for different crops and advice the farmers accordingly	364	XVII											
18	The capacity of input dealers to advice on pre-emergence herbicides is doubtful	363	XVIII	✖		✓								
19	Input dealers has a critical role for involving women in farm decisions	359	XIX							✖				
20	The input dealers encourage farmers for production of scarcely available seeds	352	XX			✖								
21	The input dealer mentors the farmers in practicing organic cultivation methods	351	XXI											

Sl. No.	Items	Weighted Aggregate		Groups										
		Score	Rank	A	B	C	D	E	F	G	H	I	J	K
22	Input dealer has less knowledge to advice on the nutrient deficiencies in farmers field	350	XXII					✕						
23	Input dealers convey the MSP rates and market opportunities for different crops before sowing to farmers	336	XXIII		✕		✕				✕			
24	Input dealers have a key role in forming FIGs and CIGs	334	XXIV							✕				
25	Input dealer is a better option to deliver weather alerts	322	XXV											
26	Input dealer can facilitate farmers in availing various loans	322	XXVI	✓					✕					✕
27	The input dealer can specify the optimal time of harvest considering the quality, weather and market prices	319	XX-VII										✕	✕
28	The different transport facilities available to reach the produce to the markets can be advised to farmers	319	XX-VIII						✕					
29	The input dealer can be used in assessment of technology at primary level	313	XXIX											
30	The information about animal health and live-stock management practices can be advertised by input dealers through camps...	306	XXX			✕		✕	✕		✕	✕	✕	✕
31	The input dealers are not capable to differentiate the pest and diseases symptoms	303	XXXI	✕		✕			✕				✕	
32	The input dealer should be involved in organizing the Government programs at village level	252	XXXII								✕	✕		

✓ Top 3 agreed statements of Group ✕ Top 3 dis-agreed statements of Group

Discussion

The facilitators felt the most important need is that an input dealer can guide in the collection of the soil sample, getting the timely reports and explaining the reports including the advisory services. In addition, the input dealer aggregates the soil samples and sends them to a concerned lab at once, which brings the demanding power for timely report generation. Subsequently, the recommended fertilizers organic and inorganic can be taken from input dealers to improve the soil properties for productivity and sustainable production. The input dealer is also utilized for creating awareness of safety precautions for farmers' health. In this, they can organize demonstrations, pamphlets, group meetings etc... frequently, thus protecting the farmer's health. Further, the input dealer can make his shop into an extension corner apart from selling the inputs. The extension corner concept includes a display of success stories and technologies by arranging a television, agricultural magazines of local importance, leaflets and folders of major diseases and pests, giving advice by utilizing different media in a more professional and convincing way.

The involvement of Government extension programs includes a lot of preparations and consultations which is time taking. Input dealers cannot spare time for these activities leaving their business. Further, the facilitators might have felt that the direct connection between the Government Agriculture Department with farmers will be lost when the input dealers are in the middle role and the chances of the input dealer taking complete advantage of such status with a profit motto cannot be undermined. Interestingly, most of the input dealers had already experience in farming and also by exposure to the field visits with the farmers, Agricultural Officers and company representatives there is no doubt in the differentiation of the pests and diseases by input dealers as opined by facilitators. In contrast to this, all the input dealers have minimal or no knowledge of animal health and livestock management. Only specific dealers where livestock rearing is more the input dealers can handle such campaigns as an extension activity. As a whole, the general input dealers cannot handle livestock-related extension activities.

Summary

The Q methodology gave the opportunity to measure the opinion of the people unlike their characteristics. This facilitated to give relative rank to a particular activity considering their experience and realistic situations. This process facilitates to collect information from larger groups within a short time. The insights in the present study gives the most agreeable extension services that can be done input dealer were ranked and further the least ranked statements are extension services that are not possible with the existing village level situations

and knowledge of the input dealers. The facilitators are keen observers of input dealers inside classrooms and in the field or shops. Their opinions will help the policy makers to take the decision on immediate cultivable extension services, little later after proper training and strategic plan to bring the least ranked extension services into operation by the studying the needs to facilitate such activities.

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Differential Adoption of Climate Smart Agriculture: Interventions in Odisha

Usha Das¹, M A Ansari², Souvik Ghosh³

ABSTRACT

Climate Smart Agriculture (CSA) is a strategy for restructuring and reorienting agricultural production systems and food value chains to promote long-term development and food security in the face of climate change. It is a novel way to chart growth trajectories that can make agriculture more productive and sustainable, as well as more adapted to climate change mitigation and adaptation. Present study was undertaken in one of the most vulnerable State's of India i.e., Odisha. The unique combination of coastal and non-coastal ecosystems in Odisha facilitated to document varied types of CSA interventions to face the wrath of climate change effects. The study was conducted in a climatically vulnerable coastal (Kendrapara) and non-coastal district (Dhenkanal) of Odisha with 200 farmers. These farmers were chosen purposively with the criteria underlying that those were the beneficiaries of NICRA (National Innovations for Climate Resilient Agriculture) project. The NICRA project is the flagship program launched by Indian Council of Agricultural Research (ICAR) to address all the climate related issues in India. Using a semi-structured questionnaire, the differential adoption of farmers for various types of CSA interventions is presented in this article. This article will guide the future researches in the similar fields and for policy advocacy to scale up the interventions that are location specific and witness better adoption by the farmers.

Keywords: Climate Smart Agriculture, Climate change, Climatic Vulnerability, Climate Resilient Agriculture

Introduction

Odisha is the eighth largest state in India. It is situated on the east coast, it has a long coastline, and a large forest cover. Five major rivers run through the state Agro-climatically, Odisha is prone to extreme weather events such as floods,

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1. MANAGE Fellow, National Institute of Agricultural Extension Management (MANAGE), Hyderabad
 2. Professor, G B Pant University of Agriculture and Technology, Pantnagar, Uttarakhand
 3. Professor, Department of Agricultural Extension, Institute of Agriculture, Visva Bharati, Shantiniketan, West Bengal
- Corresponding Author Email: gopiext8025@gmail.com

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droughts and cyclones. Its resilience and infrastructural capacity to cope with extreme weather events, however, is undermined by steep imbalances in its region wise growth and economy. The state's Gross State Domestic Product (GSDP) has grown on average by eight per cent in the last decade, a significant leap compared to the 3.4 per cent average growth it clocked 20 years before that the state's economy has seen a rebound in the year 2021-22 in spite of the second and third wave of COVID-19 hitting the state and real GSDP has grown at a rate of 10.1 per cent as per advanced estimate which is much higher than the national growth rate of 8.8 per cent. This has been possible due to development approach of the Government, effective handling of the pandemic and vaccination in full swing and pro-active fiscal measures. Per capita income of Odisha has grown at a double-digit rate of 16.8 percent in 2021-22 (Odisha Economic Survey Report, 2021). However growth in agriculture, which engages 60 per cent of the state's workforce, has been declining. The state still fares poorly among many human development indicators and has the largest percentage of population below the poverty line. Odisha's environmental legacy is largely built around concerns over the utilization and management of its natural resources.

Odisha is located between 17049' to 22034' North latitude, 81027' to 87024' East longitude covering an area of 1,56,000 sq. km. The Bay of Bengal forms the eastern boundary of the State having a coast line of nearly 480 km. With an extensive coastline measuring 480 km, bestowed with rich diversity, which accounts for eight per cent of the total coastline of India. Mangroves, sea grasses provide vital breeding, nursery and feeding areas for a number of marine species and contribute significantly towards the commercial fishery of the State. Basing on morphological peculiarities, geological, climatic and edaphic conditions the State is broadly divided into five natural regions viz.

- i) Coastal Plains,
- ii) River valley and Flood plains,
- iii) Rolling uplands,
- iv) Plateau and
- v) Mountains

There are four well-defined physical regions in Odisha, i.e., the northern plateau, the central table-land, the eastern ghat region and the coastal tract

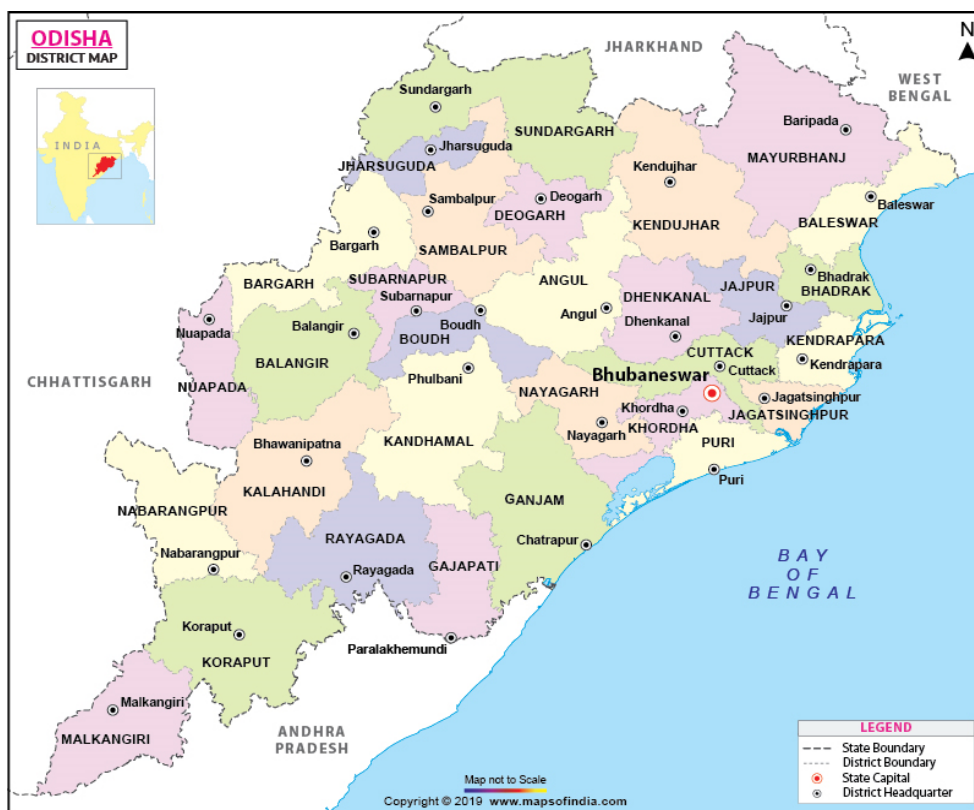


Fig. 1 Map of Odisha

Background

Historical Perspective of Agriculture in Odisha

The agrarian economy in Odisha underwent a rapid decline owing to many impediments. The economic history of Odisha was a part of the vast colonial system of the British rule. The people of Odisha had never been exposed to economic maladies as strongly as they were during the British rule. Agriculture plays a dominant role in the State of Odisha and contributes about one-fourth of NSDP for the state. It provides direct and in-direct employment to above 60 per cent of the total work force as per 2011 Census. Paddy is principal food crop of the State occupying three-fourth of gross cropped area. Pulses and Oilseeds occupy about 10 and 5 per cent of gross cropped area, respectively. Cash crops like sugarcane, potato, chilly and other crops cover rest 5 per cent of gross cropped area (Government of Odisha, 2018).

