Agricultural Extension and Advisory Services: Serving Farming Community by Agripreneurship Amid COVID-19

Working paper 4

MANAGE Centre for Agricultural Extension Innovations, Reforms and Agripreneurship

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Disclaimer

Dr. P. Chandra Shekara
Director General, MANAGE

Foreword

The ongoing crisis around COVID-19 has rapidly affected all walks of our life. It is evident that the pandemic has shaken agriculture in many ways. The global efforts to control the COVID-19 through restrictive human movement has certainly affected the functioning of agricultural and food systems worldwide. The impact is massive and has far-reaching consequences. In the meantime, agripreneurship is emerging as a prerequisite for improving the profitability in agriculture and allied sectors as well as to address the distress in the wake of pandemics like COVID-19.

The Agri-Clinics and Agri-Business Centres (AC&ABC), a flagship scheme of the Ministry of Agriculture and Farmers Welfare, Government of India is aimed at training educated youth having an academic background in agriculture and science to start a own agri-enterprises and thus helping the farmers. Agripreneurship has been linked to augmented growth and amplified quality of life and its importance has been increased during the pandemic. The research study was undertaken by the MANAGE-Centre for Agricultural Extension Innovations, Reforms and Agripreneurship (CAEIRA), entitled "Agricultural Extension and Advisory Services: Serving Farming Community by Agripreneurship Amid COVID 19" noted that agripreneurs have played a significant role to reduce farmer's distress by not only creating awareness about COVID-19 but also providing counselling, inputs and crop-based advisory services during the lockdown.

I appreciate all agripreneurs for their hard work and innovation which made their enterprises worth helping the farming community during the pandemic. The important dynamic that policymakers need to consider in preserving the role of entrepreneurship in agriculture. Post pandemic, there is a dire need to proactively engage with more farmers, youth in agripreneurship and migrants at the local level by improving their skillset in the utilization of online media tools. I appreciate and congratulate Dr. Saravanan Raj, Director (Agricultural Extension) and his team for taking up this study during the COVID-19. The findings and recommendations that emerged from the study are providing good insights and policy input to understand the potential role of agripreneurs during crisis management.

MANAGE, Hyderabad
20. 12. 2020

(P. Chandra Shekara)

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Preface

The National Institute of Agricultural Extension Management (MANAGE) is the nodal agency for implementing the Agri-Clinics and Agri-business Centres (AC&ABC), scheme with a network of the 150+ Nodal Training Institutes spread across the country. Almost two decades of partnership efforts of the MANAGE and stakeholders have resulted in the training of 72806 agri-graduates and the establishment of 30,583 (42%) successful Agri-ventures across the country. The programme has created a triple impact in terms of increasing income of farmers, generating employment and reducing the migration of rural youth. There are many success stories of agripreneurs from different states highlighting their achievements and presence in Agricultural Extension and advisory services

In these circumstances, to understand the roles and extension support services provided by agripreneurs to lower the impacts of the COVID-19 and lockdown, a study entitled, "Agricultural Extension and Advisory Services: Serving Farming Community by Agripreneurship Amid COVID-19" was carried out. We have noted the immediate challenges that have been posted by the pandemic to the agripreneurship and suggested mitigation measures to ensure a sustainable food system in the post-crisis period. Although the pandemic has affected the agripreneurs business in terms of opportunity for the consultancy services, getting recommended inputs and reduced sale of inputs and monthly turnover, but their extension services have remained significant. In this hardest time, the majority of agripreneurs have been continuing their agri-business activity and offering different services by adopting digital extension methods. The lack of mobility has imposed the Agripreneurs to adopt various online extension platforms for exchanging timely and relevant information. Further, the Agripreneurs have perceived various problems faced by the farming community in the light of pandemic which includes difficulty in receiving the recommended inputs and services, difficulty in selling the produce at remunerative prices.

Altogether, the focus on agripreneurship becomes vital as it improves the return, efficacy and profitability. Hence there is a need for adaption to these challenging conditions which requires a set of multipronged approaches at various levels. The government should mainstream the 'Agripreneurs' along with existing developmental schemes and projects for better impact by the public-private partnerships through sharing resources.

MANAGE, Hyderabad (Saravanan Raj)
20.12.2020

Contents

List of Acronyms/Abbreviations

AAU	Assam Agriculture University
AC&ABC	Agri-Clinics and Agri-Business Centres
AESA	Agricultural Extension in South Asia
APMC	Agricultural Produce Marketing Committee
COVID-19	Corona Virus Disease of 2019
DAESI	Diploma in Agricultural Extension Services for Input Dealers
FAO	Food and Agriculture Organization of the United Nations
FICCI	Federation of Indian Chambers of Commerce & Industry
FPOs	Farmer Producer Organisations
GFRAS	Global Forum for Rural Advisory Services
IARI	Indian Agricultural Research Institute
ICT	Information and Communication Technology
MANAGE	National Institute of Agricultural Extension Management
NIAM	National Institute of Agricultural Marketing
PM-CARES	Prime Minister Citizen Assistance and Relief in Emergency Situations
RBI	Reserve Bank of India
RKVY	Rashtriya Krishi Vikas Yojana
UAS	University of Agriculture Sciences
UNDP	United Nations Development Programme
USDA	United States Department of Agriculture
WHO	World Health Organization

Glossary

Entrepreneur: A person who starts a business and assumes the risk of that business in order to make money (USAID, 2016).

Entrepreneurship: The craft or skill of starting, developing, organizing and managing a business and assuming the associated risk in order to make a profit (USAID, 2016).

Agripreneurs: Like all entrepreneurs, agripreneurs are risk-takers who deliberately allocate resources to a business venture, in this case, an agribusiness, to exploit opportunities in return for profit; they are the primary decision-makers, responsible for the businesses' success or failure (FAO, 2019).

Agripreneurship: Agripreneurship is an adaptive process of business development in the agriculture sector which brings innovation as well as value addition and helps rural people not only raising their livelihood options but also providing new job opportunities (FAO, 2019).

Agri-Clinics (ACs): Agri-Clinics are envisaged to provide expert advice and services to farmers on various technologies including soil health, cropping practices, plant protection, crop insurance, post-harvest technology and clinical services for animals, feed and fodder management, prices of various crops in the market etc. which would enhance the productivity of crops/animals and ensure increased income to farmers (AC&ABC Guidelines, 2018).

Agri-Business Centres (ABCs): Agri-Business Centres are commercial units of agriventures established by trained agriculture professionals. Such ventures may include maintenance and custom hiring of farm equipment, sale of inputs and other services in agriculture and allied areas, including post-harvest management and market linkages for income generation and entrepreneurship development (AC&ABC Guidelines, 2018).

List of Tables

List of Figures

List of Boxes

Abstract

The COVID-19 outbreak has generated extreme vulnerability in the agriculture sector by creating a future threat to food security. The Agricultural Extension and Advisory Service (EAS) systems have been playing a crucial role at the frontline of the response to the COVID-19 pandemic in rural areas. This is not the first time that EAS has been called to intervene in an emerging catastrophe. As an institution with trained technical staff, the extension has supported efforts and educated communities during natural disasters. Agripreneurs trained under the AC & ABC scheme have changed their way of operating in order to adapt to the government regulations. Efforts by MANAGE and partners have resulted in the training of 72,806 agri-graduates and the establishment of 30,583 (42%) active agriventures across the world as of 2 December 2020. Although the pandemic has affected the agripreneurs' business in terms of getting recommended inputs, reduced sale of inputs and monthly turnover, their extension services have remained significant.

Agripreneurship has been linked to augmented growth and amplified quality of life. During a crisis, the importance of agripreneurship has increased. In this hardest time, the majority of agripreneurs have been continuing their venture activity and offering different services by adopting digital extension methods. The agripreneurs faced stagnation of work in India from the beginning of the pandemic in March 2020, especially during April and May due to a nationwide lockdown. The lack of mobility has imposed the agripreneurs to adopt various online extension platforms to be in touch with their clients consequently. Mobile calling and social media platforms are used for exchanging timely and relevant information. Further, the agripreneurs have perceived various problems faced by the farming community in the light of pandemic which includes difficulty in receiving the recommended inputs and services, difficulty in selling the produce at remunerative prices.

Altogether, the focus on agripreneurship becomes vital as it improves return, efficacy and profitability. The important dynamics that the policymakers need to consider in preserving the role of entrepreneurship in agriculture are explained here. Post pandemic, they need to proactively engage more youth agripreneurs and educated migrant entrepreneurs at the local level by improving their skillset in the utilization of online media tools. The government should mainstream the 'Agripreneurs' service to identify the needs and problems of the farming community. To meet the demand for agricultural commodities, e-commerce and agripreneurship, agri-startups need to be encouraged with suitable policies and incentives.

Executive summary

The ongoing crisis around COVID-19 has affected all aspects of our life. India declared a three-week nation-wide lockdown from March 25 (12:00 AM) onwards till April 14 in the initial phase, which has been subsequently extended till June 30 achieving satisfactory containment of the virus spread. During these challenging times, Indian Agriculture responded well to the crisis and government measures have affected 140 million farm households across the country. However, the COVID-19 pandemic has affected almost every activity of agriculture which also includes the agripreneurs. Lockdown and the fear of the pandemic have affected agripreneurs and companies with less manpower at physical office spaces. It is evident that the COVID-19 pandemic has affected agriculture in many ways. Global efforts to control the virus through restrictive human movement has certainly affected the functioning of agricultural and food systems worldwide.

In these circumstances, a study entitled, "Agricultural Extension and Advisory Services: Serving Farming Community by Agripreneurship Amid COVID-19" was carried out to understand the roles and extension support services provided by agripreneurs to lower the impacts of the COVID-19 and lockdown. A pre-tested and structured online questionnaire was sent to the agripreneurs through e-mail and WhatsApp. A total of 205 agripreneurs took the survey. The responses were collected online and recorded in google forms. The collected data was analysed and presented in a graphical form for a better understanding of the responses.

Since 2002, the Agri-Clinics and Agri-Business Centers (AC&ABC) system has been building capacity for agricultural and other science graduates in more than 32 different areas across the country to complement the extension activities of India's national and state agricultural extension systems. A flagship scheme of the Ministry of Agriculture and Farmers Welfare, GoI, was launched in 2002. The National Institute of Agricultural Extension Management (MANAGE) is the nodal agency for implementing the scheme partnering with a network of more than 150 Nodal Training Institutes (NTIs) across the country. The objective of the scheme is to provide self-employment opportunities to agripreneurs besides supplementing the efforts of public extension by facilitating qualified agricultural professionals to set up agri-ventures and also to deliver value-added extension advisory services to farmers. Efforts of the MANAGE and partners have resulted in the training of 72,806 agri-graduates and establishment of 30,583 (42%) successful agri-ventures across the country as on December 2nd, 2020. The Agri-Clinics and Agri-business Centers have created an impact in terms of supporting agricultural development by complementing public extension, increasing farmers' income, generating employment and reducing the migration of rural youth.

The results shed light on the challenges faced, services offered and extension methods adopted by the agripreneurs during the lockdown. The findings of the study reveal that the agripreneurs have been continuing their agri-venture activity during the lockdown. In this hardest time, more than 75 percent of the agripreneurs have been continuing their venture activity and a considerable contribution made by another 18 percent of agripreneurs. Agripreneurs have offered services like crop-based advisory services, input services, counselling and motivating the farmers, general services related to COVID-19 and other services that were provided to the farming community during the lockdown. The lack of mobility has facilitated the agripreneurs to adopt various online extension platforms to be in touch with their clientele consequently mobile calling (73.5%) and WhatsApp platform (67.4%) were used for exchanging timely and relevant information. One to one interaction, mobile calling, print media, WhatsApp and other ICT tools were used to reach the farmers.

The agripreneurs have faced stagnation of work especially during April (56.1%) and May (43.9%) due to nationwide lockdown since the beginning of the pandemic in March 2020 in India. Further, the agripreneurs have perceived various difficulties faced by the farming community in the light of the pandemic which includes difficulty in receiving the recommended inputs and services (63.6%) and difficulty in selling the produce at remunerative prices (57.6%). Also, they faced various problems like lack of mobility, inadequate capital, disturbances among the community due to miscommunication, panic among the community, inadequate response from the farmers, self-hindrances, diversified clients, inadequate responses from the agricultural developmental departments, inadequate government policies, inadequacy of technological tools (gadgets/internet services) with the farmers and other challenges related to COVID-19.

1. Introduction

1.1. Impact of COVID-19 on Agriculture

The COVID-19 pandemic is the global health crisis that has spread across the globe. The World Health Organization (WHO) declared it as a global pandemic on 30th January 2020 and named as the Corona Virus Disease of 2019 (COVID-19). This is highly contagious in nature and there is no vaccine available yet. Hence, the WHO has prescribed preventive measures for the control of the spread (WHO, 2020). Many countries have adopted lockdown measures to curb the spread of the disease. However, these measures led to a severe breakdown of the economy at all the levels and sectors throughout the world and the agriculture sector is no exception (UNDP, 2020).

Agriculture is directly related to food security and has special importance in human development (Abdelhedi and Zouari, 2020; Kogo *et al.*, 2020; Lopez-Ridaura *et al.*, 2019). From the past experiences of pandemics in the world, it has been discovered that panic and quarantines have a severe impact on human activities, economic growth (Hanashima and Tomobe, 2012) as well as agricultural activities. There is also an increase in hunger and malnutrition during the outbreak of infectious diseases (Burgui, 2020). The World Bank projects a US$110 billion decline in remittances this year, which could mean 800 million people will not be able to meet their basic needs. The disruption to food systems and the impact on food security is the immediate point of concern following the pandemic. Food distribution channels of almost all the countries have been highly disrupted, with strong negative consequences (Torero, 2020).

Fig.1. Impact of COVID 19 on Agriculture

(Source: http://www.fao.org/3/ca8388en/CA8388EN.pdf)

The norms of social distance are severely affected by the availability of labour during key agricultural operations. People are losing jobs and income every day with no way of knowing when complete normality will return. The International Labour Organization estimates that 195 million jobs could be lost. According to the latest edition of the ILO's global report on employment and social trends, rising unemployment and persisting inequality combined with a lack of decent work is making it increasingly difficult for people to build better lives through their work (ILO, 2020).

The COVID-19 pandemic is having an impact on international relationships far beyond the agri-food sector's labour force. It also includes announcements of export restrictions across several countries that limit the global agri-food trade and market access (Laborde, 2020). The agri-food sector is highly connected internationally. Due to the pandemic, ports have vastly reduced the freight capacity on commercial flights for agricultural goods, and other global supply chain disruptions are seen (Ivanov, 2020). This has negatively impacted agricultural productivity for current and future seasons. The severity of these shutdowns has left little scope for short-term identification of effective domestic substitutes but could spur less dependency on global agri-food value chains in the future. It has serious implications for our current globalized agri-food trading system and is potentially one of the most important impacts on the current food system (IFPRI, 2020).

During the lockdown, when all the sectors are clogged, the impact in terms of food loss and waste is huge and the situation is not likely to get better soon. The majority of farmers were losing their products as they are not able to harvest due to the lack of access to inputs, lack of workers, social distancing, and fuel for the machineries among others (NABARD, 2020). In addition to that, farmers markets were closed. All the food farmers' produce is at risk of either being unsold, remaining in the fields or wasted. This situation has a huge impact on food security and nutrition especially in those areas of the world that are already food insecure (Food recovery and food donations, Italy, June 2020).

