PLURALISTIC EXTENSION SERVICES—ACCESS, QUALITY AND IMPLICATIONS FROM THE RESTRUCTURED POLICY REFORMS IN COOCH BEHAR DISTRICT OF WEST BENGAL

A thesis
Submitted to the
Uttar Banga Krishi Viswavidyalaya
In partial fulfilment of the requirements for the Degree of
DOCTOR OF PHILOSOPHY (AGRICULTURE)

In
Agricultural Extension

By
Subhrajyoti Panda
[Reg. No. A-2017-27-D]

DEPARTMENT OF AGRICULTURAL EXTENSION
FACULTY OF AGRICULTURE
UTTAR BANGA KRISHI VISWAVIDYALAYA
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SUBHRAJYOTI PANDA
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PUNDIBARI, COOCH BEHAR, WEST BENGAL
2020

UTTAR BANGA KRISHI VISWAVIDYALAYA
FACULTY OF AGRICULTURE

DEPARTMENT OF AGRICULTURAL EXTENSION
P.O. Pundibari, Cooch Behar, West Bengal 736165, India

From:
Prof. Prabhat Kr. Pal
Professor & Director of Extension Education

Phone: (03582) 270586
Fax: (03582) 270249/270157

Ref No. …… **Date …….**

CERTIFICATE

This is to certify that the work recorded in the thesis entitled **'Pluralistic Extension Services—Access, Quality and Implications From the Restructured Policy Reforms in Cooch Behar District of West Bengal'** submitted by **Mr. Subhrajyoti Panda** in partial fulfilment of the requirement for the degree of Doctor of Philosophy (Agriculture) in Agricultural Extension of the *Uttar Banga Krishi Viswavidyalaya*, is the faithful and bonafide research work carried out under my personal supervision and guidance. The results of the investigation reported in the thesis have not so far been submitted for any other Degree or Diploma. The assistance and help received from various sources during the course of investigation have been duly acknowledged.

Date: 15.10.2020

Place: Pundibari, CoochBehar

Prabhat Kumar Pal

(P. K. Pal)

Chairman, Advisory Committee

APPROVAL OF EXAMINERS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY (AGRICULTURE) IN AGRICULTURAL EXTENSION

We, the undersigned, having been satisfied with the performance of Subhrajyoti Panda (Regn. No. A-2017-27-D), in the *Viva voce* associated with Final Evaluation of thesis, conducted today, the ....22nd Jan..... 2021, recommend that the thesis be accepted for the award of the degree of Doctor of Philosophy (Agriculture) in Agricultural Extension

	Name	Signature
1.	Prof. Prabhat Kumar Pal Department of Agricultural Extension **Chairman, Advisory Committee**	22/01/2021
2.	Prof. Kausik Pradhan Department of Agricultural Extension **Member of Advisory Committee**	22.01.2021
3.	Prof. Tuhin Narayan Roy Department of Agricultural Economics **Member of Advisory Committee**	22.01.21
4.	Prof. Arunava Ghosh Department of Agricultural Statistics **Member of Advisory Committee**	22/1/2021
5.	Dr. Bikash Roy Sr. Scientist & Head, KVK, Cooch Behar **Member of Advisory Committee**	
6.	Prof. S.D. Mukhopadhyay **External Examiner**	

22.01.2021
Head
Department of Agril. Extension

22/01/2021
Dean, PG Studies
Faculty of Agriculture

UTTAR BANGA KRISHI VISWAVIDYALAYA
FACULTY OF AGRICULTURE

DEPARTMENT OF AGRICULTURAL EXTENSION
P.O. Pundibari, Cooch Behar, West Bengal 736165, India

From:
Prof. Prabhat Kr. Pal
Professor & Director of Extension Education

Mobile No- 09434126766 / 7584002617
Email-pkpalubkv@gmail.com

Ref No. …… **Date …….**

CERTIFICATE

This is to certify that the work recorded in the thesis entitled **'Pluralistic Extension Services—Access, Quality and Implications From the Restructured Policy Reforms in Cooch Behar District of West Bengal'** submitted by **Mr. Subhrajyoti Panda bearing** Registration Number **A-2017-27-D** towards partial fulfilment of the requirement for the degree of Doctor of Philosophy (Agriculture) in Agricultural Extension of the *Uttar Banga Krishi Viswavidyalaya* has been checked against plagiarism through URKUND software on 14.10.2020 and that the similarity index has been achieved as **5%** which is below the maximum tolerable range as per stipulation of this *Viswavidyalaya*. The thesis of Mr. Subhrajyoti Panda may be accepted for the award of the Doctoral Degree in Agricultural Extension of *Uttar Banga Krishi Viswavidyalaya*.

Date: 15.10.2020

Place: Pundibari, CoochBehar

Prabhat Kumar Pal

(P. K. Pal)

Chairman, Advisory Committee

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Pundibari, Cooch Behar

Subhrajyoti Panda

(Subhrajyoti Panda)
(Registration No. A-2017-27-D)

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Name:	**:**	**Subhrajyoti Panda**
Registration No.	**:**	**A-2017-27-D**
Name of the Chairman and Designation	**:** **:**	**Prof. Prabhat Kr. Pal, Professor, Department of Agricultural Extension, Faculty of Agriculture, UBKV**
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Abstract

The agriculture system in our country is very large. To provide service to the entire farming community, there is need to broad base the delivery mechanism, integrate the extension approaches, provide the opportunity to private sectors through convergence. The services were fulfilled by the pluralistic extension system. The two different district-level extension organisations, the *Agricultural Technology Management Agency* (ATMA) and the *Krishi Vigyan Kendra* (KVK) have opportunity to provide pluralistic extension services through their mandatory extension activities. In Cooch Behar district both the KVK and ATMA is operating. In this backdrop, this study has been formulated to explore the operational arrangement and constraints faced during execution of pluralistic extension service. The study also assessed the level of access and perceived quality and impact of pluralistic extension services in the district among the end-users. The study was conducted in Cooch Behar district by taking four study clusters [viz. Dinhata-II block (operated by the Cooch Behar KVK), Cooch Behar-I block, Cooch Behar-II block and Mathabhanga-I block (operated by ATMA)]. 200 farmers (randomly selected) and all the officers from the said study units were interviewed for generation of information. Convergence quotient and access quotient were developed and calculated for comparison between different study units. The officials of KVK and ATMA units, beneficiaries and non-beneficiaries from the study clusters were selected for the study. The study revealed that the ATMA and KVK provide pluralistic extension services by converging different extension agents acting in the district and utilising their own human expertise. The level of convergence and own expertise was low to moderate in case of both KVK and ATMA. Whether the KVK had highest linkage with farmer's organization, input dealers and research organization, the ATMA units converge more with state line departments. Although KVK officials faced more constraints on administrative matters, but ATMA officials faced more constraints on technological aspects. The access of KVK beneficiaries were more towards autonomous extension agent whereas the ATMA beneficiaries accessed more towards NGO and farmers organization. However, beneficiaries had more access towards extension service agents than the non-beneficiaries. The quality of service perceived by the beneficiaries of both KVK and ATMA was towards higher side. The impact as perceived by change in acreage, livelihood diversity, cropping intensity, need-based service delivery etc. was more in case of beneficiaries than non-beneficiaries. Pluralistic extension services actually depends on diversity in expertise and convergence among different organisations towards extension delivery, and it was found in the study that quality of service and level of impact is significantly and positively associated with the level of expertise and extent of convergence of an organisation.

Key Words: Pluralistic extension service, Access, Implication, Restructured policy, Quality of service

Signature of Chairman

Signature of the Student

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ACRONYMS

ICAR- Indian Council of Agriculture Research

ATARI- Agricultural Technology Application Research Institute

KVK- Krishi Vigyan Kendra

SAU- State Agricultural Universities

ATMA- Agricultural Technology Management Agency

NATP- National Agricultural Technology Project

ITD- Innovations in Technology Dissemination

NGO-Non-Government Organisation

FPO-Farmer Producer Organisation

FPC-Farmer Producer Company

FC-Farmers Club

ICT-Information and Communication Technology

TOT-Transfer of Technology

NABARD-National Bank for Agriculture and Rural Development

NARS-National Agricultural Research System

COB-Cooch Behar

MTB-Mathabhanga

DFAC- District Farmers Advisory Committee

FIAC- Farm Information & Advisory Centre

BTT-Block Technology Team

BTM-Bloch Technology Manager

ATM-Assistant Technology Manager

UA-Unattended/Unauthenticated

N-Never

O-Occasionally

S-Sometimes

R-regularly

PRI-Panchayat Raj Institute

DDA-Deputy Director of Agriculture

WBSEDCL- West Bengal State Electricity Distribution Company Limited

SRFSI- Sustainable and Resilient Farming Systems Intensification in Eastern Gangetic Plains

ACIAR- Australian Centre for International Agricultural Research

PHT-Post Harvest Technology

RCT-Resource Convergence Technology

DAESI- Diploma in Agricultural Extension Services for Input Dealers

DRDC-District Rural Development Cell

CADC-Comprehensive Area Development Corporation

SHG-Self Help Group

Introduction

CHAPTER-I

INTRODUCTION

The agriculture system in India is large and diverse in terms of its' agro-climatic zone, category of farmers, crop-specific demand and problem of individual farmer and farming families. Thus extension service system is also wide in range, varied in forms and multiple in approach. The present day form of extension system in India has been developed from different individual, private and public efforts over time through different stages, to provide effective and good extension services to the farmers.

Genesis of extension services in India and approaches of service delivery adopted

Pre-independence extension systems in India

The pre-independence extension systems were characterised by different commissions established by the British government and the individual extension efforts by renowned Indian personalities. As like, Famine commission established in the year 1901, advocated scientific method in agriculture; the royal commission of agriculture in 1928, recommended the field demonstrations, short courses in agriculture and the use of visual aids in agricultural development etc. Along with these recommendations, some of the Indian personalities very famous in their fields also initiated extension service programmes for the well-being of the farmers as well as rural development on their individual leadership, like Rabindranath Tagore (initiated Sriniketan experiment at Santiniketan in Bengal), Mahatma Gandhi (initiated Sevagram project at Gujarat), F.L. Brayne (initiated Gurgaon Project), Sir Daniel Hamilton (initiated Rural Reconstruction in Sunderbans, Bengal) and Dr. Spencer Hatch (initiated Marthandam Project). Indian Village Service, Adarsh Seva Sangh, Sarvodaya program, Firka Development etc. were also some of the other rural development programmes during pre-independence era. Although, all these programmes could not create a wide spectrum effect due to individual and micro-level attempts and mostly isolated, uneven and discontinuous (Singh *et al.*,2014), but these efforts showed the methodological approaches to initiate a development programme in rural India.

Post-independence Extension Programs

Based on the experiences gathered from the efforts in pre-independence era, systematic, planned and country-wide extension system was initiated soon after India got

independence. These programmes evidences three distinct stages of innovations for extension delivery mechanism viz. community development which adopted an extensive approach, technological development which was mainly concerned with the area-specific approach in relation to spatial allocation and technological innovation; and development with social justice was another approach of development aimed to incorporate development strategy emphasising the poorest of the poor.

In this short run, India launched The Community Development Program (CDP) in 1952, National Extension Service in 1953 as an extensive development programme. The Panchayeti Raj system was introduced to support the official level of CDP in 1957 as a recommendation from the B. R. Mehta Committee. Under location-specific and area-specific extension activities, Intensive Agricultural District Program (IADP, 1960); Intensive Agricultural Area Program (IAAP, 1964); High Yielding Variety Program (HYVP) (1966) and Farmers Training Centre (1967) were launched. To support these specific programmes organisationally, Training & Visit programme (T&V), a single line of command programme unlike CDP was initiated as recommended by the World Bank. This introduction of T&V system was very important milestone in the history of extension services in India. The basic aim of T&V was to diffuse and made adopted of the pool of technology already generated by agricultural research system. This system was first introduced in 1974–75 on a pilot basis in the Chambal, Command area of Rajasthan and Madhya Pradesh and based on positive feedback the project was further extended to whole country in phased manner. Till the end of the last century, it was the dominant paradigm of agricultural extension services replacing the CDP's multi-purpose approach by a single-line of command that focused on fulfilling the goal of national food security by increasing the production of major food grains.

In 1979, Integrated Rural Development Program (IRDP) was started with the component of social justice. The ICAR also launched the Technology Assessment Refinement Project-Institute Village Linkage programme (TARP-IVLP) in 1995 along with many other flagship and mission-mode programmes for technology transfer.

India got distinct impact from these bands of development approaches. The organisational structure of development from the grass-root level to National level was formed from the experiences of implementation of Community Development Programme (CDP) in 1952 and subsequent nation-wide extension of this programme as National Extension Service in 1953. The technological development approach impacted Green

Revolution in India and has been successful in transforming India to a food self-sufficient and food exporter country from food importer. The social justice programmes dragged numerous farm and rural families over the poverty line.

Critical evaluation of the previous programmes

Although all of these projects strengthened extension in their own right but criticized because of working in isolation, with weak linkages and intermittent partnerships. The research–extension link has been criticized for not absorbing or not using feedback from farmers and extension staff. As we know, Extension personnel and farmers are the passive actors, and scientists have very limited exposure to field realities (Reddy and Swanson, 2006; Swanson and Mathur, 2003; Birner and Anderson, 2007), so the constant feedback mechanism became very much crucial for effective extension delivery. Day-by-day, with the diversification of occupational avenues, the specific problems and constraints related to the specified group of people were started realised by the experts and policy makers (Singh *et al*., 2009) enumerated these as follows:

1. In the rain-fed areas the Training and Visit (T &V) extension system was not so much successful as in the irrigated areas in transferring the green revolution technology.
2. The presentation of T &V extension system enormously extended the quantity of village extension worker in the Department of Agriculture (DOA), bringing about a great monetary problem to the state governments. As the state government funds are taken for salary of the employee, so, most of the extension programs are overwhelmed by top down approaches.
3. Government gives more attention to food production for which the extension being commodity and supply driven, in comparison with an emphasis on crop diversity and income of the farm that is market driven.
4. Due to the intervention of green revolution technology the production of food increases but the price of the commodity decreases during 1980-90 which results in low farm income.
5. During 1960-80s the extension system mainly focused on the production of staple food crops and controlled by the Department of Agriculture (DOA). Due to this, the other line departments like Animal Husbandry (DAH), Horticulture (DOH), Fisheries (DOF), Sericulture (DOS), etc. had a shortage of extension staff, no programmes

conducted from the departments. For which there was no incorporation of programs in the departments (lack of farming system approach).

6. By the 1990s, the line departments centred on the dispersion of centrally funded assistance and inputs. Due to this the following effects raised: (i) the staffs of the line department became more liable to government rather than the farmers, (ii) as government was somewhat engaged in input supply, the government field staffs saw the private input dealers as contender than accomplices, (iii) due to more focus on central government schemes the need of extension to work with researcher decreases which show in the weakening of research-extension linkage.

7. Finally, due to the support of the sponsored schemes, extension offer a little focus on the arranging farmers into groups for empowering farmers.

Requirement of reformation in policy structure—Genesis of pluralistic models for extension delivery

On the backdrop of the previous criticism and failure of the existing extension delivery system, a huge reform was demanded which can broad-base the delivery mechanism to create balanced development to all land-based sectors, integrate extension programs across the line and other departments to avoid duplicity, link research and extension activities to deliver more appropriate technology, decentralize the decision-making to serve more to disadvantaged situations and provide opportunity to non-private extension agents to serve more intensively through convergence.

During the mid-1990s, the administration of India and the World Bank started investigating new ways to deal with expansion that would address these framework issues and requirements. This search ended with the genesis of a decentralized extension approach which would give more attention on agrarian enhancement and expanding farmer income and rural employment. The central institutional development that rose to address these framework issues was the Agricultural Technology Management Agency or "ATMA" model that was institutionalised at the district level to (i) coordinate extension programs across the line departments (i.e., to execute more of a farming systems approach), (ii) link research and extension activities within each district and converge extension efforts of all stakeholders (pluralistic approach against monopolistic), and (iii) decentralize decision-making through “bottom-up” planning procedures that would directly involve farmers and the private sector in planning and implementing extension programs at the block and district-levels. This model

was pilot-tried through the Innovations for Technology Dissemination (ITD) component of a World Bank supported, National Agricultural Technology Project (NATP) that got compelling in 1998 and finished up in June 2005. As a follow up on the accomplishment of ATMA model under ITD part of NATP the Govt. of India has started another Centrally Sponsored Scheme on Support to State Extension Programmes for Extension Reforms; and had financed the setting up of Agricultural Technology Management Agency (ATMA) in all 588 rural districts in India. The ATMAs are required to help the state extension framework by making it wider based and participatory for planning, implementing and monitoring the extension activities of a district.

The *Krishi Vigyan Kendra*, although first established in 1974 at Pondichery under the Tamilnadu Agricultural University but undergoing a number of conceptual modification and reforms emerged as the most vibrant extension window of Indian Council of Agricultural Research (ICAR) at the district level and also having the scope of addressing the previous reforms although in limited manner than ATMA.

Pluralistic extension system

Pluralism:

Many organizations are brought together at one platform in the efforts of delivering extension services to promote production and productivity.

Pluralistic extension is characterized by the combination of multiple public, private and mixed extension system and approaches to meet the different services, funding streams and sources of information in the agricultural system. Pluralistic extension includes extension services delivered by NGOs, Farmers Producer Organizations, Consultancies and Companies as well as involvement of public extension system (Sajesh, *et al*., 2018, Rivera and Qamar, 2003).

Pluralistic extension is a mixed approach of public and private extension system to deliver effective extension service and advisory work for the farmers.

According to Contado (2003), a pluralistic extension system is the contrast of a single, monopolistic agricultural extension service in a given country. It is conceived to address the diverse nature of the country's agriculture and the multiple needs and requirements for assistance of different farmers in different parts of the country.

Strengths of Pluralistic Agricultural Extension System

1. Address the needs of different hierarchical stakeholders (small, marginal and big farmers).
2. Effective utilization of resources.
3. Combined influence on TOT.
4. Widespread extension services as per the need of clients may attain.
5. Collaboration and partnerships also encourage speedy disbursed of technology and the input linkages.
6. Effective utilization of ICTs and its innovations.
7. Create competitive environment in providing services to farmers.

(Source: https://www.slideshare.net/RaviKn2/pluralistic-agricultural-extension-in-india)

Characteristics of Pluralistic extension

1. Co-existence of multiple, public, private and mixed extension systems and approaches.
2. It fosters a range of partnership and utilizes both public and private institutionalized resources.
3. Diverse funding streams and multiple sources of information.
4. Multiple extension approaches to meet the diverse needs of farmers.

Principles of Pluralistic extension

1. **De-concentration:** There is need to identify the varied extension services and to recognize the various providers of such services–e.g. public and private companies, private farmer associations, non-governmental organizations and (possibly) community-based associations. Government will need to answer such questions as: Who will be responsible for which areas, and for what purposes?
2. **Decentralization:** As local governments are empowered to run their own affairs, it is common to operate on the basis of an integrated district development plan. Agricultural planning priority is shifting from sector wide agricultural planning to higher-quality district agricultural development plans.
3. **A system for providing multiple services:** Extension managers and partners recognize that the quality of service provision can be improved through performance based contracts and that the choice of provider must be based on the comparative advantages of the public sector, private sector, and civil society. The best mix of

services can be identified for every situation, depending on the demand for and availability of services.

4. **Farmer empowerment:** Farmer organizations represent the voice of their clients, but they are also partners in extension when it comes to planning, allocating resources, M&E, and providing services. In pluralistic systems, downward accountability and user involvement make quality control possible only at the local level. Downward accountability of service providers to farmers becomes more important for quality control than upward accountability to financers.
5. **Outsourcing services:** Local governments (districts, communes, and so forth) are contracting in the services directly demanded by farmers in district agricultural development plans, based on the comparative and competitive advantages of the various service providers. This trend should improve synergy and complementarity in service provision.
6. **Partnerships:** Example of partnerships and linkages between agricultural advisory services and other actors in the innovation system and services include partnerships between advisory service providers and agricultural research agencies, agricultural chambers of commerce, microfinance organizations, and agro-processing services.
7. **Extension approaches.** A major challenge is to continue shifting extension from a top-down approach offering blanket, production-oriented recommendations toward a more interactive learning approach. The interactive approach provides room to differentiate among categories of clients, messages, and approaches. Extension officers play more of a facilitating role; based on their technical expertise, they stimulate learning among farmers (as in FFSs) and with other actors, particularly market actors. District extension systems need to be supported by provincial and national services and knowledge centres in case demand for knowledge services extends beyond the district level, as this is part of the new extension.

(Source: https://siteresources.worldbank.org/INTARD/Resources)

Actors in pluralistic extension system in India

Numerous extension agents right from central to village levels, from public to individually operated system and with mono-purpose to multi-purpose objectives are acting for the sake of development of common farmers, villagers and urban clients.

Public extension System in India: Public extension system consists of different departments at centre, state and district levels. The central level departments are mainly Department of Agriculture & Cooperation (DAC), Department of Agricultural Research and Education and Department of Animal Husbandry, Dairying & Fisheries. At the state and district level, there are different line departments for the improvement of agriculture.

Private Extension System: The private extension system includes agriculture consultants, private companies, agribusiness centres and input dealers. The extension agents in private extension system are helpful for the poverty reduction of the rural people, demonstrate their product in farmers' field and also facilitate crop loan.

Autonomous extension system: The State and Central Agricultural Universities (SAU & CAU) come under this category and are significant arm for advancing extension services in the States. While their primary command is formal degree programs in major agricultural and allied disciplines, they give extension services through the directorate of extension. ICAR also may be categorised under this group.

Extension system run by Non-Government Organizations (NGOs): About 15000 to 20000 NGOs are working in our country for the development of agriculture, empowerment of women and the socioeconomic condition of rural people. Some of the best NGOs like Professional Assistance for Development Action (PRADAN), Bharatiya Agro-Industries Federation (BAIF) and Action for Food Production (AFPRO) are providing extension services to the people. The major role of the NGOs in promoting the agricultural production, empowerment of the women, conservation of natural resources, poverty reduction, water resource management and livelihood development. The problems faced by the NGOs are mainly lack of financial resources, lack of trained staff, mismanagement of funds and limited area.

Extension system run by Farmers Organization (FPO/FPC): Farmer's organizations are mainly included farmer Producer Company, farmer producer organisation, farmers club, farmer interest group. They are formed with a group of farmers with common interest and concerns. The activities done by the farmers organization are procurement of inputs, disseminating market information, technology and innovations to the farmers, facilitating finance for inputs, quality control of the product. Some of the successful farmer's organisations are MAHAGRAPE (Grape Growers Association of Maharashtra), United Planters Association of Southern India (UPASI). They mainly conduct training, seminar,

group discussions and publish leaflets for the benefit of the farmers. The major limitations are lack of coordination among the members, lack of government support, lack of technical and managerial expertise.

Government-backed models of Pluralistic Extension Service in India

"Innovation in Technology Dissemination" (ITD) component of the World Bank funded National Agricultural Technology Project (NATP), which ran from 1998-2005, made a significance difference. This project implemented the Agricultural Technology Management Agency (ATMA)—a autonomous organisation at the district level, which reformed the traditional extension system to a very significant extent.

The extension model introduced by ATMA contained some of the key extension reforms being advocated by the World Bank, including the decentralization at the district, block and village levels, bottom-up participation of male and female farmers, diversification instead of mono focus on high-value crop, livestock and other products and pluralism involving both public and non-public institutions.

Krishi Vigyan Kendras (KVKs), the centrally funded another district level organization (although very limited in manpower and operational areas in relation to ATMA) also having scope to undertake convergence activities with ATMA and operationalize pluralistic and demand-driven extension approaches by its reorganized policy reforms in 2015.

Agricultural Technology Management Agency (ATMA)

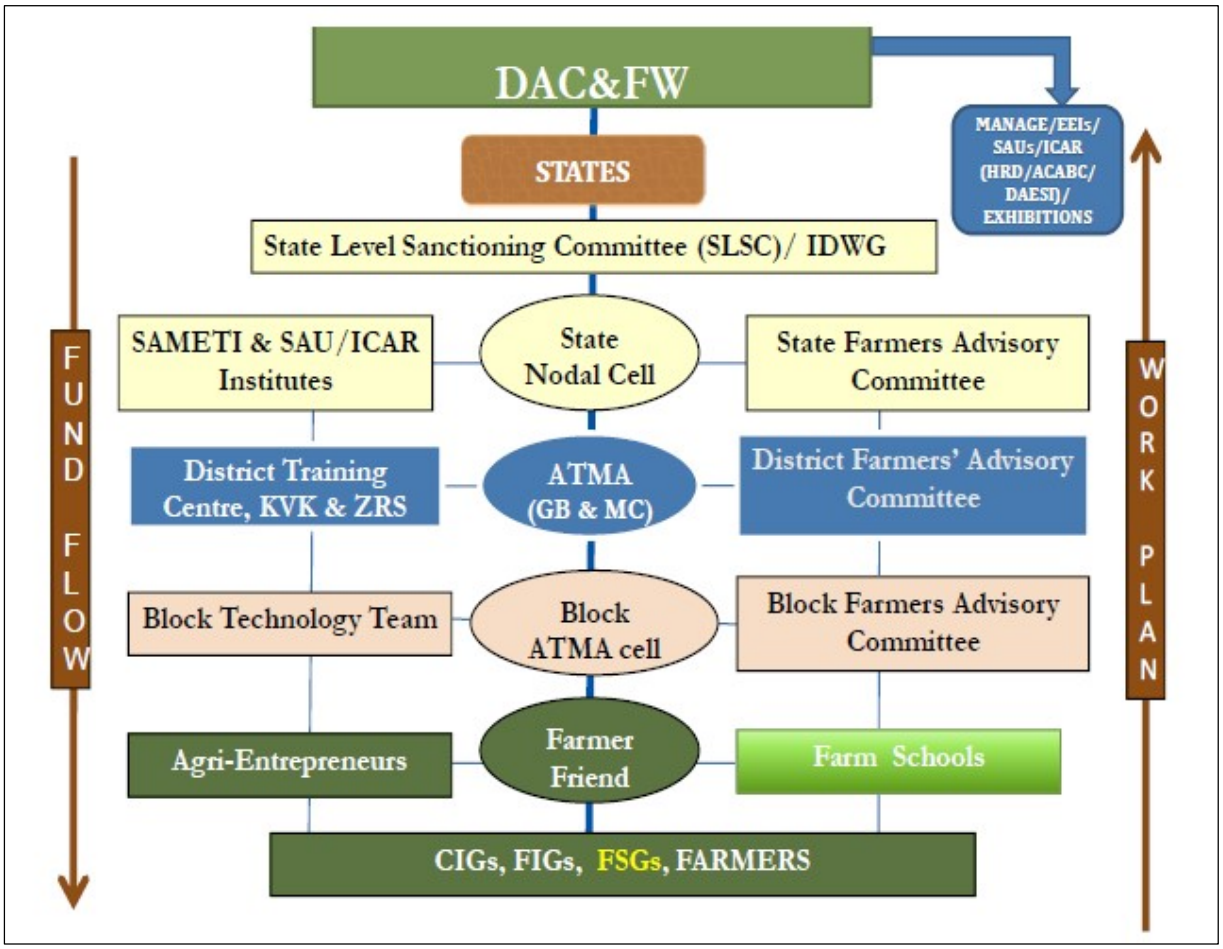
ATMA is registered society for transfer of agricultural technology and dissemination of information to the farmers at district level. The main aim of ATMA is to make extension system farmer-driven and farmer-accountable and to decentralize the decision making in agriculture. The ATMA has also good linkage with other line departments, KVKs, non-governmental organization, research organization, farmer producer organisations and organizations associated with agricultural development in the districts. At present, the Scheme is implemented in 676 districts.

The objectives of ATMA are:

- To strengthen research – extension – farmer linkages

- To provide an effective mechanism for co-ordination and management of activities of different agencies involved in technology adaption / validation and dissemination at the district level and below.
- To increase the quality and type of technologies being disseminated.
- To move towards shared ownership of the agricultural technology system by key shareholders.
- To develop new partnerships with the private institutions including NGOs.

ATMA model



Source: ATMA GUIDELINES, 2018 under Krishonnati Yojana)

Salient features of ATMA

- Multi-agency Extension Strategies: At least, 10% of allocation on recurring activities at district level is to be used through non-governmental sector viz. NGOs, Farmers

Organization (FOs), Panchayati Raj Institutions (PRIs), Para-Extension workers, Agri-Preneurs, Input Suppliers, Corporate Sector, etc.

- Farming System Approach: The activities specified in the cafeteria are broad enough to promote extension delivery consistent with farming systems approach and extension needs emerging through Strategic Research and Extension Plan (SREP).
- Farmer Centric Extension Services: The Cafeteria provides for group-based extension and it has necessary allocation for activities related to organizing and supporting farmer groups. In order to supplement these efforts, a provision for rewards and incentives to the best organized farmer groups has also been provided.
- Convergence: The SREP and SEWP are mechanisms for ensuring convergence of all activities in extension. At present, resources for extension activities are being provided under different Schemes of the Central/State Governments. It is mandated that the SEWP to be submitted by the State Governments shall specify the activities to be supported from the resources of other ongoing Schemes as well as from this Scheme. Convergence between Research & Extension is being established in the field as per a joint circular issued by DAC & ICAR.
- Mainstreaming Gender Concerns: Gender Budgeting enunciates that at least 30% of resources on programmes and activities are utilized for women farmers.
- Sustainability of Extension Services: At least, 10% contribution should be realized from beneficiaries with respect to beneficiary oriented activities.
- Community Radio Station: Community Radio Stations (CRS) have to be promoted in a big way to expand the reach of localised technologies to the farmers located within a radius of 20 to 50 Kilometers.
- Involvement of Agri Clinics and Agribusiness centers and DAESI trainees: The PD, ATMA may prepare an inventory of agricultural graduates trained under the scheme of Agri-Clinics & Agri-Business Centres and the list of agri-entrepreneurs established in the district by browsing MANAGE website (www.agriclinics.net) and DAESI trained input dealers. Agri-preneurs and DAESI trained input dealers can be appointed as Volunteer Specialists to support Farmer Friend in taking up various activities in the villages under their control including smooth functioning of Farm Schools and in imparting skill-based trainings. These agri-preneurs and DAESI trained input dealers should also act as para-extension workers.
- Use of hand held devices: States should use additional devices like smart phones and electronics devices. The basic idea behind these electronically generated farm wise

details is to ensure whether full yield potential of a crop has been achieved by the farmer (and what he needs to do to minimize the gap) and whether the farmers need to shift to some other crop. Gaps between the yield obtained and potential yield in that area and cost benefit ratio of better inputs (including irrigation) will also be conveyed while recording the data. Geographic Information System (GIS) based analysis of data shall be carried out for better macro level planning and also for micro level detailing for a village or even a field. Focus will be given on rain-fed areas where farmers get hit by vagaries of weather frequently. These devices will also be used to provide instantaneous online and offline information to farmers from the Farmers' Portal and other similar services.

- Support for ICT, Connectivity & Mobility: The modified ATMA Cafeteria has enhanced focus on use of Information Communication Technology (ICT). Experts of SAUs/KVKs, BTMs and ATMs at Block will be available on mobile phone, to provide information of immediate importance to Farmer Friend, FIGs and farmers. SMS (Short Messaging Services) alerts on weather, incidence of pest and diseases and other crop related important matters are already being sent through the SMS Portal for Farmers.Basic IT infrastructure has been provided to SAMETIs and State/District ATMAs, under the Scheme.

(Source: ATMA GUIDELINES, 2018 under Krishonnati Yojana)

Krishi Vigyan Kendra (KVK)

KVK is an essential part of the National Agricultural Research System (NARS). The main of KVK is to assess the location specific technology modules in agriculture and allied enterprises, through technology assessment, refinement and demonstrations. KVKs have been functioning as Knowledge and Resource Centre of agricultural technology supporting initiatives of public, private and voluntary sector for improving the agricultural economy of the district and are linking the NARS with extension system and farmers. 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 716 KVKs, out of which 498 are under State Agricultural Universities (SAU) and Central Agricultural University (CAU), 63 under ICAR Institutes, 103 under NGOs, 38 under State Governments, and the remaining under other educational institutions.

Objectives of KVK

- To organize on and off campus training programmes for farmers, rural women, youth, and officers of the Department of Agriculture to make them aware about the latest technologies in agriculture.
- To organize short and long term vocational training courses on vegetable, floriculture, beekeeping, dairying, mushroom, organic farming and protective cultivation etc. for rural youth for self-employment.
- To arrange front-line demonstrations and on-farm trials at farmer's fields on improved technologies and refinement of existing technology so as to suit the need of the farmer.

Mandates and Activities of KVK

- On-farm testing to assess the location specificity of agricultural technologies under various farming systems.
- Frontline demonstrations to establish 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 Knowledge and Resource Centre of agricultural technologies for supporting initiatives of public, private and voluntary sector in improving the agricultural economy of the district.
- Provide farm advisories using ICT and other media means on varied subjects of interest to farmers

In addition, KVKs produce quality technological products (seed, planting material, bio-agents, livestock) and make it available to farmers, organize frontline extension activities, identify and document selected farm innovations and converge with ongoing schemes and programs within the mandate of KVK. (Source: https://kvk.icar.gov.in/aboutkvk.aspx)

The problem Statement

Cooch Behar, a Northern district of West Bengal has also reformed its extension system by establishing ATMA at district level for delivering extension services. One *Krishi Vigyan Kendra* (KVK) is also in operation in the district. Under the discussed scenario, study on status of execution, level of achievement and quality of such extension approaches is

imperative in the district. Establishment of ATMA in the district level reorganized the extension service approach to pluralistic instead of mono-purpose extension approach. However, due to different organizational and operational constraints and also due to lack of awareness among the end-users the objective of pluralistic extension services is yet to achieve in its fullest extent. The KVK has been included to draw the policy reforms towards improvement in execution of pluralistic and demand-driven extension approaches in the district by taking a comparative analysis of operational scenario of both the organizations. In this backdrop, the study is initiated with the stated objectives.

Objectives of the study

1. To study the operational arrangement for execution of pluralistic extension services due to restructured policy reforms in Cooch Behar district.
2. To study the constraints faced during operationalisation of pluralistic extension services.
3. To assess the level of access of pluralistic extension services among the end-users.
4. To assess the quality and impact of these services as perceived by the end users.
5. To suggest a policy framework for improvement of these services in the district.

Limitations of the Study

- Time and resources are the primary limitations of the present study. The student researcher faced the constraints of time and resources in case of completing the study in particular state like West Bengal. However, the considerable cases and thoughts were exercised in making the study as objective and systematic as possible.
- The collection of information about the pluralistic extension service is a difficult task as the farmers have very less idea about the extension service.
- Primarily during data collection the investigator faced a challenge relating to the mobilization of farmers and officials in case of sharing information about pluralistic extension service as such type of study was not conducted in this area previously.
- It may however be recognised the findings of the study should not be generalised beyond the limits of the area under investigation as a result the extrapolation and generalisation of the findings are not full proof.

Concept and meaning of terms used in the Study

Pluralistic Extension Service

Pluralistic extension is characterized by the combination of multiple public, private and mixed extension system and approaches to meet the different services, funding streams and sources of information in the agricultural system. Pluralistic extension includes extension services delivered by NGOs, Farmers Producer Organizations, Consultancies and Companies as well as involvement of public extension system.

Access

According to American dictionary access means "the method or way of approaching a place or person, or the right to use or look at something".

Quality

Quality means the standard of something as measured against other things of a similar kind; the degree of excellence of something.

Implication

Implication means the conclusion that can be drawn from something although it is not explicitly stated.

Constraint

It is the element, factor, or subsystem that works as a bottleneck. It restricts an entity, project, or system (such as a manufacturing or decision making process) from achieving its potential (or higher level of output) with reference to its goal.

Convergence

Convergence can be explained as the strategic and coordinated policy decisions and program activities in multiple sectors to accomplish a common goal. It is a network of a multitude of actors, decisions, and resultant actions, which requires unloading of the various manners in which decisions and actions taken by specific actors can either enhance or impede the process**. (**Sajesh, *et al*., 2018). The convergence has divided mainly three types:

(i) Convergence at policy level: formulation of common agenda of stake holders and itsoperationalisation.

(ii) Resource based/Institutional linkage based convergence: focus on the convergence of human, financial and other resources of different programmes with common agenda.

(iii) Service based/Issue based convergence: meets the needs of people in a location for required services through input delivery, technology dissemination, training & capacity development , marketing, etc.

Restructured Policy reforms

Agriculture is changing day by day in the form of different needs of the farmer, farming condition. To change the economic viability of farmer, to promote marketing strategy, to develop support service in providing input materials in agriculture and other activities, there is need of restructuring in our policy. For that reason, the government implemented the new policy through various organization like ATMA and KVK at district level.