The agriculture in Odisha is characterized by low productivity due to traditional agricultural practices, inadequate irrigation infrastructure, and small size of holding and low investment/capital formation in agriculture. Nearly 60 per cent of the cultivable land is rainfed and exposed to the vagaries of monsoons. Out of the total number of operational holdings about 80 per cent is held by small and marginal farmers (Government of Odisha, 2018). In 1995-96, state agriculture policy has given agriculture the status of an industry. Steps have been taken to promote entrepreneurship in agriculture and horticulture. State Government is promoting agriculture through Agri-Export Zone (AEZ) in the district of Kandhamal and Koraput. State Government has made policy to provide irrigation to at least 50 per cent cultivable land through completion of in-complete projects, proper implementation of on farm water management schemes and by implementing Biju Krushak Vikash Yojana (BKVY). Watershed missions have been set-up at State level and District level to improve soil and water management and hence improving agriculture productivity. Agriculture credit has been given adequate emphasis for improving agriculture production and insuring the farmer against loss of crop. Emphasis has been given to improve use of fertilizer through organic farming as well as better availability of fertilizer use in affordable areas. On the basis of aridity index, the state can be divided into four zones:

- High moisture deficit zone (45 and above; North-western districts)
- Moderately high moisture deficit zone (40 to 45; South coastal districts)
- Medium moisture deficit zone (35 to 40; Central table-land)
- Low moisture deficit zone (35 and less; North coastal districts).

It has more than 80 per cent of population as rural population. The total workers of the state are of about 40 per cent. Out of the total workers, main workers are about 60 per cent and marginal workers are about 30 per cent. Agricultural labourers are about 20 per cent and 60 per cent of main workers and marginal workers, respectively.

Agro-Climatic Zones of Odisha

Agro-climatic classification can explain the agricultural diversity in Odisha. On the basis of soil structure, humidity, elevation, terrain, vegetation, and rainfall and other agro-climatic factors, Odisha has been categorised into ten agro-climatic zones. The variation in irrigation potential also plays a vital role in deciding cropping system to be practiced in a particular agro-climatic zone.

The agro-climatic zones of Odisha broadly fall under four topographic zones i.e., coastal plain, middle mountainous and high land region, central plateau and western rolling uplands. Of these four topographic zones, middle mountainous and high land region topography covers 70 per cent of the total geographical area in Odisha. Based on agro-climatic zones suitable management zone can be delineated and crop production as well as horticultural production can be planned. As area under each agro-climatic zone has similar features, hence, management strategy tested at a particular location in an agro-climatic zone is expected to perform similarly throughout the agro-climatic zone. While planning for agricultural activities, agro-climatic zone-specific action plan must be developed.

Climatic Potentials and Constraints

Average annual rainfall of the state is more than 1400 mm, about 80 per cent of which is the monsoon rainfall. The average winter rainfall is 162 mm. Total number of rainy days is 69, whereas monsoon rainy days are 52. Highest annual rainfall in the state is in the district of Malkangiri (1667 mm) followed by Boudh (1623 mm). Similarly, highest number of rainy days are in Koraput district (84) followed by Mayurbhanj (77). The lowest annual rainfall is in the district of Ganjam (1276 mm) followed by Raygada (1286 mm). Least number of rainy days are in Bolangir district (60) followed by Nuapada (61).

Average maximum and minimum temperature of the state is 31.90C and 21.00C, respectively. Average highest maximum temperature is 37.70C in the month of May whereas least minimum temperature is 13.60C in the month of December. Average mean maximum temperature is highest in Titlagarh (34.90C) whereas the lowest is in Koraput (16.70C). Highest maximum temperature is in Titlagarh in the month of May (43.20C) followed by Sambalpur (41.0C). The mean relative humidity of the state varies from 64 per cent in the evening to 73 per cent in the morning. The highest relative humidity in the morning is in Gopalpur and Paradip (81%) whereas in the evening highest relative humidity is in Puri (81%) followed by Paradip and Gopalpur (79%).

The climatic constraints are erratic rainfall both in monsoon and also in non-monsoon season. Recently temperature rise has become a constraint. Length of winter season has been reduced. Sometimes cyclonic rainfall occurs in unusual month i.e. in November. In some years there is huge rainfall; 60 per cent of the monsoon rainfall occurs in the month of May or sometimes in the beginning of June and a long drought spell is felt in the monsoon season.

Socio-economy of Odisha

Odisha with vast water resource potential, rich soil and wide gap between potential and actual yields of crops, the state has a good scope to lead country in food grain production. In Odisha, the coastal agro-climatic region has rural poverty head count ratio of 45-46 as compared to as high as 69 per cent in other climatic regions (Government of Odisha, 2018). Out of a total 68 agro-climatic regions in the country, the poorest are in Dankaranya areas of south Odisha and south Chhattisgarh. Although agriculture dominates the economy of the region, the agricultural growth has been slower as compared to that of all India level and below the population growth. During 1993-94 to 1996-97, the agriculture output in Odisha has been declined. Given the strong linkage between output growth (particularly agricultural growth which is dominant to Odisha economy) and reduction in poverty, accelerated agricultural growth is critical. Unfortunately, the agricultural growth in Odisha has averaged just over 1 per cent per annum over the last two decades and it is still much less in KBK districts (Government of Odisha, 2018).

Further, there is volatility in annual average growth rate in agricultural sector. While during 1980-85, the annual average growth rate in agriculture was 3.1 per cent; in 1985-90, it declined to -1.4 per cent and was just 0.2 per cent in 1990-96. Averaging for 1980-96, it is 1.8 per cent. 1996-97 was a drought year and if we include this year, the growth rate becomes 0. (CMIE, Profile of State for various years and Economic Survey, GOI, various years).

The sources of this volatility are three folds: Low irrigation coverage: an erratic climate with deviation in rainfall of 20 per cent or more every third year and most strikingly a very high degree of dependence on a single crop, rice that occupies about 90 per cent of the food grain area (Government of Odisha, 2018). The total irrigated area of the state is less than 50 per cent but for hilly agro climatic regions, this hovers around 10 per cent. The low income from agricultural sector resulting in low level of employment is the obvious reason for the endemic poverty of this region. The region is trapped in the vicious circle of low agricultural performance and poverty.

The state stands at 11th position in terms of population in the country. As per the census conducted in 2011 (Table.1), the population of the state is 41974218 with a sex ratio of 978 females in 1000 male (Census, 2011). As per an estimate by the World Bank group, around 33 per cent people in the state lives below poverty line. The same report also shows that the poverty reduction in Odisha is faster as compared to other low-income states

Table 1. A brief profile of the state is given below:

Particulars	Value
Geographical area (sq.km.)	15570730
Districts(no.)	30
Subdivisions(no.)	58
Gram panchayats	6802
Villages (inhabited)	47677
Total population	41974218
Sex ratio (female per 1000 male)	978
Literacy rate	72.9
Population density (per sq km.)	270
Urbanisation (%)	16.7

Source: Census 2011

Climate Smart Extension

Climate smart extension (CSE) is an advisory services for transferring various forms of climate information to farmers in order to help them to make informed farming decisions, implement climate-smart technologies to adapt to climate change and mitigate its effects, and reduce GHG emissions in agricultural practises in order to achieve global food security (Prasanth and Palaniappan, 2019). EAS may play a vital role in promoting CSA by transmitting real-time climate information to farmers. It helps to increasing farmers' awareness and knowledge of climate change. Various extension methods, which can be used effectively to strengthen the capacity of farmers to adopt CSA (Singh, 2020) are climate awareness programmes/ campaigns, exhibition, climate workshops, climate trainings, climate smart farmers field schools (FFS), field visits to progressive farmers, demonstration on different adaptation/ mitigation practices, dissemination of appropriate climate resilient technology, contingency crop planning, Jaldoot - community level extension professional, community based disaster management (CBDM) approach, village climate risk management committee (VCRMC), agro-meteorological advisory service, village level custom hiring centres (CHCs).

Extension and advisory services (EAS) can play a crucial role in upscaling and out scaling of CSA. EAS contribute to the achievement of all three goals of the CSA (food security, adaptation, and mitigation), although their current emphasis is on food security through increased productivity. EAS must now be implemented more aggressively to assist rural populations in adapting to

climate change and to contribute to climate change mitigation (Sulaiman et al., 2017).

EAS need to include an array of function being an integral part of agricultural innovation systems. Upscaling of CSA is not only merely disseminating information or advising farmers on how to adopt a climate smart variety, practice, or product, which is a necessary but not sufficient precondition to achieving desirable impact of CSA, and therefore must be combined with other innovation management functions that can be accomplished through building partnerships. EAS must engage in testing and adaptation of new knowledge, reflective learning, provisioning of incentives, inputs & infrastructure, setting up user/ client groups, capacity development of all stakeholders, and policy engagement & advocacy (Sulaiman et al., 2018). Identification and upscaling of CSA practices will need generation of knowledge in ever changing climate scenario. Monitoring, evaluation and learning mechanisms will be part of knowledge management strategy of EAS systems. If EAS providers are to contribute significantly in screening and upscaling CSA they also require to engaging more in research.

Objective of the study

The objective of present article is to document and understand the differential adoption of CSA interventions.