Wholesale changes have been noted in the market prices for agriculture and the relative value of agricultural outputs in our agricultural management decisions. There is a competition for critical inputs, especially water, due to an increasing emphasis on public health and sanitation systems. There is a composite effect that supports agriculture overall. It is therefore very restrictive that the world needs to devote substantial resources to developing agriculture and food supply, and that is not just because of the current crisis. Agricultural development stimulates broader economic development (FAO, 2017), offers employments and improves the quality of life, economic growth also generates resources to improve related.

The pandemic has a great impact on the agriculture and agribusiness sectors across the globe. Thus, the demand, supply and food security are greatly affected due to reduced purchasing power, mobility restrictions and with a greater impact on the most susceptible population groups. COVID-19 is a testing time for everyone, where proactive thoughts can also generate possibilities. Agriculture will play a vital role in raising the economy if the right resources are given to do so (Syngenta foundation, 2020). In the fight to reduce the disease spread, support to affected communities is leading to a rapid increase in trans-national and cross-institutional collaboration. These collaborations can create the foundation for scaling of socio-economic and environmental development efforts and substantial future strengthening. It's also critical that food safety becomes a priority for policy following this COVID-19 crisis (OECD, 2020).

1.2. Interventions at National and International level

1.2.1. National Level

The lockdown due to the COVID-19 pandemic has paved the way for the initiation of various packages for the vulnerable sections. The state-wise guidelines for farmers that need to be followed during the lockdown period have been shared by the Indian Council of Agricultural Research (ICAR) which includes specific practices during the harvest and threshing of various Rabi (winter-sown) crops as well as post-harvest, storage and marketing of the farm produce and the sowing of Kharif crops (Arabinda and Peter, 2020).

The central government has also allowed the states for amending Agricultural Produce Marketing Committee (APMC) laws which include strengthening the e-NAM platform for providing contactless remote bidding and mobile-based anytime payment which enables traders to market from their places. The advisory of the Ministry of Agriculture and Farmers' Welfare called for facilitating direct marketing, direct purchase from farmers, Farmer Producer Organizations (FPOs), and cooperatives by bulk buyers, traders and processors. Besides, the government has allowed the farmers to have choices for sale, barrier-free inter-state trading, enabling better price realization for agricultural produce such as all cereals, pulses, oilseeds, onions and potatoes and creating a facilitative legal framework for contract farming (Prachi and Shubhendu, 2020).

The veterinary sector is also facing several problems *viz*, farmers' inability to collect feed and fodder for their animals. Inadequate feed manufacturing and distributions prevent farmers from taking their animals to veterinary institutions and carrying animals for sale. While veterinary hospitals and dispensaries are exempted during the lockout, veterinarians and the field staff of the departments of

animal husbandry are deprived of the absence of public transport and restrictions on the use of personal vehicles. To address them, several states have taken initiatives such as educating the livestock farmers on the safety of animal and poultry products and permitting the provision of feed/fodder, medicine and treatment, movement of animals and products, the establishment of animal product shops and various other services. Also, KVKs like KVK Ernakulum is providing veterinary specific services for door delivery of fish. CISH, Lucknow with Sahbhagita SHG to promote the development of eggs and chicken in the Malihabad mango belt and ICAR-IVRI for the timely dissemination of information through WhatsApp, Youtube, Facebook, mobile apps, KVK portal, All India Radio and zoom app presentations (Mahesh, *et al*., 2020).

The Tamil Nadu State Department of Agriculture has constituted a committee at the district level for the procurement and arrangement of cold storage facilities free of cost till the expiry of the lockdown period (Simplicity news team, 2020). Amid lockdown, the Kerala government, in association with the voluntary organizations, local self-help government bodies and farmers' groups, is promoting the cultivation of root and tuber crops, along with vegetables which are part of the daily diet. The ICAR-CTCRI has started a tuber campaign with the support of Kerala Agricultural University (KAU), Vegetable and Fruit Promotion Council Keralam (VFPCK) and the state agriculture department (Athira, 2020).

The Krishi Bhavan of the Kerala state government has been addressing the problem of Muthalamada mango growers by establishing coordination of association of agricultural officer, people's representatives, producer company representatives and farmer representatives. The government is allowing inter-state transportation where media coverage is promoting the demand for mangoes. (Sujith and Mary 2020). The input dealers trained under DAESI have been visiting the fields to provide advisories on various good practices in agriculture and also provide marketing services by means of direct procurement, lining farmers with potential buyers, supermarkets and using ICT network services (Vincent and Balasubramani, 2020).

1.2.2. International Level

The World Bank is working on improving the existing projects and deploying short and long-term financing. The extension wing of the agricultural development departments of various countries has been striving hard to help their farming community. World Food Programme (WFP) is currently providing technical assistance to over 27 governments and has provided over $1.3 billion in cash-based transfers across 64 countries. International Organization for Migration (IOM) is mobilizing to provide immediate support to affected people. IOM has conducted an information campaign on

COVID-19, health screenings and assisted vulnerable persons in over 40 countries with livelihood support including cash transfer.

A comprehensive and holistic COVID-19 Response and Recovery Programme has been launched by the Food and Agriculture Organization (FAO), to address the socio-economic impacts of the pandemic proactively and sustainably. The European Union (EU) are determined to tackle it together by organizing joint purchases of essential equipment, funding research into treatments and a vaccine. Luxembourg has been taking in intensive care patients from France. Germany has delivered medical equipment, the Czech Republic has donated protective suits to Italy and Spain, and France has donated masks to Italy.

African countries including South Africa, Ghana, Botswana and Nigeria have established mobile testing capabilities. Similarly, South Sudan, Kenya, Burundi, Rwanda, and Tanzania have set up mobile laboratories and testing units. In Ghana, 1,300 people were assigned to disinfect 137 food markets around the Greater Accra to ensure that people can access food without compromising new health requirements. Likewise, Rwanda also disinfected and decongested its food markets and delivered food and non-food items to vulnerable communities. The market vendors adopted self-monitoring measures, in Uganda, to ensure compliance with emergency health regulations or face closure. Botswana's government procured food from local communities and established milk collection centers in communal areas. Senegal established numerous mobile response teams who are equipped to respond immediately and take samples when illnesses have been reported.

The Indonesian government has allocated around 6 million ha of land to produce basic food products *viz.* corn, rice and livestock (Peter, 2020). In Vietnam, the UNDP conducted an outreach programme for vulnerable ethnic minorities to educate them about the COVID-19 and how to curb its spread. United States Department of Agriculture (USDA) focusing on maintaining the integrity of the food supply chain assisting farmers, ranchers and consumers through its Coronavirus food assistance program. As part COVID-19 response plan, A Feed the Future helping break down biases against women in agriculture, helping more than 600 women become livestock entrepreneurs and community agents since 2015 in Bangladesh. The USAID Pakistan Agriculture Technology Transfer Activity (PATTA) enabled agribusiness partners to unexpectedly reach 1,158,392 small farmers during the crisis, through high engagement digital initiatives. The project has promoted 96 agricultural technologies and commercialized 43 of them during the pandemic. The CABI Plantwise program is associating with 10 countries in Asia (Malavika, 2020).

1.3. Interventions by various stakeholders in agriculture

In addition to the intervention of the government agricultural extension network, various other novel initiatives have been working towards improving the agricultural sector. Various agritech startups have been leveraging the digital technologies for serving the farming community Amidst the pandemic. The startup named *AgriBazaar* has created an e-mandi aggregator model to provide a supply chain platform to the farmers and traders/consumers. After a trade order, *AgriBazaars'* on-ground team operates in 16 states and follows a contactless pick-up process and supply to the trader. The firm has facilitated the transportation of 5000 trucks of farm-produce even in distant places like Lakshadweep (Garima and Amit, 2020). Similarly, a Pune based application called *Farmpal* has taken an initiative of picking the produce directly from the farm fields with the collection centres established within four kilometers of the farm (Garima and Puneet, 2020).

Harvesting Farmer Network (HFN), a farmer only app run by Harvesting India private limited, provides virtual support group advice on crop and farming practices. The network covered 10 lakh small and subsistence farmers across the states through the app, SMS, toll-free number, Twitter and WhatsApp. The *HFN* has been associating with the government officials and Indian railways to ensure safe and timely movement of the produce. The grape farmers and UAS Alumni association in Bengaluru have been associated to sell the produce to Resident Welfare Associations (RWAs) in Bengaluru city. This initiative has been procuring 250-300 tons a day when compared with that of 2-3 tons procurement by HOPCOMS, the state-run procurement agency. *Spudnik farms*, an organic farm to table venture, has been partnering with small and marginal vegetable and fruit growers in the rural districts of Bengaluru to ensure fresh produce to the customers (Rinchen, 2020).

Another technology innovation named *Agricx Lab* is providing the service of quality inspection of the farmers' produce like colour detection, uniformity, count, and external defects of the produce using artificial intelligence and machine learning. It has been collaborating with the FPOs, trading partners and large buyers. To overcome the problem of the movement of the agricultural officials, *CropIn*, a SaaS-powered platform is sending climate-smart advisories in the form of educational videos and training content which includes immediate reporting, interpretations of data, analysis reports and management of the entire ecosystem of farming. The firm is in operation from 12 states adopting precision farming techniques for reducing excessive use of resources (Garima and Jiten, 2020).

In order to support the farmers to take care of their family members, IDH sustainable trade initiative has been providing multiple initiatives like subsidizing hospital transport, sharing information and delivering essential items. Tea Agripreneurs of Golaghat is subsidizing the transport of Small Tea

Grower (STG) families with suspected cases of COVID-19 at the rate of ₹ 1500. The organization offers accurate information on government announcements and UNICEF wash (water, sanitation and hygiene) to provide advice on reliable information in real-time. The Farmers Field Schools have created a WhatsApp group to share WASH-related information, do's and don'ts' related to COVID-19 situation as stated by the World Health Organization (WHO) and other credible sources. They are also sending voice messages in local languages with the lead farmers who, in turn, spread the information further. The tea agripreneurs have been trained to provide awareness calls with their network to the STG farmers regarding personal hygiene and enforcing social distancing as advised by the local and national health authorities. Through a rural e-commerce company – *Boonbox*, the initiative is providing essential items to the farmers. The firm is also providing the shrimp farming sector-related information through the *Aquaconnect* platform (Anonymous 2020).

1.4. Agri Startups: A Ray of Hope during distress

Many big multinational corporations like Tata group, PepsiCo and food delivering company like Zomato have stepped in with the government to feed the daily wagers. Public-Private Partnerships (PPPs) aided the government to tackle the situation by raising money. To suppress the virus, this constructive and communal strategy has been shown so far. Several agri-startups have been helping the Indian farming sector with their tech solutions. Based on the survey conducted by the FICCI, there are about 450 active agri-startups in India that have been growing at 25 percent year-on-year basis and received $545 million of venture capital funding since 2014. Out of this, $330 million came in 2019. Highlighting the agri-tech solutions, the study said that the agri-startups can provide aggregation and distribution of the farm produce from the point of collection to the consumption centres (FICCI, 2020).

Table 1: Solution offered by agripreneurs during the lockdown across the globe

Sl. No.	Agripreneur	Country	Solutions offered
1	Umukunzi Adeline	Rwanda	Runs a mushrooms business in Musanze district, in the Northern province of Rwanda, changing the business model to survive the crisis from wholesale to direct selling (http://ryaf.rw/).
2	Tumwebaze Khamutima	Uganda	Shifted to teleworking using videoconference and digital communication channels and are trying to engage the young farmers who use the same tools (https://www.yofchan.com/).
3	Jean Bernard Diatta	Senegal	Working to bridge the school-to-work transition through work readiness and entrepreneurship services for students, as well as professional development for

			school teachers and administrators (https://www.eaffu.org/).
4	Karina Brito	Guatemala	A group of 20 young people, supported by FAO, started a company called 'Avantichajil', which means 'sowers of life'. Planning to offer agro-ecotourism services, along with the timber products. They had started the training with INAB (National Forest Institute) during the lockdown (https://www.facebook.com/JuventudesRuralesGuatemala/).
5	Arthur Woniala,	Kenya	Facilitating access to basic services and information
6	Poonchai Chitanuntavitaya	Thailand	Thai social entrepreneurs are helping farmers call for coronavirus cash as it continues to buy raw milk from almost 100 farmers (http://www.fao.org/ica-programme/).
7	Cherrie Atilano	Philippines	Launched her #MoveFoodInitiative to help farmers get food during lockdown to customers that otherwise would have been dumped (http://www.ekadiwa.da.gov.ph/)
8	Pak Opik	Indonesia	Sells 'exotic' vegetables such as purple cabbages and Japanese cucumbers through e-commerce platform (http://www.fao.org/ica-programme/).
9	Audrey Goo	Malaysia	Pivoting online to capture the new opportunities arising from changing consumer preferences for a fresh seafood subscription and delivery service (http://www.fao.org/ica-programme/).

Table 2: Solution offered by agripreneurs through startups during the lockdown in India

Sl. No.	Startups	Solutions offered
1	Ninjacart, Umbotail, Bigbasket, WayCool, ShopKirana, SuperZop, MeraKisan, Loop, Kamatan, DeHaat, KrishiHub, Agrowave, Crofarm, FreshoKartz, Agribolo, Kisan Network, Himkara,	Connecting farmers with buyers, including retailers, processors, cloud kitchens, commerce, and also direct to consumers. (https://www.startupindia.gov.in/content/dam/invest-india/).
2	Amvicube, Agricxlab, Intellolabs, Nanopix, Occipital, Raav Tech and Zense	Offering quality assurance and standardization of agricultural commodities through digitization to address post-harvest challenges. (http://www.ficci.in/ficci-in-news-page.asp?nid=22831).
3	Our Foods, Agri Bazaar, Star Agri, Arya Collateral, Ecozen, Origo	Providing storage facilities to give farmers an option to sell the produce at the right price and at the right time,

		instead of immediate or distressed liquidation of their produce after harvest. (https://economictimes.indiatimes.com/small-biz/startups/newsbuzz/).
4	Agrostar, AgriBolo, Bharat Agri (Lean Agri), Bharat Rohan, Behtar Zindagi, BigHaat, DeHaa, Freshokartz, Gramophone and Unnati	Offering solutions for optimum use of agricultural inputs and enable delivery to farmers. (https://www.forbesindia.com/article/coronavirus/lockdown).
5	Sickle Innovations, Distinct Horizon, Tractor Junction, Khetibadi and Farm service	Offering mechanization solutions for harvesting and sowing. (https://www.forbesindia.com/article/coronavirus/lockdown).
6	Satyukt Analytics, Flybird, Kritsnam, Agrirain, and Manna Irrigation	Developing data-driven controlled irrigation models and focused on the accurate and timely assessment of soil moisture. (https://www.livemint.com/news/india/agritech-startups).
7	CropIn, SatSure, Farmguide, Niruthi, AgRisk, Skymet	Offering farmers advisory on institutional credit, crop insurance and crop monitoring.
8	Samunnati, FarMart, Jai-Kisan, PayAgri, Bijak	Specifically working in value chain financing. (https://www.businessinsider.in/business/news/agri-startups)..

1.5. Krishi Vigyan Kendra's (KVKs): Bridging the gap

Farmers have faced various challenges since the lockdown, and KVKs have stepped in and assisted farmers as a local agricultural extension center. ICAR-ATARI have been playing an anchoring role in employing its agricultural extension network through KVKs across the country to identify the challenges faced by the stakeholders in agriculture and to develop and/or adopt practical solutions. The KVKs also faced the problems of interaction with their clientele due to the challenges of not completing the training courses such as DAESI, AC&ABC, and other vocational training courses with full potential. The disruption of supply chain between producers and consumers, lack of awareness on value addition and processing and the drastic fall in wholesale prices, safe and scientific storage practices, poor maintenance of livestock due to the fear of the spread of infection and various other challenges which otherwise noticed, has led to the closure of many activities on and off-field.

