Agricultural Extension in Western Region of Maharashtra

Discussion Paper 15

MANAGE- Centre for Agricultural Extension Innovations, Reforms, and Agripreneurship (CAEIRA)

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About the Publication

The research report is based on the research conducted by Ms. Neha Dilip Kale as MANAGE Intern under the MANAGE Internship Programme for Post Graduate students of Extension Education.

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Director General's message

Smt. G. Jayalakshmi, IAS
Director General, MANAGE

I congratulate Ms. Neha D Kale, MANAGE intern and former M.Sc. Student, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Maharashtra, for selecting the topic **"Impact of Good Agricultural Extension Practices in the region of Maharashtra"** and collected good data from the field. In detail, the paper analyses the impact, institutional linkage among farmers as well as the role and approach of different sectors in disseminating advisory services generally worldwide and particularly in the western region of Maharashtra.

Effective agricultural extension systems provide quality and timely services to farmers and are considered essential to growth and development in the agricultural sector. The study emphasises the different roles and approaches that public, private and civil society organizations (CSOs), including non-governmental organizations (NGOs), and farmer-based organizations (FBOs) which plays a key role in providing different agricultural extension and advisory services to attain specific national agricultural development goals, including achieving food security, improving rural livelihoods, and maintaining the sustainability of natural resources within the country. The role and approaches of extension services used by various stakeholders in extension advisory services are also discussed very elaborately.

The focus on and how different extension objectives can be successfully organized by various public, private and civil service organizations through well-crafted public-private partnerships in the western region of Maharashtra is well discussed in the study.

The paper also discusses the impact of good practices used by extension service providers to impact the farmer's livelihood of the region. The paper is very much useful to the policymakers and extension agents to understand the other extension practices needed and benefits of linkages between different sectors to transfer the knowledge to the doorstep of farmers enabling them to face the new challenges in farming.

(G. Jayalakshmi)

Preface

Despite a wide range of reform initiatives in agricultural extension in India in the past decades, the coverage, access and quality of information provided to marginalized and poor farmers is uneven in different regions of the country.

The present study provides a framework for understanding the different roles and approaches played by key extension stakeholders in the western region of the Maharashtra state and their vital role in providing different agricultural extension and advisory services for the benefit of the farmers. The study highlights the major extension services delivered in the region and also evaluates some new good practices in agricultural extension. The paper reviews some of the major alternative agricultural extension models and approaches to carrying out different extension and advisory services successfully like FFS, F2FE, mobile-based services (m-extension), videos for Agricultural Extension, Radio in Agricultural extension to achieve specific agricultural development goals in the study area.

The study also further emphasis that there is need for the strengthening of extension services through providing the extension stakeholders with the necessary equipment's and logistics so that they can reach larger farmer masses more easily with agricultural technologies. Skill development and capacity building of extension personnel, in the content development during the dissemination of knowledge through social media, should be emphasized. Further the study also draws out few recommendations for further improvement of agricultural extension approaches for serving the future needs and demands of the farming community in the study area.

Dr. Saravanan Raj
Director (Agricultural Extension)

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Abstract

This paper presents an overview of the good agricultural extension practices and its impact on farmers in the Western region of Maharashtra. Good extension design and implementation depend on key actors including decision-makers, extension managers, extension practitioners, educators, trainers, farmers, and end-users. These actors need reliable, evidence-based knowledge about extension practices in order to shape policy; develop strategies and allocate resources; provide effective, adapted, and evidence-based services and support to farmers; and improve the capacity of various actors. These initiatives, practices, and actions contribute to the broader goals of improving livelihoods, food security, and resilience; reducing poverty and risks; and ensuring continued investment in RAS. Agricultural extension has been one of the largest public institutions in developing countries, employing and training more than a million extension workers at a world scale, who in turn reach a multiple of millions of farmers (Anderson and Feder, 2007).

The challenge today for the extension is not simply to transfer knowledge and information but to foster and implement innovation where appropriate at the farm field level. Innovations tend to be needed in the less economically developed countries in particular throughout the extension organization, as well as at the policy level (Rivera, 2011). Now, agricultural extension has become an essential tool for delivering information and advice for modern farming in order to meet the global and national demand. For the present study, two districts of the Western region of Maharashtra were selected as farmers are advised on information by a greater number of Agricultural Institutions as well as an organized group.

The study area is having successful agripreneurs and public, private organizations including Non-Governmental Organizations (NGOs), agriculture departments, and Farmer-Based Organizations (FBOs) are maximum in this area and these sectors are responsible for disseminating the agricultural extension services. Results of the present study were found that the average mixed impact of good agricultural extension practices on the livelihood of the farmers in this study. As in this region extension activity is carried by various stakeholders and was accepted by farmers for the farming activity which are disseminating by various extension methods such as trainings, group discussion, FFS, WhatsApp group-based communication, video-based extension, exhibition etc. KVK, Baramati is very active in disseminating agricultural technologies to the farmers.

It is also observed that there is a lack of linkages and institutional support to the NGOs and FPOs which are being easily accessible by farmers directly as they exist in rural areas and working at the ground level in agriculture advisory services which need to be considered for policymaking in order to achieve effective and reliable advocacy to the farmers in the field of agriculture and allied sectors. Thus, extension services need to be strengthened and agents provided with the necessary equipment and logistics so that they can reach farmers more easily with agricultural technologies. They should be a focus on skill development and capacity building of extension agents in the view content development during the dissemination of information via social media are needed to

achieve better results in extension activities that help in enhancing farmers to help themselves in taking informed farm decisions and improving the livelihood efficiently.

Executive Summary

The agricultural extension ensures important and relevant information on improved agricultural technologies and good practices are communicated to farmers with the main objective to improve their agricultural production and productivity. The role of agricultural extension service on-farm productivity is the commercialization of agricultural activity, helping farmers to reach their goals through advice, organizing farmers to act collectively, educating farmers, bringing food security and conservation of natural resources.

The purpose of this study is to provide a framework for understanding the different roles and approaches that public, private and Civil Society Organizations (CSOs), including Non-Governmental Organizations (NGOs), and Farmer-Based Organizations (FBOs) which play a key role in providing different agricultural extension and advisory services to attain specific national agricultural development goals, including food security, improving rural livelihoods, and maintaining the sustainability of natural resources within the country. To enable the GGP initiative to support these processes, GFRAS developed a framework to systematically examine existing or promising good approaches to extension and RAS, and their impact on agriculture and rural populations. Birner *et al.*, (2009) framework for designing and analysing agricultural advisory services defines the fundamental issues that affect RAS and agriculture: governance and structures (RAS provision, financing, coordination, partnerships), management and capacity strengthening (mandate and mission, incentives, training, continuing education, performance), advisory methods (approaches for learning, targeting, delivery, scaling, technologies used), cross-cutting issues (gender, youth, climate change, nutrition). (GFRAS Note-2017) The ultimate objective of both the research and extension systems is to increase agricultural production.

Their roles in generating and transferring technology are complementary. As the study is mainly focused on extension practices, it helps in evaluating some new good practices in agricultural extension which can help the farmers by giving those better ideas to increase their agricultural production. There are alternative models and approaches to carrying out different extension and advisory services successfully like FFS, F2FE, mobile-based services, m-extension, videos for Agricultural Extension, Radio in Agricultural extension (Source: GFRAS and MEAS) to achieve specific agricultural development goals. Like this, "Good Agricultural Extension Practice" was described in this study to illustrate how different extension objectives can be successfully organized by various public, private and civil service organizations through well-crafted public-private partnerships. Of the five regions of Maharashtra, in India, from the Western region, two districts namely Pune and Kolhapur were selected purposively on the basis of the number of successful agripreneurs and public-private organizations including Non-Governmental Organizations (NGOs), agriculture departments, and Farmer-Based Organizations (FBOs) are maximum in this area and theses sectors are responsible for disseminating the agricultural extension services. Two tehsils from Pune district i.e. Baramati and Junnar and two tehsils from Kolhapur district i.e. Hatkanangale and Karvir were purposively selected for the present study as these are the vibrant growth tehsils and a big network of NGOs and Agricultural Organization exists in these tehsils. Thus, four tehsils

were selected in total. From each village, five beneficiaries and five non-beneficiaries were selected randomly to make a sample of 32 beneficiaries and 32 non-beneficiaries. Thus, a total to the tune of 64 beneficiaries and non-beneficiaries will be selected randomly by snowball sampling for the study.

From the present study, it is concluded that the impact of good agricultural extension practices and methods of approaches were used by different service providing sectors like public, private and government sectors to disseminate information in the western region of Maharashtra which has been in practice were identified and there are many innovative methods that are yet to come in practice. Thus, the good agricultural extension practices have a positive impact on the livelihood of the farmers but due to lack of linkages and institutional support to the NGOs and FPOs, they are not being easily accessible by farmers directly as they exist in rural areas and work in agriculture advisory services at the ground level. This has to be considered for policymaking in order to achieve effective and reliable advocacy for the farmers in the field of agriculture and allied sectors.

The role of agricultural extension officers with the linkages of different sectors should be further explained to the farming communities in Maharashtra. This must include agricultural extension officers' role in encouraging farmers to adopt new technologies, improved knowledge about agriculture, using a new variety of methods to reach farmers i.e. organizing study group for farmers, farmers' days, demonstrations, lectures and literature as well as informing the media about farmers' challenges. Designing policies that aim to improve better extension practices to reach every farmer of the grass-root level has to be considered for improving his livelihood and agriculture.

The extension services need to be strengthened and agents must be provided with the necessary equipment and logistics so that they can reach farmers more easily with agricultural technologies. In the view of the content development during the dissemination of knowledge through social media, the emphasis should be on skills development and capacity building of extension agents, which are important to achieve better results in extension activities and will help reinforce farmers to help themselves to make informed farm decisions and to boost livelihoods efficiently.

Introduction

1.1 Background

Effective agricultural extension systems that provide quality and timely services to farmers are commonly considered essential to growth and development in the agricultural sector. The extension has also been linked to the promotion of food security, poverty reduction and economic growth.

Farmers require a diverse range of information to support their farm enterprises. Information is needed not only on best practices and technologies for crop production but also for post-harvest aspects. So, Agricultural Extension is an essential pillar for research and development in agriculture. (Chapke and Tonapi, 2016)

The Food and Agricultural Sector Development Policy (FASDEP II) lists enhancing extension services as a specific policy strategy. Similarly, the Medium Term Agriculture Sector Investment Plan (MOFA, 2010) identifies inadequate extension services as a fundamental problem of the agriculture sector.

The good technologies, in order to be considered by the farmers for possible adoption, must first travel the distance between relevant research institutes and the farmers' fields. Then, they should be introduced to the farmers in a non-technical language and the advantages of technology over conventional practices must be demonstrated in a persuasive way, such as by field demonstration. Next, the necessary ingredients for trying the new technology, such as cost and any risk factors must be explained.

1.2 What is Extension?

GFRAS defines extension as all the institutions from different sectors that facilitate farmers' access to knowledge, information, and technologies; their interaction with markets, research, and education; and the development of technical, organizational, and management skills and practices. Thus, the extension includes not only technical knowledge but also functional elements such as communication, facilitation, and empowerment. (Kristin and Sulaiman, 2016)

A wide spectrum of advisory, facilitation and intermediary functions (innovative support service) are presently recognized by Extension. It is provided as a core business or as a part of the broader package of goods and services. It focused on agriculture in rural areas, communities and urban areas. (Anonymous, 2019)

1.3 What is Agriculture Extension?

1. Extension is multidisciplinary. It combines educational methodologies, communication and group techniques in promoting agricultural and rural development. It includes technology

transfer, facilitation, advisory services, information services and adult education. Other agricultural production mechanisms, such as marketing and credit facilities, not to me ntion economic policy and physical infrastructure, rely on it for success. (Rivera and Qamar, 2003)

2. Agricultural extension is an agricultural advisory service which comprises the entire set of organizations that support people engaged in agricultural production and facilitate their efforts to solve problems; link to markets and other players in the agricultural value chain; and obtain information, skills, and technologies to improve their livelihoods. (Birner *et al.*, 2006)

3. Agricultural and rural extension is one of the key policy instruments available to governments to bring a positive change in agriculture and rural communities. An extension is a process of working with rural and farming communities to build their knowledge and skills and thus improving their economic, social and environmental well-being. (Anonymous 2010)

4. In many countries, the extension is currently called rural advisory services. The Global Forum for Rural Advisory Services defines extension, also called rural advisory services, as consisting of all the different activities that provide information and services required and demanded by farmers and other actors in rural settings to assist them in developing their own technical, organizational and management skills and practices to improve their livelihoods and well-being. (GFRAS, 2018)

1.4 Importance of Agricultural Extension

The extension is an essential pillar for research and development. However, unfortunately, a very unhealthy perception of extension prevails in many developing countries, caused by a weak extension lobby, faulty initial organizational set-up, an inherent lack of trust in extension by most of the research organizations, and traditionally poor career development conditions in the profession of extension. Agricultural research agendas largely remain academic unless extension workers provide input in terms of the identified and as-yet unresolved field problems of the farmers.

Research focuses on the technical aspects for generating useful technologies, while extension focuses on the acceptance and adoption of those technologies by users. Applied research institutions need strong extension services to work in a problem-oriented field mode, and the extension services need the backstopping of strong applied agricultural research institutions to serve the farming communities effectively. Countries like the United States of America, Canada, Australia and Denmark, which have very advanced agriculture, have always enjoyed strong extension services, the first public, and now public and/or private.

Both the ideological and e-technological developments over the past generation have impacted extension and will continue to do so. Private-sector hegemony in agriculture and the privatization of agricultural extension systems are unlikely to abate (Rivera, 2011).

1.5 Global Developments Necessitating Reforms in Extension

Globally, extension issues have changed over time and are continually changing. In the United States, extension personnel is increasingly referred to not as 'agents,' but as 'extension educators' and 'issue leaders'. These educators engage in the enhancement of product quality, promotion of food safety, and awareness concerning the transition to integrated pest management (IPM), environmental problems and resource management.

In many countries of the world, agricultural extension services are shifting from the public to the private sector. Thus, services are being contracted out to improve the financing and delivery of agricultural knowledge. (Rivera and Qamar, 2003)

The main global developments include globalization, market liberalization, privatization, pluralism, decentralization and devolution, client participation in decision-making, natural and man-made disasters, rural poverty, food insecurity, HIV/AIDS epidemic, and emphasis on integrated, multi-disciplinary, holistic and sustainable development. These developments are creating new learning requirements for both subsistence and commercial farmers in developing countries. (Qamar and Shahbazi, 2003)

Such demands, especially when seen in the light of the information technology transition, challenge decades of old mandates and operations within conventional extension schemes. Indeed, the time is ripe for policy-makers in developing countries to challenge and revisit the discipline of the extension within a global context, so as to let the extension function be performed with excellence in line with the global challenges to their economies and especially to their agriculture sector. Cosmetic changes to the existing national extension systems will be of little benefit, as will be the repeated training of staff in stereotyped agricultural subjects. Beat the dying horse almost as well. (Qamar, 2005)

Agricultural extension has been one of the largest public institutions in developing countries, employing and training more than a million extension workers at a world scale, who in turn reach a multiple of millions of farmers. (Anderson and Feder, 2007)

Increasing pressure on government budgets increased environmental and social concerns, the emergence of new communication technologies and the strengthening of the private sector have changed the way governments approach rural and agricultural extension. (Anonymous, 2010)

The challenge today for the extension is not simply to transfer knowledge and information but to foster and implement innovation, wherever appropriate, at the farm field level. Innovations tend to

be important in the less economically developed countries in particular throughout the extension organization, as well as at the policy level. (Rivera, 2011)

The extension services such as the increasing involvement of the private sector and Non-Governmental Organizations (NGOs) in providing extension services; greater focus on participatory capacity building approaches; a switch from the public extension that provides direct technical assistance to individuals to a stronger emphasis on facilitation and in bringing stakeholders along the value chain together; increasing emphasis on developing the capacity to improve the management of natural resources and to help communities adapt to climate variability and change; increase in the use of new technologies including mobile phones and text messaging services, social networking, and other internet technologies play a key role in helping developing countries modernize their agriculture and grow (Anonymous, 2010). Yet, these services have almost universally performed below expectations.

According to the Neuchatel Initiative (Swanson and Davis, 2014), there are around 6,18,000 extension agents in China, 90,000 in India, 54,000 in Indonesia, 46,000 in Ethiopia, 35,000 in Vietnam, and 24,000 in Brazil.

Global Forum for Rural Advisory Services (GFRAS) systematically examines good extension approaches and potential topics for GGP notes against this framework, ensuring the GGP initiative adequately that reflects the key issues affecting RAS and agriculture. (www.betterextension.org.)

1.6 Extension and Advisory Services in India

Extension in today's Indian context, includes all those agencies in the public, private, NGO and community-based initiatives that provide a range of agricultural advisory services and facilitate technology application, transfer and management. While the public sector line departments, mainly the Department of Agriculture, was the main agricultural extension agency in the 60s and 70s, the last two decades have witnessed the increasing involvement of the private sector, NGOs, community-based organizations and media. With the external support drying up with the end of the T&V (Training and Visit) system of extension in the early 1990s, states have been left to fund their extension machinery and this has led to a considerable weakening of the public sector extension. The situation assessment survey of farmers conducted during the 59th round of the National Sample Survey (NSSO, 2005) provided valuable insights into the reach of extension services across India. The data collected from 51,770 households in 6,638 villages showed that sixty per cent of farmer households did not access any information on modern technology that year. For the farmers who accessed information, progressive farmers and the input dealers were the main sources of information. Broadcast media was also used a great deal to obtain information, which included radio, television and newspapers. The public sector extension worker was a source of information for only 5.7 % of farmer households interviewed and the Krishi Vigyan Kendra (KVK) accounted as an extension source for only 0.7% of the sample farmers. Private and NGO extension services were accessed by only 0.6%.

The farmer household assessment surveys conducted by the International Food Policy Research Institute (IFPRI) in 5 states during recent years have also shown the importance of input dealers as an important source of information. But the IFPRI studies revealed that a significant number of farmers are also accessing public sector extension, especially the staff of the Department of Agriculture. For instance, 'in Tamil Nadu, the main sources of agricultural information in 2010 were the input dealer (68.6%), followed by the state department of agriculture extension staff (51.2%). In Karnataka, of the 966 farmer households surveyed in 2006, 22% had at least one contact with a 6 worker government extension over the past year. In Uttar Pradesh, only 18% of households used the extension (from any source, public or private) in the past year. Of these, only 7% were from state extension officers. Other public-sector extension sources put together (that is the KVK, All-India Radio, university extension, and plant protection unit) were used 18% of the time. The remaining 75% of the extension comes from the private sector' (Babu *et al.*, 2012). All these reveal the wide diversity in extension provision and the wide variation in the way farmers access various extension sources in different states.

Globally, the world population will reach 9.7 billion by 2050 and India's population will be about 1.7 million surpassing China to become the world's most populous country (UN DESA, 2013). This puts immense pressure on land to feed its burgeoning population. This also creates the problem of poverty and malnutrition accompanied by other socio-economic problems. There has been a gradual change in the Indian agricultural scenario and worldwide. Several emerging challenges confront Indian farmers. These include limited land and water availability, which is further exacerbated by the degradation of natural resources, climate changes, changes in demand and consumption patterns, moving towards high-value agriculture, increasing population pressure, and liberalization of trade (Lele, 2010). As 49% of the Indian population depends on agriculture as their primary source of income (NSSO, 2011), enhancing farm income can become a panacea for alleviating poverty and malnutrition.

In 2014-15, India allocated around Rs. 18 billion for agriculture extension and training exclusively, which has grown from Rs. 6.4 billion in 2000-01 thus recording a CAGR of 7.6 percent for the given period.

The traditional view of extension in developing countries was focused on increasing production, improving yields, training, and transferring technology. Today's understanding of extension goes beyond technology transfer to facilitation, beyond training to education, and includes assisting farmer groups to form, dealing with marketing issues, and partnering with a broad range of service providers. (Sulaiman, and Davis, 2012)

1.7 Pluralistic Agricultural Extension System in India

Pluralistic networks provide farmers with multiple sources of information and sustainable resources for the extension. The challenge to effective operation in the pluralistic network is arranging collaboration and coordination of the various service providers and the stakeholders in the

network. Without engagement and collaboration, effective and supportive partnerships cannot be achieved.

Indian agriculture has an impressive long-term record of taking the country out of serious food shortages, given the heavy reliance on its pluralistic extension system. In India, the extension has a mixed record. On one side, it shows a role in promoting productivity, sustainable resources use, and agricultural development (Singh, 1999). On the other side, the public extension has fallen short of expectations. Planning Commission (2008) narrated that the links between research, extension, and farmers are seen to be inadequate and uncoordinated. The main responsibility for extension activities rests with state governments since agriculture is a state subject. The central government also implements several technology transfer plans through state governments. Indian agriculture is becoming more pluralistic in nature, where a large number of private sector firms and civil society extension service providers co-exist with this public extension system. (Singh and Meena, 2009)

The pluralistic extension system is driven by the privatization of the agricultural extension system. For the pluralistic extension system to take root, the private sector must see a financial opportunity in providing services required by the farmers in a particular region or district.

The pluralistic extension needs to be promoted in the agricultural and allied sectors. Role space for each Extension Service Provider (ESP) has to be assigned to those agencies having a comparative advantage based on the 'best actor' scenario. Both public and private extension providers may respond to emerging extension needs as per proven expertise, comparative advantage and based on feedback analysis. (Sajesh, 2018)

In the pluralistic extension service, service providers can address farmers' specific needs by tailoring their offerings to market demands more easily than is possible in the public extension system. (Okorley *et al.*, 2010)

During this period, everyone was aware that farm households had varying land, labour and other resources but the focus of the agricultural research and extension systems was primarily on increasing agricultural productivity to achieve national food security. However, the world food system is becoming increasingly integrated, and world food prices are now representing the shifting supply and demand for all forms of food and extension through farmers' organizations and agri-pruners agricultural products. Therefore, the price of different food products can change rapidly due to new factors, such as biofuel and climate change.

Since then, agricultural extension has become 'pluralistic' (Birner, et al, 2006). Decentralization, outsourcing, cost-recovery, and involvement by the private sector and non-governmental organizations (NGOs) require new thought.

As a result, the focus of extension and advisory systems is now shifting towards improving rural livelihoods and achieving food security at the household level by strengthening farmers' ability to

adapt more rapidly to changes in markets. Therefore, it is now necessary to differentiate among these major clientele groups that can be served by a more pluralistic extension system because the technical, managerial and socio-economic skills and information needs of farm households differ from country to country and from culture to culture with different target groups (Swanson, 2008).The state-level government extension system (e.g., Government of Bihar [GoB]) is, without doubt, the state's largest and only integrated extension and advisory service (EAS) provider, employing approximately 3,000 professional and administrative staff members who assist more than 7,000 non-salary farm advisors (FAs) working directly with grassroots farmers. (MEAS, 2012)

There are around 0.3 million agro-input dealers (those dealing with seeds, fertilizers, pesticides and agro-machinery) operating in nukes and corners of the country. (DAC, 2014)

According to GFRAS, the Global Good Practices Initiative aims to facilitate access to information and know-how on agricultural extension for a wide audience of practitioners. It does so by presenting Good Practice Notes, which are descriptions of key concepts, approaches, and methods in an easy-to-understand format. (Hlamalani and Mercy. 2017)

The Indian extension system is said to be pluralistic in nature with a number of agencies involved in the delivery of extension services. There are public, private and third sector actors along with Information Communication Technology (ICT) based initiatives proactively involved in information and technology dissemination in the agriculture and allied sectors. (Sajesh et.al., 2018)

Fig. No. 1 shows the different agricultural extension systems in India. There are 64 SAUs and 100 ICAR institutes in the country. Though their mandates involve extension in addition to research and teaching (in the case of SAUs), the outreach is mainly limited to the villages in their proximity, primarily to demonstrate the technology options suiting the micro agro situations. Some institutes like the Indian Agricultural Research Institute (IARI), New Delhi have tried to overcome this by forging collaboration with the Non-Governmental Organizations, other ICAR institutes/SAUs and the postal department to increase the spread of institute technologies. Krishi Vigyan Kendras are the extension wings of ICAR at a district level with a major mandate of technology assessment and demonstration for its application and capacity development. The KVKs, with six to seven subject matter specialists, also provide need-based and skill-oriented vocational training to the farmers and field level extension workers. At present, there are 706 KVKs in the country. The ICAR has also initiated Agricultural Technology Information Centers (ATIC) in selected ICAR institutes and State Agricultural Universities to function as a single-window to disseminate the technologies developed in the institute/university. ATICs have been in operation since 2000.

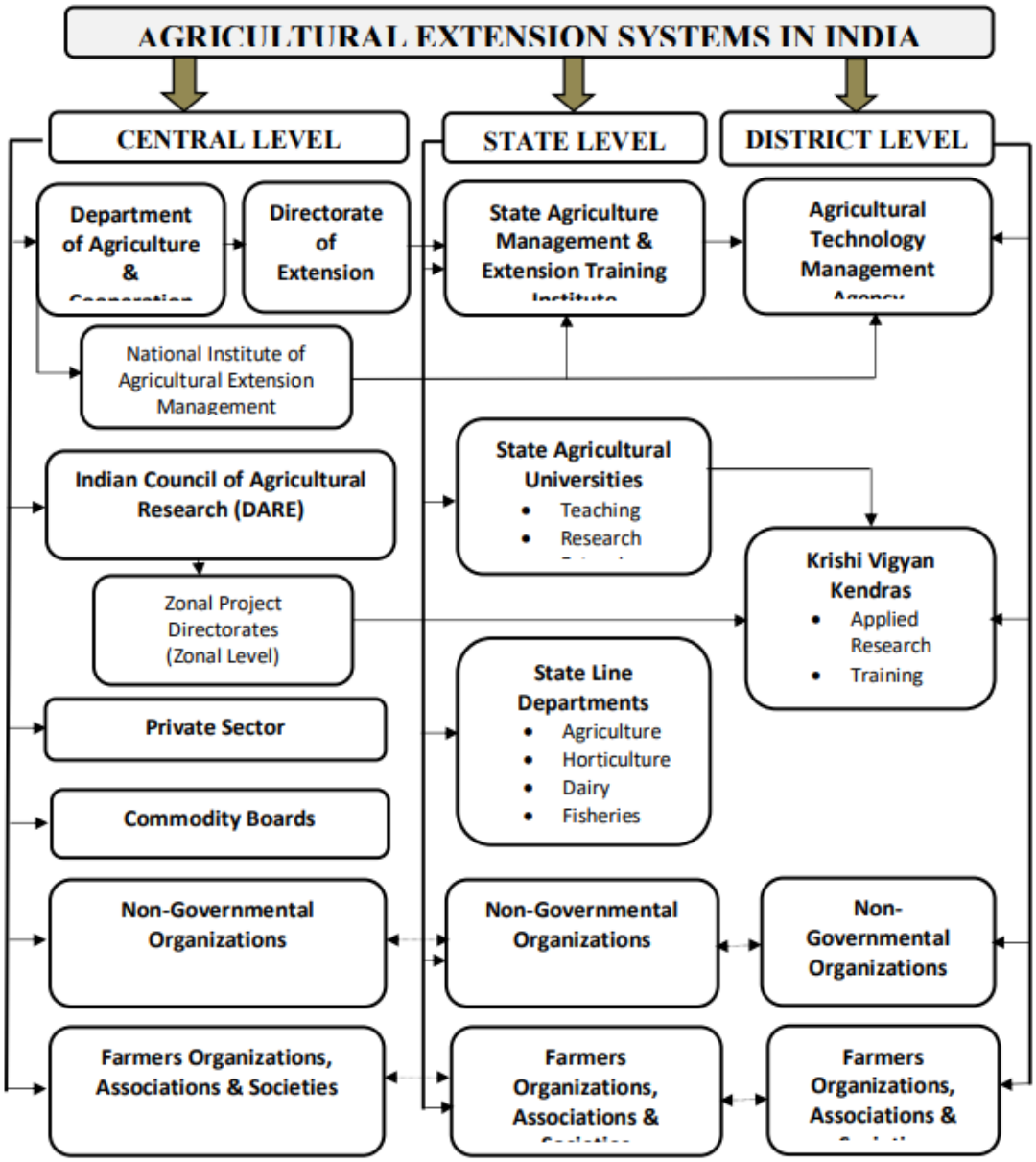


Fig. 1: Pluralistic Agricultural Extension Systems in India

1.8 Issues and constraints faced by the Indian Agricultural Extension

1. The major issues before the Indian extension system are: How to improve the effectiveness of extension systems? How to serve the small landholders and marginal farmers in diversified farming systems? And the proper allocation of funds, human resources and its management are also major issues.

2. XIth FYP recommendation shows the major constraints as (i) Lack of convergence in the operationalization of extension reforms (ii) Lack of provision for dedicated manpower at various levels (iii) Inadequacy of funds (iv) Lack of infrastructural support below district level and (v) Inadequate support for the promotion of farmers' organizations and their federation. (Meena et. al. 2010)

3. The country is also experiencing changes in the key climate variables namely temperature, precipitation and humidity which has already started affecting agriculture and it has to consider an adaptive measure to cope with these changes.

4. Today, expansion is rapidly recognized as crucial for rural growth due to factors such as food price crises and climate change. Food and agriculture innovation processes in a quickly developing environment are facing new and highly dynamic challenges.

5. Fighting poverty, ensuring food security and improving living standards of farmers, new mechanisms to foster development and diffusion of innovation are needed to strengthen how information, knowledge and technology are developed and disseminated to ensure that the global changes benefit smallholder farmers. Similarly, agricultural extension service operates from the backdrop belief that increased agricultural productivity depends primarily upon the acceptance of improved cultural and technological changes at the rural farm level and that peasant farmers can achieve higher farm yields only if they adopted commended scientific farming techniques in place of their traditional practices (Sulaiman, 2012). These could only be channelled through effective extension services which are assessed from the farmers' viewpoint. However, extension services in India perform poorly due to lack of knowledge in agriculture.

Agricultural extension services must play an important role in addressing many of these challenges. Considering the changing nature of agriculture and the evolving challenges, producers currently need a wider range of support, including organizational, marketing, technological, financial and entrepreneurial. To be successful, farmers require a wide range of knowledge from different sources and support to integrate these different bits of knowledge in their production context.

Though the theory and practice of extension have considerably evolved globally during the last few years, there is still a substantial improvement to be made in the way extension is understood and practiced in the country.

1.9 Good practices

A good practice is not only a practice that is good, but a practice that has been proven to perform well and yield good outcomes, and is therefore recommended as a model. It is a successful experience, which has been tested and validated, in the broad sense, which has been repeated and deserves to be shared so that a greater number of people can adopt it.

According to GFRAS, the Global Good Practices Initiative aims to facilitate access to information and know-how on agricultural extension for a wide audience of practitioners. It does so by providing Good Practice Notes, which are descriptions of key concepts, approaches, and methods in an easy-to-understand format. (Hlamalani and Mercy, 2017)

1.10 Definition of Good Practices

1. A mechanism, method, process, or strategy that allows extension functions to be more effective and efficient, and contributes to the introduction of innovations to improve skills (Preissing, 2011).
2. Extension and advisory practices that have successfully engaged men and women farmers and entrepreneurs with limited resources, which are successfully adapted to fit local conditions and the institutional context to establish productive and profitable relationships (Swanson, 2008).