Methodology

To analyse the adoption of different CSA interventions in the face of climate change, a study was conducted in the climatically vulnerable districts of Odisha. The locale of present study was the state of Odisha that is characterized with a unique geographic location on the east coast of India with contrasting agro-ecosystems, dominated with small and marginal farmers with about 38% cultivators & 62% agricultural labourers along with a vulnerable coastline & fragile ecosystem (State of India's Environment Report, 2021). Therefore, the state of Odisha was purposively chosen for present study. Indian Council of Agricultural Research (ICAR) launched National Innovations in Climate Resilient Agriculture (NICRA) since 2011 through ICAR institutes, SAUs and Krishi Vigyan Kendras (KVKs or Farm Science Centers) in climate sensitive districts of India. For the present study, one coastal and one non-coastal NICRA district was purposively selected, namely, Kendrapara and Dhenkanal, respectively; based on the functionality of NICRA project as well as their level of vulnerability to climate change (Bahinipati, 2014). During the pilot study it was identified that each district had adopted different CSA interventions. And there was though

little similarity in types of CSA interventions, however the adoption of farmers was different. Using random sampling with proportionate allocation 200 beneficiary farm households (100 from each district) as respondents for present study. The agricultural and climatic conditions of Odisha are very dynamic and a brief characterization about the same will be helpful to understand the differential adoption of CSA interventions.

Results and Discussion

In response to the changing climatic conditions in Odisha, a number of CSA interventions are adopted by farmers. However, the extent of adoption as well as the interventions adopted was distinct for both the coastal and non-coastal districts of Odisha. The CSA interventions are classified into three pillars namely Scientific Technologies, Institutional Interventions, Indigenous Technical Knowledge and Information & Communication Technologies.

Table 2 and 3 respectively indicates the varied Scientific CSA interventions as adopted by coastal and non-coastal farmers. The coastal farmers adopted Natural Resource Management (NRM) based scientific interventions like Green manuring with dhanicha in Paddy (41%), Ridge and furrow method of moisture conservation (4%) and Renovation of traditional drainage system (4%) while under same category, the non-coastal farmers adopted Ridge and furrow method of moisture conservation (33%) and Planting multipurpose fodder trees on bunds (5%). The scientific crop farming based interventions as adopted by the coastal farmers included Paira cropping of Paddy-Green gram (14%), Flood tolerant variety of paddy (Swarna Sub-1) (79%) and Disease resistant variety of Green gram (PDM 54) and/or Black gram (PU 30) (55%) while under same category, the non-coastal farmers adopted Appropriate intercropping (Groundnut+Arhar) (31%), Introduction of new crops like groundnut (28%), Drought tolerant variety (Naveen, Anjali, Konark) (81%). The scientific livestock farming based interventions adopted by coastal farmers were High yielding breeds of livestock (36%), Khaki Campbell duck high yielding variety (5%), Cattle Feed Mixture (32%), Preventive vaccination in livestock (66 %) and Prophylaxis of Livestock (8%). The non-coastal farmers however adopted interventions like better and high yielding variety of buck (34%), Prophylaxis and mitigation of vitamins and minerals deficiency in livestock and poultry (48%) and Preventive vaccination in livestock (4%) under same category.

Table 2. Scientific CSA technologies as adopted by the farmers in coastal district

Sl. No.	Scientific CSA technologies	Percentage of farmers adopted (n)
Natural resource management		
1.	Green manuring with dhanicha in Paddy	41
2.	Ridge and furrow method of moisture conservation	4
3.	Renovation of traditional drainage system	4
Crop farming		
1.	Paira cropping of Paddy-Green gram	14
2.	Flood tolerant variety of paddy (Swarna Sub-1)	79
3.	Disease resistant variety of Green gram (PDM 54) and/or Black gram (PU 30)	55
Livestock farming		
1.	High yielding breeds of livestock	36
2.	Khaki Campbell duck high yielding variety	5
3.	Cattle Feed Mixture	32
4.	Preventive vaccination in livestock	66
5.	Prophylaxis of Livestock	8

Table 3. Scientific CSA technologies as adopted by the farmers in non-coastal district

Sl. No.	Scientific CSA technologies	Percentage of farmers adopted (n)
Natural resource management		
1.	Ridge and furrow method of moisture conservation	33
2.	Planting multipurpose fodder trees on bunds	5
Crop farming		
1.	Appropriate intercropping (Groundnut+Arhar)	31

2.	Introduction of new crops like groundnut	28
3.	Drought tolerant variety (Naveen, Anjali, Konark)	81
Livestock farming		
1.	Better and high yielding variety of buck	34
2.	Prophylaxis and mitigation of vitamins and minerals deficiency in livestock and poultry	48
3.	Preventive vaccination in livestock	4

Majority of the coastal farmers adopted the institutional interventions (Table 4) like community managed farm machineries through custom hiring centres (CHCs) (73%) followed by Seed production and storage in paddy, green gram black gram using farmer groups (20%), Agro advisory based on IMD weather forecast and village weather observatory (17%), Training youths as livestock service providers for prophylaxis (15%) and Fodder bank (3%). Whereas the majority of non-coastal farmers adopted the institutional interventions (Table 5) like Community managed Custom Hiring Centres (82%) followed by Training youth as livestock service providers for prophylaxis (34%), Seed production and storage of paddy and groundnut through farmers' group (33%), Agro advisory based IMD weather forecast and village weather observatory (14%) and Promotion and capacity building for mushroom production technology (6%).

Table 4. Institutional interventions for CSA as adopted by the farmers in coastal district

Sl. No.	Institutional interventions for CSA	Percentage of farmers adopted (n)
1.	Community managed farm machineries through custom hiring centres (CHCs)	73
2.	Fodder bank	3
3.	Seed production and storage in paddy, green gram black gram using farmer groups	20
4.	Agro advisory based on IMD weather forecast and village weather observatory	17
5.	Training youths as livestock service providers for prophylaxis	15

Table 5. Institutional interventions for CSA as adopted by the farmers in non-coastal district

Sl. No.	Institutional interventions for CSA	Percentage of farmers adopted (n)
1.	Seed production and storage of paddy and groundnut through farmers' group	33
2.	Community managed Custom Hiring Centres	82
3.	Promotion and capacity building for mushroom production technology	6
4.	Agro advisory based IMD weather forecast and village weather observatory	14
5.	Training youth as livestock service providers for prophylaxis	34

The Information and Communication Technologies (ICTs) interventions adopted by both the coastal and non-coastal farmers were limited to one or two interventions. The majority of farmers in coastal district (Table 6) adopted Kisan Mobile Sandesh by Krishi Vigyan Kendras (KVKs) (97%) while only 10 percent farmers adopted Communication by KVKs about trainings &/ or meetings as an ICT intervention. In the non-coastal district (Table 7), majority of farmers adopted Krushak Odisha (information through calls from block officials) (90%) followed by 86 percent farmers adopted Kisan Mobile Sandesh as a climate smart ICT intervention.

Table 6. ICTs for CSA as adopted by the farmers in coastal district

Sl. No.	ICTs for CSA	Percentage of farmers adopted (n)
1.	Kisan Mobile Sandesh by Krishi Vigyan Kendras (KVKs)	97
2.	Communication by KVKs about trainings &/ or meetings	10

Table 7. ICTs for CSA as adopted by the farmers in non-coastal district

Sl.No.	ICTs for CSA	Percentage of farmers adopted (n)
1.	Kisan Mobile Sandesh	86
2.	Krushak Odisha (information through calls from block officials)	90

The findings of this study shows a significant difference in adoption of interventions that are in line with the findings of Palanisami et al. (2015). His study emphasised on the adoption and identification of demand specific CSA technologies and scaling out the same because every strata of farmers have different needs and prioritize technologies based on their need and capacity to adopt any technology. Those technologies put forth by the organizations matches the perceptions of the community, is expected to be adopted by the community (Acharya and Panda, 2013). The same is noticed in this study as well, only those technologies by NICRA that were location specific and need based were perceived effective by the farmers and readily adopted. However, it is noteworthy that the entire dynamics of perception of the CSA technologies was not just limited to the push factors by the organization rather it also was influenced by the pull factors of the farmers' characterization. Fusco et al. (2020) identified similar dynamics in his study where he agreed upon out-scaling those sustainable & resilient technologies that were effective only in a given context and if they were flexible & all-inclusive for all the sections of society.

Policy Implications & Conclusion

The differential adoption in case of Kendrapara (coastal) district as compared to Dhenkanal (non-coastal) district may be attributed to the effective & efficient implementation of different capacity building measures by Krishi Vigyan Kendra besides the technical & institutional interventions promoted under the NICRA. And it is worth concluding that involvement of KVK in implementation of NICRA has resulted in a better impact in that coastal district (Kendrapara) as compared to other non-coastal district (Dhenkanal) where interventions were made by ICAR institutes/SAUs alone on pilot basis without involvement of KVKs. Therefore, at policy level, a gradual shift from scale-neutral interventions to location-specific interventions under CSA is proposed as a potential solution under the given grim scenario of worsening climate change to achieve the aim of Climate Smart Agriculture.

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Electronic Negotiable Warehouse Receipt (eNWR)

A Tool to Promote Liquidity in Rural Area

Kanchan Bhagwat¹, Sangamesh Angadi¹, Akshita Vashisth² and Shalendra³

ABSTRACT

The warehouse receipt serves as collateral for loans, for delivery in accordance with a futures contract or for swapping. Realising the importance, the Government has taken various initiatives to make warehouse receipt negotiable, transparent and a sound instrument facilitating trade transactions and availability of credit mainly to smallholder farmers. Introduction of repositories have facilitated the introduction of a true electronic warehouse receipt in the Country. The electronic receipt exhibit various advantages over paper receipts. The system having online centralised management of records is transparent, efficient and facilitates easy transfer and splitting of receipts. Nearly one lakh electronic receipts were issued during 2020-21 by both the repositories namely NeRL and CCRL. The electronic warehouse receipt has shown its potential, though, it may need consumer specific products and creation of awareness to make the same popular among farmers.