The identified problems posed a great challenge on the part of the agricultural extension system. Hence the KVKs have proactively adopted various mitigation strategies to help the farming community and related stakeholders in agriculture as well as the general public. In order to overcome

the constraints imposed by the restriction of movement, KVKs have adopted appropriate ICT tools. They have adopted these tools to get in touch with the farming community and to establish a network with the stakeholders through social media tools such as Facebook live, WhatsApp, Telegram, conferencing, phone calls, mobile applications, audio-visual aids, and the tele-training. The various services offered were tele-training through video clips by KVK Alappuzha, Kerala, Agromet advisories via WhatsApp, Facebook and phone calls (KVK Saraiya, Muzaffarpur, Bihar), Zoom app conferencing for local resource-based solutions (KVK Divyayan, Ranchi, Jharkhand). 'Unnat Krishi Abhiyan' a WhatsApp mediated training group (KVK East Singhbhum, Jharkhand), a WhatsApp group for training input dealers on DAESI course (KVK Nimpith, West Bengal), Facebook live classes (KVK Ernakulam of ICAR-CMFRI, Kerala), Mobile based Veggies application to sell vegetables on pre-order (KVK Selam), WhatsApp group of primary farmers and Ajim Premji NGO, Dept of Horticulture, Kalyani Foundation and Volunteers to market fruits (KVK Kalburagi), KISANKARTS.COM a registered startup for online farm-to-home delivery of fresh vegetables, fruits and other food grains (KVK, Cooch Behar), odihortmarketing.nic.in, an online portal of Dept. of Agriculture and Farmers Empowerment for selling farm produce (KVK Malkangiri, Odisha), cghaat app operated by CMO for monitoring online delivery of vegetables and milk (KVK Bastar, Chhattisgarh). For advertisement and creating safety precautions, newspapers, all India radio service (KVK Ernakulam of ICAR-CMFRI, Kerala), pamphlets (KVK Fatehbad) were employed. The payment was encouraged through online mode such as Google pay, Net banking, phone pe etc.

In an attempt to address the issue of the market channel disruption, KVKs have been establishing linkages with various FPOs, SHGs, and local vendors. Some of them are KVK Sirmour, HP with Himachal Pradesh Horticulture Produce Marketing and Processing Corporation (HPMC) to sell raw strawberry and pulp, KVK Solan to sell mushroom and its value-added products, KVK Uttarkashi to sell summer squash, KVKs Bathinda and Amritsar to market processes products of Amla, KVK Lunglei, Mizoram with a village-level task force to sell cabbage, KVK Nanded-I to market turmeric and vegetables, KVK, Beed-1, KVK Ramgarh to sell fruits and vegetables, KVK with Puthari FPC to sell tomato, chilli watermelon and avocado, KVK Bagalkot with FPO Hungund for procuring and selling fruits and vegetables to the wholesale buyers like ITC, MORE, SAFAL and Reliance Fresh, KVK Shivamogga in association with Horticultural Producers' Cooperative Marketing and Processing Society (HOPCOMS), FPO and APMC to sell pineapple, KVK Selam in long-distance transportation of fruits and vegetables. KVK Erode organized fertilizer vehicle for the supply of inputs timely to farmers, KVK, East Midnapore created 'Green Basket' for home delivery of vegetables and other daily need articles, KVK, Kamrup, KVK Morigaon are assisting in getting passes from the district authorities, KVK Ghazipur II, in exporting chilli and bottle guards to London with the help of APEDA.

Table 3: Solution offered by KVKs during the lockdown in India

Sl. No.	Name of KVK	Innovation to promote agripreneurship
1	KVK Jalna-I, Maharashtra	Took an initiative to develop the 'Farm to kitchen' e-commerce website for the online purchase of fruits and vegetables during the lockdown period due to COVID-19.
2	KVK Begusarai, Bihar	Identified entrepreneurs, provided a mushroom kit for production at home and motivated them to market collectively.
3	KVK-Hanumangarh-I, Rajasthan	Facilitated the migration of bee-colonies to distress beehives and keepers during the lockdown.
4	KVK Nadia, West Bengal	Enabling the marketing of Chrysanthemum saplings through ICT tools.
5	KVK Koraput, Odisha	Trained farmers for branding and doorstep marketing of Mushroom.
6	KVK Kamrup, Assam	Trained and guiding flower growers to dry the flower petals to be used as poultry feed. Also, it guided flower growers to remove the floral bud completely to encourage the vegetative growth of the gerbera crops during the lockdown.
7	KVK Salem, Tamil Nadu	Promoted FPO for marketing farm-fresh produce.

(***Source:*** *https://www.icar.org.in/content/innovative-agri-solutions-during-covid-19).*

KVKs have asked their Self Help Groups to come forward for the noble cause of social service by preparing and providing masks to the needy. The trained women were given orders to prepare protective kits for medical warriors. Various KVKs of zone-1, KVKs Patiala and Moga, Punjab, KVK Kota, Rajasthan and KVK Wyra, Telangana were a few of them. Apart from these, various KVKs have been involving in creating awareness regarding COVID-19 and supplying essentials for the needy. KVK Ajmer, Rajasthan in association with FPO, have been creating awareness regarding the COVID-19 and collected handsome from local donors to distribute food and other essentials. KVK Rewari, Haryana and a team of farmers' club have been sanitizing the rural areas with the help of a tractor operated spray pump. KVK Mandi, HP through the SHGs advised the farm women to collect vegetables/fruits in a bucket to avoid direct contact with the fruit and vegetable sellers and to wash them in lukewarm water by adding salt/alum/vinegar/baking soda.

1.6. Extension support for developing agripreneurship

There are several agencies, government and non-government, that support and promote agripreneurship development. The Ministry of Agriculture, GoI has launched a programme to fill the potential available in the broad pool of agriculture graduates. Irrespective of their experience (fresher

or are currently working or not), the Agri-Clinic or Agri-business Center (AC&ABCs) may provide paid professional services to enhance agricultural production and farmers' incomes, and it is an appreciable initiative to make better farming methods accessible to farmers across the country. This is implemented by the National Institute of Agricultural Extension Management (MANAGE), Hyderabad in association with NABARD and by coordinating 45 days training programme for agripreneurs through selected institutes across the country. The course comprises entrepreneurship and business management, as well as skill improvement modules in the chosen areas of activity by the agripreneurs. Small Farmers Agri-business Consortium (SFAC), being an implementing agency, is offering free start-up training to agriculture or any subject allied graduates. SFAC will also support in the establishment of linkages for sustainability after the agripreneurs setup their Agriclinics and Agri-Business Centres (AC&ABCs). National Bank for Agriculture and Rural Development (NABARD) is offering bank loans for setting up agri-business centres. The State Agricultural Marketing Banks (SAMB) is set up to regulate the markets actively for food crops and oilseeds in bigger markets of towns and cities. The National Council for State Marketing Board (NCOSAMB) is the body to coordinate the programmes with modern facilities. The government provides grants in aid to the state to set up such training facilities. A premier international trading house, State Trading Corporation (STC), owned by the government of India has developed vast expertise in handling the bulk international trade. The KVK PIRENS, Babhaleshwar in Maharashtra has been selected as a recognized training center after taking cognizance of its innovative extension methodology and unique professionalism in providing vocational training for rural youths. There are various other schemes in agriculture such as the Ministry of Food Processing Industries (MFPI), National Horticulture Board like MSME, Agri-export zones, Agri-Udaan, women empowerment through SHG's, dairy entrepreneurship development scheme and various other incentives.

Likewise, ICAR-National Academy of Agricultural Research Management (NAARM) has established a Centre for agri-innovation a-IDEA to give incubation support services to the agri-entrepreneurs. This helps in developing their businesses and to provide access to knowledge and networking support services in fostering innovation and entrepreneurship in agriculture. Attracting and Retaining Youth in Agriculture (ARYA) scheme of the ICAR aims to empower youth in rural areas to take up agriculture, allied and service sector enterprises for sustainable income and gainful employment. It enables the youth to establish network groups to take up resource and capital intensive activities. Rural and Entrepreneurship Awareness Development Yojana (STUDENT READY) is yet another scheme of the ICAR. This is a skill development initiative to strengthen students with skills to take up global challenges and also to improve both their employability as well as the ability to set up a venture. Several similar schemes are under implementation by various ministries including a range of schemes being implemented by the Ministry of Agriculture and Farmers' Welfare (GoI, 2019). The farm magazines, radio, TV and YouTube videos profiling enterprising farmers have become very common

in recent times. The Department of Agriculture and Cooperation, GOI has documented their success stories in the shape of a Coffee Table Book titled "Harvest of Hope", with the sponsorship of NABARD. MANAGE has documented successful Agri-Startups Coffee Table Books titled 'Agri-Startups Seeding the Ideas', and 'Scaling-Agri-Startups: Promoting Innovations' (2020). The ICAR honors innovative farmers including the agripreneurs under different categories every year on its Foundation Day i.e. on July 16. Almost all the SAUs, ICAR institutes and KVKs in India have a list of enterprising farmers whom these institutions have not only awarded but also utilized their services as resources persons too.

1.7. AC&ABC scheme: An overview

The whole world is thinking about how to establish sustainable sources of livelihood during this crisis time. Many schemes and programs are being run by the government for promoting farming which will provide employment opportunities to the youth and a constant source of income. Aiming at this, the government has launched a scheme called Agri Clinic and Agribusiness Center (AC&ABC) on 9th April 2002.

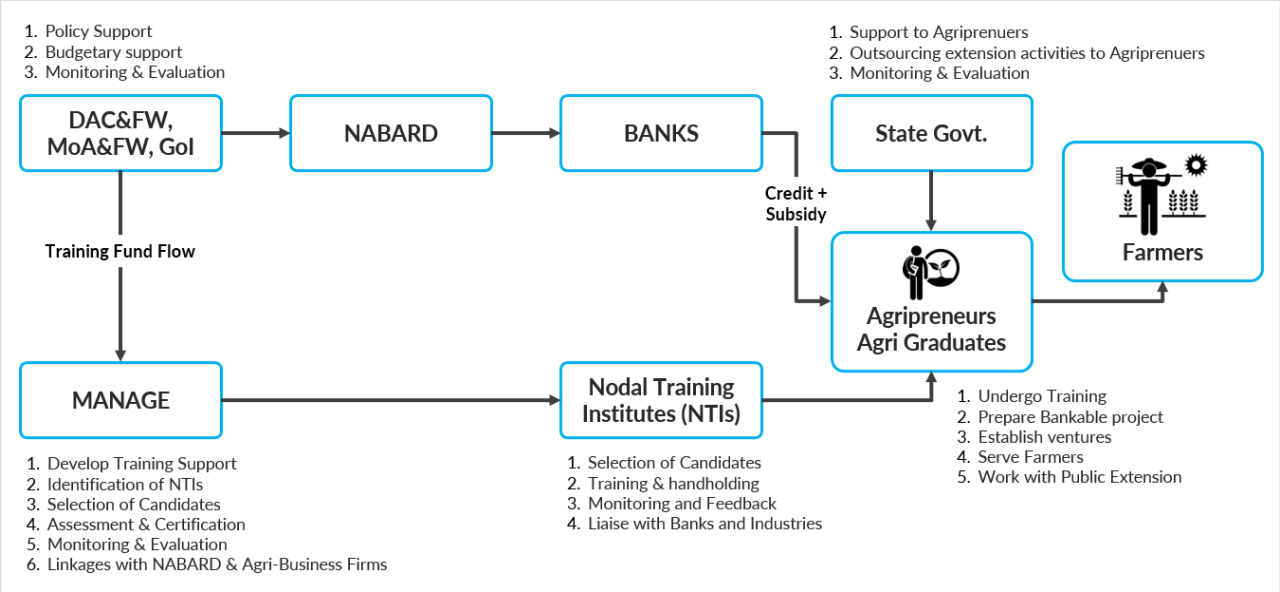

Fig. 2: AC&ABC Scheme Structure

(Source: www.agriclinics.net, 2020)

1.7.1. Objective of the AC&ABC Scheme

The main objective of this scheme is to promote the establishment of Agricultural Clinics and Agri-Business Centers (AC&ABC) in the country. A plan has been prepared to promote agri-business through which a person associated with farming or willing to join can take a loan of up to 20 lakh

rupees to establish an agriventure. Agripreneurs can get this amount through AC&ABC Scheme. One who joins this scheme is given 45 days training and if his/her business plan is found eligible, then NABARD will give provide a loan for the same.

1.7.2. Eligibility for AC&ABC

Unemployed agricultural graduates, agricultural diploma holders, higher secondary and biological science graduates with agriculture and postgraduate courses in agriculture are eligible for the training under this scheme. The age limit is 18 to 60 years for the trainees.

1.7.3. Documents and Online application process

Aadhaar card number, email ID, last educational qualification, bank account information and photo of the applicant are necessary to apply for the training. One can apply online at https://www.acabcmis.gov.in/Institute.aspx. As per your convenience, an applicant can choose the center of training. If the applicant is selected, he/she will be eligible for the training and can open their own agricultural clinic or agribusiness center after completion of the training from the institute.

Box 1: Special features of AC & ABC Scheme

- A special initiative to promote agripreneurship in India.
- Training institutes have been established in all states.
- The government has tied up with the National Institute of Agricultural Extension Management (MANAGE) Hyderabad, an organization of the Ministry of Agriculture.
- 45 days of residential training to students who are desirous of setting up the AC&ABC centers.
- During the training, the agripreneurs are made aware of the topics and procedures related to agricultural clinic and agribusiness.
- The information about project management, maintenance of accounts, market survey, personality development, and computer internet etc. will be given to the trainees.
- The trainees will also be sent to the tour of professional institutes of successful entrepreneurs in the field of agriculture. (www.manage.gov.in; www.agriclinics.net, 2020).

1.7.4. Loans and Subsidies in this Scheme

To set up the agricultural clinics and agribusiness centers, NABARD will provide a personal loan of ₹20 lakh and a group loan up to ₹1 crore for the training entrepreneurs. The agripreneurs will also be given 36 to 44 percent of the project cost on loan. On this loan, 36 percent subsidy will be given to the general category entrepreneurs. Also, 44 percent subsidy will be given to the entrepreneurs belonging to scheduled castes, tribes and women.

Table 4: Indicative List of Agri Ventures under the ACABC Scheme

• Production units like dairy, poultry, piggery, fisheries, sheep, goat, emu and rabbit rearing etc. • Production of bio-fertilizers, bio-pesticides & other bio-control agents • Apiaries (bee-keeping) and honey & bee products' processing units • Production and marketing of farm inputs & outputs • Horticulture clinic, nursery, landscaping, floriculture • Metallic and non-metallic storage structures. • Seed production and processing units • Crop production and demonstration • Micro-propagation • Information technology kiosks • Agri journalism • Agri tourism • Extension consultancy services • Crop protection services • Contract farming	• Production, maintenance and custom hiring of agricultural implements and machinery • Production, processing and marketing of medicinal and aromatic plants • Post-harvest management centres for storage and packaging • Livestock health cover, veterinary dispensaries & artificial insemination • Soil and water quality cum inputs testing laboratories • Retail marketing outlets for processed agri-products • Feed production, marketing and testing units • Cool chain including cold storage units • Agricultural insurance services • Poultry and fishery hatcheries • Vermiculture units • Mushroom production • Sericulture • Value addition centres • Vegetable production and marketing

Source: (www.agriclinics.net, 2020)

1.8. Understanding agripreneurs and agripreneurship

Entrepreneurs may be defined as the innovators who, by serving new markets or creating new ways of doing things, drive a change in the economy. Hence, an agripreneur maybe someone who carries out a variety of activities in the agriculture sector in order to be an entrepreneur. According to Njegomir et al., (2017), entrepreneurship requires tasks that usually require initiative, creativity and willingness to take risks and can be completed in groups individually: this confirms that the

agricultural producers are basically entrepreneurs because they take risks in order to achieve positive business results.