Review of Literature

CHAPTER-II

REVIEW OF LITERATURE

In any scientific investigation a comprehensive and relevant review of literature is essential. Its main function apart from determining the activities conducted before concerning the problem area is to provide an insight into the methods and procedures as well as create a basis for interpretation of findings. It also reflects a strong logistics to the conceptual and methodological backbone of the study. This chapter deals with the review of literature adopted from different authors and researchers who have conducted more or less similar type of studies in past. Efforts are made to review the available literature directly or indirectly associated with the present study and chronologically presents under the following domains:

2.1. Operational arrangement for execution of pluralistic extension services due to restructured policy reforms.

World Bank (2005) evaluated ATMA as highly satisfactory, with regard to rationalization and reorientation of public extension services, the ATMA and SREP proved to be a remarkably effective institutional and process mechanism for ensuring decentralization, inter-departmental coordination and demand/user focus by bringing together the district administration, line departments, local farmer representatives and NGOs.

Swanson (2006) proposed a new national extension strategy consisting of elements like shifting to high value crops or enterprises, becoming market driven, building social capital and moving to a decentralized extension structure. It was suggested that the strategy for agricultural development must be based on improving the real incomes and the quality of life of farming community.

Birner *et. al* (2009) in their study of developing framework for analysing pluralistic agricultural advisory services defined agricultural extension or agricultural advisory services, as the entire set of organizations that support people engaged in agricultural production and facilitate their efforts to solve problems; link to market and other players in the agricultural value chain and obtain information, skill and technologies to improve their livelihood.

Okorley *et al.*(2010) in their case study in Ghana reported that where other extension service providers, such as NGOs, input providers, and some government departments, exist and were functional, it was realistic to practice a cross-sector pluralistic extension to create the

capabilities needed to meet the broader livelihood security needs of farm households. Sustainable agricultural development in African could be improved through cross-sector pluralistic extension approach.

Prasad (2012) observed there were three dimensions of the challenge for demand driven extension services : first, is the structural design – organization, ATMA is the emerging one; second, the functioning of the system, where the commitment of the extension personnel and the subject-matter specialists are at stake; and third, the agricultural Extension Management.

Babu *et al*. (2013) reported the current status of agricultural extension system and associated research system in India. It was observed that the broad objectives of decentralization and farmers' participation had been achieved, but the reforms fall short in terms of increased accountability to farmers and being fully demand-driven. Inclusiveness of smallholder and marginal farmers had been achieved only partially. The group approach to extension remained weak and needs strengthening at the block and village levels. While the reform measures provided opportunities to the states in terms of flexibility, adaptability, and learning and thereby leading to the sustainability of reformed system, huge gaps in organizational and human capacity suggest the need for long-term capacity development strategy. The monitoring and evaluation system needs to go beyond process monitoring to the provision of inputs for learning and change. Incentives for motivating and retention of human resources need further attention to strengthen the current fragility of the system.

Gemo *et al.* (2013) reported that in the pluralistic extension system of Mozambique NGOs and the private commodity extension organisations played an important role together with the public extension system in supporting smallholder farmers. The private commodity organisations (cotton and tobacco private extension) had a main responsibility to ensure the main services related to cotton and tobacco value chains from input supply, technical assistance at field level, commercialisation of the produce, to processing and export. Inevitably, different extension approaches are followed by the private commodity organisations like the use of "tobacco farmer clubs" and the use of "local extension staff" to support smallholder tobacco and cotton producers respectively. Farmers procure facilitation services (for the farmer group process as well as interaction with input and market actors) through the various NGO's that were playing

a role in agriculture development. There was no extension platform at national level which takes care of the coordination and management of the pluralistic extension system.

Sathish *et al.*(2015) concluded in their study that the extension personnel of the Krishi Vigyan Kendras and Raita Samparka kendras of Raichur, karnataka perceived that Panchayat level was the important level of convergence area for activity wise implementation, selection of beneficiaries and sharing of benefits.

Mukherjee and Maity (2015) reported that long term commitments, capacity building of stake holders and a strong system for monitoring and evaluation were indispensible prerequisites for successful implementation of convergence. If all the extension organizations (Public and Private) were converged at different levels according to their relative advantage area, the days were not far when young farmers would be motivated and mobilized to adopt better technologies provided by coordinated and converged extension approach. Convergence of all these extension efforts through public private partnership effectively monitored by the government was a need of the hour.

Masangano *et al.* (2016) reported that the demand driven extension service system was effective but needs to be enhanced by formalizing the creation of additional structures at the village, group village and national level and to train and sensitize stakeholders in order to appreciate the system as well as to establish and start using it.

Yoga and Philip (2017) observed that the reforms in ATMA bring the convergence between the extension and research institutions for the effective delivery of extension services. It was also observed that during strategic research and extension plan the convergence was maximum whereas, convergence was least witnessed during monitoring and evaluation.

2.2. Constraints faced during operationalisation of pluralistic extension services.

Kumar *et al.* (2009) in their study reported that the extension functionaries involved in ATMA faced the important constraints were too many schemes and vacancies, less demonstrations on existing farming systems in the district and lack of technological training on different farming systems pertaining to agriculture and allied departments. Major suggestions offered were, positioning separate chairman to ATMA, project director shall be of group I officer cadre and plan early before season starts were the important suggestion for effective

implementation of ATMA programme. Additional attention must be given for filling up of existing vacancies and intensifying technological trainings to stakeholders involved in agriculture and allied departments.

Chauhan and Chauhan (2012) in their study reported that lack of promotion channel for the staff of KVK, many posts of the subordinate staff lying vacant, intermittent flow of the funds from organization to KVK head for carrying out mandated activities, pressure from the local politicians to fetch more benefits from KVK schemes to their own jurisdiction, funds for the extension activities and FLDs were not released in time by the council, frequent transfers of the staff from KVK to other department were the major constraints faced by the programme coordinators in managing the KVK. Further they opined that most of the staff was engaged with organizational work or say other than KVK activities, lack of adequate infrastructure facilities such as building, fencing, tube well, vehicle, unnecessary involvement of organizational head in taking decision regarding planning, execution and implementations of the KVK activities, inadequate required educational qualification among the subordinate staff, local organizational rules do not allow the KVK staff to work freely according to the guidelines of council are the other constraints experienced and expressed by the Programme coordinators to restrict their extension management ability.

Meena and Singh (2013) in their study reported that the important perceived constraints faced by the trainees were lack of practical trainings, lack of transport and inadequate infrastructural facilities at the KVKs.

Borah *et al.* (2013) reported that that the major problems faced by farmers' group under ATMA includes non-availability of different irrigation facilities, lack of special market for organic produce, lack of need based training, lack of electricity, non-availability of seed in the village at proper time, non-availability of own vehicle, unavailability of raw materials needed for storage construction, too costly infrastructure, unavailability of organic manures and high cost of pump sets and other equipments required for irrigation.

Kumar and Kaur (2015) reported that the major constraints faced by the Subject Matter Specialists of selected districts of Northern India were lack of location specific technologies, too much reporting work, price fluctuations in crops other than paddy and wheat , untimely supply of various inputs or budget , lack of freedom to disagree with decisions taken by superiors and coterminous nature of the job respectively.

Poonam and Rathore (2017) in their study reported that major constraints perceived by KVK managers for effective functioning of KVKs were scarcity of required number of staff in KVKs, lacking of advanced infrastructural facilities, insufficient funds for training and meals, delay in releasing grants from State Agricultural University, unwanted pressure from the local politicians and lack of residential facilities within the KVK premises for staff.

Chaturvedani *et al.* (2017) reported that the major constraints faced by the ATMA beneficiaries farmers of Chattisgarh were low mobility in rural areas, less training opportunity on improved technology, lack of education, lack of timely advice and guidance and climatic risk and uncertainty.

Kale *et al.* (2017) revealed that the major constraints faced by the KVK scientists in utilization of ICT in agricultural extension were lack of expertise to use ICT, slow functioning of internet, lack of trainings related to ICT use, lack of awareness among the farmers regarding ICT use for educational and agriculture purpose.

Das and Borua (2017) revealed in their study that the ATMA extension functionaries of Assam were facing infrastructural problems, lack of adequate training on new technologies, lack of knowledge on efficient and appropriate methodologies in extension activities, lack of coordination among the staff of ATMA and unavailability of agricultural inputs at affordable price to farmers.

Neelam and Kadian (2018) found that sporadic visits of the extension functionaries and lack of confidence in operating effective group without external support were the major constraints faced by the farmers of Andhra Pradesh. The prime most constraints faced by ATMA extensionfunctionaries of Andhra Pradesh were facing inadequate conveyance allowances, lack of adequate time to keep in touch with CIGs followed byextension persons under ATMA were not trained as trainers.

Neelam and Kadian (2018) founded that sporadic visits of the extension functionaries and lack of confidence in operating effective group without external support were the major constraints faced by the farmers of selected districts of Andhra Pradesh. ATMA extension functionaries were facing inadequate conveyance allowances, lack of adequate time to keep in touch with CIGs followed by extension persons under ATMA were not trained as trainers are the prime most constraints faced by them.

Ramannanavar and Nagnur (2019) reported that the major constraints faced by the SMSs were too many reports to be written (67.50%), difficulty in disseminating complex technology (61.66%), unavailability of timely budget (61.66%), lack of freedom of expression (57.50%), lack of interest among farmers (51.66%).

2.3. Assess the level of access of pluralistic extension services among the end-users.

Adhiguru *et al.* (2009) reported that the public extension system had been found to be accessed by only 5.7 per cent households. Only 4.8 per cent of the small farmers had access to public extension workers as compared to 12.4 per cent of large farmers. The sector-wise study on the type of information, sought had revealed that a majority of the farmers had sought information on seed (32-55%) in the cultivation sector; on health care (26-54 %) in animal husbandry; and on management and marketing (8-46 %) in fisheries. Regarding adoption of information by farmers, input dealers and other progressive farmers had depicted greater influence mainly due to easy and convenient access to these sources.

Mbo'o-Tchouawou and Colverson (2014) reported that lack of recurrent funding for supporting public extension, disorganized structures and limited coverage of extension services across rural regions were among the most pressing challenges that prevent them from accessing extension advisory services. Innovative EAS models have primarily focused on supporting rural women farmers' access to agricultural extension services, through a variety of mechanisms, but they had not been scaled for significant impact.

Rashid and Qijie (2016) reported that at present farmers in Bangladesh use a diversity of information sources originated mainly from public, private and NGO sectors. Unfortunately, farmers‟ access to formal sources like public and NGO service was still very limited, especially for women and small farmers. Government extension service had countrywide coverage and a sized skilled work force to provide extension service to all categories of farmers. Lamentably their service provision seemed to be more concentrated on large farmers rather than small farmers. NGOs could be credited for creating space for small and women farmer, but their institutional capacity for handling sophisticated extension service was very limited. Nonetheless, their coverage of extension service was limited based on location and number of clients. Private extension service was suffering severely from skilled manpower shortage and often criticized for high concentration in maximizing profit. Although, their service suffers from low efficiency, but

this service was effective and sustainable in terms of financial capacity. Extension service in Bangladesh was still in the backdrop in terms of client access, geographical coverage and efficiency. However, at the same time, this country was also in a propitious position to endow a pluralistic extension system, which probably could solve many shortcomings of present agricultural extension service.

Abdallah and Abdul-Rahaman (2016) in their study on "Determinants of Access to Agricultural Extension Services: Evidence from Smallholder Rural Women in Northern Ghana" found that that age square, farm size, group membership, time spent on the farm and access to fertilizer were the main factors that influence access to agricultural extension services. Other factors include farming experience and proximity to input store but these factors were negatively related to extension services. These thus confirm the importance of the personal and household attributes, farm/plot characteristics, socio-economic and institutional factors in accessing extension services.

Debnath *et al.* (2016) concluded that a majority of the clientele in Tripura had perceived medium level of relevancy, quality, usefulness and customer service of extension services. Still the state department of agriculture could improve the clientele satisfaction by providing more relevant, quality and useful services and by upgrading the customer services of the department. The department should put more attention on providing market information, input supply in time, farmers' group formation, need based and flexible services; whereas the extension personnel should be equipped with recent teaching materials and they should get proper incentives or rewards for their job performance. Cropping intensity as well as irrigation intensity of the farmers' field can be improved to increase the farmers' over-all income. The farmers should be encouraged to become more innovative and they should be regularly kept informed about the recent developments. The extension service commitment of the farmers could be improved through proper advisory services on time. Major problems faced by most of the clientele were timely availability of extension personnel, lack of inter-agency cooperation both in program planning & implementation and lack of use of mass media channel by the extension personnel etc. could be reduced for providing need based advisory services.

2.4. Assess the quality and impact of these services as perceived by the end users.

Rivera (2004) revealed that exciting reforms underway in many countries were attempting to make extension services more relevant and effective, but the reform process would be a long one. Government and donors would need to stay the course to ensure the evolution of new institutional approaches and foster an appropriate division of labor between public and private sectors and civil society.

Bahal *et al*. (2006) reported that expert system of extension was planned and designed in such a way that it would provide the demand-based information to the millions of the farmers efficiently through website even in the remote corners of the country at the same time and was entirely different from the conventional system of extension in terms of efficiency, accuracy, precision, decision-making and also considering the cost and benefit of the technology.

Birner and Anderson (2007) revealed that various options for providing and financing agricultural advisory services, which involve the public and private sectors as well as a third sector comprising non-governmental organizations and farmer-based organizations. The market and state failures, and the "community" failures (failures of non-governmental and farmer-based organizations) inherent in existing models of providing and financing agricultural extension services and then outline strategies to address those failures and make extension demand-driven. Although the framework proposes a wide range of strategies to make agricultural extension demand-driven, it is less specific in addressing the challenges inherent in those strategies.

Singh *et al. (*2009) revealed that due to the impact of ATMA financial resources, infrastructure to facilitate training quite good according to the farmers. It was also observed that scientists had become more responsive to needs of farmers and have sharpened their focus of research to meet location-specific requirement of different farmers. There had been a considerable improvement in adoption of new technologies and farm practices by all categories of farmers.

Meena and Bhati (2010) reported in their study on impact of KVK's training on knowledge and adoption of crop production technologies in Srinagar that that Krishi Vigyan Kendra trainings were effective and significantly increased the knowledge levels of farmers about cotton production technology. The areas in which knowledge gained recorded high include

improved varieties, seed rate, use of manures and fertilizers, plant spacing etc. Regarding adoption of recommended practices of cotton production, Krishi Vigyan Kendra trainees reported 25 to 30 percentage of adoption than the pre-training season. Favourable response was noticed towards different Krishi Vigyan Kendra trainings by the trainees. Overall it could be concluded that trainings conducted by ZARS-KVK were helpful to trainees in gaining knowledge which ultimately increased the adoption level in cotton production technologies.

Jadallah *et al.* (2011) reported that decentralization and pluralism in agricultural extension service encourages more contact and open communication to build respect and trust among the staff, gives a level of flexibility to field staff to design their location-specific extension activities with farmers and effective coordination among various organizations. Further and concrete studies were needed because of complexity of the impact evaluation; it was necessary to combine studies using different perspectives in order to increase the scope and rigor of results.

Singh *et al.* (2013) reported that the ATMA model at the district level, would continue to play a prominent role in serving the larger group of small and marginal men and women farmers as well as landless laborers and the other actors involved in the extension/transfer of technologies—such as NGOs, farmer organizations and the private sector (both corporate and informal)—would actively complement/supplement the efforts of the public extension agency.

Sahu *et al*. (2013) in their study on impact of ATMA on socio-economic status of tribal farmers reported that the mechanical power, animal husbandry, house type, home related items, possession of other assets and annual income were more in case of ATMA beneficiaries as compared to non-beneficiaries. Majority of the beneficiaries acquired positively higher level of productivity as compared to nonbeneficiaries which shows the positive impact of ATMA on socio-economical aspects of ATMA beneficiaries. Majority of the ATMA beneficiaries (65%) were found to have medium socio-economic status.

Chowa *et al*. (2013) reported the farmers in Malawi experienced that Pluralistic extension system presented a rich and complex picture that could not be described as completely demand driven or responsive. Due to the poor coordination of the actors(Public, Private, NGO) with

farmers and weakened farmers' organization to engage the different actors were the reasons of failure of the system in Malawi.

Asiwal *et al*. (2015) on their study in Sikar district of Rajasthan reported that before KVK most of the farmers of the adopted villages were using uncertified seed without treatment and not adopting improved practices resulting in low production of moong bean. But after contact with KVK and conducting the FLDs and trainings in adopted villages the change in extent of adoption of new technologies were increased up to 29.16 per cent in case of HYVs, 29.13 per cent balance dose of NPK, 25.00 per cent in use of zinc sulphate, 21.87 per cent in seed treatment and 18.75 per cent increased in proper seed rate and use of insecticides. The percentage of increase in production of FLDs ranged from 19.36 to39.69 per cent with additional net profit ranged fromRs.15700 to Rs. 35350/- over local plots. Similarly, horizontal spread and adoption of technology among 280farmers of nearby 24 villages in more than 200 hectare area which created greater curiosity and motivation among other nearby farmers showed positive role of KVK in enhancing the production and profitability of moong bean with improvement in socio-economic status of the farmers.

Bar (2015) revealed that KVK training had made significant impact in increasing the knowledge level of the tribal farmers and farm women on various farm activities of selected tribal districts of Odisha. At the same time, average gap of 33.00% indicated that the tribals were still lacking in adequate knowledge. More knowledge gaps were observed on farm forestry, fish farming, income generating activities, farm mechanization, animal production and horticulture in comparison to crop production. Socio-economic attributes of the respondents had not much influence in increasing the knowledge level of respondents.

Chhodvadia *et al.* (2016) revealed that the respondents of Amreli district of Gujrat was better impact on extension indicator like extent of awareness (ranked first), spread of technology (ranked second) followed by change in attitude (ranked third), gain in knowledge about technology and package of practices (ranked fourth), Improvement in work performance/skill (ranked fifth) and increase in SHGs/Figs, Formation/ establishment of co-operative (ranked sixth). In case of technological indicators, introduction of new varieties ranked first followed by rank two was increase in production rank third is decrease in Yield gap. while extent of adoption,

increase in income and creation of infrastructure facility stood ranked fourth, where as marketable farm produce ranked five, opening of farm school ranked sixth, expansion of enterprises and introduction of new enterprise ranked seventh, increase in yield/ productivity ranked eighth, generation of employment ranked ninth and increase in area stood rank tenth.

Sharma *et al.* (2017) concluded in their study reported that there was a positive impact of ATMA on productivity of various crops in Mandla and Dindori districts of Madhya Pradesh. It was also evident from the result that there was positive and good impact found in ATMA respondents in terms of increasing the area and increasing the productivity and production of crop.

Singhal and Vatta (2017) reported that in Jodhpur district of Rajasthan the KVK contributed positively in enhancing the adoption level of farmers in various aspects of agricultural production technologies. KVK practices created great awareness and motivated the other farmers to adopt appropriate production technologies and due to the interventions of KVK scientists in training, demonstrations activities, on farm trials and other extension activities helped in enhancing the enhancing the knowledge level of farmers which in turn led higher adoption of agricultural production technologies.

Katole *et al.* (2017) concluded that KVK's trainings were able to bring significant changes in the level of knowledge and adoption among farmers. Training and guidance given to trainees by KVK had played key role in influencing technological changes besides other managemental tasks, therefore having positive impact. Farmers with progressive attitude were always optimistic and try to get maximum information and benefit from KVK trainings and likely to get new ideas to change their outlook towards life, which made them more innovation prone.

Imtiwalling *et al.*(2017) in their study on "Impact of agricultural technology management agency on rural economy of Nagaland, India" reported that the impact of ATMA to the beneficiaries on average income is found to be highest at Forest and Plantation (Rupees 8593.75/-) followed by Crop production (Rupees 7410.75/-), Fishery (Rs.6500/-)Animal Husbandry (Rupees 5186/-) others (Rupees 5175/-), and Business (Rupees 1962.50/-), on average per year. The least impact was on Service (Rs.750/-) on an averageper year. On an

average family income of the beneficiaries increased by Rupees 35127.98/-. The study revealed that on an average beneficiary family had a total income ofRs.209563.75/- per annum whereas for a non-beneficiary was found out to be Rs. 159636.56/-. This indicated that beneficiaries had better income compared to non beneficiaries. In all the enterprise there had been impact of employment in numbers has been positive which reveals that ATMA had a positive impact on employment generation to the beneficiaries and their family.

Muzenda *et al*.(2018) revealed that pluralistic and demand driven extension significantly improves performance of communal farmers in terms of cropped area and yields in Gokwe South Ward 23, Zimbabwe. The incomes from farmers improved significantly. According to the data provided, the number of extension service providers operating in the area should be increased so that they conquer with the number of farmers in the area. This could also be increased by providing resources such as motorbikes, bicycles and other stationary for service provision. This also improves communication between farmers and other service providers, and this helps in addressing challenges faced by farmers well in time. Capacitation of extension agents in terms of knowledge gaps also improves and increases farmer productivity.

Christopher *et al.* (2018) revealed in their study that Krishi Vigyan Kendra plays positive role in enhancing the adoption behaviour of maize growers in Bettiah block of West Champaran district of Bihar. The trainees respondents had high level of adoption in comparison of non-trainees respondents. It was shown that 61.25 per cent trainees respondents had medium level of adoption while, in non-trainees categories 52.50 per cent respondents had lowest level of adoption.

Subba and Mukhopadhyay (2019) revealed that ATMA interventions were having positive and significant impact on improvement of the knowledge and skill level of the respondents of all the selected districts of Sikkim in agriculture / horticulture as well as animal husbandry. Positive impact of ATMA interventions were also observed in case of adoption behavior of the respondents. Changes in respondents' knowledge, skill and adoption pattern were also found to be significant before and after participating in ATMA programme.

Materials and Methods

CHAPTER-III

MATERIALS AND METHODS

Research is a systematic and intensive process of carrying on the scientific method of analysis. According to Creswell (2008) "Research is a process of steps used to collect and analyze information to increase our understanding of a topic or issue". The scientific study of any problem requires that a researcher should follow appropriate methods and procedures in order to reach reliable, unbiased and objective inferences. Methodology is the study, description, explanation and justification of methods. This chapter is of paramount requirement which deals with various procedures, designed to the extent to which it is planned before conducting the enquiry and the extent to which the method is employed specifically as per the objectives are set for making decisions to evaluate and to draw inference. The present study is delineated to know the operationalization structure, access, quality and implication of pluralistic extension services with the help of structured research methodology adopted for the purpose of operationalising and developing a conceptual framework. However, the entire discussion has been made under the following sub-themes:

3.1 Conceptual framework and design of the study
3.2 Selection of study area and individual respondents
3.3 Data collection tools- description of the schedule
3.4 Selection and measurements of variables
3.5 Data processing, tabulation and procedure used for analysis
3.6 Statistical Methods Used

3.1 Conceptual framework and design of the study

After realising the failure of the Training and Visit extension, the dominant model for public extension delivery, a huge reform became inevitable to make the system more broad-based and pluralistic in nature to create balanced development to all land-based sectors, to integrate extension programs across the line and other departments to avoid duplicity, and to provide opportunity to non-private extension agents to serve more intensively through convergence. In 2005, Govt. of India introduced Agricultural Technology Management Agency (ATMA) model in district level that has scope to address these methodological reforms. In 2015, the Zonal Project Directorates of ICAR extension mechanism was also

renamed as Agricultural Technology Application Research Institute (ATARIs) and reorganised functionally to address these reforms also. ATARIs implement their programmes through the *Krishi Vigyan Kendras* (KVKs) in district level. So, the present study purposively selected these two types of public/autonomous extension delivery systems to explore their operational arrangements for supporting pluralistic extension services, assess their level of access among the end users and to assess the quality of such services and impact achieved out of this.

A pluralistic system operate through combining multiple public, private and mixed extension systems, different funding streams and sources of information in one platform which can be achieved by convergence of opportunities and services of different other organizations. Pluralistic system is also expected to fulfill the diverse and multiple needs and requirements of farmers. An assessment on level of convergence with different organizations and existing level of expertise in the study organizations (ATMA & KVK) can scale the operational arrangements for practicing pluralistic extension services by the organization.

Cooch Behar district is having both ATMA and KVK providing pluralistic extension services to their command areas through their own expertise and with convergence activities with different other organizations. At present, the ATMA in the district is working through 12 block units to provide their services. As like the activities of KVK is extended to four blocks at present. The present study explored the level of access, quality and implication of the pluralistic extension services from these study units. The study adopted exploratory research design to know the operational framework of the organizations. The study also adopted the **ex-post facto** and **after with control** design to know access, quality and impact of the pluralistic service and realize the actual impact of these systems. The study respondents were selected from both beneficiaries (those who got assistance from ATMA or KVK for at least once in last 3-4 years) and non-beneficiaries of KVK and ATMA to compare and assess the penetration of pluralistic service in the district.

3.2. Selection of study area and individual respondents

3.2.1 Sampling Frame:

The study was undertaken in two consecutive phases. Phase-I undertook official level study for assessing the expertise, level of convergence and constraints faced to execute pluralistic services, and phase-II conducted study on the end users to assess the access, quality of service and implications from pluralistic services due to restructured policy reforms.

Selection of Study Units

According to restructured policy, ATMA and KVK have scope to provide pluralistic services by convergence with other actors. ATMA in Coochbehar district is working in twelve blocks (Cooch Behar-I & II, Mathabhanga-I & II, Dinhata-I & II, Tufanganj-I & II, Sitalkuchi, Sitai, Mekhiliganj and Haldibari) in the district and KVK intensively working in four blocks (Cooch Behar-II, Tufanganj-II, Mathabhanga-II and Dinhata-II, although their network is extended to whole district) at present. Both ATMA and KVK work in a village/cluster area for a period of around 3 to 4 years and shift to another area in the block/district. Considering this spatial expansion of ATMA and KVK, the units of study was selected on random sampling basis (**one** out of **four** blocks of KVK represented by purposively selected adopted village in the block, and **three** out of **twelve** blocks of ATMA represented by a purposively selected adopted village/cluster in the block for each) as follows:

- KVK unit-Dinhata-II (Name of village: *Durganagar*)
- ATMA Unit-I- Cooch Behar-I (Name of village: *Hawargari*)
- ATMA Unit-II-Cooch Behar-II (Name of village: *Petbhata Chandanchowra*)
- ATMA Unit-III- Mathabhanga-I (Name of village: *Daluarpar*)

Selection of officials for Stage-I study

All the officials (KVK and ATMA study units) from the selected study units were selected which include officials from line department, ATMA functionaries viz. ATM and

BTM, Sr. Scientist and Head of KVK and Subject Matter Specialists of KVK. All total 28 officials were selected for the purpose.

Selection of end users

Selected study units are working in selected villages/clusters for a period of last 3-4 years and covered around 50 percent eligible families for service provisioning as beneficiary. So, from selected village/cluster 25 beneficiaries and 25 non-beneficiaries have been randomly selected. A total of 200 respondents were selected.

3.2.1 Description of Study Areas

3.2.1.1 The District Cooch Behar

Geography

The district lies between $25^0$57'40" and $26^0$32'20" North latitude and between $88^0$47'40" and $89^0$54'35" East longitude with 3,38,700 ha geographical area. Cooch Behar is located in the northeastern part of the state and bounded by the district of Jalpaiguri and Alipurduar in the north, Dhubri and Kokrajhar district of Assam in the east and by Bangladesh in the west as well as in the south. The district forms part of the Himalayan Terai of West Bengal. Total reporting area – 331565 ha, forest area - 4256 ha, area under non-agriculture use – 69431 ha, barren and uncultivable land – 263 ha, permanent pasture and other grazing land- 8 ha, land under miscellaneous trees/groves – 5800 ha, cultivable waste land - 286 ha, fellow land other than current fallow - 55 ha, current fallow – 855 ha, net area sown -250611 ha.

Climate

Annual Rainfall – 3200 to 3300 mm, agro-climatic region- eastern Himalayan region - 2, the climate of the district is characterized by a very high level of humidity and abundant rainfall. The temperature is hardly ever excessive. The flora here constitutes, among others, palms, bamboo, creepers, ferns, orchids, aquatic plants, fungi, timber, grass, vegetable, fruit trees, etc.

Topography

Cooch Behar is a flat region with a slight southeastern slope along which the main rivers of the district flow. Most of the highland areas are in the Sitalkuchi region and most of the low-lying lands lie in Dinhata region. The rivers in the district of Cooch Behar generally

flow from northwest to southeast. Six rivers that cut through the district are the Teesta, Jaldhaka, Torsha, Kaljani, Raidak, Gadadhar and Ghargharia.

Fig 3.1- Position and map of Cooch Behar district

Economy

The economy is solely dependent on agriculture. The inland marketing of the agricultural products mainly supports the economy of Cooch Behar. However, to supplement the agriculture-based economy, some measures have been taken up to ensure growth in the industrial sector. As the district is primarily agrarian, the agro-based industries are in the first priority.

Demographics

According to the 2011 census, Cooch Behar district has a population of 2,822,780 with population density of 833 inhabitants per square kilometer (2,160/sq mi) and population growth rate over the decade 2001–2011 was 13.86 per cent. Koch Bihar has a sex ratio of 942 females for every 1000 males, and a literacy rate of 75.49 per cent. As per census reports-2001, cultivators male: 2,77,339, female: 1,15,222 and total: 2,85,426.

Agricultural Scenario

Cropping intensity – 204 per cent, total irrigated area - 130416 ha., agro-climatic zone – Terai, Teesta, Alluvial, no. of agricultural sub-divisions – 4, no. of agril. block – 11 (tufanganj block consisting of tufanganj-I &II panchayet samiti), no. of small farmers - 50748 nos., no. of marginal farmers - 249437 nos. Almost 85-90 per cent of the total population depends on agriculture. In spite of several obstacles like poor soil status, acidity, lack of irrigation facilities, adoption of new improved technologies, inclusion of different high yielding varieties and hybrid varieties through different on-going schemes like ATMA, NFSM, RKVY etc. the production and productivity of different crops are raising keeping pace with the increasing demand of population. No. of regulated market – 6, no. of hats – 253, no. of cold storage - 12 (with storage capacity of 16, 11, 423.05 qt), no. of input dealer – 1500, no. of farming families: 3, 27, 127, consumption of fertilizers - 52000 m.t, nitrogenous fertilizers - 30.2 (‘000mt), phoshatic fertilizers - 12.2 (‘000mt), potashic fertilizers - 9.6 (‘000 m.t).

Cooch Behar KVK

Cooch Behar KVK was established in April 2004 from ZARS-KVK, is vested with the responsibilities to bring forth agriculture vis-a-vis rural development in the blocks of Cooch Behar district. As a basic pre-condition to work for the rural people, KVK has to analyse strength, weakness, opportunities and perceived threats of the adopted villages. Presently KVK is well-linked with district line departments and farmers’ club of the district.

Cooch Behar KVK is composed of one senior scientist & Head, 4 subject matter specialists, two programme assistant, one stenographer, one farm manager, one accountant, two drivers, and two skill supporting staff.

ATMA units of Cooch Behar

District Level: - The Agricultural Technology Management Agency (ATMA) is an autonomous institution set up at district level to ensure delivery of extension services to farmers. ATMA Governing Board is the apex body of ATMA which provides overall policy direction. ATMA Management Committee (AMC) is the executive body looking after implementation of the scheme. District Farmers Advisory Committee (DFAC) is a body to provide farmers' feedback for district level planning and implementation. With dedicated staff provided for the ATMA, it will continue to be the district level nodal agency responsible for overall management of agriculture extension system within the district, including preparation of Strategic Research and Extension Plan (SREP). ATMA is responsible for coordination and management of agricultural extension related work in Cooch Behar. ATMA Cooch Behar consisting with five core staff, under the overall supervision of Project Director of ATMA, Cooch Behar. The Project Director of ATMA, Cooch Behar shall report to the District Magistrate & Chairman of ATMA, Cooch Behar. The two Deputy Project Directors, Computer Programmer & Accountant-cum-Clerk would work under the administrative control of Project Director of ATMA, Cooch Behar.

Block Level: - The Farm Information & Advisory Centre (FIAC) consisting of Block Technology Team (BTT) comprising officers of agriculture and other allied departments within the block. Block Farmers Advisory Committee (BFAC) is a group exclusively consisting of selected farmers of the block. They will prepare the Block Action Plan (BAP) and provide necessary extension support within the Block in its execution. Block Technology Manager (BTM) is provided in each Block to co-ordinate the ATMA related activities of the BTT and BFAC. BTM will work under the overall supervision of the BTT Convener for all ATMA related activities at the Block level. On an average three Assistant Technology Managers (ATMs) are to be placed in each Block exclusively for delivery of extension services in agriculture and allied sectors as per priority areas for various Blocks. Block Technology Manager (BTM) is provided in each Block to co-ordinate the ATMA related activities of the BTT and BFAC. BTM willwork under the overall supervision of the BTT Convener for all ATMA related activities at the Block level.On an average three Assistant Technology Managers (ATMs) are to be placed in each Block (2 to 4 depending on size of the Block) exclusively for delivery of extension services in agriculture and allied sectors as per priority areas for various Blocks.

Cooch Behar-I block

The block Cooch Behar-I consists of 15 Gram Panchayats (GPs) and 149 villages in his area of operation. The total geographical area of this block is 362.42 sq. km. The net cultivable area is 23,899ha.The main sources of irrigation are river lift irrigation (7), deep tube well (10), shallow tube well (1107). The soil condition is sandy loam and the climate is modest dry with moderate rainfall.The total population of this block is 258564(male-146298 and female-138266). Among this population the total no. of Schedule Caste and Schedule Tribe population is 96082 and 886 respectively. The sex ratio is 945:1000 of the block and the child sex ratio is 954:1000. The percentage of child population in respect of total population is 15.60%. The literacy rate (excluding 0-6 year's population) of this block is 67.98%. The total no. of literate is 163,277 (male- 95,668 and female- 67,609). Among this 18,185 people are associated with agricultural labour.

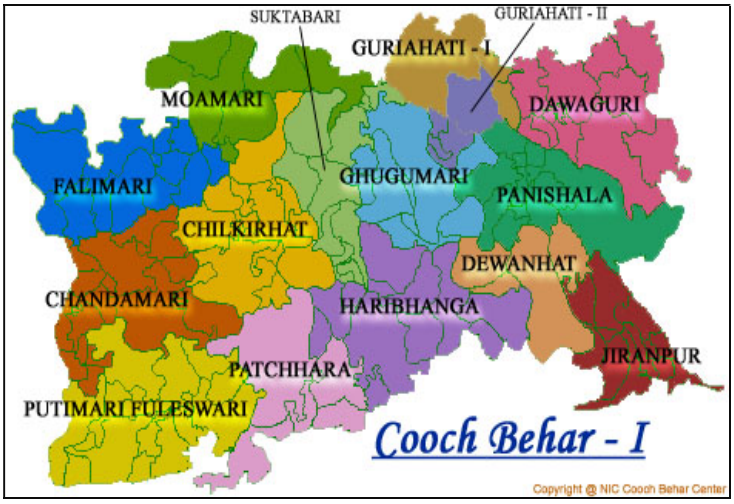


Fig 3.2: Map of Cooch Behar-I block

The Village Howaragari—the selected village from the block

The village Howaragari is situated 12 km away from block headquarter Cooch Behar (it is also the district headquarter). Total number of household is 725. The total population of Howaragari is 3247 (male- 1692 and female- 1555). The total Schedule Caste population is 178 (male- 95 and female- 83).

Cooch Behar-II block

The block Cooch Behar-II consists of 13 Gram Panchayats (GPs) in her area of operation. The total geographical area of this block is 362.36 sq. km. The net cultivable area is 24,011 ha. The agricultural land is 18,789 ha. The total irrigated area is 9811 ha. The main

sources of irrigation are river lift irrigation (10), deep tube well (7), shallow tube well (718). The soil condition is sandy loam and the climate is modest dry with moderate rainfall.The total population of this block is 2,98,163 (male-1,54,011 and female-1,44,152). Among this population the total no. of Schedule Caste and Schedule Tribe population is 1,19,479 and 2,904 respectively. The sex ratio is 936:1000 of the block and the child sex ratio is 960:1000. The percentage of child population in respect of total population is 14.49%. The literacy rate (excluding 0-6 year's population) of this block is 74.56%. The total no. of literate is 1,90,093 (male- 1,09,694 and female- 80,399). Among this 20,221 people are associated with agricultural labour. No. of below poverty line family of this block is 31,226.

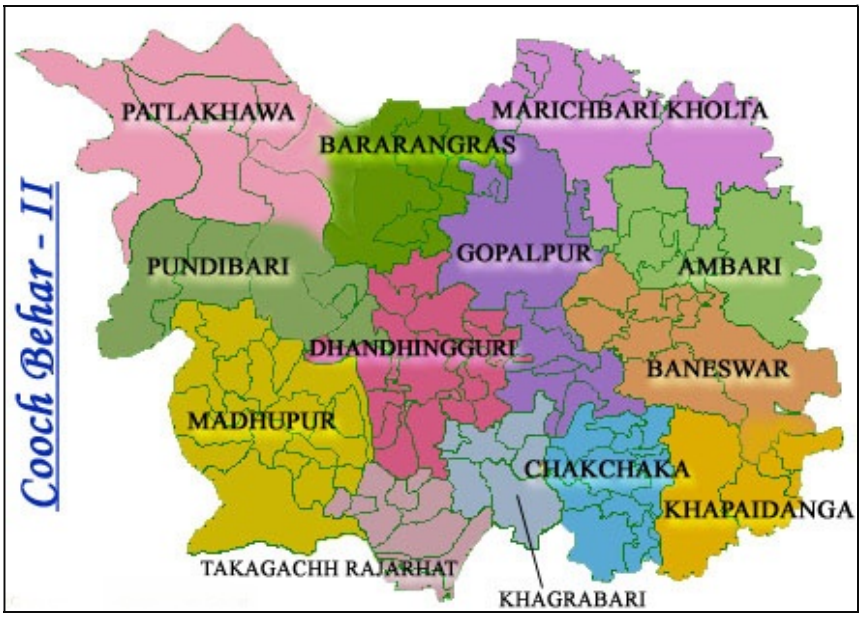


Fig 3.3: Map of Cooch Behar Block-II

The Village Petbhata Chandanchowra—selected village from Cooch Behar-II

The village Petabhata Chandanchowra is situated 2km away from block headquarter Pundibari and 15 km from Cooch Behar. Total number of household is 387. The total population of is 1614 (male- 845 and female- 481). The total Schedule Caste population is 481(male- 258 and female- 223).