1.11 Criteria of Good Practices

The following set of criteria will help to determine whether a practice is a good practice:

1. **Effective and successful:** A good practice has proven its strategic relevance as the most effective way in achieving a specific objective; it has been successfully adopted and has had a positive impact on individuals and communities.

2. **Environmentally, economically and socially sustainable:** A good practice meets current needs, in particular, the essential needs of the world's poorest without compromising the ability to address future needs.

3. **Gender-sensitive:** A description of the practice must show how actors, men and women involved in the process, were able to improve their livelihoods.

4. **Technically feasible**: Technical feasibility is the basis of good practice. It is easy to learn and implement.

5. **Inherently participatory approaches:** These are essential as they support a joint sense of ownership of decisions and actions.

6. **Replicable and adaptable:** A 'good practice' should have the potential for replication and should therefore be adaptable to similar objectives in varying situations.

7. **Reducing disaster/crisis risks, if applicable:** A 'good practice' contributes to disaster/crisis risks reduction for resilience. (FAO, 2014)

How good Agricultural Extension practices contribute to strengthening the agricultural sector?

Good extension design and implementation depend on key actors including decision-makers, extension managers, extension practitioners, educators, trainers, farmers, and end-users. These actors need reliable, evidence-based knowledge about extension practices in order to shape policy; develop strategies and allocate resources; provide effective, adapted, and evidence-based services and support to farmers; and improve the capacity of various actors. These initiatives, practices, and actions contribute to the broader goals of improving livelihoods, food security, and resilience; reducing poverty and risks; and ensuring continued investment in RAS.

To enable the GGP Initiative to support these processes, GFRAS developed a framework to systematically examine the existing or promising good approaches to extension and RAS, and their impact on agriculture and rural populations. Birner *et al.*, (2009) framework for designing and analyzing agricultural advisory services defines the fundamental issues that affect RAS and agriculture: governance and structures (RAS provision, financing, coordination, partnerships), management and capacity strengthening (mandate and mission, incentives, training, continuing education, performance), advisory methods (approaches for learning, targeting, delivery, scaling, technologies used), cross-cutting issues (gender, youth, climate change, nutrition) (GFRAS Note,2017)

Table 1: Good Agricultural Extension Practices followed in Different Countries

Sr. No.	Extension Practices	Country and Detail of Practice	Source
1	Farmer-to-farmer extension (F2FE)	• Peru's Yachachi (from Quechua for 'one who teaches') programme reaches 90,000 of the country's poorest Andean farmers. • F2FE programmes date back considerably and have been used in the Philippines since the 1950s and in Central America since the 1970s. • F2FE programmes have grown tremendously in Africa in recent years and are now quite common, with 78% of development organisations using the approach in Malawi and one-third using it across seven regions of Cameroon.	Franzeland et. al., 2015
2	Value chain development for the adoption of new agricultural knowledge: BRAC's initiatives in Khulna with Sunflower(Participatory approach) Bangladesh	• This case describes the approach implemented by a reputed NGO from Bangladesh – BRAC - for promoting a new crop (for the region – sunflower) in the Khulna and Barisal divisions in southwestern Bangladesh. • BRAC's success, in this case, was due to its approach to large-scale participatory block demonstration and development of a value chain. • During the current harvesting season, about 3,200 farmers under the guidance of BRAC have grown sunflower on about 4,000 acres of land. They have plans to bring 16,000 acres of land under sunflower cultivation by next season (end of 2013).	Sulaiman and Reddy, 2014 https://meas.illinois.edu

3	FARM CENTER INDOCHINA, FCI (Trainings)	• Crops grown at Aloha Farm include 55 vegetables, 33 herbs and diverse fruits, along with livestock (pastured poultry for eggs and meat, natural pork, cow and goat milk, tilapia and earthworms), and value-added products such as salsa, jams, pestos, cheese, yogurt, soap, lip balm and toothpaste. • The primary extension methods that the SFRC uses include three-day intensive trainings on sustainable agriculture, usually held at the SFRC; one-day specific short courses; tours of the farm; school lectures about sustainable agriculture; internships for local farmworkers to gain agricultural management skills; hosting of conferences and events; acting as a consultant and resource to other NGOs, farmers and government entities; and online and print training tools, books and videos. • In addition to the beneficiaries attending the farm for consulting, internships and workshops, the center hosts approximately 500 visitors per year.	ECHO Asia Impact Center Consulting Group https://meas.illinois.edu 2013
4	**Farmer Field Schools (FFS)** It is a group-based adult learning approach that teaches farmers how to experiment and solve problems independently.	• The FFS program for rice was carried out firstly in Indonesia. After this, it is being carried out in 12 Asian countries and gradually expanded to include new commodities such as vegetables, cotton, and other crops. • It is further used to adapt and institutionalize FFSs in more than 90 countries of the world.	Dhamankar and Wongtschowski, 2014 www.betterextension.org
5	**Mobile-based "bundled" services: Example of Agri-Fin Mobile** The Mercy Corps Agri-Fin mobile program provides a 'bundle' of advisory and financial services plus market information to the smallholder farmers via the mobile phone. Through this approach, the programme brings together players including banks,	• In Indonesia, a social enterprise company called 8 villages has launched a platform known as LISA (Layanan Informasi Desa (Village Information Service) which leverages information and communication technologies (ICTs) to address information challenges in rural markets. • Econet Wireless in Zimbabwe has led the development and rollout of the eco farmer suite of services that capitalizes on the organisation's mobile telecommunications infrastructure. • In Uganda, FIT Uganda is disseminating agricultural market information and providing market intelligence to smallholder farmers.	Kakooza, 2014 www.betterextension.org

	mobile network operators, smallholder farmer aggregators, rural advisory service providers, and platform hosting and content managers to build a comprehensive suite of services that addresses all the farmers' constraints together.		
6	m- extension (Mobile-based agro advisory)	• Push and pull SMS, interactive voice response, mobile apps (www.iksl.in) in India • Gobi Sahana Sarana (http://www.agridept.gov.lk/index.php/1920-hotline) in Sri Lanka • iCow (http://icow.co.ke) in Kenya, • Kilimo Salama (https://kilimosalama.wordpress.com) in Kenya and Rwanda • e-Krishok (http://wp.ekrishok.com) in Bangladesh • solely agricultural information (e.g. Gobi Sahana Sarana(http://www.agridept.gov.lk/index.php/1920-hotline) in Sri Lanka) • farmer-specific fertiliser recommendations (NMRiceMobile (http://webapps.irri.org/nm/phmobile/) in Bangladesh, China, India, Indonesia, Philippinesand West Africa)	Saravanan and Bhattacharjee, 2015 www.betterextension.org
7	Videos for Agricultural Extension	Digital Green has produced over 3700 participatory videos in more than 20 languages. Digital Green has reached 7,448 villages and over 640,000 community members in Ethiopia, Ghana, India and Tanzania. • Access Agriculture has produced over 60 farmer learning videos with farmers, in 67 languages.(www.accessagriculture.org) • VideoKheti is a Microsoft project that is a new initiative from India collaborates with Digital Green to allow villagers to find and watch agricultural videos (147) on a mobile phone in the Hindi language.	Bentley et. al.,2015 www.accessagriculture.org
8	Using Radio in Agricultural Extension	• Ethiopia, a four-month radio programme on teff (a staple crop in Ethiopia), which reached four regions costs just US$0.38/farmer.7 Community stations	Rao, 2015 www.betterextension.

		can be established for as little as US$20,000 (including costs of equipment, permits, and other essentials). • Farm Radio International used its experience over the last 10 years to develop a tool called VOICE, which enables radio stations to consider key factors such as consistency, relevance, and convenience that can help them to develop high quality programmes for farmers. Farm Radio International's participatory radio campaign strategy continues to show positive results in both enhancement of knowledge and uptake of particular agricultural practices presented through radio with support from existing NGO and government interventions.	org
9	Integrating Nutrition into Rural Advisory Services and Extension	• Extension workers (through public, private, and Non-Government Organisation (NGO) channels) are often thought of as a promising platform or vehicle for the delivery of nutrition knowledge and practices to improve the nutritional health of rural communities because they reach and interact closely with farmers in different settings. • This new approach served as a global resource and was later adapted to the national contexts of numerous countries throughout Latin America and Africa. • There are several delivery channels that EAS could use to deliver better nutrition. These include: - On-farm demonstrations - Farmer field schools and associations - Public health and school platforms - Water and sanitation programmes	Fanzo, 2015 www.betterextension.org
10	THE SUSTAINABLE AGRICULTURE TRAINING CENTER, MYANMAR	• The Sustainable Agriculture Training Center (SATC) was started in August 2005 by Rev. Kya Moo, associate general secretary of Myanmar Baptist Convention, and Saw Hei Moo, director, Christian Social Service and Development Department of Myanmar Baptist Convention. • Throughout the history of SATC, intensive on-farm training has been a key vehicle for human capacity building. Between 2006 and 2011, SATC conducted 24 training programs for more than 580 farmers. • The Sustainable Agriculture Training Center evaluates, adapts and demonstrates farming and community development ideas that have been proven elsewhere and that show promise for Myanmar's rural poor.	Kya Moo, Sustainable Agriculture Training Center 2005

11	Improving nutrition and livelihoods through Farmer Field and Life Schools based on interviews with FFLS members in Uganda and Rwanda (Tukwatamise group, Mbarara District, Uganda)	• Malnutrition is a threat to the wellbeing of vulnerable populations in Eastern Africa. • The FFLS methodology is a community based participatory learning process. Working together in small groups, farmers learn and adapt to improved agricultural production techniques under the guidance of a trained facilitator. • FFLS members are recommended to start their own backyard kitchen garden where they can further experiment. • One member now facilitates 27 farmers, mostly women, on a weekly basis. Although the lives of its members have improved, lessons can still be learned to further strengthen the FFLS programme.	Producer organizations in rural advisory services: Evidence and experiences (Position Paper), February 2015
		India	
12	**Pashu Sakhi** - An alternative livestock extension approach	• Pashu Sakhi- With access to knowledge and inputs, the goat rearers of Gondia district in Maharashtra are able to make a decent livelihood with goat rearing. A community based alternative extension system which is women-centric, has also brought out a positive change in the lives of women and the communities. • By building their capacities and providing handholding support, over 4712 Pashu Sakhis (meaning: friends of livestock) have been promoted in 16 Indian states reaching over 2.5 lakh small livestock farmers daily. The present case is about a partnership initiative between Maharashtra State Rural Livelihood Mission (MSRLM), Mahila Arthik Vikas Mahamandal (MAVIM) and the Goat Trust, which promoted the alternative community-based extension approach in Gondia, a tribal-dominated district in Maharashtra.	Maharashtra http://vikaspedia.in/agriculture/best-practices/extension-practices and
13	Farmer Producers Organization Chaitanya Agriclinics-Service Providers for Farmers Producers Organization (Training)	• Kiran Dumbre is promoting Chaitanya Agri clinics since 2014. It provides technical support and services to Farmer Producer Organizations (FPOs). • CHAITANYA Agri clinic adopts a social approach to deliver services, technical know-how and backward-forward integration. During the last decade, there has been a very big movement by different governments. and NGOs to form and promote Farmer Producer Companies (FPCs). • Chaitanya Agriclinic provides training and capacity buildings to 700 farmers, SHG members and NGO staff. Chaitanya Agri clinics provide services to more than 600 members annually through the financial inclusion centers.	Saravanan and Todd, (2018)

Aims and Objective of the study

The major purpose of this study is to examine the good extension practices in agriculture among farmers.

Other general objectives of the study are:

1. To identify the major extension organizations that provide different types of extension practices to farmers.
2. To study the impact of agricultural extension practices on farmers.
3. Mapping out different good agricultural extension practices.

2.1 Importance of the Study

1. Extension is essentially the means by which new knowledge and ideas are introduced into rural areas bring about change and improve the lives of farmers and their families.
2. Extension, therefore, is of critical importance. Without it, farmers would lack access to the support and services required to improve their agriculture and other productive activities. The critical importance of extension can be understood better if its three main elements are considered i.e. knowledge, communication and farm family.
3. Purpose of this study is to provide a framework for understanding the different roles and approaches that public, private and Civil Society Organizations (CSOs), including Non-Governmental Organizations (NGOs), and Farmer-Based Organizations (FBOs) can play in providing different agricultural extension and advisory services to attain specific national agricultural development goals, including achieving food security, improving rural livelihoods, and maintaining the sustainability of natural resources within the country.
4. The ultimate objective of both research and extension systems is to increase agricultural production. Their roles in generating and transferring technology are complementary. As the study mainly focuses on extension practices, it helps in evaluating some new good practices in agricultural extension which can help the farmers by giving better ideas or a better way of understandings for the increase in their agricultural production.
5. There are alternative models and approaches to successfully carrying out different extension and advisory services like FFS, F2FE, mobile based services, m-extension, and videos for agricultural extension, radio in agricultural extension (Source: GFRAS and MEAS) to achieve specific agricultural development goals. Like this, 'good agricultural extension practice' will be described in this study to illustrate how different extension objectives can be successfully organized by various public, private and civil service organizations through well-crafted public-private partnerships.

2.2 Extension Networks for Good Agricultural Practices

2.2.1 KVKs and State Agricultural Universities

The first KVK, on a pilot basis, was established in 1974 at Puducherry (Pondicherry) under the administrative control of the Tamil Nadu Agricultural University, Coimbatore. At present, there are 706 KVKs, out of which 498 are under State Agricultural Universities (SAU) and Central Agricultural University (CAU), 63 are under ICAR Institutes, 101 are under NGOs, 38 are under State Governments, and the remaining are under other educational institutions. They test and transfer technology to farmers.

The State Agricultural Universities are much bigger, but still small compared with the farm population. In India, the first SAU was established in 1960 at Pantnagar in Uttar Pradesh. The SAUs were given autonomous status and direct funding from the state governments. They were autonomous organizations with state-wide responsibility for agricultural research, education and training or extension education. The establishment of the SAUs, based on a pattern similar to that of the land-grant universities in the United States, was a landmark in reorganizing and strengthening the agricultural education system in India. These universities became the branches of research under the ICAR and became the partners of the National Agricultural Research System (NARS).

The green revolution, with its impressive social and economic impact, witnessed significant contributions from the SAUs, both in terms of trained, scientific workforce and the generation of new technologies. However, most of the agricultural universities in India continue to be dominated by top-down, monolithic structures that follow a limited extension mandate. None of the post-Training-and-Visit (T&V) system extension reforms could revitalize it to meet the demands of a changing agricultural context. SAU extension operates through state-level entities but sometimes reaches out to farmers directly. KVKs and SAUs are important but under-resourced. Both tend to focus on primary production rather than post-harvest and marketing aspects.

2.2.2 Extension by Input and Technology Providers

Farmers frequently receive advice from input and technology providers. Agro dealers and input suppliers have a vested interest in providing advice. They primarily market results like weed control that are the consequence of the best use of a substance and information. The quality and relevance of their advisory services are major determinants of brand reputation and market share.

The industry's issue is cost: how can it more effectively educate large numbers of farmers who consume only small quantities each? The challenge for regulators and the public, on the other hand, is reliability — both of the information and the products. In the agrochemical market, for example, useless or even dangerous counterfeits abound.

There are an estimated 2,82,000 input dealers in India. They are the pillars of their communities and have every interest to offer quality services. However, this requires training. MANAGE, the National Institute of Agricultural Extension Management offers a Diploma in Agricultural Extension Services for Input Dealers (DAESI). So far, however, only a minute fraction of all input dealers have signed

up. DAESI covers agronomy, extension and communication methods, individual and business development, and legislation.

Several other training sources also exist for input dealers. The Mahindra Krishi Vihar (MKV) 'one-stop farm solution center' by the Mahindra & Mahindra Ltd. tractor and utility vehicle company is one example. Started in 2000, Mahindra ShubhLabh Services aims to 'tackle deficiencies in the farm sector, including low consumption of quality inputs, lack of mechanization, scarcity of farm finances and low awareness of scientific farm practices.' MKV centers operate on a franchise basis. They provide farmers with quality inputs, rental equipment, credit (in partnership with banks), farm advice by trained field visitors, and crop contracts with processors.

A study of MKV results based on the primary field data (Sulaiman and Sadamate, 2005) suggests that: (i) farmers are willing to pay for integrated services; (ii) a private extension provider can help substantially increase yields and farm income; (iii) increases stem from field-specific advice on input application; (iv) MKV has developed a sustainable and profitable extension business; (v) MKV's flexible 'learning by doing' approach contributes to success; and (vi) this type of approach focuses on medium and larger scale farmers.

Hariyali Kisaan Bazaar (HKB), run by the DCM Shriram fertilizer, seed and sugar conglomerate, provides 'end-to-end agri-solutions.' The offer is built around agri-inputs, extension, credit, and produce marketing. HKB operates over 300 rural stores across eight states; each serves at least 15,000 farmers. HKB has evolved into a 'super bazaar' which provides fuel, credit, insurance, and mobile phones along with the inputs. Other examples of extension by input suppliers include:

- **Tata Kisan Sansar (TKS) by Tata Chemicals Ltd:** These 'one-stop farmer solution shops' provide operational and advisory support, mainly in Uttar Pradesh, Haryana, and Punjab. Services include soil testing, remote diagnostics and house brands for seeds, cattle feed, pesticides and sprayers. Some 681 TKS serve 2.7 million farmers in about 22,000 villages.

- Godrej Agrovet is a chain of rural outlets, each serving some 20,000 farmers. GA offers agricultural equipment, consumer goods, technical services, soil and water testing, veterinary, financial and post office services, and pharmaceuticals. Started in 2003 near Pune, it now has over 60 centers across the country. The company aims to open at least 1,000 stores.

- Jain Irrigation provides education on micro-irrigation at its High-Tech Agriculture Training Institute. Farmers, students, government officers, and NGO staff learn about water resources, watershed and irrigation management, fertigation, and modern cultivation. Jain Irrigation agronomy and engineering experts also mentor client farmers.

These approaches impact on smallholders is yet to be evaluated, but they may provide better-quality inputs and technical services than local suppliers upon which most farmers currently rely.

2.2.3 The Private Sector: Commercial Providers

How good is the information that agro-dealers and input suppliers provide? Critics accuse suppliers of promoting their own brands, and agro-dealers of pushing sales regardless of farmers' real interests and needs. The criticism still awaits a neutral and robust study.

The study would also test the opposite hypothesis: those private solutions naturally respond to farmers' needs. Input dealers' reputation and business depend on providing good services and advice. Seed and technology sales forces know that honest advice on products creates a competitive edge. Buyers of produce advise farmers as a part of their procurement drive. A commercial extension is also likely to be the best at delivering private sector R&D results that truly meet farmers' needs. Partnership with non-profits can help reach smaller and poorer farmers.

Agricultural extension by commercial companies is advancing rapidly in India. This includes seed and input firms, manufacturers and suppliers, distribution providers, food processors and retailers, and as mentioned in the next segment, mobile operators and their business partners. Contract farming is an increasingly important vehicle for 'embedded services,' information tied to input sales or marketed produce (Feder *et al.*, 2011). Input suppliers and produce aggregators provide information services to foster products' safe and effective use, expand market share, and ensure the necessary supply of commodities. Companies may work independently or in partnership with other organizations across all sectors.

A variety of models currently exist for delivering and financing extension by private providers. Commercial providers may offer information services as a part of contract farming or 'out-grower' schemes. They may send their agronomists into farmers' fields or engage third parties. Possible partners include NGOs, consultants, research institutes or universities, and public providers. The sources of funding include direct farmer fees as well as public or donor payments. A further model links a commodity-specific extension to production contracts: farmers' produce prices reflect the extension costs.

2.2.4 Extension by NGOs

NGOs are giving valuable assistance to smallholder Indians. Like government organizations, however, they cannot cover all those seeking advice. NGOs range considerably in size. Their professionalism and knowledge of agriculture vary but their social commitment is typically high. Many dedicate themselves to forming self-help groups or farmer-based organizations as focal points for demand-driven agricultural extension. Outside sponsors or donors often help. The NGOs were active in the respective areas before the foundation stepped in. Community organization and social programs had already progressed well when they teamed up to address agriculture.

A study in Maharashtra by Bachhav (2012) concluded that the majority of farmers seek information on the availability of seeds (74 per cent), crop production (71 per cent), fertilizer (65 per cent) and insecticide availability (62 per cent). Other areas mentioned by farmers were water management (34 per cent), weather information (23 per cent), and agricultural equipment (18 per cent). The most important information requirement of tribal farmers, as identified by Saravanan (2007), concerning disease and pest management, followed by information related to suitable crop varieties, packages of practices, farmers' training programmes, irrigation, and farm credit.

Glendenning *et al.*, (2010) concluded from a review of agriculture extension in India that despite the variety of agricultural extension approaches that operate in parallel and sometimes duplicate one another, the majority of farmers in India do not have access to any source of information. This lack of access severely limited their ability to increase productivity and income and reduce vulnerability.

Community Radios deliver a wide range of information on rural life, agriculture, forests, health, nutrition, etc. in their proximity (Sulaiman et. al., 2011). Of late, social media (e.g. Facebook, WhatsApp, YouTube etc.) are used in extension for sharing information in text, audio, visual and video formats (Sulaiman et.al.,2011).

2.2.5 Extension by Aggregators and Processors

Extension by aggregators and processors of produce mainly operates via contract farming, the role of which is growing in Indian agriculture. Gulati *et al.* (2008) make the point that while the 'front-end' activities such as wholesaling, processing, logistics, and retailing are rapidly expanding and consolidating, the 'back-end' activities of primary production have been fragmenting. The author believes that contract farming can link both ends and create business opportunities for all concerned.

The literature on contract farming is not universally positive. However, an IFPRI study of Andhra Pradesh poultry farming states that "contract production is more efficient than non-contract." Although the processor benefits most from the efficiency surplus, farmers 'gain appreciably' through lower risk and (expected) higher returns. Improved technology and production practices help make these outcomes possible. The advantages of contract organic farming include organized sales and the training on production protocols that they need to follow. A Punjab study also finds merit in contract farming and stresses the need for extension related to both production and marketing of crops (Singh, 2005).

Examples of contract farming and 'value chain integration' include:

- Contract wheat farming practiced in Madhya Pradesh by Hindustan Lever Ltd. (HLL), Rallis and ICICI (MANAGE, 2003). Rallis supplies agri-inputs and know-how, ICICI provides credit, and the processors HLL offer a buyback arrangement. Farmers have an assured market and

floor price, quality inputs, and free technical advice. HLL's supply chain is more efficient, and Rallis and ICICI have an assured clientele.

Contract farming is becoming an increasingly important aspect of agribusiness, whether the contracts are negotiated with multinationals, smaller companies, government agencies, farmer cooperatives or individual entrepreneurs. The method tends to have tremendous potential in countries where small-scale farming continues to be prevalent, as in many instances small-scale farmers can no longer compete without access to resources offered by contract farming firms. However, the decision to use the contract farming modality is a commercial one. It is not a development model to be tried by aid donors, governments or NGOs because the other rural development approaches have failed (Eaton and Shepherd, 2001).

2.3. Organizations involved in Good Agricultural Extension Practices

1. Farmers Organization (FO)

As a part of the extension reforms, the NATP project focused on the group approach as a means to technological transfer in the villages to have better coverage. Farmers groups are encouraged at a village level and these groups, in turn, evolve into Commodity Associations (CAs), Marketing Cooperatives and other types of FOs at the block and district level. At the village level, Farmer Interest Groups (FIGs) and Women Interest Groups (WIGs) are effectively involved in the preparation of group action plans, which were later integrated into the block action plans.

2. Advisory and Consultative Team of Farmers

In some of the districts, few societies like institutions have come up at a village and block level after learning the benefit of the group approach. These societies have created their own infrastructures like small buildings, transportation facilities and guiding the farmers about the market demand and prices and also collecting the produce of farmers for the sale.

3. Innovations in extension through ATMA model

- ATMAs began by working with the line departments and research centres within the district to carry out a PRA as a part of developing a strategic research and extension plan for the district.
- An important part of the PRA is to identify success stories of entrepreneurial farmers who have supplied specific markets with higher-value products.
- These success stories are assessed in terms of their potential to involve significant numbers of small-scale farmers in these new enterprises (Singh and Swanson, 2006).

4. Organizing Producer Groups

- There is a general agreement within the government that the small-scale and marginal farmers should be organized into community, farmer and/or producer groups (within and between local communities).

- The purpose of these groups is to help different groups of farmers to refocus on intensifying and diversifying their respective farming systems by producing more high-value crops, livestock and fish products to increase farm income. In addition, if these groups will work together both for input supply and marketing purposes, they can also minimise the cost of these inputs, as well as connect these producer groups to wholesale markets, so that they will not be exploited by local 'traders.' It should be noted that different approaches are being implemented across the different donor sponsored projects.

For example:

1. Common Interest Groups appear to be those farmers most closely connected with the extension staff at the Union and Upazila levels.

2. Integrated Pest Management (IPM) and Integrated Crop Management (ICM) Clubs being generally 50% men and 50% women.

3. Village Groups being organized by KVK have monthly meetings to discuss and solve immediate technical, management or marketing problems.

4. Other donor projects seem to be focusing on organizing producer groups that are more specifically focused on a particular crop, livestock or fish systems (e.g. horticulture groups, prawn groups, etc.)

There is a broad agreement on the need to organize farmer or producer groups as these groups are essential in successfully linking farmers to markets and in reducing the risk of poor farmers being exploited by local traders. Groups are being organized by different donors and NGOs, but most are using somewhat different methods of organizing these groups.

5. Extension Advisory Service by Various Organizations

1. Farm Advisory Service

- Diagnostic Team Visits
- Field Demonstrations
- On-Farm Trials
- Organization of Kisan Melas, Kisan Divas, Field Days
- Field Visits
- Village Adoption

- Veterinary Clinical Camps
- Farm & Home Visits
- Celebration of Important Days
- Trainings

These trainings are organized for the benefit of farmers, women-groups, Mahila Mandals, unemployed youths, Self Help Groups, entrepreneurs, officers of different government departments as well as NGOs.

Off-campus trainings

One day off-campus training programmes are also organized under different projects in the project areas.

Organization of Workshop and Seminars

To provide a common platform for interaction among university scientists, officers of the agriculture departments, other extension workers and progressive farmers, Rabi Workshop and Kharif Workshop are organized every year before the commencement of Rabi and Kharif seasons, respectively.

In these workshops, new recommendations of the University for improving agricultural production, emerging problems and issues are discussed and packages of practices for cereal crops are finalized.

2. Farm Information and Communication

- Publications
- Museum
- Use of Electronic media
- Radio Talks
- Radio Pathshala on different aspects
- Beekeeping
- Pulse cultivation
- Agricultural Engineering
- Live Phone-In programme from Doordarshan

3. Use of Print Media

- Fortnightly information on important activities in agriculture and animal husbandry published in local newspapers in Hindi &English

Methodology

3.1 Description of the Study Area

Maharashtra occupies the western & central part of India and has a 720 km long coastline along the Arabian Sea and is also fortified naturally by Sahyadri and Satpura mountain ranges. The state is surrounded by Gujarat to the North West, Madhya Pradesh to the north, Chhattisgarh to the east, Telangana to the southeast, Karnataka to the south and Goa to the southwest. For administrative convenience, the state has been divided into 36 districts and six revenue divisions (viz. Konkan, Pune, Nashik, Aurangabad, Amravati and Nagpur). With a population of 11.24 crore, as per Population Census (2011) and with a geographical area of about 3.08 lakh sq. km, the state ranks 2nd by population and 3rd in terms of geographical area. The state is highly urbanized with 45.2 per cent population living in towns.

The state enjoys a tropical monsoon climate. The hot scorching summer from March onwards is followed by the monsoon in early June. As seen in its thick and lush forests, Maharashtra has also earned natural blessings and it hosts six prime tiger reserves and six National Parks.

It is the second-most populous state and third-largest state by area in India. Maharashtra is an agricultural state. Almost 82% of the rural population depends on agriculture for livelihood. Both food crops and cash crops are grown in the state.

Agriculture & allied activities

In Maharashtra, the agricultural net sown area is 17,345,000 ha. , and the gross cropped area is 23,474000 ha. Also the area under principal crops are rice 1,530,000 ha., wheat 1,083,000 ha., jowar 3,186,000 ha., bajra 8,34,000 ha., all cereals 7,909,000 ha., all food grains (cereals and pulses) 11,680,000 ha., harvested area of sugarcane is 883,000 ha., cotton 4,066,000 ha., 330,000 ha. Maharashtra's livestock census is 32,489,000 total livestock (2012) and 61,724 sq. of total forest area (2017). The per capita income of Maharashtra is Rs. 191,827 and the gross product growth rate is 7.5 per cent. (Advance estimates as per Directorate of Economics and Statistics, GoM 2018-19).

The state received only 73.6 per cent of the normal rainfall during the monsoon in 2018. Out of 355 talukas (excluding talukas in Mumbai City & Mumbai suburban districts) in the state, 192 received deficient, 138 received normal and 25 received excess rainfall.

The state ranks 11th in the average size of operational holding (1.34 ha) amongst all states, as per the agriculture census 2015-16. The total area of small & marginal (upto 2.0 ha) operational holdings was 92.20 lakh ha constituting 45.0 per cent of the total area whereas the number of small and marginal operational holdings was 121.55 lakh which is 79.5 per cent of the total number of operational holdings.

During the Kharif season of 2018, sowing was completed on a 151.03 lakh ha area. The production of cereals & pulses is expected to decrease by six per cent and 35 per cent respectively while the production of oilseeds, cotton and sugarcane is expected to increase by 16 per cent, 17 per cent and 10 per cent respectively over the previous year.

During 2018-19, the area under rabi crops is 33.83 lakh ha which is 50 per cent compared to the previous year mainly due to the deficit rainfall in September and October 2018. During 2018-19, the area under horticulture crops is 16.43 lakh ha and production is expected to be 224.17 lakh MT as against an area of 17.22 lakh ha and production of 248.53 lakh MT during 2017-18.

3.1.3 Industry and co-operation

During 2018-19, a crop loan of 31,282 crores was disbursed through financial institutions as against 25,322 crores during 2017-18. During 2018-19, the agricultural term loans of an amount of 36,632 crores were disbursed as against 25,695 crores during 2017-18.

During 2018-19, the annual target for the agriculture & allied activities sector in the annual credit plan is 85,464 crores. During 2017-18, primary agricultural credit co-operative societies disbursed loans of 14,573 crores to farmers.

Till March 2019, about 9.86 lakh Micro, Small and Medium Enterprises (MSMEs) in the state have obtained Udyog Aadhaar number (8.58 lakh Micro, 1.23 lakh Small and 0.05 lakh are Medium enterprises) with an investment of 1,60,016 crores and 57.51 lakh employment.

As of 31st March 2018, there were about 1.98 lakh co-operative societies, with 5.17 crore members therein. Of these, 11 per cent were in agricultural credit, 10 per cent were in non-agricultural credit and 79 per cent were engaged in other activities. In all, 18.1 per cent of co-operative societies were in loss, of which 33.1 per cent were in agricultural credit.

The co-operative movement in Maharashtra has made a significant contribution to the social and economic development of the state. Initially, the co-operation movement was mainly confined to agricultural credit. Later, it rapidly spread into agro-processing, marketing, housing, dairy, storage, textile, finance, and fishery and even into industries.