Table 5: Unique aspects of agripreneurship and agripreneurs

Agripreneurship	Agripreneurs
Profitable marriage of agriculture and entrepreneurship	Has a special foresight with regards to resource and environmental constraints, to learn from others and his/her own past.
Directly-marketed agriculture	Willing to make it more sustainable
New methods, processes techniques in agriculture	Adopt new technologies for farming
Converts agricultural activity into an entrepreneurial activity	An individual or group with the right to use or exploit the land or other related elements that are required to carry out agricultural, forestry or mixed activities
Using a unique set of resources	Works within a food system, located in but not necessarily limited to, a rural location
Rural	Consider the full range of 'agribusiness' opportunities within the extended food system
Sustainable	Creating new ways of doing things in the agriculture sector
Community-oriented	Utilizing innovative and sustainable production methods

Source: (FAO, 2018)

As a result, farmers seem to produce solely for the market: as a small entrepreneur, the farmer observes the market, price fluctuations and adjustments, and develops his or her business strategy in accordance with the market, Njegomir et al (2017). Thus, entrepreneurial orientation can be defined as a farmer's willingness to innovate to rejuvenate market offerings, take risks to try out new and uncertain products, services and markets, and be more proactive than the competitors towards the new marketplace opportunities. The original entrepreneurial orientation construct combines three key elements of entrepreneurial behavior, namely, innovativeness, risk-taking and pro-activeness, Lans et al., (2013).

The term 'agripreneurship' is synonymous with entrepreneurship in agriculture. It refers to agribusiness establishment in the agriculture and allied sectors and is a profitable blend of agriculture and entrepreneurship. It turns your farm into an agribusiness. Agripreneur is 'an entrepreneur whose main business is agriculture or agriculture-related' (Dabson and Markley, 2010vii). Sustainable agriculture denotes a holistic, system-oriented approach to farming that focuses on the interrelationships of the social, economic and environmental process. Sudharani described agripreneurship as 'generally sustainable, community-oriented, directly marketed agriculture' (Uneze 2013vi). Kumari and Prasad (2017) see agri-entrepreneurship as a way towards self-sustainability.

Damarla and Kumar (2015) define an entrepreneurial farmer has to take the advantage of opportunities. A farmer with an entrepreneurial spirit energetically, enthusiastically and carefully makes many different decisions about his/her farm activities in the context of the value chain that influences the profits of the farm business till the produce reaches the consumer. Estahbanaty (2013) finds the farmer entrepreneur has a special foresight with regards to the resource and environmental constraints, to learn from others and his/her own past, according to modern and indigenous knowledge.

Farmer-entrepreneurs are market-oriented, forward-looking and amenable to taking calculated risks, creating new products, adopting new technologies, and innovating in their use. As they pay more attention to the survival of their businesses in the long run, they are willing to make them more sustainable, as per Faria and Mixon (2016). In his view, the farmer-entrepreneur creates a simple vision of what is possible and the future they want, and what is possible is determined by the market demand. The farmer entrepreneur wants to make profits. They know that profits are made in the market, FAO (2013). An 'agricultural entrepreneur' is an individual or a group with the right to use or exploit the land or other related elements required to carry out agricultural, forestry or mixed activities (Suarez (1972).

Box 2: Types of Agripreneurs

According to Alsos et al. (2006), there are three types of agripreneurs: Pluriactive farmer, Resource-exploiting, and the Portfolio Entrepreneur.

Pluriactive Farmer: They derive a reasonable proportion of income from the off-farm income-generating activists. The purpose of engaging in the off-farm economic activities is to sustain their farming and/or to expand their farms to provide employment to their family members. This approach is used as a coping mechanism to sustain in adverse climatic conditions and other shocks that affect their livelihoods (Shucksmithet al. 1989). In the pluriactive approach, the farm business is owned by the family and is less capital intensive.

Resource Exploiting Entrepreneur: They are the farmers who utilize the unique resources available on their farm to develop a new farm-based business. For example, livestock farmers can prepare compost from cow dung; or the farm can be used as an agri-tourism venue to generate additional income. The capital requirement for business activity varies with the nature of the business.

The Portfolio Entrepreneur: They are progressive farmers who wish to exploit a novel but risky business idea. They develop teams to implement their ideas and are ready to invest large capital for translating these into a viable business. Though the ideas originate from the farm, the new business is registered as a separate entity from the farm. For example, a group of farmers create a mango pulp processing factory using their own produce at the initial stages and then go on to procure from others when expanding production (Alsos et al. (2006).

Agripreneurs: Agripreneurs, in general, should be visionary, curious, honest, determined, proactive, persistent, hardworking, maintain integrity with strong organizational and management skills. Agripreneurs are also known as entrepreneurs in agriculture and agribusinesses.

According to Rao and Kumar (2016), an agripreneur, as an innovator, drives change in a rural economy by adopting innovative ideas in the agriculture and allied sectors. He takes a risk, adopts innovation, creates new ways of doing things and taps new markets. More specifically, Bairwa et al., (2014) define an agripreneur as someone who undertakes a variety of activities in the agriculture sector in order to be an entrepreneur. Carr and Roulin (2016) see an agripreneur as the one who works within a food system, located in but not necessarily limited to, a rural location. An agripreneurs identifies an opportunity within a market to directly produce foodstuffs such as vegetables, fruit, dairy, meat, fish and grains utilizing innovative and sustainable production methods. The agribusiness may also recognize the full spectrum of 'agribusiness' opportunities within the expanded food system, which may include activities as diverse as manufacturing, packaging, logistics, utilities, cooking and recycling.

Box 3: Case Study: CITRUS 500 Club- Deepthi Reddy Madugula- Telangana- India

Ms. Deepthi Reddy Madugula, an ACABC trained women social Agripreneur, is promoting agri-tourism by the name 'Farm Tour' through her first company Idhya Eco Living Pvt. Ltd. Farm Tour aims to conserve farming traditions and to promote as a culture to

be inherited among the next generation, and also to involve the urban community to create awareness on farming. During these COVID conditions, the citrus farmers neighboring and connected to the Farm Tour were affected and failed to sell their produce. The Farm Tour team has come up with a solution to help the small fruit cultivators and also improve the community's immunity through a common social platform called 'CITRUS 500 Club'.

The salient features of the 'CITRUS 500 Club' is building a social platform to make the fruits and vegetables available to the orphanages, slum dwellers, daily wage earners, sanitation workers, health workers etc. On the contrary, the small fruit cultivators get profit. Along with this, another social initiative named 'Womenergy', with a vision to empower women, builds eco- entrepreneurship, intrapreneurship among the homepreneurs, creates green livelihoods, facilitates networking, branding and bringing hundreds of women together on a single platform was initiated as a startup. Economically middle and lower-income families are the most affected during COVID-19. Hence, supporting the 'EARN FROM HOME' model just by referring the business in WhatsApp; also proposes to shine as intrapreneurs with mentors for this social impact model. For this, any women can register and can take advantages of a bulk business and referral networks now from home (Saravanan and Jyoti, 2020).

1.8.1. Agripreneurship: Tool to uplift Agriculture

Small farmers' job suggests that they are an agricultural entrepreneur because they grow food for their families, but they sell a small portion of their goods in many markets at the same time. In this way, entrepreneurs can work independently and maintain the profit from the harvest, or they can be part of the Farmers group and jointly sell the crop and gain the profit accordingly. Besides, the farmers enter into business relationships with other value chain partners such as agents, and also, this forms an approach of contractual marketing which may lead to large business industries at the end if they get success (Entrepreneurship, 2020). Agripreneurship combines agriculture and entrepreneurship to deal with several challenges faced across the agricultural value chain by disrupting the agriculture system with affordable solutions and innovative ideas. The government is ensuring skills required in the agri-entrepreneurship so that it reaches every corner of the country due to which agriculture in India is observing a fundamental shift in terms of technology. As modern technology is replacing conventional agricultural practices, the government is ensuring a strong linkage between agriculture and entrepreneurship (Financial express, 2018).

Box 4: The role of extensionists in the development of Agripreneurship

Farmers, in particular smallholder farmers and groups of farmers, need to improve their understanding of the market and economic opportunities in order to become agricultural entrepreneurs. At the same time, as successful firms, they should be able to achieve success in farms, groups and companies. While farmers can embrace innovation and maybe an entrepreneur, they regularly lack market-related knowledge and need advice and help from extension services to transfer their sales to normal, reliable and profitable sales, for the same to happen.

1.8.2. Agripreneurs and Agripreneurship in other countries

Following knowledge of multiple meanings of agripreneurship and agripreneur, examples were analyzed from different countries as per the evidence provided based on the documented results of primary research, from various countries.

Table 6: Agripreneurs and agripreneurship in other countries

Sl. No.	Country	Reported by	Example
1	East Africa	Mehta *et al.*, (2011)	Entrepreneurs operate within homogenous, tightly knit social networks of trusted individuals. However, the challenge of expanding beyond such networks to access new knowledge, skills and resources can be met only by establishing relationships with individuals outside their existing sphere of trust.
		Nagalakshmi and Sudhakar (2013)	The agripreneurs use biodegradable and natural fertilizers for their commercial crops, thus reducing the usage of chemicals to avoid soil erosion. They have created their own agripreneurs associations to solve their problems.
2	India	Rao and Kumar (2016)	Agripreneurs play various roles: there is a chance to go innovative with regard to the use of fertilizers and pesticides, adopting multiple crops simultaneously, changing crops season by season to protect the quality of the soil, and using machines to reduce the cost of labor.
		Singh (2013)	In Uttar Pradesh contrary to common belief, caste, farm size, and age of the farmers are not necessarily major constraints for agripreneurship. Even less educated small farmers who are old in age are agri-entrepreneurs

3	Iran	Rajaei *et al.*, (2011)	From the perspective of cooperative managers, the most important factors in strengthening entrepreneurship in agricultural cooperatives are: providing financial support and tax breaks, reform the banking laws and making regulations to adjust with entrepreneurs' conditions.
4	Poland	McElwee (2005)	Entrepreneurship is a relatively recent phenomenon in Poland. Farmers believe that being independent will make them more adaptive to the market. The emergence of the free market economy has resulted in the development of a new spirit of enterprise and responsibility for farmers running their own businesses.
5	Republic of Serbia	Njegomir *et al.*, (2017),	Entrepreneurship is inseparably connected to agricultural production in Serbia. However, this connection stems from the interpretation of entrepreneurship as an 'undertake' of business activities. Entrepreneurship partially occurs in fruit growing, and also occurs in farming and animal husbandry at the same time.
6	Nigeria	Esiobu *et al.*, (2015)	Among arable crop farmers in Imo State, sixty household entrepreneurs were selected using multi-stage random sampling techniques. A reasonable proportion of the farmers identified personal intension, wanting autonomy and displacement/disruption in life as the key driver to entrepreneurship development in the area.

1.8.3. Agripreneurship in challenging environments

Basically, agripreneurship operates within an environment comprising economic, societal, political, and environmental elements (FAO, 2014). It helps to promote agripreneurs to build employment and sustainable development as agents of change. Its chances to flourish are strongly dependent on the environment in which a venture operates. At times, even the most skillful agripreneur will struggle to flourish if he/she operates in an unconducive environment. Empowering business environments are defined as sets of institutions, policies, support services and other circumstances that enhance the business environment in order to develop business activities (FAO, 2013). The public and private sectors also play a crucial role in shaping the environment through the implementation and execution of fiscal, sectoral, economic and labour policies. Government institutions also set food safety and quality standards, and engage in inspection services, while providing valuable agricultural information through crop research, extension services, data collection and market research. The enabling environment includes natural environmental elements to which the governments permit access (e.g. land), while at the same time allowing their use and ensuring their protection (FAO, 2019).

The important elements that influence the success or failure of an agripreneurship are: (ILO, 2007; FAO, 2018c)

1. **Natural elements** including preservation of soils, clean air and water, ecosystems and genetic resources, as well as climate adaptation and mitigation, in the provision of access to and protection of natural resources.
2. **Societal elements** like education, physical infrastructure, training and lifelong learning, social justice and social inclusion, agripreneurial culture, ICTs, services, as well as adequate social protection.
3. **Economic elements** such as fair competition, access to financial services and land, good management of the economy, sound and stable micro and macro-economic policy, trade policies, and sustainable economic integration as well as an enabling legal and regulatory environment.
4. Also, **Political elements** *i.e.* good governance, peace and political stability, social dialogue, respect for universal human rights and adherence to the International Labour Standards.

Although there are many opportunities in the agriculture and allied sectors to set up an agriventure, there are few important challenges in the process of agripreneurship development. Some of them are poor entrepreneurial culture, poor technologies and equipment, poor infrastructural facilities, talent migration from rural to urban, high costs of physical logistics, problems in marketing of agricultural products as well as government policies. An important challenge, however, is facilitating farmers' development of entrepreneurial and organizational capacities and attitudes. This requires economic support, beyond awarding and recognizing the successful farmers including a greater emphasis on their education, training and using their services proactively in extension advisory services possibly with suitable remuneration. Research on the development of entrepreneurial and organizational competency in farmers is scarce, especially in the context of the developing countries. The government schemes must focus on attracting the youth to the agriculture sector by transforming it into a business and offering them new avenues and opportunities to engage along the agriculture value chain.

1.9.4. Significance of Agripreneurship development

From a research study conducted by the World Bank in 2015, it was observed that first of all, the farmers focused on the basic amenities of their family and not considered their farmers as enterprises. The accessibility to vital extension services was about 10 to 12 percent of the small farmers as the large industries in the field of agriculture were crowding the essential benefits of smaller farmers. All

the forms of extension assistance earned by small farmers were roaming around improving the productivity and not increasing the profitability of the enterprise to make it sure that the lives are sustainable.

A new approach to the extension services and policies must be introduced to ensure improvements, where agriculture could be considered as an enterprise and the farmer could be an entrepreneur. The opinion of the extension services is to move from the reduction in the profit to the creation of wealth. The main motive of the extension services is to put the focus on the profitability along with the enhancement in the production. The expansion of remote areas is connected to the entrepreneurship rapidly and is regarded as the development that promotes and expedites the process of rural development. Furthermore, individuals and groups agree that there is an extensive need for the promotion of rural industries. Instead of offering employment opportunities to the people of remote areas, agricultural entrepreneurship is considered as one of the ways to improve the quality of life for families and individuals. Moreover, the focus idea is to promote the farmers as entrepreneurs and then, to learn and perform as an entrepreneur.

Box 5: Case Story of Seema Biotech: Economics of Profitable Banana

"The journey of entrepreneurship started by the intention to supply pest and disease-free production materials to the farmers", says Mr. Vishwas Chavan (30), an agriculture graduate from Talasande village of Kolhapur district in Maharashtra. Mr. Vishwas underwent entrepreneurial training under Agri-Clinics and Agri-Business Centers Scheme organized at the Krishna Valley Advanced Agriculture Foundation Sangali, Maharashtra.

Farmers Covered	Employment	Annual Turnover	
5000 farmers from **5** states	**70** persons	**Rs. 2/- Cr.**	

Seema Biotech is one of the most prominent tissue culture manufacturers and suppliers for a wide variety of plants. "We fulfill the demands of the customers by offering tissue culture grown plants that include teak, pomegranate, Burma teak, and net pot teak plants. We have

large organic farms for the cultivation of the plants. Our dexterous team members, inclusive of trained technicians, make sure that the plants are grown using natural fertilizers and organic material. We efficiently deliver the healthy and disease-free plants in corrugated boxes or individual pouch packed in crates. In this way, the plants survive for more than 48 hours on a journey. I am selling 25 lakhs tissue-cultured banana saplings to about 5000 farmers from five states in India" Mr. Vishwas briefed about his services.