The block Mathabhanga-I

The block Mathabhanga-I consists of 10 Gram Panchayats (GPs) in her area of operation. The total geographical area of this block is 314.50 sq. km. The net cultivable area is 23509 ha. The main sources of irrigation are river lift irrigation (7), deep tube well (2),

shallow tube well (90). The total population of this block is 1,86,683 (male-96,031 and female-90,652). Among this population the total no. of Schedule Caste and Schedule Tribe population is 50 respectively. The sex ratio is 944:1000 of the block and the child sex ratio is 965:1000. The percentage of child population in respect of total population is 16.69%. The literacy rate (excluding 0-6 year's population) of this block is 60.81%. The total no. of literate is 94,577 (male- 58,254 and female-36,323). The total no. of agricultural labourers is 13,472.

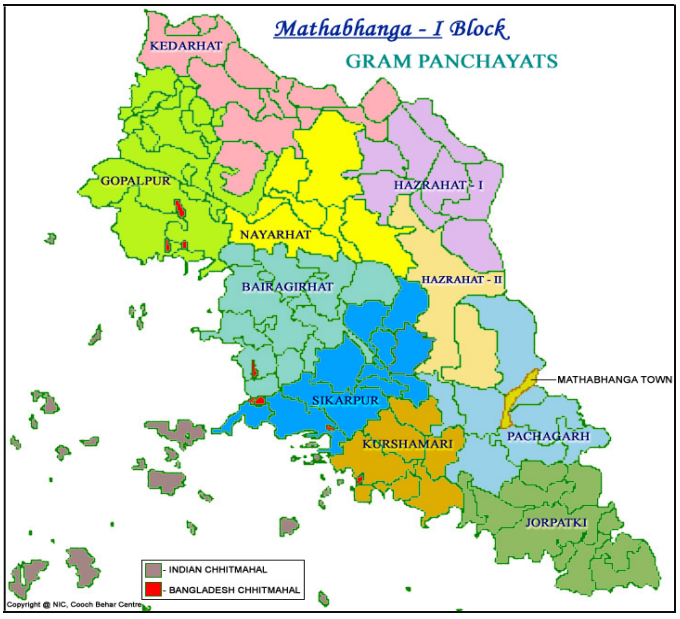


Fig 3.4: Map of Mathabhanga-I block

The Village Duluarpar—selected village from Mathabhanga-I

The village Duluarpar is situated 7 km away from block headquarter Mathabhanga and 25 km from Cooch Behar. Total number of household is 669. The total population of is 2988 (male- 1513 and female- 1475). The total Schedule Caste population is 2551(male-1296 and female- 1255).

Dinahata-II block

The block Dinhata-II consists of 12 Gram Panchayats (GPs) in her area of operation. The total geographical area of this block is 103.30 sq. km. The net cultivable area is 18626 ha. The main sources of irrigation are river lift irrigation (18), deep tube well (8), shallow tube well (1290). The total population of this block is 205391 (male-104443 and female-100948). Among this population the total no. of Schedule Caste 82324 and Schedule Tribe population is 843 respectively. The sex ratio is 967:1000 of the block and the child sex ratio is 983:1000. The percentage of child population in respect of total population is 15.10%. The

literacy rate (excluding 0-6 year's population) of this block is 66.57%. The total no. of literate is 116,080 (male- 67,841 and female-48,239). The total no. of agricultural labourers is 19,830.

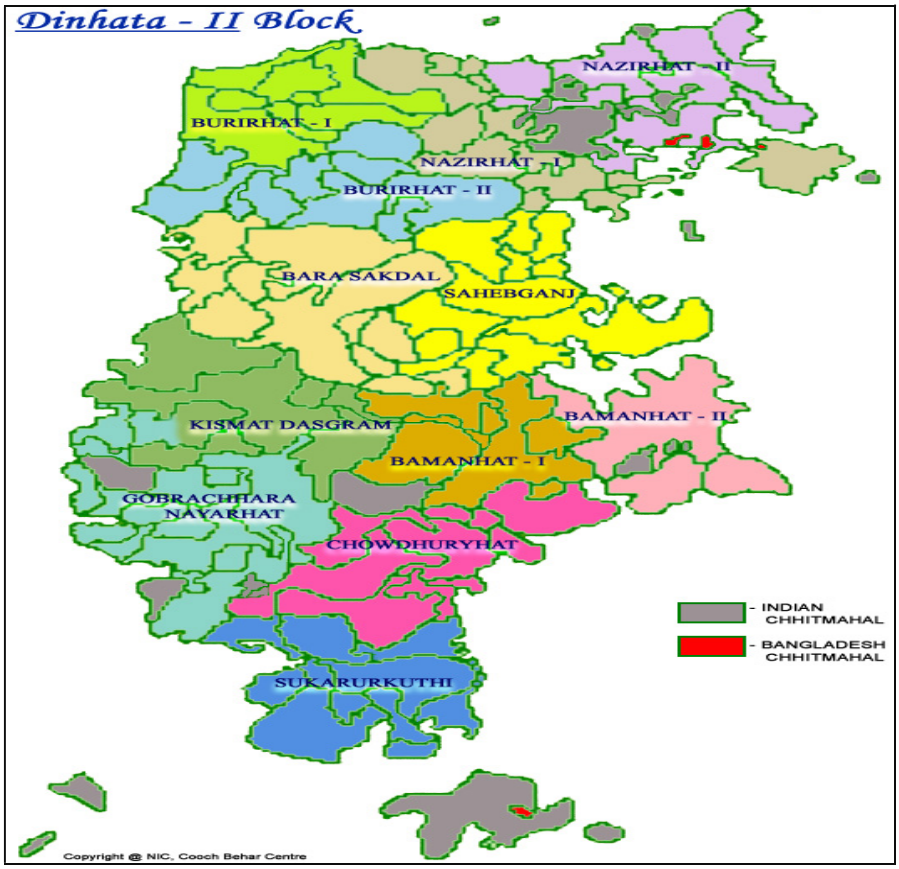


Fig 3.5: Map of Dinhata-II block

The Village Durganagar

The village Durganagar is situated 15 km away from block headquarter Dinhata-II and 53 km from the district Cooch Behar. Total number of household is 586. The total population of is 2191 (male- 1139 and female- 1052).

Data collection tools- description of the schedule

The present study considered qualitative and quantitative data collected mainly from primary sources. Primary data were collected through discussion, observation, group and individual interview schedule.

3.2.2 Pilot Study

Before conducting the actual study, a pilot study was conducted in the selected blocks to understand the area, people and institution and communication channels. An outline of socio-economic background of farmers in the concerned areas was obtained in the construction of reformative working tool.

3.3.2 Construction of schedule after pre-testing:

The draft schedule for collection of data, incorporating the tools and techniques of different variables was presented twice each time on contact with the farmers and officials. The quantification was done for each and every variable after operationalising them. Before final data collection, entire schedule was pre-tested for elimination, addition and alteration with non-sample respondents of the study area. In pre-testing, care was taken not to include respondents who were selected as sample for final interview. On the basis of experiences in pre-testing, appropriate changes in the construction of item and their sequence were made. The schedule was then finalized and multiplied. The final form of the schedule is given in the appendix.

3.3.3 Field Data Collection:

The data were collected during August, 2018 to July 2019 with the help of the schedule constructed for the study through personal interview method. In each village, before starting the interview, a few days were devoted to establish rapport with the respondents. The schedule was administered to the women respondents in local language and the responses were recorded in English on the schedule. The interview was carried out by the researcher himself.

3.3 Selection and measurements of variables

The variables for the study were selected based on the review of literature,consultation with experts and from previous studies taken up in the related subjects. The variables, which were found to have relevance to the present investigation, were thus included in the present study. The instruments are used to measure the variables together with detailed procedure was presented here.

I. Age

Age is operationally defined as the number of years the individual completed chronologically after birth. The respondents were classified into three categories, namely young (below 35 years), middle-age (35 to 50 years) and old (above 50 years).

II. Caste

The scale comprises of Schedule Tribe, Schedule Caste and General. It is a categorical variable and no score were assigned.

III. Education

Education may be operationalised as the amount of formal education, completed successfully or literacy level acquired by the respondent at the time of interview. Education is instrumental in building personality structure and helps in changing one's behavior in social life. For the present study, the education of the farmers and officials is measured with the help of slightly modified scale developed by Supe (2007) as follows:

Sl. No.	Category	Score
1	Illiterate	0
2	Primary School	1
3	Middle school	2
4	Higher Secondary	3
5	Graduation	4
6	Above	5

IV. Religion

The variable comprises of Hindu, Muslim and Others. It is also a categorical variable and no scoring or scale value was assigned.

V. Family Information

Family information includes the total number of family member, number of male and female, their highest education and other livelihood options other than primary.

VI. Family Occupation and Income

It is the type of vocation found in the respondent's family like Farming, Business, Service, and Others, from which the family gets highest income or gains primary livelihood.

VII. Access of farmers with Organizations (Farmer level and Institute/organization level)

As many as 15 organizations were listed which were rated against scale point of frequently, sometimes, only in need and never with assigned score of 3, 2, 1 and 0 respectively. Here, I have taken the frequency of contact of farmers with the organizations and frequency of expert from the organization with the farmers (Modified scale of Nayak, 2015).

VIII. Information needs for different vocation

The information needs for different vocation felt by the farmers was analyzed by taking three-point scale that is extreme, moderate and low with the assigned score 3,2 and 1 respectively. The type of service need includes agricultural aspect, animal husbandry, poultry, fishery, organic farming, zero tillage, agri-preneurship, modern technology, mobile advisory services and market information.

IX. Quality measurement of the organization

The quality of the organizations measured with seven parameters. The parameters were timely, accurate, need based, effective, low cost, applicable and diverse. These parameters were assigned with three-point scale that were always, sometimes and never with the assigned score 2, 1 and 0 respectively.

X. Impact of service

According to International Fund for AgriculturalDevelopment (IFAD) Impact means 'The changes in the lives of rural people, as perceived by them and their partners at the time of evaluation, plussustainability-enhancing change in their environment to which the project has contributed. Changes can be positiveor negative, intended or unintended. In the logframe terminology these "perceived changes in the lives of the people"may correspond either to the purpose level or to the goal level of a project intervention.'The impact of the pluralistic extension service measured with the change in the farmers livelihood within three to five years. The effects are mainly included were Crop Productivity in your farm , Animal

husbandry in your farm, Poultry production in your farm, Fishery production in your farm, Crop diversity in your farm, New crop introduced in your farm, Water holding capacity of your farm, Balanced growth of all vocations, Women participation in farming, Inclusion of your agenda in planning, Need based services in all vocations, Your participation in bottom up planning , Drudgery reduction tools for women, Family income, Occupation diversity, Mechanization in agriculture, Entrepreneurship development among rural youth, Availability of market information, Use of organic input in farming, Availability of weather forecasting, Availability of mobile advisory, Availability of experts in need and Training/advisory in diverse needs. These effects were analyzed with five point scale that were definitely increased (2), increased (1), noChange (0), decreased (-1) and definitely decreased(-2).

XI. Training undertaken by Officers

The number of training taken by the officials in different fields like Crop Husbandry, Animal Husbandry, Fishery, Bee keeping, Horticulture, Marketing, Use of ICT and where they take the training.

XII. Addressed the services by the organization to the farmer

This was mainly analyzed by taking the different needs of the farmer like agricultural aspect, animal husbandry, poultry, fishery, organic farming, zero tillage, agripreneurship, modern technology, mobile advisory services and market information and how the organization delivered the service that is by their own experts or the organization ask the expert from other departments.

XIII. Types of convergence are existing in your organization

The convergence of the organization with different organization was measured by taking the parameters policy, resource (human & financial), and service (technology & manpower) levels. It is assessed through linkage/partnership established with different enlisted organisations (yes=1, no=0) on the aforesaid levels.The different type of organization taken for the study were research organization, Line departments (agriculture, animal husbandry, fishery, horticulture, soil conservation, ATMA,DRDC,CADC, Sericulture), NGO, Farmer organization, Private organization and banks.

XIV. Extent of convergence with different organization

The extent of convergence was analyzed by taking four-point scale that were increased, remains constant, decreased and no convergence by assigning the score 3,2.1 and 0 respectively.

XV. Constraints faced by officials during providing services to the farmers/others

The constraints were taken for the research purpose were administrative, management, technological, Infrastructure and policy, Financial and political constraints. Constraints were measured as perceived by the officials in the organization. Different constraint situations were exposed with a 3-point scale for response as: extreme(3), moderate(2) and low(1) respectively.

XVI. Opinion regarding Pluralistic extension system

A list of twelve sentences was taken regarding pluralistic extension system. The opinions are measured with two-point scale 1-yes and 0-No.

XVII. Expertise level

The expertise/skill of the KVK and ATMA functionaries were assessed to provide pluralistic services through questionnaire survey. No. of subject-streams of formal degree and No. of in-service training undertaken on different aspects were the indicators for assessment of expertise.

Scale score: In-service training=1 for each training; Graduate degree=3; Post-Graduate=5.

3.4 Data processing, tabulation and presentation of data

Data processed through assigning scale values/numerical values to different variables under consideration individually or through development of quotient.

1. For calculating the convergence score the formulae used convergence quotient

$$Convergence\ Quotient(Unit\ Level) = \frac{No.of\ Organisations\ in\ partnership\ or\ linked}{Total\ no.of\ Organisations\ considered}$$

Overall Convergence level=Average over all unit level Convergence Indices

2. The access quotient for an agency providing extension services was calculated as:

$$\text{Access Quotient} = \frac{MS(farmers'level) + MS(agency\ level)}{3 \times 2}$$

3.5 Statistical Methods Used

The statistical methods in this study include frequency, percentage, mean, chi-square, Mann-Whitney test, Kruskal-Wallis Test, Pearson's coefficient of correlation and Linear regression.

3.6.1Mean

The arithmetic mean is the average, which is most easily computed and understood, for it is calculated as the sum of the items divided by the number of items. The symbol for the mean is X (read as X bar). The formula for the mean of a series of numbers is as follows

$$\bar{X} = \frac{\Sigma x}{N}$$

Where, x- represents items to be averaged and

N- represents the number of items.

3.6.2. Percentage

Percentage is used for making simple comparisons. For calculating percentages, the frequency of the particular cell was divided by the total number of respondents in that particular category and multiplied by 100. Percentage was calculated upto two places after the decimal points.

$$\text{Percentage} = \frac{\text{Frequency}}{\text{N}} \times 100$$

Where, N - represents the number of respondents

3.6.3. Frequency

Frequency is the statistical measure to represent the number of respondents in a particular category.

3.6.4. Range

Range is the statistical measurement to represent the minimum and maximum score of a category. The same can be represented as the minimum-maximum.

3.6.5. Chi-square ($\chi 2$) test

Amongst the several tests used in statistics for judging the significance of the sampling data, chi-square test, developed by Prof. Fisher, is considered an important test. Chi-square, symbolically written as $\chi 2$ (chi-square), is a statistical measure with the help of which it is possible to assess the significance of the difference between the observed frequencies and the expected frequencies obtained from some hypothetical universe.

Conditions for the application of test:

The following condition should be satisfied before the test can be applied:

1) Observations recorded and used are collected on a random basis.

2) All the members (or items) in the sample must be independent.

3) No group should contain very few items say less than 10. In case, where the frequencies are less than 10, regrouping is done by combining the frequencies of adjoining groups so that the new frequencies become greater than 10. Some statisticians take this number as 5.

4) The overall number of items (*i.e.*, N) must be reasonably large. It should at least be 50 howsoever small the number of group may be.

Area of Application of Chi-square:

Chi-square test is applicable in large number of problems. The test is, in fact, a technique through the use of which it is possible for us to (i) test the goodness of fit; (ii) test the homogeneity of a number of frequency distributions; and (iii) test the significance of association between two attributes. In the present study parts of the data has been treated with the Chi-square test.

3.6.6. t-test

A t-test is any statistical hypothesis test in which the test statistic follows a Student's *t* distribution if the null hypothesis is supported. It can be used to determine if two sets of data are significantly different from each other, and is most commonly applied when the test statistic would follow a normal distribution if the value of a scaling term in the test statistic were known. When the scaling term is unknown and is replaced by an estimate based on the data, the test statistic (under certain conditions) follows a Student's *t* distribution.

This test is only used when both:

- The two sample sizes (that is, the number, *n*, of participants of each group) are equal;
- It can be assumed that the two distributions have the same variance.

Violations of these assumptions are discussed below.

The *t* statistic to test whether the means are different can be calculated as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{X_1X_2} \cdot \sqrt{\frac{2}{n}}}$$

Where,

$$s_{X_1X_2} = \sqrt{\frac{1}{2}(s_{X_1}^2 + s_{X_2}^2)}$$

Here $s_{X_1X_2}$ is the grand standard deviation (or pooled standard deviation), 1 = group one, 2 = group two. $s^2_{X_1}$ and $s^2_{X_2}$ are the unbiased estimators of the variances of the two samples. The denominator of *t* is the standard error of the difference between two means.

For significance testing, the degrees of freedom for this test are $2n - 2$ where *n* is the number of participants in each group.

Equal or unequal sample sizes, equal variance

This test is used only when it can be assumed that the two distributions have the same variance. (When this assumption is violated, see below.) The *t* statistic to test whether the means are different can be calculated as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{X_1X_2} \cdot \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where

$$s_{X_1X_2} = \sqrt{\frac{(n_1 - 1)s^2_{X_1} + (n_2 - 1)s^2_{X_2}}{n_1 + n_2 - 2}}.$$

Note that the formulae above are generalizations of the case where both samples have equal sizes (substitute *n* for n_1 and n_2).

Sx_1x_2 is an estimator of the common standard deviation of the two samples; it is defined in this way so that its square is an unbiased of the common variance whether or not the population means are the same. In these formulae, *n* = number of participants, 1 = group one, 2 = group two. $n - 1$ is the number of degrees of freedom for either group, and the total sample size minus two (that is, $n_1 + n_2 - 2$) is the total number of degrees of freedom, which is used in significance testing.

Equal or unequal sample sizes, unequal variances

This test, also known as Welch's *t*-test, is used only when the two population variances are not assumed to be equal (the two sample sizes may or may not be equal) and hence must be estimated separately. The *t* statistic to test whether the population means are different is calculated as:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{s_{\overline{X}_1 - \overline{X}_2}}$$

Where,

$$s_{\overline{X}_1 - \overline{X}_2} = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}.$$

Here s^2 is the unbiased estimator of the variance of the two samples, n_i = number of participants in group i, i=1 or 2. Note that in this case $s_{\overline{X}_1 - \overline{X}_2}^2$ is not a pooled variance. For use in significance testing, the distribution of the test statistic is approximated as an ordinary Student's t distribution with the degrees of freedom calculated using

$$\text{d.f.} = \frac{(s_1^2/n_1 + s_2^2/n_2)^2}{(s_1^2/n_1)^2/(n_1 - 1) + (s_2^2/n_2)^2/(n_2 - 1)}.$$

This is known as the Welch–Satterthwaite equation. The true distribution of the test statistic actually depends (slightly) on the two unknown population variances (see Behrens–Fisher problem).

Researches have found that the null hypothesis is a useful tool in testing the significance of differences. In its simplest form, this hypothesis asserts that there is no true difference between two population means. Let us consider two samples with X_1 and X_2. We are interested to know whether there is any actual difference between these two population (from which samples are drawn) means. In such situation 't' test is applied. For 't' test the following formula was used.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{X_1 X_2} \cdot \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Where,

$$s_{X_1 X_2} = \sqrt{\frac{(n_1 - 1)s_{X_1}^2 + (n_2 - 1)s_{X_2}^2}{n_1 + n_2 - 2}}.$$

Where $\overline{X}_1$ and $\overline{X}_2$ = means of two samples; s_{x1} and s_{x2} = standard deviation of the two samples; n_1 and n_2 = sizes of the samples.

The calculated values were compared with the table values of 't' from Fisher and Yates table with $(n_1 + n_2 - 2)$ degrees of freedom.

3.6.7. Kruskal-Wallis Test

The Kruskal-Wallis Test was developed by Kruskal and Wallis (1952) jointly and is named after them. The Kruskal-Wallis test is a nonparametric (distribution free) test, and is used when the assumptions of ANOVA are not met. They both assess for significant differences on a continuous dependent variable by a grouping independent variable (with three or more groups). In the ANOVA, we assume that distribution of each group is normally distributed and there is approximately equal variance on the scores for each group. However, in the Kruskal-Wallis Test, we do not have any of these assumptions. Like all non-parametric tests, the KruskalWallis Test is not as powerful as the ANOVA.

Null hypothesis: Null hypothesis assumes that the samples are from identical populations. Alternative hypothesis: Alternative hypothesis assumes that the samples come from different populations.

Procedure:

1. Arrange the data of both samples in a single series in ascending order.

2. Assign rank to them in ascending order. In the case of a repeated value, or a tie, assign ranks to them by averaging their rank position.

3. Then sum up the different ranks, e.g. R1 R2 R3…., for each of the different groups.

4. To calculate the value, apply the following formula:

$$H = \frac{12}{n(n+1)} \sum_{i=1}^{k} \frac{R_i^2}{} - 3(n+1)$$

Where,

H = Kruskal-Wallis Test statistic N = total number of observations in all samples Ti = Sum of the ranks assigned

The Kruskal-Wallis test statistic is approximately a chi-square distribution, with k-1 degrees of freedom where ni should be greater than 5. If the calculated value of the Kruskal-Wallis test is less than the critical chi-square value, then the null hypothesis cannot be rejected. If the calculated value of Kruskal-Wallis test is greater than the critical chisquare value, then we can reject the null hypothesis and say that the sample comes from a different population.

3.6.8 Pearson's coefficient of correlation (simple correlation)

It is most widely used method of measuring the degree of relationship between two variables. This coefficient assumes the following:

(a) that there is linear relationship between the two variables.

(b) that the two variables are casually related which means that one on the variable is independent and the other one is dependent

(c) a large number of independent causes are operating in both variables so as to produce a normal distribution.

Pearson's coefficient of correlation can be worked out thus

$$r = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})}{n.\sigma X.\sigma Y}$$

Where, r = coefficient of correlation

X_i = i^{th} value of X variable

$\bar{X}$ = mean of X variable

Y_i = i_{th} value of Y variable

$\bar{Y}$ = mean of Y variable

N = number of pairs of observations of X and Y

σ_X= standard deviation of X variables

σ_Y = standard deviation of Y variables

Pearson's coefficient of correlation 'r' lies between ± 1. Positive values of 'r' indicate positive correlation between the two variables i.e. changes in both variables take place in the same direction, whereas negative valued of 'r' indicate negative correlation i.e. changes in the two variables taking place in the opposite directions. A zero value of 'r' indicates that there is no association between the two variables. When r = (+) 1, it indicates perfect positive correlation and when it is (-) 1, it indicates perfect negative correlation, meaning thereby that variations in independent variable (X) explain 100% of the variations in the dependent variable (Y). We can also say that for a unit change in independent variable, if there happens to be a constant change in the dependent variable in the same direction, then correlation will be termed as perfect positive. But if such change occurs in the opposite direction, the correlation will be termed as perfect negative. The value of 'r' nearer to +1 or -1 indicates high degree of correlation between the two variables.

3.6.9 Multiple regression

It is an extension of simple linear **regression**. It is used when we want to predict the value of a variable based on the value of two or more other variables. The variable we want to predict is called the dependent variable (or sometimes, the outcome, target or criterion variable). In statistics, **regression analysis** is a statistical process for estimating the relationships among variables. It includes many techniques for modelling and analysing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis helps one understand how the typical value of the dependent variable (or 'criterion variable') changes when any one of the independent variables is varied, while the other independent variables are held fixed. Most commonly, regression analysis estimates the conditional expectation of the dependent variable given the independent variables – that is, the average value of the dependent variable when the independent variables are fixed. Less commonly, the focus is on a quantile, or other location parameter of the conditional distribution of the dependent variable given the independent variables. In all cases, the estimation target is a function of the independent variables called the **regression function**. In regression analysis, it is also of interest to

characterize the variation of the dependent variable around the regression function which can be described by a probability distribution.

In general, the multiple regression equation of Y on X_1, X_2, …, X_k is given by:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \ldots\ldots\ldots\ldots\ldots\ldots + b_k X_k$$

Here b_0 is the intercept and b_1, b_2, b_3, …, b_k are analogous to the slope in linear regression equation and are also called regression coefficients. They can be interpreted the same way as slope. Thus if $b_i = 2.5$, it would indicates that Y will increase by 2.5 units if X_i increased by 1 unit.

The appropriateness of the multiple regression model as a whole can be tested by the F-test in the ANOVA table. A significant F indicates a linear relationship between Y and at least one of the X's.

Once a multiple regression equation has been constructed, one can check how good it is (in terms of predictive ability) by examining the coefficient of determination (R^2). R^2 always lies between 0 and 1.

R^2 - coefficient of determination

Assumptions

Multiple regression technique does not test whether data are linear. On the contrary, it proceeds by assuming that the relationship between the Y and each of X_i's is linear. Hence as a rule, it is prudent to always look at the scatter plots of (Y, X_i), i= 1, 2,…,k. If any plot suggests non linearity, one may use a suitable transformation to attain linearity.

Another important assumption is non existence of multicollinearity - the independent variables are not related among themselves. At a very basic level, this can be tested by computing the correlation coefficient between each pair of independent variables.

Multiple regression analysis is used when one is interested in predicting a continuous dependent variable from a number of independent variables. If dependent variable is dichotomous, then logistic regression should be used.

3.6.10. Mann-Whitney U test

It is the non-parametric alternative test to the independent sample ttest. It is a non-parametric test that is used to compare two sample means that come from the same population, and used to test whether two sample means are equal or not. Usually, the Mann-Whitney U test is used when the data is ordinal or when the assumptions of the t-test are not met.

Assumptions of the Mann-Whitney:

Mann-Whitney U test is a non-parametric test, so it does not assume any assumptions related to the distribution of scores. There are, however, some assumptions that are assumed.

1. The sample drawn from the population is random.

2. Independence within the samples and mutual independence is assumed. That means that an observation is in one group or the other (it cannot be in both).

3. Ordinal measurement scale is assumed.

Calculation of the Mann-Whitney U:

$$U = n1n2 + \frac{n2(n2+1)}{2} - \sum_{i=n1+1}^{n2} Ri$$

Where, U=Mann-Whitney U test value; N1 = sample size one; N2= Sample size two; Ri = Rank of the sample size

Use of Mann-Whitney:

Mann-Whitney U test is used for every field, but is frequently used in psychology, healthcare, nursing, business, and many other disciplines. For example, in psychology, it is used to compare attitude or behaviour, etc. In medicine, it is used to know the effect of two

medicines and whether they are equal or not. It is also used to know whether or not a particular medicine cures the ailment or not. In business, it can be used to know the preferences of different people and it can be used to see if that changes depending on location.

Analysis of data

The data were analysed with the application of statistical software. SPSS analysis tool pack, MS Office Excel was used for analysis. The data were interpreted in the light of the objective and hypothesis of the study.

Results and Discussion

CHAPTER-IV

RESULTS AND DISCUSSION

This chapter explains the objective wise findings of the research. The research was carried out according to the objective and the information was collected from the respondents. The data was additionally ordered, classified, analysed and introduced in a deliberate route according to the accompanying heading:

4.1. Operational arrangements of the organisations due to restructured policy reforms

4.2. Constraints faced by the officials

4.3. Socio-economic characteristics of end users

4.4. Access of the end users towards the extension agents

4.5. Quality and Impact of the organisation perceived by the end users.

4.6. Factors influencing level of access, quality and impact of services provided by pluralistic organizations

4.7. Policy implications extracted from the study

4.1. Operational arrangements for providing pluralistic extension services in the district

Operational arrangements are the facilities and processes existing in the district for operation of pluralistic services. Facilities are the existing actors or service agents that can be linked with the study institutions viz. the ATMA and/or KVK. The services of these institutes can be converged with the services of ATMA and/or KVK. The section also explored the level of convergence and expertise existing in the study institute. Information for this section also explored from secondary sources along with focus group interview and survey schedule.

Table-4.1 presented a comprehensive list of public, private, autonomous and other extension service institutions or agents acting in the district. Through focus group discussion of key functionaries of the district (DDA, ATMA project director, NABARD, SAU & KVK heads), the geographical reach of the services of the institutes has also been assessed.

Table 4.1: Extension service agents acting in Cooch Behar district

Sl. No.	Service agents	Spatial expansion of services	Provision of service
General development agents			
1.	Panchayat raj institutes	√√√√√	General Holistic development of rural infrastructure, housing, sanitation, drinking water facilities through implementation of government schemes.
2.	Department of Irrigation	√√√	Protect river banks from erosion and irrigation to the cultivable area.
3.	Department of electricity	√√√√	Farm and household power in the village areas.
4.	Financial Institutions	√√√	Farm finance by providing credit to end users.
Line Departments (Agriculture and allied sector)			
1.	Agriculture	√√√√√	Agricultural development through diagnostic, consultacy and subsidy by implementing government schemes.
2.	Horticulture	√√√	Horticultural development through diagnostic, consultacy and subsidy by implementing government schemes.
3.	Animal resource	√√√	Integrated development of animal husbandry and poultry through diagnostic, consultacy and subsidy by implementing government schemes.
4.	Soil conservation	√√√√	Provide service on soil testing and water shed development in the area.
5.	Fishery	√√√	Inland fishery development through diagnostic, consultacy and subsidy by implementing government schemes.
Autonomous Extension Organization			
1.	Agricultural University	√√√	Agricultural teaching, research and extension for manpower and technology development in agriculture and allied sector.

2	Krishi Vigyan Kendra (KVK)	√√√	Delivered services on on-farm testing, front line demonstration, Organize training for extension personnel and youths and implement schemes of ICAR. Provide pluralistic extension service by converging with other development agents.
3.	Agricultural Technology Management Agency (ATMA)	√√√√√	Provide input material to the farmers and training on different cultivation practices on crops, farm machinery, animal husbandry, poultry and fishery. Provide pluralistic extension service.
NGO & Farmer's Organisation			
1.	NGOs	√√√	Objective-wise specific activity on agriculture, animal husbandry, fishery activities and general development to specific area.
2.	Farmer producer Organisations	√√√√	Service provision by acting as a delivery agent of pluralistic services.
Private Extension Agents			
1.	Private input Companies	√√√	Paid services for the companies benefit on agriculture and allied sector.
2.	Input Dealers	√√√√	Material and input supply as an important agent of pluralistic system.

'√' represents the extent of service expansion upto remotest corner/village of the district

The general development departments include Panchayati Raj department, department of irrigation, department of electricity and financial institutes. From the table, it can be illustrated that the Panchayti raj department provided more service to the remotest areas and every corner of the village followed by department of electricity, department of irrigation and financial institutes. The Panchayati raj department of Cooch Behar had consisted of 128 numbers of Gram Panchayats, 12 numbers of Panchayat Samities and one Zilla Parishad. The Panchayat raj institutions were having adequate infrastructure and man power to provide service to the remotest area of the village. The panchayat raj institutes were village level implementing agencies of different government schemes like National Rural Employment guarantee scheme, Bharat Nirman Rajeev Gandhi Sewa Kendra, Swarnajayanti Gram Swarozgar Yojna (SGSY) etc. The panchayati raj institutes provide partial pluralistic

extension service as it also work as convergence with other departments like health extension, housing services in the rural areas. The West Bengal State Electricity Distribution Company Limited (WBSEDCL) having regional office in Cooch Behar district to operate the electricity. As per respondents, electricity service in the village was not satisfactory. Some of the villages had no electricity or partial electricity. The irrigation department was working in ten numbers of blocks of Cooch Behar district with the main task having riverbank protection. The irrigation department had not yet reached in every corner of the villages due to the limited staffs and infrastructure. Different financial agencies like, Central Bank of India, State Bank of India, Canara Bank, UCO Bank, Union Bank etc. has branch office at Cooch Behar city, but were not able to reach up to remote villages due to the communication. The different financial departments having in Cooch Behar were Central Bank of India, State Bank of India, Canara Bank, UCO Bank, Union Bank etc. The financial departments were not reached to the rural areas due to the communication gap. But now-a-days the villagers are opening bank accounts due to the Pradhan Mantri Jan Dhan Yojana (PMJDY) scheme.

From the table it was also revealed that, the state departments like agriculture, horticulture, animal resource, fisheries and soil conservation were the major public line department to provide service to the farmers in this district. It was shown that agriculture department having more active to provide service in the rural areas followed by soil conservation, horticulture, animal resource and fishery, respectively. Agriculture department helped the farmers in improvising the production and productivity; provide input materials like seed, fertilizer and machinery, diagnosis of disease and pest and their management. Agriculture departments also engaged in empowering women farmers by providing different on farm & off farm trainings. Agriculture department implemented different agricultural schemes like Krishak Bandhu, Bangla Fasal Bima Yojana, Parmparagat Krishi Vikas Yojana etc. for the farmers.

Again, the table showed the service provided by the autonomous organizations in the district. The ATMA coverege in remote areas more than the KVK and Agricultural University. ATMA had sub offices in every block of the district. ATMA has farmer's friend who remain present in the village areas for agro-advisory service. The KVK also provide service to the rural areas by the convergence with the FPOs but due to less number of functioning FPOs, services are not reaching every corner of the district.

From the table, it is shown that comparatively Farmer producer organisations were more active in rural areas than the NGOs. As the Farmer Producer Organisations were present in a specific area, so the coverage of area was limited to that area only. The NGOs were very less active in the village areas. The NGOs working area was limited to very few villages. Simultaneously, FPOs were working in various activities like custom hiring centre; Fish hatchery; Agricultural. Implement dealership; Agro-chemical retailing; seedling factory, pulse processing and marketing; Goatery, duckery; technology up-scalling (CA) and implement different projects (SRFSI, ACIAR etc.).

The table showed that the input dealers having reached more in the village areas than the private companies. The input dealers were providing service to the farmer for their growth. The private companies were less active in the district, providing restricted services like fertilizer, insecticide, pesticide through their agents.

From the above table, it was shown that most of the extension agents provide monopolistic type of extension service except ATMA and KVK. These two organisations somewhat satisfy the principles of pluralistic extension service at the district level according to the reformed policy structure.

This section assessed the expertise/skill of the KVK and ATMA functionaries to provide pluralistic services through questionnaire survey. Diversity in subject-streams of formal degree and No. of in-service training undertaken on different aspects were the indicators for assessment of expertise. The convergence level (through partnership/linkage) on Planning and policy aspect, Technology aspect (Provision/backstop), Extension service level (training, input, demonstration), Manpower resource level (hiring manpower) and capital resource level (providing fund) was also explored in this section.

Table-4.2 displayed the personal and professional characteristics of the officials of KVK and ATMA. The result shows that majority of the officials of KVK were young and middle aged that was 40 percent each followed by 20 percent old aged, respectively. In case of ATMA, majority of the officials young aged that was 69.56 percent followed by 26.09 percent middle aged and 4.35 percent old aged respectively. The mean age of the officials of ATMA and KVK were 33.17 years and 39.20 years. The t-value indicates that there was no significant variance in the age of the officials. The ATMA officials were mostly joined in the

after the completion of undergraduate but in case of KVK the minimum qualification was post-graduation.

Table 4.2: Personal and Professional characteristics of Officials (expressed in percentage)

Official socio-economic	KVK	ATMA	Statistical implications
Age			
Young Age (Upto 35 yrs.)	40.00	69.56	Mean Age: KVK=39.20 yrs; ATMA=33.17 yrs. t=1.14 (p=.306)
Middle Age (36 to 50 yrs.)	40.00	26.09	
Old Age (More than 50 yrs.)	20.00	4.35	
Professional experience			
Upto 2 yrs	20.00	39.13	Mean values KVK=11.00 yrs.; ATMA= 4.30yrs; t=3.03 (p=.006)
3 to 7 yrs	40.00	60.87	
More than 7 yrs	40.00	0.00	
Formal education			
Graduate	0.00	52.17	Fisher Exact test p=.006
Masters'	40.00	43.48	
Doctorate	60.00	4.35	
Professional field			
Agriculture & allied	80.00	65.22	Fisher Exact test p=.999
Others	20.00	34.78	

From the table it was also shown that the KVK officials having more than 7 years experience and 3 to 7 years experience that was 40 percent each followed by up to 2 years was 20 percent. In case of ATMA, majority of the officials having 3 to 7 years experience that was 60 .87 percent followed by 39.13 percent up to 2 years respectively. The statistical value shows that there was significant difference between KVK and ATMA in reference to professional experience.KVK officials were having more experience as their education level was higher and get more exposure than ATMA officials.