3.1.4 Agricultural credit through co-operative societies

Agricultural credit co-operative banks have a three-tier structure. The Maharashtra State Co-operative Bank is the apex body, the District Central Co-operative Banks are working at the district level and the Primary Agricultural Credit Societies are working at the village level. (Source: Office of the Commissioner for Co-operation & Registrar Co-operative Societies, GoM)

3.1.5 Primary Agricultural Credit Societies (PACS)

The short term agricultural credits, mainly for seasonal agricultural operations, are provided by the Primary Agricultural Credit Societies (PACS). As of 31st March 2018, there were 21,102 PACS in the state which include 22 Farmer service societies and 889 Adivasi Co-operative societies having 0.55 lakh and 7.28 lakh members respectively.

3.1.6 Agro-processing Co-operative Societies

The state government provides financial assistance to the societies for setting up agro-processing units, sugar factories, cotton ginning & pressing, spinning mills, handloom & power loom, dairy, fisheries, rice mills, oil mills and other processing units that are the constituents of agro-processing co-operative societies. As of 31st March 2018, there were 25,634 agro-processing co-operatives having 53.09 lakh members. Of the total sugar factories in India, a maximum (36 per cent) are located in the state. There were 89 co-operative cotton ginning & pressing societies in the state as of 31st March 2018.

There were 3,038 primary fisheries co-operative societies working in the state as of 31st March 2018. In addition, there were 36 fisheries co-operative unions and two federations.

Co-operative marketing societies have a three-tier organizational structure. The Maharashtra State Co-operative Marketing Federation Ltd. is the apex body. There are 1,221 District co-operative marketing societies and the Primary co-operative marketing societies are functioning at the district and village level respectively. (Economic Survey of Maharashtra 2018-19)

3.1.7 Location and Profile of Pune

The total area of this district is 15,642 square kilometers i.e. 5% of the total area of Maharashtra and Pune is the central administrative place. It is located on the Mumbai-Bangalore highway. It is 192 km. away from Mumbai, the capital of Maharashtra. Pune City Corporation and Pimpri Chinchwad Corporation are the two corporations in the Pune district. The climate of the district is generally hot. In the eastern part i.e. Indapur, Daund and Baramati Talukas, it is hotter when compared to the Western Ghats. The district receives its maximum rainfall from the southwest monsoon. However, the average rainfall differs from place to place. The Western Ghats receives an average of 3,000 to 4,000 mm as the eastern end of the district receives only 750 mm average rainfall.

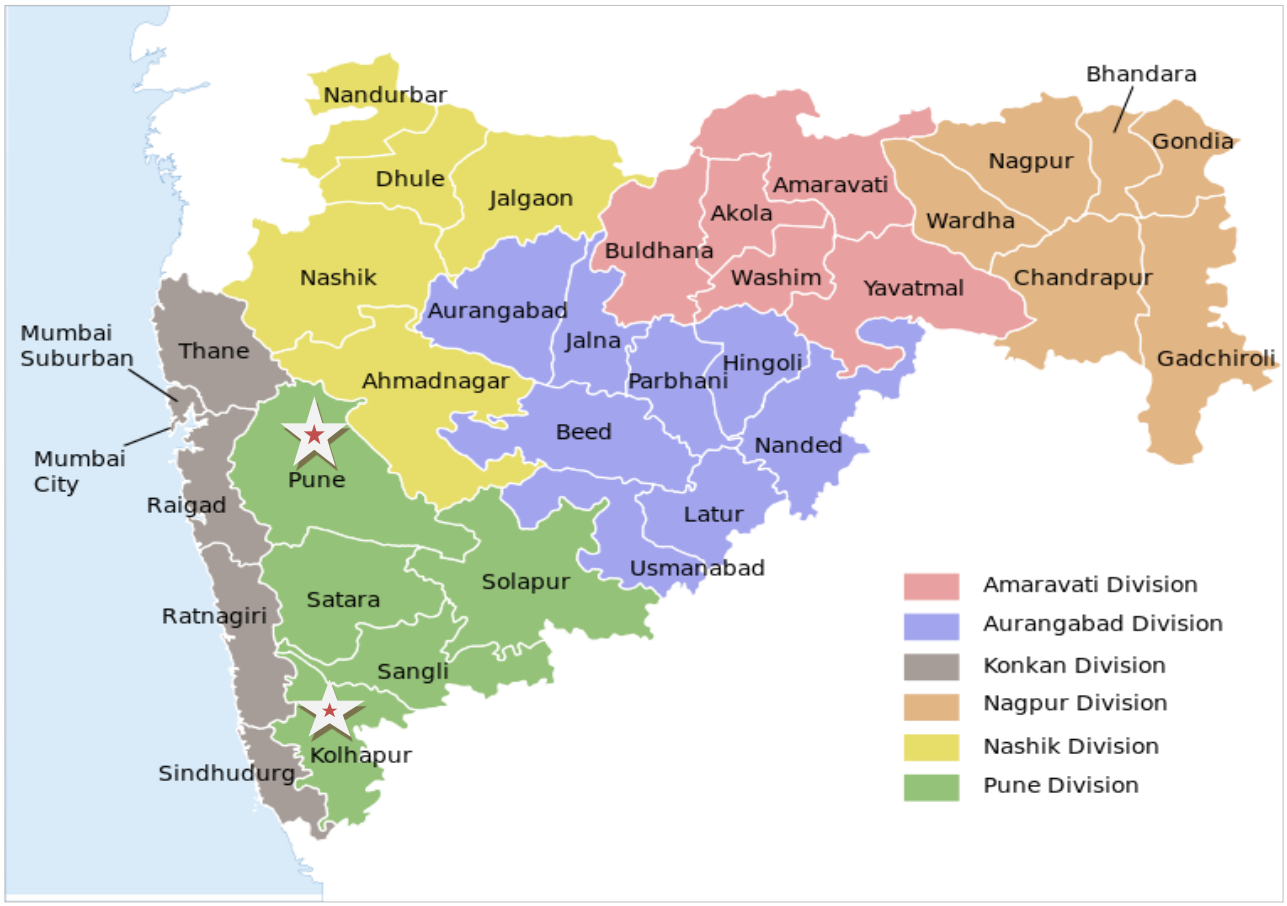
3.1.8. Location and profile of Kolhapur

The district of Kolhapur lies in the south-west of Maharashtra between 150 to 170 North latitude and 730 to 740 East longitude and spreads across the Deccan Plateau in the rain shadow region of the Sahyadri mountain ranges on the southernmost tip of the state of Maharashtra. To the west, we have the Sahyadri ranges and the river Warana is to the north which forms the natural boundaries

to the district. It has an area of 7,685.00 sq. kms, which is about 2.5 per cent of the total area of the state and it ranks 24th in the state as far as the area is concerned. (www.kolhapur.nic)

The district interior has a varied economical culture. The ranges of Sahyadri Mountains have stretched their wings primarily in the western region of the district and this has transformed 57 parts of the district with soil and ecology of the Konkan type and partly with the Deccan type. Although the major portion of the district is 390 to 600 meters above the mean sea level, some of the points are as high as 900 meters above mean sea level. The proportion of rainfall decreases very sharply from the west to east ranging between the maximum of 6000 mm in the west to the minimum of 600 mm in the east.
(https://shodhganga.inflibnet.ac.in/bitstream/10603/4312/8/08_chapter%202.pdf)

Selected districts of Maharashtra State



3.1.9 Agro-ecological Characteristics of Pune district

Agriculture in Pune received a much-needed lift when there was an increase in the cropped area. This resulted in a decrease in the number of fallow lands. Another reason was the increase in the portion of the cultivable land. The major plantations of Pune include the extremely tasty and luscious grapes and pomegranate. Sugarcane is considered to be the chief cash crop of Pune.

3.1.10. Agro-ecological Characteristics of Kolhapur district

Out of the total geographical area of 7,76,261 hectares, 4,11,418 hectares (53%) is under cultivation. The district has 1,43,090 hectares (18.43%) of land under forest, 14,132 hectares (1.82%) of the land is barren/uncultivable and 31,092 hectares (4.00%) is occupied by permanent pastures/grazing lands, while7,232 hectares (0.93%) is under miscellaneous tree/growers. Additionally, 37,047 (4.77%) and 42,460 (5.49%) hectares of the area are covered by cultivable waste and fallow land respectively.

Kolhapur district holds a leading rank in respect to the sugarcane cultivation and sugar industry. The laterite soil in Gaganbavada, Panhala, Radhanagari and Shahuwadi Talukas is conducive for raising hill millets. Paddy is grown in the talukas of Chandgad, Ajara, Gadhinglaj, Shahuwadi, Hatkanangale, Karveer, Radhanagari, Panhala and some parts of Bhudargad, Kagal, Shirol and Gaganbavada talukas which have rich and fertile soils. Rice, jowar and groundnut are cultivated in the Kharif season. Sugarcane and vegetable are grown where irrigation facilities are available. (https://shodhganga.inflibnet.ac.in/bitstream/10603/4312/8/08_chapter%202.pdf)

3.2 Different agriculture extension organizations/services in Maharashtra

A) Government organization

1. National Mission on Agriculture Extension and Technology (NMAET)

The National Mission on Agriculture Extension and Technology (NMAET) was launched by the Department of Agriculture and Farmers' Welfare (DACFW) in 2014-15 and takes a holistic view of extension by embedding components for technical support and training. It aims to make the system farmer-driven and accountable by restructuring and strengthening existing agriculture extension programmes to enable the delivery of technology and to improve the current agronomic practices of farmers. At the central level, different programmes were introduced with the objective of strengthening the extension machinery and utilizing it for synergizing the interventions under the ATMA. The programmes include support to the state extension programme for extension reforms (ATMA), Sub Mission on Seed and Planting Material (SMSP), Sub Mission on Agricultural Mechanization (SMAM), Sub Mission on Plant Protection and Plant quarantine (SMPP).

2. KVK

The first KVK, on a pilot basis, was established in 1974 at Puducherry (Pondicherry) under the administrative control of the Tamil Nadu Agricultural University, Coimbatore. At present, there are 706 KVKs, out of which 47 KVKs are in Maharashtra. The following are the KVKs in the Pune district.

i. KVKs in Pune district

- **Krishi Vigyan Kendra, Baramati**

The farmers or any person or organization can avail of the following services of the Krishi Vigyan Kendra, Baramati:

- **Participation in the Trainings**
  Interested farmers may register their names with the Krishi Vigyan Kendra either personally or through phone or e-mail for the training if he/she wishes to attend. The Krishi Vigyan Kendra can also arrange off-campus training on desired topics in the farmer's village. For such trainings, a minimum of 25 farmers from the same village needs to participate. Special trainings can also be arranged for organizations on topics of their choice.

- **Participate in Extension Activities**
  Farmers can participate in extension activities such as Kisan Melas, study tours, and field days by prior registration.

- **Consultancy**
  Farmer's may interact with the scientists at the Krishi Vigyan Kendra & get consultancy on issues related to agriculture, allied fields & information on advanced agricultural technologies.

- **Demonstrations and On-Farm Trials**
  Farmers can participate in conducting demonstrations & trials on their fields, which is arranged by Krishi Vigyan Kendra every year.

- **Weather Information**
  Farmers can get information on weather in the form of mobile SMS from the KVK, about rainfall and disease predictions. Accordingly, they can decide the water requirement and spraying schedule for the crops.

- **Availability of Infrastructure**
  Other organizations that wish to conduct trainings for the farmers can use our classrooms and audio-visual aids on nominal charges.

- **Study Tours to KVK**
  Farmers on the study tour can see our farm & demonstration units on greenhouses, nursery, dairy & the museum of agri-implements. Farmers can stay in our hostels after paying nominal charges.

- **Soil and Water Testing**
  Farmers, institutions and organizations can get their soil, water samples, fertilizers/manure and leaf samples tested for various parameters of their choice at reasonable rates in our soil testing laboratory. Farmers may also invite the mobile soil testing laboratory of the KVK to visit their village to get their samples tested.
- **Diagnostic Services**

Farmers can request Krishi Vigyan Kendra scientists to visit their problematic fields for getting curative & diagnostic recommendations.

- **Hiring Agricultural Implements**
  Farmers can hire various agricultural implements from the Krishi Vigyan Kendra.

- **Interactive Voice Response**
  Farmers can access information about the market rates for agricultural commodities and weather through an interactive voice response facility.

- **Video Conferencing Room**
  This connects with different organizations and farmers for facilitating training on various improved agricultural practices.

ii. KVK Narayangaon

Krishi Vigyan Kendra, Narayangaon, was established on 1st June 2010 for the 6 Tehsils in Pune district i.e. Junnar, Ambegaon, Khed, Shirur, Maval, and Mulshi for implementing various agricultural activities as per the needs of farmers of different localities.
On average, the Krishi Vigyan Kendra conducts 60 to 70 need-based training programmes in the whole year for farmers, women, and rural youth. Some of them are for long durations. KVK has

organized long term & short term vocational training courses for rural youths for entrepreneurship development. Some training has organized to empower the women component technically as they play a very vital role in agricultural operations.

Activities of KVK

- On-farm testing to assess the location specificity of agricultural technologies under various farming systems.
- Organize frontline demonstrations to establish the production potential of technologies on the farmers' fields.
- Capacity development of farmers and extension personnel to update their knowledge and skills on modern agricultural technologies.
- To work as a knowledge and resource center of agricultural technologies for supporting initiatives of public, private and voluntary sectors in improving the agricultural economy of the district.
- Provide farm advisories using ICT and other media means on varied subjects of farmers' interest.

iii. KVK in Kolhapur district

KVK, Kaneri Math, Kolhapur

Technology demonstration is the most effective way to show how a thing works, how to do the work, principals involved in an operation and to show the end results of the technology/methodology adopted. On the basis of purpose for which technology demonstration is conducted, it is classified into (i) method demonstration and (ii) result demonstration. Also, this KVK conducts different off-campus and campus training programme.

This KVK conducts several extension activities such as field day, Kisan Mela, exhibition, film show, method demonstrations, workshops, group meetings, newspaper coverage, advisory services, a scientific visit to farmer's field, diagnostic visits, soil health camp, soil test campaigns, self-help group conveners meetings etc.

This KVK possesses 20.658 ha of land which is entirely under cultivation of crops relevant to the area. The main purpose of the farm is to demonstrate the latest horticultural and agronomical practices to the farmers.

Krishi Vigyan Kendra, Talsande, Kolhapur

Dist. Kolhapur. Dr. Jaywant Jagtap, Programme Coordinator Contact no. 0231-2653426, kvkkolhapur@gmail.com

3. ATMA

The Indian Government (1998), with the help of the World Bank, introduced the Agriculture Technology Management Agency (ATMA) under the Innovation in Technology Dissemination (ITD) component of the National Agricultural Technology Project (NATP). Firstly, it was introduced in 28 districts in seven states from 1998 to 2003 under the guidance of MANAGE (National Institute of Agricultural Extension Management), an institution promoted by the Ministry of Agriculture, Government of India. It was later expanded throughout the country in 2005 (Babu *et al.*, 2013).

ATMA created a platform for the convergence of human and financial resources available in the government, civil society, farm community and private sector. ATMA governing board at the state level set out the priorities for research and extension which is to be implemented in each district.

After the Strategic Research Extension Plan (SREP) was approved, the Farm Information and Advisory Centres (FIAC) at the district level, the Block Level Teams (BTT) and the Farmer Advisory Committee (FAC) were responsible for the extension activities in the district. Existing extension staff still formed the backbone of the ATMA approach. Some additional resources were made available to support innovative approaches, pilots by NGOs, the private sector etc. At the state level, an apex planning and training body, the State Agricultural Management and Extension Training Institute (SAMETI) was established, with the aim of training various levels of extension staff in the convergence-led approach of ATMA.

Support to State Extension Programmes For Extension Reforms (ATMA Scheme)

The Scheme "Support to State Extension Programmes for Extension Reforms" aims at making extension system farmer-driven and farmer accountable by disseminating technology to farmers through new institutional arrangements viz. Agricultural Technology Management Agency (ATMA) at the district level to operationalize the extension reforms in a participatory mode.

This Scheme shall focus on the following key extension reforms:

- Encouraging multi-agency extension strategies involving Public/Private Extension Service Providers.
- Ensuring an integrated, broad-based extension delivery mechanism consistent with the farming system approach with a focus on the bottom-up planning process.
- Adopting a group approach to extension in line with the identified needs and requirements of the farmers in the form of CIGs & FIGs and consolidate them as Farmers Producer Organizations.
- Facilitating convergence of farmer-centric programmes in planning, execution and implementation.
- Addressing gender concerns by mobilizing farm women into groups and providing training to them.

i) ATMA in Pune district
ii) ATMA in Kolhapur District

To support their efforts of the revitalization of the extension system and making available the latest agricultural technologies in different thematic areas to increase agricultural production through extension activities viz. Farmers Training, Demonstrations, Exposure Visits, Kisan Mela, Mobilization of Farmers Groups and Setting up of Farm Schools. Through these activities, the latest agriculture technologies are disseminated to farmers of the country.

4. State Agricultural Universities

While the main mandate of giving formal degree programmes in major agricultural disciplines, they provide extension and training support through the directorate of extension and education. The information flow is mainly from the universities to the KVKs which are responsible for training farmers.

In Maharashtra, there are four agricultural universities namely, Mahatma Phule Krushi Vidyapeetham, Rahuri, VNMKV, Parbhani, PDKV, Akola and DBSKKV, Dapoli are established to provide extension and training support. Pune and Sangli district KVKs come under the Mahatma Phule Krushi Vidyapeetham, Rahuri.

i. Mahatma Phule Krushi Vidyapeeth, Rahuri

Under MPKV, Rahuri University, College of Agriculture, Kolhapur facilitates different extension activities by ATIC etc.

ii. RKVY scheme

The Rashtriya Krishi Vikas Yojana (RKVY) scheme was initiated in 2007 as an umbrella scheme for ensuring the holistic development of the agriculture and allied sectors by allowing states to choose their own agriculture and allied sector development activities as per the district/state agriculture plan.

5. ICT (Information and Communication Technology) led Extension

ICT has a significant potential to reach large numbers of farmers in a cost-effective manner and facilitate two-way information flows between farmers and the extension agencies. The scheme launched under ICTs includes farmers portal, mKishan, Kishan Call Centre, Kishan TV Channel, mobile agro advisory services etc.

In Maharashtra, Doordarshan telecasts the Amchi Mati Amchi Manas programme. Other local T.V. channels also telecast different programmes like annadata, shetkari etc.

6. Agriculture Clinic and Agriculture Business Centres (ACABC)

The ACABC scheme was launched in 2002 and was targeted at young rural agriculture graduates who wanted to turn entrepreneurs seeking to provide fee-based agriculture services to farmers. Mandatory two-month training at the National Institute of Agricultural Extension Management (MANAGE), at Hyderabad, was designed to know the basics of business management among aspiring agriculture entrepreneurs (MANAGE, http://www.manage.gov.in/).

In Maharashtra, in Pune district, Krishna Valley Advanced Agriculture Foundation, Pune and in Kolhapur district D. Y. Patil education Society-KVK-Kolhapur, Krishna Valley Advanced Agriculture Foundation, Uttur Sub-Centre programme was started and 35 trainees facilitate under ACABC scheme.

3.2.2 List of the different government agriculture organizations/Sectors/Institutes provided Extension services

Pune

1. Indian Agricultural Research Institute, Pune
2. ICAR-ATARI, College of Agriculture Campus, Shivajinagar, Pune
3. ICAR-National Research Centre for Grapes
4. Mahatma Phule Agricultural Institute, Pune
5. ICAR-DFR, Pune
6. National Agri Research Project, Pune
7. Central Bee Research Institute, Pune

Baramati

1. Taluka Agriculture office, Baramati
2. KVK, Baramati

B) Private Agriculture Extension System

Some private sector agribusiness and input manufacturing companies undertake direct extension activities that help the farmers to realize higher production (and thus returns) through necessary pre-sowing preparation, optimum seed rate, correct agronomic practices, application of nutrients and harvesting techniques.

In the case of different fertilizer companies, different extension activities include a wider range of interventions such as conducting farmer meetings, organizing crop seminars, arranging for soil testing facilities, adopting villages etc. The growing importance of the private sector in both research and extension in India gives rise to an important aspect.

In Pune District

1. Agro-star
2. Agrocel
3. Godrej Agrovet (GAVL) - A diversified agri-business company
4. Dhanuka, transforming India through agriculture

In Kolhapur

1. Krushi Kranti Sheti Vidnyan Mandal
2. Krishibandh Agro Limited
3. Sahyadri Agrotech Agency
4. Adinath Agro Industries Alatag
5. Seema Biotech





C) Agriculture Extension System through Farmer Interest Groups/ Farmer producer Groups/ Women farmer Groups etc.

Organized user groups such as commodity groups, farmer interest groups, farmer clubs, and women farmer groups, special interest groups etc. also play small but significant roles in extension in niche regions and areas.

i. **Farmer Producing Organization:** There are 123 FPOs in Pune and 42 (krishi.maharashtra.gov.in) in Kolhapur working today.

FPOs in Pune

1. Vasundhara Agrihorti Producer Company Limited, Pune
2. Nirman Agro Producer Company Limited, Pune
3. Sahyadri Agriculture Producer Company Limited, Pune
4. Utkarsha Krushi Producer Company Limited, Pune
5. Mayureshwar Agrihorti Producer Company Limited, Pune
6. Vighnaharta Agrihorti Producer Company Limited, Pune
7. Kamadhenu Cattle and Buffalo Producer Company Limited, Pune
8. Kukadi Agro Producer Company Limited, Pune

FPOs in Baramati

1. Baramati Farmer's Producer Company Limited, Baramati
2. Nathson Farmer's Producer Company Limited, Baramati
3. Pratibha Farmer's Producer Company Limited, Baramati
4. Sharda Women's Farmer Producer Company Limited, Baramati
5. Krishi Pragati Centre – Kamdhenu organic vegetables and fruits producer group, Kolkata, Junnar
6. Nathson Farmer's Producer Company Limited, Baramati

FPOs in Kolhapur

1. Mahabeema Bamboo Producer Company Limited, Hatkanagale
2. Shri Doodhganga Vedganga Milk & Agro Producer Company Limited, kolhapur
3. Family Farming Producer Company limited, Hatkanagale
4. Shetkari Vikas Agro Producer Company Limited, Hatkanagale
5. Shree Khanaidevi Agro Producer Company, Hatkanagale
6. Kumbhoj Agro Producer Company Limited, Hatkanagale
7. Monocots Starch Farmer Producer Company Limited, Kolhapur
8. Krushiutkarsh Agro Farmers Producer Company Limited, Kolhapur
9. Suvarnasheti Agro Producer Company Limited, Kolhapur

Extension activities that have been taken up by them are as follows

1. SMS group
2. Trainings
3. Field visits
4. Mobile advisory
5. Group discussion

ii. Cooperative Societies

There are 565 cooperative societies dated 15.10.2018 in Maharashtra. In this, the majority of the societies come under the Pune and Kolhapur districts. (mscs.dac.gov.in)

Cooperative Societies in Pune

1. Gaj Vaibhav Laxmi Multistate Agro Purpose Cooperative Society Ltd., Maharashtra, Pune
2. Shree Saidip Multistate Agro Purpose Cooperative Society Ltd.
3. Agro Panan Sahakari Sanstha Maryadit, Maharashtra, Pune
4. Shriraj Cooperative Milk Producer and Processor Sangha Ltd., Maharashtra, Pune
5. Parli Peoples Urban Multistate Cooperative Credit Society Ltd., Maharashtra, Pune
6. Sampada Multi State Cooperative Credit Society Ltd., Maharashtra, Pune
7. Shri Wagheshwar Multistate Cooperative Dairy Foods and Agro Products Ltd., Maharashtra, Pune
8. Maharashtra State Grape Growers Association
9. Shivmudra Infotech Private limited and Shivkarya Urban Multipurpose Credit Ltd.
10. Satsadhak Cooperative Water Supply Society Ltd.

Cooperative Societies in Kolhapur

1. Somnath Women Multistate Cooperative Agro Processing Society Ltd., Maharashtra, Kolhapur
2. The Deepak Jaggery Producers Cooperative Society Ltd., Maharashtra, Kolhapur
3. Sahyadri Rural Agriculture Research Management Development Sanstha Ltd., Maharashtra, Kolhapur
4. Navbharat Cooperative Agro Processing Society Ltd., Maharashtra, Kolhapur
5. Venkateshwara Multistate Cooperative Agro Products Society Ltd., Maharashtra, Kolhapur
6. Swabhimani Multistate Cooperative Milk & Agro Processing Ltd., Maharashtra, Kolhapur
7. Kolhapur Zillha Dudh Utpadak Sangh (Gokul)

D) Agriculture Extension System by NGOs

In India, thousands of NGOs are actively involved in the development of rural areas. Their grassroots orientation and proclivity to work in rain-fed and tribal regions has naturally oriented

them towards land based livelihood. These organizations work in different places and mainly specialize in the field of agriculture, watershed development, natural resource management, livelihood improvement, women empowerment, institutional development etc. (Sulaiman, 2012).

NGOs in Pune

1. BAIF - Bharatiya Agro Industries Foundation
2. Action for Agricultural Renewal in Maharashtra (AFARM) - 2/23 A-B Raisoni Park, Market Yard, Pune 411 037, Maharashtra, India.
3. Chetna Mahila Vikas Kendra
4. Deep Griha Society
5. Centre for Science and Technology
6. Edu-Tech Agro Foundation
7. Aasha foundation f-50140/p, Pune (Maharashtra)
8. Watershed Organisation Trust (WOTR), Pune
9. Acharya Atre Vikas Pratishthan

NGOs in Baramati

1. Agricultural Development Trust, Malegaon, Baramati
2. Vidya Pratishthan, Baramati
3. Environmental Forum of India (Ngo), Baramati

NGOs in Kolhapur

1. Rajarshi Shahu Kala Krida V Shaikshanik Prabodhini Konvade 33986, Kolhapur (Maharashtra)
2. Abhinav Education Society F21510, Kolhapur (Maharashtra)
3. Jijau Bahuuddeshiy Samajik Va Shaikshnik Sanstha Kolhapur
4. Jivandan Mahila Bahuddeshiy Sevabhavi Sanstha, Kolhapur

Extension Activities that have been taken up by them are as follows

1. Field demonstration
2. Mobile advisory services
3. FFS
4. Trainings

Research Design

First Phase: Data or information on the different roles of extension services, different extension organizations and their working, extension tools etc. are searched and information collected by reviewing annual reports, research papers, online published reports, books, magazines etc.

Second phase: For the current study, all the services provided in the field of agriculture by the public sector, private sectors and NGOs were visited for the study of how agricultural extension practices are conducted and provided to the farmers.

Third phase: Farmers were interviewed individually using a semi-structured interview scheduled to find out the impact of good agricultural extension practices. The observation method is used to collect data.

Selection of Area

Of the five regions of Maharashtra, in India, two districts from the western region namely Pune and Kolhapur were selected purposively on the basis of a number of successful agripreneurs and public, private organizations including Non-Governmental Organizations (NGOs), agriculture departments, and Farmer-Based Organizations (FBOs) are maximum. The KVKs are also playing a vital role in this area and these sectors are responsible for disseminating the agricultural extension services.

Table 2: Distribution of extension services providing sectors

Sr. No.	Sectors	Maharashtra	India	Source
1	NGOs	10304	78909 i. Agriculture- 18383 ii. Animal Husbandry, Dairy, Fishery- 12421 iii. Rural development and poverty alleviation- 9352	https://ngodarpan.gov.in/index.php/home/statewise
2	FPO	99	818	http://sfacindia.com/List-of-FPO-Statewise.aspx (According to SFAC-2019)
3	AC-ABC	8023	28365	MANAGE progress report AC-ABC 2019 http://www.agriclinics.net/OtherDocuments/state-wise.pdf

Selection of Tehsil

Two tehsils from Pune district i. e. Baramati and Junnar and two tehsils from Kolhapur district i. e. Hatkanangale and Karvir were purposively selected for the present study as these are the vibrant growth tehsils and a big network of NGOs and agricultural organization exist in these tehsils. Thus, a total of four tehsils will be selected.

Type of growth region	Talukas in Pune District	Talukas in Kolhapur District
Vibrant growth region	Baramati, Junnar, Haveli, Indapur, Daund	Hatkanangale, Karvir, Shirol, Kagal, Gadhinglaj
Medium growth region	Khed, Ambegaon, Shirur, Velha, Maval, Mulshi,Purandhar	Shahuwadi, Shahuwadi, Panhala
Slow growth region	Bhor, Velha	Ajra, Bhudargad, Chandgad, Gaganbavada

(Source: http://krishi.maharashtra.gov.in, 2016-17)

The different growth regions of the districts are characterized by the following indicators of development

a) Gross irrigated area to gross cultivable area is more than 26% in these talukas.
b) Big network of NGOs and SHGs exist in the talukas.
c) Growing interest among the farmers towards organic farming.
d) Scope for sericulture development.
e) Horticulture development, especially fruits & vegetable production is picking up.
f) Animal husbandry is gaining momentum as a supplementary source of income.
g) The talukas have well established APMC
h) Potential exists for crop diversification
i) Scope for agro processing units.

Source: (http://krishi.maharashtra.gov.in, 2016-17)

3.3.6 Selection of Villages

From one taluka, two villages are selected randomly. Thus, eight villages were selected in total for the present study.

3.3.7 Selection of Respondents

From each village, four beneficiaries and four non-beneficiaries were selected randomly to make a sample of 32 beneficiaries and 32 non-beneficiaries. Thus, 64 beneficiaries and non-beneficiaries were selected randomly in total by snowball sampling for the study.

3.4 Data Collection Tools and Techniques

For the current study, data will be collected by using the ex post facto method. In the present study, both primary and secondary data were used. Mixed Method data were collected from an interview schedule. Primary data will be collected and calculated quantitatively and qualitatively. In quantitative data, the data will be collected through measuring things such as the impact of good

extension practices on farmers whereas, in qualitative, the data were collected through participant's observation and interviews.

3.4.1 Secondary data Collection: It was collected after reviewing the annual reports, research papers, online published reports, books, magazines etc. It helped to explore the impact of good extension practices, different case studies regarding good extension practices and the role of extension services in the selected districts of Maharashtra to achieve the objectives of the study.

3.4.2 The primary data Collection: It was collected by conducting telephonic conversations and face to face interviews with the respondents. For the purpose of the present study, a semi-structured interview schedule will be prepared where focus group discussions were done and observation methods were used to collect the information.

Fig. 2: Researchers' interaction with farmers for primary data collection

3.4.3 Variables

Impact of good extension practices

3.4.3.1 Impact Evaluation

Impact evaluation seeks to measure lasting impacts of programs or projects on important indicators such as crop yields, farm profitability, family income, livelihood improvement and socio-economic change. Such assessments may also focus on broad and long-term program effects such as changes in ecological, social, economic, or community conditions.

Impact evaluation attempts to assess the changes that can be attributed to a particular intervention, such as a project, program or policy. These changes can be those intended or expected and also unintended ones. In contrast to the outcome monitoring which examines whether targets have been achieved, impact evaluation is structured to answer the bigger question: has there been any change in the situation where the intervention was planned to correct and how has the intervention impacted the lives of the intended beneficiaries? This involves counterfactual analysis i.e. comparison between what actually happened and what would have happened in the absence of the intervention. The key challenge in impact evaluation is that the counterfactual cannot be directly observed and must be approximated with reference to a comparison group.

Impact evaluations seek to answer cause-and-effect questions. In other words, they look for the changes in the outcome(s) that are directly attributable to a program. Such analysis helps in evidence-based policy decisions and understanding what works, what doesn't, where, why and at how much cost? The impact evaluations go for an in-depth analysis of the impacting process as well. This has received increasing attention as it aids in policymaking in recent years in contexts of both developed and developing countries. It is an important component of the armory of evaluation tools and approaches and integral to global efforts to improve the effectiveness of the aid delivery and public spending more generally in improving living standards.