Keywords: Agricultural Credit, Agricultural Marketing, Agri Warehouse, Food Supply Chain, Rural Area

Introduction

A shift in agricultural orientation has been observed from production toward agri-food policy (Chand, 2017). The Government has taken various policy initiatives to support the same including reforms in agri-warehousing sector. The provisions of Warehousing Development & Regulation Act, 2007 allows agri-warehouses to issue negotiable warehouse receipt enabling the user to avail loan from banks against such instrument issued against the stored produce. The system is expected to help farmers avoid distress sale, operate as a tool of trade and facilitate finance to the farmers, enable bank to improve the quality of lending services in agriculture sector and increase liquidity in the rural areas

1. Consultant, National Institute of Agricultural Extension Management (MANAGE), Hyderabad

2. Consultant, MANAGE

3. MANAGE Intern, MANAGE

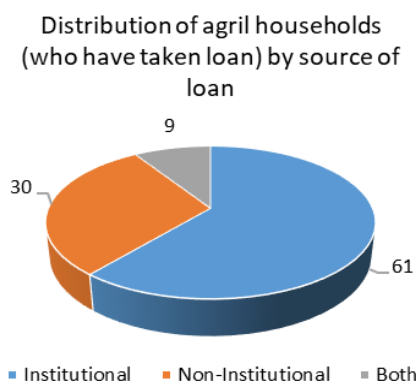
4. Director (Agricultural Marketing), National Institute of Agricultural Extension Management (MANAGE), Hyderabad

Corresponding Author Email: 24kbhagwat@gmail.com

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(PIB, 2011). Warehouse receipts as negotiable instatement that can be traded, sold, swapped, used as collateral to support borrowing, or accepted for delivery against a derivate instrument such as a futures contract (RBI, 2005). The receipt can also be used for offering collateral security. Approximately 30 percent of agricultural households still avail credit from non-institutional sources. The probable reasons could be that either their credit demand are for consumption purposes or they are tenant farmers, sharecroppers and landless labourers who are not able to offer collateral security to avail institutional credit, or they are involved in unviable subsistence agriculture and banks don't find them credit worthy. As a result, these farmers find it convenient to borrow money from non-institutional sources due to easy accessibility (RBI, 2019). With this background, it will be interesting to understand initiatives taken by the government and the actual electronic negotiable warehouse system (e-NWR) system immerging in the country as a result of these steps. The paper will speak about agri-warehousing sector in India, policies introduced by the government to strengthen the sector and how have these policies helped in development of an ecosystem for development of electronic negotiable warehouse receipt system. The paper is mainly based on secondary information culled out from reports of various public and private organizations. A few discussion were also organised online with officials of WRDA and NeRL to have a better understanding of the emerging ecosystem.



Agri-warehousing in India

Policy makers have recognised the importance of warehousing right from early days. The Royal Commission on Agriculture in India (1928) laid emphasis on development of storage and warehousing. The Commission recommended the establishment of licensed warehouses in India. The importance of warehousing was felt seriously in India and in the year 1944, the Reserve Bank urged all the State Governments by issuing directions to enact legislation for setting up of warehouses in their concerned States. The Government of India appointed Agricultural Finance Sub-Committee under the chairmanship of late Prof. D. R. Gadgil to report the ways to overcome rural indebtedness. The Gadgil Committee observed that finance provided by the commercial banks to the

agriculturists could be increased considerably by improving the arrangements for marketing of crops by grading and standardization, creation of proper storage facilities and promoting regulated markets. The Committee also felt the need for introducing negotiable warehouse receipt system in the country with ability to enhance rural credit.

The Rural Banking Enquiry Committee in 1949, suggested an institutional arrangements, with participation of Central and State Governments along with Reserve Bank of India, to promote construction of scientific warehouses in the country. The need for similar institutional arrangements was further emphasised by Rural Credit Survey Committee in 1954, which led to enactment of the Agricultural Produce (Development and Warehousing) Corporations Act, 1956. This enactment helped in establishment of public warehousing system in the country operating at three levels, the Central Warehousing Corporation (CWC) for the markets of all India importance; State Warehousing Corporations (SWC) for secondary markets operating at district level and Cooperatives to look after the warehousing needs at the village and community level. In the year 1962, the Government of India decided to split the Agricultural Produce (Development and Warehousing) Corporations Act, 1956 into two Acts, namely National Cooperative Development Corporation Act, 1962 and the Warehousing Corporations Act, 1962. National Cooperative Development Corporation Act, 1962 is responsible for different activities being carried out by Cooperatives. Whereas, the Warehousing Corporations Act, 1962 defines specific functions and areas of operation of Central and State Warehousing Corporations along with the list of notified commodities allowed for storage. Such warehouses can store seeds, manures, fertilisers and agricultural implements in addition to agricultural produce.

Encouraged participation of private sector

Considering the role played and services offered by warehouses in supply chain followed by most of the agri-commodities, it is important for warehouses to be equipped with technology allowing temperature control, moisture control and other such specifications. Therefore, increased investment mainly coming from private sector has become a necessity for development of cold storages, temperature-controlled vehicles and other technologically supported storage spaces so as to support emerging modern supply chain required to deliver safe food/ product as per the requirements of the consumers. Accordingly, the Government has introduced various programs and schemes to encourage participation of private players in agri-warehousing sector. Same has also been observed in the growth registered in the storage capacity created by private sector over last ten years as depicted in Table-1. The table reveals that the storage

capacity during 2020-21 over 2010-11 has increased by 57.45 million MTs. The major contribution to this increase in storage capacity has come from State agencies and private sector. The storage capacity managed by private sector increased four times from 18.97 million MTs during 2010-11 to 78.56 million MTs during 2020-21. This clearly indicate the conducive environment created by the policies of the Government has helped in brining desired changes at the ground.

Table 1. Storage Capacity created by different organisations

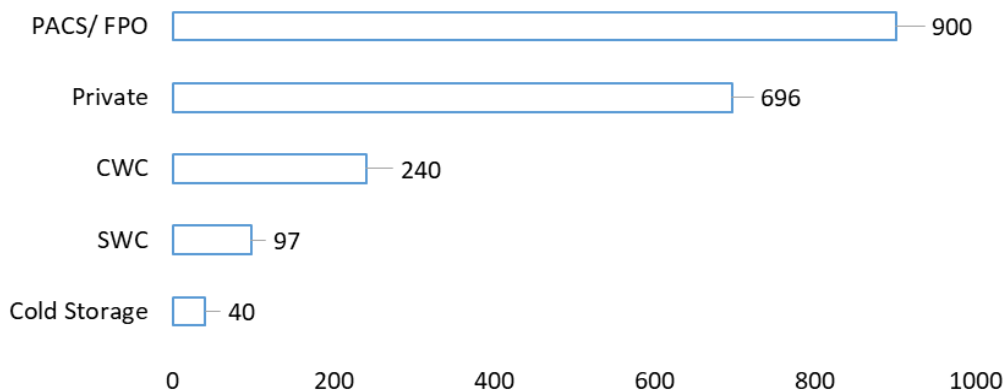
Sl.No.	Organisation/ Sector	Capacity in Million MTs		Change (%)
		2010-11	2020-21	
1	Food Corporation of India (FCI)	32.05	12.70	-60.37
2	Central Warehousing Corporation (CWC)	10.07	14.5	43.99
3	State Warehousing Corporation (SWCs) and other state agencies	32.59	43.91	34.73
4	Cooperative Sector	15.07	16.53	9.69
5	Private Sector	18.97	78.56	314.13
	Total	108.75	166.2	52.83

Source: Annual Report, WDRA, 2010-11 & 2020-21 (<https://wdra.gov.in>)

Need for reforms in agri-warehousing sector

The massive growth in private warehousing capacity led the Government to develop regulatory processes to facilitate development of a credible warehousing ecosystem in the country with ability to make warehouse receipt truly negotiable. Accordingly, the Government of India has enacted the Warehousing (Development and Regulation) Act, 2007 to strengthen warehousing activities in the country and put in place a regulatory framework for negotiable warehouse receipt system. The Warehousing Development & Regulation Act, 2007 came into effect from 25th October 2010 mainly to ensure the development and regulation of warehouses, make warehouse receipts truly negotiable and establish Warehousing Development and Regulatory Authority (WDRA) as the institute to ensure implementation of various provisions as envisaged in the Act. The Authority was set-up by the Government in October 2010 to regulate and facilitate development of warehouses in the Country. The receipts issued by the warehouses registered with Warehousing Development Regulatory Authority (WDRA) would be fully negotiable instrument backed by central legislation. The authority has registered a total of 1973 warehouses with roughly half of

them coming from PACs and FPOs suggesting the importance of warehouses



Electronic Negotiable Warehouse Receipt (eNWR)

The Authority established under the Act, 2007 has set forth minimal monetary, legal and infrastructure conditions for a warehouse to be registered with the Authority. Registered warehouses can issue negotiable warehouse receipt which can be used by the depositors inducing farmers as collateral for availing bank loans. The negotiability of the receipt is provided as per the provisions of the Act which led to increase in the confidence of banks and depositors. An electronic negotiable warehouse receipt must be issued by registered warehouses only in accordance with the WDRA Notifications (Singh et al, 2022). As per the Warehousing Development and Regulation Act (2007), the Negotiable Warehouse Receipts (NWRs) can be in both in paper and electronic forms. The system of electronic negotiable warehouse receipts (e-NWR) was launched by the Authority on 26th September 2017 (GoI, 2021). In order to facilitate management of database and support electronic receipts, two repositories namely NeRL and CCRL have been established by WDRA. The electronic repository system maintained as per the guidelines developed by WDRA facilitates in overcoming challenges related to paper receipt and associated trade transaction based paper work. Electronic receipt are maintained in repository accounts similar to holding shared in DEMAT Accounts. Ownership of eNWR can be transferred smoothly through transfer from one account to other. Finance against eNWRs can also be availed easily because of involvement of repository establishing linkage with all possible stakeholders.

Superiority of electronic over paper receipt

The electronic negotiable warehouse receipt offers various advantages over present paper dominated receipt system. The physical receipt bases system suffers from various limitations like lack of trust among stakeholders, limited transparency and market access, operational challenges and high cost of transactions. Some of the advantages offered by electronic over physical receipt are presented in Table-2.