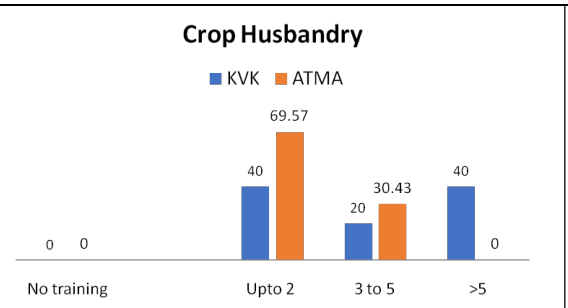
The table also displayed the formal education of the KVK and ATMA officials. Majority of KVK officials were doctorate that was 60 percent followed by master's 40 percent. In case of ATMA majority of the officials having qualification graduate that was 52.17 percent followed by 43.48 percent masters and 4.35 percent doctorate respectively. The statistical value indicates that there was significant difference between KVK and ATMA. The eligibility criteria for joining for ATMA was Graduate and Masters but regarding KVK the candidate must be Masters in agriculture.

The analysed result shows that 80 percent of officials were from Agriculture and allied sector followed by 20 percent from other discipline. With reference to ATMA, majority of the officials were from Agriculture and allied sector that was 65.22 percent followed by 34.78 percent others respectively. The statistical value shows there was no variance between KVK and ATMA.

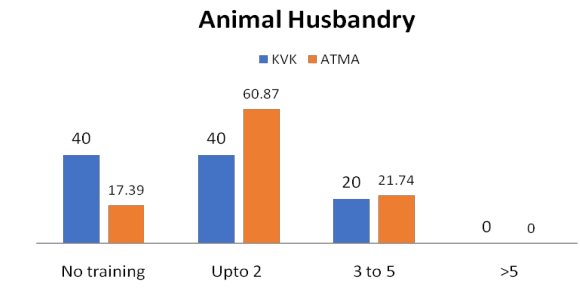
Table 4.3: Professional training undertaken by the officials (expressed in percentage)

No. of training undertaken	KVK	ATMA	**Statistical Implication**
1 to 5	20.00	43.48	Mean no. KVK=13.00; ATMA=7.52 t=1.354 (p=.237)
6 to 12	40.00	39.13	
More than 12	40.00	17.39	

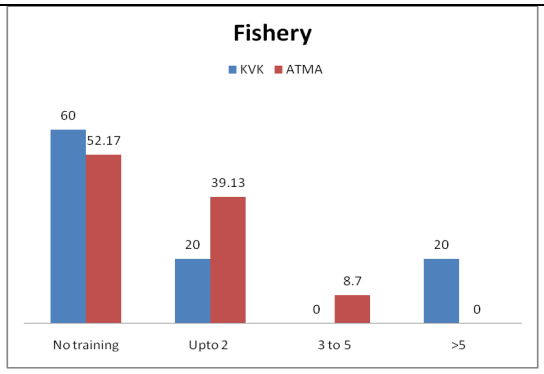
The table 4.3 presented the overall professional trainings undertaken by the KVK and ATMA officials. The result shows that 40 percent of officials of KVK taken more than twelve numbers of trainings followed by 40 percent 6 to 12 number of and 20 percent one to five number of trainings respectively. Regarding ATMA, majority of the officials was taken one to five number of trainings that was 43.48 percent followed by 39.13 percent 6 to 12 number of trainings and 17.39 percent more than 12 number of trainings separately. The statistical value indicates that there was no significant difference between KVK and ATMA. Most of the ATMA officials were newly recruited and they were going to the KVK for any training.



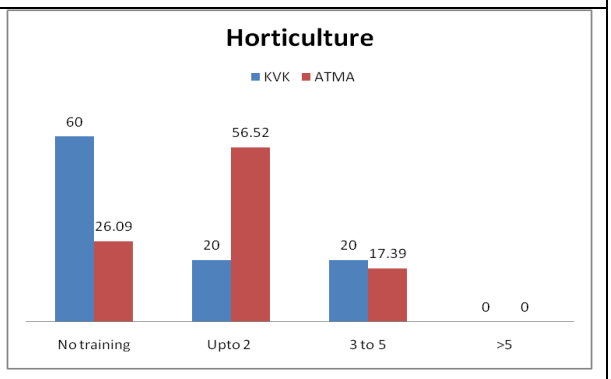
Fisher Exact test p=.031



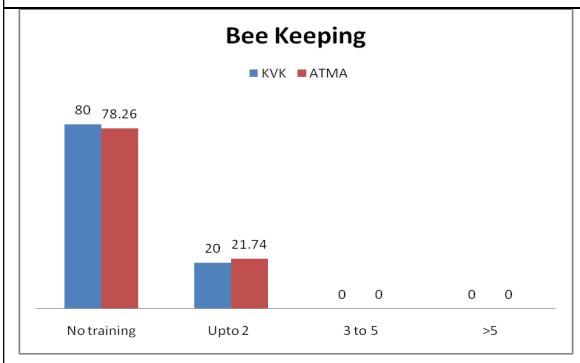
Fisher Exact test p=.533



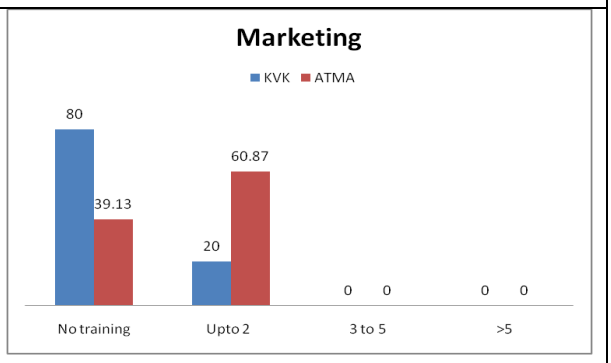
Fisher Exact test p=.547



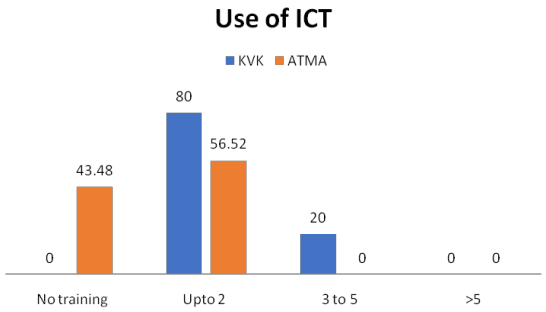
Fisher Exact test p=.269



Fisher Exact test p=.999



Fisher Exact test p=.082



Fisher Exact test p=.000

Fig 4.1: Trainings undertaken by the Officials on different aspects

The figure 4.1 explained the trainings undertaken by the officials on different aspects. From the figure it was shown that the KVK officials taken more than 5 numbers of trainings and up to two numbers of trainings on crop husbandry was 40 percent each followed by 20 percent on 3 to 5 number of trainings. The ATMA officials were taken up to two number of training that was 69.57 percent followed by 30.43 numbers of trainings on crop husbandry. In case of animal husbandry, the KVK officials were having no training and up to two numbers of training that was 40 percent in each and 20 percent 3 to 5 numbers of training. The ATMA officials were also having up to 2 numbers of trainings 60.87 percent followed by 21.74 percent five numbers of training respectively Regarding Fishery, only 20 percent each taken training 5 numbers of training and up to 2 numbers of training. In ATMA, 39.13 percent taken up to two numbers of training. Majority of the officials in both KVK (60%) and ATMA (52.17%) were not taken any training. In case of horticulture, majority of the KVK officials were not taken any training. But, 56.52 percent ATMA officials were taken up to two numbers of training. Regarding Bee keeping, majority of the officials were not taken any training that was 80 percent in KVK and 78.26 percent in ATMA. In KVK, only 20 percent taken training on bee keeping as the officials belongs to plant protection background. In case of marketing, not any trainings taken by the officials that was 80 percent in KVK and 39.13 percent in ATMA. There was 60.87 percent of ATMA officials were taken up to two numbers of training. In reference to the use of Information and communication technology, majority of the officials were taken up to 2 numbers of training that was 80 percent in KVK and 56.52 percent in ATMA. The statistical value indicates that there was significant difference in case of crop husbandry and use of ICT but not significant in case of animal husbandry, fishery, bee keeping, horticulture and marketing. . In both the organisations most of the officials were having qualification in agriculture, so their interest was less in other areas.

Table 4.4: Pattern of human resource sharing for training to the farmers by the organisation (Overall)

Type of staff	KVK	ATMA	Statistical
Own	47.83	26.08	$\chi 2$=6.784 (p=.034)
Hired	39.13	36.65	Fisher Exact p=.028
Mixed	13.04	37.27	

The table 4.4 displayed pattern of human resource sharing for training to the farmers by the organisation. The analysed result shows that KVK having 47.83 percent own staff for training followed by 39.13 percent hired from other departments and 13.04 jointly for overall training respectively. Regarding ATMA, ATMA jointly gives training that was 37.27 percent followed by 36.65 percent hired and 26.08 percent own staff separately. The statistical value shows that there was variance in between KVK and ATMA. The KVK officials were more experienced and having high qualification than the ATMA officials, so KVK was given most of training by using own staff.

Table 4.5: Pattern of human resource sharing for training on different aspects

	KVK	**ATMA**	**Statistical implication**
Crop husbandry			
Own	71.43	61.22	
Hired	0.00	10.20	exact p=.999
Both	28.57	28.57	
Animal husbandry/Fishery/Poultry			
Own	0.00	0.00	
Hired	100.00	64.29	exact p=..09
Both	0.00	35.71	
PHT(Post harvest technology)			
Own	0.00	7.14	
Hired	50.00	57.14	exact p=.999
Both	50.00	35.72	
Agri-preneurship/Marketing			
Own	50.00	7.14	
Hired	50.00	64.29	exact p=.292
Both	0.00	28.57	
RCT(Resource Convergence Technology)			
Own	100.00	28.57	
Hired	0.00	14.29	exact p=.073
Both	0.00	57.14	
Others			

Own	66.67	19.05	
Hired	33.33	33.33	exact p=.156
Both	0.00	47.62	

The table 4.5 depicted pattern of human resource sharing for training different aspects like crop husbandry, animal husbandry, poultry, fishery, post harvest technology, research convergence technology, agri-preneurship, marketing and others. From the table, it was shown that the KVK used his own staff for training on crop husbandry that was 71.43 percent followed by 28.57 percent jointly with another organisation. The ATMA used 61.22 percent own staff for the service on crop husbandry followed by 28.57 percent both and 10.20 percent hired from another department respectively. In case of animal husbandry, poultry and fishery, KVK hired specialist persons from other departments for training that was 100 percent. ATMA also hired personnel for training that was 64.29 percent followed by 35.71 percent jointly. Regarding post harvest technology, KVK hired resource persons for training was 50 percent and 50 percent both own and hired staff. The ATMA hired staffs for post harvest technology was 57.14 percent followed by 35.72 percent both and 7.14 percent own staff respectively. In reference to agripreneurship and marketing, KVK having own staff that was 50 percent and hired 50 percent staffs for the training. ATMA hired staff for training on agripreneurship and marketing was 64.29 percent followed by 28.57 both own and hired and 7.14 percent own staff respectively. Regarding research convergence technology, KVK having own staff that was 100 percent for training. ATMA having both own and hired staff that was 57.14 percent followed by 28.57 percent own staff and 14.29 percent hired for training on research convergence technology. In case of other needs, KVK having own staff that was 66.67 percent and 33.33 percent hired. The ATMA used both to provide service was 47.62 percent followed by 33.33 percent hired and 19.05 percent own staff separately. The statistical value indicates that there was no significant difference between KVK and ATMA in reference to like crop husbandry, animal husbandry, poultry, fishery, post harvest technology, research convergence technology, agri-preneurship, marketing and others.

The radar Fig. 4.2 summarised the previous observations through calculation of expertise level (vide Materials and Methods) of study organisations (KVK and ATMA units of different blocks) to support pluralistic services. It is calculated through diversity in subject-

streams of formal degree and no. of in-service training undertaken on different aspects as the indicators for expertise.

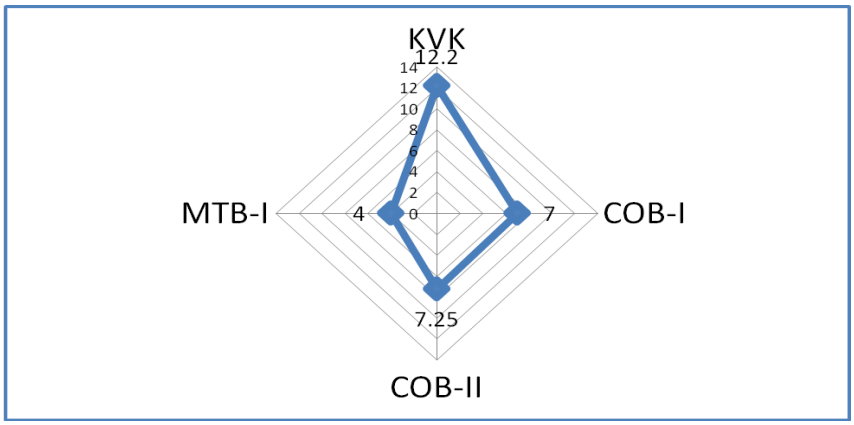


Fig 4.2: Level of expertise of the organisation

The figure explained the level of expertise of the organisations. From the figure it was shown that KVK having high expertise than the ATMA blocks (Cooch Behar-I, Cooch behar-II and Mathabhanga-II). The KVK officials were more educated and the exposure of KVK officials for taking any professional training was more. In case of ATMA officials majority of them having education level up to under graduate and taken very less number of professional training.

The following section assessed convergence explored by the KVK and ATMA through linkage and utilisation of facilities and services of other organisations. The convergence was assessed on five different aspects, viz. planning, technology, financial/capital resource, service and manpower based and depicted through Convergence quotient (vide Materials and Methods). A value of 1.00 as convergence quotient represents maximum level of convergence and that of 0.00 represent minimum level. Table 4.6 displayed the convergence of KVK and ATMA with other organisations on different aspects like policy, technology, resource, service and manpower.

Analysis of collected data shows that KVK converge with research organisation for technology was having highest convergence quotient 1.00 followed by 0.67 each in policy, financial/capital resource, service and manpower respectively. The research organizations were mainly focused on producing different technology for the agriculture and allied sector. On the other hand, KVK helps in transfer of technology to the farmers by the partnership with research organization. As per policy, KVKs had to participate with different zonal

workshops, research conferences. In the workshops, the KVKs placed their agenda on different development aspects of agriculture for the locality. For the conduct of any demonstration, training the research organization provides financial resources to the KVK. The research organizations like ICAR, MANAGE implemented different programs like DAESI, NICRA through KVK. The KVK provides staff and the research organization provides fund for the program. As per the need of the people the KVK provides different type of services like marketing, input materials for which KVK partnership with the research organization. Sometimes the research organization provides manpower for the conduct of any training or demonstration of new technology. In case of state line departments KVK converge with the departments for capital resource based that was having convergence quotient 0.67 followed by 0.44 service based, 0.33 each in manpower and technology based respectively. The KVK converge with the cooperative, FPO, FC, SHG, NGOs for the purpose of technology based (convergence quotient=1.00), captal resource based (1.00), service based (1.00) and manpower based (1.00) separately. The KVK comes together with the private agent for the reason of technology, resource, service and manpower that was having quotient 1.00 in each. The financial agents joined with KVK for the purpose of service that was having quotient 1.00 followed by 0.75 each in resource and man power and 0.25 in policy based respectively. The financial agent like NABARD was given the fund for the development of project for the farmers for which KVK provides resource and service. It was also shown that in total KVK converged more with the cooperative, FPO, FC, SHG, NGOs that was having quotient 0.80 followed by private agents(0.80),research organization(0.73), financial agents(0.55) and state line departments (0.36) respectively.

Table 4.6: Convergence/partnership of KVK and ATMA with Other Organisations

Convergence with	Convergence quotient					
	Policy based	Technology based	Financial/Capital Resource based	Service based	Manpower based	Total
***Krishi Vigyan Kendra* (KVK)**						
Research organisations	0.67	1.00	0.67	0.67	0.67	0.73
State line departments	0.00	0.33	0.67	0.44	0.33	0.36
Cooperative/FC/FPO/SHG/ NGO	0.00	1.00	1.00	1.00	1.00	0.80
Private agents	0.00	1.00	1.00	1.00	1.00	0.80
Financial agents	0.25	0.00	0.75	1.00	0.75	0.55
Overall	**0.18**	**0.67**	**0.82**	**0.82**	**0.75**	**0.65**
Agricultural Technology Management Agency						
Research organisations	0.00	0.50	0.21	0.07	0.50	0.26
State line departments	0.11	0.35	0.43	0.30	0.21	0.28
Cooperative/FC/FPO/SHG/ NGO	0.00	0.14	0.06	0.40	0.00	0.12
Private agents	0.00	0.00	0.14	0.43	0.00	0.11
Financial agents	0.00	0.00	0.00	0.00	0.00	0.00
Overall	**0.02**	**0.20**	**0.17**	**0.24**	**0.14**	**0.15**

From the table 4.6 it was also revealed that, the convergence of ATMA with other organisations for different purposes. The ATMA converged with research organizations for the purpose of technology that was having convergence quotient 0.50 followed by 0.50 man power, 0.21 capital resource based and 0.07 service based respectively. The research organizations were generating technology and that technology reached to the farmer through ATMA. For this purpose, research organization required man power which was available from ATMA and ATMA got the technology. The ATMA joined with state line departments mostly for capital resource based that was having quotient o.43 followed by 0.35 technology based, 0.30 service based, 0.21 manpower based and 0.11 policy based separately. The

ATMA mainly working with state line departments, so the different resources available from the state department and for the bottom up planning ATMA participated in the district action plan. The cooperatives/FPOs/FC/SHGs were joined with ATMA for the reason of service based that was having convergence quotient 0.40 followed by 0.15 in technology based and 0.06 in service based. ATMA provides all type of extension service to the groups for the benefit of the farmers. The ATMA converged with the private agents for the purpose of service that was having convergence quotient 0.43 followed by resource-based 0.14. The ATMA had no convergence with the financial departments. In total ATMA converged more with state line departments that was having quotient 0.28 followed by research organization (0.25), cooperatives/FPOs/FC/SHGs (0.12) and private agents (0.11) respectively.

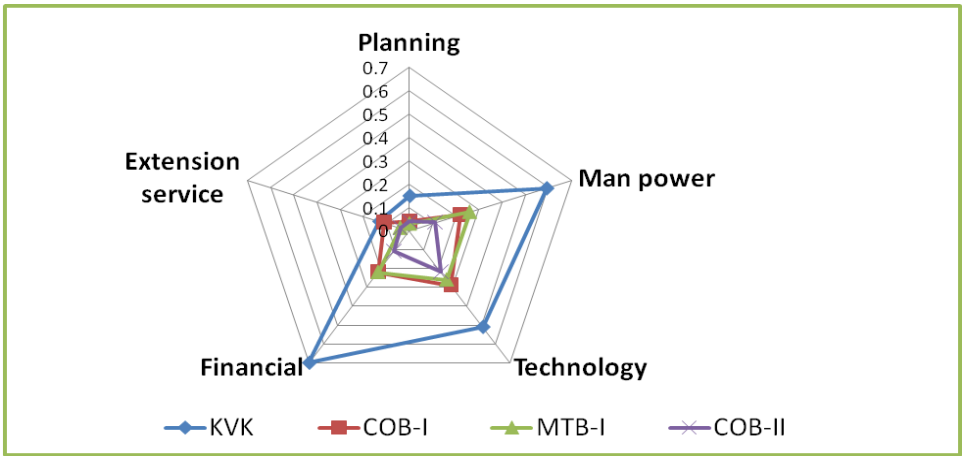


Fig 4.3:Pattern of Convergence on different levels

Figure 4.3 explained the convergence of organisations at different levels. From the figure, it was shown that convergence level of KVK was more at financial level followed by manpower, technology, extension service and planning. It was also shown that the other three blocks of ATMA convergence level lower in case of planning, technology, man power, extension service and financial level.

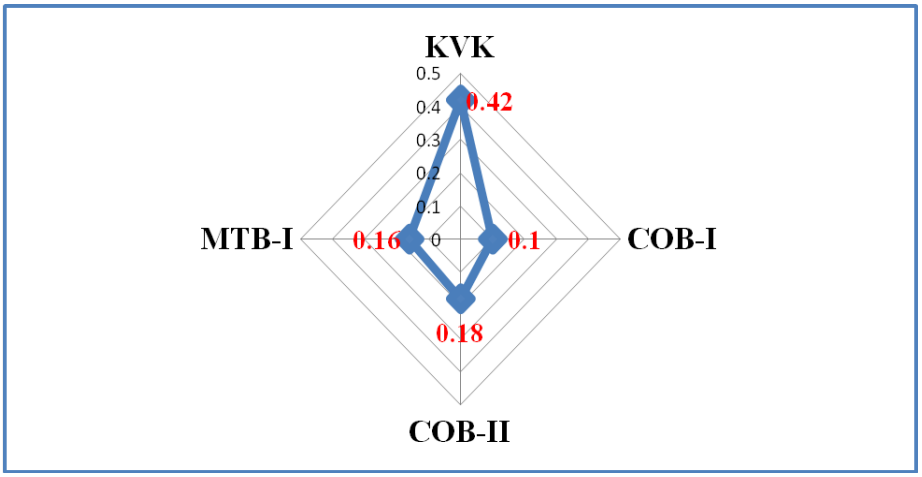


Fig 4.4: Pattern of Overall convergence

Figure 4.4 shows that KVK having highest convergence (0.42) followed by Cooch Behar block-II ATMA (0.18), Mathabhanga-I (0.16) and Cooch Behar-I (0.1) block ATMA respectively.

Fig.-4.5 explained the heat map on change of convergence level of study units (KVK and ATMA) with different organisations over temporal frame (last five years). The map represented on the five years activity of the KVK and ATMA.

Institutions	KVK	ATMA-(COB-I)	ATMA(Mathabhanga)	ATMA(COB-II)
ICAR	⇧ 1	x	x	x
SAU	⇧ 1	⇧ 1	⇨ 0	⇧ 1
KVK	⇧ 1	⇧ 1	⇧ 1	⇧ 1
Foreign organization	⇧ 1	x	x	x
Agriculture	⇧ 1	⇧ 1	⇧ 1	⇧ 1
Horticulture	⇨ 0	⇧ 1	⇩ -1	⇧ 1
Animal resource dept.	⇩ -1	⇧ 1	⇨ 0	⇧ 1
Fishery	⇨ 0	⇧ 1	⇧ 1	⇧ 1
Soil conservation	⇨ 0	⇧ 1	⇧ 1	⇧ 1
ATMA	⇧ 1	x	x	x
DRDC	⇩ -1	⇨ 0	⇩ -1	x
CADC	⇩ -1	⇨ 0	⇨ 0	x
Sericulture	⇩ -1	x	⇨ 0	⇧ 1
Farmers club	⇧ 1	⇧ 1	⇧ 1	⇧ 1
Farmer producer organization	⇧ 1	⇧ 1	x	⇧ 1
SHGs	⇧ 1	⇧ 1	⇧ 1	⇧ 1
NGOs	⇧ 1	⇧ 1	⇩ -1	⇧ 1
Cooperative	⇩ -1	⇧ 1	⇨ 0	x
Private company	⇧ 1	⇨ 0	x	x
Input dealer	⇧ 1	⇧ 1	⇧ 1	⇧ 1
NABARD	⇧ 1	x	x	x
Any nationalized bank	⇨ 0	x	⇨ 0	x
Post office	⇧ 1	x	x	x
Microfinance institute	⇨ 0	x	x	x

⇧= Increased; ⇩= Decreased; ⇨ = No change; **X** = No link

Fig 4.5: Heat map on Convergence matrix of KVK and ATMA with different organisations over temporal frame

From the figure 4.5 it was shown that the convergence of KVK with ICAR, State agriculture university, foreign organization, state department of agriculture, ATMA, Farmers club, Farmer producer organisation, SHGs, NGOs, Private company, Input dealer, NABARD and post office increases. As KVK was formed under ICAR and SAU, so the KVK was partnership with these on every aspect like administrative, technology etc. The convergence with foreign organization increases due to the different foreign projects like SRFSI. The state department of agriculture and ATMA were mainly gone for KVK for training on different aspects. Farmers were the ultimate end users of KVK services and the convergence channelize through different Farmer's club, FPOs, SHGs, NGOs. KVK helped the farmers in

formal group formation like FPO, SHGs etc. to access different schemes, programmes to generate employement activity, collective bargaining etc. and accelerate socioeconomic development as a whole. Due to the post office convergence extension model of IARI the convergence between KVK and post office increases. The convergence with input dealers increases due to the offering DAESI program through KVK as one district delivery agency. The convergence of KVK was less with animal resource department, DRDC, CADC, sericulture and cooperatives. The KVK doing most of the activities on agriculture so the convergence with animal resource department decreases. The convergence of KVK remains constant or no change with horticulture, fishery, soil conservation, any nationalized bank and microfinance. The KVK having own staff on soil conservation, horticulture, so the convergence remains constant with these department.

Regarding the ATMA blocks, the convergence Cooch Behar-I block increased with SAU, KVK, state department of agriculture, horticulture, animal resource, soil conservation, fishery, farmers club, FPO, SHG, NGOs and input dealers. There was no convergence with ICAR, sericulture, NABARD, any nationalized bank, post office and microfinance institute. The convergence of Mathabhanga-I block increased with KVK, agriculture, fishery, soil conservation, farmers club, SHG and input dealer. The convergence decreased with horticulture, DRDC, NGOs and no change with SAU, animal resource department, cooperative and any nationalized bank. The convergence of Cooch Behar-II block increased with SAU, KVK, state department of agriculture, horticulture, animal resource, fishery, soil conservation, sericulture, farmers club, FPO,SHGs, NGOs and input dealers. There was no convergence with ICAR, foreign organization, CADC, private company, NABARD, any nationalized bank, post office and microfinance. In case of all ATMA blocks the convergence increased with KVK, state department of agriculture, fishery, soil conservation, farmers organisations, input dealer. The staffs of ATMA were mainly taking training from the KVK, so the convergence increases. ATMA was working under the state department of agriculture, so the convergence was so strong with department. According to the need of farmer and planning formed by the district ATMA the ATMA blocks convergence with the other department.

4.2. Constraints faced on opertionalisation of pluralistic services

This section explored different constraints faced by the study organizations towards practicing pluralistic services. Different constraint situations (enlisted through literature survey and discussion with officials and selected through experts' rating) were exposed with a 3-point scale for response as: extreme (3), moderate (2) and low (1) respectively. Constraint was assessed on different domains viz. Administrative, Management, Technological, Infrastructural & Policy, Financial and Political. Domain-wise Sum and Overall sum were considered as the Value of the Constraint.

Table 4.7 displayed the frequency distribution of officials perceived different levels of constraints (somewhat, moderate, extreme) and ranking of different constraints faced by the KVK officials during service to the farmers. The table showed different types of constraints faced by the officials like administrative, management, technological, Infrastructure & policy, Financial and political constraints.

Table 4.7: Constraints faced by KVK officials (expressed in percentage)

Sl. No.	Constraints	Somewhat (1)	Moderate (2)	Extreme (3)	Mean Score	RANK
Administrative constraints						
1.	Inadequate staffing pattern to provide pluralistic services to the farmers	0	40.00	60.00	2.60	II
2.	Staff vacancy within sanctioned posts	20.00	40.00	40.00	2.20	IV
3.	Other line departments are reluctant to support practicing pluralistic services	20.00	40.00	40.00	2.20	V
4.	Posts of supporting staff are less	0	0	100.00	3.00	I
5.	Too much report writing	0	40.00	60.00	2.60	III
6.	Lack of opportunities for updating knowledge	40.00	20.00	20.00	1.80	VI
Management Constraint						
1.	Lack of incentives for excellent	0	0	100.00	3.00	I

	work					
2.	Lack of encouragement from superiors	40.00	40.00	20.00	1.80	II
3.	Lack of cooperation from subordinates, office staff and colleagues	40.00	60.00	0	1.60	IV
4.	Discrimination in rewards	20.00	80.00	0	1.80	III
5.	Difficulty in practicing Bottom-up planning with farming community	60.00	20.00	20.00	1.60	V
Technological constraint						
1.	Lack of location specific technologies	40.00	60.00	0	1.60	II
2.	Lack of response from the farmers to adopt technologies	20.00	80.00	0	1.80	I
3.	Lack of training facility to know about new complex technology	80.00	20.00	0	1.20	III
Infrastructure and Policy Constraint						
1.	Lack of infrastructural support below district level	20.00	40.00	40.00	2.20	I
2.	Inadequate policy support for convergence with other service departments (Govt./NGO/Pvt.)	40.00	60.00	0	1.60	III
3.	Shortage of transport facility	20.00	40.00	40.00	2.20	II
Financial and Political constraint						
1.	Pressure from the local politician to fetch more benefits from KVK schemes to their own jurisdiction	100.00	0	0	1.00	II
2.	Inadequacy of funds	0	100.00	0	2.00	I

Administrative Constraint

The analysed result shows that majority of the staffs of KVK reported that posts of supporting staffs are less having highest mean score 3.00 followedby inadequate staffing pattern to provide pluralistic services to the farmers, too much report writing, other line departments are reluctant to support practicing pluralistic services, staff vacancy within sanctioned posts and Lack of opportunities for updating knowledge having mean score 2.60,2.60,2.20,2.20 and 1.80 respectively. The supporting staffs are less in the KVK as compared to the organisation. KVK is the only central level organisation in a district to conduct research and to implement the ICAR programmes with the collaboration with other state departments. So, there is a requirement of more supporting staff and a good staffing pattern which improves the effective work delivery to the farmers. Due to the heavy work load from the government to conduct the programmes and sending report to the government was a major problem. It was also seen that the state departments are not so cooperative to work with KVKs. (Ramannanavar and Nagnur,2019)

Management Constraint

From the table it was revealed that the management constraints were having more or less similar with each other except lack of incentives for excellent work. Majority of the officials gives first rank to the lack of incentives for excellent work having mean score 3.00. The other constraints perceived were lack of encouragement from superior and discrimination in reward having mean score 1.80. The last two constraints perceived by the officials gives 4^{th} and 5^{th} rank were lack of cooperation from subordinates, office staff and colleagues and difficulty in practicing Bottom-up planning with farming community. In KVK, there was very less or no incentive for the excellent work. The KVK get award for the excellent work nut the officials not get any payment or award for their hard work. So, the government should give some incentive to increase the level of confidence of officials and motivate them to do more hard work.

Technological Constraint

The result shows the ranking of technological constraints faced by the KVK officials. From the table it shows that the officials given first rank to the lack of response from the farmers to adopt the technologies having mean value 1.80 followed by lack of specific technologies (1.60) and lack of training facility to know about new complex technology(1.20) severally. As majority of the farmers are small and medium land holding, so their response to adopt any new technology is very difficult. The technologies recommended by the

government is also not location specific which is also big problem for the officials. The officials also do not get enough training to know the complex technologies. So, there should be a good technology specialist who can give training to the farmers about the new technologies.

Infrastructure and Policy Constraint

The table reflected that the officials gives first rank to lack of infrastructural support below district level followed by shortage of transport facility and inadequate policy support for convergence with other service departments (Govt./NGO/Pvt.) respectively. KVK is the only organisations which have no other sub offices below the district level. The KVK staffs directly go to the farmers for any lunch of programme or to solve the problem. The KVK having only one vehicle for transport which was a big problem for the staffs to cover all the areas of the district. To solve all these constraints infrastructure of KVK should be improved at block and Panchayat level by the convergence with public and private organisations. The policy structure of KVK should include a greater number of farmer producer organisation, NGOs and farmers club to work at the grassroot level.

Financial and Political Constraint

From the table it was revealed that majority of the officials gives first rank to inadequacy of funds was a major constraint followed by pressure from the local politician to fetch more benefits from KVK schemes to their own jurisdiction. The fund was released by the government was not so sufficient to cover the district.

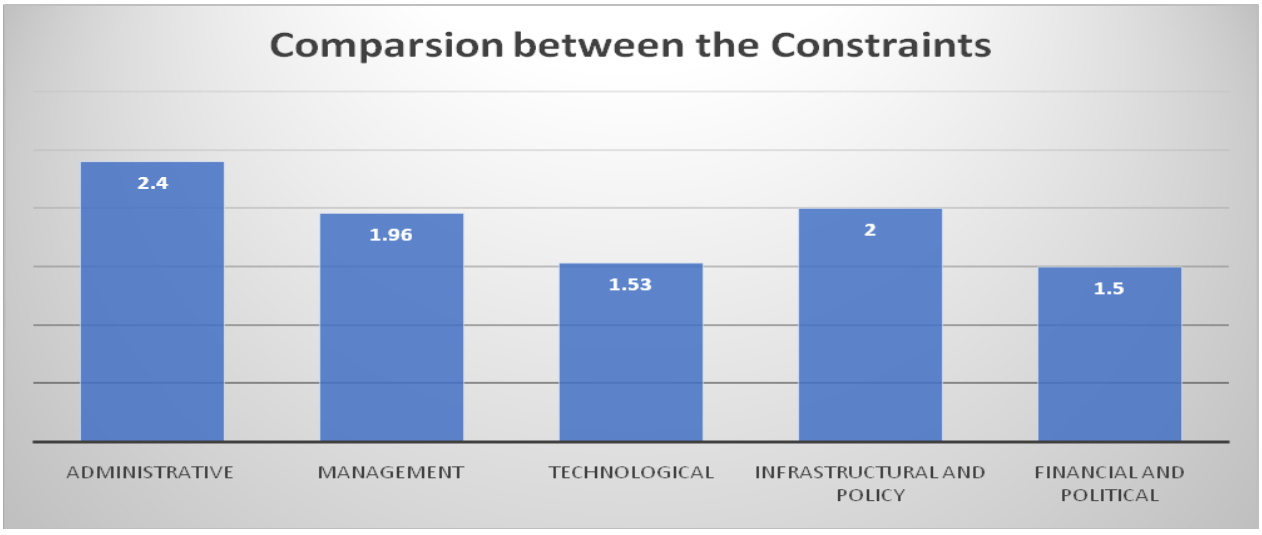


Fig 4.6: Comparison between different domains of constraints faced by KVK officials

From the figure it showed that administrative constraint was the major constraint followed by infrastructural and policy, management constraint. The other two constraints perceived by the officials were equal.

Table 4.8 depicted percentage of officials perceiving constraints and the ranking of constraints perceived by the ATMA officials for providing service to the farmers.

Table 4.8: Constraint faced by the ATMA officials (expressed in percentage)

Sl. No.	Constraints	Somewhat (1)	Moderate (2)	Extreme (3)	Mean	RANK
Administrative constraints						
1.	Inadequate staffing pattern to provide pluralistic services to the farmers	0	78.26	21.74	2.21	I
2.	Staff vacancy within sanctioned posts	30.43	39.13	30.43	2.00	III
3.	Other line departments are reluctant to support practicing pluralistic services	8.70	78.26	13.04	2.04	II
4.	Posts of supporting staff are less	52.17	30.43	17.39	1.65	VI
5.	Too much report writing	30.43	52.17	17.39	1.89	V
6.	Lack of opportunities for updating knowledge	30.43	47.83	21.74	1.91	IV
Management Constraint						
1.	Lack of incentives for excellent work	26.09	39.13	34.78	2.08	I
2.	Lack of encouragement from superiors	30.43	60.87	8.70	1.78	III
3.	Lack of cooperation from subordinates, office staff and colleagues	47.83	47.83	4.35	1.56	V
4.	Discrimination in rewards	30.43	56.52	13.04	1.82	II

5.	Difficulty in practicing Bottom-up planning with farming community	30.43	65.22	4.35	1.73	IV
Technological Constraints						
1.	Lack of location specific technologies	26.09	56.52	17.39	1.91	III
2.	Lack of response from the farmers to adopt technologies	17.39	56.52	26.09	2.08	I
3.	Lack of training facility to know about new complex technology	17.39	65.22	17.39	2.00	II
Infrastructure and Policy Constraint						
1.	Lack of infrastructural support below district level	26.09	65.22	8.70	1.82	II
2.	Inadequate policy support for convergence with other service departments (Govt./NGO/Pvt.)	8.70	82.61	8.70	2.00	I
3.	Shortage of transport facility	30.43	60.87	8.70	1.78	III
Financial and Political constraint						
1.	Pressure from the local politician to fetch more benefits from ATMA schemes to their own jurisdiction	34.78	39.13	26.09	1.91	II
2.	Inadequacy of funds	17.39	65.22	17.39	2.00	I

Administrative Constraint

To run an organisation efficiently the administration should be structured. From the table, it showed that majority of ATMA officials given first rank to inadequate staffing pattern to provide pluralistic extension service to farmer having highest mean score 2.21 followed by other constraints like other line departments are reluctant to support practicing pluralistic services (2.04),Staff vacancy within sanctioned posts (2.00), lack of opportunities for updating knowledge(1.91),too much report writing(1.85) and post of supporting staff are less(1.65) respectively. ATMA is formed at district level to provide pluralistic service to the

farmers. But the staffing pattern is not good as it is not recruiting any subject area specialist to provide service. ATMA is formed to work with other line departments but it is only working under the state department of agriculture. ATMA should be reformed at district level with specific subject area specialist to provide service to the farmer.