2. Methodology

The AC&ABC scheme has been building the capacity of the agricultural and other science graduates and providing services in more than 32 different areas across the country. However, the COVID-19 pandemic has affected almost every sector of agriculture, which might include the agripreneurs also. Hence, a survey is conducted to analyze the services provided by the agripreneurs Amid pandemic and the challenges faced during the farm servicing.

2.1. Selection of the sample and sampling method

The study was conducted all over India as the AC&ABC agripreneurs are in every state of our country. The sample was collected using the stratified random sampling method. A total of 205 Agripreneurs were involved in the survey across the country.

2.2. Research design

The research design used for this study was an ex-post-facto study. It is because the variables used in the study have already occurred. It was well understood that the lockdown has affected the agripreneurs. At the same time, they have also disseminated good practices of agriculture and extension advisory services to resolve the problems faced by the farmers and migrant workers due to the COVID-19 and lockdown.

2.3. Data collection methods

The data for the study was collected using a structured questionnaire. The questionnaire was pre-tested among agripreneurs for its reliability and content validity. Based on the suggestions and results of the pre-test, the questionnaire was standardized. The structured questionnaire was administered into an online survey tool using google forms (https://docs.google.com/). Then, the link of the questionnaire was created and sent to the individual agripreneur through e-mail and WhatsApp. The individual agripreneur was requested to fill the questionnaire. The responses were collected and recorded on google forms for further analysis.

2.4. Data analysis

The collected data were imported to Microsoft Excel for further analysis. The data were analysed using simple statistical tools such as percentage analysis and frequency. Further, the weighted score analysis method was used to group the data for ranking purposes and the findings of the study were elaborated in the form of results and discussions.

3. Discussion

The data on the AC&ABC scheme has been distributed across the country. The majority of the respondents belong to the state of Maharashtra which offers a rich ecosystem of agripreneurship development followed by Tamil Nadu and Uttar Pradesh.

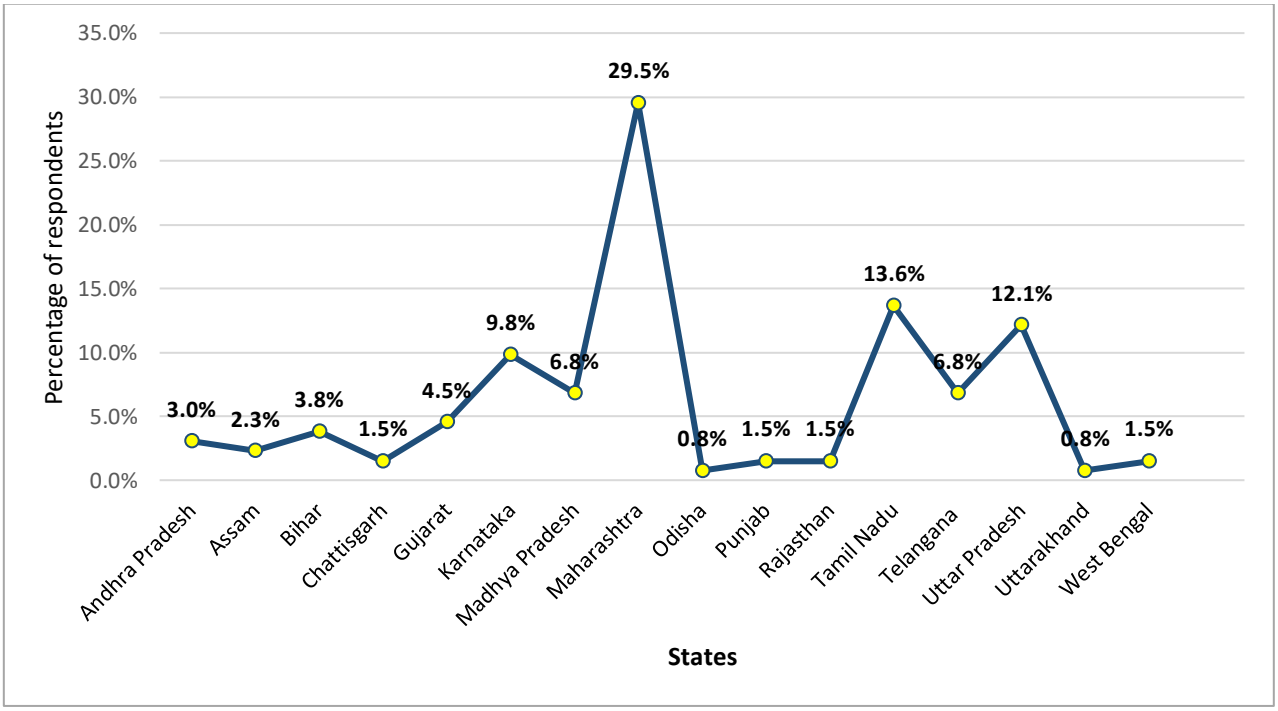

Fig. 3 State-wise distribution of respondents

About 42% of the respondents had graduation and allied subjects followed by post-graduation in agricultural and allied subjects (23.00%). The Rest of the participants belong to various educational qualifications including intermediate in agriculture, diploma in agriculture, under graduation & post-graduation in non-agriculture, management courses and doctoral degree in agriculture and non-agriculture subjects.

The professional AC&ABC scheme has been providing training in over 32 areas for agri-venture establishment. The majority of the respondents followed agri-clinic and agribusiness centers followed by agri-clinic (agricultural consultancy services). The other major areas include animal husbandry, crop cultivation and/or post-harvest management and agribusiness centers. The primary nature of service provision includes extension consultancy service (25.80%), and crop protection service (17.40%). More than 50 percent of the respondents are following the MANAGE ACC&ABC Facebook page and about 50 percent have their network with the Facebook page of MANAGE incubation center.

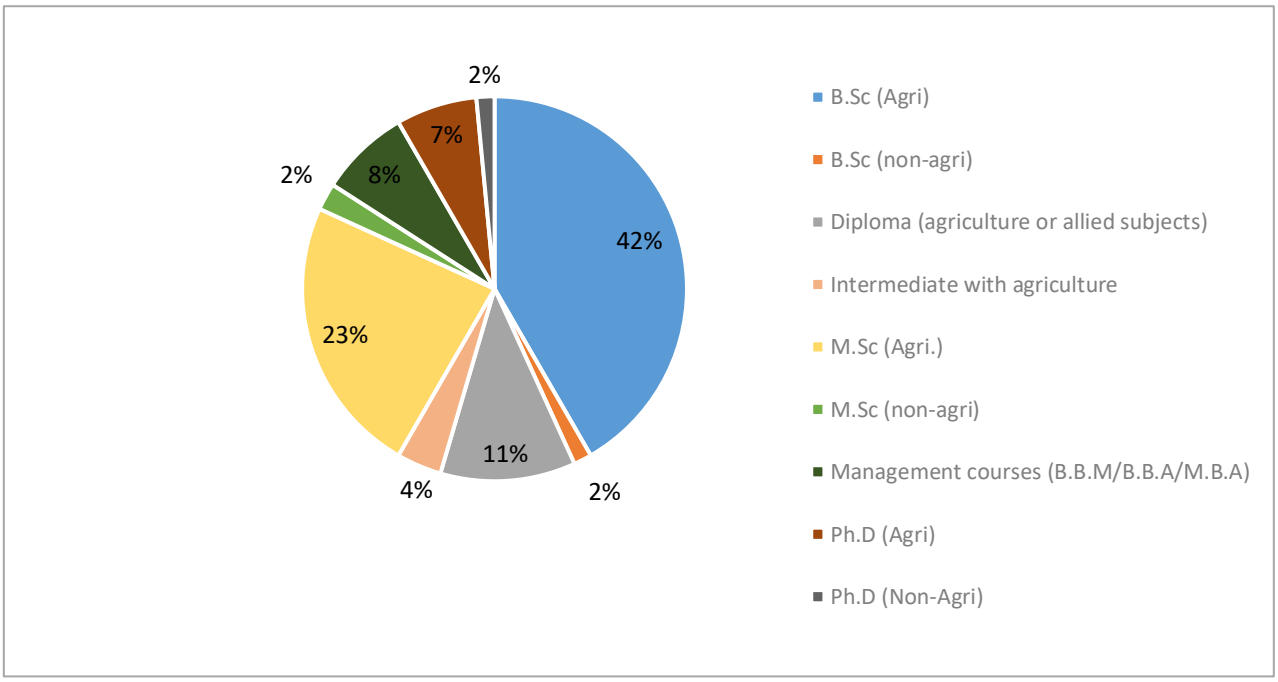

Fig: 4 Educational details of respondents

The agripreneuship service has a greater impact in terms of fetching the annual income of more than ₹ 10 lakhs. Over 33.30 percent of the respondents had more than 10 lakh of annual income. With respect to the receipt of loans and subsidy, less than 1/3rd of the respondents had received bank loans but the sanction of subsidy was accounted for 22%. The sample size is very small compared to the total number of candidates trained so for so the number of recipients of loans and subsidy will differ.