The study applies 'Bennett's hierarchy' (Bennett, 1976), which describes evidence of extension activity impacts, to the data collected through individual surveys of the participants, beginning at the bottom step with inputs, and progressing to the top-end results. While this model is useful for assessing inputs, activities, outputs, reactions, knowledge, opinions, skills and attitude changes (levels 1–5), it is not rigorous enough to assess practice change and end results at levels 6–7 (Morford *et al.*, 2006). Secondly, in order to address the above deficiency, the study employs different case studies of stakeholders.

Table 3: Impact Evaluation using Bennett's hierarchy

Evaluation hierarchy	Measurements	Indicators
Level 7 (End results)	Extension practices usefulness further	• Change in crop production • Change in social status

	changes required	• Change in Annual income • Change in expenditure pattern and saving pattern.
Level 6 (Practice change)	Technical advices adoption	• Non-adoption, partial adoption and full adoption of technical advices
Level 5 (KASA change)	Farmers' perceptions	• Changes in Knowledge, Attitude, Skills, Adoption etc. of good extension practices
Level 4 (Reactions)	Farmers' feedback	• Factors of motivation to adopt different extension methods • Reasons to change/ adopt different extension methods in the past two years
Level 3 (Participation)	Activities completed	• Involvement of farmers in different extension service providers
Level 2 (Activities)	Activities performed by farmers in his farm	• Crop production, and productivity • Livestock production and productivity • Crop protection • Intercultural operations • Post-harvest management • Marketing of produce
Level 1 (Inputs)	Investments and resources used	• Time required for attaining extension methods like demonstration, phone calls, trainings, group discussion etc. • Time utilized for video call, for watching different agriculture-related videos, for using agricultural mobile apps. • Investment cost in subsidiary business and new farm inputs • Labour required for agricultural activities in farm.

Impact Indicators

- Knowledge level
- Family Annual income
- Family Expenditure Pattern
- Family saving pattern
- Social status
- Social participation
- Health improvement
- Decision-making ability

Research Design

1. Ex-post facto research design was used for the present study.

2. Mixed Method data were collected from an interview schedule. Primary data was collected and calculated quantitatively and qualitatively. In quantitative data, data was collected through measuring things such as the impact of good agricultural extension practices on farmers whereas, in qualitative, data was collected through participant's observation and interviews.

3. For the purpose of the present study, a semi-structured interview schedule was prepared where focus group discussions were done and observation methods were used to collect the information.

4. Secondary data was collected after reviewing the annual reports, research papers and online published reports, books, magazines etc. It will help to explore different case studies regarding good agricultural extension practices and the role of extension services in the selected districts of Maharashtra to achieve the objectives of the study.

5. The primary data was collected by conducting telephonic conversations and face to face interviews with the respondents.

Result and Discussion

Table 4: Agricultural Extension Practices in different sectors in the Western region of Maharashtra

Different governments, NGOs and private sector institutions involved in the extension activities are mentioned and discussed in the below table:

Sr. No	Organization / Institute	Sector type	Agriculture and Allied Practices/content/ services	Extension Practices
Pune District				
1	AFARM – Action Plan for Agriculture Renewal in Maharashtra, Pune	NGO	Promotion of package of practices of organic farming Empowering women For poor marketing linkages Increasing cropping intensity and crop productivity: i. In-situ soil moisture conservation ii. Rain water harvesting iii. Micro irrigation promotion	• FFS- in 34 villages • Field demonstrations- 645 • Field trials • SHGs groups -194 • Livelihood literacy classes- in 20 villages • Training on PHM and value addition • Facilitating market linkages with private players • Collective procurement of agriculture inputs and marketing of produce **Group discussion** • Shetkari Vigyan Mandal (20) • Agriculture Producer Group (76)
2.	BAIF (Bharatiya Agro Industries Foundation) Development Research Foundation	NGO	BAIF is a voluntary organization established to create sustainable livelihood opportunities for the rural people. BAIF has been a pioneer in the cross breeding of high yielding European cattle such as Holstein Friesian and Jersey with sturdy Indian breeds	• BAIF has been promoting a cluster-based multidisciplinary programme with a special focus on the holistic development of the poor family in the last 47 years. **Training** • In entry activity, they give training to the people of selected area. • BAIF develops a number of SHG

			such as Gir from Gujarat. Through rural development projects on dairy husbandry, water resource management, improved agriculture and tree-based farming, BAIF has touched the lives of 4.0 million families in 60,000 villages in 16 states of India.	groups and develop more than 600 Krushi and Pashu Sakhi in different areas. • During the year 2018-19, there is 1786 youth from participant families who were trained in various skills, to manage their enterprises better. **Group Discussion** • In selected areas, BAIF has been taking group discussion of people for encouraging them for different allied activities like livestock management, water management, national resource management, different crop production techniques etc. • BAIF takes different workshops, symposium and seminars yearly for promotion of different livestock aspects and livelihood improvement in different areas of India.
3.	KVK Agriculture Development Trust, Baramati KVK	NGO	Training programme has been given for school dropouts and unemployed rural youth. These include keeping poultry, goatery, nursery, dairy & sericulture units. Objectives for conducting trips such as water storage/saving techniques, mechanized dairy farming, organic farming, cultivation under greenhouses, modern irrigation and fertigation technique. Showcasing the innovative efforts of farmers is the main	**Training** • On average, this KVK conducts 100 to 120 need-based training programs in a year for farmers, farm women, rural youth and extension personnel. 40-50% of them are long duration trainings. • The KVK has purchased more than 200 educational audio-visual aids to make the training activities more effective. • Exposure visit/Study tour

purpose of conducting trips.

KVK Baramati organizes field day on various crops like Bengal gram, wheat, pomegranate, fig, paddy, soya bean, sorghum and back yard poultry.

Field Day

- Every month, a day is fixed with the farmers growing that crop and it enhances trust in them.

From its establishment, the KVK organizes Kisan Mela programs once or twice monthly and100-500 farmers participate in each Kisan Mela. In this Kisan Mela, experts from agriculture universities and research stations guide the farmers on particular issues.

- Kisan Mela

The greatest achievement of the KVK is the implicit faith of the farmers and social realization.

The KVK offers prompt diagnostic visits to the problematic fields and guides accordingly.

- Diagnostic visits for on-farm consultancy.
- No. of diagnostic visits are approximately 150 in 2017.

Group Dynamics

Farmers' producer organization:

There are nearly 500 members that are the small farmers producing various vegetables and fruit crops.

KVK facilitates the FPOs to have linkages with agencies exporting fruits

- 7 FPOs have been established by KVK in Pune District.
- Direct marketing through Dhyanya Mahostav (Food Grain Festival) from 2013 with the objective of bringing the farmers and consumers on one platform to directly sell their products to the consumer.
- Total 53 farmers club and more than 7000 farmers participated in the festival.
- In this new initiative of KVK, Baramati

and vegetables to 5-star hotels, McDonald's, Pizza Hut, Dominos etc. Some of the exporters are in contact with these FPOs for exporting pomegranate, grapes, vegetables etc. to the European Union. Hence, they are getting very good prices throughout the year. KVK is taking care of various value chains for providing market guidance to the FPOs for their bright future.	farmers from nine different blocks from four districts viz. Pune, Satara, Sangli and Kolhapur participated in the food grain festival with their farm produce. • In 2017, a total purchase of farm produce is of worth rupees 43.2 lakh.
Farmers clubs and SHGs KVK is encouraging the illiterate women from rainfed areas to do more productive farming that can reduce their drudgery too.	**Farmers clubs and SHGs** • This KVK has established 154 farmers' club in 3 districts i.e. Pune, Solapur and Satara. Out of these, 13 farmers clubs are women farmers' clubs. • KVK has established 1427 farmers' self- help groups. Out of that, 460 are women SHGs.
Commodity Interest groups CIG is established by KVK during 2008-2009. There are eight different commodities that are grown on a large scale in the districts like pomegranate, banana, citrus, fig, custard apple.	• These groups are trained for improved technologies through demonstrations, trainings and exposure visits and by different methods of transfer of technologies. • Training organized for CIG- 75 • No. of farmers participating in the training are 2181.
Bhimthadi Jatra and Women Day	• Since 2006 to advertise and sell products, every year, Bhimthadi Jatra is organized in Pune, which is known for its reputation as the cultural and educational capital of Maharashtra, and its recognition as a global city

with all the modern means of communication.
- Awareness was spread about garbage and waste management and the exhibition was declared as 'No Plastic Zone'.
- Renowned personalities and experts are invited to guide women participants on scales, packaging and product quality.

Chaitrapalavi (Yearly Programme)

Till today, 5 programmes have been organized by the institute on various issues like climate change, marketing, water management, Post-harvest technology/value addition, export/processing and contract farming.

- Agricultural Development Trust's KVK, Baramati is organizing Chaitrapalavi- The state level leader/progressive farmers meet since 2013. Young and dynamic farmers who have the leading capacity to exchange agriculture knowledge are selected for participation across the state.
- Each year, the topic of discussion is varying according to the importance of current circumstances.
- Also, the experts and farmers are sharing their knowledge experiences with the gathered farming community.

KRUSHIK- Innovative activities for sustainable development of farmers

Krushik Live Demo and Agri Expo

- Keeping in view the importance attached by the central as well as state government and growth of the agriculture industry in the country, KVK Baramati had started to organize annual trade fair KRUSHIK, LIVE DEMO AND AGRI EXPO on its 110 acres farm.
- The first edition was organized from 6-8 November 2015.
- The 2nd edition was organized during January 19-22, 2017, where 178 exhibitors participated.
- Out of these, 134 companies were present within the exhibition hanger and displayed their technologies and agri related offering to the attendees, while 44 companies had participated

	in this event by showcasing their technologies in the form of a live demo, seminars, video shows, animal shows, technologies etc.
Innovation for extension communication, information boards	• During the year 1997, it was realized that with the limited staff, it is not possible to reach a number of villages in a month many times which were also in need of technology or scientific information. • Places were identified where a number of farmers visit every day for different activities e.g. bus station, agro shops, milk collection centers, veterinary dispensaries, village panchayats, co-operative sugar factories etc. BLACK BOARDS were fixed at such suitable places. Every month/fortnight (depending on the need), agricultural messages most relevant to that month were written. • These boards were receiving a good response and KVK was operating 15-20 such boards.
Reach to unreached	• The trainings, demonstration and on-farm testing were mainly concentrated in the focal and satellite villages of KVK. In order to take scientific and technical information at every farmer's door step, this KVK had organized a programme 'KVK at your Village' where the entire team of KVK scientist reaches the selected villages on a given day and arranges an exhibition of all the demonstrated inputs and displays various informative boards, charts.
Farmer Service Centre	• On analyzing the reasons for the very low adoption of agricultural technologies, the main reason was found to be the non-availability of agricultural inputs in time at the grassroot level. • Realizing this, the KVK decided to

work on no profit no loss basis, to serve the farming community without investing any additional amount and started farmers' service where inputs like bio-fertilizer, bio-control agents, micronutrients, seed of improved varieties of soybean, groundnut, chemical traps, grape rootstock, chicks of RIR breed, vermin compost, seeds/stumps of fodder etc. were sold.

- In the year 2016-17, 219,930 farmers were benefited from the farmers' service centres.

Farmer Field School

- The KVK from 2007 is undertaking FFS on various crops like bengal gram, wheat, pomegranate, fig, paddy, soybean, sorghum and back yard poultry in selected villages assemble on a field to discuss the present stage of growth, to observe the changes, pest and diseases, if any, and to discuss the future management to be done in the crop.
- Results of these interactions have been very fruitful as farmers get the guidance at right time.

Campaign

Different need-based campaigns were organized by KVK by conducting various training programmes in different villages

1. Dairy cattle management campaign

- In this, drought related technologies have been undertaken in 6 villages in Baramati block, 2 villages in Indapur block, 2 villages in Purandar block and 2 villages in Phaltan block of Satara district were covered.

2. Water conservation Campaign for drought Management

- KVK had organized a training programme in 91 villages which were attached by 4055 farmers.

	Demonstrations on in-situ soil moisture conservation were also conducted and found helpful to the farmers for enhancing their yield in drought condition. Farmers adopted this technique over more than 600 acres of area in the drought-prone zone.
	3. Campaign on Pest and Disease Management • KVK Baramati is conducting awareness campaigns for pests and disease management in various crops and seasons according to the pest and disease severity and outbreak. • Likewise, campaigns on bio fertilizer and bio-pesticides, campaign on pollinators and beneficial also conducted by KVK Baramati.
Agro-tourism	• KVK has started the agro tourism centre in the demonstration farm from the year 2004. • Mainly, the guest and the school/college students from urban areas are regularly coming to the agro eco-tourism centre. • This facility is also utilized for the training of the farmers who wants to establish the agro tourism center. • 4 trainings on this concept were conducted and more than 800 guests and more than 14000 school students have visited this centre.
ICT for reaching to unreached Krishi Vigyan Kendra's website (www.kvkbaramati.com)	• This website gives information on weather information, training programmes like dairy, poultry, poly-house, beekeeping, products available for sale, agro and weather advisory, monthly agricultural activities, market rates, photo gallery, video gallery, success stories, news events, dignitaries remarks,

	publications, of leaflets, brochures, community radio station programme and information of host organization are available on this website. Every month, more than 3500-4000 visitors from different countries visit this website for different agricultural information.
Community radio station- Sharada Krishi Vahihi 90.8 MHz	• CRS stated at KVK in 2011 under the ATMA scheme of the agricultural department. • The programmes include information on new agriculture technology, interviews of entrepreneurs, and results of different demonstrations taken on KVKs farm etc. Till date, it has broadcasted more than 3940 success stories and scientist interviews. • The extension of new technology and the results of demonstrations can be reached to more and more farmers through radio.
Video conferencing unit	• KVK, Baramati, has recently installed a video conferencing unit under PPP Grape Project. • This is a two-way system through which farmers can share information on different crops, technologies, market information and also guidance from experts.
Disease forecasting Station	• The KVK has established a digital fully automated weather recording station at its farm that has 7 sensors recording parameters like minimum and maximum temperature, relative humidity and sunshine hours at an hourly interval. The forecasted information is then broadcasted through radio and display on the KVK notice board as well as on the KVK website.

			Touch Screen Kiosk	• Agro information media contains information about good horticulture, forestry, dairy management practices etc. • The information on the other topics like soil health, pest and disease management, agricultural engineering, energy sources for farmers' family, the government scheme and small scale business is given. • The information is given in the local Marathi language and supported by photographs, charts and tables.
			Krushik Mobile App	• KVK in association with the host institute Agricultural Development Trust launched an android based mobile app 'Krushik' for farmers. • The trust has used modern technology to connect farmers from rural and remote areas with the latest agricultural practices. • The app has reached 36,000 farmers and more users in 33 tehsils of Maharashtra.
4.	Central Bee Research and Training Institute	Govt.	Recently this institute has taken up TRADING activity of honey and other bee products at a national level. 6 zonal centres and its 18 branch extension centers are established for field trials. New areas are surveyed and beekeeping is introduced in potential areas. Portable honey testing kit was developed and supplied to over 200 individuals and organizations.	• Extension through Publications- CBRTI library is the recognized library of the International Bee Research Association (IBRA), Cardiff and U. K. • It has 2349 books, 12 video films, 1878 CDs on beekeeping, journals etc. • All farmers, students, scientists, extensionists visit this library and get benefited from it. • Awareness camp is conducted in 10-15 numbers. • Total of 1000 participants get benefited per year. • Training courses for students, beekeepers, farmers, beekeeping co-operatives, government organization, honey hunters and honey tribals etc. are given by CBRTI.

5	KVK, Narayangaon NGO	NGO	KVK focuses primarily on increasing the crop production level of local farmers by providing them with various technical inputs and services like soil and water analysis, bio-fertilizers, bio-pesticides, vermicompost, and vermi-wash at reasonably moderate rates. KVK ensures the quality and variety production of crops like sugarcane, paddy, jawar, bajra, gram, soybean and groundnut. Vegetable production training includes tomato, cabbage and cauliflower. Similarly, fruits like grapes, banana, pomegranate, mango and many other crops are conducted by KVK Narayangaon.	The following extension activities are carried out yearly in KVK, Narayangaon: • Field day for successful demonstrations • Film show during training • Method demonstration • Farmers seminar for awareness creation • Lectures delivered as resource persons to line departments and NGOs • Farm Advisory service • Field visits to the farmers field • Exposure visits organized • Awareness camp organized • Kisan Goshti/Melava • Conducting skill-oriented training programme for self-employment like nursery management, PHT, vermiculture, high-tech poly house and entrepreneurship based programmes like backyard poultry and goat farming to rural youth.
6	Vegetable Growers Association of India (VGAI) NGO	Non-Profit Orgniz ation	Marketing linkages– producer to consumer, institutional supply, retail, export. Vegetable Growers Association of India (NGO) based in Narayangaon, Pune, working mainly on farmers mobilization, capacity building, sustainable and organic agriculture, direct marketing etc. with small and marginal farmers to improve their	• Farmers mobilization, capacity building, trainings, meetings, exposure visits, demonstrations, technology adoption & dissemination, business plan preparation of FPO's, mechanization, value chain development, direct marketing of agricultural produce are the activities that run in FPO's. • It is registered as a resource institute partner with SFAC, POPI with NABARD & training partner with NSDC-SSC-ASCI. It conducts trainings in all agri job roles in Maharashtra. It also formed a federation of all FPCs in Maharashtra called MAHA FPC which mainly

			livelihoods.	focuses on the facilitation of FPOs.
7	Shivkarya Urban Multiple Nidhi Ltd. (Decent Foundation)	NGO		• Training programme on proper handling of insecticide and other agricultural aspects like water conservation and organic farming etc. • Different guest lectures on women empowerment, women entrepreneurship, personal hygiene of school girls through 'Kali Umaltana Programme' • Campaign- It happens once a year and 3000-4000 farmers participate in it. • Exhibition for farmers farm implements, seed varieties, fertilizers, pesticides etc.
	Kolhapur District			
8	KVK, Talsande	NGO		**1. Field Days** • Majorly monthly 2 field days are arranged by KVK. **2. Diagnostic visit** • Scientists visits to farmers' fields are arranged 12-15 times a month. • Farmers' visits to the KVK farm are arranged monthly where 10-12 farmers or a group of farmers visit KVK for their queries, for knowing about new technology and different crop cultivation practices. **3. Training Programme** • Different training programmes on crop productions, pest and disease management, water harvesting techniques, post-harvest management etc. are conducted by KVK.
9.	Family Farming Producer	Private	This producer company started on 8 December 2014.	**1. Group Discussion** • This FPO conducts weekly group discussion of farmers related to the

	Company And Consultancy		It has 536 members. FPO has a cold storage facility, marketing facility and consultancy facility. FPO's audit is about 1.40 crore /annum.	production and marketing of the produce. **2. Diagnostic meeting** • An FPO field executive who has good knowledge about the agriculture field regularly visits the field and helps the farmers in solving their queries. **3. Consultancy** • FPO also facilitates consultancy to the farmers related to vegetables, flowers and main crops of the region. This consultancy is free of cost to the members of the FPO.
10.	Warna Dairy cooperative society	Private	The dairy plant is equipped with advanced machinery and technology for the manufacture of milk & milk products. Warana brand milk & milk products are popular in the domestic & export market due to its quality. The dairy plant has a handling capacity of 7,00,000 litres per day and makes various products and its marketing.	• All veterinary services are almost free. Only special visits are being nominally charged where the fee is Rs. 50/- and large operations like caesarian and Ruminatomy have a fee of Rs. 100/- only. **Exhibition and Competition** • To motivate the milk producers, DCS Union organizes different competitions every year such as Ideal DCS, Ideal Women DCS, Highest Milk supplying DCS, Best quality milk – cow, Best milk quality – buffalo, Highest milk supply – lean season, Best artificial inseminator, Best fat tester, Ideal Chairman of DCS, Ideal Secretary etc. On each occasion, 400-500 animals participated in the AGM milk animal show organised by the Union. • Various training programmes related to livestock management and livestock feed is conducted by the milk plant.

Table 5. Socio-economic characteristics of respondents of good agricultural extension practices

Sr. No.	Characteristics	Pune		Kolhapur	
		Beneficiaries	Non-Beneficiaries	Beneficiaries	Non-Beneficiaries
1.	**Education**	**F**	**%**	**F**	**%**
	No formal Education	0	0	0	0
	Up to Primary	3	18.75	4	25
	Up to High school	2	12.5	5	31.25
	Higher Secondary	4	25	5	31.25
	Graduate	5	31.25	2	12.5
	Post graduate	2	12.5	0	0
2.	**Area under living**				
	Rural	12	75	16	100
	Urban	4	25	0	0
3	**Farming Experience**				
	Up to 14	4	25	3	18.75
	15-23	6	37.5	6	37.5
	24 & Above	6	37.5	7	43.75
4	**Occupation**				
	Agriculture	6	37.5	10	62.5
	Agri+Livestock/Poultry	4	25	4	25
	Agri+ Business	6	37.5	2	12.5

It was revealed through the investigation that the majority (31.25%) of the beneficiaries from Pune districts were educated up to graduate level, followed by (25.00%) higher secondary level. Whereas 18.75 per cent of the respondents were educated upto primary level, 12.50 per cent of them were educated up to high school level and postgraduate compared with non-beneficiaries

.

Whereas, it was revealed through the investigation that the majority (31.25%) of the beneficiaries from Kolhapur districts were educated up to graduate level, followed by (25.00%) up to high school and higher secondary level. Whereas 12.50 per cent of the respondents were educated upto primary level, 6.12 per cent of them were educated up to postgraduate compared with non-beneficiaries.

It was revealed from the study that all the non-beneficiaries (100%) from both the study areas (Pune and Kolhapur) are from rural areas. However, 87.5% of the beneficiaries from Kolhapur and 75% of the beneficiaries of Pune are from rural areas.

It is noticed from the above table that the majority (43.75%) of the non-beneficiaries from Pune as well as from Kolhapur districts have more than 24 years of farm experience. However, 37.5% per cent of the non-beneficiaries from both the study areas (Pune district and Kolhapur district) have

farm experience between 15 to 23 years. Equal (18.75%) per cent of them have up to 14 years of farm experience.

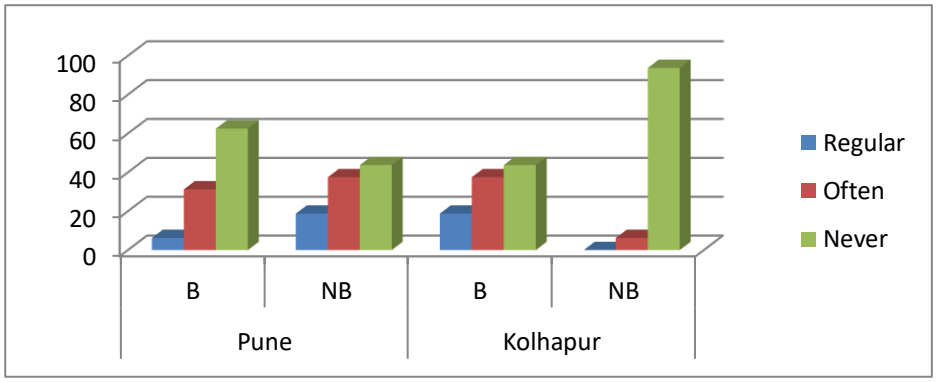
The majority (43.75%) of the beneficiaries from Kolhapur district had more than 24 years of farm experience. It is followed by 31.25% per cent of the beneficiaries who had farm experience between 15 to 23 years. An equal number (37.5%) of beneficiaries from the Pune district falls under the two farm experience categories namely 15 to 23 years and above 24 years. It is followed by the same number (25%) of beneficiaries from both Pune and Kolhapur districts that had fallen under the last category i.e. below 14 years of farm experience.

Regarding occupation, it is seen from the above table that the majority (62.5%) of the non-beneficiaries for the Pune district have agriculture as their main occupation. However, 56.25% of the non-beneficiaries from the Kolhapur district have agriculture as their main occupation. The findings conclude that there is no difference between beneficiaries of both Pune and Kolhapur districts as they have an equal (37.5%) number of respondents falling under agriculture as their main occupation.

37.5% per cent of the beneficiaries from the Pune district fall under the agriculture and business category compared to the non-beneficiaries (12.5%). It is followed by 37.5% of the beneficiaries from the Kolhapur district that fall under the agriculture and livestock/poultry category compared to non-beneficiaries (31.25%).

A) Extension Contact of the respondents

1. Agricultural Scientist (n= 64)



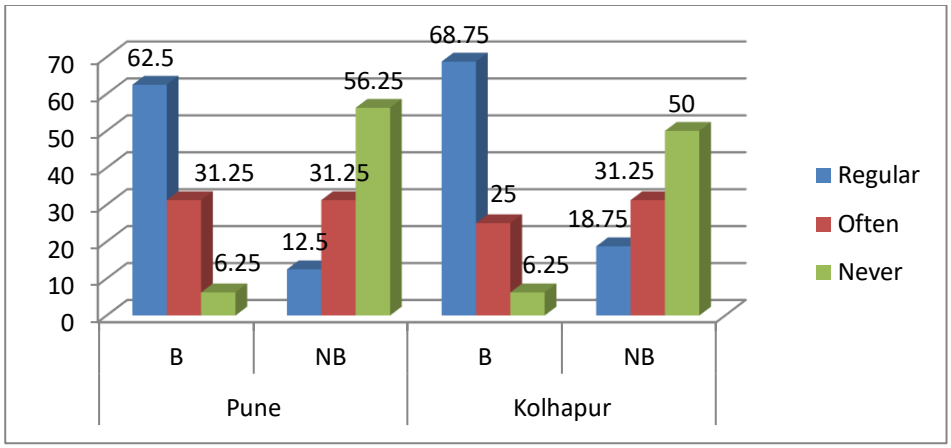
The investigation revealed that the majority (87.5%) of the non-beneficiaries from the Pune district have never taken advice from the agricultural scientists, followed by (12.5%) who met agricultural scientists often compared with non-beneficiaries from the Pune district.

Whereas it was revealed through the investigation that the majority (93.75%) of the non-beneficiaries from Kolhapur districts have never taken advice from the agricultural scientists when

compared to beneficiaries. Whereas 37.50 per cent of the beneficiary respondents have met agricultural scientists often for advice compared with non-beneficiaries.

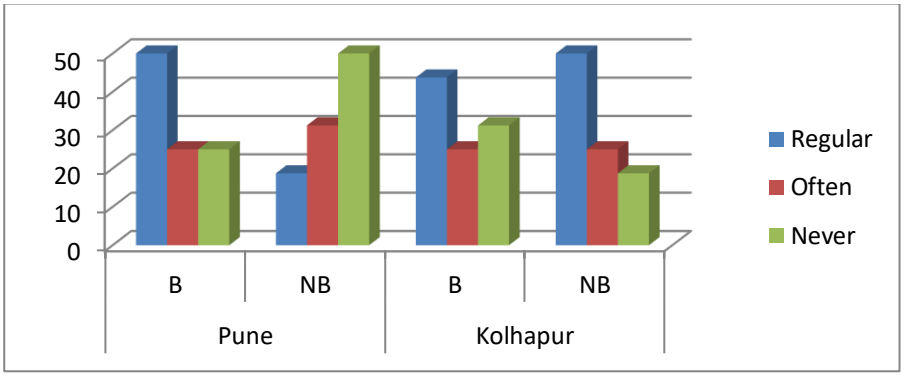
2. Agricultural Officer (n= 64)

The investigation revealed that the majority (62.50%) of the beneficiaries from the Pune district have taken advice from the agricultural officer on a regular basis followed by (31.25%) who met the agricultural officer often compared with non-beneficiaries from the Pune district. Whereas 56.25% of the non-beneficiaries have never taken advice from the agricultural officers compared to the beneficiaries of the Pune district.



The investigation revealed that the majority (68.75%) of the beneficiaries from Kolhapur districts have taken advice from the agricultural officer on a regular basis compared to non-beneficiaries. Whereas 50.00% of the non-beneficiaries have never taken advice from the agricultural officers compared to the beneficiaries of the Kolhapur district.

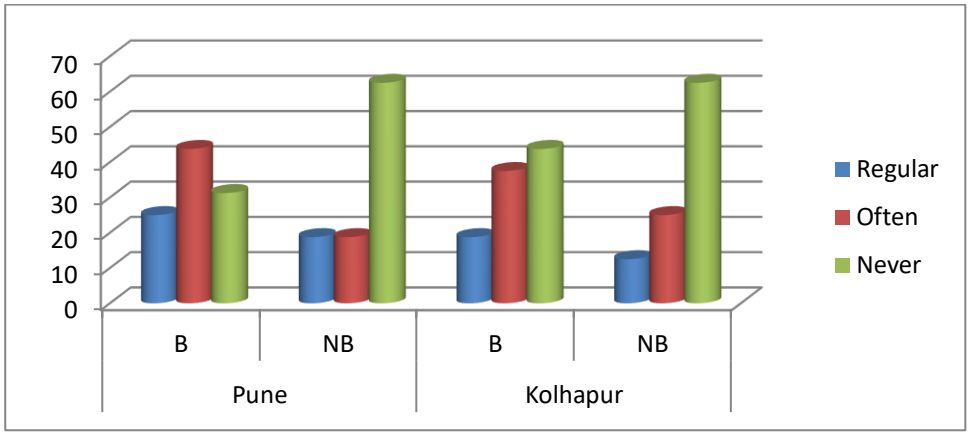
3. Agro Agencies (n= 64)



The investigation revealed that the majority (50%) of the non-beneficiaries from the Pune district had no extension contact with the agro agencies compared to beneficiaries. It is followed by (50%) of the beneficiaries that had regular extension contact with the agro agencies compared with the non-beneficiaries from the Pune district.

The investigation revealed that the majority (50%) of the non-beneficiaries from Kolhapur districts had regular extension contact with the agro agencies compared to the beneficiaries and 31.25% of the beneficiaries had no extension contact with the agro agency compared to the non-beneficiaries of the Kolhapur district.

4. Private company (n= 64)

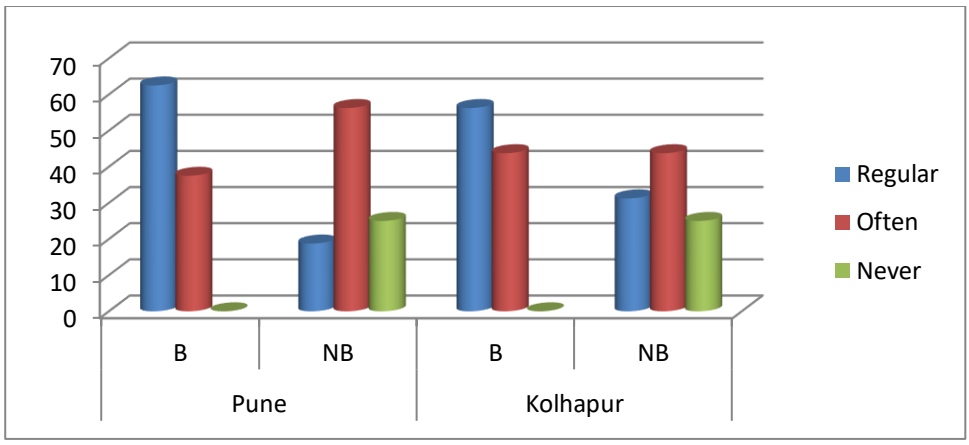


The investigation revealed that the majority (62.50%) of the non-beneficiaries from the Pune district had no extension contact with the private company compared to the beneficiaries. It is followed by (43.75%) of the beneficiaries who had often extension contact with the private company compared with the non-beneficiaries from the Pune district.