Table 2. Advantages of electronic over paper receipt

Paper based Warehouse Receipt	eNWR
Can be shared with prospective buyer in a one to one mode only	Help farmers / depositors to have access to a large number of buyers nationwide with better bargaining powers;
Cannot be split	eNWRs can be split with obligation to transfer only a part of the commodity
Prone to loss, mutilation, tampering, fudging of warehouse receipt information.	No possibility of any such eventuality
Inherent difficulties in efficient clearing and trading in a transparent manner	Promote an efficient clearing, settlement and delivery system with transparency in trading of agricultural produce
Difficult to share vital information of the warehouse receipt with multiple stakeholders	Its easy to share vital information of the eNWR with multiple stakeholders like bankers, commodity exchanges, government, etc.
No uniformity of information in the receipt	Standard format as prescribed under the Act and Regulation
Not regulated	Regulated by a statutory Authority
Assaying is not mandatory	Reporting the quality of goods in eNWR is mandatory
Risk of issuing of warehouse receipt without receiving goods	Possibility ruled out
Risk of issuing a duplicate warehouse receipt without following the procedure	Not Applicable
Fraudulent overstatement of the value of goods is possible	Agmark.net prices are retrieved

No monitoring and surveillance	Regularly monitored by WDRA
Problems in valid transferability of goods in case of transfer/ endorsements due to trades without legal negotiability to the warehouse receipts.	Being electronic in nature, multiple transfers are easy and with due backup of W(D&R) Act, 2007
Higher litigations in case of non-regulated warehouses	Litigation shall be greatly reduced

Source: NeRL (2022) Introduction to Electronic Negotiable Warehouse Receipt (eNWR). Unpublished document by National E-Repository Limited (NeRL), Mumbai

Benefits

The repository maintained eNWR system facilitates integration between different stakeholders like warehouse, bank, exchange, assayer and the participants leading to higher efficiency in operations. The system having online centralised management of records is transparent, efficient and facilitates easy transfer and splitting of receipts. The smooth interaction between different players of supply chain reduced the need for collateral monitoring and surveillance and therefore, making finance available at lower rate of interest.

Challenges

The Warehousing Development and Regulation Act (WDRA) of 2007 established the repository system and other regulations but the agri-warehousing industry in India still faces a number of challenges related to lack of infrastructure, participation of private sector which is required to be improved further and make more structured, lack of comprehensive development as investment in infrastructure like cold storage is still limited through agriculture is diversifying towards high value crops, standardisation and mainly the lack of trust and limited participation by farmers. In order to overcome these challenges, it is important for the government and private sector to invest in infrastructure, technology and capacity building. Developing products and creating awareness mainly among farmers can also play a significant role in building trust and encouraging participation of farmers in the sector.

Repository system introduced by WDRA

In order to facilitate electronic and transparent maintenance of information, the Authority has introduced an intuitional arrangement having repositories in its core. The repository system is an electronic record-keeping system that

allows warehouse operators to keep track of and update information about the commodities stored in their facilities. This information is made available to the public via a central electronic repository maintained by the Warehousing Development and Regulatory Authority (WDRA). The repository system mandates that warehouse operators register with the WDRA to get registered with at least one of the repositories empanelled by the Authority (NeRL & CCRL) before starting operations. The authority has empanelled two repositories namely National E-Repository Limited (NeRL) and CDSL Commodity Repository Limited (CCRL). Once registered, companies are required to keep accurate records of the goods kept in their warehouses, including details on the kind, quantity and quality of the commodities as well as the names and addresses of those who use the warehouse. This data is then regularly uploaded at the central repository and made available to the public.

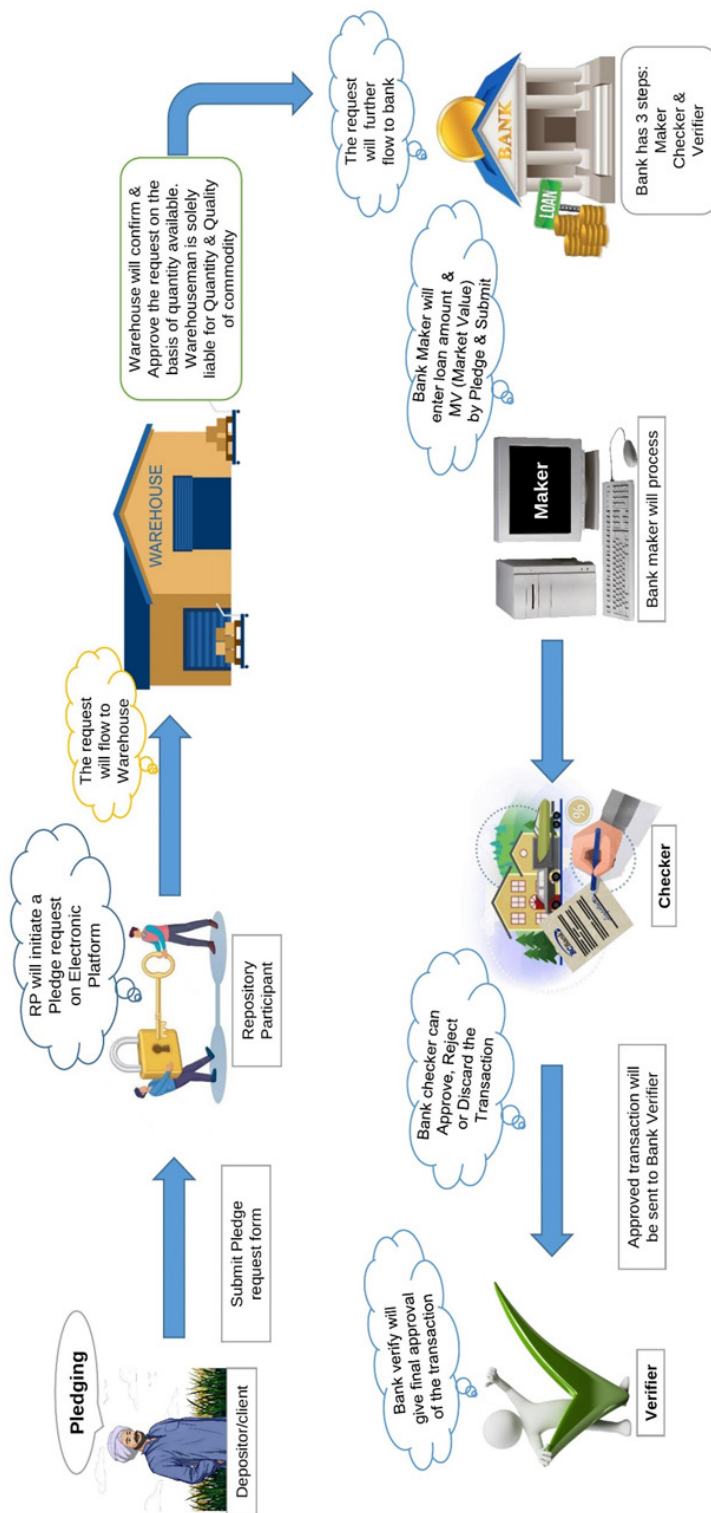
The repository system has several advantages for both warehouse operators and the general public. It helps warehouse operators streamline and automate the process of record-keeping, which can be time-consuming and error-prone when done manually. It also improves transparency and accountability because all information is accessible to the public and easily verified. The repository system makes it easier for the farmers and other commodity producers to find and compare different warehouse operators, as well as to check the availability and quality of commodities stored in a specific warehouse. Overall, the repository system aims to improve the efficiency, accessibility and transparency of warehousing and storage industry in India by leveraging the use of technology and regulations, encouraging the use of standard warehouse receipts. This is important for warehouse operators to be able to raise finance against the stored goods, facilitating commodity marketability and increasing farmer bargaining power.

Progress of eNWR

The warehouses registered with the Authority are required to register with at least one of the two repositories to be able to issue e-NWR. Most of the WDRA registered warehouses were issuing both manual as well as electronic receipts to their respective depositors, but from 1st August 2019, it was made mandatory for all such registered warehouses to issue receipts only in electronic form to all depositors whether public or private. The concept is gradually getting popular as suggested by the number of receipts issued by the repositories during 2020-21 (Table-3). A total of 88480 receipts have been issued by NeRL & CCRL during 2020-21. However, majority of the receipts issued are exchange based and issued by NeRL.

Pledge Process

The process flow at the sample markets after their integration with the e-NAM platform Figure 2.



Note – The Pledge Process Flow presented above is based on inputs received during discussion with NeRL Officials

Table 3. e-NWRs issues by repositories during the year 2020-21

Repository type	Exchange based	No-exchange based	Total
NeRL	70008	6574	76582
CCRL	11830	68	11898
Total	81838	6642	88480

Source: WDRA Annual Report 2020-21

e-NWR and e-NAM

Digital receipts will also facilitate integration with other platforms as has been experienced in case of National Agricultural Market (e-NAM) which is an online platform facilitating wholesale trade at regulated APMC Mandi. e-NAM has now been integrated with e-NWR which allows farmers having electronic receipt from registered warehouses to trade commodities on e-NAM platform. This type of trade provisions help in improving the efficiency of markets by avoiding hassle of moving their stocks from one mandi to another and rather make sales against the receipt itself. The farmers can also monitor prices and make transaction only when they feel a desirable price is prevailing in the market for their commodity.

Conclusion

In order to make agri-warehousing system integrated, efficient and be utilised as a tool to improve liquidity in rural areas, the Government has taken various initiatives like enactment of W(D&R) Act, 2007 and implementing its various provisions through the Authority established there under. The provisions of Act have not only helped in creating an environment for making the warehouse negotiable but introduction of a system revolving around repositories to maintain all the trail of transactions electronically will facilitate not only in making the system more efficient and transparent but will lead to improved liquidity in rural areas. Though, there is need to come up product specific to the requirement of farmers and create awareness to help farmers mainly smallholders to optimally utilise the benefits made available through these provisions and programs.