Management Constraint

Management is the process of controlling or dealing with the people for improvement of the organisation. From the table it was revealed that majority of officials gives first rank to lack of incentives for excellent work having highest mean score 2.08 followed by discrimination in reward,lack of encouragement from superiors, difficulty in practicing Bottom-up planning with farming community and lack of cooperation from subordinates, office staff and colleagues having mean score 1.82,1.78,1.73 and 1.56 respectively.There was no incentive for the officials for their excellent work which affects the work performance of the officials. Their moral value decreases as the are not getting any recognition for their excellent work. The government should give some incentive for their excellent work for that the officials will be highly encouraged and their work performance will be improved.

Technological Constraint

Technology is the main component to increase the work efficiency and to reduce the time of work. Table reflects that lack of response from the farmers to adopt technologies was the major constraint having mean score 2.08 followed by lack of training facility to know about new complex technology(2.00) and lack of location specific technologies (1.91) respectively. As per the officials there were a lot of farmers who are hesitate to adopt new technology. The main reason of lack of response from the farmers was that the farmers were small and marginal and believe in traditional farming. The officials should aware the farmer about the technology and they should form different farmer group to adopt the technology. For which the cost of technology will be less and farmers can easily use the technology.

Infrastructure and Policy constraint

From the table it was shown that majority of the officials gives first rank to inadequate policy support for convergence with other service departments (Govt./NGO/Pvt.) having mean score 2.00 followed by lack of infrastructural support below district level (1.82) and Shortage of transport facility (1.78) respectively. The officials were not getting enough support from other departments to do the work more effectively. There should be specific

policy for the convergence of the departments to improve the efficiency of worker as well as the farmers.

Financial and Political constraint

Table reflects that inadequacy of fund was the major constraint than the pressure from the local politician to fetch more benefits from KVK schemes to their own jurisdiction. The fund coming from the government was not adequate to solve a large number of farmers problem. The fund should be increased by the government and there should be a specific structure how to utilise the fund in a specific scheme.

Figure 4.7 shows that technological constraint was the major constraint followed by administrative, financial and political, infrastructure and policy and management respectively. The officers should be taken proper training on the new technology before going to the farmer. The ATMA should converge with the private company to transfer the technology to the farmers.

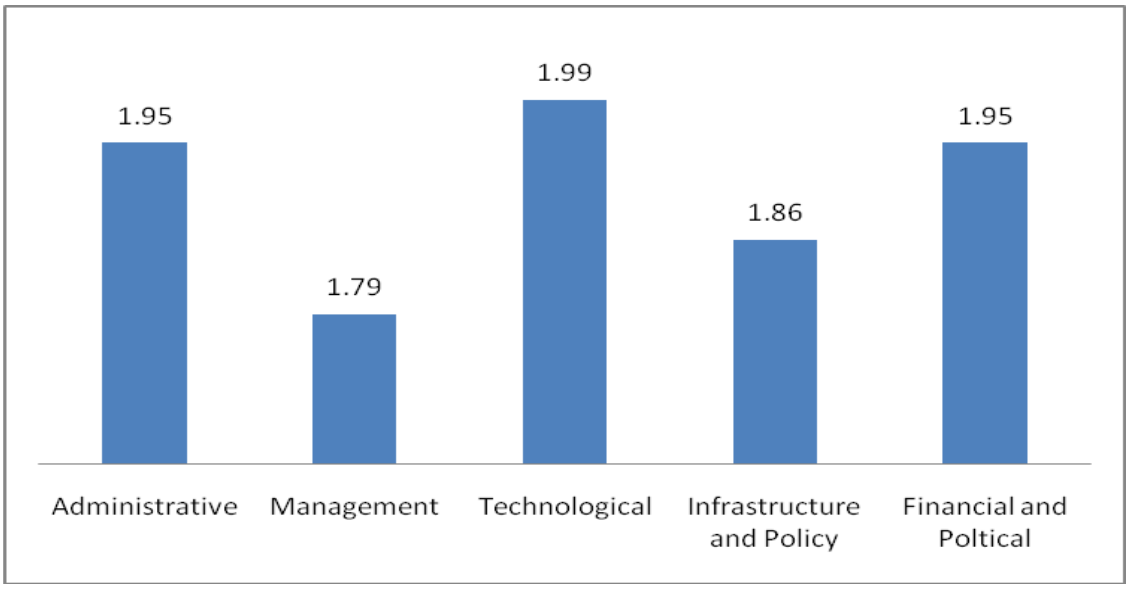


Fig 4.7: Comparison between the constraints faced by ATMA officials

Similar type of constraints faced by ATMA officials also observed in the study of Bortamuly and Khuhly,2013, Das and Borua,2017.

4.3. Socio-economic and personal characteristics of end users

Socio-economic and personal characters are the determining factors of individual capability and social sanction towards any action. The present section expresses the socio-economic and personal background of the end-users to realize their perspective of present options found in the study.

Table 4.9: Distribution of respondents according to age

Age	Beneficiary		Non- Beneficiary	
	Freq	Percent	Freq	Percent
Young Age (up to 35)	19	19.00	17	17.00
Middle Age (35-50)	54	54.00	41	41.00
Old Age (Above 50)	27	27.00	42	42.00
Statistical implication: Chi-Square=5.51NS				

Table (4.9) presents the distribution of respondents according to their age. The result shows that most of the beneficiary farmers were middle aged that is 54% followed by 27% old aged and 19% young aged. In case of non-beneficiary farmers 42% belongs to old aged followed by middle aged (41%) and young aged (17%).The statistical value indicates that there was no significant difference between the age of the beneficiary and non-beneficiary farmers.

Table 4.10 Distribution of respondents according to education

Education	Beneficiary		Non- Beneficiary	
	Freq	Percent	Freq	Percent
Illiterate	7	7.00	15	15.00
Primary School	18	18.00	25	25.00
Middle School	27	27.00	22	22.00
High School	14	14.00	19	19.00
Higher Secondary	14	14.00	10	10.00
Graduation	15	15.00	9	9.00
Above	5	5.00	0	0
Statistical implication: Chi-Square=12.48*; *Significant at 5%				

The table(4.10) depicted the distribution of respondents in relation to their education. It was seen that 27 percent of beneficiaries having education status of middle school followed by 18% primary school,15% graduated,14 % each in high school and higher secondary,7% illiterate and 5% above graduation respectively. But in case of non-beneficiary farmers 25% having education status primary school followed by 22% middle school, 19% high school,15% illiterate, 10% higher education and 9% above graduation respectively. The statistical value indicates there was a significant relation between the farmers. The beneficiary farmers were more educated than non-beneficiary farmer as their exposure was high outside the social system. They were mainly getting different benefits as they are associated with the different pluralistic organisation.

Table4.11: Distribution of respondents according to Religion

Religion	**Beneficiary**		**Non- Beneficiary**	
	Freq	**Percent**	**Freq**	**Percent**
Hindu	75	75.00	83	83.00
Muslim	25	25.00	17	17.00
Statistical implication: Chi-Square=1.92NS				

The table 4.11 shows the distribution of respondents according to their religion. The result shows that majority of the beneficiary farmers were Hindu (75%) followed by Muslim (25%) and 83% non-beneficiaries followed by 17% Muslim respectively.

Table 4.12: Distribution of respondents according to Caste

Caste	**Beneficiary**		**Non- Beneficiary**	
	Freq	**Percent**	**Freq**	**Percent**
General	12	12.00	9	9.00
OBC	36	36.00	25	25.00
SC	52	52.00	66	66.00
ST	0	0	0	0
Statistical implication: Chi-Square=4.07NS				

The table 4.12 displayed the distribution of respondents in reference to their caste. It is seen that majority of the beneficiaries and non-beneficiaries were belongs to SC category that is 52% and 66% respectively. It is also presented in the table that 36% beneficiaries belong to OBC category followed by 12% general category and 25% non-beneficiaries belongs to OBC category followed by 9% general category respectively. The statistical value implies that there was no significant relationship in between the castes. As the farmers were belongs to SC category, it shows that SC category were mostly involved in doing agriculture.

Table 4.13: Distribution of respondents according to Primary occupation

Primary Occupation	**Beneficiary**		**Non- Beneficiary**	
	Freq	**Percent**	**Freq**	**Percent**
Agriculture	100	100.00	100	100.00

The table 4.13 presented the distribution of respondents according to their primary occupation. The result shows that 100 percent of respondents in both cases i.e. beneficiaries and non-beneficiaries are doing agriculture. It implies that farmers are taken for the study were mostly doing agriculture.

Table 4.14: Distribution of respondents according to economic class

Economic Class	**Beneficiary**		**Non- Beneficiary**	
	Freq	**Percent**	**Freq**	**Percent**
APL	56	56.00	62	62.00
BPL	44	44.00	38	38.00
Statistical implication: Chi-Square=0.74NS				

The table 4.14 presented the distribution of respondents according to their economic class.The result shows that majority of beneficiaries belong to APL class i.e. 56% followed by 44% BPL. But in case of non-beneficiaries 62% were APL class followed by 38% BPL class. The statistical value indicates that there was no significant relationship in economic class. The majority of respondents belongs to APL class which shows that their income was good form their occupation.

Table 4.15: Distribution of respondents according to highest education of Male in their family

Highest Education (Male)	Beneficiary		Non- Beneficiary	
	Freq	Percent	Freq	Percent
Illiterate	2	2.00	0	0
Primary School	8	8.00	11	11.00
Middle School	16	16.00	15	15.00
High School	18	18.00	35	35.00
Higher Secondary	21	21.00	18	18.00
Graduation	25	25.00	16	16.00
Above	10	10.00	5	5.00
Statistical implication: Chi-Square=11.83NS				

The table 4.15 presented the distribution of the respondents according to the highest education of male member in their family. The result shows that majority of beneficiaries having graduation that is 25% followed by 21% higher secondary, 18% high school, 16% middle school, 10% above graduation, 8% primary school and 2% illiterate respectively. In case of non-beneficiaries most of the respondents belong to high school i.e. 35% followed by 18% high school, 16% graduation, 15% middle school, 11% primary school and 5% above graduation respectively. The statistical value implies that there was no significant relationship between the farmers in case of highest education of male. In both the groups the families were very much interested to give a higher education to their children to improve the socioeconomic condition. They believed that higher education can give them a good exposure to know everything and they could get government job.

Table 4.16: Distribution of respondents according to the highest education of female in their family

Highest Education (Female)	Beneficiary		Non- Beneficiary	
	Freq	Percent	Freq	Percent
Illiterate	3	3.00	2	2.00
Primary School	14	14.00	15	15.00
Middle School	25	25.00	21	21.00

High School	25	25.00	34	34.00
Higher Secondary	13	13.00	17	17.00
Graduation	14	14.00	10	10.00
Above	6	6.00	1	1.00
Statistical implication: Chi-Square=6.72NS				

The table 4.16 displayed the distribution of respondents according to their highest education of female in their family. The result shows that majority of the beneficiary family female members having education status middle school and high school i.e. 25% followed by 14% each in primary school and graduation, 13% higher secondary, 6% above graduation and 3% illiterate respectively. Coming to the non-beneficiaries 34% belongs to high school followed by 21% middle school, 17% higher secondary, 15% primary school, 10% graduation, 2% illiterate and 1% above graduation respectively. The statistical value indicates there was no significant difference among the beneficiaries and non-beneficiaries.

Table 4.17: Distribution of respondents according to their Secondary occupation

Secondary Occupation	**Beneficiary**		**Non- Beneficiary**	
	Freq	**Percent**	**Freq**	**Percent**
Agriculture	50	50.00	34	34.00
Animal Husbandry	7	7.00	9	9.00
Small business	21	21.00	33	33.00
Farm/Casual Labour	5	5.00	10	10.00
Govt. Employment	2	2.00	3	3.00
Pvt. Employment	9	9.00	3	3.00
Van/Rickshaw puller	6	6.00	8	8.00
Statistical implication: Chi-Square=11.78NS				

The table 4.17 presented the distribution of respondents according to their secondary occupation. The analysed data shows that majority of the beneficiaries having secondary occupation was agriculture i.e. 50% followed by 21% doing small business, 9% private employ, 7% animal husbandry, 6% van/rickshaw puller, 5% farm/casual labour and 2% govt. employ respectively. In case of non-beneficiaries 34% doing agriculture followed by 33%

small business, 10% farm/casual labour, 9% animal husbandry, 8% van/rickshaw puller, 3% each in private and govt. employ respectively. The statistical vale indicates that there was no significance difference between the two farmer groups. It shows that beneficiaries were mostly doing agriculture as they get benefit from various public and private agriculture departments.

Table 4.18: Distribution of respondents according to family annual income

Family Income	Beneficiary		Non- Beneficiary	
	Freq	Percent	Freq	Percent
Low (upto 86001)	32	32.00	42	42.00
Medium (86001 to 154000)	39	39.00	47	47.00
High (Above 154000)	29	29.00	11	11.00
Statistical implication: Chi-Square=10.19**				

The table 4.18 shows the distribution of respondents according to their family annual income. The result shows that majority of the beneficiaries having medium level income i.e. 39% followed by 32% low income and 29% high income level respectively. In case of non-beneficiaries 47% having medium income followed by 42% low income and 11% high level income respectively. The statistical value indicates that there was significant difference between the beneficiaries and non-beneficiaries. The beneficiaries were doing agriculture for profit oriented whereas majority non-beneficiaries doing agriculture for their own purpose. So, the income was more in case of beneficiaries than non-beneficiaries.

Table 4.19: Distribution of respondents according to livelihood diversity

Livelihood Diversity	Beneficiary		Non- Beneficiary	
	Freq	Percent	Freq	Percent
Low (upto 0.34)	14	14.00	14	14.00
Medium (0.34 to 0.51)	77	77.00	77	77.00
High (Above 0.51)	9	9.00	9	9.00

Table 4.19 presented the distribution of respondents according to their livelihood diversity. It shows that there was no difference in between the two group of farmers in their

livelihood diversity. The result shows that both beneficiaries and non-beneficiaries have medium level livelihood diversity i.e. 77% followed by 14% low and 9% high level of livelihood diversity respectively. As both groups are belonging to farmer group and they mostly depend on agriculture for their livelihood, so there is no difference in their livelihood diversity.

Table 4.20: Distribution according to Family Size

Family size	**Beneficiary**		**Non- Beneficiary**	
	Freq	**Percent**	**Freq**	**Percent**
Small (up to 4)	14	14.00	8	8.00
Medium (4 to 6)	52	52.00	51	51.00
Large (Above 6)	34	34.00	41	41.00
Statistical implication: Chi-Square=2.29NS				

The table 4.20 presented the distribution of respondents according to their family size. The result shows that majority of the beneficiaries having medium family size i.e. 52% followed by 34% large and 14% small family size respectively. It was also seen that in case of non-beneficiaries majority of respondents belong to medium family size(51%) followed by large(41%) and small (8%) family size respectively. The statistical value indicates that there is no significant relationship between the two groups.

4.4. Access of the end users towards the extension agents

Access is the level of contact established by the respondent himself/herself or contact established by the service agency (viz. the organisation) for fulfilment of needs. This section also explored the extent of need on different agriculture and allied aspects and need wise sources of information. Contact to different organizations for fulfilling their need ultimately constituted the level of access of an organization

4.4.1 Access of KVK beneficiary and non-beneficiary towards extension agent

The table displayed the extent of contact of KVK beneficiary and Non-beneficiary with different general development departments of public extension system.

Table 4.21: Level of contact with different general development departments of Public Extension system **Expressed in percentage**

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		Never	Only in need	Sometimes	Regular		
Panchayati Raj Institute (PRI)	Beneficiary	6 (24.00)	10 (40.00)	9 (36.00)	0	1.12	2.29*
	NB	9 (36.00)	15 (60.00)	1 (4.00)	0	0.68	
Community Dev. Block (CDB)	Beneficiary	19 (76.00)	3 (12.00)	2 (8.00)	0	0.29	0.61NS
	NB	20 (80.00)	5 (20.00)	0	0	0.20	
Dept of Irrigation	Beneficiary	9 (36.00)	14 (56.00)	2 (8.00)	0	0.72	3.89**
	NB	21 (84.00)	4 (16.00)	0	0	0.16	
Dept. of Electricity	Beneficiary	1 (4.00)	24 (96.00)	0	0	0.96	3.34**
	NB	10 (40.00)	15 (60.00)	0	0	0.60	
Financial Institutes	Beneficiary	5 (20.00)	20 (80.00)	0	0	0.80	4.23**
	NB	18 (72.00)	7 (28.00)	0	0	0.28	

The result shows that beneficiaries had more contact from different general departments of the public extension system than the non-beneficiaries. From the table it was also seen that the beneficiaries have more contact with the panchayat raj institute having highest mean contact score 1.12 followed by department of electricity, financial institutes, department of irrigation and community development block having mean contact score 0.96, 0.80, 0.72 and 0.29 separately. Similar trend also seen in case of non-beneficiaries but their contact was very less with the departments. The t-value indicates that there was statistically significant between beneficiaries and non-beneficiaries in terms of contact with every department except in the community development block. There was no significant difference between the beneficiaries and non-beneficiaries in contact with community development block. The KVK beneficiaries have more exposure towards the different organization than the non-beneficiaries.

The table 4.22 depicted the level of contact of KVK beneficiaries and non-beneficiaries with agriculture and allied development departments of public extension system. From the table, it was revealed that the beneficiaries have good contact with agriculture department than the other departments. The t value indicates that there was a significant difference between beneficiaries and non-beneficiaries in each state department except the horticulture department. The farmers have less access towards state horticulture department as the farmers were mostly growing major crops like rice, potato, jute and maize in their fields. The beneficiaries were aware about different government schemes and they know where to get the benefit of these schemes.As most of the state government agriculture schemes were implemented through state agriculture department,so the farmers have good contact with the agriculture department.

Table 4.23 displays the level of contact with NGO and Farmers, organization. From the table it was shown that the beneficiaries have good contact with FPOs having mean contact score 2.44 than the non-beneficiaries having mean contact score 1.84 respectively. The statistical value indicates that there was a difference between the beneficiaries and non-beneficiaries in contact with FPO/FPCs. In the study there were very few numbers of NGOs, so the contact of farmer was very less with NGOs. The NGOs activity should be broadened to reach the farmers.

Table 4.22: Level of contact with different Agriculture and allied development departments of Public Extension system (Expressed in percentage)

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		N	O	S	R		
Agriculture department	Beneficiary	0	12 (48.00)	13 (52.00)	0	1.52	4.62**
	NB	3 (12.00)	21 (84.00)	1 (4.00)	0	0.92	
Horticulture Department	Beneficiary	25 (100.00)	0	0	0	0.00	0
	NB	25 (100.00)	0	0	0	0.00	
Animal resource department	Beneficiary	18 (76.00)	6 (20.00)	1 (4.00)	0	0.36	0.27NS
	NB	17 (68.00)	8 (32.00)	0	0	0.32	
Fisheries Department	Beneficiary	13 (52.00)	11 (44.00)	1 (4.00)	0	0.52	3.39**
	NB	23(92.00)	2(8.00)	0	0	0.08	
Soil Conservation Department	Beneficiary	8(32.00)	14(56.00)	3(12.00)	0	0.80	6.19**
	NB	25(100.00)	0	0	0	0.00	

N=Never; O=Only in need; S=Sometimes; R=Regular

Table 4.23: Level of contact with NGO & Farmers' organisation

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		N	O	S	R		
FPO/FPC	Beneficiary	0	1 (4.00)	12 (48.00)	12 (48.00)	2.44	3.16**
	NB	0	9	11	5	1.84	

			(36.00)	(44.00)	(20.00)		
Non-Governmen t Organisatio n	Beneficiary	21 (84.00)	2 (8.00)	1 (4.00)	1 (4.00)	0.28	1.89NS
	NB	25 (100.00)	0	0	0	0.00	

N=Never; O=Only in need; S=Sometimes; R=Regular

Table 4.24: Level of contact with autonomous extension agents

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		N	O	S	R		
Agricultural University	Beneficiary	0	8(32.00)	14(56.00)	3(12.00)	1.80	13.94**
	NB	25(100.00)	0	0	0	0.00	
Krishi Vigyan Kendra	Beneficiary	0	0	19(76.00)	6(24.00)	2.24	25.69**
	NB	25(100.00)	0	0	0	0.00	
ATMA	Beneficiary	0	3(12.00)	20(80.00)	2(8.00)	1.96	16.34**
	NB	22(88.00)	3(12.00)	0	0	0.12	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table 4.24 depicts the level of contact with autonomous extension agents. There are mainly three autonomous organization in the study area. From the it was revealed that majority of the beneficiaries have good contact with the agricultural university, Krishi Vigyan Kendra and ATMA having mean contact score 1.80,2.24 and 1.96 respectively. In case of non-beneficiaries, the contact was very less or there was no contact with Agricultural university and KVK. The reason of no contact with the organization were that non-beneficiaries were less aware about the organization, most of them belongs to poor family

and less interest in agriculture. The t-value shows that there was significant difference between the beneficiaries and non-beneficiaries.

Table 4.25: Level of contact with private extension agents

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		N	O	S	R		
Input dealers	Beneficiary	0	2(8.00)	20(80.00)	3(12.00)	2.04	0.63NS
	NB	0	1(4.00)	20(80.00)	4(16.00)	2.12	
Corporate house	Beneficiary	23(92.00)	2(8.00)	0	0	0.08	1.44NS
	NB	25(100.00)	0	0	0	0.00	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.25) depicted the level of contact of beneficiaries and non-beneficiaries with the private extension agents. The analysed result shows that both beneficiaries and non-beneficiaries have a strong relationship with the input dealers as they got all type of benefits like seed, fertilizer, insecticide, pesticide etc. easily and quickly. The input dealers are available in their local market, so they can easily access them. There were very a smaller number of corporate houses, so their accessibility was very less by the farmers. The statistical value indicates that there was no difference between the two groups in accessing input dealer and corporate house.

4.4.2 Access of extension agent towards KVK beneficiary and non-beneficiary

Table 4.26: Level of contact of Extension agents different general development departments of Public Extension system

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		N	O	S	R		
Panchayati Raj Institute (PRI)	Beneficiary	0	0	13(52.00)	12(48.00)	2.48	7.66**
	NB	5(20.00)	16(64.00)	2(8.00)	2(8.00)	1.04	
Community Dev. Block (CDB)	Beneficiary	21(84.00)	3(12.00)	1(4.00)	0	0.20	2.00*
	NB	25(100.00)	0	0	0	0.00	
Dept of Irrigation	Beneficiary	10(40.00)	15(60.00)	0	0	0.60	5.19**
	NB	24(96.00)	1(4.00)	0	0	0.04	
Dept. of Electricity	Beneficiary	3(12.00)	22(88.00)	0	0	0.88	4.82**
	NB	17(68.00)	8(32.00)	0	0	0.32	
Financial Institutes	Beneficiary	7(28.00)	18(72.00)	0	0	0.72	5.97**
	NB	23(92.00)	2(8.00)	0	0	0.08	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table(4.26) represents the level of contact of extension agents of different general development departments of Public Extension system with farmers. The analysed data shows that the extension agents were good contact with the beneficiary than the non-beneficiary. Panchayat raj institutes have more contact with the beneficiary having mean score 2.48

followed by department of electricity(0.88), financial institutes(0.72),department of irrigation(0.60) and community development block(0.20) respectively. In case of non-beneficiary, the panchayat raj institutes had contact with the farmers than the other extension agents having mean score 1.04.The extension agents of panchayat raj institutes are the local leader who helps the farmer by reaching their home. They are the agents who carried out the government schemes like MGNREGA,IAY etc.The statistical value designates that there was a variation between beneficiary and non-beneficiary in terms of contact of extension agents with them.

Table 4.27: Level of contact Extension agents of different Agriculture and allied development departments of Public Extension system

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		N	O	S	R		
Agriculture department	Beneficiary	0	12(48.00)	12(48.00)	1(4.00)	1.56	10.10**
	NB	21(84.00)	4(16.00)	0	0	0.16	
Horticulture Department	Beneficiary	25(100.00)	0	0	0	0.00	-1.00NS
	NB	24(96.00)	1(4.00)	0	0	0.04	
Animal resource department	Beneficiary	19(76.00)	5(20.00)	1(4.00)	0	0.28	2.07*
	NB	24(96.00)	1(4.00)	0	0	0.04	
Fisheries Department	Beneficiary	15(60.00)	9(36.00)	1(4.00)	0	0.44	3.24**
	NB	24(96.00)	1(4.00)	0	0	0.04	
Soil Conservation Department	Beneficiary	9(36.00)	13(52.00)	3(12.00)	0	0.76	5.72**
	NB	25(100.00)	0	0	0	0.000	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.27) depicted the level of contact of extension agent of different agriculture and allied development departments of public Extension system with the farmers. From the table, it was revealed that the extension agents of agriculture department have more contact with the beneficiaries having highest mean contact score 1.56 than the other departments. There was very less contact or no contact with the non-beneficiaries by the extension agent. In some activities like the agriculture department converge with the KVKs to provide training on different aspect to the farmer. So, the KVK beneficiaries gets benefit directly from the agriculture department. The t-value indicates that there was significant difference between the beneficiaries and non-beneficiaries in terms of contact of extension agent of agriculture,animal resource,fisheries and soil conservation department except there was no variation in horticulture department.

Table 4.28: Level of contact of extension agent of NGO & Farmers' organisation

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		N	O	S	R		
FPO/FPC	Beneficiary	0	0	13(52.00)	12(48.00)	2.48	7.66**
	NB	5(20.00)	16(64.00)	2(8.00)	2(8.00)	1.04	
Non-Government Organisation	Beneficiary	20(80.00)	3(12.00)	1(4.00)	1(4.00)	0.32	2.13*
	NB	25(100.00)	0	0	0	0.00	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.28) displayed the level of contact of extension agent of NGO & Farmers' organization with the beneficiaries and non-beneficiaries. It shows that FPO/FPC contact more with the beneficiaries (mean contact score=2.48) than the non-beneficiaries(mean contact score=1.04).The KVK beneficiaries were mostly the members of the FPC/FPOs. The mean contact score of NGO with the beneficiaries was 0.32 that was more than the non beneficiaries. The activities of NGOs in the area were limited to a specific area. So,all the

beneficiaries were not get the benefits of NGOs. The statistical value indicates that there was significant difference in contact of extension agent with the two groups.

Table 4.29: Level of contact of extension agent of autonomous extension agents

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		N	O	S	R		
Agricultural University	Beneficiary	0	8(32.00)	14(56.00)	3(12.00)	1.80	13.94**
	NB	25(100.00)	0	0	0	0.00	
Krishi Vigyan Kendra	Beneficiary	0	0	20(80.00)	5(20.00)	2.20	26.94**
	NB	25(100.00)	0	0	0	0.00	
ATMA	Beneficiary	0	5(20.00)	16(64.00)	4(16.00)	1.96	12.56**
	NB	21(84.00)	4(16.00)	0	0	0.16	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.29) depicted the level of contact of extension agent of autonomous organization with the farmers.n The KVK extension agents had a very good relation with their benefiaries having mean contact score 2.20. ATMA extension agents also contact with the beneficiaries having mean contact score 1.96 followed by contact of agricultural university (1.80) separately. The extension agents of KVKs and Agricultural university had no contact with non-beneficiaries but ATMA agents have somewhat contact with the non-beneficiaries. The extension agents of KVK regularly in touch with their beneficiaries for the improvement of their production, marketing through different programs like NICRA, front line demonstration, on-farm training.The t-value designates that there was significant variation between the two groups.

Table 4.30: Level of contact of extension agents of private extension agents

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=50)				Mean contact score	t-test value
		N	O	S	R		
Input dealers	Beneficiary	1(4.00)	3(12.00)	18(72.00)	3(12.00)	1.92	6.05**
	NB	2(8.00)	21(84.00)	2(8.00)	0	1.00	
Corporate house	Beneficiary	24(96.00)	1(4.00)	0	0	0.04	1.00NS
	NB	25(100.00)	0	0	0	0.00	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.30) shows the level of contact of private extension agents with the beneficiaries and non-beneficiaries. The input dealers having good contact with the beneficiaries (mean contact score=1.92) and non-beneficiaries (1.00) respectively. As the farmers were mostly visited to the input dealer for different input material for agriculture, so there was good relationship between input dealer and farmers. Corporate houses had very less contact with the beneficiaries and non-beneficiaries. The t-value was significant in case of input dealer but no significant in corporate house.

Table 4.31: Access quotient of different groups of extension service providers/organisations according to KVK beneficiaries and non-beneficiaries

Groups of extension agents	Beneficiary		Non-beneficiary	
	Access- Index (Range: 0 to 1)	Rank	Access- Index (Range: 0 to 1)	Rank
Public general development departments	0.29	IV	0.11	III
Public line departments (Agriculture and allied)	0.21	V	0.05	IV
NGO and Farmers Organisation	0.46	II	0.24	II

Autonomous Extension agent	0.66	I	0.02	V
Private Extension Agent	0.34	III	0.26	I

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.31) depicted the access quotient of different groups of extension service providers/ organisations according to KVK beneficiaries and non-beneficiaries. From the table it was shown that the beneficiaries were more access towards the autonomous extension agents for different information need having value 0.66 followed by NGO and farmers organization(0.46), private extension agents(0.34), public general development departments(0.29) and public line departments(0.21). In case of non-beneficiaries, they were having more access towards private extension agents having access quotient 0.26 followed by NGO and Farmers organization(0.24), public general development(0.11),public line department(0.05) and autonomous extension agents(0.02) accordingly.

4.4.3 Access of ATMA beneficiary and non-beneficiary towards extension agent

Table 4.32: Level of contact with different general development departments of Public Extension system

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=150)				Mean contact score	t-test value
		N	O	S	R		
Panchayati Raj Institute (PRI)	Beneficiary	8(10.66)	29(38.66)	26(34.66)	12(16.00)	1.56	5.31**
	NB	38(50.66)	20(26.66)	13(17.33)	4(5.33)	0.77	
Community Dev. Block (CDB)	Beneficiary	24(32.00)	29(38.66)	21(28.00)	1(1.33)	0.98	4.35**
	NB	52(69.33)	13(17.33)	10(13.33)	0	0.44	
Dept of Irrigation	Beneficiary	39(52.00)	27(36.00)	9(12.00)	0	0.60	1.82NS
	NB	56(74.66)	10(13.33)	8(10.66)	1(1.33)	0.38	

Dept. of Electricity	Beneficiary	6(8.00)	49(65.33)	18(24.00)	2(2.66)	1.21	3.00**
	NB	22(29.33)	43(57.33)	7(9.33)	3(4.00)	0.88	
Financial Institutes	Beneficiary	22(29.33)	30(40.00)	13(17.33)	10(13.33)	1.14	0.80NS
	NB	39(52.00)	13(17.33)	7(9.33)	16(21.33)	1.00	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.32) represents the level of contact of ATMA beneficiaries and non-beneficiaries with different general development departments of Public Extension system. From the table it was revealed that the beneficiaries have more access towards panchayat raj institutes having highest mean contact score 1.56 followed by department of electricity(1.21), financial institutes(1.14), community development block(0.98) and department of irrigation(0.60) respectively. In case of non-beneficiaries, they had more contact with financial institutes (1.00) followed by department of electricity (0.88), panchayat raj institution (0.77), community development block (0.44) and department of irrigation (0.38) separately. The t-value indicates that there was significant difference between beneficiaries and non-beneficiaries in contact with panchayat raj institutes, community development block and department of electricity. There was no difference in contact with department of irrigation and financial institutes. Most of the rural development programmes are implemented through panchayat raj institutes. The beneficiaries were aware about the programmes, so they have more access towards panchayat raj institutes than the non-beneficiaries.

Table 4.33: Level of contact with different Agriculture and allied development departments of Public Extension system

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=150)				Mean contact score	t-test value
		N	O	S	R		
Agriculture department	Beneficiary	10(13.33)	28(37.33)	26(34.66)	11(14.66	1.50	6.70**

					)		
	NB	39(52.00)	26(34.66)	10(13.3 3)	0	0.61	
Horticulture Department	Beneficiar y	67(89.33)	6(8.00)	2(2.66)	0	0.13	0.88NS
	NB	70(93.33)	4(5.33)	1(1.33)	0	0.08	
Animal resource department	Beneficiar y	39(52.00)	25(33.33)	11(14.6 6)	0	0.62	1.96*
	NB	53(70.66)	14(18.66)	8(10.66)	0	0.40	
Fisheries Department	Beneficiar y	59(78.66)	9(12.00)	7(9.33)	0	0.30	0.54NS
	NB	60(80.00)	12(16.00)	2(2.66)	1(1. 33)	0.25	
Soil Conservation Department	Beneficiar y	34(45.33)	28(37.33)	11(14.6 6)	2(2. 66)	0.74	4.60**
	NB	63(84.00)	7(9.33)	3(4.00)	1(1. 33)	0.21	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.33) displays the level of contact with different Agriculture and allied development departments of Public Extension system. The analysed data shows that the beneficiaries have more contact with agriculture department having mean contact score 1.50 followed by soil conservation department(0.74),animal resource department(0.62), fisheries department(0.30) and horticulture department(0.13) respectively. The non-beneficiaries were less access towards the departments as comparison to the beneficiaries. Among different departments the non-beneficiaries have more access towards agriculture department (having mean contact score=0.61) than other departments. The statistical value indicates that there was significant difference between the beneficiaries and non-beneficiaries in contact with agriculture, soil conservation and animal resource department but no significant in case of horticulture and fishery department. In the study area the ATMA was mainly working under the agriculture department, so the beneficiaries have more contact with agriculture department than the other department.

Table 4.34: Level of contact with NGO & Farmers' organisation

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=150)				Mean contact score	t-test value
		N	O	S	R		
FPO/FPC	Beneficiary	1(1.33)	13(17.33)	30(40.00)	31(41.33)	2.21	4.60**
	NB	4(5.33)	27(36.00)	36(48.00)	8(10.66)	1.64	
Non-Government Organisation	Beneficiary	54(72.00)	10(13.33)	9(12.00)	2(2.66)	0.45	2.63**
	NB	68(90.66)	2(2.66)	5(6.66)	0	0.16	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.34) depicted the level of contact with NGO and farmers' organization. The table shows that beneficiaries have good contact with the FPO/FPC(mean contact score=2.21) than the non-beneficiaries(1.64).In case of NGOs the beneficiary have more access(0.45) than the non-beneficiaries(0.16) respectively. The t-value shows there was difference between the two groups in contact with FPO/FPC than NGOs. The FPOs are mainly created by a group beneficiary farmer to get the benefits from agriculture. So, the farmers have a good contact with this organization.

Table 4.35: Level of contact with autonomous extension agents

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=200)				Mean contact score	t-test value
		N	O	S	R		
Agricultural University	Beneficiary	32(42.66)	17(22.66)	24(32.00)	2(2.66)	0.94	7.17**
	NB	67(89.33)	7(9.33)	1(1.33)	0	0.12	
Krishi Vigyan	Benefici	34(45.	15(20.	19(25.	5(6.66	0.93	3.49**

Kendra	ary	33)	00)	33)	)		
	NB	56(74.66)	9(12.00)	8(10.66)	2(2.66)	0.41	
ATMA	Beneficiary	0	16(21.33)	38(50.66)	21(28.00)	2.06	12.02**
	NB	53(70.66)	9(12.00)	10(13.33)	3(4.00)	0.50	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.35) displayed the level of contact with autonomous extension agents. Table shows that the beneficiaries have good contact with ATMA (2.06) followed by agricultural university (0.94) and KVK (0.93) respectively. The non-beneficiaries were very less access towards these organisations. The statistical value designates that there was significant variation between two groups in accessing towards the autonomous extension organization. The main reason that non beneficiaries were mostly less educated and doing agriculture for their own requirement.

Table 4.36: Level of contact with private extension agents

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=200)				Mean contact score	t-test value
		N	O	S	R		
Input dealers	Beneficiary	4(5.33)	17(22.66)	40(53.33)	14(18.66)	1.85	3.90**
	NB	19(25.33)	15(20.00)	39(52.00)	2(2.66)	1.32	
Corporate house	Beneficiary	61(81.33)	9(12.00)	1(1.33)	4(5.33)	0.30	082NS
	NB	65(86.66)	6(8.00)	2(2.66)	2(2.66)	0.21	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.36) depicted the level of contact of farmers with private extension agents. The table reflects that beneficiaries (mean contact score=1.85) have more access towards input dealers than the non-beneficiaries (mean contact score=1.32). The t value indicates that

there was a significant difference between the two groups in contact with input dealer. Both beneficiaries and non-beneficiaries have less contact with corporate house that was having mean contact score 0.30 and 0.21 respectively.