The investigation also revealed that the majority (62.50%) of the non-beneficiaries from the Kolhapur districts had no extension contact with the private company compared to beneficiaries and 37.50% of beneficiaries had often extension contact with the private company compared to the non-beneficiaries of the Kolhapur district.

B) Extension Input of the respondents

1. Group Discussion (Discussion with agricultural officers/scientist) (n= 64)

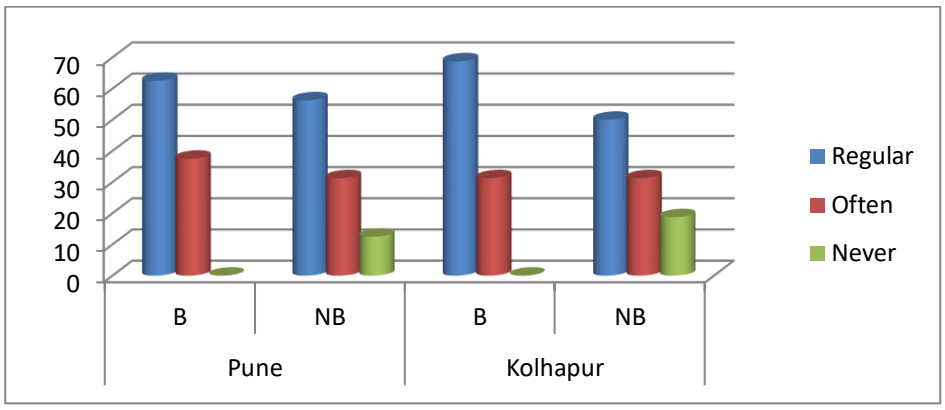


The investigation revealed that the majority (62.50%) of the beneficiaries from the Pune district had used the group discussion extension method compared to the non-beneficiaries. It is followed by (37.50%) of the beneficiaries who had often used the group discussion method compared to the non-beneficiaries from the Pune district.

The investigation also revealed that the majority (56.25%) of the beneficiaries from the Kolhapur districts had used the regular group discussion extension method compared to the non-beneficiaries and 43.75% of the beneficiaries had often used the group discussion extension method when compared to the non-beneficiaries of the Kolhapur district.

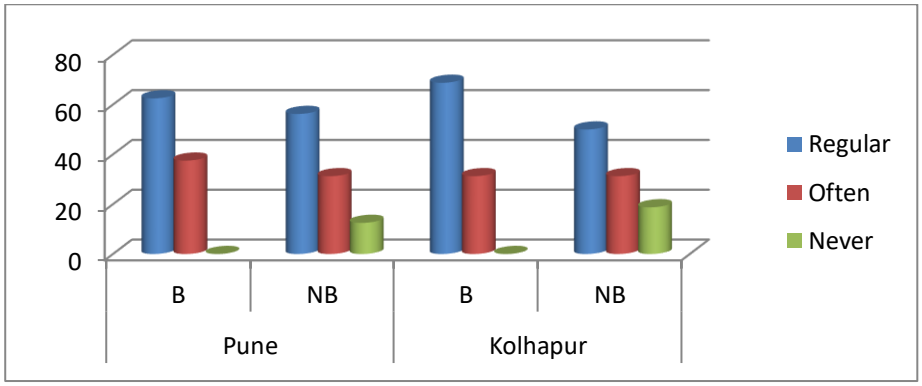
2. Discussion with Progressive Farmers

The investigation revealed that the majority (56.25%) of the beneficiaries from the Pune district had used group discussion with the progressive farmer's extension method when compared to the non-beneficiaries. It is followed by (31.25%) of the beneficiaries who had often used the group discussion method compared with the non-beneficiaries from the Pune district.



The investigation revealed that the majority (68.75%) of the beneficiaries from the Kolhapur district had used the group discussion extension method compared to the non-beneficiaries (50.00%). It is followed by (31.25%) of the beneficiaries and non-beneficiaries who had often used group discussion with the progressive farmer method from the Kolhapur district.

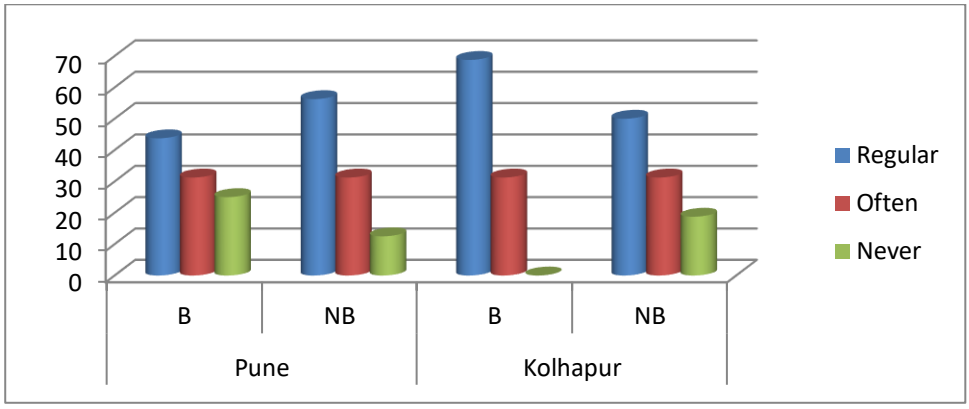
3. Training



The investigation revealed that the majority (62.50%) of the beneficiaries from the Pune district had used the training extension method regularly compared to the non-beneficiaries (56.25). It is followed by (37.50%) of the beneficiaries that had often used the training method compared to the non-beneficiaries from the Pune district.

The investigation revealed that the majority (68.75%) of the beneficiaries from the Kolhapur district had used the training extension method regularly compared to the non-beneficiaries (50.00%). It is followed by (31.25%) of the beneficiaries who had often used the training method compared to the non-beneficiaries from the Kolhapur district.

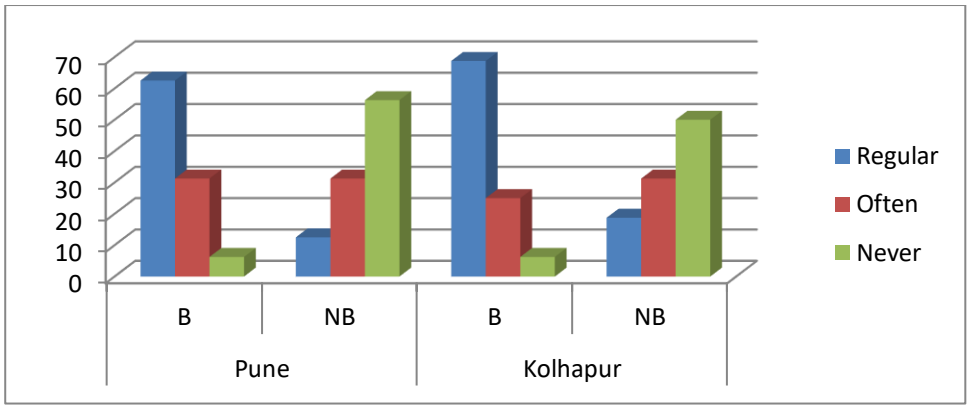
4. Farmers field School



The investigation revealed that the majority (43.75%) of the beneficiaries from the Pune district had used the FFS extension method regularly compared to the non-beneficiaries (18.75%). It is followed by (31.25%) of the beneficiaries who had often used the FFS method compared to the non-beneficiaries from the Pune district.

The investigation revealed that the majority (43.75%) of the beneficiaries and non-beneficiaries (62.50%) from the Kolhapur district had never used the FFS extension method. It is followed by (31.25%) of the beneficiaries who had often used the FFS method compared to the non-beneficiaries (18.75 %) from the Kolhapur district.

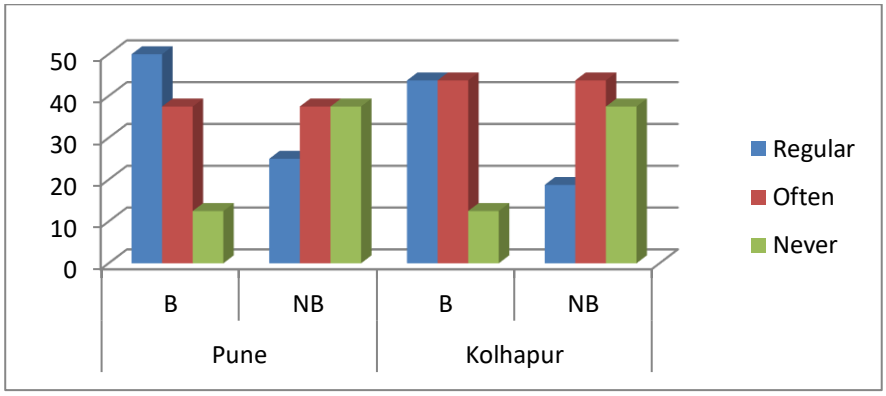
5. Field Tour



The investigation revealed that the majority (62.50%) of the beneficiaries from the Pune district had used the field tour extension method regularly compared to the non-beneficiaries (12.50%). It is followed by (31.25%) of the beneficiaries who had often used the field tour method compared to the non-beneficiaries from the Pune district.

The investigation revealed that the majority (68.75%) of the beneficiaries from the Kolhapur district had used the field tour extension method regularly compared to the non-beneficiaries (18.75%). It is followed by (25.00%) of the beneficiaries who had often used the field tour method compared to the non-beneficiaries from the Kolhapur district.

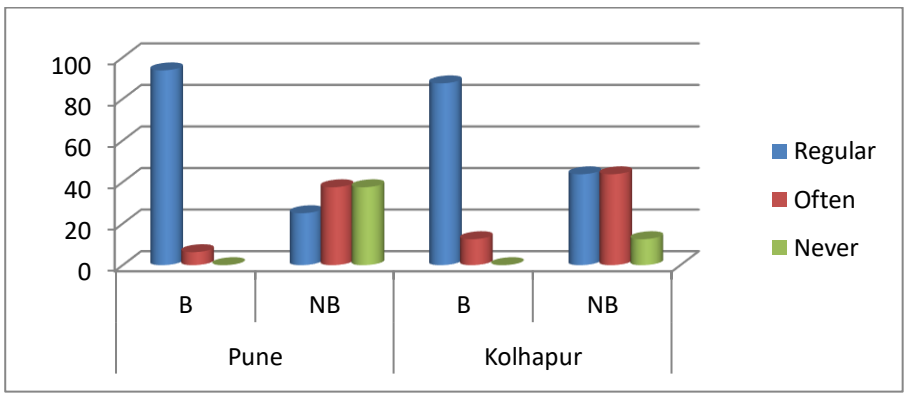
6. Method Demonstration (Farmers Field)



The investigation revealed that the majority (50.00%) of the beneficiaries from the Pune district had used the method demonstration regularly compared to the non-beneficiaries (25.00%). It is followed by (37.50%) of the beneficiaries who had often used the method demonstration compared with the non-beneficiaries from the Pune district.

The investigation revealed that the majority (43.75%) of the beneficiaries from the Kolhapur district had used the method demonstration regular and often compared to the non-beneficiaries (18.75%). It is followed by (12.50%) of the beneficiaries who had never used the method demonstration compared with the non-beneficiaries from the Kolhapur district.

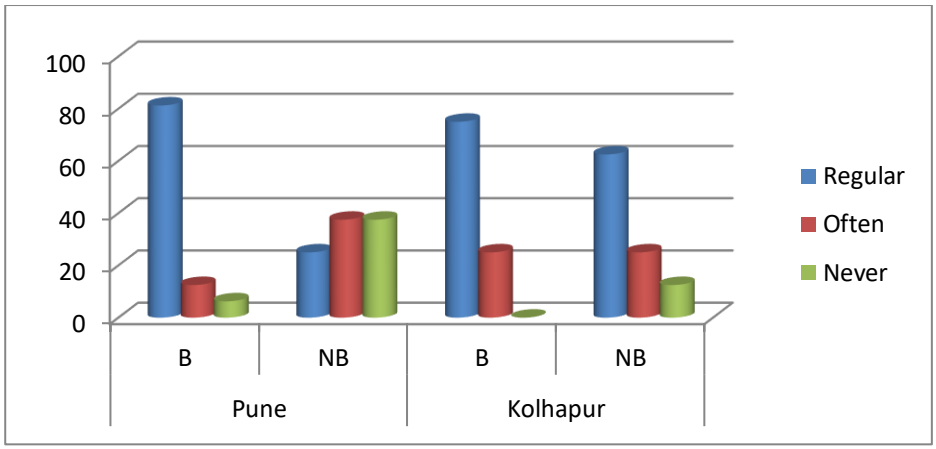
7. Agri. Exhibition



The investigation revealed that the majority (81.25%) of the beneficiaries from the Pune district had used the agriculture exhibition regularly compared to the non-beneficiaries (50.00%). It is followed by (6.25%) of the beneficiaries who had often used the agriculture exhibition compared with the non-beneficiaries from the Pune district.

The investigation revealed that the majority (87.50%) of the beneficiaries from the Kolhapur district had used the agriculture exhibition regularly compared to the non-beneficiaries (43.75 %). It is followed by (37.50 %) of the beneficiaries who had often used the agriculture exhibition compared with the non-beneficiaries from the Kolhapur district.

8. Need based weekly mobile advisory



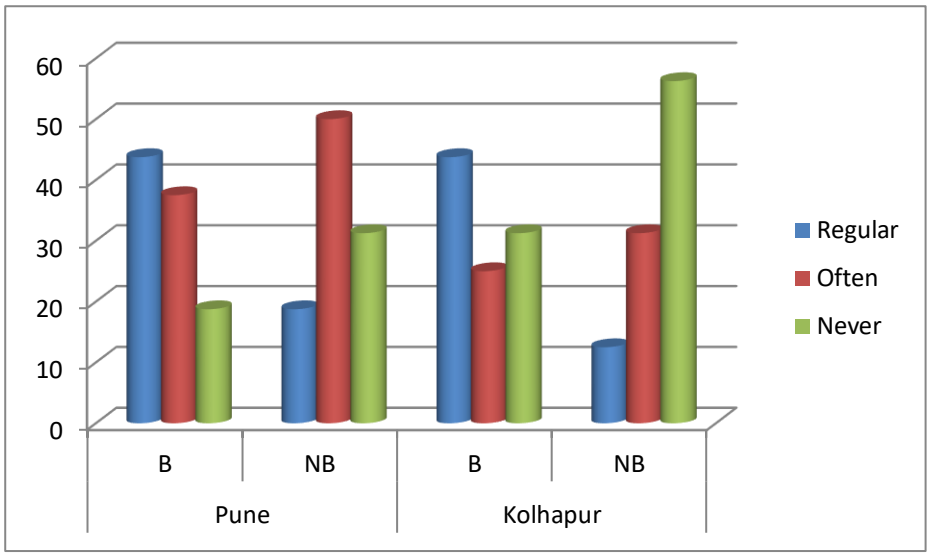
The investigation revealed that the majority (81.25%) of the beneficiaries from the Pune district had used the mobile advisory services regularly compared to the non-beneficiaries (25.00%). It is followed by (12.50%) of the beneficiaries who had often used the mobile advisory services compared with the non-beneficiaries from the Pune district.

The investigation revealed that the majority (75.00%) of the beneficiaries from the Kolhapur district had used the mobile advisory services regularly compared to the non-beneficiaries (62.50%). It is followed by (25.00%) of the beneficiaries and non-beneficiaries who had often used the mobile advisory services from the Kolhapur district.

C) Mass media participation of the respondents

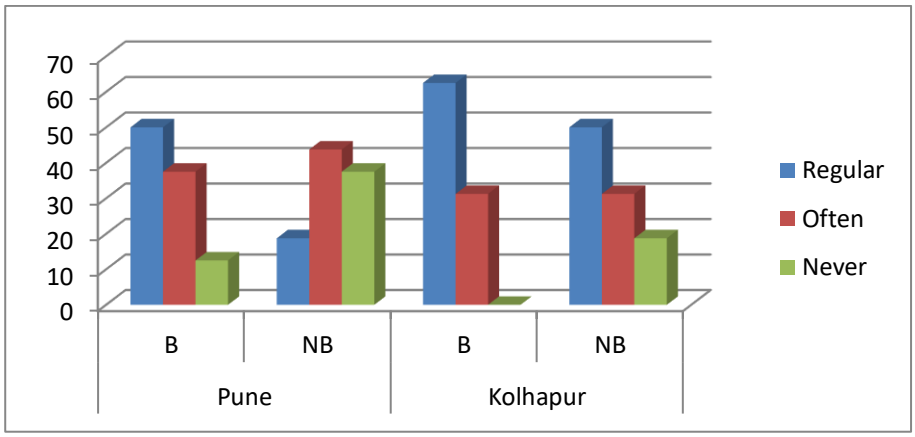
1. Radio

The investigation revealed that the majority (50%) of the non-beneficiaries from the Pune district had no extension contact with the agro agencies compared to the beneficiaries. It is followed by (50%) of the beneficiaries who had regular extension contact with the agro agencies compared with the non-beneficiaries from the Pune district.



The investigation revealed that the majority (50%) of the non-beneficiaries from the Kolhapur districts had regular extension contact with the agro agencies compared to the beneficiaries and 31.25% of the beneficiaries had no extension contact with the agro agency compared to the non-beneficiaries of the Kolhapur district.

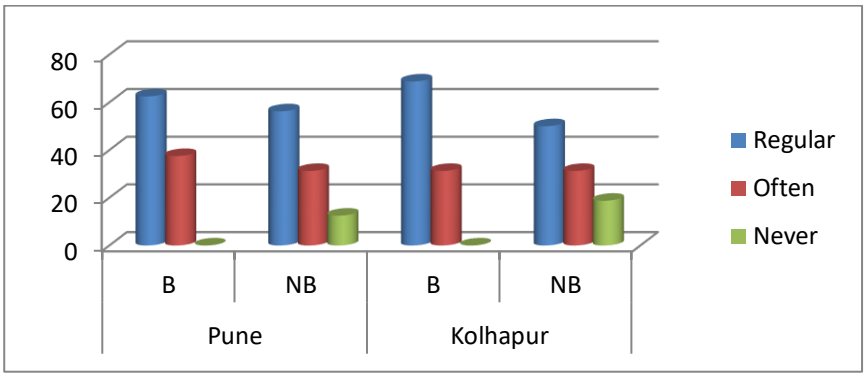
2. Television (n= 64)



The investigation revealed that the majority (50%) of the beneficiaries from the Pune district had regular participation in television compared to the non-beneficiaries. It is followed by (43.75%) of the non-beneficiaries who often participated in television and 37.5% of the non-beneficiaries had no participation in television compared to the beneficiaries from the Pune district.

The investigation revealed that the majority (62.50 %) of the beneficiaries from Kolhapur districts had regular participation in television compared to the non-beneficiaries. It is followed by an equal (31.25%) number of both beneficiaries and non-beneficiaries who had often participated in television.

3. News Papers

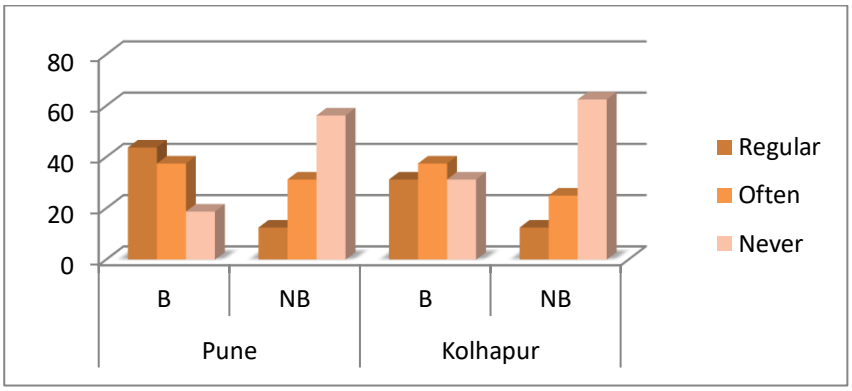


The investigation revealed that the majority (62.50%) of the beneficiaries from the Pune district had regularly read the newspaper compared to the non-beneficiaries. It is followed by (56.25%) of the non-beneficiaries who had regularly read the newspaper and 12.5% of the non-beneficiaries had no participation in reading newspapers compared to the beneficiaries from the Pune district.

The investigation revealed that the majority (68.75%) of the beneficiaries from Kolhapur districts had regular participation in reading the newspaper compared to the non-beneficiaries. It is followed by an equal (31.25%) number of both beneficiaries and non-beneficiaries who had often participated in reading the newspaper.

4. Agri. Magazines

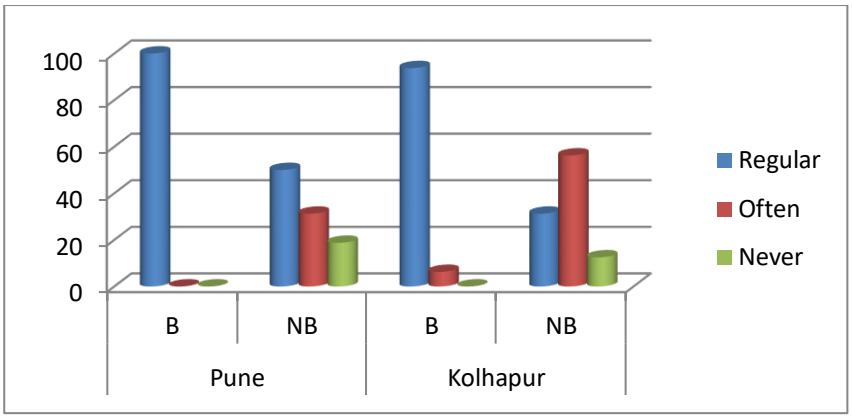
The investigation revealed that the majority (43.75%) of the beneficiaries from the Pune district had regularly read the agricultural magazines compared to the non-beneficiaries. It is followed by (56.33%) of the non-beneficiaries who had never read the agricultural magazines and 31.25% of the non-beneficiaries who had often participated in reading the agricultural magazines compared to the beneficiaries from the Pune district.



The investigation revealed that the majority (37.50%) of the beneficiaries from Kolhapur districts had often read the agricultural magazines compared to the non-beneficiaries. It is followed by 31.25% and 62.50% number of both beneficiaries and non-beneficiaries who had no participation in reading the agricultural magazines.

D) ICT based Extension

1. SMS

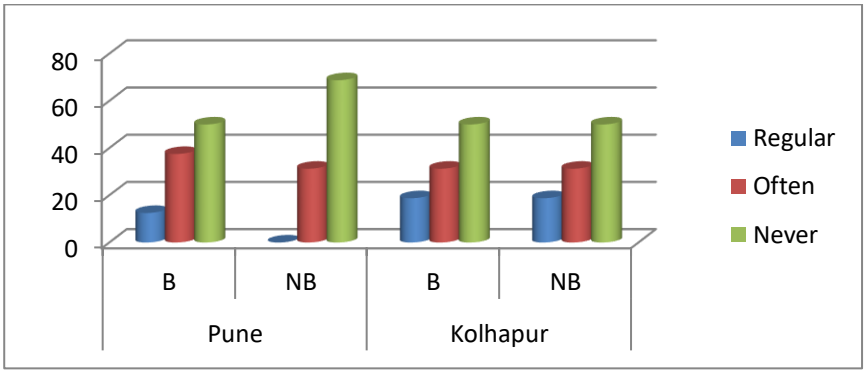


The investigation revealed that the majority (100.00%) of the beneficiaries from the Pune district had regularly used the SMS services compared to the non-beneficiaries. It is followed by (50.00%) of the non-beneficiaries had regularly used the SMS services and 31.25% of the non-beneficiaries had often used the SMS services compared to the beneficiaries from the Pune district.

The investigation revealed that the majority (93.75%) of the beneficiaries from the Pune district had regularly used the SMS services compared to the non-beneficiaries. It is followed by (56.25%) of the non-beneficiaries who had often used the SMS services and 31.25% of the non-beneficiaries had regularly used the SMS services compared to the beneficiaries from the Pune district.

2. Kisan Call Center

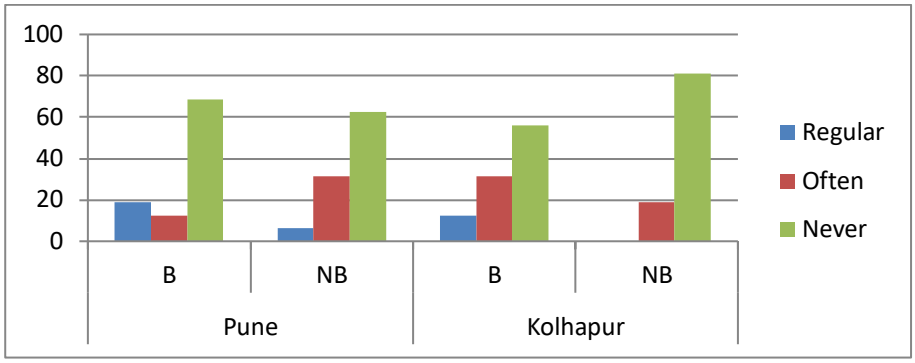
The investigation revealed that the majority (100.00%) of the beneficiaries from the Pune district had regularly used the KCC services compared to the non-beneficiaries. It is followed by (50.00%) of the non-beneficiaries who had regularly used the SMS services and 31.25% of the non-beneficiaries had often used the KCC services compared to the beneficiaries from the Pune district.



The investigation revealed that the majority (50.00%) of the beneficiaries from the Kolhapur district had never used the KCC services equal to the non-beneficiaries. It is followed by an equal (31.25%)

number of beneficiaries and non-beneficiaries who had often used the KCC services from the Kolhapur district.

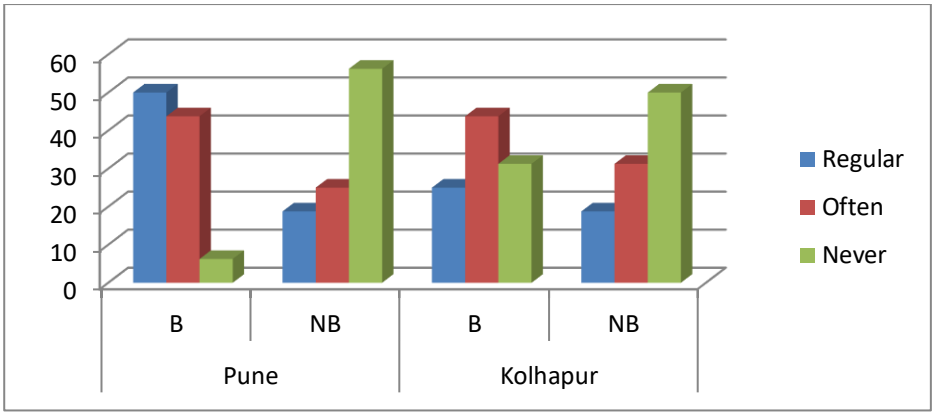
3. Agritech Portals



The investigation revealed that the majority (68.75%) of the beneficiaries from the Pune district had regularly used the Agritech portals services compared to the non-beneficiaries. It is followed by (62.50%) of the non-beneficiaries who had never used the Agritech portals services and 18.75% of the beneficiaries had regularly used the Agritech portals services compared to the beneficiaries from the Pune district.

The investigation revealed that the majority (56.25) of the non-beneficiaries from the Kolhapur district had never used the Agritech portals services. It is followed by (31.25%) of the beneficiaries who had often used the Agritech portals services and 12.50% of the beneficiaries had regularly used the Agritech portals services compared to the non-beneficiaries from the Kolhapur district.

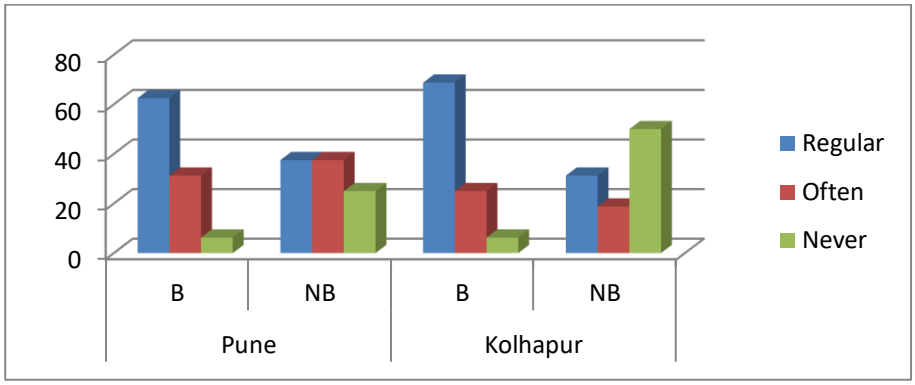
4. Agricultural Mobile Applications



The investigation revealed that the majority (50.00%) of the beneficiaries from the Pune district had regularly used the agricultural mobile application services compared to the non-beneficiaries. It is followed by (56.25%) of the non-beneficiaries who had never used the Agritech portals services and 43.75% of the beneficiaries had often used the Agritech portals services compared to the non-beneficiaries from the Pune district.

The investigation revealed that the majority (43.75 %) of the beneficiaries from the Pune district had regularly used the agricultural mobile application services compared to the non-beneficiaries. It is followed by (50.00%) of the non-beneficiaries who had never used the Agritech portals services and 43.75% of the beneficiaries had often used the Agritech portals services compared to the non-beneficiaries from the Pune district.

5. WhatsApp

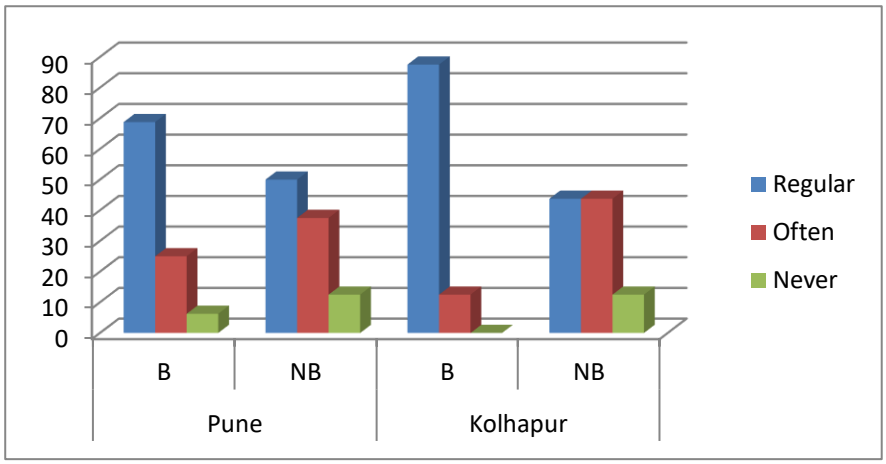


The investigation revealed that the majority (62.50%) of the beneficiaries from the Pune district had regularly used the WhatsApp service for taking agricultural information compared to the non-beneficiaries. It is followed by (37.50%) of the non-beneficiaries who had often used WhatsApp and 31.25 % of the beneficiaries had often used WhatsApp services compared to the non-beneficiaries from the Pune district.

The investigation revealed that the majority (68.75%) of the beneficiaries from the Pune district had often used the WhatsApp service for taking agricultural information compared to the non-beneficiaries. It is followed by (37.50%) of the non-beneficiaries who had regularly and often used WhatsApp and 31.25 of the beneficiaries had often used the WhatsApp services compared to the non-beneficiaries from the Pune district.