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Implementation of National Agricultural Market (eNAM)

A successful case of APMC Nizamabad (Telangana)

Sangamesh Angadi¹, Madhulatha C² and Shalendra³

ABSTRACT

Indian agriculture has achieved impressive growth in terms of production which increased many fold since independence. However, challenge is to link this production efficiently with market. Realising the importance of market, the Government has taken various measures to make marketing system more efficient, responsive, liberal and infrastructure rich. National Agricultural Market (eNAM) is one such initiative which is a comprehensive marketing concept helping integration of exchange functions of a market with physical and facilitating functions under as a single window. Progress of the concept has been impressive with 1361 markets getting integrated with eNAM platform from 27 states/UTs. The concept has also seen introduction of initiatives like FPO Module to facilitate trade by farmers' organisation, warehouse based trading, logistic module and Platform of Platform (POP). Telangana has emerged as a successful example in implementing eNAM capturing more than 10 percent of the all India users registered on the platform like traders, commission agents and farmers with proportionately less number of markets. APMC Nizamabad is a successful example with many lessons for other interest markets and states like shifting from manual auction to e-tendering for price discovery, alternative of direct sale platform available to farmers, optimal utilisation of facilities by creating extra gate entry points and digitisation of weighment process. Integration of services like storage and finance have made the Nizamabad market operate as a service unit. The Nizamabad Market suggest that the platform of eNAM can be leveraged for improving the efficiency of market and help it convert into a service unit.

Keywords: Agricultural Marketing, APMC, eNam, Electronic Commerce

Introduction

Indian agriculture has achieved impressive growth with foodgrain production increasing many fold during 1950-51 to 2022-22. This increased production is

1. Consultant, National Institute of Agricultural Extension Management (MANAGE), Hyderabad
 2. Consultant, MANAGE
 3. Director (Agricultural Marketing), National Institute of Agricultural Extension Management (MANAGE), Hyderabad
- Corresponding Author Email: sangameshangadi5@gmail.com

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required to be supported by efficient marketing system to help farmers realise the complete price benefit. An efficient marketing system protects the interests of both producer and consumers. Accordingly, the Government has taken several measures to make marketing system more efficient, responsive, liberal and available with sufficient infrastructure to help farmers realise the best possible price. National Agricultural Market (eNAM) is one such initiative by the Government.

The online trading portal of eNAM was launched by the Government on 14th April 2016 on a pilot basis in selected markets. The concept aims at ensuring price discovery in real time by elimination the information asymmetry between buyers and sellers. The concept has the ability to address various limitations of the traditional marketing system by creating a unified market through an online trading platform at the national level and bringing uniformity in standards and procedures across the markets participating on the platform. The concept will facilitate seamless information flow among buyers and sellers through the transparent automatic auction process and price discovery (Schmitz, 2000). Under eNAM, farmers get access to buyers across the nation, and the price is discovered based on its nationwide demand ensuring better price coupled with instant online payment. eNAM is a, comprehensive marketing concept facilitating not only the exchange functions of a market but also the physical and facilitating functions as a single window (Aditya and Bhaskar, 2017). It has the ability to address challenges related to infrastructure, institution and information (Bisena and Kumar, 2018). Though, its success and acceptance among different stakeholders, mainly the farmers, will depend on factors like, efficiency in auction and payment, reliability in transaction, scalability and access (Lee and Lee, 2009).

In an environment where slow growth of the concept has been observed in many states, Telangana has emerged as a successful example in implementing eNAM. There are successful examples from the state like APMC Nizamabad. It would be interesting to understand performance of the concept of eNAM in Telangana and draw learning for other markets from successful example like APMC Nizamabad which has introduced various changes to make it adjusted to the requirement of eNAM platform.

National Agricultural Market (eNAM)

National Agricultural Market (eNAM) is a pan-India electronic trading portal which networks the existing APMC mandis to create a unified national market for agricultural commodities. The concept aims at integration of selected APMCs across the country through a common online market platform to facilitate pan-India trade in agriculture commodities and providing better price

discovery through transparent auction process based on quality of produce along with timely online payment. The concept pilot launched in India on 14th April 2016 in selected 21 regulated wholesale markets (APMC) from 08 State increased to 585 markets, subsequently to 1000 markets from 21 States/ UTs and at present 1361 markets from 27 States/UTs. The concept, though miles away from emerging into a fully operational national market for agri-commodities facilitating integration of markets and services with the application of ICT, has been successful in creating the desired environment by inducing competition, reducing collusion among traders and realization of better price by the farmers. There are studies suggesting the reduction in collusion among traders by 55 percent as perceived by farmers. More than one-third of the farmers observed reduced incidences of deduction by commission agents in the name of recovery of previous loans. Increased transparency has also been reported by 68 percent of the farmers with three-fourth of the farmers receiving payments on time. Majority of the traders participating in e-NAM trading are satisfied from trade on digital platform. The review of literature on the implementation of eNAM in selected states like Punjab, Odisha, Himachal Pradesh, Haryana and Gujarat and field observations from states like Telangana, Rajasthan and Karnataka suggest that the introduction of eNAM has facilitated various positive changes at local level like time efficiency and short trade cycle getting completed on the same day which concludes with final payment to the farmers. Farmers have also been able to realize better price due to higher number of bids received per lot due to increased competition and transparency after the introduction of e-NAM.

The digitization of markets under eNAM provides opportunities to bring in efficiency in performing various functions associated with trade of agri-commodities and encourage participation of different stakeholders to improve operational efficiency. However, these opportunities are required to be looked upon at bringing efficiencies in intra-mandi operations in short-run and facilitating inter-mandi trade with integration of various other services like grading and assaying, logistics, payment, dispute redressal, etc., in long run. In order to make eNAM more efficient and acceptable, it is important to take appropriate lessons from the states having examples of successful implementation of eNAM like Telangana.

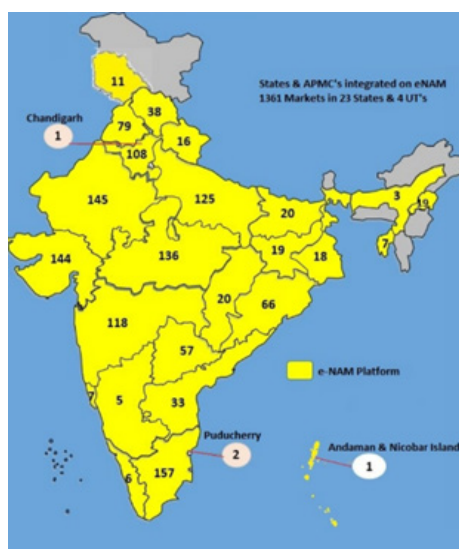


Fig 1. Status of markets registered under eNAM (Sourced on 10.04.2023)

Implementation structure

Different agencies are associated with the implementation of eNAM at national and state level. The Small Farmers Agribusiness Consortium (SFAC) is the lead agency for implementing Electronic National Agricultural Market (eNAM) which operates under the aegis of Ministry of Agriculture and Farmers' Welfare, Government of India. M/s. Nagarjuna Fertilizers and Chemicals Ltd. is the Strategic Partner (SP) and is responsible for development and maintenance of software, customizing it to the specific requirements of the mandis in the States willing to integrate with NAM and running the platform. State government is responsible for bringing desired reforms and creation of requisite infrastructure.

Progress of eNAM in India

The electronic trading portal developed under national agricultural market is an attempt to modernise agricultural marketing system through application of technology. The concept has made reasonable progress with 1361 Mandis integrated from 27 states / Union Territories (Figure-1). However, the state wise distribution of 1264 mandies as on 31.03.2023 is presented in the Table-1. Recently, a few mandis from Karnataka having a separate Unified Market Platform called ReMS have also been integrated with the e-NAM platform. Currently, about 1.75 crore farmers and 2575 Farmer Producer Organizations (FPOs) are registered on the platform suggesting that many farmers may have transacted through e-NAM. Entire transaction proceeds are facilitated by about 2.43 lakhs traders and about 1.09 lakhs commission agents registered on e-NAM platform across the networked mandis.

Table 1. State wise status of Mandis registered (As on 31.03.2023)

Sr. No.	Name of State/UT	Mandis registered on e-NAM	Registered Traders on e-NAM	Unified licenses issued by State (No.)	Percent Unified Licenses (%)
1	Andaman & Nicobar Islands	1	4	0	--
2	Andhra Pradesh	33	3,546	3,546	100.0
3	Assam	3	8	0	--
4	Bihar	20	26	0	--
5	Chandigarh	1	119	0	--
6	Chhattisgarh	14	3,176	47	1.5

7	Goa	7	350	197	56.3
8	Gujarat	122	9,920	9,832	99.1
9	Haryana	108	15,637	35	0.2
10	Himachal Pradesh	26	2,065	0	--
11	Jammu And Kashmir	11	1,895	0	--
12	Jharkhand	19	2,443	32	1.3
13	Karnataka	2	701	701	100.0
14	Kerala	6	388	55	14.2
15	Madhya Pradesh	136	22,507	1,100	4.9
16	Maharashtra	118	21,917	0	--
17	Nagaland	7	28	0	--
18	Odisha	54	8,201	8,201	100.0
19	Puducherry	2	198	0	--
20	Punjab	79	2,695	1	--
21	Rajasthan	145	84,011	84,011	100.0
22	Tamil Nadu	127	8,907	5,517	61.9
23	Telangana	57	5,908	5,908	100.0
24	Tripura	7	11	0	--
25	Uttar Pradesh	125	38,881	38,881	100.0
26	Uttarakhand	16	5,377	5,377	100.0
27	West Bengal	18	4,286	42	1.0
	Total	1,264	2,43,205	1,63,483	67.2

Source: enam.gov.in

The information compiled in the table reveals that more than half of the traders registered on e-NAM have unified license with permission to trade across the mandis within their respective states. Among all the 27 states/UTs, states like Andhra Pradesh, Karnataka, Odisha, Rajasthan, Telangana, Uttar Pradesh and Uttarakhand have given unified licenses to all the registered traders. There are states like Goa, Kerala and Tamil Nadu with moderate beginning. However, the progress of some of the states/UTs like Bihar, Chhattisgarh, Chandigarh, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Maharashtra, Madhya Pradesh, Nagaland, Puducherry, Punjab, Tripura and West Bengal having issued only a limited number of licenses or no licenses have been issued. The limited unified license issued to registered traders may defeat the purpose of eNAM for ensuring better price discovery. There is provision for completing trade in 209 commodities on the eNAM Platform.

Recent developments in eNAM in India

In order to make the concept more comprehensive and user friendly, various new concept have been introduced during 2020, as listed below –

FPO Module for trade

FPO trading module in e-NAM helps FPOs to trade their produce from their collection center without bringing the produce to APMC. Produce aggregated at FPO can participate directly on eNAM platform without the need to take it physically to the market.