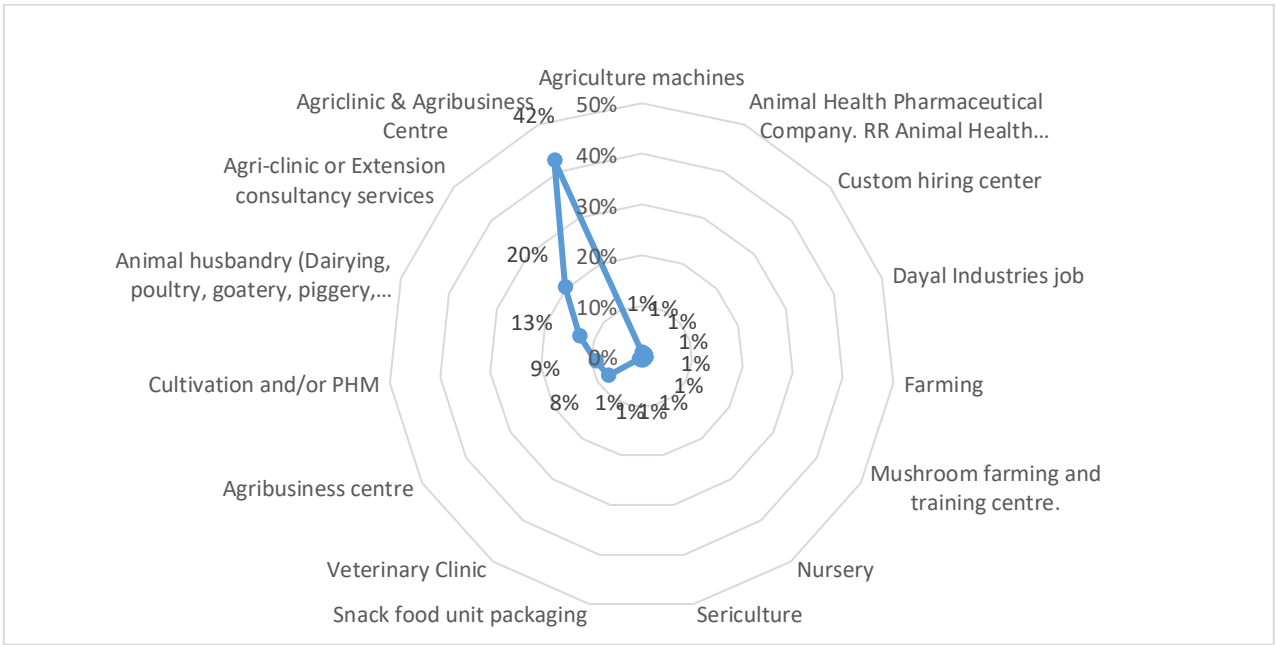

Fig 5: Types of Agriventures established

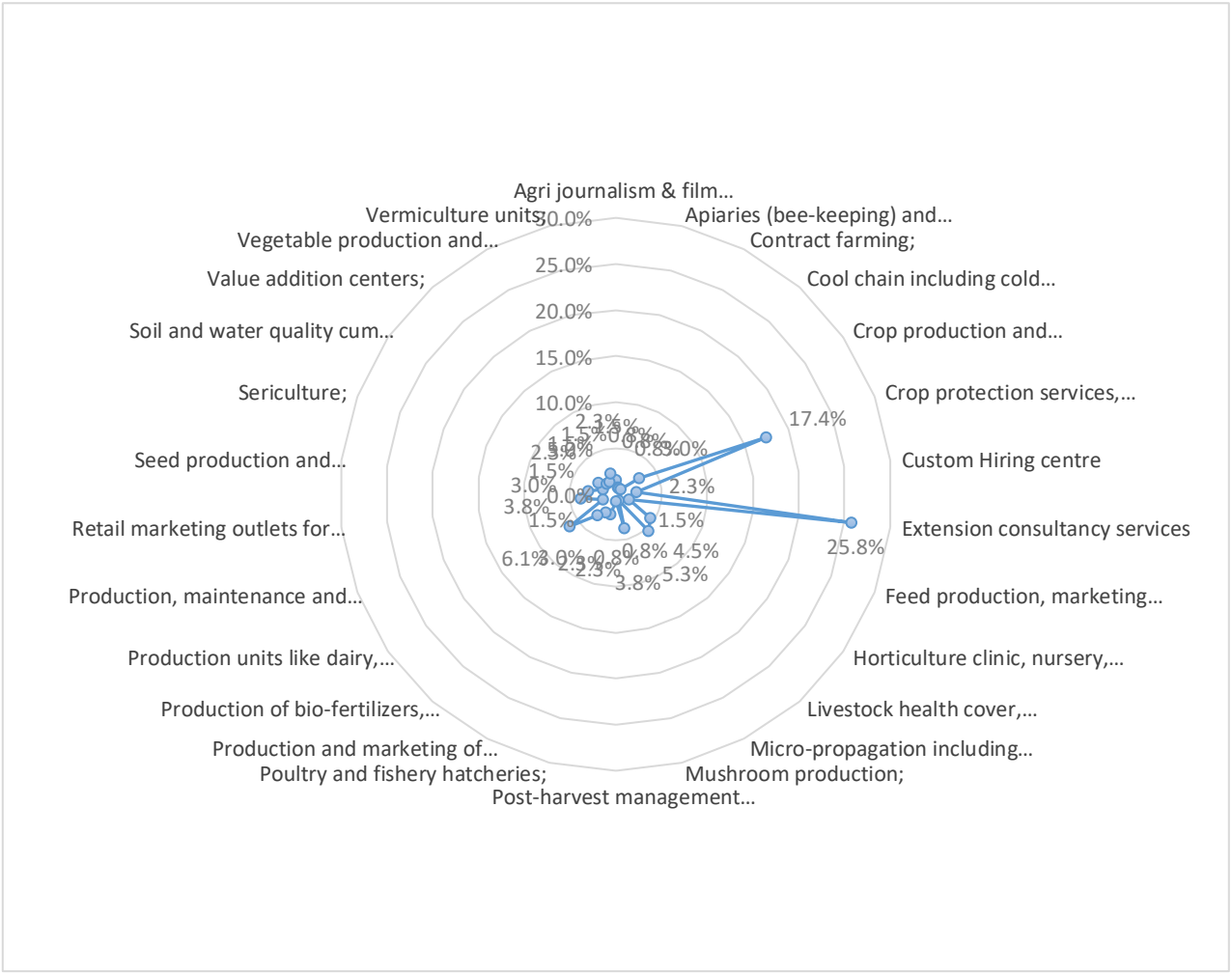

Fig 6: Services offered through agriventures

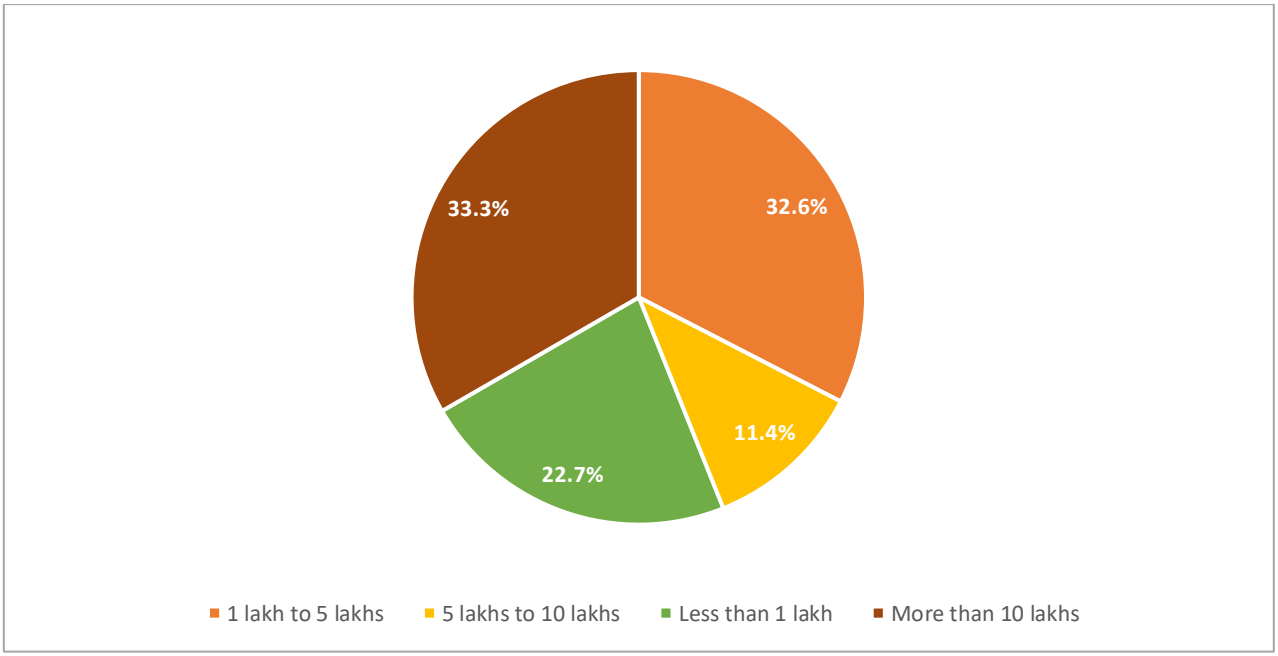

Fig 7: Annual income of respondents

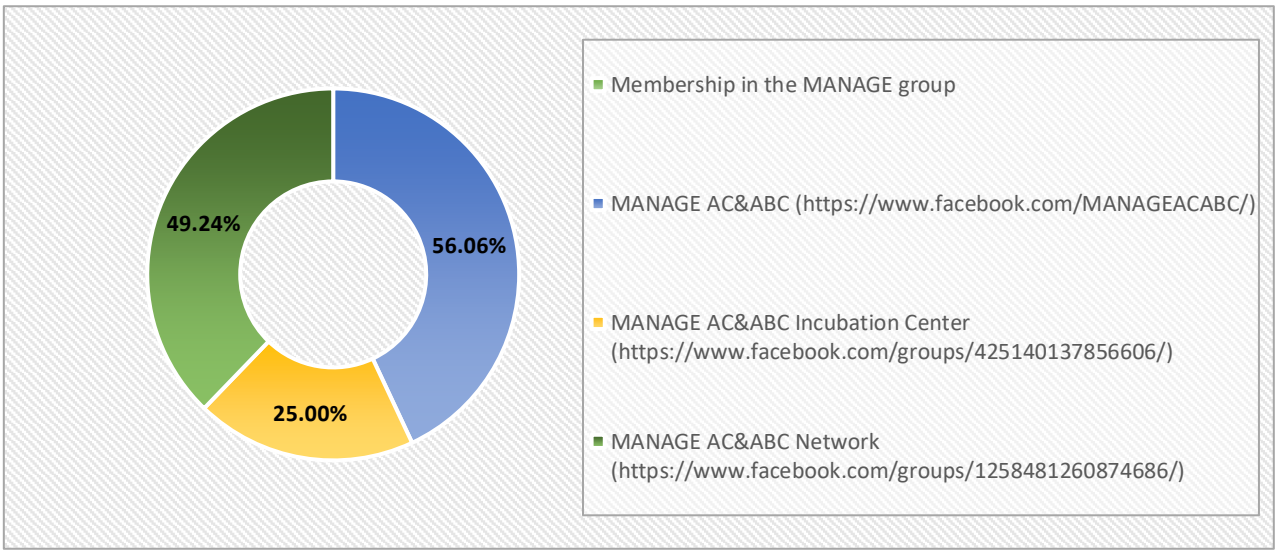

Fig 8: Membership in MANAGE based online groups

In the toughest phase of the covid-19 pandemic, more than 75 percent of the agripreneurs have been continuing their venture activity and about 18 percent are contributing to a certain extent possible. The agripreneurs were able to provide crop-based advisory services (55.3%), inputs services to provide planting materials, fertilizers and other inputs (50%) and providing counselling services to the farming community (43.9%). They are also offering general services such as creating community awareness regarding COVID-19 safety (75.8%), and the awareness regarding government services and facilities (47.0%).

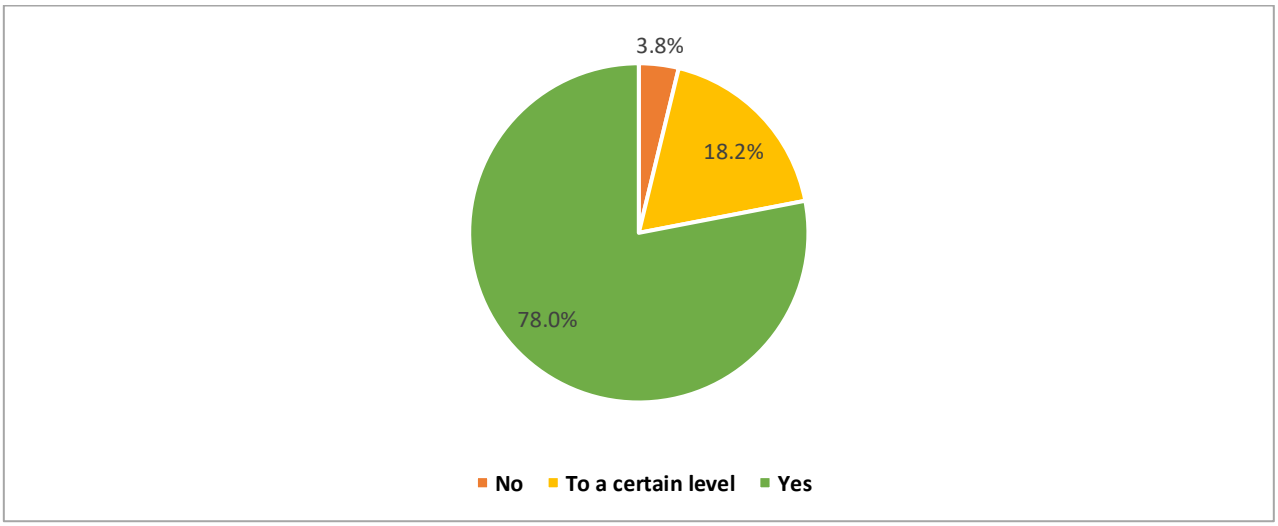

Fig 9: Distribution of respondents supporting the farming community during COVID-19

The agripreneurs have been encouraging the return migrants by providing information regarding the government services (46.2%), providing recommended inputs and services (43.2%) and arranging/providing employment opportunities (25.0%). The lack of mobility has imposed the agripreneurs to adopt various online extension platforms to be in touch with their clients. For

example, mobile calling (73.5%) and WhatsApp platform (67.4%) are used for exchanging timely and relevant information. However, a considerable number of agripreneurs are still visiting their clients through personal face to face mode (61.4%).

However, the lack of mobility (58.3%) and inadequate capital (47%) and disturbances created among the community due to miscommunication (35.6%) were the major challenges posed in front of the service operation. The lack of awareness on COVID-19 among the population and not following social distancing measures created a serious threat to the functioning of the agripreneurs. Since the beginning of the pandemic in March 2020 in India, the agripreneurs have faced stagnation of work especially during April (56.1%) and May (43.9%) due to a nationwide lockdown.