6. YouTube

The investigation revealed that the majority (68.75%) of the beneficiaries from the Pune district had used the YouTube service regularly for taking agricultural information compared to the non-beneficiaries. It is followed by (50.00%) of the non-beneficiaries who had used YouTube regularly and 25.00% of the beneficiaries had often used the YouTube services compared to the non-beneficiaries from the Pune district.

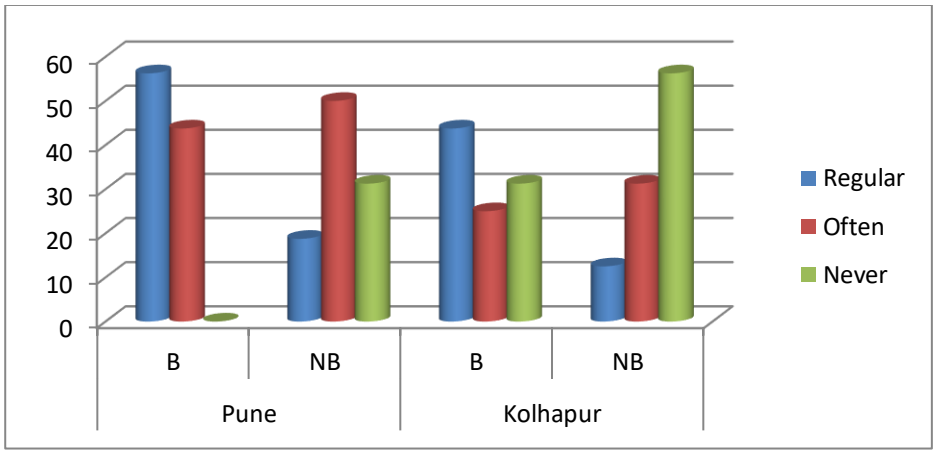


The investigation revealed that the majority (87.50%) of the beneficiaries from the Kolhapur district had used YouTube service regularly for taking agricultural information compared to the non-beneficiaries. It is followed by (43.75%) of the non-beneficiaries who had used YouTube regularly and 12.50% of the beneficiaries had often used the YouTube services compared to the non-beneficiaries from the Kolhapur district.

E) Distribution of respondents according to the participation in EAS providers to seek information

1. KVK

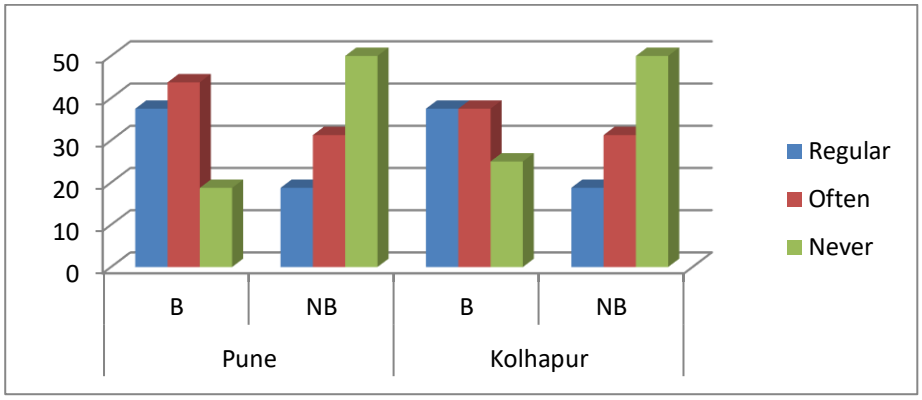
The investigation revealed that the majority (56.25%) of the beneficiaries from the Pune district had sought agricultural information from KVK compared to the non-beneficiaries. It is followed by (50.00%) of the non-beneficiaries who had often sought agricultural information and 43.75% of the beneficiaries had often sought agricultural information compared to the non-beneficiaries from the Pune district.



The investigation revealed that the majority (43.75%) of the beneficiaries from the Kolhapur district had sought agricultural information from KVK compared to the non-beneficiaries. It is followed by (56.25%) of the non-beneficiaries who had never sought agricultural information from KVK and

31.25% of the beneficiaries had never sought agricultural information compared to the non-beneficiaries from the Kolhapur district.

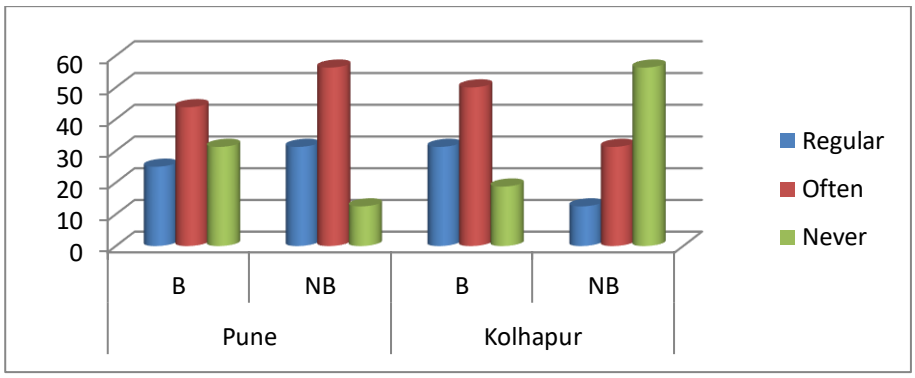
2. Taluka Agriculture office



The investigation revealed that the majority (56.25%) of the beneficiaries from the Pune district had sought agricultural information from KVK compared to the non-beneficiaries. It is followed by (50.00%) of the non-beneficiaries who had often sought agricultural information and 43.75% of the beneficiaries had often sought agricultural information compared to the non-beneficiaries from the Pune district.

The investigation revealed that the majority (37.50%) of the beneficiaries from the Kolhapur district had sought agricultural information from TAO, office compared to the non-beneficiaries. It is followed by (31.25%) of the non-beneficiaries who had often sought agricultural information and 37.50% of the beneficiaries had often sought agricultural information from TAO compared to the non-beneficiaries from the Kolhapur district.

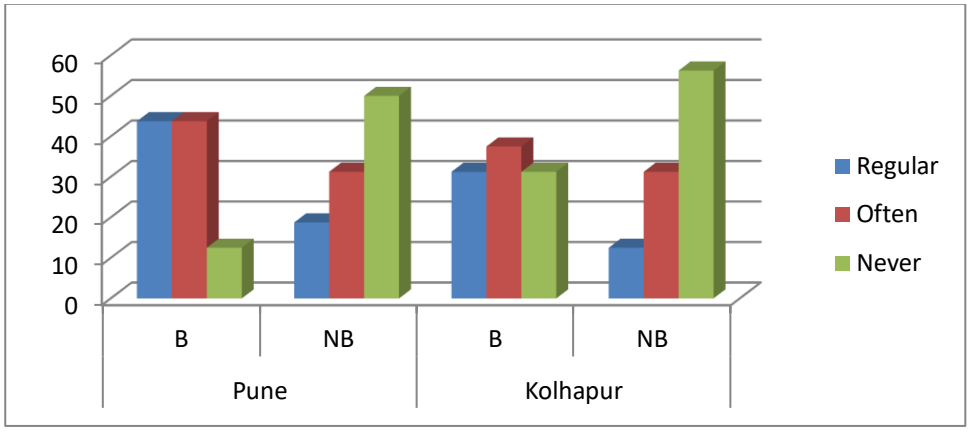
3. ATMA



The investigation revealed that the majority (43.75%) of the beneficiaries from the Pune district had sought agricultural information from ATMA compared to the non-beneficiaries. It is followed by (56.25%) of the non-beneficiaries who had often sought agricultural information and 43.75% of the beneficiaries had often sought agricultural information from ATMA compared to the non-beneficiaries from the Pune district.

The investigation revealed that the majority (50.00%) of the beneficiaries from the Kolhapur district had sought agricultural information from ATMA compared to the non-beneficiaries. It is followed by (56.25%) of the non-beneficiaries who had never sought agricultural information and 31.25% of the beneficiaries had regular sought agricultural information from ATMA compared to the non-beneficiaries from the Pune district.

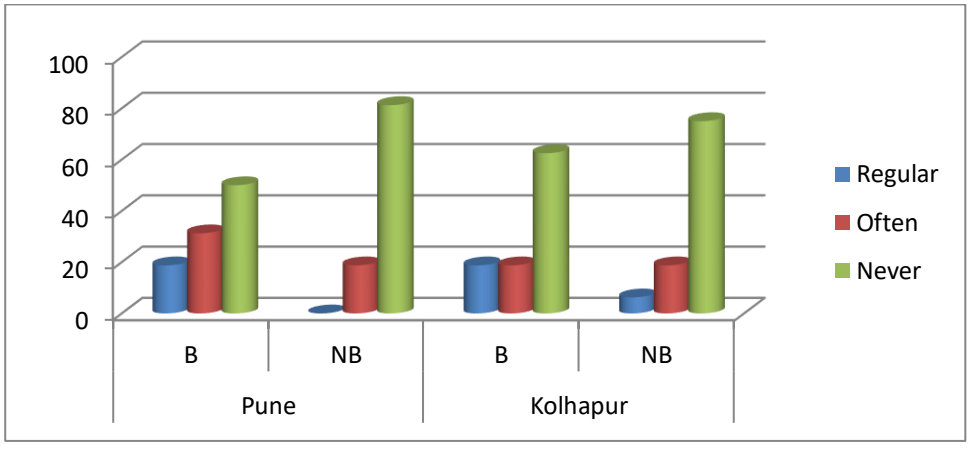
4. FPO



The investigation revealed that the majority (43.75%) of the beneficiaries from the Pune district had regularly and often sought agricultural information from FPO compared to the non-beneficiaries. It is followed by (50.00%) of the non-beneficiaries who had never sought agricultural information from FPO from the Pune district.

The investigation revealed that the majority (37.50%) of the beneficiaries from the Kolhapur district had sought agricultural information from FPO compared to the non-beneficiaries. It is followed by (56.25%) of the non-beneficiaries who had never sought agricultural information and 31.25% of the beneficiaries had regular sought agricultural information from FPO compared to the non-beneficiaries from the Kolhapur district.

5. NGO



The investigation revealed that the majority (43.75%) of the beneficiaries from the Pune district had regularly and often sought agricultural information from FPO compared to the non-beneficiaries. It is followed by (50.00%) of the non-beneficiaries who had never sought agricultural information from FPO from the Pune district.

The investigation revealed that the majority (37.50%) of the beneficiaries from the Kolhapur district had sought agricultural information from FPO compared to the non-beneficiaries. It is followed by (56.25%) of the non-beneficiaries who had never sought agricultural information and 31.25% of the beneficiaries had regular sought agricultural information from FPO compared to the non-beneficiaries from the Kolhapur district.

F) Inputs

Table 6: Frequency of usage of various Extension Services

Sr. No.	Characteristics	Pune				Kolhapur			
		Beneficiaries		Non-Beneficiaries		Beneficiaries		Non-Beneficiaries	
1	**Mobile AES via SMS alert**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
	Everyday	0	0	0	0	0	0	0	0
	1xin a week	11	68.75	3	18.75	8	50	6	37.5
	2x a week	0	0	0	0	0	0	0	0
	1x fortnight	3	18.75	2	12.5	5	31.25	0	0
	1x month	1	6.25	2	12.5	3	18.75	2	12.5
	Not used	1	6.25	9	56.25	0	0	8	50
2	**Method Demonstration**								
	Everyday	0	0	0	0	0	0	0	0
	1xin a week	8	50	0	0	0	0	0	0
	2x a week	0	0	0	0	0	0	0	0
	1x fortnight	6	37.5	4	25	7	43.75	4	25
	1x month	0	0	6	37.5	7	43.75	6	37.5
	Not used	2	12.5	6	37.5	2	12.5	6	37.5
3	**Video based extension or television**								
	Everyday	0	0	0	0	2	12.5	0	0
	1xin a week	2	12.5	0	0	5	31.25	0	0
	2x a week	4	25	2	12.5	3	18.75	9	56.25
	1x fortnight	6	37.5	4	25	5	31.25	0	0
	1x month	2	12.5	4	25	0	0	4	25
	Not used	2	12.5	6	37.5	0	0	3	18.75
4	**Radio Programme**								
	Everyday	5	31.25	0	0	3	18.75	0	0

	1x in a week	6	37.5	2	12.5	5	31.25	2	12.5
	2x a week	2	12.5	1	6.25	2	12.5	3	18.75
	1x fortnight	0	0	4	25	0	0	2	12.5
	1x month	0	0	4	25	1	6.25	0	0
	Not used	3	18.75	5	31.25	5	31.25	9	56.25
5	**Notice board**								
	Everyday	0	0	0	0	0	0	0	0
	1x in a week	2	12.5	0	0	2	12.5	0	0
	2x a week	5	31.25	0	0	5	31.25	3	18.75
	1x fortnight	3	18.75	3	18.75	2	12.5	2	12.5
	1x month	2	12.5	3	18.75	3	18.75	3	18.75
	Not used	4	25	10	62.5	4	25	8	50
6	**Private AES providers**								
	Everyday	2	12.5	0	0	0	0	0	0
	1x in a week	3	18.75	0	0	0	0	0	0
	2x a week	5	31.25	0	0	8	50	2	12.5
	1x fortnight	0	0	5	31.25	3	18.75	3	18.75
	1x month	5	31.25	7	43.75	4	25	3	18.75
	Not used	1	6.25	4	25	1	6.25	8	50

Here are the observations and conclusions:

The majority (68.75%) of the beneficiaries and non-beneficiaries (18.75%) from the Pune district had used mobile advisory once in a week followed by 18.75% of the beneficiaries and 12.50% of the non-beneficiaries who used mobile SMS alert once in a fortnight in the Pune district.

The majority (50.00%) of the beneficiaries and non-beneficiaries (37.50%) from the Kolhapur district had used mobile advisory once in a week followed by 31.25% of the beneficiaries who used mobile SMS alert once in a fortnight as compared to the non-beneficiaries in the Kolhapur district.

The majority (50.00%) of the beneficiaries used method demonstration extension service once in a week and an equal number of (37.50%) non-beneficiaries used it once in a month and never used in the Pune district.

The majority (37.50%) of the beneficiaries used video-based extension services and 37.50% of non-beneficiaries did not use video based extension services in the Pune district. Whereas in the Kolhapur district, 31.25% of the beneficiaries used it once a week and 56.25% of the non-beneficiaries used video based extension services.

The majority (31.25%) of the beneficiaries used radio programme service and 31.25% of non-beneficiaries did not use radio programme service in the Pune district. Whereas in the Kolhapur

district, 31.25% of the beneficiaries used it once a week and 56.25% of the non-beneficiaries did not use radio programme service.

The majority (31.25%) of the beneficiaries used notice board service and 62.50% of non-beneficiaries did not use notice board service in the Pune district. Whereas in the Kolhapur district, 31.25% of the beneficiaries used it twice in a week and 50.00% of non-beneficiaries did not use radio programme service.

G) Level 3 Participation

9.1. Distribution of respondents according to the participation in EAS providers to seek information

Table 7: Distribution of respondents according to the participation in EAS providers to seek information

A) Informal sources

Sr. No.	Characteristics	Pune				Kolhapur			
		Beneficiaries		Non-Beneficiaries		Beneficiaries		Non-Beneficiaries	
1	**Friends**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
	Regular	7	43.75	3	18.75	7	43.75	2	12.5
	Often	6	37.5	8	50	4	25	5	31.25
	Never	3	18.75	5	31.25	5	31.25	9	56.25
									0
2	**Relatives**								0
	Regular	3	18.75	3	18.75	4	25	3	18.75
	Often	6	37.5	7	43.75	6	37.5	5	31.25
	Never	4	25	6	37.5	6	37.5	8	50
									0
3	**Input Dealers**								0
	Regular	10	62.5	5	31.25	11	68.75	5	31.25
	Often	6	37.5	9	56.25	5	31.25	8	50
	Never	0	0	2	12.5	0	0	3	18.75
									0
4	**Progressive Farmers**								
	Regular	7	43.75	2	12.5	5	31.25	2	12.5
	Often	6	37.5	5	31.25	6	37.5	5	31.25
	Never	3	18.75	9	56.25	5	31.25	9	56.25

It was revealed that the majority (43.75%) of the beneficiaries seek information regularly from friends in the Pune and Kolhapur districts as compared to the non-beneficiaries. Whereas 37.50% of the beneficiaries and non-beneficiaries seek information from relatives very often in the Pune and Kolhapur district. Also, 43.75% of the beneficiaries seek information regularly from progressive

farmers and 56.25% of the non-beneficiaries never seek information from progressive farmers in the Pune district. 37.50% of the beneficiaries seek information often from progressive farmers in the Kolhapur district.

B) Formal Source

Table 8: Formal Sources in the Pune and Kolhapur District

Sr. No	Characteristics	Pune				Kolhapur			
		Beneficiaries		Non-Beneficiaries		Beneficiaries		Non-Beneficiaries	
1	**KVK**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
	Regular	9	56.25	3	18.75	7	43.75	2	12.5
	Often	7	43.75	8	50	4	25	5	31.25
	Never	0	0	5	31.25	5	31.25	9	56.25
2	**Taluka Agriculture office**								
	Regular	6	37.5	3	18.75	6	37.5	3	18.75
	Often	7	43.75	5	31.25	6	37.5	5	31.25
	Never	3	18.75	8	50	4	25	8	50
3	**ATMA**								
	Regular	4	25	5	31.25	5	31.25	2	12.5
	Often	7	43.75	9	56.25	8	50	5	31.25
	Never	5	31.25	2	12.5	3	18.75	9	56.25
4	**FPO**								
	Regular	7	43.75	3	18.75	5	31.25	2	12.5
	Often	7	43.75	5	31.25	6	37.5	5	31.25
	Never	2	12.5	8	50	5	31.25	9	56.25
5	**NGO's**								
	Regular	3	18.75	0	0	3	18.75	1	6.25
	Often	5	31.25	3	18.75	3	18.75	3	18.75
	Never	8	50	13	81.25	10	62.5	12	75

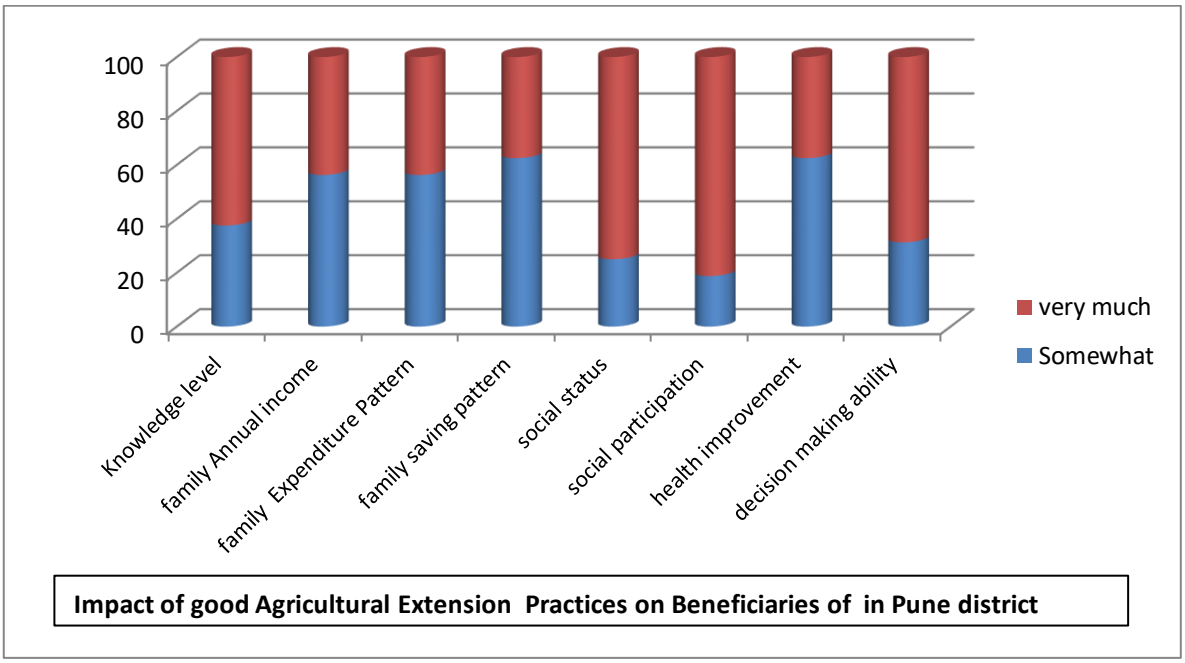
Here are the conclusions:

The majority of 56.25% and 43.75% of the beneficiaries seek information from KVK and FPO respectively. Whereas 43.75%, 43.75% and 31.25% beneficiaries seek information often from TAO, office, ATMA and NGOs respectively in the Pune district as compared to the non-beneficiaries.

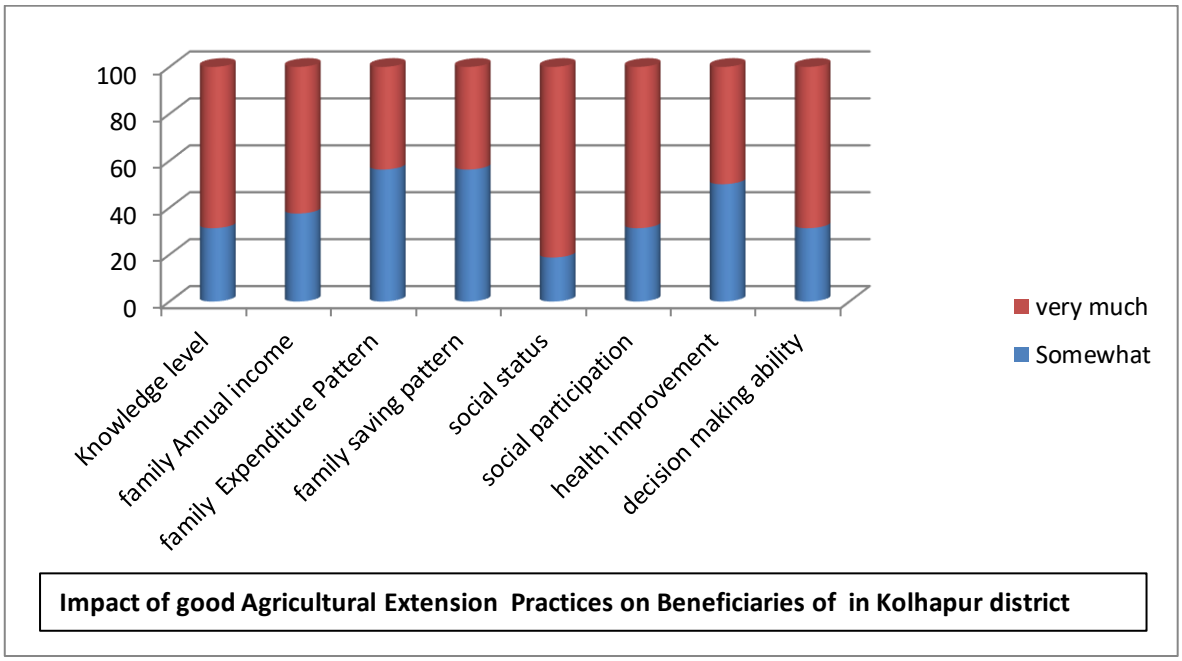
The majority of 43.75% and 37.50% of the beneficiaries seek information regularly from KVK and TAO respectively. Whereas 50.00% and 37.50% of beneficiaries seek information often from ATMA and FPO respectively in the Kolhapur district as compared to the non-beneficiaries.

Impact of Good Agricultural Extension Practices

Impact of good agricultural extension practices on farmers of Pune and Kolhapur district with respect to various aspects such as changes in knowledge level, family annual income, family expenditure pattern, family saving pattern, social status, social participation, health improvement, decision making ability of farmers are shown in the figure below:



Impact of good Agricultural Extension Practices on Beneficiaries of in Pune district



Impact of good Agricultural Extension Practices on Beneficiaries of in Kolhapur district

Level 6: Package of practices of beneficiaries and non-beneficiaries in the western region of Maharashtra

Table 9: Adoption of technical advices

Sr. No	Characteristics	Pune				Kolhapur			
		Beneficiaries		Non-Beneficiaries		Beneficiaries		Non-Beneficiaries	
1	**Land Preparation**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**
	Adopted	12	75	6	37.5	11	68.75	7	43.75
	Non- Adopted	4	25	10	62.5	5	31.25	9	56.25
2	**Variety/Seed**								
	Adopted	12	75	6	37.5	11	68.75	8	50
	Non- Adopted	4	25	10	62.5	5	31.25	8	50
3	**Sowing Time**								
	Adopted	11	68.75	7	43.75	10	62.5	7	43.75
	Non- Adopted	5	31.25	9	56.25	6	37.5	9	56.25
4	**Fertilizers and manures**								
	Adopted	13	81.25	6	37.5	11	68.75	6	37.5
	Non- Adopted	3	18.75	10	62.5	5	31.25	10	62.5
5	**Weed management**								
	Adopted	8	50	4	25	9	56.25	2	12.5
	Non- Adopted	8	50	12	75	7	43.75	14	87.5
6	**Water management**								
	Adopted	14	87.5	8	50	13	81.25	9	56.25
	Non- Adopted	2	12.5	8	50	3	18.75	7	43.75
7	**Weather information**	11	68.75	6	37.5	10	62.5	4	25
		5	31.25	10	62.5	6	37.5	12	75
8	**Plant Protection Measures**	16	100	8	50	13	81.25	7	43.75
		0	0	8	50	3	18.75	9	56.25
9	**Harvesting and threshing**	13	81.25	7	43.75	10	62.5	8	50
		3	18.75	9	56.25	6	37.5	8	50
10	**Drying and storage**	13	81.25	8	50	11	68.75	7	43.75
		3	18.75	8	50	5	31.25	9	56.25
11	**Harvesting and threshing**	13	81.25	7	43.75	10	62.5	8	50
		3	18.75	9	56.25	6	37.5	8	50
12	**Post-harvest**	10	62.5	5	31.25	8	50	8	50

	method	6	37.5	11	68.75	8	50	8	50
13	**Storage and warehousing**	13 3	81.25 18.75	5 11	31.25 68.75	10 6	62.5 37.5	7 9	43.75 56.25
14	**Market based information**	11 5	68.75 31.25	6 10	37.5 62.5	9 7	56.25 43.75	8 8	50 50

It is concluded that 75.00 per cent, 68.75 per cent, 81.25 per cent, 50.00 per cent, 87.50 per cent, 68.75 per cent, 100.00 per cent, 81.25 per cent and 62.50 per cent of the beneficiaries from the Pune district adopt different cultivation practices like land preparation, variety/seed, sowing time, fertilizers and manures, weed management, water management, weather information, harvesting and threshing, post-harvest method, storage and warehousing, and market-based information respectively.

However, as per the Kolhapur district concern, 68.75 per cent, 68.75 per cent, 62.50 per cent, 68.75 per cent, 56.25 per cent, 81.25 per cent, 62.50 per cent, 68.75 per cent, 62.50 per cent, 50.00 per cent, 62.50 per cent and 56.25 per cent of the beneficiaries adopt different cultivation practices like land preparation, variety/seed, sowing time, fertilizers and manures, weed management, water management, weather information, harvesting and threshing, post-harvest method, storage and warehousing, and market-based information respectively.

Table 10: Majorly adopted Agricultural Extension Practices in the Western region of Maharashtra

Sr. No	Agricultural Adopted Practices/Services	Extension Practice (Method)
1.	Organic Farming	Group discussion and method demonstration
2.	New agriculture technologies like high tech nursery, new machineries, new climate smart techniques etc.	Agricultural exhibition (KVK, Baramati), training
3.	Crop cultivation practices, different pest disease management, water management etc.	Farmer to farmer extension
4.	Online marketing channels, weather forecasting information, new government schemes, quick agriculture related information	Mobile based apps and consultancy services, Facebook (ICT)
5.	New government schemes, new crop related information or project information to illiterate or less educated farmers at the village level	Notice Board (Mass media-Visual aid)
6.	It is the visual mass advisory platform by which farmers come to know about different agricultural and farm related information	Television (Aamchimaati-Aamchi manse, Annadata)
7.	SMS advisory service used by the different public,	SMS

	private as well as public-private sectors to share the knowledge of agricultural farm practices.	
8.	Latest innovations & ideas in agriculture as well as problems of farmers are solved by experts, scientists and progressive farmers instantly with the use of social media extension WhatsApp	WhatsApp
9.	Latest technology and all agricultural information countrywide as well as worldwide obtained by farmers in local language newspapers.	News Paper (Agrown, Krushikonnati)
10.	It is the most valuable video based social media platform used by the educated and progressive farmers which improves farmers' knowledge about farming.	YouTube

Case Study 1: Extension through Mass media- Community Radio station

Radio is a popular communication channel for receiving news in developing countries, especially in rural areas. The Community Radio Station (CRS) named Sharada Krishi Vahini was established at KVK Baramati and inaugurated on 18 January 2011 by the auspicious hands of Ms. Supriyatai Sule. This radio station can be heard on 90.8 MHz frequency. The aim of the CRS is to deliver the latest information in the field of agriculture to the farming community as per their needs and problems. It was also decided to provide a platform to the farmers and farm women to share their experiences, skill and art, problems and needs to the other farmers and communities.

Broadcasting: The broadcasting is done in the morning from 7.00 am to 7.00 pm. The Sharada Krishi Vahini has its own Krishi Vahini song which is based on an agricultural theme. Radio broadcasting has been going on the Google for listening to the radio in any place. Sharada Radio App is also available on mobiles for the listeners. This radio station has broadcasted only agricultural related programmes like Krushisandesh, Balirajya Tuzyachsathi, Sakhi Mach programme, Tantra Shetiche, SMS talk on different agricultural related aspects etc.

CRS has participation from farmers, self-help groups, students, doctors, local artists, agriculture entrepreneurs, teachers, and experts in its programs. They share their experiences in agriculture, cattle rearing, poultry etc. The programmer goes to villages and collects farmer's talks about their experiences, their problems of livelihood, and it is broadcasted on CRS. Also, the farmers come to the CRS and can record their talks. CRS also records local folk songs from the community member and these songs are played through CRS which gives them broad exposure. The songs like patriotic, devotional and light music are recorded at CRS and also at the home of a community member. The guidance from agriculture scientists, experts on the necessities and problems according to the farming activities are broadcasted through the CRS. The programmes include information on new agriculture technology, interviews of entrepreneurs, and results of different demonstrations taken on KVKs farm etc. To date, it has broadcasted more than 3940 success

stories and scientist interviews. The extension of new technology and the results of demonstrations can be reached to more and more farmers through radio.

Case Study 2: Innovative activity for sustainable development of farmers – KRUSHIK Exhibition

Krushik Live Demo and Agri Expo

Keeping in view the importance attached by the central as well as state government and growth of the agriculture industry in the country, Agricultural Development Trust's KVK Baramati had started to organize an annual trade fair KRUSHIK, live demo and agri expo on its 110 acres farm for 4 days. Krushik Expo, an activity that ensures interaction, education and awakening about agricultural technologies with a global vision, a novel event, and a renaissance in agriculture!!! The Krushik is a forum for farmers, officials, agriculture industrialists, professionals and social institutions to connect and gain from each other's expertise and research work.