Warehouse based trade

Warehouse based trading module in e-NAM software facilitates trade from warehouses based eNWR. Produce stored in registered warehouse (WDRA) and declared as Mandi can directly participate on eNAM platform through this module. Already, States of Telangana (14 warehouses) & Andhra Pradesh (23 warehouses) have declared designated warehouses in the State as deemed market.

Logistic Module

The module facilitates transportation of the commodities from farm to mandis and mandis to warehouse/ consumption centres. Nine logistic service providers/ aggregators linked with 2.3 lakhs transporter and 11.37 lakhs vehicles have been on-boarded on eNAM platform.

Platform of Platform

The government introduced eNAM – Platform of Platforms (POP) in July 2022. The platform will facilitate farmers in having access to different buyers and various service providers. A wide range of provisions are covered under the POP like trading, assaying, transportation, warehousing, financial services, agri-advisory/ extension services, market information, assaying, institutional buying and selling, and agricultural inputs services. The platform has the ability to integrate different players of the value chains leading to transparency and efficiency in price discovery and delivery of commodity.

Progress of eNAM in Telangana

The concept of eNAM was introduced in the Telangana State during 2016 in five selected mandis on pilot basis namely AMC Nizamabad, AMC Warangal, AMC Badepally, AMC a Hyderabad and AMC Thirmalgiri. At present 57 markets

are registered under eNAM in the States. The state has taken multiple steps to popularise the scheme as well as encourage efficient handling of the mandi level operations leveraging eNAM portal like introduction of digital weighing scales, integration of warehouses and assaying facility under PPP Mode. The initiatives of the marketing department have reduced manual intervention and associated error leading to efficient delivery of marketing services. More than 1.83 million users covering traders, commission agents, farmers' organisations and farmers are registered on eNAM Platform in Telangana. The state is having more than 10 percent of the registered users on the platform with proportionately limited number of markets, Talangana is having just about 4 percent of the total eNAM markets covered in India (Table-2).

Table 2. Stakeholders participated under eNAMs in India and Telangana (as on 31st March 2023)

Stakeholders	India (No.)	Telangana (No.)	Contribution (%)
Traders	2,43,205	5,908	2.43
Commission agents (CAs)	1,09,085	4,794	4.39
FPOs	2,575	95	3.69
Farmer	1,75,36,114	18,23,885	10.40
Total	178,90,979	18,34,682	10.25

Source: enam.gov.in

APMC Nizamabad – A Successful Example of eNAM Implementation

Agricultural Market Committee (AMC), Nizamabad came into existence under Hyderabad Market Act in 1938 whereas eNAM was introduced during 2016. The notified area of the market consists of nine revenue Mandals namely Nizamabad (U), Nizamabad (R), Navipet, Dharpally, Dichpally, Makloor, Nandipet, Mogpal and Indalwai. The leading commodities arriving in the market are paddy, maize, turmeric, pulses and oilseeds. It is one of the prominent Turmeric markets in India. The performance of the market over years is presented in Table-3.

Table 3. Performance of Nizamabad market over years

Sr. No	Particulars	2018-19	2019-20	2020-21	2021-22
1	Farmers (No.)	48,452	65,948	38,653	56,347
2	Traders (No.)	290	226	192	193
3	Commission Agents (No.)	95	90	89	92
4	Quantity Traded (Quintals)	13,54,349	14,75,593	9,86,670	13,42,638
5	Total Turnover (Crore)	870.26	679.74	488.74	801.98

Mandi has introduced various changes in the process followed at the market to improve its efficiency in discovery of prices and take advantage of platform like eNAM. Some of the initiatives taken by Nizamabad market, which may serve as lessons for other markets looking for successful implementation of eNAM, are listed below:

Shifting to e-tendering process for price discovery

In order to have proper integration with eNAM electronic platform and bring efficiency in the process of price discovery, the market shifted from manual auction method to electronic bidding process. The market has always been proactive about these changes and first experienced with online bidding during 2014 with the support of NCDEX. Though, subsequently the market shifted the price discovery process to e-tendering process in 2016 after getting registered under eNAM Scheme for more transparent and efficient price discovery of prices. The traders observed e-tendering to be more time efficient in comparison to auction.

Direct sale platform

In addition to the implementation of the scheme for overall trade, the Direct Sale System was also introduced in the Nizamabad Market on the same e-NAM Platform. The initiative was introduced to ensure better price discovery for the farmers by linking them directly with the buyers without the involvement of any commission agent. This is an appropriate step to encourage direct linkage of farmers with traders to help farmers realise a better price.

Creation of extra gate entry points

The gate pass with basic details like time and date of arrival, name of the farmer, type of vehicle, weight of the commodity, type of produce and unique gate

pass number is issued at the gate when a farmers arrives at the mandi with the commodity. In order to issue electronic gate passes efficiently during the peak days of arrival, the mandi will make the entry of farmers flexible and additional facilities will be created to ensure electronic recording of every lot entering the market. Facilities created in the mandi for bidding by the traders is also used for the purpose of issuing gate passes in the market. Innovative approaches are required to optimally utilise the infrastructure created to adjust to the peak season load as the level of trade is not uniform for agricultural commodities being seasonal in nature.

Rythu Bandu Scheme

The mandi also offers the service of warehousing and finance support if farmer is not satisfied with the price offered by the market. The farmers not satisfied with the price can avail short term loan under Rythu Bandu Pathakam for all the notified commodities by keeping their produce in the godowns available in the market. The benefits availed by different farmers over years under the scheme is presented in Table-4.



Table 4. Number of farmers benefited under Rythu Bandhu Scheme in Nizamabad market

Year	No. of Farmers Benefited	No. of Quintals Stored	Loan Amount (Rs. In lakhs)
2016-17	227	22,950	285.78
2017-18	266	29,787	334.60
2018-19	13	856	23.72
2019-20	6	972	11.61
2020-21	1	70	1.64
2021-22	16	17,000	39.00

Source: eNAM Nizamabad Annual Report 2021-22

Weighment

In order to ensure correct weighment of the produce, the market has introduced digital weighing scales. The weighing is done with the help of these electronic machines integrated with the help of blue tooth enabled POS Machines for brining accuracy in weighing of commodities. The system is running successfully in the market.

Summary & Suggestions

National Agriculture Market is an attempt to improve efficiency of Agricultural Marketing System in India through application of ICT leading to better scale of operation, transparency and development of a system having integration with various other physical and facilitating functions of a market. The concept has made reasonable progress as suggested by the number of markets integrated and the participation of different stakeholders. Introduction of provisions like FPO Module, warehouse based trading, logistic module and Platform of Platforms (POP) has made the concept even more comprehensive and ready for present time market requirements. Though, a total of 1361 markets from 27 States/UTs have been brought under the umbrella of eNAM, the progress is not uniform across different states. Some of the states like Telangana have been doing relatively better as suggested by the implementation of process envisaged under the concept and registration of different stakeholders mainly farmers. The state have registered more than 1.83 million stakeholders covering farmers (1.82 million), traders (5908), commission agents (4794) and FPOs (95) which is more than 10 percent of the total stakeholders registered under eNAM at all India level. The state has also been able to create some successful examples like Nizamabad having implemented various innovative ideas like shirting to e-tendering process for price discovery, Direct Sale Platform, Creation of extra gate entry points and Rythu Bandu Scheme having helped in improving the acceptability of the concept. These lessons can also be adopted by other markets for better acceptance of concepts and make it truly successful.

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Gender inequality in Agriculture and Food systems: An Indian Evidence Study

Satyabrata Mohanty¹, Veenita Kumari², Ruchi Singh³

ABSTRACT

India produces one-fourth of the world's agricultural output and has a nearly equal gender distribution, but there is a sizable gender gap in the country when it comes to decision-making, access to credit, wage gaps, farm activities, marketing, extension services, food consumption, and food production & productivity. Seven years have passed since the Sustainable Development Goals were established by the UN in 2015 to advance prosperity while preserving the environment. The SDG-5's goal of attaining gender equality and the empowerment of all women and girls has experienced several obstacles over the years. Inequalities between men and women have long plagued India's food and agricultural systems. To understand gender inequality in India's agriculture and food systems and to offer practical solutions to close the gender gap that already exists, this study employed the systematic review methodology to investigate the relevant literature. In order to effectively close this gap in the future, it was determined that more qualitative and mixed method research must be conducted across the country in a number of areas, including decision-making, credit access, wage disparities, farm activities, marketing, extension services, food consumption, and food production & productivity. A lot of work needs to be done to bridge the gender gap and empower farm women, according to the data. In order to minimize the gender gap in India's food and agricultural systems, a number of methods are offered.

Keywords: Gender Gap, Systematic Review, Agriculture, Food System, Women Farmers

Introduction

Gender inequality is a major issue in India. Gender inequality can be defined as allowing people different opportunities due to perceived differences based solely on issues of gender or simply we can say it as a social phenomenon in which

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1. MANAGE Intern, MANAGE
 2. Deputy Director (Gender Studies), National Institute of Agricultural Extension Management (MANAGE), Hyderabad
 3. MANAGE Intern, MANAGE

Corresponding Author Email: veenita.k@manage.gov.in

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men and women farmers are not treated equally. Women farmers and girls have been discriminated against for too long – it's time to change that. Farm women make up almost half of the agricultural workforce in countries like India and it is typically large. For example, 80% of all economically active women farmers in India are involved in India; they comprise 33% of the agriculture labour force and 48% of the self-employed farmers. Yet women farmers in agriculture face a variety of obstacles and constraints than their male counterparts. In highly unequal countries, the majority of the farming population, particularly women farmers, lacks the economic resources and capacity to invest in appropriate agricultural technologies, as well as the knowledge to implement improved agricultural practices. Because of the disparity in access, women farmers face an increasing knowledge gap. Women farmers also have difficulty in access to land ownership, extension services, and finance. Agricultural credit, for instance, is critical for farmers to manage the seasonality of agricultural income and expenditures, and to invest in technologies and long-term farm improvements. According to the Global Gender Gap Report 2022, India ranks at 135 out of 146 countries in terms of gender equality. This is a serious concern and needs to be addressed urgently. In India, good news is that there are many initiatives and programs that are working to promote gender equality and empowerment. One such initiative is the "Beti Bachao, Beti Padhao Yojana," which works to save and educate girls. This has been a terrific step as it has increased female literacy and India now ranks 121st in the global Gender report. Moreover when we talk of gender Equality there arises a more related term i.e Gender Equity. Again how are they, both terms different from each other? According to gender equality, a person's opportunities, rights, and duties are not based on the sex they are given at birth. While the term "gender equity" refers to the need to constantly make both genders' needs for equity, solutions, and measures available. Although gender equality is the ultimate aim, it can only be reached by promoting gender equity. The objective of the study was to analyze the evidences of gender inequality in agriculture and food system in India.