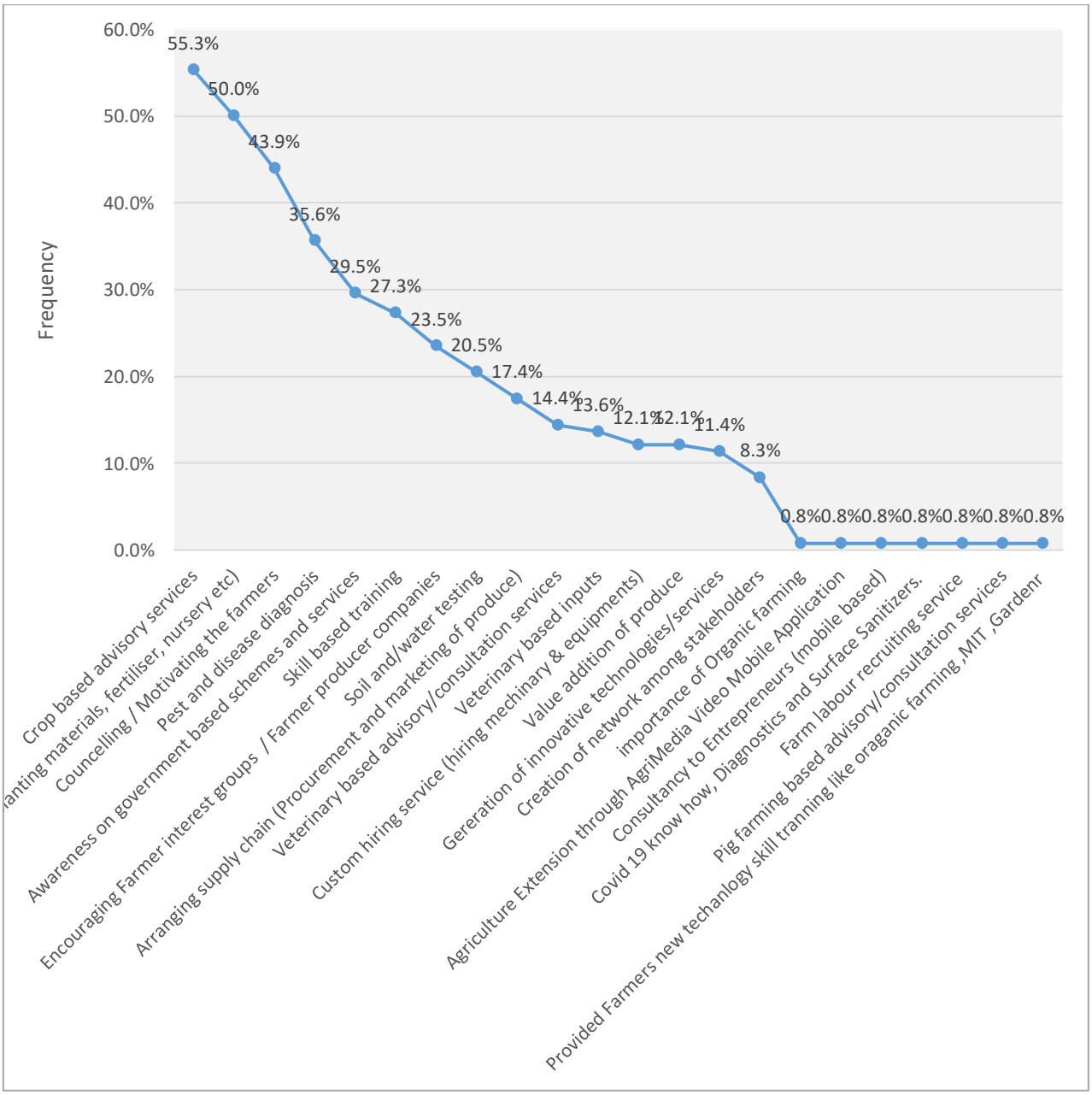

Fig 10: Services offered related to Agriculture and allied sectors

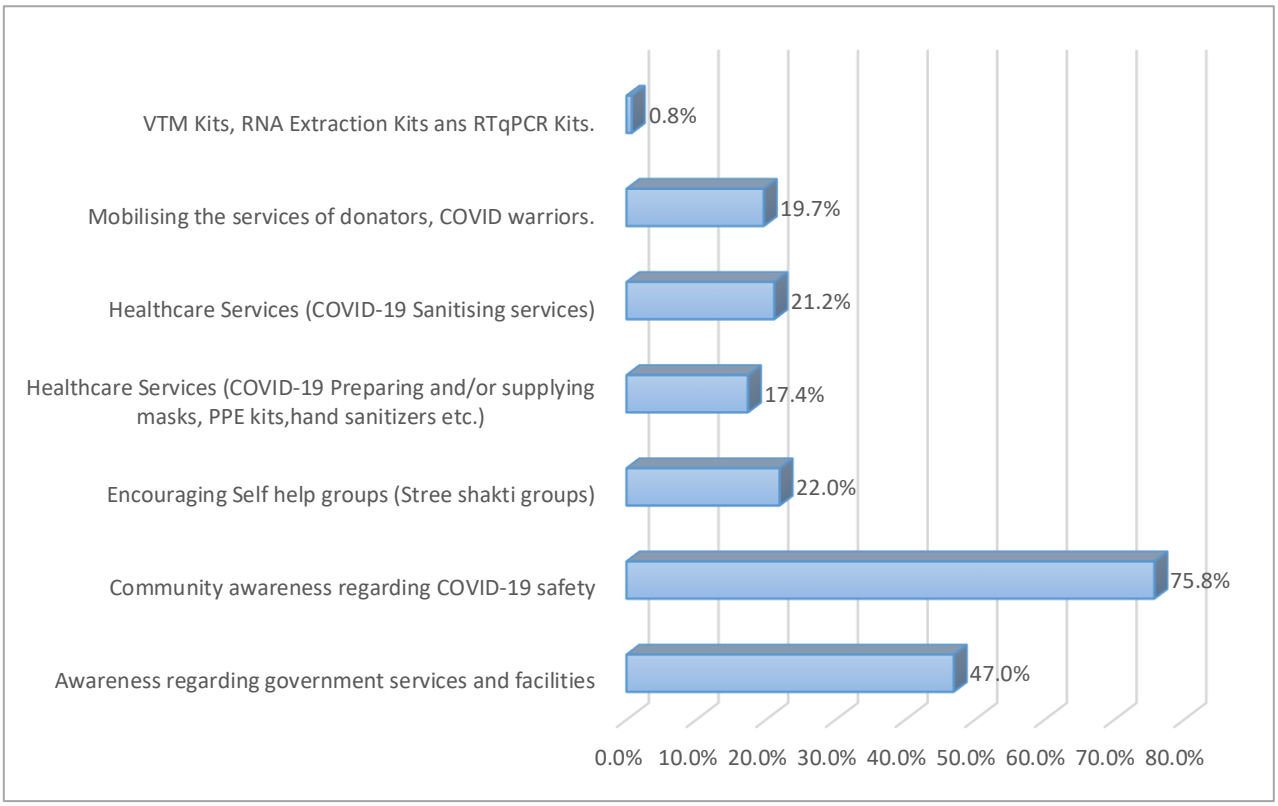

Fig 11: General services provided by the respondents

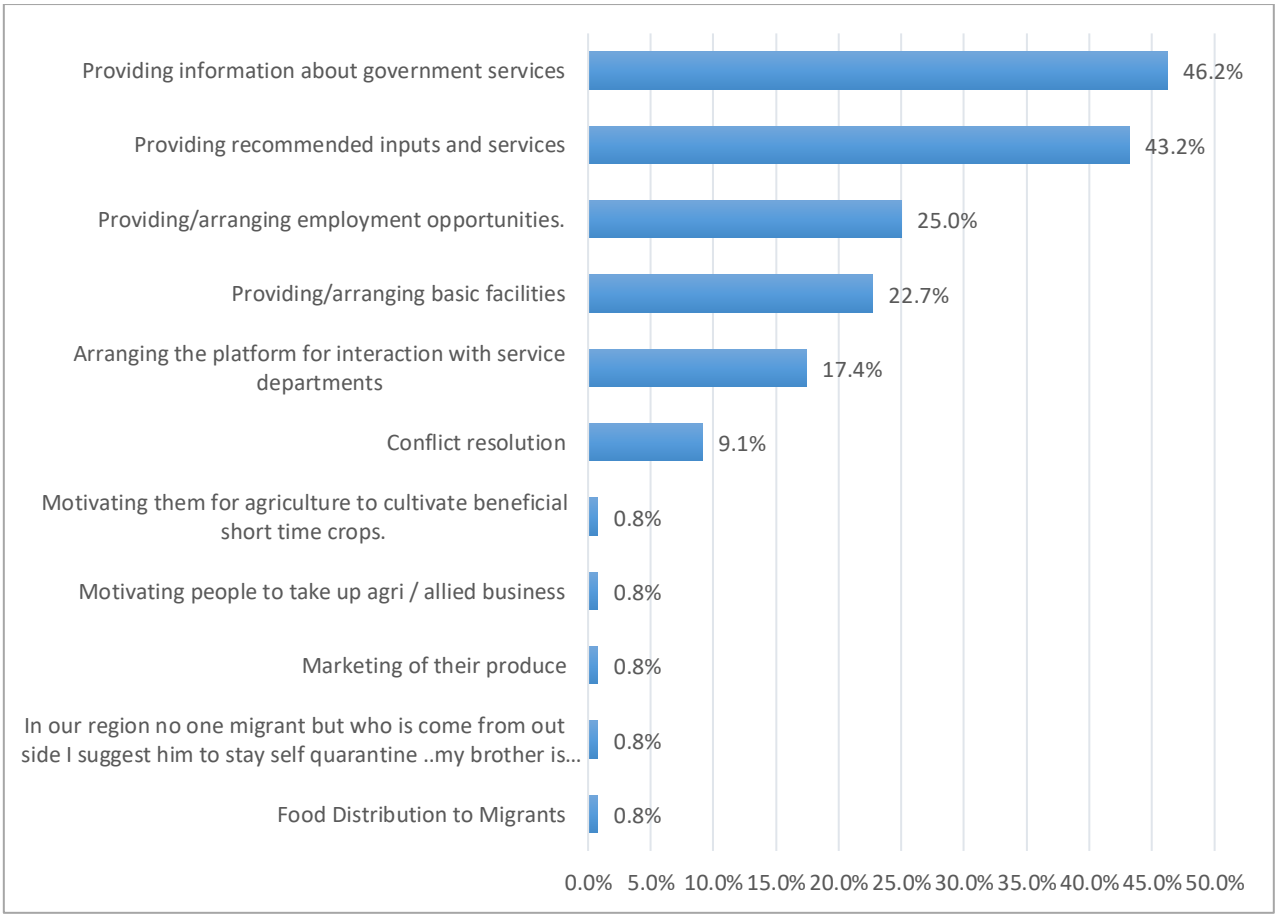

Fig 12: The ways of encouraging the return migrants

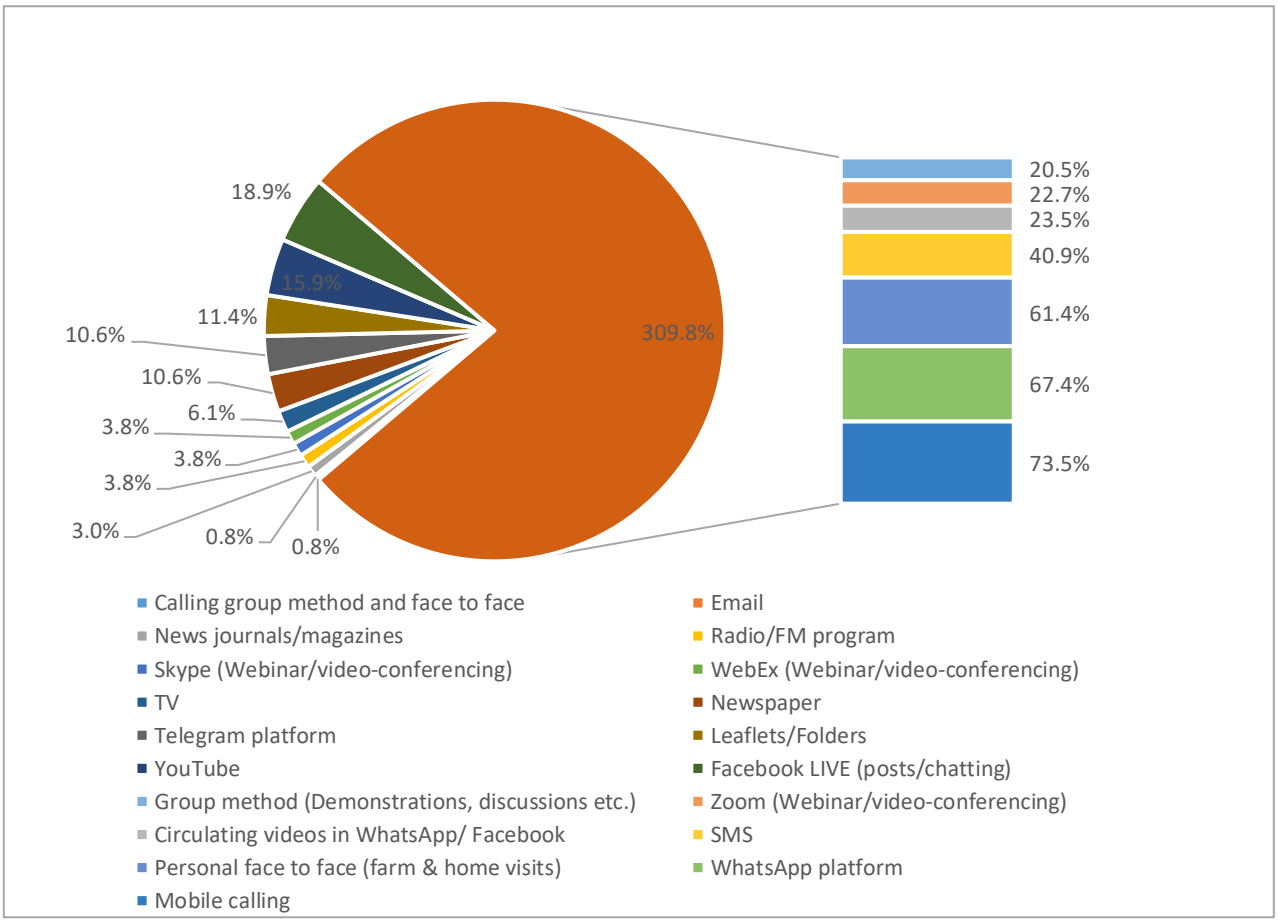

Fig 13: Extension methods adopted to reach the farmers

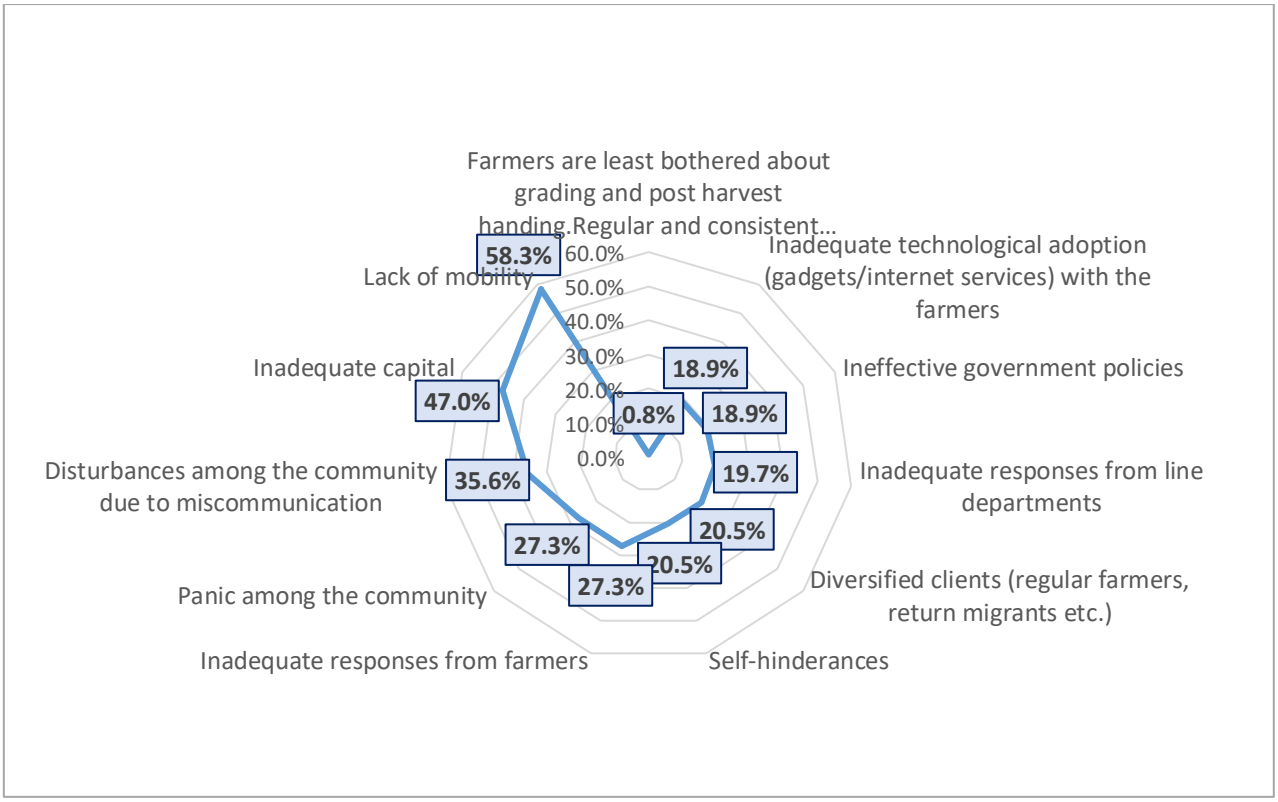

Fig 14: Challenges faced by the respondents in providing extension services

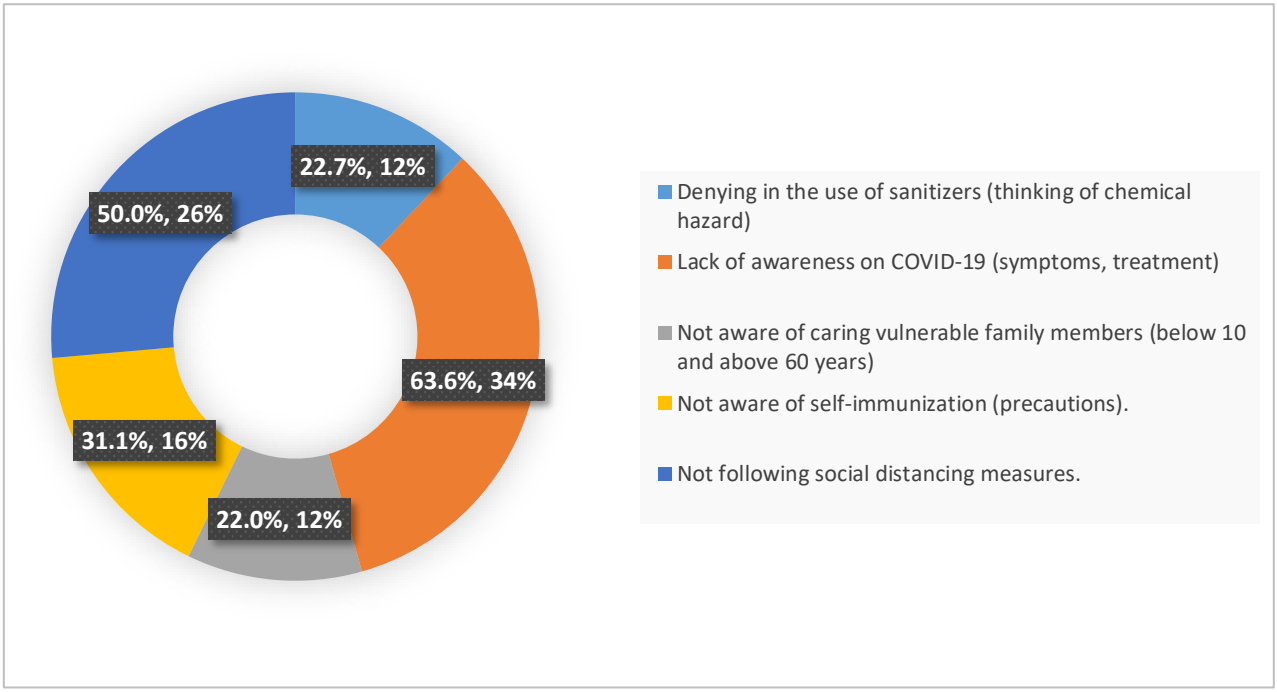

Fig 15: Other challenges faced by the respondents

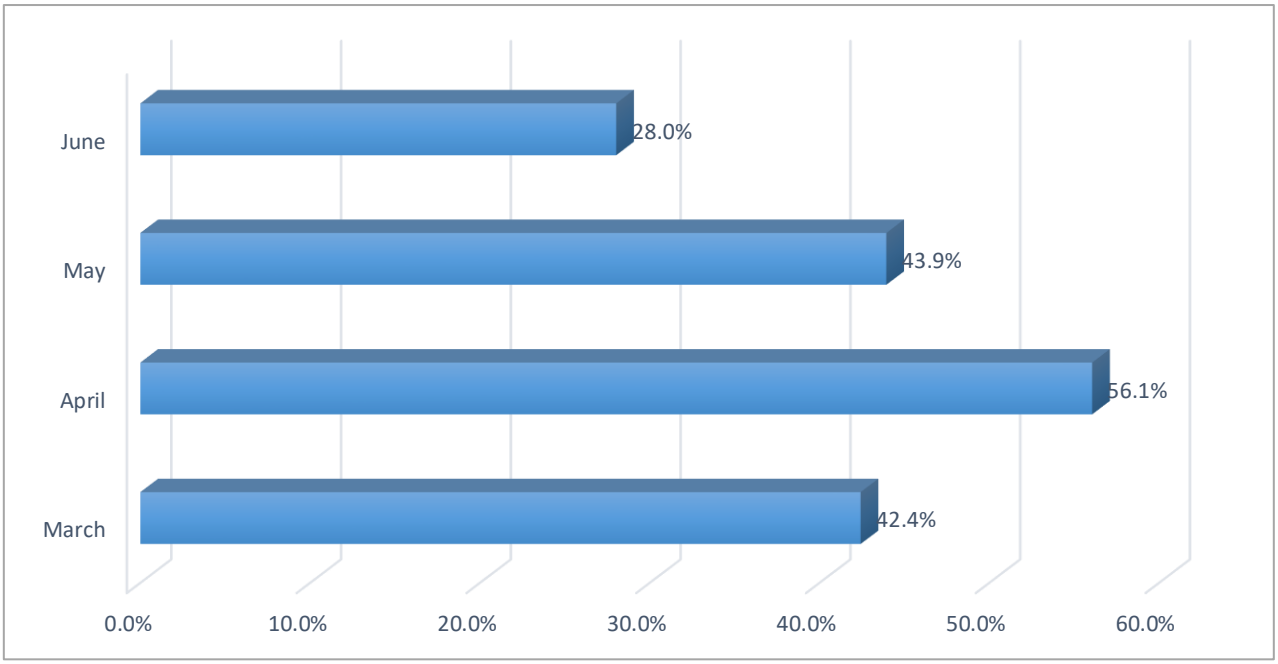

Fig 16: Months of stagnation encountered by the respondents

Further, the agripreneurs have perceived various problems faced by the farming community in the light of pandemic which includes difficulty in receiving the recommended inputs and services (63.6%), difficulty in selling the produce at remunerative prices (57.6%) which are leading to panic selling at lower costs (40.9%). Similarly, the return migrants have been facing the problems of lack of basic facilities (43.9%), the inadequacy of lack of land properties (40.9%) and facing discomfort during social interaction (36.4%).