The first edition was organized from 6-8 November 2015. The 2nd edition was organized during January 19-22, 2017, where 178 exhibitors participated. Out of these, 134 companies were present within the exhibition hanger and displayed their technologies and agri related offering to the attendees, while 44 companies had participated in this event by showcasing their technologies in the form of a live demonstration of crops, machinery and equipment demonstration, seminars, video shows, animal shows, technologies etc.

KRUSHIK: Glimpses

This is the first time that a KVK had conducted such huge live demonstrations of all the technologies related to agriculture and allied enterprises. Live demonstrations on crops invoked real-time feedback and serious inquiries for exhibiting companies. Some exhibitors also demonstrated small implements like sprayers, vermicomposting, crop covers, mulching, dusting machines, polished nets, hydroponics, etc. There were also concurrent events like animal shows,

fishery, and contract farming. Women SHG had set up a huge food court with a rural carnival Bhimthadi.

The total visitors' count of farmers visiting was 412,000 in 2015 and 219,930 in 2017. All the farmers, agripreneurs etc. from different districts of Maharashtra and other states visited the exhibition.

Highlights of KRUSHIK

- 110 acres of land was used for live demonstrations of various crops, fruits and vegetables, and allied sectors.
- Display and live demonstration of agricultural machinery.
- Over 300 national and international exhibitors had participated and showcased their agriculture & allied technologies.
- Panel discussion by experts for the latest agriculture and allied technologies.
- An opportunity to connect and interact with successful farmers and learn their best practices with knowledge sharing.
- Direct conversation with the government officials and policymakers for clarification of uncertainties in agriculture.
- New innovative technologies for cash-rich produce.
- Active participation by contract farming companies.
- More than 100 food stalls by women SHGs.
- Animal shows to promote Desi breeds of animals.
- New innovative technologies for cash-rich produce.

Case Study 3: Successful Organic farming with Group Discussion

Mr. Ganesh Hande, a farmer, has been promoting organic farming since 2012. He studied till the 10th. He had traditionally cultivated land prior to this organic farming. Nevertheless, he always faced crop losses. He got a new idea of organic farming after a few years of talking with friends and he realized the importance of organic food, eating fresh and feeding it to individuals. So, he started organic farming with his wife on his farm in the 4-acre region. He read about organic farming from 'Navnath Granth' and discussed it among a group of farmers. After this, he created a group of 25 organic farmers named 'Swarajya Yuva Attma Purush Gat' where everybody carries out organic farming.

Mr. Hande has an organic produce collection center. He was marketing produce in different big markets like Mumbai and Pune. He has tied up with Ratan Tata Trust, Go for Fresh, Star Bazar etc. He has been marketing his produce online on the Amazon store branding. Now, he is cultivating all vegetables, soybean, rice, potato etc. on his farm. He has been marketing 1.5 tons of organic food daily which includes all vegetables, papaya, pomegranate etc. Mr. Hande grows 14 ton/acre onion by organic farming but gets 15% more profit than conventional farming.

Mr. Hande involved in many extension activities as he is a progressive farmer in his region and promoted organic farming. He does field visits to different farmers' fields. Many farmers come to his field for information related to organic farming. He is giving training to the AC-ABC center students on organic farming. His farmers' group is well known in his region and they all are giving knowledge to different people by promoting organic farming and giving training to different farmers on how to make Jivamrut, Dashparni Ark etc. Mr. Hande's wife is also involved in marketing and collection centers and has been awarded many prizes as a successful women agripreneur.

Case study 4: Family Farming Producer Company Ltd- Consultancy service

Talsande, District Kolhapur, Maharashtra

Family Farming Producer Company Ltd. has been formed by farmers in the Talsande village of the Kolhapur district. It has 536 members and promotes YARA company fertilizer and pesticide products. To increase the farmers' production and to minimize the input cost, this FPO was established on 8 December 2014. It has a cold storage facility, vacuum packing machine etc. FPO sells its produce like banana, mango, all vegetables, etc. to the nearby markets like the local market and Kolhapur market. The annual profit of the company is Rs. 300,000.

It provides consultancy services as well. Mr. Rohit Patil carries out the field executive service and he visits farmers' fields weekly to solve their problems related to free charges on phone calls. He consults all the member farmers of the Tehsil on YARA company fertilizer dose soil testing, pest and disease management, marketing of produce etc. Yearly, 10 to 12 expert field visits are arranged by the FPO. They improve more marketing channels and increase the direct supply to the consumers. It has contacted KVK, Talsande and Tata consultancy Services regularly. This group started AC- ABC center in Kolhapur for improving extension work.

Success story: Neem processing unit – Successful Agripreneur

Name	Dipak Dhanvant Khomstne.(Bse.Agri.) MS-7125, A/P-Korhale, Bk.Tal-Baramati, Dist-Pune
Enterprise	Neem Processing Unit
Date of Storing	15/08/2011
Financial Details	a) Total Investment- 22 Lakhs (Union Bank of India Branch-Korhale.11/07/2012) b) b) Annual Turnover- 14 Lakhs c) c) Annual Income- 1.90 Lakhs

No of Farmers connected	390 Farmers	No of People employed	7
Extension work	Field Visits, Farmers training programme on benefits of organic Farming		
Land Holding	75 Acres (Sugarcane, Banana, Mango, Custured apple, Jamun), Installed Automation Unit for 19 acres farm		
Future Plan	Want to start Biodiesel Plant		

(Source: kvkbaramati.com)

Case study: 5 ACTION FOR AGRICULTURAL RENEWAL IN MAHARASHTRA (AFARM) – for sustainable development of agriculture

Building No. 2/23 A-B, Raisoni Park, Market Yard, Pune 411037, Maharashtra.

AFARM, established in 1969, is a membership organization of voluntary agencies working in Maharashtra. It functions basically in the areas of development of water resources, community development and agricultural extension. Its main strategies are coordination, networking, and conducting training programmes. Over the past 30 years, AFARM has engaged itself in promoting sustainable development of water resources. Watershed development programmes are being pursued by AFARM with an 'integrated approach' to natural resource development, necessarily

involving the communities. AFARM, today, has around 240 NGOs as corporate and associate members. It publishes a newsletter called Mahiti Vahini, in addition to several booklets, video cassettes and CDs. Its support services include evaluations, surveys, soil and water analysis, groundwater investigation, financial support for innovative and experimental activities, etc.

AFARM has developed its own methodology which is demonstrated on its one-acre agricultural campus at Latur. As a result of organic farming practices followed over the past decade, the plot is now fully fertile, yielding quality products.

Simultaneously, AFARM implemented the watershed plus programme on food security for marginal farmers with the help of 340 marginal farmers and 649 acres of land throughout Maharashtra. With this experience and excellent results from the pilot programme, the government of Maharashtra has nominated AFARM as an Organic Farming Mitra Margadarshak Sanstha in the Pune and Latur district. Under this programme, AFARM has formed 22 farmers groups (comprising 2033 farmers and 2732.5 ha land) in the Latur district. These groups meet regularly at AFARM training center, Latur, to exchange their ideas, experiences and views regarding organic farming, composting, vermicomposting, bio-pesticides, bio-fertilisers, etc. AFARM has conducted a district-wise workshop on organic farming throughout Maharashtra for the motivation and awareness of farmers.
(Source: Communication with OIP)

AFARM is involved in many extension activities. It promoted FFS- in 34 villages, Field demonstrations- 645, Field trials, Livelihood literacy classes- in 20 villages, Training on PHM and Value Addition, Facilitating Market Linkages with the Private Players, Collective Procurement of Agriculture Inputs and Marketing of Produce, Group Discussion, Shetkari Vigyan Mandal (20), Agriculture Producer Group (76) .

Conclusion and Recommendation

The extension has all the institutions from different sectors that facilitate farmers' access to knowledge, information, and technologies; their interaction with markets, research, and education; and the development of technical, organizational, and management skills and practices. Thus, the extension includes not only technical knowledge but also functional elements such as communication, facilitation, and empowerment.

The good technologies, in order to be considered by the farmers for possible adoption, must first travel the distance between relevant research institutes and the farmers' fields. Then, they should be introduced to the farmers in a non-technical language and the advantages of technology over traditional practices must be demonstrated in a convincing manner, such as through field demonstrations. Next, the necessary ingredients for trying the new technology, such as cost and any risk factors must be explained.

The focus of the extension and advisory systems is now shifting towards improving rural livelihoods and achieving food security at the household level by strengthening farmers' ability to adapt more rapidly to changes in markets. Therefore, it is now necessary to differentiate among these major clientele groups that can be served by a more pluralistic extension system.

The researcher conducted the study in all the sectors and found that there is a weak linkage between public and private sectors which causes a gap in the dissemination of technology in a proper and effective manner.

In this study, the role of agricultural extension officers with the linkages of different sectors should be further explained to the farming communities in Maharashtra. This must include the agricultural extension officers' role in encouraging farmers to adopt new technologies, improved knowledge about agriculture, using a new variety of methods to reach farmers i.e. organizing study group for farmers, farmers' days, demonstrations, lectures and literature as well as informing the media about the farmers' challenges. They must design policies that aim to improve better extension practices to reach every farmer of the grassroot level for improving his livelihood and agriculture.

It is evinced from the study that there are many good practices in agricultural extension i.e. agricultural exhibition, group discussion, mobile based advisory services, mass media, community radio station and farmer to farmer extension etc. Different extension sectors are doing their work in agriculture. However, the impact of the government sector and NGOs are more on the farmers as farmers are improving their agricultural knowledge by making contact with these organizations.

From the present study, it is concluded that the impact of good agricultural extension practices and methods of approaches used by different service providing sectors like public, private and

government sectors to disseminate information in the western region of Maharashtra which has been in practice were identified and there are many innovative methods yet to come in practice.

Thus, the good agricultural extension practices have a positive impact on the livelihood of the farmers but due to lack of linkages and institutional support to the NGOs and FPOs, they are not being easily accessible by farmers directly. As they exist in rural areas and are working at the ground level in agriculture advisory services, policies have to be implemented in order to achieve effective and reliable advocacy to the farmers in the field of agriculture and allied sectors.

The good agricultural extension practices like group discussion, training, mobile advisory, ICT tools like WhatsApp, Facebook, YouTube is increasing day by day and farmers are getting more information from KVK, ATMA, NGOs, FPOs etc. The farmers adopted different agricultural practices by doing innovative things. Also, non-beneficiaries that are not regularly in contact with the extension agencies had found less impact and less agricultural technology adoption rate.

There is a need to focus on enhancing collective farming and marketing which reduces possible risks in production. Agricultural extension is not only restricted to the transfer of technology but also should be beyond that in terms of purpose-specific, target-specific, need-specific and enhancing farmers to help themselves in improving the livelihood in an effective way.
However, with this hope for improvements, the impact of good agricultural extension practices has now become a global concern. Based on the study, the following recommendations were made:

1. **Institutional linkage should be forward for agricultural sustainability**

The increasing involvement of the private sector and Non-Governmental Organizations (NGOs) in providing extension services.

2. **There should be a greater focus on participatory capacity building approaches**

A switch from the public extension that provides direct technical assistance to individuals, to a stronger emphasis on facilitation and in bringing stakeholders along the value chain together. Also, focus on farmers groups, FPOs, farmers club etc. for group farming and improvement in extension services.

3. **More emphasis should be given to ICT based Extension**

Digital media is providing real-time information, text messaging services, social networking, and other internet technologies by overcoming tie barriers. Thus, ICT based extension services like mobile apps, information KIOSKS, WhatsApp messages can be given more importance.

4. **Enhanced funding, convergence and coordination**

In the view of effective coordination among the various players in the field of agriculture extension, funding should be doubled and policy can be drawn in order to facilitate coordination among public and other stakeholders convergent towards achieving the aims of extension effectively.

5. More focused on farmer to farmer extension approach

6. Training programmes

The training programmes related to newer agricultural technologies are the need of the hour and this must be exposed to the farming community. For this purpose, the government may entrust the KVKs, SAUs, and NGOs to conduct trainings to effectively bring a transformation in farming through the innovative farmers.

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Worldwide Case Studies of different Extension Practices

1. KENYA – Mobile telephony for delivery of animal health services

(GFRAS- Extension Services: Case Studies June 2012)

FARM-Africa, an NGO working in Kenya in conjunction with the Kenyan Government and other stakeholders, has developed a decentralised animal health care system as part of their Kenya Dairy Goat and Capacity Building Project (KDGCBP). To link key participants in the system, the project approached the Safaricom Corporation, the corporate social responsibility arm of the mobile phone company Safaricom. The KDGCBP system works with a community animal health worker, who purchases a veterinary drug kit and mobile phone at a subsidised price. Animal health assistants and vets working with the project also receive mobile phones. Community phones are also installed in the project at vet shops, which have solar panels and batteries where there is no electricity. The owner of the community phone is responsible for repairs and can make a profit by charging for its use; a way for private vets to diversify their income. The phone system allows animal health care workers to update one another, share information, and conduct referrals. This system has reduced transaction costs and increased the efficiency of animal health care in the area.

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2. MOZAMBIQUE – Casas Agrárias

(GFRAS- Extension Services: Case Studies June 2012)

Around the town of Lichinga in Mozambique's Niassa Province, farmer associations have established 'Casas Agrárias' with support from two NGOs to assist their marketing needs. Casas Agrárias are agribusiness centres for marketing crops. They offer temporary storage and processing facilities and facilitate access to credit, inputs, and agricultural advice. Each centre has four or five extension staff from public agencies, who provide farmers with advice on input and output marketing.

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3. MALI – The Cheetah Network

(GFRAS- Extension Services: Case Studies June 2012)

Malian farmers can sell their products and derive better prices from their production by developing and honing their business skills. Specific programmes called 'business incubators' have been established to assist with the development of entrepreneurial activities. In Mali, small-scale farmer organisations formed a partnership with the National Agricultural Research Organisation, the National Agricultural University, and some American universities to develop the Mali Agribusiness Incubator Network– the 'Cheetah Network'. The network facilitated the university students and staff to train farmers in business skills and encouraged university staff to

revise the university curricula to include greater skills development in marketing agricultural products. One cluster involved a women's co-operative focused on producing, processing, and storing shea butter for export and on developing a high-quality market for its products in the United States and Canada. Another cluster involved the production of certified seed potatoes for regional export.

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4. MOZAMBIQUE – Nhambita Community Carbon Project

(GFRAS- Extension Services: Case Studies June 2012)

Extension services do not focus only on increasing yields or improving marketing skills. Innovative programmes can help farmers to protect and gain value from their environment. In Mozambique, with the support of a specialised organisation called Envirotrade, farmers set up a successful business model for the sale of carbon offsets to support the conservation of forests and the planting of new ones. The project focused on increasing local productivity while protecting the forest in the buffer zone of the nearby Gorongosa National Park. Farmers' use of sustainable farming practices, introduced as part of the Nhambita Community Carbon Project, increased cashew and fruit yields and improved livelihoods for about 1,300 families. Since its launch six years ago, the initiative has traded more than 120,000 tons of CO2, earning the community over US$1 million. Participants are paid for the carbon stored by the trees they plant, the forests that they manage, and the fires that they prevent. Felicio Lucas Melo, one of the participating farmers, has two plots that can sequester over 55 tons of CO2 per year, earning him US$244 per year in direct payments and an additional US$25 that is paid into the community carbon fund, which is used to improve schools, clinics, and wells.

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5. PERU – Café Peru

(GFRAS- Extension Services: Case Studies June 2012)

Farmer education is often essential to enable farmers to reach global markets and meet the product standards imposed by major buyers or achieve valuable certifications that allow them to sell their products at a premium. Cacao production is a major source of income for the farmers in Peru. Three cacao cooperatives in Huánuco Region partnered with Café Peru to acquire technical assistance and training to increase the productivity of cacao, obtain certification for organic cacao production, and increase the marketing of their organic cacao. The co-operatives received market analysis and specific training in co-operative management and product promotion. Starting from zero in the project's first year, more than 1,200 producers had obtained organic certification by the end of year three. Over the same period, cacao productivity rose from 340 to 600 kg per ha, and the co-operative now markets some 1,500 tons of organic cacao. Although cacao prices have risen overall, the productivity increases and the switch to organic production have enabled producers' returns to rise from US$546 to US$1,543 per ha.

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6. MADAGASCAR – Best practices for improved soil

(GFRAS- Extension Services: Case Studies June 2012)

Farmer organisations are a key source of knowledge sharing and can play an important role in helping disseminate and scale-up the use of best practices. In Madagascar, la Coalition Paysanne de Madagascar (also known as FTM/ CPM) is one of many farmers' groups that encourages best practices such as crop rotation by training their members. They use crop rotation to improve soil nutrients, foster soil quality, minimise soil erosion, and increase water efficiency. Continuous replanting of one crop in a field depletes soil nutrients and the organic matter in the ground. National support programmes and international research and extension networks are critical to furthering these efforts. Cooperation with scientists and agricultural research centres, and conducting workshops with farmers to put practices into place locally are both vital activities. In Madagascar, information campaigns on the radio and on key 'Action Days' have proven to be effective. They also hold forums to encourage farmers to share their experiences with each other.

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7. MOZAMBIQUE – Women's farming co-operative helps shares knowledge

(GFRAS- Extension Services: Case Studies June 2012)

Women often form the majority of the labour force in rural areas, providing for their family and communities' livelihoods. However, they typically face difficulties and inequalities in accessing services, training, and technologies. Being part of a farmer co-operative can be a tremendous help in gaining access to resources and boosting productivity and incomes. In Mozambique, a group of 250 women from Maputo responded to the difficulties they faced by pooling their resources, growing crops, and raising poultry as a group. With limited funds at first, many of the women brought in their own agricultural tools and invested their own money to support the project. The women sold the excess produce and created a business that now has a membership of about 2,900 farmers, mostly women. And as the numbers grew, they expanded the reach of their operation and began helping others to gain credit to start their own businesses.

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8. GLOBAL SURVEY ON SOCIAL MEDIA IN RAS

In 2015, GFRAS conducted a global survey on the use of social media in agricultural extension and RAS. The survey was conducted online across 60 countries and 226 respondents provided results. Facebook was found to be the most popular platform used by RAS actors. The main uses of social media were searching for news and events and sharing information. A major impeding factor for social media use was the lack of authenticity of the information shared online. The social construction of information (development and publication of information socially by the users) was considered the most important feature of social media (95.1%). Ninety five percent of the respondents believed social media can play an important role in bridging the gap between

stakeholders in agricultural innovation systems. Reaching clients (77.4%) was a major use of social media in RAS. Training in social media use was uncommon, and 71% of the respondents said they need training. If and when there was the training conducted by the respondents' organization, it mainly focused on the specifics of different platforms, and on the uses of social media in agricultural extension or the creation of social media tools. But at an organizational level, social media is still not given much importance by higher authorities (45.6%), and social media policy restricts rather than encourages its use (41.9%). Also, weak or non-existent connectivity in rural areas (69.9%), high data costs (52%), illiteracy of the clients (43.4%), and low participation and lack of interest (16.2%) of clients are reported to be major problems. Overall, the survey found that social media is still a very useful tool. To quote one respondent, "Social media is not only a tool for reaching large audiences; it is also an opportunity to develop relationships."

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8. Farmer-to-Farmer Extension

(Steven Franzel, Ann Degrande, Evelyne Kiptot, Josephine Kirui, Jane Kugonza, John Preissing, and Brent Simpson, July 2015)

GOVERNMENTS PAYING FARMER-TRAINERS: THE WAY OF THE FUTURE?

In parts of Peru, F2FE has become the main delivery vehicle for the extension. Peru's Yachachi (from Quechua for 'one who teaches') programme reached 90,000 of the country's poorest Andean farmers. In addition to being locally recruited and selected, these F2FE trainers are paid by the government via community-awarded innovation funds (no external funding is involved). They receive an equivalent of US$340 per month for four days a week, which is 67% of an extension technician's salary). Women make up 25% of the 2,500 Yachichis. Training activities focus on a wide range of crop, livestock, and agroforestry practices. Importantly, the national agricultural research and innovation institute (INIA) and SENASA, the national phytosanitary service, provide ongoing training and support to Yachachis.

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9. Lessons Learned from Locally Produced Videos – the Approach of Digital Green in India - by Kerry Harvin Digital Green 7, November 2013

The mission of Digital Green is to increase the productivity of smallholder farmers by making agricultural extension services more effective. In collaboration with partners and local communities, farming needs are assessed and farmers trained in producing videos that address the identified needs through sharing best practices. The development of the videos involves multiple levels of review and refinement. Currently, Digital Green works with nine partners in seven states throughout India, with project locations in Ethiopia and Ghana as well. To date, local partners have produced over 2,600 videos, reaching over 150,000 farming households in about 2,300 villages. A recent study was undertaken in the states of Karnataka, Madhya Pradesh, and Orissa estimated that an average farmer who adopted the new practices for rice

cultivation and livestock described in the training videos would see an annual income gain of $294. Typically, 44% of the farmers who receive video training will adopt at least one of the farming practices they learn as opposed to just 11% of farmers who are exposed to conventional extension methods (Gandhi, 2009).

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10. INDIA – Kerala Horticultural Development Programme

(GFRAS- Extension Services: Case Studies June 2012)

Farmers' organisations can provide knowledge and learning for farmers while providing add-on services for marketing as well. These multiply the positive impacts of education and ensure farmers to have an outlet for their improved production. Created in 1992, the Kerala Horticultural Development Programme aimed to improve the lives of Kerala's fruit and vegetable farmers by increasing and stabilising their incomes, reducing production costs, and improving their marketing systems. The programme worked with the fruit and vegetable farmers to promote self-help groups. It trained three farmers from each group to become master farmers who were competent in crop production, credit, and marketing. It promoted the concept of credit to farmers who leased land, promoted group marketing, and established modern seed processing and fruit processing plants.

To generate and access locally relevant technical knowledge, the programme began research with a local agricultural university which strengthened the skills of farmers in participatory technology development. The Vegetable and Fruit Promotion Council, Kerala (VFPCK) currently works with about 6,800 self-help groups (of which 405 are run by women) and reaches more than 132,000 farmers. An external evaluation and impact study of the project reported a significant increase in the area under fruit and vegetables in 86% of the self-help groups, and increased incomes in 75% of the groups. The same study also reported that the number of farmers receiving credit increased from 21% in the pre-programme period to 41% by 1999, with an increase in the efficiency of loan disbursal and an increase in the size of the loans.

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11. The Creation and Consolidation of Papa Andina

(Source: Author, based on Devaux *et al.* 2009. Note: CIP = Centro Internacional de la Papa; INCOPA = Innovación, tecnológica y competitividad de la papa en Perú;)

Since 1998, Papa Andina has fostered agronomic, technical, and commercial innovations in Andean potato-based food systems to improve farmers' access to more dynamic and lucrative markets. The network, which reaches about 4,000 poor rural households and includes about 30 partners in Bolivia, Ecuador, and Peru, pursues several strategies: increasing demand for native and commercial potato varieties, adding value to potatoes, improving contractual arrangements, and facilitating access to commercial information. Financed by the Swiss Agency for Development and Cooperation and other donors, Papa Andina is hosted by the International

Potato Center (CIP). Based on a participatory method for stimulating agricultural innovation (Rapid Appraisal of Agricultural Knowledge Systems), 2000 CIP researchers started to enhance innovation through a participatory market chain approach and stakeholder platforms. These efforts bring researchers together with small scale farmers, agricultural service providers, and market chain actors (including chefs, supermarkets, and potato processors).

In each participating country, Papa Andina coordinates its activities with a "strategic partner" that assumes leadership and coordinating role in market chain innovation: PROINPA Foundation in Bolivia, the INCOPA Project in Peru, and the National Potato Program of INIAP in Ecuador. Although the approaches to developing the networks are common (the participatory market chain approach and stakeholder platforms), different organizational arrangements, involving different partners and interaction patterns, emerged in each project implemented by Papa Andina. Papa Andina's success resulted largely from the exploration of alternatives to reaching its goal (poverty alleviation), the involvement of different actors in developing and testing innovations, and the continued support of its funders.

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12. SUPERVISED ENTERPRISE PROJECTS AS A COMMUNITY DEVELOPMENT TOOL

-by Festus Annor-Frempong, Department of Agricultural Economics and Extension, University of Cape Coast, Cape Coast, Ghana MEAS HRD Case Study Series, # 4, January 2013

The SEPs play a very useful role in the overall development of extension agents and farmers in many communities in sub-Saharan Africa. The SEPs link farmers, lecturers, employers and other stakeholders in identifying and solving real-life problems. The government employees from the Ministry of Food and Agriculture in Ghana (MoFA), research institutes and others provide technical assistance in the implementation and evaluation phases. The Bobo Dioulasso Region is a food basket of Burkina Faso. Farmers in this region grow a lot of maize because it is a staple food for the people of Burkina Faso. The use of local seeds kept yields of maize low. The SEP of Ousmane Sawadogo promoted the adoption of the improved Obatampa, maize variety in the Bobo Dioulasso Region. "Obatampa", which means "good mother," was developed by the Crop Research Institute of Ghana. Obatampa is noted for its high yield and valuable protein qualities. The adoption of Obatampa is good for improving not only crop yield but also the nutritional status of farm family members.

The Cocoa Services Division (CSD) of the Ghana Cocoa Board is responsible for the production and supply of hybrid cocoa seedlings. Cocoa farmers are expected to use the hybrid seeds from the numerous cocoa seed gardens of CSD. Due to the unavailability of hybrid seedlings at Adenkyensu in the Birim South District of the Eastern Region of south Ghana, farmers had to use old cocoa cultivars, which are late-bearing and low-yielding. Albert Akomaning forged a linkage with CSD through a SEP to establish a demonstration nursery of 1200 improved cocoa seedlings with 20 cocoa farm families at Adenkyensu. Each farmer, in turn, established a nursery,

which was certified by CSD. Other farmers bought certified seedlings from Adenkyensu to establish cocoa farms.

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13. Case study: Use of ICTs to reach rural women farmers: The case of e-Krishok

(by Dr. Rasheed Sulaiman and T.S. Vamsidhar Reddy 2014)

Place: Villages and homes in Bangladesh
What: e-Krishok and the use of Information and Communication Technology (ICT)-based services

Advisory services to service centers in villages, called Batighar ("Lighthouse")

This case discusses an agricultural initiative of the Bangladesh Institute of ICT in Development (BIID) using ICTs to reach rural farmers with relevant knowledge. By utilizing the rapidly increasing popularity and use of ICT in Bangladesh, BIID developed and pilot tested an approach that it is currently promoting. Its approach builds on the existing government and private ICT infrastructure available in the country and on developing entrepreneurship to provide new advisory services to farmers. Apart from the provision of an SMS/voice call facility to subscribers of the service, farmers can avail support from BIID field officers who visit farmers, while also seeking support from local information centers called "Batighar". Low awareness among farmers and other stakeholders as well as lack of reliable, locally relevant content are major challenges faced by e-Krishok. BIID is experimenting with several approaches to deal with these and other challenges.

Under the Batighar initiative, an information Center, owned by local entrepreneurs, is established in the village. The Batighar owner/BIID franchisee provides services to farmers and others by charging a small service charge. For instance, a farmer in need of some agricultural information can visit the Batighar. Based on his/her request, the Batighar owner would use the computer and internet available in his/her center to access relevant information. If s/he could not get the needed information, s/he would help the farmer send an email to the BIID specialist, seeking a solution. As of mid-2014 ten Batighars have been established in Bangladesh. Batighars operate as a franchisee network with BIID. This arrangement is expected to ensure ownership of the Center's well as the growth of the centers in terms of services. There is an agreement signed between the entrepreneur and BIID.

The entrepreneur invests in setting up the Batigar, including its infrastructure. S/he pays BIID the one-time franchise charges. In return, BIID provides the necessary support for providing services (agriculture, health, education, tourism, etc.) and branding. The profit generated by providing services is shared at a pre-decided percentage between BIID and the Batighar owner. On average, a Center services 100-150 customers (both commercial & information) per day. To operate these initiatives, BIID has identified entrepreneurs in each of the villages called Business

Promoters. They help in registering farmers for various BIID services and manage Batighar. By the end of 2009, 100 community telecenters across the country replicated the service. By 2013, the campaign reached over 138,000 farmers directly enlisted with the campaign, provided information and advice to approximately 8,000 farmers, and benefited tangibly and measurably about 29,000 farmers. Now e-Krishok is in operation in 350 upazillas and is targeted to reach 500,000 farmers by 2015 through SMS/voice service.
(Source: https://meas.illinois.edu)

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14. Case Study: A case of reaching women farmers with a community organization as the organizing principle: Union Federations as promoted by RDRS in Bangladesh
(by Dr. Rasheed Sulaiman and T.S. Vamsidhar Reddy 2014)

Where: Northwest Bangladesh
What: Rangpur Dinajpur Rural Services RDRS promoting Union Federations (UFs)

This case discusses the agricultural interventions of RDRS, one of the reputed NGOs that has been working in northwest Bangladesh for more than four decades. The northwest area of Bangladesh is characterized by smallholder farmers, where RDRS applied their Union Federation approach to building a strong social organization of these communities. Agricultural programmers were subsequently implemented through the Union Federations. RDRS linked the UF to several of its agricultural programmers; this facilitated the Ufs to access new knowledge and other inputs through demonstrations, trainings, and better links to other agencies involved in agricultural development. While the farmers' field school is the main approach for knowledge delivery, demonstrations and training are also used to provide new knowledge. RDRS's long-term engagement with the Ufs and implementation of several agricultural programmers through the Ufs has resulted in a wide-scale adoption of new technologies by farmers and farm women in NW Bangladesh.

At the moment, there are about 359 UF consisting of 287,500 members. About 70% of these are women (199,245). Currently, out of 352 UF, 107 have women as chairpersons. In an effort to institutionalize the initiative, 224 UF out of a total of 352 UF have now been registered with the Social Welfare Department. The additional advantage of this is that the government recognizes the registered UF and they are eligible to access government funds. The villagers through this social organization seem to have improved the quality of their own economic, social and cultural lives through several developmental initiatives. They could collectively raise awareness of their problems and seek help.
(Source: https://meas.illinois.edu)

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15. Case Study: Value chain development for adoption of new agricultural knowledge: BRAC's initiatives in Khulna with Sunflower

(by Dr. Rasheed Sulaiman and T.S. Vamsidhar Reddy 2014)

What: Bangladesh Rehabilitation Assistance Committee's initiatives to promote the sunflower crop.
Where: Khulna and Barisal divisions of Bangladesh

This case describes the approach implemented by a reputed NGO from Bangladesh – BRAC - for promoting a new crop (for the region – sunflower) in the Khulna and Barisal divisions in southwestern Bangladesh. This initiative is with women farmers mainly because that organization has a strong focus on working with women. BRAC's success, in this case, was due to its approach to large-scale participatory block demonstration and development of a value chain. BRAC's long-term presence in the region, provision of financial assistance to farmers to buy the needed inputs for growing the crop, organization of several knowledge sharing activities conducted during the growing stage of the crop, ensuring the availability of inputs locally and procurement of outputs, and finally its engagement of all relevant stakeholders in the initiative also contributed to its success.

During the current harvesting season, about 3,200 farmers under the guidance of BRAC have grown sunflower on about 4,000 acres of land. They have plans to bring 16,000 acres of land under sunflower cultivation by next season (end of 2013). BRAC has set up a processing factory near Rupganj, Naraonganj and has made all arrangements to introduce sunflower oil by the end of 2013, under the brand name of 'Shufola'. They have plans to sell this oil at Tk 160-170 per liter- around 31 percent lower than the prices of imported sunflower oil. In Bangladesh, BRAC's approach for agricultural development generally has two key features: large-scale farmer participatory block demonstrations, training and field days and value chain development. These were employed together in the current case as well.