Lessons from past

In India, women make up more than two-thirds of the workforce in agricultural production. [1] Women's activity is mainly focused in labor-intensive jobs including weeding, harvesting, and processing after harvest. [2] But still, there are significant regional differences in the earnings and labour involvement of women in agriculture. India's northern states are significantly poorer than its southern states. [3] In India the family unit, in particular via culture and society, has a great impact on the work participation of women. [4] Although women make up a significant portion of the agricultural labour force, they frequently have

low nutritional health. According to research, there is also a connection between the nutritional state of mother and her children, their household's autonomy and power in decision-making and female empowerment. [5,6] In SHGs, women not only actively participate in and make decisions about agricultural techniques, but they also have a significant impact on decisions about food intake that are required for them and their families to live healthy and profitable lives. [7] To acquire solid evidence for creating effective interventions, more research is required on all areas of gender disparity in agriculture and food systems. The majority of policy-makers consider several types of evidence. They must take into account a variety of factors in addition to the scientific rigour of the evidence, such as cost-benefit analysis, political expediency, context, resources, and aims.[8]

Methodology

An explicit desktop review of secondary literature served as the foundation for this study. Throughout, a systematic review approach was used to find the literatures and analyze them. From 23 databases, utilizing predetermined inclusion and exclusion criteria, studies were identified over the course of three stages. Finally, the study included 26 identified literatures from 5,492 literatures that included qualitative, quantitative and mixed method studies on gender inequality in decision making, farm activities, marketing, credit access, extension services, wage gap in agriculture, food production & productivity and gender inequality in food consumption in Indian food systems since 2015.

Head	Inclusion Criteria 1	Exclusion Criteria 1
Geography	India	Other than India
Time period	Published from 2015 onwards	Published before 2015
Language	English	Other than English
Type of Studies	Peer -reviewed- conforming to quality and relevance criteria	Blogs, newspapers, articles, web pages, newsletters, press release

Exclusion Criteria 2
The study period of the published literature before 2015.
The literature must satisfy the objectives of the study.
Documents without clear methodology and sample selection criteria
Documents without clear Study Period.
Review articles, Policy brief, Conference proceedings

Table 1 & 2 are the inclusion and exclusion criteria determined for selection of the study.

Lessons learnt and way forward

Since the formation of the Sustainable Development Goals in 2015, of which SDG-5, “Achieving Gender Equality and Empowering all Women and Girls, have faced numerous challenges over the years. The number of studies identified across the 8 chosen sub-themes has been represented in Figure 1. However, there are only a few studies available on the chosen areas in India, which is evidence of the lack of adequate studies on these areas and efforts to address these inequalities. It was strange to see that there was no study on impact of women on farm productivity since more than a decade and the other themes had only a handful number of researches done in since 2015. Until and unless robust evidence is gathered in support of the diverse gender challenges, the gender gap cannot be closed.

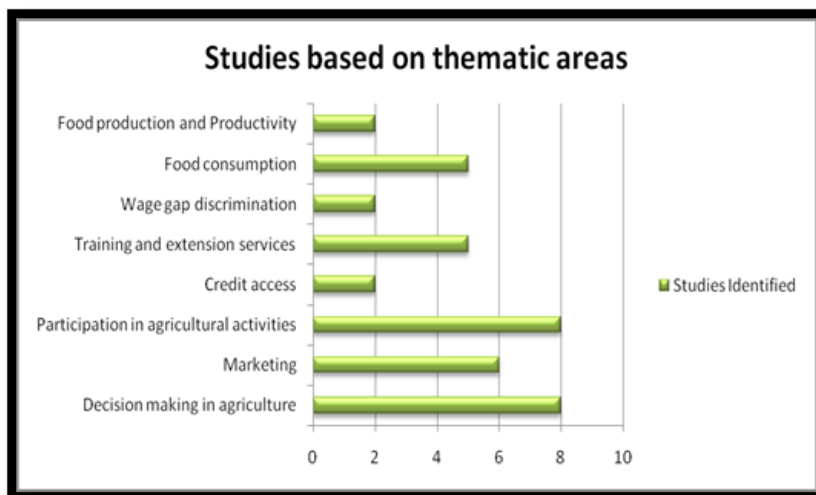


Figure 1: Number of the studies identified under various themes

The various identified literatures were then grouped based on the year of publications to see the growth of the studies focused on the gender issues in agriculture & food systems and are graphically been represented in figure 3. The trend seen in the graph is very concerning as India being the 7th largest country, 5th biggest economy and 2nd most populated country could only produce handful amount of researches on, Gender inequality, one of the most important areas of concern. It only gender equality which can help us in stepping towards hunger free nation.

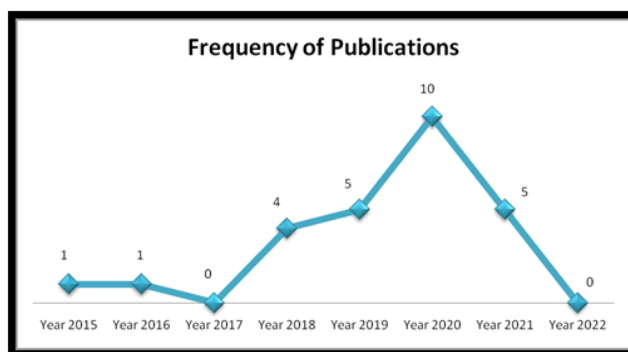


Figure 2: Year wise publication of the identified literatures

The studies were also classified based on the 3 basic types of research designs i.e. qualitative method, quantitative method & mixed are shown in figure 4. The data in the figure suggests that majority of the studies followed quantitative method (88%) then mixed method (8%) and finally qualitative research methodology (4%). But considering the subject of the topic i.e. gender, there is a need for more mixed method and qualitative methodology so as to provide a detailed, contextualized insights of qualitative data and the generalizable, externally valid insights of quantitative data through a deeper understanding of complexity and especially that of human behavior.



Figure 3: Number of the studies according to the Research designs

The studies were organized based on the institutions / organizations that carried out the research across, various States of India. Encouraging research in a large and diverse country like India will aid in the development of the country as a knowledge hub on the global stage, therefore it is expected that all concerned institutions/ organizations realize its importance and contribute to address the gap through taking up more research studies on the topic.

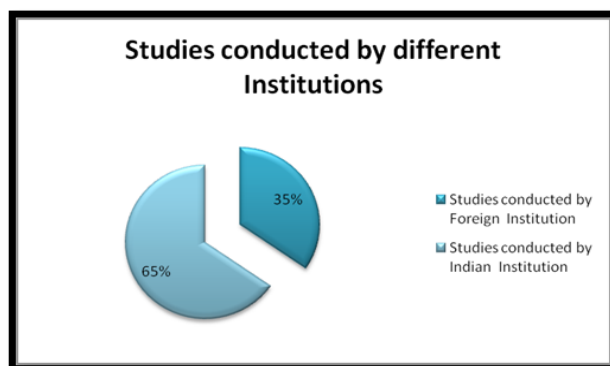


Figure 4: Number of the studies by different institutions

The literatures were then identified according to the States across India where the studies were conducted on the selected sub- themes. Majority (46%) of the research were conducted in Odisha. One of the major reasons being the location of ICAR- Central Institute of Women in Agriculture, who is mostly focused to work for women in agriculture. But since it's a subject of national interest and gender dimensions vary widely across States, regions and cultures, there is a need to have many more such studies across the country. This shall provide sufficient data to understand the gender gap at national level. The number of researches conducted in almost 7 years of time is very low (26 on the selected sub-themes). If more research isn't done to pinpoint gender-related issues nationwide, the gender gap will continue to increase. To advance the country, it is important to recognize and address the strong legacies of gender segregation at every level and in every field.

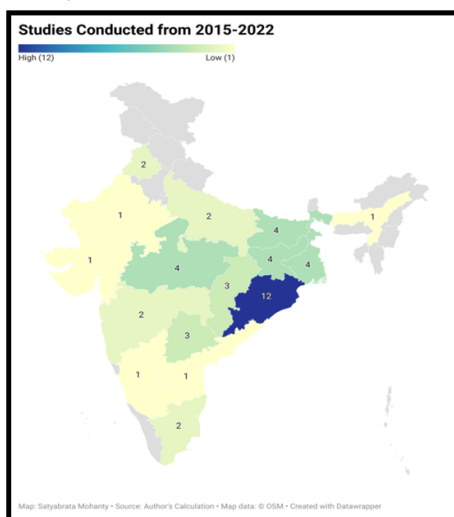


Figure 5: Number of the studies across the states

Agriculture employs 80% of all economically active women in India; they make up 33% of the labour force in agriculture and 48% of self-employed farmers. [9] Women's increased contribution in agriculture and allied sectors, is slowly being recognized in the recent years, but at a very low scale. Empowering and mainstreaming rural women workers in agriculture can cause a structural shift in favour of economic expansion. As reported women working in agriculture has increased as compared to the male over the time and also the GDP per capita. [10] With the existing gender gap with regard to decision making, access to resources, credit and wage inequality, the female workforce in agriculture have contributed significantly to the GDP. If we ensure women-oriented reforms, access to resources, technology, education, health facilities, ownership rights and skill development then it will certainly improve agriculture productivity and help in building an empowered nation, providing nutritional and food security to India; while also reducing poverty and hunger. There is a need to address women's issues in agriculture from a gender perspective in order to overcome the constraints and become the torch-bearers for India's next dawn of agriculture. To make this possible, all concerned stakeholders must focus and work on gender issues, which will aid in the collection of reliable data.

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Rajendranagar, Hyderabad – 500 030, Telangana, India

Tel: +91-40-24016702-706, Fax: -91 -40-24015388 Website: www.manage.gov.in