4.4.4 Access of extension agent towards ATMA beneficiary and non beneficiary

Table 4.37: Level of contact of Extension agents of different general development departments of Public Extension system

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=150)				Mean contact score	t-test value
		N	O	S	R		
Panchayati Raj Institute (PRI)	Beneficiary	17(22.61)	28(37.24)	23(30.59)	7(9.31)	1.26	5.33**
	NB	44(58.52)	21(27.93)	10(13.30)	0	0.54	
Community Dev. Block (CDB)	Beneficiary	39(51.87)	23(30.59)	13(17.29)	0	0.65	2.55*
	NB	58(77.14)	9(11.97)	7(9.31)	1(1.33)	0.34	
Dept of Irrigation	Beneficiary	47(62.51)	24(31.92)	4(5.32)	0	0.42	1.74NS
	NB	62(82.46)	8(10.64)	4(5.32)	1(1.33)	0.25	
Dept. of Electricity	Beneficiary	15(19.95)	49(65.17)	8(10.64)	3(3.99)	0.98	3.03**
	NB	29(38.57)	43(57.79)	2(2.66)	1(1.33)	0.66	
Financial Institutes	Beneficiary	41(54.53)	24(31.92)	9(11.97)	1(1.33)	0.60	0.71NS
	NB	50(66.50)	16(21.28)	5(6.65)	4(5.32)	0.50	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.37) presented the level of contact of extension agents different general development departments of Public Extension systemwith the ATMA beneficiaries and non-beneficiaries. The extension agents of panchayat raj institutes highest contact with beneficiaries (mean contact score=1.26) followed by department of electricity(0.98), community development block(0.65),financial institute(0.60) and department of irrigation(0.42) respectively. In case of non-beneficiaries,the contact of extension agent of department of electricity (0.98) and panchayat raj institution (0.54) was more than the other departments. The extension agents of panchayat raj institutes were providing different government services for the development of rural people.The different type of government services like allowance to the older people, house for the rural people, MNREGA, community health center. The statistical value indicates there was significant difference between beneficiaries and non-beneficiaries in terms of contact of extension agents of panchayat raj institutes, community development block and department of electricity. But there was no difference in the department of irrigation and financial institutes.

Table 4.38: Level of contact of extension agents of different Agriculture and allied development departments of Public Extension system

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=150)				Mean contact score	t-test value
		N	O	S	R		
Agriculture department	Beneficiary	24(31.92)	28(37.24)	16(21.28)	7(9.31)	1.08	5.67**
	NB	56(74.48)	13(17.29)	6(7.98)	0	0.33	
Horticulture Department	Beneficiary	68(90.44)	7(9.31)	0	0	0.08	1.45NS
	NB	73(97.09)	2(2.66)	0	0	0.02	
Animal resource department	Beneficiary	42(55.86)	31(41.23)	2(2.66)	0	0.45	2.55*
	NB	62(82.46)	19(25.27)	4(5.32)	0	0.22	
Fisheries	Beneficiar	62(82.46)	9(11.97)	4(5.32)	0	0.21	0.82NS

Department	y						
	NB	67(89.11)	5(6.65)	3(3.99)	0	0.14	
Soil Conservation Department	Beneficiary	42(55.86)	25(33.25)	8(10.64)	0	0.54	3.03**
	NB	65(86.45)	3(3.99)	7(9.31)	0	0.22	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.38) depicted the level of contact of extension agents of different Agriculture and allied development departments of Public Extension system with the ATMA beneficiaries and non-beneficiaries. From the table, it was shown that extension agents of agriculture department was good contact with the beneficiaries (mean contact score=1.08) followed by soil conservation department (0.54), animal resource department (0.45), fisheries department (0.21) and horticulture department (0.08) separately. The non-beneficiaries were less contacted by the extension agents that was department of agriculture having highest mean contact score 0.33 followed by animal resource department, fishery department and horticulture department having mean contact score 0.22,0.22 and 0.14 respectively. The t-value shows that there was significant variation in contact of extension agents of agriculture, animal resource and soil conservation department. But there was no difference in horticulture and fisheries department. The agriculture departments provide different services to the farmers like crop insurance and Rs 5000/per acre annually to the farmer etc. The extension agents of agriculture arrange different training programmes and demonstrations for the farmers, So, the contact of extension agent was more with the beneficiaries than non-beneficiaries.

Table 4.39: Level of contact of extension agentof NGO & Farmers' organisation

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=150)				Mean contact score	t-test value
		N	O	S	R		
FPO/FPC	Beneficiary	4(5.32)	15(19.95)	34(45.22)	22(29.26)	1.98	6.55**
	NB	18(23.94)	30(39.90)	27(35.91)	0	1.12	
Non-Government Organisation	Beneficiary	56(74.48)	8(10.64)	8(10.64)	3(3.99)	0.44	2.19*
	NB	66	4	5	0	0.18	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.39) displayed the level of contact of extension agent of FPO/FPC and NGOs with the farmers. The analysed data reflected that FPO/FPC have more contact with the beneficiaries(mean contact score=1.98) than the non-beneficiaries(1.12).The contact of NGO was very less both with beneficiaries and non-beneficiaries. But the contact with beneficiaries(0.44) was more than the non-beneficiaries(0.18). Thet-value indicates that there was significant difference in terms of contact of extension agent of both FPC/FPO and NGOs with the beneficiaries and non-beneficiaries.

Table 4.40: Level of contact of autonomous extension agents

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=200)				Mean contact score	t-test value
		N	O	S	R		
Agricultural University	Beneficiary	44(58.52)	17(22.61)	12(15.96)	2(2.66)	0.62	3.91**
	NB	67(89.11)	3(3.99)	5(6.65)	0	0.17	
Krishi Vigyan Kendra	Beneficiary	43(57.79)	18(23.94)	10(10.64)	4(5.32)	0.66	2.30NS
	NB	58(77.14)	7(9.31)	10(10.64)	0	0.36	
ATMA	Beneficiary	6	22	33	14	1.73	10.22**
	NB	57	11	4	3	0.37	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.40) depicted the level of contact of autonomous organization extension agents with the beneficiaries and non-beneficiaries. The ATMA extension agents were the highest contact with their beneficiaries(mean contact score=1.73) followed by KVKs(0.66) and Agricultural university(0.62) respectively. The ATMA extension agents also get connected with the non-beneficiaries those who were living nearer to the beneficiaries' house and sometimes take advantage of getting benefit from ATMA. The mean contact score was 0.37. The t-value shows the significant variation in terms of contact of extension agents of ATMA and agricultural university with the beneficiaries and non-beneficiaries. The

extension agents of ATMA were visit to the beneficiaries field for the improvement of agricultural practices which were provided through ATAM schemes.

Table 4.41: Level of contact of private extension agents

Expressed in percentage

Extension Agent	Contact by	Extent of contact (N=200)				Mean contact score	t-test value
		N	O	S	R		
Input dealers	Beneficiary	18(23.94)	20(26.60)	17(22.61)	10(13.33)	1.40	3.19**
	NB	29(38.57)	24(31.92)	21(27.93)	1(1.33)	0.92	
Corporate house	Beneficiary	61(81.13)	10(13.30)	1(1.33)	3(3.99)	0.28	1.61NS
	NB	66(87.78)	8(10.64)	1(1.33)	0	0.13	

N=Never; O=Only in need; S=Sometimes; R=Regular

The table (4.41) represented the level of contact of private extension agent with the beneficiary and non-beneficiaries. The input dealers were the agents who residing in the rural area and also provide all agricultural inputs to the farmers whenever required. They also give agricultural information to both beneficiaries and non-beneficiaries. The contact of input dealer was good with the beneficiaries(mean contact score=1.40) followed by non-beneficiaries(mean contact score=0.92). The t-value designates there was significant difference between two groups. The extension agents of corporate house was very less communication with both beneficiary and non-beneficaries. The t-value was non-significant in case of corporate house.

Table 4.42: Access quotient of different groups of extension service providers/organisations according to ATMA beneficiaries and non-beneficiaries

Groups of extension agents	Beneficiary		Non-beneficiary	
	Access- Index (Range: 0 to 1)	Rank	Access- Index (Range: 0 to 1)	Rank
Public general development departments	0.31	IV	0.19	III
Public line departments(Agriculture and allied)	0.19	V	0.08	V
NGO and Farmers Organisation	0.42	I	0.26	I
Autonomous Extension agent	0.39	II	0.11	IV
Private Extension Agent	0.32	III	0.21	II

The table (4.42) displayed the Access quotient of different groups of extension service providers/organisations according to ATMA beneficiaries and non-beneficiaries. From the table, it was revealed that the beneficiaries were having more access towards NGO an farmers organization(Access quotient=0.42) followed by autonomous extension agent(0.39), private extension agent(0.32),public general development departments(0.19) and public line departments(0.19) respectively. In case of non-beneficiaries, they were having more access towards the NGO and farmers organization(0.26) followed by private extension agent(0.21),public general development departments(0.19), autonomous extension agents(0.11) and public line departments(0.08) respectively.

Influence of socio-economic and personal characters on access of services of different extension service providers/organizations

Table 4.43 explained the effect of socio-economic and personal variables on access level. Among many other factors, distance from head-quarter, respondent's education, caste and income were taken for study. The distance from head-quarter invites hardship to reach and get the desired services. Similarly, educated persons, and persons having more income, feel more confident to contact with formal as well as personnel service channels to get extension services. So hypothesis may be set that there is a relationship of these characters with access to extension services. At present, due to abundance of Scheduled Class or Scheduled Tribe Sub-Plans, the organizations are bound to contact with the people of these communities to provide extension services; so, hypothesis may also be set that caste may also influence level of access. F-ratio (by One-way ANOVA) were calculated to see whether there

exists any difference in access level with the difference in the level of these variables. Simple correlation (r-value) was also calculated to confirm this result (however, r-value was not calculated for caste as it was a discrete variable). Table-7 displayed the results of analysis to extract the influence of these variables on access of extension services of different agents.

Access and distance from headquarter: Although mean access values are found different among different groups of respondents according to distance from head quarter, but non-significant F-ratio suggests that there was no difference in access level if the distance is more from the headquarter of the organization. And it is true for all types of organizations. Value of simple correlation confirms the results.

Access and education level: Here, for most of the service institutions, access level changes with the level of education except Government general development departments and NGO**.** In each case, r-value indicates that this relationship is positive; means with the increase of educational level, there is an increase in level of access. Only in case of NGO, this relationship is insignificant, because, NGOs work in a limited area with limited and very specific objectives. So, when respondents are from diverse areas, the impact was minimized.

Access and Caste groups: Significant difference found in the classes of Castes on access to the services of government based agriculture and allied development departments, autonomous extension (viz. SAU & KVK) and NGO. As previously, explained there are different types of programmes meant for different types of Caste classes; and so, this difference was found.

Access and annual Income: As like previous cases, there was also influence of income level on access of services of government based agriculture and allied development departments, autonomous extension (viz. SAU & KVK) and extension services provided by private agents. Here also in most of the cases, except government general development departments and NGOs, the r-value is positive. This also proves that more income raises the access, which may due to the confidence level of the respondents, or may be due to more access to these services they earned more.

Table-4.43: Influence of socio-economic and personal characters on access of extension services of different agents

Class Category	Percentage of respondents	Public Extension (General)	Public Extension (Ag & allied)	Autonomous Extension	NGO Agents	FPO / FPC	Private Agents
Access quotient according to distance from headquarter							
Less than 4.5km	25.00	0.27	0.19	0.25	0.06	0.62	0.32
4.5km to less than 16.5km	57.50	0.22	0.18	0.19	0.10	0.59	0.26
16.5km and above	17.50	0.22	0.19	0.24	0.10	0.60	0.27
Statistical implication	F-ratio	2.128NS	0.116NS	1.090NS	0.838NS	0.333NS	2.344NS
	r-value	NS	NS	NS	NS	NS	NS
Access quotient according to education level							
Illiterate	11.00	0.20	0.11	0.18	0.05	0.48	0.20
Primary	21.50	0.20	0.18	0.15	0.09	0.63	0.25
Middle School	24.50	0.22	0.17	0.17	0.10	0.58	0.32
Secondary	16.50	0.26	0.19	0.19	0.15	0.53	0.26
Higher Secondary	12.00	0.28	0.24	0.28	0.10	0.63	0.26
Graduate	12.00	0.24	0.22	0.35	0.01	0.68	0.33
Master and above	2.50	0.29	0.33	0.54	0.13	0.90	0.33
Statistical implication	F-ratio	1.240NS	3.169**	3.225**	1.346NS	3.121**	2.098*
	r-value	0.156*	0.260**	0.258**	NS	0.183**	0.158*
Access quotient according to Caste group							
General	10.50	0.18	0.18	0.22	0.08	0.53	0.25
OBC	30.50	0.26	0.23	0.29	0.16	0.61	0.30
SC/ST	59.00	0.23	0.17	0.17	0.06	0.60	0.27
Statistical implication	F-ratio	2.047NS	4.174*	3.937*	5.390**	0.751NS	1.115NS
Access quotient according to annual Income							
Upto Rs. 86,000/-	37.00	0.21	0.17	0.15	0.12	0.56	0.25
Rs. 86001/- to 154000/-	43.00	0.24	0.18	0.20	0.05	0.60	0.27
Greater than 154000/-	20.00	0.25	0.24	0.37	0.12	0.67	0.33
Statistical implication	F-ratio	1.391NS	4.510*	9.766**	2.192NS	2.297NS	3.596*
	r-value	NS	0.189**	0.282**	NS	0.149*	0.169*

***significant at 5% level; **significant at 1% level; NS=Not Significant**

4.4.5. Information needs Tables on different aspect (KVK beneficiaries and non-beneficiaries)

Table 4.44: Information Need on Agricultural Aspect

Agricultural Aspect		Low	Moderate	Extreme	Mean score	t-test value
Varietal aspects of crop	Beneficiary	5(20.00)	15(60.00)	5(20.00)	2.00	.23NS
	NB	3(12.00)	18(72.00)	4(16.00)	2.04	
Cultivation practice on crops	Beneficiary	18(72.00)	7(28.00)	0	1.28	1.75NS
	NB	12(48.00)	13(52.00)	0	1.52	
Soil testing	Beneficiary	0	9(36.00)	16(64.00)	2.64	1.82NS
	NB	1(4.00)	1(4.00)	23(92.00)	2.88	
Crop protection	Beneficiary	0	23(92.00)	2(8.00)	2.08	1.54NS
	NB	0	19(76.00)	6(24.00)	2.24	
Weed management	Beneficiary	12(48.00)	13(52.00)	0	1.52	3.36NS
	NB	3(12.00)	19(76.00)	3(12.00)	2.00	
Irrigation time and method	Beneficiary	17(68.00)	8(32.00)	0	1.28	.54NS
	NB	16(64.00)	9(36.00)	0	1.36	
Application of fertilizer	Beneficiary	7(28.00)	18(72.00)	0	1.68	.56NS
	NB	6(24.00)	19(76.00)	0	1.76	
Weather forecasting	Beneficiary	5(20.00)	17(68.00)	3(12.00)	1.88	5.19**
	NB	0	7(28.00)	18(72.00)	2.72	
Harvesting method and timing	Beneficiary	21(84.00)	4(16.00)	0	1.04	3.51**
	NB	0	11(44.00)	14(56.00)	1.56	
Post-harvest management	Beneficiary	3(12.00)	7(28.00)	15(60.00)	2.36	2.47*
	NB	0	3(12.00)	22(88.00)	2.88	

The table (4.44) depicted the agricultural information need of the KVK beneficiaries and non-beneficiaries. From the table, it shows that both beneficiaries and non-beneficiaries needed more or less information on various aspects. The beneficiaries required more information on soil testing having highest mean score 2.64 followed by post-harvest management, crop protection, varietal aspects of crop, weather forecasting, application of fertilizer, weed management, irrigation time and method, cultivation practice on crops and harvesting method and timing having mean score 2.36,2.08,2.00,1.88,1.68,1.52, 1.28,1.28 and 1.04 respectively. In case of non-beneficiaries, the need of information was more than the beneficiaries. The non-beneficiaries needed more information on soil testing and post-harvest management(mean score for both was 2.88) followed by weather forecasting(2.72), crop protection(2.24), varietal aspect of crop(2.04), weed management(2.00), application of fertilizer(1.76),harvesting method and timing(1.56),cultivation practices on crop(1.52) and irrigation timing and method(1.36) separately. The t-value shows significant in case of weather forecasting, harvesting method and timing and post-harvest management, but it was non-significant in case of varietal aspect of crop, cultivation practices on crop, soil testing, crop protection, weed management, irrigation time and method and application of fertilizer. The beneficiaries and non-beneficiaries were both need soil testing to know the soil status of their field. Soil testing is required to know the nutrients, micronutrients, acidity, alkalinity of the soil, so that the farmers can applied the fertilizer according to the recommendation. In case of non-beneficiaries they require more information on weather forecasting as they had less contact with ATMA and KVKs.

Table 4.45: Information needs on Animal husbandry, poultry, fishery

Animal Husbandry, Poultry, Fishery		**Low**	**Moderate**	**Extreme**	**Mean score**	**t-test value**
Animal health management	Beneficiary	0	8(32.00)	17(68.00)	2.68	0.29NS
	NB	0	9(36.00)	16(64.00)	2.64	
Milch animal breed	Beneficiary	0	19(76.00)	6(24.00)	2.24	NA
	NB	0	19(76.00)	6(24.00)	2.24	

Feeding of Animal	Beneficiary	3(12.00)	22(88.00)	0	1.88	0.63NS
	NB	4(16.00)	18(72.00)	3(12.00)	1.96	
Preparing milk products	Beneficiary	2(8.00)	20(80.00)	3(12.00)	2.04	4.09**
	NB	13(52.00)	12(48.00)	0	1.48	
Selection of poultry breed	Beneficiary	2(8.00)	18(72.00)	5(20.00)	2.12	3.81**
	NB	15(60.00)	8(32.00)	2(8.00)	1.48	
Management of Poultry	Beneficiary	2(8.00)	16(64.00)	7(28.00)	2.20	3.25**
	NB	11(44.00)	12(48.00)	2(8.00)	1.64	
Fish cultivation	Beneficiary	4(16.00)	13(52.00)	8(32.00)	2.08	0.88NS
	NB	8(32.00)	12(48.00)	5(20.00)	1.88	

The table (4.45) displayed the information need of KVK beneficiary and non-beneficiaries on animal husbandry, poultry and fishery. The analysed data shows that the need of information on animal health management required more by the beneficiaries(mean score=2.68) followed by mlich animal breed (2.24), management of poultry(2.20), selection of poultry breed(2.12), fish cultivation(2.08),preparing milk products(2.04) and feeding of animal(1.88) respectively. The KVK beneficiaries were not getting so much information on health management due to the absence of specific subject matter specialist in animal health management and the convergence was not good with state animal resource department. In case of non-beneficiaries, they also required more information on animal health management (2.64), mlich animal breed (2.24),feeding of animal (1.96),fish cultivation(1.88),selection of poultry breed(1.48) and preparing milk products(1.48) respectively. They had interest in doing animal husbandry, fishery and poultry activities but due to the lack of information they were not involved in such activities. The t-value designates that there was a significant difference in preparing milk products, selection of poultry breed and management poultry. As some of the beneficiaries got training on poultry and animal husbandry from KVK, they were doing animal husbandry and poultry as a business but the other farmers were keep cow, goat in their house for their own purpose.

Table 4.46: Information need on other aspects

Need required on	Respondent category	Low	Moderate	Extreme	Mean score	t-test value
Organic Farming	Beneficiary	0	3(12.00)	22(88.00)	2.88	1.41NS
	NB	0	7(28.00)	18(72.00)	2.72	
Zero tillage cultivation	Beneficiary	3(12.00)	16(64.00)	6(24.00)	2.12	1.30NS
	NB	0	17(68.00)	8(32.00)	2.32	
Agripreneurship	Beneficiary	0	8(32.00)	17(68.00)	2.68	0
	NB	0	8(32.00)	17(68.00)	2.68	
Modern Technology	Beneficiary	1(4.00)	22(88.00)	2(8.00)	2.04	3.24**
	NB	0	14(56.00)	11(44.00)	2.44	
Mobile advisory service	Beneficiary	2(8.00)	20(80.00)	3(12.00)	2.00	5.25**
	NB	0	6(24.00)	19(76.00)	2.76	
Market information	Beneficiary	0	10(40.00)	15(60.00)	2.60	2.33*
	NB	0	3(12.00)	22(88.00)	2.88	

The table (4.46) presented the information need of the beneficiaries and non-beneficiaries on other activities on agriculture and allied. From the table, it was revealed that most of the beneficiaries were interested in organic farming, so they required more information on organic farming(mean score=2.88) followed by agripreneurship(2.60),market information(2.60),zero tillage cultivation(2.12),modern technology(2.04) and mobile advisory services(2.00) respectively.In case of non-beneficiaries, they required more market information having highest mean score 2.88 followed by mobile advisory service(2.76), organic farming (2.72), agripreneurship(2.68), modern technology (2.44) and zero tillage cultivation (2.32) separately. The t-value was significant in case of modern technology,

mobile advisory services and market information which mean there was difference between the need of information between beneficiaries and non-beneficiaries. The farmers were not getting the market information timely due to the lack of marketing infrastructure and source of information. The beneficiaries were somewhat managed in getting marketing information through KVK, mobile but they also want more information on it. Now-a-days the government focuses more on the organic farming to protect the environment and health. So, the farmers were very much interested in organic farming but they were fearing that the production will be decreased. The KVKs can give more information on it by doing demonstrations.

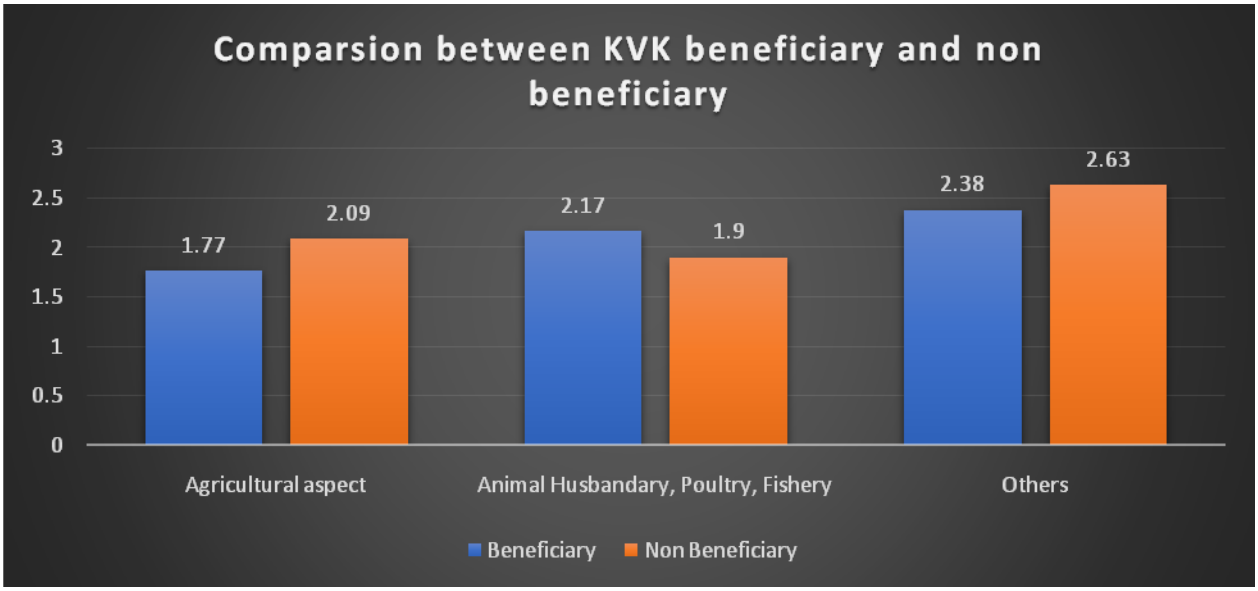


Fig: 4.8 Comparison between the information needs of KVK beneficiary and non-beneficiary

The figure (4.8) explained the comparison between the beneficiaries and non-beneficiaries on the information need of agriculture, animal husbandry, poultry, fishery and others. It shows that non-beneficiaries were required more information agriculture and others than the animal husbandry, poultry and fishery. The beneficiaries were requiring more information on animal husbandry, poultry and fishery as the KVKs having no specialist on these aspects.

4.4.6 Information needs tables on different aspects (ATMA beneficiaries and non-beneficiaries)

Table 4.47: Information Need on Agricultural Aspect

Agricultural Aspect	Category of respondent	Low	Moderate	Extreme	Mean score	t-test value
Varietal aspects of crop	Beneficiary	3(4.00)	40(53.33)	32(42.66)	2.36	0.29NS
	NB	3(4.00)	42(56.00)	30(40.00)	2.38	
Cultivation practice on crops	Beneficiary	21(28.00)	32(42.66)	22(29.33)	1.84	1.33NS
	NB	20(26.66)	45(60.00)	10(13.33)	2.00	
Soil testing	Beneficiary	10(13.33)	20(26.66)	45(60.00)	2.36	0.88NS
	NB	12(16.00)	24(32.00)	39(52.00)	2.46	
Crop protection	Beneficiary	2(2.66)	26(34.66)	47(62.66)	2.29	3.24**
	NB	6(8.00)	41(54.66)	28(37.33)	2.60	
Weed management	Beneficiary	16(21.33)	36(48.00)	23(30.66)	2.24	1.27NS
	NB	12(16.00)	31(41.33)	32(42.66)	2.08	
Irrigation time and method	Beneficiary	29(38.66)	32(42.66)	14(18.66)	1.76	0.35NS
	NB	23(30.66)	45(60.00)	7(9.33)	1.80	
Application of fertilizer	Beneficiary	15(20.00)	36(48.00)	24(32.00)	1.82	2.17*
	NB	15(20.00)	52(69.33)	8(10.66)	2.09	
Weather forecasting	Beneficiary	17(22.66)	36(48.00)	22(29.33)	2.32	2.09*
	NB	12(16.00)	25(33.33)	38(50.66)	2.05	
Harvesting method and timing	Beneficiary	25(33.33)	32(42.66)	18(24.00)	1.84	0.23NS
	NB	19(25.33)	49(65.33)	7(9.33)	1.86	
Post-harvest management	Beneficiary	9(12.00)	21(28.00)	45(60.00)	2.54	1.03NS
	NB	5(6.66	22(29.33)	48(64.00)	2.41	

The table (4.47) displayed the information need of ATMA beneficiaries and non-beneficiaries. From the table, it was revealed that the beneficiaries needed more information on post-harvest management having mean score 2.54 followed by varietal aspects of crop(2.36), soil testing(2.36), weather forecasting(2.32), crop protection(2.29),weed management(2.24),cultivation practice on crops(1.84), harvesting method and timing(1.84), application of fertilizer(1.82) and irrigation time and method(1.76) respectively. The beneficiaries were more focus on the production and to sell the product directly. They had very less information ab out the post-harvest management of the product for which they can get more profit in future. So, the ATMA should more focus to give training on post-harvest management of crops. It was also seen that the non-beneficiaries required more information on crop protection (mean score=2.60) followed by soil testing(2.46) post-harvest management (2.41),varietal aspect of crop(2.38),application of fertilizer(2.09),weed management(2.08),weather forecasting(2.05), cultivation practices on crop(2.00),harvesting method and timing(1.86) and irrigation time and method(1.80) separately. The non-beneficiaries were not so much active in collecting the information, whatever they get mainly from the contact farmer or input dealer. According to them they went to the pesticide shop for any disease or pest management and whatever the shopkeeper gives they applied in the field. The ATMA or state department organise a training or demonstration on the village then both beneficiaries and non-beneficiaries get the benefit. The t-value was non-significant in each case except there was significant difference in case of crop protection, application of fertilizer and weather forecasting. The beneficiaries were registered their mobile number for getting information on weather forecasting but the non-beneficiaries were not registered any mobile number.

Table 4.48: Information need on Animal Husbandary, Poultry, Fishery (ATMA Beneficiary and Non-Beneficiary)

Animal Husbandry, Poultry, Fishery		Low	Moderate	Extreme	Mean score	t-test value
Animal health management	Beneficiary	19(25.33)	23(30.66)	33(44.00)	2.13	-.42NS
	NB	15(20.00)	35(46.66)	25(33.33)	2.18	
Milch animal breed	Beneficiary	31(41.33)	30(40.00)	14(18.66)	1.88	1.00NS

	NB	23(30.66)	38(50.66)	14(18.66)	1.76	
Feeding of Animal	Beneficiary	24(32.00)	32(42.66)	19(25.33)	1.74	-1.49NS
	NB	26(34.66)	38(50.66)	11(14.66)	1.93	
Preparing milk products	Beneficiary	34(45.33)	25(33.33)	16(21.33)	1.77	.40NS
	NB	31(41.33)	30(40.00)	14(18.66)	1.72	
Selection of poultry breed	Beneficiary	35(46.66)	16(21.33)	24(32.00)	1.78	-.18NS
	NB	33(44.00)	23(30.66)	19(25.33)	1.81	
Management of Poultry	Beneficiary	35(46.66)	23(30.66)	17(22.66)	1.57	-.92NS
	NB	40(53.33)	21(28.00)	14(18.66)	1.70	
Fish cultivation	Beneficiary	28(37.33)	24(32.00)	23(30.66)	1.82	.56NS
	NB	32(42.66)	22(29.33)	21(28.00)	1.90	

The table(4.48) presented the need of information on animal husbandry, poultry and fishery. The result showed that the majority of the beneficiaries required information on animal health management(mean score=2.13) followed by mlich animal breed(1.88),fish cultivation(1.82),selection of poultry breed(1.78), preparing milk products(1.77),feeding of animal(1.74) and management of poultry(1.70) respectively. It was also shown that the non-beneficiaries also needed information on animal health management (2.18) followed by feeding of animal(1.93),fish cultivation(1.90),selection of poultry breed(1.81),mlich animal breed(1.76)preparing milk products(1.72) and management of poultry(1.70) separately. The t-value indicates there was no significant difference between beneficiaries and non-beneficiaries on the information need of animal husbandry, poultry and fishery. Both groups were not getting proper information. The beneficiaries only got the input material for fish cultivation but there was no such proper training on management of fish cultivation.

Table 4.49: Information need on Others (ATMA Beneficiary and Non-Beneficiary)

Other		**Low**	**Moderate**	**Extreme**	Mean score	t-test value
Organic Farming	Beneficiary	7(9.33)	12(16.00)	56(74.66)	2.46	-1.86NS
	NB	3(4.00)	34(45.33)	38(50.66)	2.65	
Zero tillage cultivation	Beneficiary	17(22.66)	24(32.00)	34(45.33)	2.21	.10NS
	NB	14(18.66)	31(41.33)	30(40.00)	2.22	
Agripreneurship	Beneficiary	13(17.33)	18(24.00)	44(58.66)	2.02	-2.47*
	NB	22(29.33)	21(28.00)	32(42.66)	2.40	
Modern Technology	Beneficiary	7(9.33)	27(36.00)	41(54.66)	2.22	-2.02*
	NB	8(10.66)	40(53.33)	27(36.00)	2.45	
Mobile advisory service	Beneficiary	9(12.00)	21(28.00)	45(60.00)	2.40	.64NS
	NB	11(14.66)	21(28.00)	43(57.33)	2.48	
Market information	Beneficiary	5(6.66)	13(17.33)	57(76.00)	2.37	-2.77**
	NB	12(16.00)	21(28.00)	42(56.00)	2.69	

The table (4.49) depicted the need of information other technologies, activities in agriculture. From the table, it was shown that beneficiaries were required more information on organic farming having highest mean value 2.46 followed by mobile advisory service (2.40), market information (2.37), modern technology (2.22), zero tillage cultivation (2.21) and agripreneurship (2.02) respectively.In case of non-beneficiaries, more information was required on market information(2.69) followed by organic farming(2.65), mobile advisory service(2.48),modern technology(2.45),agripreneurship(2.40) and zero tillage cultivation (2.22) separately. The statistical value designates that there was significant difference in case of agripreneurship, modern technology and market information. The beneficiaries were take the advantage of ATMA for the use of modern technologies in their field which did not get

by the non-beneficiaries. The ATMA beneficiaries can get the information on organic farming through different government schemes which was implemented by agriculture department like Parmparagat Krishi Vikas Yojana(PKVY). Both beneficiaries and non beneficiaries needed market information timely and easily. Market information not only means the price of the product in the local market, it also includes production cost of different crops, price of product at different market places, where the demand is more and current price at different places. The farmers should aware about different digital platforms like DD Kisan channel, e-NAM mobile app, AgMarknet.

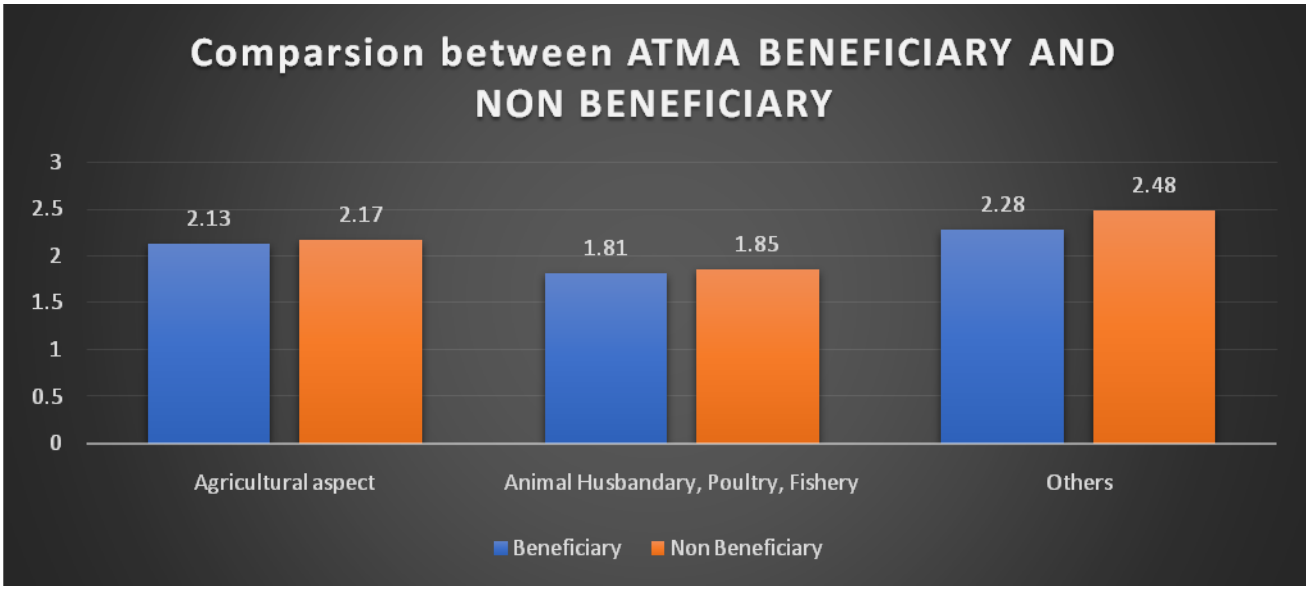


Fig 4.9: Comparison between the information needs of ATMA beneficiaries and Non-beneficiaries

The figure (4.9) presented the comparison between information need of beneficiaries and non-beneficiaries. It was shown that both beneficiaries and non-beneficaries perfcived same type of information need as the mean scores were almost equal. The ATMA should gives more focus in providing information timely to the beneficiaries.