The approach focuses on promoting new and better agriculture technology to farmers through farmers' participatory large-scale block demonstrations. They organize a group of 40-50 marginal farmers and provide them partial grants to cultivate and use modern varieties of crops, fishes, and production technologies and practices. Their extension staffs provide adequate training and the latest information for getting better production from their fields. They are presently operating extension activities at 50 upazillas of 12 districts in Bangladesh.

BRAC is targeting to cover around 60 thousand direct beneficiaries with improved technologies by the year 2015. Cash grants of BDT 9,000-8,000 per acre for rice and BDT 3,000-7,500 per acre for non-rice crop cultivation are provided to the participating farmers to buy seed, fertilizer, pesticides, land preparation, and irrigation services. The program is also providing a cash grant of BDT 10,000 for fish cultivation to buy fingerling, feed, and fencing. The beneficiaries are provided with cash grants to buy different inputs, available in the local markets. BRAC is aiming to cover 41,000 acres under hybrid rice cultivation, 30,000 acres under HYV rice cultivation, 14,000 acres under maize cultivation, 19,000 acres under sunflower cultivation, 2,000 acres

under mustard cultivation, and 1,500 acres under sesame cultivation during 2012-2015. (Source: https://meas.illinois.edu)

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16. Communicating Agricultural and Health-Related Information in Low Literacy Communities: A Case Study of Villagers

-by the Bougoula Commune in Mali by Assa Kanté, Florence Dunkel (Department of Plant Sciences and Plant Pathology, Montana State University), Ashley Williams (Department of Geography, University of Missoula), Sam Magro (Plant Sciences and Plant Pathology, Montana State University), Haoua Traoré (Peace Corps, Bamako, Mali), and Abdoulaye Camara (Institut D'Economie Rurale, Bamako, Mali)

The study addressed two major issues important to villagers in Mali. Each issue was examined in male, female and mixed-gender consensus groups in each village. The results presented are a composite of the results from the 13 villages studied. The study revealed problems related to water infrastructure, diseases related to water and hunger caused by drought. When researchers examined male and female villagers' responses to water-related problems, they found obvious gender differences. Both groups had the same three primary concerns: the toilet, the pump and the dam. However, females saw the pump, the day-to-day source of water for drinking, cooking and washing, as the primary issue (Figure 1).

The males were most concerned with the dam. Overall, the response patterns of male and female villagers were relatively similar except with regard to the CLIC, in which males ranked second as a preferred method of receiving information. The female villagers studied, especially those from Tadianabougou, Dialakoroba, Falan and Safekoro, showed more consistent patterns of response than male villagers, with the chief of the village and meetings being the preferred methods for disseminating information. Although the males studied were more variable in their responses, the chief of the village and meetings were both among the top three preferred information methods.

The findings of the study showed that both males and females preferred interpersonal communications channels over mass media. Although radio is a popular communication channel for receiving news in developing countries (Siemering, 2007), the villagers interviewed preferred to receive information on water related problems through their chief of the village. An examination of male and female villagers' responses to water related problems and preferred communication channels revealed obvious gender differences.

Some issues may need to be addressed separately, according to the gender group. Both genders, however, perceived specific health issues as holding the same level of importance. Villagers preferred interpersonal communication channels for receiving information, except for the CLIC, in which male participants ranked second. Overall, the chief of the village was the

villagers' traditional communication channel, which can be explained by the cultural obligations of community leaders in Mali.

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17. Case study: Farmer Producers Organization Chaitanya Agriclinics- Service Providers for Farmers Producers Organization Authors: Saravanan Raj and Jyoti Todd

India | West Region | Maharashtra | Pune | Chaitanya Agriclinics | Kiran Dumbre

Venture: Kiran Dumbre is promoting Chaitanya Agriclinics since 2014. It provides technical support and services to Farmer Producer Organizations (FPOs). There was a need for technical support services in the development and setting up a sustainable business unit, to serve members of the FPOs. Chaitanya Agriclinic is providing technical consultancy to the targeted FPOs for developing their strategy to grow up as an organization, increase the share capital by means of implementing innovative services to the targeted farming community in the local area.

Agripreneur: Kiran Dumbre, a successful agripreneur, has a BSc. Agriculture degree, along with MBA-Marketing and he completed the AC&ABC Scheme of MOA&FW, GOI from 09 July to 06 August 2008 (ID No. MS 5053) from MITCON Consultancy Services Pvt. Ltd and started the agri consultancy services after completion of AC&ABC training.
As an Agripreneur, it is very helpful to work for a group instead of for individuals. It brings in equity and one can benefit from the economies of scale. CHAITANYA Agri clinic adopts a social approach to deliver services, technical know-how and backward-forward integration. During the last decade, there has been a very big movement by different governments and NGOs to form and promote Farmer Producer Companies (FPCs). Unfortunately, these FPCs didn't stand up as their own even after 4-5 years of their incorporation. They are facing problems in promoting share capital, developing business activities, etc.

Agripreneurs are also the domain experts for agriculture production. This gap in the existing system triggered a business opportunity and now the agripreneur is a consultant to MAHAFPC (a state level consortium of FPC in Maharashtra). Chaitanya Agriclinic provides training and capacity buildings to 700 farmers, SHG members and NGO staff. Chaitanya Agriclinics provide services to more than 600 members annually through the financial inclusion centers.

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18. FARM CENTER INDOCHINA, FCI

-by ECHO Asia Impact Center Consulting Group. Principal Investigators: Abram J. Bicksler, Ricky Bates, Rick Burnette, Boonsong Thansrithong MEAS Case Study # 1 on Small Farm Resource Centers in Asia, October 2013

Small farm resource centers (SFRCs) have played a key role in strengthening the relevance and role of their sponsoring organizations (e.g., missions' organizations, development organizations) and were popular as an outreach and development tool from 1920 to1980. In the late 1980s, the advent of Participatory Rapid Appraisal (PRA) and farmer field schools (Van den Berg, 2004) emphasized the importance of farmer-led extension, causing many extension and development experts to question the role of traditional agricultural centers. Though many SFRCs are still in existence, the benefit and efficacy of SFRCs on local livelihoods have never been measured or evaluated comprehensively, perhaps because of their multifarious foci, differences in extension techniques, their secondary role to other institutional priorities, lack of understanding or interest in extension best practices, and lack of institutional vision or sustainability.

The purpose of this research was to explore a suite of SFRCs in south-east Asia to illustrate and classify the concept of the SFRC, evaluate their outreach efficacy and provide recommendations to amplify their extension services. Seven SFRCs were utilized to answer our set of research questions and determine if the concept of the SFRC is antiquated or adaptable and if the SFRC can remain relevant as a development tool. All data were entered into Excel worksheets during and upon return from the field. Wherever necessary, the data was coded to calculate percentages and ratios. Abram Bicksler of ECHO Asia Impact Center analyzed and interpreted the data using a combination of Excel functions and Excel macros.

Farm Center Indochina (FCI [name has been changed to protect the company's identity]) is different from the other SFRCs because of its primary role as a business, albeit a positive social enterprise. FCI was begun in June 2009 with a board of five directors (one Australian, one French, one American, one Canadian and one local person). FCI's mission is to: "Produce and sell organic products to the market while providing organic agriculture training and a positive sustainable business model in the district." The farm owns 50 ha of land across the four villages in the district where it is located. The primary ethnic group of the surrounding villages (where many of the farm employees originate from) is a major ethnic group in the country, but approximately 10 percent of the population is a predominantly landless minority group that makes up 90 percent of the business's workforce. Because land-owning groups depend on subsistence rice production, many cannot work full-time for the farm but can work as contract laborers during the non-rice growing seasons.

Perhaps instead of trying to "be all things to all people," the company should strive to be "some things to some people." This means that it looks for relevant opportunities to make positive impacts on its beneficiaries in a capacity that the government recognizes and appreciates. Work more closely with the government to continue to further educational and extension causes while showing the authorities that they have nothing to fear from FCI's presence in the district. Continue to engage the rice growers group and the fair trade association and make it a priority to determine how best to link farmers to domestic and international markets.

19. THE ALOHA HOUSE, PHILIPPINES

- by ECHO Asia Impact Center Consulting Group. Principal Investigators: Abram J. Bicksler, Ricky Bates, Rick Burnette, Boonsong Thansrithong MEAS Case Study # 3 on Small Farm Resource Centers in Asia, October 2013

Small farm resource centers (SFRCs) have played a key role in strengthening the relevance and role of their sponsoring organizations (e.g., missions' organizations, development organizations) and were popular as an outreach and development tool from 1920 to1980. In the late 1980s, the advent of Participatory Rapid Appraisal (PRA) and farmer field schools (Van den Berg, 2004) emphasized the importance of farmer-led extension, causing many extension and development experts to question the role of traditional agricultural centers. Though many SFRCs are still in existence, the benefit and efficacy of SFRCs on local livelihoods have never been measured or evaluated comprehensively, perhaps because of their multifarious foci, differences in extension techniques, their secondary role to other institutional priorities, lack of understanding or interest in extension best practices, and lack of institutional vision or sustainability. The purpose of this research was to explore a suite of SFRCs in Southeast Asia to illustrate and classify the concept of the SFRC, evaluate their outreach efficacy and provide recommendations to amplify their extension services.

Crops grown at Aloha farm include 55 vegetables, 33 herbs and diverse fruits, along with livestock (pastured poultry for eggs and meat, natural pork, cow and goat milk, tilapia and earthworms), and value-added products such as salsa, jams, pestos, cheese, yogurt, soap, lip balm and toothpaste. The center is productive, helping to feed the orphanage with nutrient-dense food, but is also agronomically profitable. The farm produces 75 percent of the food consumed at the orphanage, and the rest of the food produced is sold through a diverse network to local consumers.

The primary extension methods that the SFRC uses include three-day intensive trainings on sustainable agriculture, usually held at the SFRC; one-day specific short courses; tours of the farm; school lectures about sustainable agriculture; internships for local farmworkers to gain agricultural management skills; hosting of conferences and events; acting as a consultant and resource to other NGOs, farmers and government entities; and online and print training tools, books and videos. In addition to beneficiaries attending the farm for consulting, internships and workshops, the center hosts approximately 500 visitors per year.

Countless other beneficiaries access knowledge disseminated through videos, a blog and online publications in addition to direct marketing of produce to the community through chefs, restaurants, families, a CSA and grocery stores. A host of people and organizations have benefitted from time in trainings and workshops and at the farm. ECHO Asia, in conjunction with Aloha House, hosted a Philippines sustainable agriculture workshop at the farm in March 2013, with 30 national development workers in attendance. A post-workshop evaluation using

iClickers was conducted, and of the 24 respondents, 75 percent agreed strongly that they improved their knowledge and skills related to food production. The center cost was around $40,000 to set up (mainly in infrastructure costs) but now has a profit margin of 15 percent and helps to offset about 25 percent of the operating costs of the orphanage (in addition to providing 75 percent of the children's food).
(Source: meas.illinois.edu)

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20. THE SUSTAINABLE AGRICULTURE TRAINING CENTER, MYANMAR

- by ECHO Asia Impact Center Consulting Group. Principal Investigators: Abram J. Bicksler, Ricky Bates, Rick Burnette, Boonsong Thansrithong MEAS Case Study # 2 on Small Farm Resource Centers in Asia, October 2013

Small farm resource centers (SFRCs) have played a key role in strengthening the relevance and role of their sponsoring organizations (e.g., missions' organizations, development organizations) and were popular as an outreach and development tool from 1920 to1980. In the late 1980s, the advent of Participatory Rapid Appraisal (PRA) and farmer field schools (Van den Berg, 2004) emphasized the importance of farmer-led extension, causing many extension and development experts to question the role of traditional agricultural centers. Though many SFRCs are still in existence, the benefit and efficacy of SFRCs on local livelihoods have never been measured or evaluated comprehensively, perhaps because of their multifarious foci, differences in extension techniques, their secondary role to other institutional priorities, lack of understanding or interest in extension best practices, and lack of institutional vision or sustainability.

The Sustainable Agriculture Training Center (SATC) was started in August 2005 by Rev. Kya Moo, associate general secretary of Myanmar Baptist Convention, and Saw Hei Moo, director, Christian Social Service and Development Department of Myanmar Baptist Convention. The SATC farm is located in Hmawbi Township, approximately 46 km north of Yangon. SATC is developing infrastructure and capacity to include applied research capabilities related to appropriate technology. Throughout the history of SATC, intensive on-farm training has been a key vehicle for human capacity building. Between 2006 and 2011, SATC conducted 24 training programs for more than 580 farmers. Some of these farmers were from local communities; others came from distant states and divisions and returned to these locations to teach other local smallholder farmers. Farmers participating in the Basic Agriculture and Livestock Training program learn how to raise crops and livestock on small plots of land and how to design and conduct demonstrations. This intensive 10-day training begins with six days focusing on general agriculture, including soil science, plant nutrition and fertilizers, plant growth and development, plant propagation, insects and diseases, safe use of agrochemicals, integrated farming systems and agricultural development.

The Sustainable Agriculture Training Center evaluates, adapts and demonstrates farming and community development ideas that have been proven elsewhere and that display promise for Myanmar's rural poor. The best of these ideas are developed into a variety of educational and training formats, outreach projects and poverty alleviation initiatives. SATC clearly represents an effective and successful small farm resource center.

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21. THE CENTER FOR THE UPLIFT OF THE HILLTRIBES (CUHT) - SILOAM KAREN BAPTIST LIFE DEVELOPMENT CENTER, THAILAND

- by ECHO Asia Impact Center Consulting Group. Principal Investigators: Abram J. Bicksler, Ricky Bates, Rick Burnette, Boonsong Thansrithong MEAS Case Study # 4 on Small Farm Resource Centers in Asia, October 2013

Small farm resource centers (SFRCs) have played a key role in strengthening the relevance and role of their sponsoring organizations (e.g., missions' organizations, development organizations) and were popular as an outreach and development tool from 1920 to1980. In the late 1980s, the advent of Participatory Rapid Appraisal (PRA) and farmer field schools (Van den Berg, 2004) emphasized the importance of farmer-led extension, causing many extension and development experts to question the role of traditional agricultural centers. Though many SFRCs are still in existence, the benefit and efficacy of SFRCs on local livelihoods have never been measured or evaluated comprehensively, perhaps because of their multifarious foci, differences in extension techniques, their secondary role to other institutional priorities, lack of understanding or interest in extension best practices, and lack of institutional vision or sustainability.

The purpose of this research was to explore a suite of SFRCs in Southeast Asia to illustrate and classify the concept of the SFRC, evaluate their outreach efficacy and provide recommendations to amplify their extension services. In Thailand, the Karen ethnic minority currently numbers approximately 300,000 people. Largely residing in upland regions of the north and west of the country, most Karen is engaged in agricultural livelihoods. In Thailand, the economic and social situation of the Karen is representative of most hill tribe populations in the country. Three of the Siloam/CUHT center stakeholders – RDP, ITDP and Tabitha Handicrafts – offer extension programs that benefit KBC communities. RDP estimates that it has extended agriculture and community development work into 80 percent of the communities where roughly 200 KBC churches are located and reached an estimated 15,000 people through the years. ITDP's coffee-related work extends into 50 communities and reaches approximately 2,000 people (many of whom reside in KBC communities).

Tabitha Handicraft's activities take place among approximately 50 families or 500 people. RDP's organization of the community is cooperative. Participants stated that "being a cooperative group enables us to better negotiate prices and set our own prices for commodities." In

addition, besides not having middlemen to sell their commodities, the cooperative's marketing leverage benefits all farmers in the community, whether they are members or not.

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22. THAI LAHU CHRISTIAN CHURCHES (TLCC) BI-VOCATIONAL SCHOOL, THAILAND

- by ECHO Asia Impact Center Consulting Group. Principal Investigators: Abram J. Bicksler, Ricky Bates, Rick Burnette, Boonsong Thansrithong MEAS Case Study # 5 on Small Farm Resource Centers in Asia, October 2013

Small farm resource centers (SFRCs) have played a key role in strengthening the relevance and role of their sponsoring organizations (e.g., missions' organizations, development organizations) and were popular as an outreach and development tool from 1920 to1980. In the late 1980s, the advent of Participatory Rapid Appraisal (PRA) and farmer field schools (Van den Berg, 2004) emphasized the importance of farmer-led extension, causing many extension and development experts to question the role of traditional agricultural centers. Though many SFRCs are still in existence, the benefit and efficacy of SFRCs on local livelihoods have never been measured or evaluated comprehensively, perhaps because of their multifarious foci, differences in extension techniques, their secondary role to other institutional priorities, lack of understanding or interest in extension best practices, and lack of institutional vision or sustainability. Approximately, 37 churches in roughly as many Lahu communities in Thailand cooperate with the TLCC. These congregations work together to support religious activities at the TLCC Bi-Vocational School, in community-based congregations and beyond. Despite the agricultural and vocational activities taking place at the TLCC Bi-Vocational School, the TLCC does not yet have a dedicated curriculum to proactively promote community-based agriculture and community development efforts.

On Feb. 13, 2013, 18 members of the TLCC-affiliated church of Nong Pham, a Yellow Lahu community located in the Mae Suai district of Chiang Rai province (about 100 km north of the TLCC Bi-Vocational School), were surveyed by Abram Bicksler, Boonsong Thansritong and Rick Burnette. During the survey at Nong Pham, three data collection activities were carried out: construction of a timeline of key community events over the past 50 years, an interview consisting of four open-ended questions regarding the community's perception of the TLCC Center and anonymous polling with iClickers regarding their perceptions of the effectiveness of the TLCC Bi-Vocational School agriculture and livelihoods programming in their community. It is estimated that at least 1,200 TLCC church members are benefiting from the current 48 graduates serving in TLCC-supported congregations.

Although there has been no dedicated extension work from the TLCC Bi-Vocational School, members of the Nong Pham church stated that agricultural activities that they have seen at the center, including the production of rice, pigs, fish and vegetables, are of interest and possible benefit to them.

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23. UPLAND HOLISTIC DEVELOPMENT PROJECT (UHDP), THAILAND

- by ECHO Asia Impact Center Consulting Group. Principal Investigators: Abram J. Bicksler, Ricky Bates, Rick Burnette, Boonsong Thansrithong MEAS Case Study # 6 on Small Farm Resource Centers in Asia, October 2013

Small farm resource centers (SFRCs) have played a key role in strengthening the relevance and role of their sponsoring organizations (e.g., missions' organizations, development organizations) and were popular as an outreach and development tool from 1920 to1980. In the late 1980s, the advent of Participatory Rapid Appraisal (PRA) and farmer field schools (Van den Berg, 2004) emphasized the importance of farmer-led extension, causing many extension and development experts to question the role of traditional agricultural centers. The purpose of this research was to explore a suite of SFRCs in Southeast Asia to illustrate and classify the concept of the SFRC, evaluate their outreach efficacy and provide recommendations to amplify their extension services.

Today, UHDP comprises 15 acres and about 20 buildings, including a meeting hall/kitchen, library/meeting room, office, staff houses (seven), a volunteer house, guest housing (three houses for visitors/trainees, one dormitory, one guest house); nurseries, pig pens, animal rearing areas, a fish pond, a seed bank (operated by ECHO but rented from UHDP), numerous plant grow-out areas, agroforestry areas and common areas. It is classified as a local NGO based in Thailand. Last year, UHDP had an operating budget of approximately 500,000 THB ($17,030), which was sourced internally from training fees (120,000-200,000 THB), lodging at the guest house (100,000-200,000 THB), rental fees for the ECHO seed bank (100,000-150,000 THB), the sale of products sourced from the center (100,000-150,000 THB) and individual donations (100,000-150,000 THB). Overall results of polls from these two villages suggest that Ban Dang Nai has overall greater esteem for how the work of UHDP has improved their livelihoods -- 4.5 versus 3.9, where 1=much worse and 5=much better.

In all categories, however, both villages acknowledged that their lives were at least a little better to much better because of the work of UHDP, and both villages decidedly acknowledged that, overall, the center and its outreach activities had made their lives much better. From the beginning, extension and center activities have been linked and are interdependent. The center activities exist to create and refine knowledge, techniques, plant varieties and appropriate technology that have been born out of needs assessment from extension activities.

Similarly, extension activities exist to extend the abovementioned deliverables to communities and seek to have communities adopt, adapt and refine those, sharing that information learned with the center. In effect, the two activities complement each other in a positive reinforcement loop. Currently, 12 UHDP staff members work on some 200 projects among 21 local communities and host some 3,000 visitors to the center annually, which include representatives

of local NGOs, international NGOs and local people movements. The center grew in relation to its available capital, the needs of the communities and the capacity of the staff.

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24. THE NTOK NTEE CENTER, CAMBODIA

- by ECHO Asia Impact Center Consulting Group. Principal Investigators: Abram J. Bicksler, Ricky Bates, Rick Burnette, Boonsong Thansrithong MEAS Case Study # 7 on Small Farm Resource Centers in Asia, October 2013.

Small farm resource centers (SFRCs) have played a key role in strengthening the relevance and role of their sponsoring organizations (e.g., missions' organizations, development organizations) and were popular as an outreach and development tool from 1920 to1980. In the late 1980s, the advent of Participatory Rapid Appraisal (PRA) and farmer field schools (Van den Berg, 2004) emphasized the importance of farmer-led extension, causing many extension and development experts to question the role of traditional agricultural centers.

Ntok Ntee's approach is to widely disseminate pro-poor farming technologies and education by focusing resources on the smallholder farmer community and the marginalized Bunong ethnic group. The center is active in the communities where it works and develops programs based on stakeholder requirements. Within the Bunong community, Ntok Ntee demonstrates ideas and technologies that have been shown to be valuable elsewhere. In addition, the center actively evaluates and trials plant species thought to hold potential in Moldulkiri's harsh environment. Ntok Ntee has focused on developing on-farm crop, livestock and appropriate technology demonstrations and research.

These programs serve as the basis for training at the center and outreach to target communities. A theme that was repeated numerous times was the value derived from the village's having an active relationship with the SFRC. Extension efforts in the village such as training or on-site demonstrations and subsequent follow-up visits resulted in high rates of knowledge gained, innovations adopted and practices changed. It was noted that it is from within the context of this relationship that village-level problem solving can best function. It was also evident that the village had a high level of trust in Ntok Ntee because of past successes, and that this formed the basis for future cooperation. Ntok Ntee has the infrastructure, expertise and capacity to implement a useful applied research and demonstration program, particularly in species evaluation and introduction and appropriate technology. Projects of the SFRC are based on local stakeholder needs and are showing significant impact.

The Nok Ntee training center, situated on the outskirts of Sen Monorom, Mondulkiri Province, Cambodia, was established in 2012 and serves smallholder farmers, local churches, NGO and development workers, and focuses outreach efforts on Bunong smallholder farmers. A few organizations have also found success in incentivizing communities to provide their own EAS by

providing trainings to farmers that center on entrepreneurship and training others. Overall, community leaders and stakeholders highly value the outreach programs offered by Ntok Ntee. The education and training of village veterinarians are highly regarded and have had uniformly positive results, especially in pig culture and management. Bunong village leaders value their relationship with the SFRC; Ntok Ntee extension efforts in the villages have resulted in high rates of knowledge gained, technologies adopted and practices improved.

Photographs while interviewing the farmers

आधुनिक शेती फायद्याची

शरद पवार : काळवाडी येथे शरद ऑरगॅनिक सेंटरचे उद्घाटन

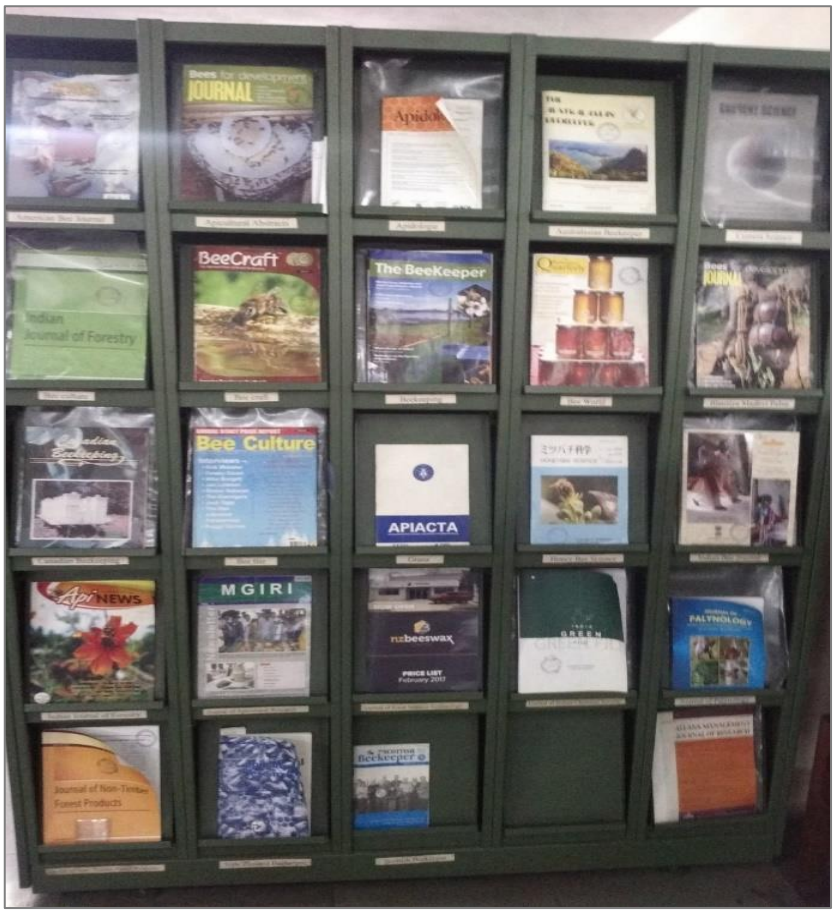
आलेफाटा, दि. २६ (वार्ताहर) - आधुनिक शेती करताना शेतकऱ्यांनी एकत्रयेऊन उत्पादन वाढवून विक्रीसाठीही सामूहिक प्रयत्न केल्यास त्याचा निश्चित फायदा होऊन शेतकऱ्यांचे जीवनमान उंचावू शकते, असे मत राष्ट्रवादी काँग्रेसचे सर्वेसर्वा शरद पवार यांनी व्यक्त केले. काळवाडी (ता. जुन्नर) येथे शरद ऑरगॅनिक सेंटरचे उद्घाटन शरद पवार यांच्या हस्ते करण्यात आले. त्याकरिता ते बोलत होते.

काळवाडी (ता. जुन्नर) : येथे शरद ऑरगॅनिक सेंटरचे उद्घाटन करताना शरद पवार, शरद सोनवणे.

पाटसचे विधानसभेचे माजी अध्यक्ष दिलीप वळसे पाटील, खासदार शिवाजीराव आढळराव पाटील, आमदार शरद सोनवणे, किसान परिषद अध्यक्ष विश्वास देवकाते, किसान सलाहकार समितीचे सभापती देवदत्त निकम, संजय काळे, जिल्हा परिषद सदस्य शरद लेंडे, पांडुरंग पवार, आशा बुचके, एकनाथ वामन, शरद चौधरी, निवृत्ती काळे, अंजली वामन, शरद वामन, अजय घोलपकर, सुभाष काकडे व ग्रामस्थ मोठ्या संख्येने उपस्थित होते.

पवार म्हणाले की, इतर राज्यांच्या तुलनेत महाराष्ट्रामध्ये पाण्याची समस्या मोठी आहे. पाण्याअभावी २० टक्के शेती पाण्याखाली असल्याने आहे ते पाणी वाया न घालवता प्रत्येक शेतकऱ्याने ठिबक सिंचनाचा वापर केला पाहिजे. सेंद्रीय शेतीकडे शेतकऱ्यांचा वाढता कल लक्षात घेऊन महाराष्ट्रामध्ये चार ठिकाणी सेंद्रीय शेती माल विक्रीसाठी व्यवस्था करण्यात येणार आहे. पुण्यामध्येही मगरपट्टा वसाहतीमध्ये अशा बाजारची व्यवस्था करण्यात येणार असल्याने भविष्यामध्ये शेतकऱ्यांनी या बाजारचा लाभ घेण्याचे आवाहन त्यांनी यावेळी केले. प्रास्ताविक शरद वामन यांनी केले. सूत्रसंचालन सुनिता वामन यांनी केले.तर एम. डी. वामन यांनी आभार मानले.

Images of different Agricultural Institutions engaged in Extension Advisory Services



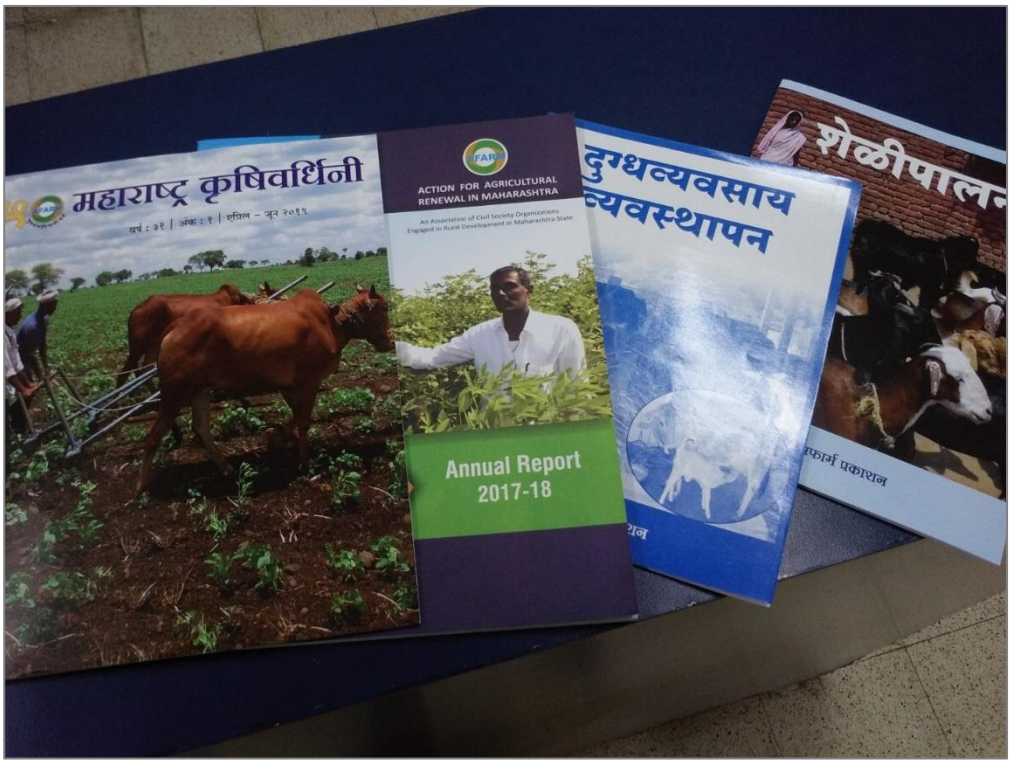
Central Bee Research and Training Institute

School of Edaphic Stress Management

National Institute of Abiotic Stress Management: (NIASM)

KVK, Narayangaon

KVK, Baramati



AFARM publications

Seema Biotech Nursery: (tissue culture Banana Nursery, Kolhapur)

National Institute of Agricultural Extension Management (MANAGE)
(An organisation of Ministry of Agriculture and Farmers' Welfare, Govt. of India)
Rajendranagar, Hyderabad – 500 030, Telangana State, India
www.manage.gov.in