Table 4.50: Source of Information on Agricultural Aspect (ATMA beneficiaries and non-beneficiaries) Expressed in Percentage

Sl. No.	Type of need	ATMA Beneficiaries				ATMA Non-beneficiaries			
		ATMA	KVK	Other	UA	ATMA	KVK	Other	UA
1.	Varietal aspects of crop	62 (82.66)	1 (1.33)	5 (6.66)	7 (9.33)	0	0	32 (42.66)	43 (57.33)
2.	Cultivation practice on crops	40 (53.33)	6 (8.00)	6 (8.00)	23 (30.66)	0	0	30 (40.0)	45 (60.0)
3.	Soil testing	66 (88.0)	0	4 (5.33)	5 (6.66)	0	0	30 (40.0)	45 (60.0)
4.	Crop protection	33 (44.0)	12 (16.0)	24 (32.0)	6 (8.00)	0	0	42 (56.0)	33 (44.0)
5	Weed management	32 (42.66)	14 (18.66)	20 (26.66)	9 (12.0)	0	0	36 (48.0)	39 (52.0)
6.	Irrigation time and method	20 (26.66)	13 (17.33)	20 (26.66)	22 (29.33)	0	0	29 (38.66)	46 (61.33)
7.	Application of fertilizer	26 (34.66)	12 (16.0)	15 (20.0)	22 (29.33)	0	0	34 (45.33)	41 (54.66)
8.	Weather forecasting	10 (13.33)	16 (21.33)	34 (45.33)	15 (20.0)	0	0	35 (46.66)	40 (53.33)
9.	Harvesting method and timing	20 (26.66)	8 (10.66)	20 (26.66)	27 (36.0)	0	0	30 (40.0)	45 (60.0)
10.	Post-harvest management technologies	19 (25.33)	8 (10.66)	19 (25.33)	29 (38.66)	0	0	31 (41.33)	44 (58.66)

UA=Unattended/Unauthenticated

The table (4.50) represented the source of information on agricultural aspect. The analysed result shows that majority of the ATMA beneficiaries that was 88 percent getting the information on soil testing from ATMA followed by 82.66 percent on varietal aspect of crop, 53.33% cultivation practices on crops, 44 percent crop protection, 42.66 percent weed management, 34.66 percent application of fertilizer,26.66 percent irrigation time and method, 26.66 percent harvesting method and timing,25.33 percent post-harvest management and 13.33 percent on weather forecasting respectively. Some of the ATMA beneficiaries were getting information on weather forecasting from other organisation that was 45.33 percent followed by 32 percent on crop protection and26.66 percent each on weed management, irrigation timing and method harvesting method and timing separately. The other organisation includes the mass media, farmer producer organisation and input dealers. There were some of beneficiaries getting information from the unattended and unauthenticated sources that was 38.66 percent on post harvest technology followed by 30.66 percent on cultivation practices and 29.33 percent each on irrigation timing and application of fertilizer. The unauthenicaed sources mostly include the neighbours, fore fathers and uauthorised service centres. In case of non-beneficiaries majority of them were depend on other departments and unauthenticated sources for their information. It was shown that most of the farmers were getting information from unattended/unauthenticated that were 61. 33 percent on irrigation timing followed by 60 percent each on cultivation practices and harvesting timing, 58.66 post harvest management,57.33 percent on varietal aspects,54.66 on application of fertilizer, 53.33 percent on weather forecasting, 52 percent on weed management and 44 percent on crop protection respectively. The non –beneficiaries were accessing the other sources mainly for getting the information on crop protection and weed management that was 56 percent and 48 percent. The other sources included were input dealer, FPO, mass media. Some of the non-beneficiaries were previously associated with some agricultural organisation but now they were doing the farm individually from his own knowledge. Most of them also use the traditional way of farming, if any information required on crop protection, they mainly visited to the input dealer.

Table 4.51: Source of information on Animal husbandry, Poultry and Fishery (ATMA beneficiaries and non-beneficiaries)

Sl. No.	Type of need	ATMA Beneficiaries				ATMA Non-beneficiaries			
		ATMA	KVK	Other	UA	ATMA	KVK	Other	UA
1.	Animal health management	15 (20.0)	1 (1.33)	21 (28.0)	38 (50.66)	0	0	32 (42.66)	43 (57.33)
2.	Milch animal breed	14 (18.66)	1 (1.33)	22 (29.33)	38 (50.66)	0	0	31 (41.33)	44 (58.66)
3.	Feeding of Animal	12 (16.0)	0	23 (30.66)	40 (53.33)	0	0	30 (40.0)	45 (60.0)
4.	Preparing milk products	1 (1.33)	1 (1.33)	27 (36.0)	46 (61.33)	0	0	31 (41.33)	44 (58.66)
5.	Selection of poultry breed	20 (26.66)	0	24 (32.0)	31 (41.33)	0	0	35 (46.66)	40 (53.33)
6.	Management of poultry	19 (25.33)	2 (2.66)	22 (29.33)	32 (42.66)	0	0	32 (42.66)	43 (57.33)
7.	Fish cultivation	51 (68.0)	0	7 (9.33)	17 (22.66)	0	0	32 (42.66)	43 (57.33)

UA=Unattended/Unauthenticated

The table (4.51) depicted the source of information by the beneficiaries and non-beneficiaries on animal husbandry, poultry and fishery. From the table, it was revealed that the beneficiaries were mostly depend on other and unauthenticated source/unatended for getting the information on animal husbandry, fishery and poultry. As the ATMA has limited resource on providing information about animal husbandry, poultry and fishery, so the beneficiaries were dependent on other and unattended. For preparing milk products 61.33 percent of beneficiaries on unauthenticated sources/ unattended followed by 53.33 percent on feeding of animal, 50.66 percent on animal health management and mlich animal breed, 42.66 percent on management of poultry, 41.33 percent on selection of poultry breed and

22.66 percent on fish cultivation respectively. For fish cultivation ATMA provides input material and cultivation practices. The non-beneficiaries were accessing the unauthenticated sources/ unattended that was 60 percent on feeding of animal followed by 58.66 percent each on preparing milk product and mlich animal breed, 57.33 percent each on animal health management, management of poultry and fish cultivation and 53.33 percent on selection of poultry breed respectively. The non-beneficiaries were mainly getting the information from other and unauthenticated sources. As the information was not satisfactory for the doing animal husbandry, poultry and fishery, so most of the non-beneficiaries were leave the practices.

Table 4.52: Source of information on other aspects (ATMA beneficiaries and non-beneficiaries)

Sl. No.	Type of need	ATMA Beneficiaries				ATMA Non-beneficiaries			
		ATMA	KVK	Other	UA	ATMA	KVK	Other	UA
1.	Organic farming	40 (53.33)	11 (14.66)	10 (13.33)	14 (18.66)	0	0	31 (41.33)	44 (58.66)
2.	Zero tillage cultivation	21 (28.0)	14 (18.66)	25 (33.33)	15 20.0)	0	0	31 (41.33)	44 (58.66)
3.	Agripreneurship	4 (5.33)	14 (18.66)	29 (38.66)	28 (37.33)	0	0	30 (40.0)	45 (60.0)
4.	Modern technology	16 (21.33)	11 (14.66)	28 (37.33)	20 (26.66)	1 (1.33)	0	31 (41.33)	43 (57.33)
5.	Mobile advisory services	3 (4.00)	14 (18.66)	31 (41.33)	27 (36.00)	0	0	33 (44.0)	42 (56.0)
6.	Market information	8 (10.66)	2 (2.66)	33 (44.0)	32 (42.66)	0	0	35 (46.66)	40 (53.33)

UA=Unattended/unauthenticated

The table (4.52) displayed the source of information of other activities. The result shows that 53.33 percent beneficiaries were getting the information on organic farming from ATMA followed by 28 percent on zero tillage cultivation, 21.33 percent on modern technology, 10.66 percent on market information, 5.33 percent on agripreneurship and 4 percent on mobile advisory services respectively. It was also seen that 44 beneficiaries get market information from other sources followed by 41.33 percent on mobile advisory

services, 38.66 percent on agripreneurship,37.33 percent on modern technology,33.33 percent on zero tillage and 13.33 percent on organic farming correspondingly. The beneficiaries also get the information from the unauthenticated sources/ unattended that were 42.66 percent on market information, 37.33 percent on agripreneurship and 36 percent on mobile advisory service. Most of the beneficiaries only know about agripreneurship but they want more information on it. The non-beneficiaries were getting the information from other and unattended. Most of the non-beneficiaries doing zero tillage by the help of FPOs and NGOs that were 41.33 percent. Majority of the non-beneficiaries were gwtting the information from the unattended that was 60 percent on agripreneurship, along with 58.66 percent each on zero tillage and organic farming, 57.33 percent on modern technology, 56 percent on mobile advisory service and 53.33 percent on market information respectively. The non-beneficiaries were getting mobile advisory service and market information from the local input dealer or the contact farmer. But it was very less and not timely. As the unattended were no trust worthy, most of the non-beneficiaries were not follow the information.

Table 4.53: Source of Information (KVK beneficiaries and non-beneficiaries) N=50 Agricultural aspect (Expressed in percentage)

Sl. No.	Type of need	KVK Beneficiaries				KVK Non-beneficiaries			
		ATMA	KVK	Other	UA	ATMA	KVK	Other	UA
1.	Varietal aspects of crop	0	25 (100.0)	0	0	0	0	15 (60.0)	10 (40.0)
2.	Cultivation practice on crops	0	21 (84.00)	2 (8.00)	2 (8.00)	0	0	15 (60.00)	10 (40.00)
3.	Soil testing	5 (20.00)	20 (80.00)	0	0	3 (12.00)	0	12 (48.00)	10 (40.00)
4.	Crop protection	0	25 (100.0)	0	0	0	0	17 (68.00)	8 (32.00)
5	Weed management	0	25 (100.0)	0	0	0	0	16 (64.00)	9 (36.00)
6.	Irrigation time and method	0	18 (72.00)	0	7 (28.00)	0	0	16 (64.00)	9 (36.00)
7.	Application of fertilizer	0	20 (80.0)	2 (8.00)	3 (12.00)	0	0	14 (56.00)	11 (44.00)
8.	Weather	0	25	0	0	0	0	15	10

	forecasting		(100.0)					(60.0)	(40.00)
9.	Harvesting method and timing	0	17 (68.00)	2 (8.00)	6 (24.00)	0	0	15 (60.00)	10 (40.00)
10.	Post-harvest management	0	21 (84.00)	1 (8.00)	3 (12.00)	0	0	15 (60.00)	10 (40.00)

UA=Unattended/Unauthenticated

The table (4.53) presented the KVK beneficiaries and non-beneficiaries access towards the organisation for the source of information. From the table, it was shown that KVK beneficiaries were getting information from the KVK that was 100 percent each on varietal aspects of crop, crop protection, weed management, weather forecasting, 84 percent each on post-harvest technologies and cultivation practice on crops, 80 percent each on application of fertilizer and soil testing and 68 percent on harvesting method and timing respectively. According to the beneficiaries, the KVK officials were touch with them for every problem and solve the problem in timely. In case of non-beneficiaries they were mainly getting the information from other organisations and unauthenticated source. The other source of information for the KVK non beneficiaries were the state departments, mass media, FPOs, NGOs etc. Majority of the KVK non-beneficiaries were getting the information from other sources that were 68 percent on crop protection, 64 percent each on weed management and irrigation time and method, 60 percent each in varietal aspect on crop, cultivation practices, weather forecasting and post harvest management, 56 percent on application of fertilizer and 48 percent on soil testing respectively. Due to less education, economically poor, lack of communication some of the non-beneficiaries were not so much access towards the different source of information.

Table 4.54: Source of Information on Animal Husbandry, Poultry and Fishery (KVK beneficiaries and non-beneficiaries)

Sl. No.	Type of need	KVK Beneficiaries				KVK Non-beneficiaries			
		AT MA	KVK	Other	UA	AT MA	KVK	Other	UA
1.	Animal health	0	6 (24.0)	6 (24.0)	13 (52.00)	0	0	16 (64.00)	9 (36.00)

	management								
2.	Milch animal breed	0	6 (24.00)	6 (24.00)	13 (52.00)	0	0	16 (64.00)	9 (36.00)
3.	Feeding of Animal	0	6 (24.00)	6 (24.00)	13 (52.00)	0	0	17 (68.00)	8 (32.00)
4.	Preparing milk products	0	4 (32.00)	6 (24.00)	15 (60.00)	0	0	17 (68.00)	8 (32.00)
5.	Selection of poultry breed	0	14 (56.00)	4 (16.00)	7 (28.00)	0	0	17 (68.00)	8 (32.00)
6.	Management of poultry	0	13 (52.00)	5 (20.00)	7 (28.00)	0	0	17 (68.00)	8 (32.00)
7.	Fish cultivation	9 (36.00)	11 (44.00)	1 (4.00)	4 (16.00)	1 (4.00)	0	16 (64.00)	8 (32.00)

UA=Unattended/Unauthenticated

The table (4.54) depicted source of information on animal husbandry, poultry and fishery. From the table, it was revealed that the beneficiaries were not getting so much of information on animal husbandry and fishery from the KVK. The beneficiaries were getting the information on poultry and fishery through NICRA project from the KVK. Majority of the beneficiaries were getting the information from unauthenticated sources/unattended that were 60 percent on preparing milk products followed by 52 percent each on animal health management, mlich animal breed, feeding of animal, 28 percent each on selection of poultry breed and management of poultry and 16 percent on fish cultivation respectively. The non-beneficiaries were interested in animal husbandry, poultry and information. They were getting the information from other and unattended sources but that was not adequate to get the proper information. The KVK non-beneficiaries were getting the information other sources that were 68 percent each on feeding of animal, preparing milk products, selection of poultry breed, management of poultry, 64 percent each on animal health management, mlich animal breed and fish cultivation respectively. The non-beneficiaries were getting the information from the FPOs and input dealers.

Table 4.55: Source of information on other aspects (KVK beneficiaries and non-beneficiaries)

Sl. No.	Type of need	KVK Beneficiaries				KVK Non-beneficiaries			
		ATMA	KVK	Other	UA	ATMA	KVK	Other	UA
1.	Organic farming	1 (4.00)	22 (88.00)	0	2 (8.00)	0	0	17 (68.00)	8 (32.00)
2.	Zero tillage cultivation	0	25 (100.0)	0	0	0	0	17 (68.00)	8 (32.00)
3.	Agripreneurship	0	24 (96.00)	0	1 (8.00)	0	0	17 (68.00)	8 (32.00)
4.	Modern technology	0	24 (96.00)	0	1 (8.00)	0	0	17 (68.00)	8 (32.00)
5.	Mobile advisory services	0	25 (100.0)	0	0	0	0	16 (64.00)	9 (36.00)
6.	Market information	0	14 (56.00)	5 (20.00)	6 (24.00)	0	0	16 (64.00)	9 (36.00)

UA=Unattended/Unauthenticated

The table depicted KVK beneficiaries and non-beneficiaries were getting the information on other activities from different sources. The analysed data shows that 100% KVK beneficiaries were getting information on zero tillage cultivation, mobile advisory services,96 percent each on agripreneurship and modern technology, 88 percent on organic farming from KVK respectively. But only 56 percent beneficiaries were getting market information from KVK and that was not adequate. The non-beneficiaries were mainly depending on other sources for getting the information. The non-beneficiaries were getting the information on zero tillage cultivation from FPO, KVK beneficiaries. Majority of the non-beneficiaries were getting information from other sources that were 68 percent each on organic farming, zero tillage cultivation, agripreneurship, modern technology and 64 percent each on mobile advisory services and market information respectively. For organic farming they were getting the information through Paramparagat Krishi Vikas Yojana (PKVY) through state department of agriculture. The KVK non-beneficiaries were also good access towards the FPOs getting for the information.

4.5 Perceived quality and impact of services provided by KVK and ATMA

This section presents the analysis on perceived quality of extension services rendered by the organisation (KVK or ATMA) and the indicators were timeliness, accuracy, need-based, effectiveness, whether low cost, applicability in their situation and diversity of messages / services. A 3-point scale was used for the purpose (vide Materials and Methods). It also assessed the perceived impacts of services over last five years on different aspects as expected from restructured policy reforms. A 5-point scale used for this purpose (vide Materials and Methods).

Table 4.56: Quality of service of KVK according to KVK beneficiaries

Sl. No.	Quality parameters	KVK				Rank
		Always (2)	Sometimes (1)	Never (0)	Mean Score	
1.	Timely	25 (100.00%)	0	0	2	II
2.	Accurate	17 (68.00%)	8 (32.00%)	0	1.68	VII
3.	Need based	22 (88.00%)	3 (12.00%)	0	1.88	III
4.	Effective	19 (76.00%)	6 (24.00%)	0	1.76	VI
5.	Low cost	25 (100.00%)	0	0	2	I
6.	Applicable	20 (80.00%)	5 (20.00%)	0	1.80	IV
7.	Diverse	21 (84.00%)	4 (16.00%)	0	1.84	V

The table (4.56) presented the quality of service provided by the KVK according to the KVK beneficiaries. The analysed result shows that all the beneficiaries responded that KVK provides timely service always followed by low cost(100%), need based(88%), diverse(84%),

applicable(80%),effective(76%) and accurate(68%) respectively. The beneficiaries were getting all type of services from the KVK through different projects, training programs, On farm testing, Frontline demonstration. The KVK also transfer technology or information through different projects like NICRA,DAESI and skill training for youth. The KVK officials frequently visit to the farmers field to observe the condition of crop and also gives information disease, pest management. From the table it was shown that the service provided by the KVK was very low cost and timely having mean score 2.0 in each followed by need based(1.88),diverse(1.84), effective(1.76), accurate(1.68) respectively.

Table 4.57 : Quality of service of ATMA according to ATMA beneficiaries

Sl. No.	Quality parameters	ATMA				
		Always (2)	Sometimes (1)	Never (0)	Mean Score	Rank
1.	Timely	35 (46.66%)	37 (49.33%)	3 (4.00%)	1.42	II
2.	Accurate	32 (42.66%)	41 (54.66%)	2 (2.66%)	1.40	III
3.	Need based	25 (33.33%)	49 (65.33%)	1 (1.33%)	1.32	IV
4.	Effective	28 (37.33%)	42 (56.00%)	5 (6.66%)	1.30	V
5.	Low cost	50 (66.66%)	23 (30.66%)	2 (2.66%)	1.64	I
6.	Applicable	21 (28.00%)	52 (69.33%)	2 (2.66%)	1.25	VI
7.	Diverse	20 (26.66%)	47 (62.66%)	8 (10.66%)	1.16	VII

The table (4.57) displayed the quality of service provided by ATMA to the beneficiaries. The analysed result shows that majority of the beneficiaries responded that ATMA provides

sometimes quality of service. Most of the beneficiaries that was 69.33 percent reacted that the ATMA service was applicable sometimes followed by need based (65.33%),diverse (62.66%),effective (56.00%),accurate (54.66%) and low cost (30.66%) sometimes respectively. But according to beneficiaries the ATMA provides service with a very low cost (66.66% beneficiaries). As per the governing body meeting of ATMA, the ATMA provides different service to the farmers. The ATMA governing body decides the type of service given in which year and in which block according to the need of the farmer. So, the farmers were getting need based, diverse services from ATMA. ATMA provides monetary fund to the beneficiaries for the development of their farm. According to some of the beneficiaries, the ATMA gives service to the farmers who have already start a farm or fish cultivation or any other things. But it was also seen that ATMA forms different farmer group, women group to provide service them through different trainings like mushroom cultivation, paddy nursery, fish cultivation etc. From the table it was also explained that the ATMA provides low cost service having mean score 1.65 followed by timely (1.42), accurate (1.40), need based (1.32), effective (1.30), applicable (1.25) and diverse (1.16) respectively.

Table 4.58: Perceived impact of KVK (beneficiaries and non-beneficiaries)

Effects		Definitely increased (2)	Increased (1)	No Change (0)	Decreased (-1)	Definitely decreased (-2)
Farm Production						
Crop Productivity in your farm	Beneficiary	24 (96.00)	1 (4.00)	0 (0.00)	0 (0.00)	0 (0.00)
	NB	4 (16.00)	19 (76.00)	2 (8.00)	0 (0.00)	0 (0.00)
Animal husbandry in your farm	Beneficiary	9 (36.00)	14 (56.00)	2 (8.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	14 (56.00)	11 (44.00)	0 (0.00)	0 (0.00)

Fishery production in your farm.	Beneficiary	5 (20.00)	13(52.00)	7 (28.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	2 (8.00)	23 (92.00)	0 (0.00)	0 (0.00)
Poultry production in your farm	Beneficiary	4 (16.00)	19 (76.00)	2 (8.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	6 (24.00)	17 (68.00)	2 (8.00)	0 (0.00)
Farm Advisory						
Need based services in all vocations	Beneficiary	0 (0.00)	16 (64.00)	9 (36.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	1 (4.00)	20 (80.00)	4 (16.00)	0 (0.00)
Availability of market information	Beneficiary	1 (4.00)	19 (76.00)	5 (20.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	11 (44.00)	14 (56.00)	0 (0.00)	0 (0.00)
Availability of weather forecasting	Beneficiary	2 (8.00)	21 (84.00)	2 (8.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	0 (0.00)	25 (100.00)	0 (0.00)	0 (0.00)
Availability of mobile advisory	Beneficiary	1 (4.00)	24 (96.00)	0 (0.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	0 (0.00)	25 (100.00)	0 (0.00)	0 (0.00)
Availability of experts in need	Beneficiary	13 (52.00)	12 (48.00)	0 (0.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	2 (8.00)	23 (92.00)	0 (0.00)	0 (0.00)

Skill Development						
Mechanization in agriculture	Beneficiary	9 (36.00)	14 (56.00)	2 (8.00)	0 (0.00)	0 (0.00)
	NB	1 (4.00)	19 (76.00)	4 (16.00)	1 (4.00)	0 (0.00)
Entrepreneurship development among rural youth	Beneficiary	0 (0.00)	9 (36.00)	16 (64.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	0 (0.00)	25 (100.00)	0 (0.00)	0 (0.00)
Use of organic input in farming	Beneficiary	0 (0.00)	7 (28.00)	10 (40.00)	8 (32.00)	0 (0.00)
	NB	0 (0.00)	0 (0.00)	11 (44.00)	14 (56.00)	0 (0.00)
Training/advisory in diverse needs	Beneficiary	19 (76.00)	6 (24.00)	0 (0.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	9 (36.00)	16 (64.00)	0 (0.00)	0 (0.00)
Bio-Physical						
Crop diversity in your farm	Beneficiary	0 (0.00)	20 (80.00)	5 (20.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	3 (12.00)	21 (84.00)	1 (4.00)	0 (0.00)
New crop introduced in your farm	Beneficiary	1 (4.00)	21 (84.00)	3 (12.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	5 (20.00)	18 (72.00)	2 (8.00)	0 (0.00)
Water holding capacity of your farm	Beneficiary	0 (0.00)	0 (0.00)	13 (52.00)	12 (48.00)	0 (0.00)
	NB	0	0	8	17	0

		(0.00)	(0.00)	(32.00)	(68.00)	(0.00)
Livelihood						
Balanced growth of all vocations	Beneficiary	0 (0.00)	20 (80.00)	5 (20.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	1 (4.00)	19 (76.00)	5 (20.00)	0 (0.00)
Women participation in farming	Beneficiary	2 (8.00)	21 (84.00)	2 (8.00)	0 (0.00)	0 (0.00)
	NB	4 (16.00)	19 (76.00)	1 (4.00)	1 (4.00)	0 (0.00)
Drudgery reduction tools for women	Beneficiary	0 (0.00)	11 (44.00)	14 (56.00)	0 (0.00)	0 (0.00)
	NB	0 (0.00)	5 (20.00)	20 (80.00)	0 (0.00)	0 (0.00)
Occupation diversity	Beneficiary	23 (92.00)	1 (4.00)	1 (4.00)	0	0
	NB	1 (4.00)	24 (96.00)	0 0	0 0	0 0
		5 (20.00)	20 (80.00)			
Family income	Beneficiary	0	12 (48.00)	13 (52.00)	0	0
	NB	0 (0.00)	20 (80.00)	5 (20.00)	0 (0.00)	0 (0.00)
Decentralization in planning						
Inclusion of your agenda in	Beneficiary	0 (0.00)	22 (88.00)	3 (12.00)	0 (0.00)	0 (0.00)

planning	NB	0 (0.00)	1 (4.00)	13 (52.00)	11 (44.00)	0 (0.00)
Your participation in bottom up planning	Beneficiary	0 (0.00)	22 (88.00)	3 (12.00)	0 (0.00)	0 (0.00)
	NB	2 (2.66)	1 (1.33)	52 (69.33)	20 (26.66)	0 (0)

The table (4.58) depicted the impact perceived by the KVK beneficiaries and non-beneficiaries on different aspects like farm production, farm advisory, skill development, bio-physical, livelihood and decentralization in the last five years.

The table explains the perceived impact of the beneficiaries and non beneficiaries on their farm production. It was shown that 96 percent beneficiaries perceived that crop productivity definitely increased where as 76 percent non beneficiaries considered that increase in crop production..Again, 56 percent beneficiaries and non beneficiaries animal husbandry production increased in last five years. 52 percent beneficiaries poultry production increases, but in case of non-beneficiaries there was no change in poultry production that was 92 percent. In case of fishery production there was increase in fish production for the beneficiaries that was 76 percent followed by 68 percent non beneficiaries was no change. The KVK beneficiaries were getting different type of training, demonstration from the KVK and some of the beneficiaries also attached with different farmers club.

Again, the table displayed the impact on the farm advisory services. It was shown that 64 percent beneficiaries increased the need based services in all vocations where as there was no change in case of non beneficiaries that was 80 percent. In case of beneficiaries there was increase in market information, weather forecasting, mobile advisory service and experts in need that was 76 percent,84 percent,96 percent and 48 percent respectively. But there was no change in case of non beneficiaries that was 56 percent in market information, 100 percent weather forecasting, 100 percent mobile advisory and 92 percent in availability of experts. Due to the attachment of beneficiaries with the organization were good, so they were getting all type service through different government schemes. The beneficiaries were registered their mobile number in

the KVK for weather information and other services. Also, the KVK opened whatsapp group for providing service to the farmers.

From the table, it was also revealed that the skill development perceived by the beneficiaries and non-beneficiaries. It was seen that 56 percent of beneficiaries' skill on mechanization increases followed by 36 percent in entrepreneurship development among rural youth, 28 percent organic input use and 76 percent definitely increased in training advisory services respectively. In case of non-beneficiaries, only mechanization skill increased that was 76 percent followed by no change in entrepreneurship development among rural youth(100%), use of organic input in farming(44%) and training advisory needs(64%) respectively. The beneficiaries were getting all type of trainings from the KVK and other organizations where as the non-beneficiaries were not getting such type of trainings.

The table also explained the impact on the bio-physical aspects perceived by the beneficiaries and non-beneficiaries. It was shown that majority of the beneficiaries perceived that increase in crop diversity that was 80 percent followed by new crop introduced (84%) and no change in water holding capacity(52%) respectively. Regarding non-beneficiaries there was no change in crop diversity that was 80 percent followed by 72 percent new crop introduced in farm and decrease in water holding capacity 68 percent separately. As KVK introduced new variety for demonstration, so the beneficiaries were the first who got the benefit.

The table displayed the impact on the livelihood of the beneficiaries and non-beneficiaries. According to 84 percent of beneficiaries the women participation in farming was increased followed by 44 percent drudgery reduction tools for women, 92 percent perceived definitely increase in family income and 80 percent increase in occupation diversity respectively.In case of non-beneficiaries,76 percent perceived that increase in women participation in farming followed by no change in drudgery reduction tools for women(80%), increase in family income(96%) and no change in occupation diversity(52%) respectively.The beneficiaries not only get the benefit from the KVK but also from other government organizations like state departments, panchayats and other development agents. So their livelihood impact more than the non-beneficiaries.

The table also shows the impact on the decentralization process perceived by the farmer. It was shown that the majority of the beneficiaries were participated in bottom up planning and their agenda included in the planning that was 88 percent for each. But in case of non-beneficiaries there decrease in the participation in bottom up planning that was 72 percent and inclusion of agenda in planning was 44 percent separately. The KVK beneficiaries were participated in the bottom up planning of KVK to demand their need and services in agriculture.

Table 4.59: Comparative picture on impact of KVK (beneficiaries and non-beneficiaries)

Effects	Beneficiary (Mean Score)	Non-beneficiary (Mean Score)
Farm Production	1.31	0.47
Farm Advisory	1.01	0.12
Skill development	0.86	0.15
Bio-Physical	0.41	-0.17
Livelihood	1.06	0.52
Decentralization in planning	0.88	-0.56
Wilcoxon test for comparison	W=23.00; p=0.01	

The table (4.59) presented the impact on KVK beneficiaries and non beneficiaries on the basis of mean score of the indicators. It was seen that the impact on the beneficiaries was good having highest impact on farm production (1.31) followed by livelihood (1.06), farm advisory (1.01), decentralization (0.88), skill development (0.86) and bio physical (0.41). But in case of non-beneficiaries the impact was less than the non beneficiaries. The impact was highest on livelihood (0.52) followed by farm production (having mean score=0.47), skill development (0.15), farm advisory (0.12) respectively. There was very less or no impact on biophysical and decentralization. The KVK beneficiaries were good contact with the KVK and also with other department. They were getting different types of training, field visit, input materials through the government programmes. They were more exposure towards different extension agent. So, they were mostly developed than the non-beneficiaries. Statistical analysis (Wilcoxon W=23.00

which is significant at 1% level) for comparison indicates that the perceived impact is more on beneficiaries than non-beneficiaries.

Table 4.60:Perceived Impact table of ATMA beneficiaries and Non- beneficiaries

Effects		Definitely increased (2)	Increased (1)	No Change (0)	Decreased (-1)	Definitely decreased (-2)
Farm Production						
Crop Productivity in your farm	Beneficiary	46 (61.33)	24 (32)	5 (6.66)	0 (0.00)	0 (0.00)
	NB	14 (18.66)	55 (73.33)	6 (8.00)	0 (0.00)	0 (0.00)
Animal husbandry in your farm	Beneficiary	8 (10.66)	40 (53.33)	22 (29.33)	5 (6.66)	0 (0)
	NB	2 (2.66)	25 (33.33)	45 (60)	3 (4)	0 (0)
Fishery production in your farm.	Beneficiary	11 (14.66)	25 (33.33)	38 (50.66)	1 (1.33)	0 (0)
	NB	0 (0)	10 (13.33)	57 (76)	8 (10.66)	0 (0)
Poultry production in your farm	Beneficiary	9 (12)	26 (34.66)	40 (53.33)	0 (0)	0 (0)
	NB	1 (1.33)	4 (5.33)	65 (86.66)	5 (6.66)	0 (0)
Need based services in all vocations	Beneficiary	15 (20)	37 (49.33)	23 (30.66)	0 (0)	0 (0)
	NB	0 (0)	13 (17.33)	50 (66.66)	12 (16)	0 (0)
Farm Advisory						
Availability of market	Beneficiary	12 (16)	42 (56)	49 (65.33)	2 (2.66)	0 (0)

information	NB	0 (0)	31 (41.33)	44 (58.66)	0 (0)	0 (0)
Availability of weather forecasting	Beneficiary	8 (10.66)	30 (40)	34 (45.33)	2 (2.66)	0 (0)
	NB	1 (1.33)	19 (25.33)	52 (69.33)	3 (4)	0 (0)
Availability of mobile advisory	Beneficiary	12 (16)	37 (49.33)	24 (32)	2 (2.66)	0 (0)
	NB	2 (2.66)	13 (17.33)	57 (76)	3 (4)	0 (0)
Availability of experts in need	Beneficiary	13 (17.33)	47 (62.66)	15 (20)	0 (0)	0 (0)
	NB	1 (1.33)	9 (12)	58 (77.33)	5 (6.66)	2 (2.66)
Skill Development						
Mechanization in agriculture	Beneficiary	21 (28)	41 (54.66)	13 (17.33)	0 (0)	0 (0)
	NB	3 (4)	47 (62.66)	24 (32)	1 (1.33)	0 (0)
Entrepreneurship development among rural youth	Beneficiary	17 (22.66)	27 (36)	29 (38.66)	2 (2.66)	0 (0)
	NB	3 (4)	21 (28)	49 (65.33)	2 (2.66)	0 (0)
Use of organic input in farming	Beneficiary	13 (17.33)	28 (37.33)	29 (38.66)	5 (6.66)	0 (0)
	NB	2 (2.66)	29 (38.66)	24 (32)	20 (26.66)	0 (0)
Training/advisory in diverse needs	Beneficiary	24 (32)	36 (48)	12 (16)	2 (2.66)	1 (1.33)
	NB	3	22	44	4	2

		(4)	(29.33)	(58.66)	(5.33)	(2.66)
Bio-Physical						
Crop diversity in your farm	Beneficiary	13 (17.33)	44 (58.66)	15 (20)	3 (4)	0 (0)
	NB	1 (1.33)	25 (33.33)	41 (54.66)	8 (10.66)	0 (0)
New crop introduced in your farm	Beneficiary	20 (26.66)	30 (40)	24 (32)	1 (1.33)	0 (0)
	NB	4 (5.33)	17 (22.66)	47 (62.66)	7 (9.33)	0 (0)
Water holding capacity of your farm	Beneficiary	6 (8)	20 (26.66)	8 (10.66)	35 (46.66)	6 (8)
	NB	5 (6.66)	8 (10.66)	21 (28)	31 (41.33)	10 (13.33)
Livelihood						
Balanced growth of all vocations	Beneficiary	9 (12)	35 (46.66)	29 (38.66)	2 (2.66)	0 (0)
	NB	4 (5.33)	12 (16)	50 (66.66)	8 (10.66)	1 (1.33)
Women participation in farming	Beneficiary	37 (49.33)	29 (38.66)	6 (34.66)	2 (2.66)	1 (1.33)
	NB	16 (21.33)	49 (65.33)	8 (69.33)	0 (0)	2 (2.66)
Drudgery reduction tools for women	Beneficiary	9 (12)	28 (37.33)	36 (48)	1 (1.33)	1 (1.33)
	NB	2 (2.66)	18 (24)	53 (70.66)	2 (2.66)	0 (0)

Occupation diversity	Beneficiary	10 (13.33)	49 (65.33)	16 (21.33)	0 (0)	0 (0)
	NB	2 (2.66)	55 (73.33)	18 (24)	0 (0)	0 (0)
Family income	Beneficiary	31 (41.33)	38 (50.66)	6 (8)	0 (0)	0 (0)
	NB	13 (17.33)	51 (68)	11 (14.66)	0 (0)	0 (0)
Decentralization						
Inclusion of your agenda in planning	Beneficiary	6 (8)	39 (52)	28 (37.33)	2 (2.66)	0 (0)
	NB	2 (2.66)	11 (14.66)	46 (61.33)	15 (20)	1 (1.33)
Your participation in bottom up planning	Beneficiary	16 (21.33)	31 (41.33)	26 (34.66)	2 (2.66)	0 (0)
	NB	2 (2.66)	1 (1.33)	52 (69.33)	20 (26.66)	0 (0)

The table (4.60) represented the impact perceived by ATMA beneficiaries and non-beneficiaries on different aspects like farm production, farm advisory, skill development, bio-physical, livelihood and decentralization in the last five years.

The data displayed in the table shows the impact perceived by beneficiaries and non-beneficiaries on their farm production. From the table it was found that 61.33 percent beneficiaries perceived that crop productivity definitely increased whereas 73.33 percent non-beneficiaries considered that increase in crop production. Again, 53.33 percent beneficiaries and 33.33 non-beneficiaries were increased; 29.33 percent beneficiaries and 60 percent no change in animal husbandry. In case of fishery production there was increase in 33.33 percent beneficiaries followed by 13.33 percent non-beneficiaries; 76 percent non-beneficiaries were no changed in fish production followed by 50.66 beneficiaries. For the poultry production the non-beneficiaries that was 86.66 percent followed by 53.33 percent beneficiaries was no change. Need bases

services in all vocations were increased 49.33 percent beneficiaries, whereas 66.66 percent non-beneficiaries was no changed. ATMA supports the beneficiaries to improve their production by providing fund, training and information on the Management.

From the table it was observed that the impact recognized by the beneficiaries and non-beneficiaries on farm advisory. Availability of market information of beneficiaries was 65.33 percent and 58.66 percent non-beneficiaries were no changed. In case of availability of weather forecasting, the non-beneficiaries possess 69.33 percent followed by 45.33 percent beneficiaries were no changed. For availability of mobile advisory, the beneficiaries increased by 49.33 percent, whereas the non-beneficiaries perceived 76 percent no changed in availability of mobile advisory. Again, availability of expert in need, the beneficiaries increased 62.66 percent whereas the non-beneficiaries considered 77.33 percent were no changed.

The table also depicted the impact judged by the beneficiaries and non-beneficiaries of skill development. The result shows that 62.66 percent of non-beneficiaries were increased followed by 54.66 percent beneficiaries in mechanization in agriculture. For the entrepreneurship development among rural youth, the non-beneficiaries perceived 65.33 percent followed by 38.66 percent were no changed. In case of use of organic input in farming, the beneficiaries considered 38.66 percent no changed whereas the non-beneficiaries perceived 38.66 percent increased. Again, the beneficiaries possess 48 percent increased in training/advisory in diverse needs whereas the non-beneficiaries considered 58.66 percent were no changed.

The table presented the impact perceived by the beneficiaries and non-beneficiaries in Bio-Physical. The result shows that the beneficiaries considered 58.66 percent increased in crop diversity whereas for the non-beneficiaries 54.66 percent were no changed in crop diversity. In case of new crop introduced, the beneficiaries perceived 40 percent were increased; the non-beneficiaries 62.66 percent were considered no changed in new crop introduced. The beneficiaries perceived 46.66 percent followed by 41.33 percent followed by the non-beneficiaries were decreased in water holding capacity.

The findings in the table show the impact considered by the beneficiaries and non-beneficiaries in livelihood. The beneficiaries perceived 46.66 percent increase in balanced growth of all vocations; the non-beneficiaries possess 66.66 percent no change in balanced

growth of all vocations. In case of women participation in farming, the beneficiaries perceived 49.33 percent were definitely increased for the non-beneficiaries considered 69.33 percent were no changed in women participation in farming. For the drudgery reduction tools for women the non-beneficiaries considered 70.66 percent followed by 48 percent beneficiaries were no changed. Again, the non-beneficiaries perceived 73.33 percent followed by 65.33 percent beneficiaries were increased in occupation diversity. Lastly, for the family income the non-beneficiaries considered 68 percent followed by 50.66 percent beneficiaries were increased in family income. ATMA formed different women groups and provided training on different aspects to make them self-efficient. The socioeconomic condition of the women increases in the last five years due to their active participation in farming. The women in the study area were doing mushroom cultivation, paddy nursery and fish cultivation due to the impact of ATMA.

The results in the table also depict the impact viewed by the beneficiaries and non-beneficiaries in decentralization. The beneficiaries considered 52 percent were increased in inclusion of agenda in planning; the non-beneficiaries perceived 61.33 percent were no changed in inclusion of agenda in planning. Again, the beneficiaries possess 41.33 percent increased in participation in bottom up planning; the non-beneficiaries perceived 69.33 percent no changed in participation in bottom up planning. As farmers friend was a part of ATMA project, so there must be included farmers agenda. So, the beneficiaries participation increases than the non-beneficiaries.

Table 4.61: Comparative picture of impact on ATMA (beneficiaries and non-beneficiaries)

Effects	**Beneficiaries(Mean Score)**	**Non-beneficiaries (Mean Score)**
Farm Production	0.85	0.36
Farm Advisory	0.81	0.17
Skill development	0.89	0.36
Bio-Physical	0.53	0.02
Livelihood	0.97	0.64
Decentralization	0.73	-0.11
Wilcoxon test for comparison	W=22.00; p<0.01	

The table (4.61) displayed the comparative picture of impact on ATMA beneficiary and non-beneficiary. From the table it was revealed that the beneficiaries were developed in every aspect than the non-beneficiaries. The livelihood of the beneficiaries increased having highest mean score 0.97 followed by skill development(0.89), farm production(0.85), farm advisory(0.81), decentralization(0.73) and bio-physical(0.53) respectively. In case of non-beneficiaries, the livelihood having highest impact mean score 0.64 followed by farm production(0.36),skill development(0.36), farm advisory(0.17), bio physical(0.02) and decentralization(-0.11) separately. The beneficiaries were access towards the different extension agents than the non-beneficiaries. The beneficiaries were getting different type of services through ATMA. The beneficiaries also participate in the bottom up planning to include their agenda. Statistical analysis (Wilcoxon W=22.00 which is significant at 1% level) for comparison indicates that the perceived impact is more on beneficiaries than non-beneficiaries.

4.6 Factors influencing level of access, quality and impact of services provided by pluralistic organizations

This section presented the relation of the organisational features with the end users level of access with organisation, quality and impact perceived by the end users.

Table 4.62: Correlation between the organisational features with farmers' level of impact, quality of service and access

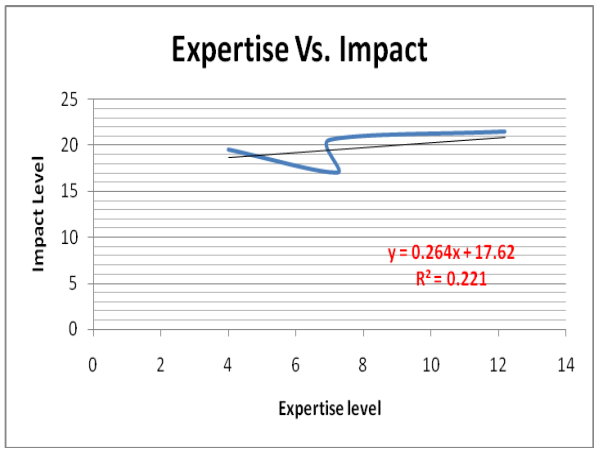
Organisational features	Level of Impact	Quality of Service	Level of Access
Expertise	0.145	0.540**	0.167
Constraint	0.201*	0.302**	-0.020
Convergence	0.184	0.527**	0.168

The table (4.62) depicted the correlation of expertise level of the officials, constraint faced by the officials and the convergence of organization with level of impact, quality of service perceived by the farmer, level of access of the farmers. It was shown that the constraint was positively and significantly associated with the level of impact. The table also explains the expertise, constraint and convergence was positively and significantly associated with quality of service. It means a change in these variables will change the quality of service in same direction. The organizations were having their own expertise to provide service, but in some cases they hired the staff or given jointly service to the farmer. The staffs were also trained on different aspects, so they were having knowledge on providing different types of service. So, the quality of service was increases due to the mixed system of expertise in the organization. The constraints were faced by the officials were mostly lack of incentives for the excellent work, very less supporting staff. These constraints were minimized due to the convergence of the oranisation. Although, this result is in contradiction with the common perception that increased level of constraint may lead to less service quality. But in present case, whether an organization felt more constraint with their own staffing and organizational pattern, they have increased the level of

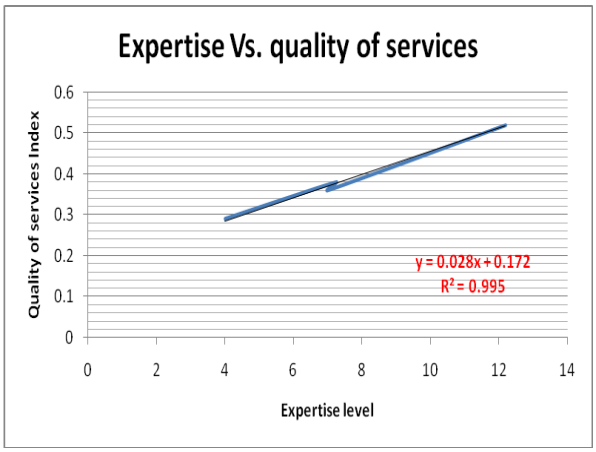
convergence with other organization, which is clear from the positive correlation value between level of constraint with expertise and between level of constraint and convergence (r-value between constraint & expertise; and constraint & convergence are 0.637 and 0.632 respectively at p<.01). This may be the cause of positive association of with quality of service and level of impact with constraint.

Calculation of Linear regression to determine the impact of independent variables (expertise, convergence and constraint of ATMA and KVK) on dependent variable (level of impact, access and quality of service)

Linear regressions were drawn between dependent and independent variables (Fig 4.10, 4.11 and 4.12) to determine the contribution of expertise, convergence and constraint on the impact, quality of service and access of pluralistic services.



A



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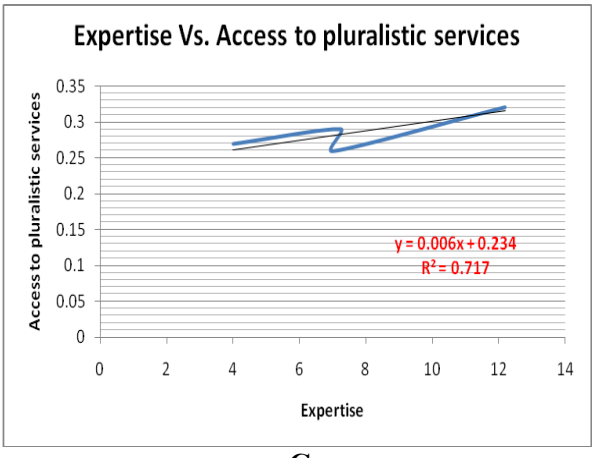


C

Fig. 4.10: Linear regression of Expertise on dependent variables

A: Expertise with Impact

B: Expertise with quality of services

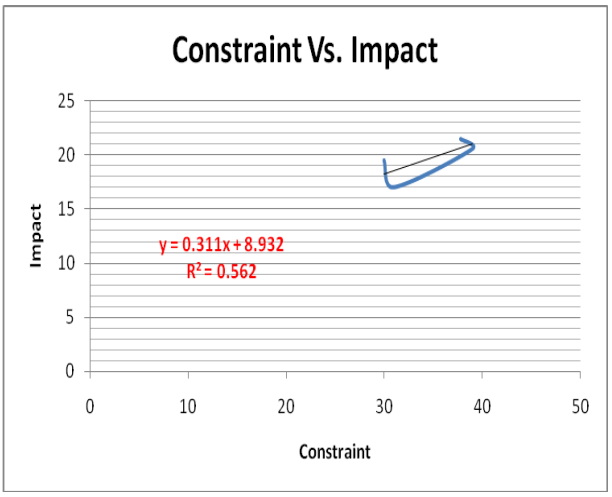
C: Expertise with Access to pluralistic services

The figure (4.10: A, B, C) explained that the expertise have contribution of 22.1 percent, 99.5 percent and 71.7 percent on the variability on the level of impact, quality of service and access to pluralistic services of the end users.

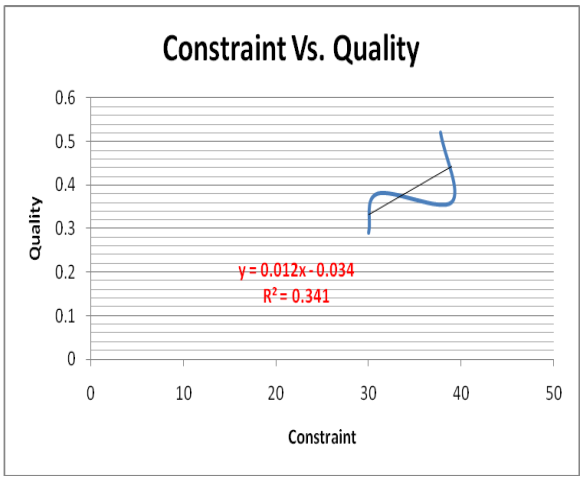
The role of expertise in level of impact was less because there may be some other variables like convergence or constraint or any other which was not considered in this study may have some contribution also helps them to improve their condition.

From the figure, it was seen that expertises of the organisation have 99 percent variability on quality of service. The expertise level of the officials should increase to increase the quality of service. The expertise level should be increased by proper selection of staff and increase in professional training.

The figure also explained that expertise have contribution of 71 percent variability on the access. The increase in expertise level also increases the access of farmers towards organisation.



A



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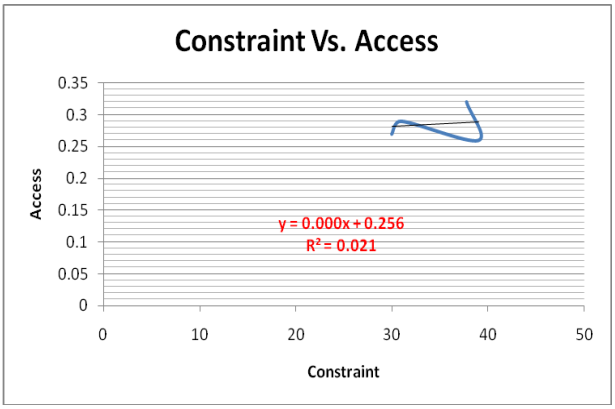


C

Fig. 4.11: Linear regression of Constraint on dependent variables

A: Constraint with Impact

B: Constraint with quality of services

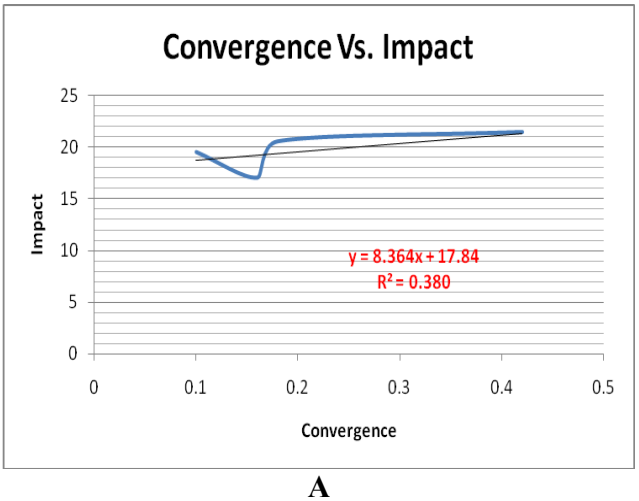
C: Constraint with Access to pluralistic services

The figure (4.11: A, B, C) explained that the expertise have contribution of 56.2 percent, 34.1 percent and 2.1 percent on the variability on the level of impact, quality of service and access to pluralistic services of the end users.

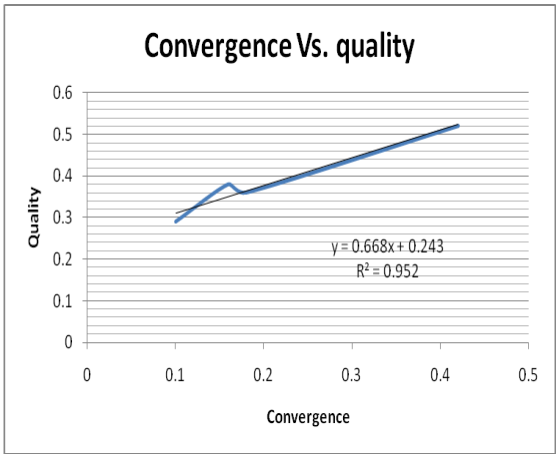
From the figure it was shown that the role of constraint of the organisation was 56.2 percent variability on the level of impact.

The figure also shows that the role of constraint of the organisation was 34.1 percent variability on quality of service. The constraint of the organisation was minimised due to convergence for which the quality of service was not affected.

The role of constraint in the level of access was very less because there were some other variables having contribution on the access.



A



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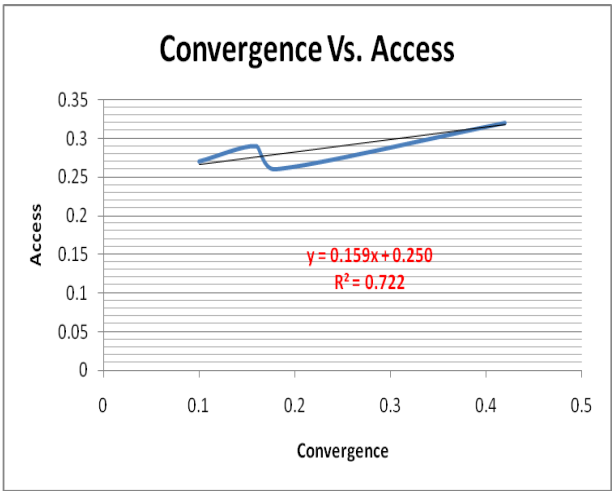

C

Fig. 4.12: Linear regression of Convergence on dependent variables

A: Convergence with Impact

B: Convergence with quality of services

C: Convergence with Access to pluralistic services

The figure (4.12: A, B, C) explained that the convergence have contribution of 38 percent, 95.2 percent and 72.2 percent on the variability on the level of impact, quality of service and access to pluralistic services of the end users.

The figure shows that the role of convergence in level of impact was less because there were some other variables which were not considered in the study contributes towards the level of impact.

From the figure it was shown that convergences have contribution 0f 95.2 percent variability on quality of service. The increase in convergence increases the quality of service. The partnership of organisation increases the quality as the farmers get the service timely and more accurately.

The figure shows that convergences have contribution of 72 percent variability on the access level. The convergence increase the access as the farmers get the service from one point. As some organizations like FPOs have better linkage with the villagers, so convergence with grass root level organizations gives better access to deliver extension service.

Table 4.63: Opinions of officials regarding pluralistic extension service

Sl. No.	Statements	KVK	RANK	ATMA	RANK
1.	Pluralistic extension system is useful for the organization.	1.00	I	1.00	I
2.	Information through pluralistic extension system is timely and easily accessible.	0.80	II	0.95	II
3.	Convergence helps in minimizing the communication gaps.	1.00	I	0.91	III
4.	Repetition of Similar objectives of different programmes can be minimised with the help of Convergence.	1.00	I	0.86	IV
5.	Management skills can be improved with the help of convergence.	1.00	I	0.86	IV
6.	Convergence always depends on the scarcity or abundance of funds.	0.20	IV	0.73	VII
7.	Convergence is possible even if one of the participating agencies has lack of executive ability.	0.60	III	0.82	V
8.	Convergence saves time to execute various activities of different agencies.	1.00	I	0.82	V
9.	Convergence lead to improvement in knowledge and skills of the workforce.	1.00	I	0.91	III
10.	Pluralistic extension system can reduce the work load of an organization.	0.20	IV	0.78	VI
11.	Pluralistic extension system is more helpful than public extension system.	0.60	III	0.95	II
12.	Diversified approaches and targets can be covered through pluralistic extension system.	0.80	II	1.00	I
Statistical implications					

Spearman Rank order correlation (ρ) = 0.364 (p = 0.245)

The table (4.63) depicted the opinions of the officials regarding pluralistic extension service. From the table it was shown that majority of the officials of both KVK and ATMA states that pluralistic extension service is useful for the organisation. But both the organization gave difference ranking for preference of listed statements. Majority of the KVK official's suggested that pluralistic extension approach is a useful system, convergence helps to minimize communication gaps, repetition of Similar objectives of different programmes can be minimised with the help of Convergence, management skills can be improved with the help of convergence, convergence saves time to execute various activities of different agencies, convergence lead to improvement in knowledge and skills of the workforce having highest mean score 1.00.The KVK officials gave least score for convergence always depends on the scarcity or abundance of funds and pluralistic extension system can reduce the work load of an organization having a mean score of 0.20 in each. On contrary, ATMA official's preferred pluralistic extension system is most useful for the organization and diversified approaches and targets covered by through pluralistic extension system having the highest mean score of 1.00 each. There was a little difference between the statements opinioned by the ATMA officials. The ATMA officials gave lowest score for convergence always depends on the scarcity or abundance of funds that was 0.73.

The rank order correlation is not significant at 5% level; so, the opinion regarding pluralistic extension is not at par between KVK and ATMA.

4.7 Policy implications extracted from the study

Any extension service aims at higher access to end-users (farmers), quality services and positive impact towards prosperity. The present study scaled out the institutional factors that influence the access, quality and impact from extension services. From the observation of the study, the following policy implications may be suggested:

- **Increasing the quantity and quality of the human resource expertise in an organisation:** The study revealed that diverse expertise in an organisation has positive impact on access towards the farmers, quality of the services and impact from those services. Expertise, in turn, is dependent on existence of trained manpower. Possession of professional degree and training experience will impact on quality services. An organisation should be careful in selection of appropriate manpower for providing pluralistic services among the farmers.

- **Reducing organisational lacuna (constraints) through convergence among the organisations:** Organisational lacuna viz. the constraints in exercising pluralistic or monopolistic services would have a negative influence on access, impact and quality of services of an organisation. Astonishingly, in this study these variables are positively correlated with level of constraints; and an in-depth analysis revealed that the constraint here is positively correlated with convergence. In this study it is also seen that more the convergence level, more the access to pluralistic services, more the impact and more the quality of services. In this study, it is found that the organisations are minimising their level of constraints of manpower, fund or other resources through convergence. So, convergence is that magic activity that can enhance pluralistic services and in turn to get greater impact.

So, if pluralistic extension services of an organisation aims to create higher access, to make better quality of services and to get higher impact, organisational expertise through selection of quality human resources and convergence of efforts of different organisations in different levels are crucial policy implications to be considered by the planners and policy makers.

Summary

CHAPTER-V

SUMMARY

The purpose of the study was to know the "Pluralistic extension services-access, quality and implications from the restructured policy reforms in Cooch Behar district of West Bengal" with the following delineated objective:

1. To study the operational arrangement for execution of pluralistic extension services due to restructured policy reforms in Cooch Behar district.
2. To study the constraints faced during operationalisation of pluralistic extension services.
3. To assess the level of access of pluralistic extension services among the end-users.
4. To assess the quality and impact of these services as perceived by the end users.
5. To suggest a policy framework for improvement of these services in the district.

The study was conducted in Cooch Behar district of West Bengal. The two organisations (KVK and ATMA) were selected as per the restructured policy reforms. According to policy reform these two organisations satisfy the principles of pluralistic extension services. From these two types of district-based organisations four operational areas (in Dinahata-II Block operated by KVK, in Cooch Behar-I, Cooch Behar-II and Mathabhanga-I Blocks operated by ATMA) selected randomly as KVK working presently in 4 blocks and ATMA working in 12 blocks. A total of 28 officers selected from the KVK and ATMA. Twenty five beneficiaries and twenty five non-beneficiaries were selected from each operation unit. A total of 200 respondents were selected randomly. Information conducted in two phases: from officials and from end-users. Both qualitative (focus group interview of officials) and quantitative (individual interview method of official and end-user respondents) data collection method were employed.

The findings are summarised as per the objectives of the study.

Operational arrangements of the organisations due to restructured policy reform

- The extension agents working in the Cooch Behar district were mainly general development agents, line departments (agriculture and allied), autonomous extension organization, NGOs and Farmers organisation , Private agents(private input companies and input dealers). From the extension agents it was found that Panchayat raj institute,

state agriculture department, ATMA, farmers organisation and input dealers were covered more remote area than the extension agents. Among all the organisations KVK and ATMA satisfies the principles of pluralistic extension service due to the restructured policy reforms.

- Expertise of officials for providing pluralistic extension services is an important operational indicators of an organization, which was depicted in the study through level of formal education and in-service training undertaken by these officials. It is found that all the officials of KVK are having Masters' degree in the professional field, whereas, less than 50% officials of ATMA are having Masters' degree. The KVK officials have also undergone more number of professional training than the officials of ATMA in their service life (13.00 unit for KVK officials against 7.52 units for ATMA on an average per person). These qualities of officials resulted to higher expertise level of KVK than the ATMA units (Expertise scores are 12.20, 7.25, 7.00 and 4.00 for KVK, Cooch Behar-II ATMA unit, Cooch Behar-I ATMA unit and Mathabhanga-I ATMA unit respectively).
- Operational arrangement for pluralistic services also depends upon the availability of trained manpower; and so, the present research also studied level of human recourse sharing and convergence with different organization for resources and activities. It is found that KVK and ATMA can conduct 47.83% and 26.08% of their training programmes with their own manpower; and remaining they conduct with fully or partially hired manpower.
- Regarding convergence of resources and activities, it is seen that the studied organizations have converged in the domain of technology, planning, financial, extension service and manpower; and overall convergence quotient of KVK and ATMA is 0.65 and 0.15 respectively.

Constraints faced by the officials in providing pluralistic extension service

- The constraints faced by the KVK officials were mostly administrative constraint (mean score=2.4) followed by infrastructure and policy (2.00), management (1.96), technological (1.53) and financial and political (1.50) respectively.

- The constraints faced by the ATMA officials were mostly faced technological constraint (mean score=1.99) followed by administrative (1.95), financial and political (1.95), infrastructure and policy (1.86) and management (1.79) respectively.

Access of the end users towards extension agent

- The access of the KVK beneficiaries were more towards autonomous extension agent (ATMA and Agricultural university) having highest access quotient 0.66 followed by NGO and farmers organisation (0.46), private extension agent (0.34), public general development agent (0.29) and public line departments (0.21) respectively. In case KVK non-beneficiaries, more access towards private extension agents (access quotient=0.26) followed by NGO and farmers organisation (0.24), public general development (0.11), public line department (0.05) and autonomous extension agent (0.02) respectively.
- The access of ATMA beneficiaries were NGO and farmers organization (access quotient=0.42) followed by autonomous extension agent (0.39), private extension agent (0.32), public general development departments (0.19) and public line departments (0.19) respectively. In case of non-beneficiaries, they were having more access towards the NGO and farmers organization (0.26) followed by private extension agent (0.21), public general development departments (0.19), autonomous extension agents (0.11) and public line departments (0.08) respectively.
- The KVK beneficiaries were need more information on animal husbandry, poultry, fishery having highest mean score 2.17 followed by others (organic farming, zero tillage, weather forecasting, agri-preneurship, mobile advisory, modern technology, market information) having mean score 2.38 and agriculture (1.77) respectively. In case of non beneficiaries they required more information others having mean score 2.63 followed by agriculture (mean score=2.09) and animal husbandry, poultry fishery (mean score=1.9) respectively.
- The ATMA beneficiaries required more information on the aspects like organic farming, zero tillage, weather forecasting, agri-preneurship, mobile advisory, modern technology, market information etc. (having combined mean score of 2.28) followed by agricultural aspects (2.13) and animal husbandry, fishery, poultry (1.81). In case of ATMA non-

beneficiaries, they needed more information on other aspects having mean score of 2.48 followed by agriculture (2.17) and animal husbandry, poultry, fishery (1.85).

- Majority of the KVK beneficiaries got the agricultural and other aspects information from the KVK but the information on animal husbandry, poultry and fishery were not available from the KVK in time. The KVK non beneficiaries were mostly depend on the other organisations like input dealer, farmers club for the information.
- The ATMA beneficiaries got the information on agriculture from the ATMA and other organisations like farmer Producer Company, input dealer, NGOs. The non beneficiaries were mostly depending on input dealers for the information and some of them not getting the information.

Quality and Impact of the organisations perceived by the end users

- According to the KVK beneficiaries the quality of service provided by KVK having low cost (mean score=2.00) followed by timely (2.00), need based (1.88), applicable (1.80), diverse (1.84), effective (1.76) and accurate (1.68).
- According to ATMA beneficiaries the ATMA provides low cost service having mean score 1.65 followed by timely (1.42), accurate (1.40), need based (1.32), effective (1.30), applicable (1.25) and diverse (1.16) information.
- The impact on the KVK beneficiaries was good having highest impact on farm production (1.31) followed by livelihood (1.06), farm advisory (1.01), decentralization (0.88), skill development (0.86) and bio physical (0.41). But in case of non-beneficiaries the impact was less than the non beneficiaries. The impact was highest on livelihood (0.52) followed by farm production (having mean score=0.47), skill development (0.15) and farm advisory (0.12) discerningly.
- According to ATMA beneficiaries the impact perceived by them increased in the livelihood having highest mean score 0.97 followed by in the field of skill development (0.89), farm production (0.85), farm advisory (0.81), decentralization (0.73) and bio-physical (0.53). In case of non-beneficiaries, the livelihood having highest impact mean score 0.64 followed by farm production (0.36), skill development (0.36), farm advisory (0.17), bio physical (0.02) and decentralization(-0.11) separately.

Influencing factors and suggested policy framework

- The expertise, constraint and convergence is positively and significantly associated with quality of service provided.
- The expertise has contribution of 99 percent variability on quality of service and 71 percent variability on access of the beneficiaries. The constraint has contribution of 56 percent variability on impact and 34 percent variability on quality of service perceived by beneficiaries. The convergence has contribution of 95 percent variability on and 72 percent on access of the beneficiaries.

Recommendations from the study

Both the KVK and ATMA have shown the conformity with the principles of pluralistic extension services. Based on the conclusion of the study the following policy recommendation can be forwarded:

- The expertise level of the officials should be increased by the proper selection of staff and by upgrading the knowledge of the officials.
- The convergence of the organisation should be more which minimises the constraint of the officials for providing pluralistic extension service.

Future scope of Study

- In depth study can be conducted by taking more extension agents like state line departments, private agents etc.
- There is a scope of applied study with the good extension delivering practice.
- There is a scope to measure the supply and demand driven extension service.

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APPENDIX

(Schedule for officials)

Instruction: Collect Annual Action Plans (3-years, if possible) from each intervening KVK/ATMA)

Respondent No……..

1.	Name of the official:		
2.	Designation:		
3.	Date of joining		
4.	Block:		
5.	District:		
6.	Age:	**6.**	Education(Basic degree):
7.	Religion:	**8.**	Caste:
8. (a) Staff composition in your office: **(b) In your opinion, how much percentage of farmers of your jurisdiction (District/Block) have been covered for service delivery by your KVK/ATMA?**			

9. Training you have undertaken in last three years

Sl No.	**Training undertaken in the field**	**Frequency / No.**	**Where**
1.	Crop Husbandary		
2.	Animal Husbandary		
3.	Fishery		
4.	Bee keeping		
5.	Horticulture		
6.	Marketing		
7.	Use of ICT		

Part-II

1. **If farmers come to your organization with the following needs, how will you address?**

Sl.No.	Needs of the farmer	By our own staffs	Ask the expert from other department
	Agricultural Aspect		
1.	Varietal aspects of crop		
2.	Cultivation practice on crops		
3.	Soil testing		
4.	Crop protection		
5	Weed management		
6.	Irrigation time and method		
7.	Application of fertilizer		
8.	Weather forecasting		
9.	Harvesting method and timing		
10.	Post harvest management		
11.	Marketing aspect		
	Animal Husbandary		
12.	Animal health management		
13.	Milch animal breed		
14.	Feeding of Animal		
15.	Preparing milk products		
16.	Selection of poultry breed		
17.	Management of poultry		
18.	Fish cultivation		
	Others		
19.	Organic farming		
20.	Zero tillage cultivation		
21.	Agripreneurship		
22.	Modern technology		
23.	Mobile advisory services		

2. **What type of Convergence are existing between your organization and the following organisations**

Sl. No.	**Organization**	**HRM &Administrative / policy**	**Extension Activities(Training and Skill development,OFT,FLD)**	**Technology Backstop**	**Resource based**	**Service based**	**others**
Research Organization							
1.	ICAR						
2.	SAU						
3.	KVK						
4.	Foreign organization						
5.	Others						
Line Dept.							
1.	Agriculture						
2.	Horticulture						
3.	Animal resource dept.						
4.	Fishery						
5.	Soil conservation						
6.	ATMA						
7.	DRDC						
8.	CADC						
9.	Sericulture						
10.	Others						

NGO and Farmer Organization							
1.	Farmers Club						
2.	Farmer Producer Organization						
3.	SHGs						
4.	**NGOs**						
a)							
b)							
c)							
d)							
e)							
Private Org.							
1.	Cooperative						
2.	Private company						
3.	Input Dealer						
Banks							
1.	NABARD						
2.	Any Nationalized bank						
3.	Post office						
4.	Microfinance institute						
5.	Others						

3. How do you feel about the extent of convergence with the following agencies / organisations

Sl. No.	Name of the agency / organisation / dept.	Increased	Remained constant	Decreased	No convergence
1	ICAR				
2	SAU				
3	KVK				
4	Foreign organization				
5	Agriculture				
6	Horticulture				
7	Animal resource dept.				
8	Fishery				
9	Soil conservation				
10	ATMA				
11	DRDC				
12	CADC				
13	Sericulture				
14	Farmers Club				
15	Farmer Producer Organization				
16.	SHGs				
17.	**NGOs**				
18.	Cooperative				
19.	Private company				
20.	Input Dealer				
21.	NABARD				
22.	Any Nationalized bank				
23.	Post office				
24.	Microfinance institute				

4. What type of constraints you face during providing services to the farmers/others:

Constraints	Extreme (3)	Moderate (2)	Low (1)
1. Inadequate staffing pattern to provide pluralistic services to the farmers			
2. Staff vacancy within sanctioned posts			
3. Inadequate policy support for convergence with other service departments (Govt./NGO/Pvt.)			
4. Inadequacy of funds			
5. Lack of infrastructural support below district level			
6. Lack of training facility to know about new complex technology			
7. Lack of response from the farmers to adopt technologies			
8. Difficulty in practicing Bottom-up planning with farming community			
9. Lack of location specific technologies			
10. Other line departments are reluctant to support practicing pluralistic services			
11. Posts of supporting staff are less			
12. Lack of incentives for excellent work			
13. Lack of opportunities for updating knowledge			
14. Lack of encouragement from superiors			
15. Lack of cooperation from subordinates, office staff and colleagues			
16. Shortage of transport facility			
17. Too much report writing			
18. Pressure from the local politician to fetch more			

benefits from KVK schemes to their own jurisdiction			
19. Discrimination in rewards			

5. **Opinion regarding Pluralistic Extension System**

SL. No.	Statements	Yes	No
1.	Pluralistic extension system is useful for the organization.		
2.	Information through pluralistic extension system is timely and easily accessible.		
3.	Convergence helps in minimizing the communication gaps.		
4.	Repetition of Similar objectives of different programmes can be minimised with the help of Convergence.		
5.	Management skills can be improved with the help of convergence.		
6.	Convergence always depends on the scarcity or abundance of funds.		
7.	Convergence is possible even if one of the participating agencies has lack of executive ability.		
8.	Convergence saves time to execute various activities of different agencies.		
9.	Convergence lead to improvement in knowledge and skills of the workforce.		
10.	Pluralistic extension system can reduce the work load of an organization.		
11.	Pluralistic extension system is more helpful than public extension system.		
12.	Diversified approaches and targets can be covered through pluralistic extension system.		

Schedule for End Users

Respondent No……..

1.	Name of the farmer:		
2.	Village:		
3.	Block:		
4.	District:		
5.	Village distance from ATMA/KVK headquarter?		
5.	Whether you are a beneficiary of ATMA/KVK?		
5.	Age:	**6.**	Education:
7.	Religion:	**8.**	Caste:
9.	Primary occupation:	**10.**	Economic Class: APL/BPL

11. Family Information

Total number of members	**No. of adult Male**	**No. of adult female**	**Highest Education**		**Other livelihood options found other than primary***	
			Male	**Female**		

*Write codes:

1=Agriculture; 2=Animal husbandry; 3=Caste occupation; 4=Small Business; 5=Farm/casual labour; 6=Govt. employment; 7=Pvt. Employment; 8=Van/rickshaw puller; 9=Fishery; 10=Poultry/duckery; 11=Forestry; 12=Marginal works; 13= Rural artisans; 14=Middle man/marketing agent; 15=Other

12. Family occupation and income (Rs./year) [Family members are earning from which field and how much]:

Occupation	Income (Rs)
Agriculture	
Animal husbandry Agricultural labour	
Poultry, duckery etc.	
Fisheries (cultural/catch fish)	
Business	
Service (including private)	
Self-employed (Caste vocation/van rikshaw/artisan/ Agril. & other labours etc.)	
Others	

Part-II

1. From which of the following agents you get your farming information and how frequently?

Sl. No.	Department	Frequency of contact by you				Frequency of visit by the experts to the farmer			
		Frequently (3)	Sometimes (2)	Only in need (1)	Never (0)	Frequently (3)	Sometimes (2)	Only in need (1)	Never (0)
1.	Krishi Prayukti Sahyak								
2.	Contact Farmers								
3.	Panchayat members								
4.	Block Development Officer								
5.	Agricultural								

	University								
6	State Dept. Of Agriculture								
7	State Dept. Of Horticulture								
8	State Animal resource dept.								
9.	State Dept. Of Fisheries								
10	State dept of Soil conservation								
11	Krishi Vigyan Kendra								
12	ZRS								
13	ICAR research unit								
14	Irrigation Dept.								
15	Electricity company / Dept.								
11	Cooperative / bank								
12	Input Dealers								
13	Corporate Houses								
14	NGO								
15	ATMA								
16	Any other								

2. Information Need for different vocation

Sl. No.	Type of need	Extreme	Moderate	Low	Where you get the information			
					ATMA	KVK	Others	Unauthenticated sources
Agricultural Aspect								
1.	Varietal aspects of crop							
2.	Cultivation practice on crops							
3.	Soil testing							
4.	Crop protection							
5	Weed management							
6.	Irrigation time and method							
7.	Application of fertilizer							
8.	Weather forecasting							
9.	Harvesting method and timing							
10.	Post-harvest management technologies							
Animal Husbandry								
11.	Animal health management							
12.	Milch animal breed							

13.	Feeding of Animal							
14.	Preparing milk products							
15.	Selection of poultry breed							
16.	Management of poultry							
17.	Fish cultivation							
Others								
18.	Organic farming							
19.	Zero tillage cultivation							
20.	Agripreneurship							
21.	Modern technology							
22.	Mobile advisory services							
23.	Market information							

3. Services you may get from following organization are

Sl. No.	**Quality parameters**	**KVK**			**ATMA**			**Other organisatons**		
		Always (2)	**Sometimes (1)**	**Never (0)**	**Always (2)**	**Sometimes (1)**	**Never (0)**	**Always (2)**	**Sometimes (1)**	**Never (0)**
1.	Timely									
2.	Accurate									
3.	Need									

	based									
4.	Effective									
5.	Low cost									
6.	Applicable									
7.	Diverse									

4. What type of change you are seeing in your farm and livelihood are you seeing after getting attached with ATMA/KVK (for beneficiary)/last 3-5 years (for others)?

Effects	Definitely increased (2)	Increased (1)	No Change (0)	Decreased (-1)	Definitely decreased (-2)
Crop Productivity in your farm					
Animal husbandry in your farm					
Poultry production in your farm					
Fishery production in your farm					
Crop diversity in your farm					
New crop introduced in your farm					
Water holding capacity of your farm					
Balanced growth of all vocations					
Women participation in farming					
Inclusion of your agenda in planning					
Need based services in all vocations					
Your participation in bottom up planning					
Drudgery reduction tools for					

women					
Family income					
Occupation diversity					
Mechanization in agriculture					
Entrepreneurship development among rural youth					
Availability of market information					
Use of organic input in farming					
Availability of weather forecasting					
Availability of mobile advisory					
Availability of experts in need					
Training/advisory in diverse needs					

VITA

Name of the student:	:	Subhrajyoti Panda
Father's name:	:	Srikanta Kumar Panda
Mother's name :	:	Renubala PAnda
Nationality	:	Indian
Date of birth	:	06/07/1992
Home Permanent address	:	At-Ballav, PO-Bainsia, Via- Mahimagadi, Dist-Dhenknal, Pin-759014, Odisha

EDUCATIONAL QUALIFICATION

Bachelor degree

Name of the University:	:	Odisha University of Agriculture and Technology
Year of award:	:	2015
OGPA %:		7.71

Master degree

Name of the University	:	Uttar Banga Krishi Viswavidyalaya
Year of award	:	2017
OGPA	:	9.11

Doctor of Philosophy

OGPA	:	8.99
Title of Master's Thesis :	:	Assessing the effectiveness of information communication technology (ICT) enabled extension services for addressing the information needs of the farmers in Cooch Behar District Of West Bengal

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Submitter email	pkpalubkv@gmail.com
Similarity	5%
Analysis address	pkpalubkv.ubkv@analysis.urkund.com

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