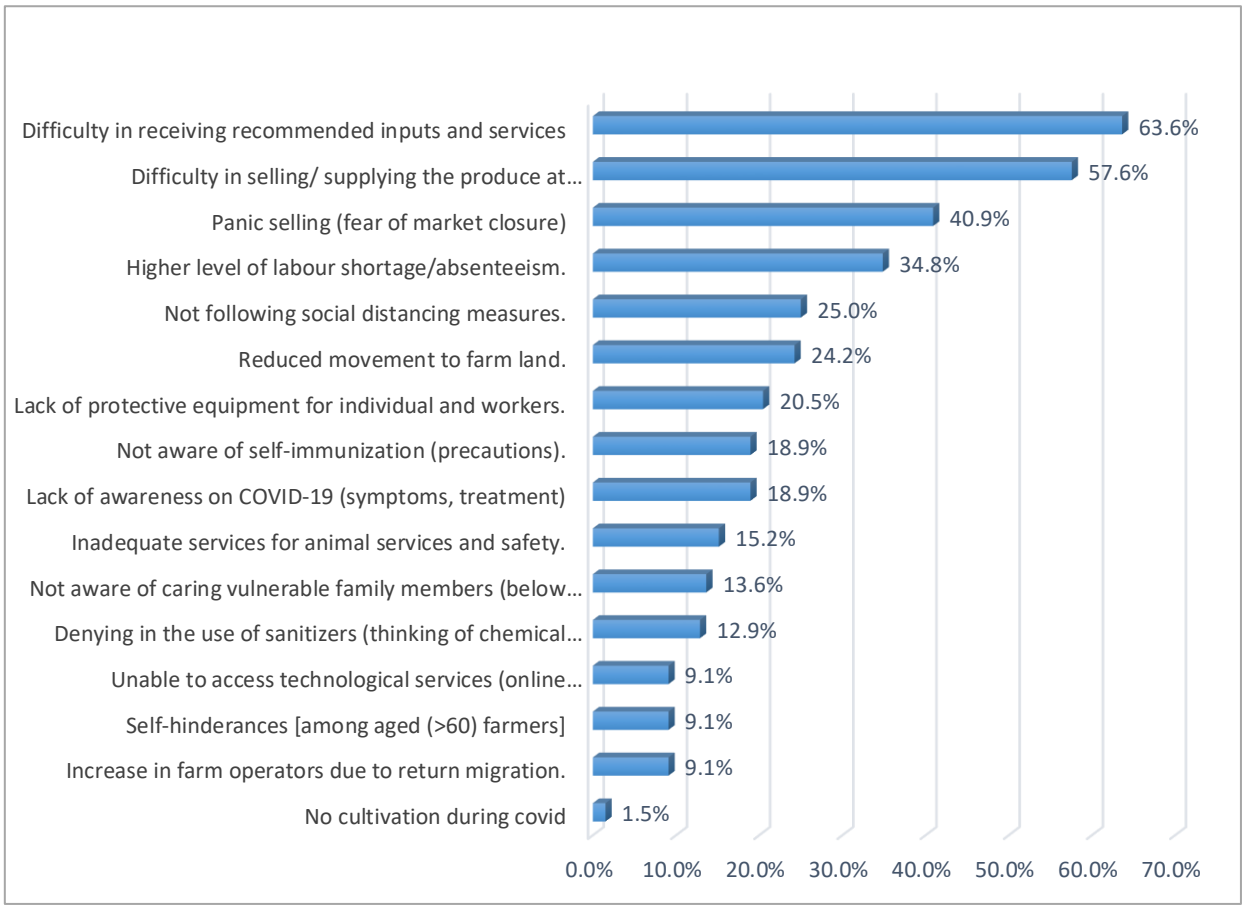

Fig 17: Problems faced by the farmers during COVID-19

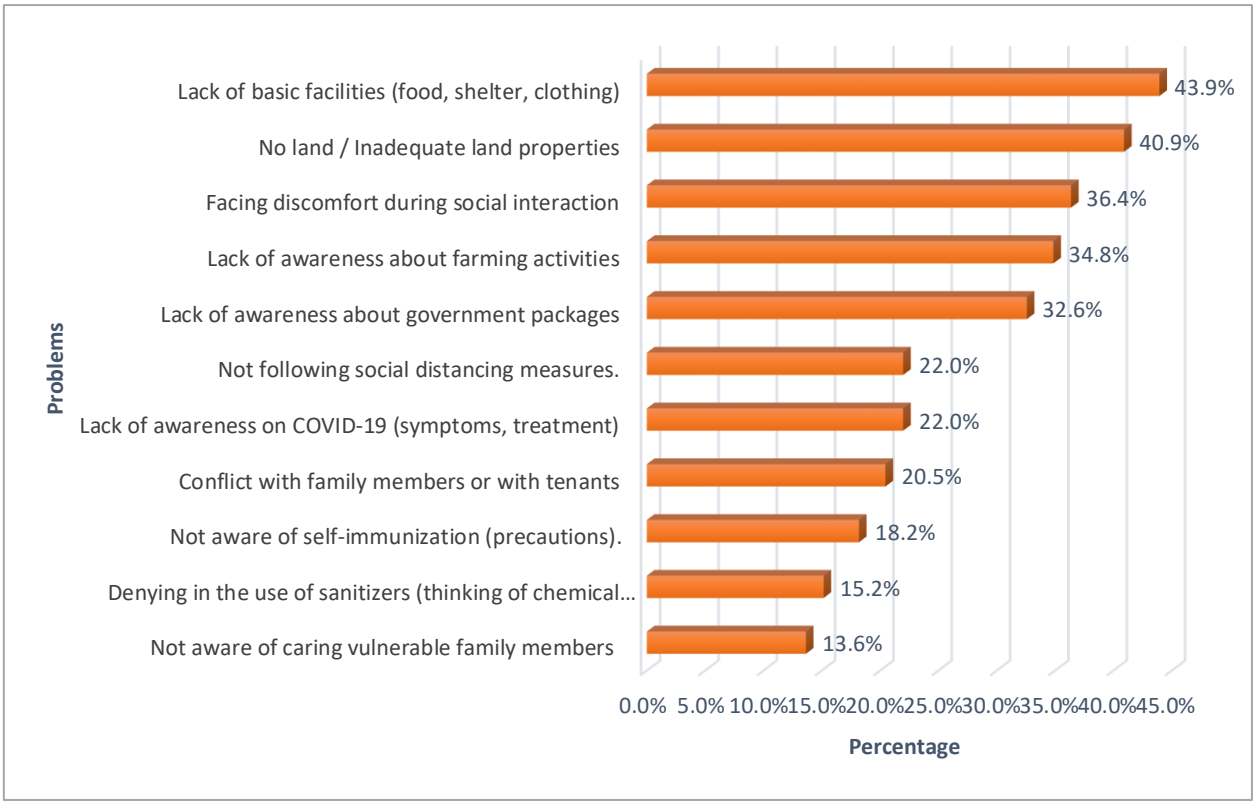

Fig 18: Problems faced by the return migrants

4. Conclusions

"Everything else can wait, not agriculture" reminds the efforts of every nation to safeguard the interest of the farmer and farming community. However, the emergence of the COVID-19 pandemic has disturbed the coordinating mechanism of the farming system throughout the world. In India, various efforts have been taken by the government to support farming activities. However, the grassroots reach by the agribusiness sectors has given additional strength. Since 2002, about 72,806 educated graduates, diploma holders and intermediate holders in agriculture and allied subjects have received training and 30,583 (42%) have established agriventures in more than 32 areas of interest and are helping in providing agro advisory services. Hence, the services offered, challenges faced and innovations adopted by the agripreneurs during COVID-19 were documented, analysed and discussed below.

4.1. Services offered during COVID-19

1. **Crop-based advisory services:** Crop production is considered to be the most important components of the farming system in Indian condition. The major sectors of agripreneurship include agri-clinics (farm consultancy services) and agribusiness centres which are offering crop-based advisory services to the farming community.
2. **Input Shops and Delivery:** The agri-enterprises are providing farm inputs such as planting materials, fertilizers, pesticides etc.
3. **Counselling/motivating the farmers:** The pandemic has mentally disturbed the farmers. The havoc created among the farming community in terms of panic in buying and selling, market disturbance, return migration etc. is being addressed by the agripreneurs through counselling. The farmers are motivated to contribute to better agriculture and nation-building in the crisis period.
4. **Other services:** The agripreneurs are offering services like pest and disease diagnosis, creating awareness on government schemes like PM Kisan, Pradhan Mantri Fasal Bima Yojana (PMFBY), Minimum Support Price (MSP), market facilities etc., skill-based trainings in sectors like vermicomposting, mushroom cultivation etc., encouraging farmer interest groups, soil and water testing facilities, arranging for supply chain management, veterinary-based consultancy and inputs services, custom hiring services to provide farm implements, and value addition facilities.
5. **General Awareness Services related to COVID-19:** The agripreneurs are leveraging their opinion leadership to create community awareness about the COVID-19 pandemic and its precaution measures, information about the government health services and facilities,

encouraging self-help groups for making safety materials, sanitizing services and preparation and supply of masks, Personal Protective Equipment (PPE) kits, hand sanitizer etc., mobilizing the services of donors and COVID warriors and the preparation of Viral Transport Medium (VTM) kits, RNA extraction kits etc.

6. **Services to uplift the conditions of return migrants:** The return of migrant labour to home villages is a prevalent phenomenon due to the lockdown. The agripreneurs have been giving helping hands to the migrants by providing information about the local employment opportunities, government services related to agriculture and social welfare, providing agro advisory and input services for practicing agriculture, arranging for employment opportunities in schemes like MGNREGA, arranging for basic facilities, arranging the platform for interaction with other stakeholders, conflict resolution in the villages by legal and democratic means, motivating them to follow farming, and helping them in marketing their produce.

4.2. Extension methods adopted to reach the farming community

1. **Mobile calling:** The limitation of non-movement/travel restrictions has enabled the agripreneurs to find an alternative for communication. Wider adoption of mobile phones by the farmers has enabled them to use calling over function to establish a network with information sources. The agripreneurs are making use of this strength for communication purposes.
2. **WhatsApp platform**: The travel restriction has made a drastically increased shift to social media platforms. The stakeholders have embraced the online mode of interaction and this shift is a new normal. The customized and user-friendly interface of the WhatsApp platform has allowed the Agripreneurs to solve the problems of the farming community.
3. **Personal face to face (farm & home) visits:** Even though there exists a restriction of travel, the agripreneurs are making it a way to visit the farms of farmers. The non-techno savvy farming community needs the advice and motivation the most and the agripreneurs are reaching them by following safety measures. The agripreneurs are creating awareness on how to use the ICT tools for communication.
4. **Other ICT tools:** The agripreneurs are employing various ICT tools like mobile SMS service, WhatsApp and Facebook platforms for circulating videos, zoom platform for video conferencing and participating in webinars, Facebook live posting or chatting, creating YouTube videos & sharing YouTube links, Telegram chat platform, Television program links, WebEx and Skype for video-conferencing, radio/FM programs and email services. The agripreneurs are creating and using user-generated content in the colloquial languages. The

farmers are getting exposed to new and innovative technologies and gathering additional information through agripreneurs.

5. **Print media:** The agripreneurs are creating leaflets, educational handouts and monographs related to farming practices and circulating them to the farmers. They are also publishing popular articles in news, journals and magazines to create awareness. They are also strategically utilizing them for the promotional activity to ensure a competitive spirit.

4.3. Challenges faced by Agripreneurs in providing extension services during COVID-19

1. **Lack of mobility:** The unprecedented lockdown restrictions imposed throughout the country (during March-May 2020) has minimized the movement of the agripreneurs mainly due to the suspension of bus and train services. It has affected the provision of backward and forward linkages to the farming communities. The shortage of labour for farm and venture activities has disrupted their activities. The family and peer pressures and repeated messages about following precautionary measures have made them hesitant to step out of their homes.
2. **Inadequate capital:** Amid the lockdown, the qualified agripreneurs who applied for the bank loan were rejected by the banking institutions for different reasons. The practicing agripreneurs were deprived of movement and the farming community denied the payment of consultancy fee. This has affected their regular work and sufficient capital resources to work further.
3. **Disturbances among the community due to miscommunication:** The inaccurate and misleading statements on the coronavirus outbreak have created a situation of panic and disturbances in the rural areas. The mismanagement of the crisis communication coupled with a focus on yellow communication (the use of lurid features and sensationalized news) to gain attention by the media has affected the credibility of information sources. The fake news and advices circulated over the internet have created the culture of prejudice and negative environment.
4. **Panic among the community:** The disturbances created by the COVID-19 pandemic has made the public to adopt panic buying or selling.
5. **Inadequate response from the farmers:** The COVID-19 has profoundly affected the lives of the farming community in terms of socio-economic, cultural and psychological disturbance and they are unaware of what is going on around them. Although the movement of farmers is not limited, as agriculture is considered to be the essential service, the farmers are failing to comprehend the situation with clarity.

6. **Self-hindrances:** Some of the agripreneurs are also being disturbed due to the panic created about the COVID-19. The fear of contact with the virus and lack of idea about the precaution and treatment has put them in a situation of staying in their homes.
7. **Diversified clients:** The exodus of the migrants from the cities to their homes has created additional duties on the part of agripreneurs. It is a difficult job to grasp the new client system and its specifications during the state of panic.
8. **Inadequate responses from the agricultural developmental departments:** The country-wide shutdown has restricted the movement of the extension and research personnel and lack of preparedness from the agricultural developmental departments has affected the farming community for availing the advisory services.
9. **Inadequate government policies:** While the central government announced relief packages via different schemes for the farming community, the needs and interests of the agripreneurs were not addressed. The inadequate reach of policies to the grassroots level has aggravated the situation for negative consequences.
10. **Inadequacy of technological tools (gadgets /internet services) with the farmers:** Adapting to a new normal condition of virtual interaction requires the adoption of technological tools by the users. Even though the farmers have adopted mobile phones, the required gadgets for a virtual mode of communication over the internet are not adequate. Lack of networks or poor connectivity, no internet connections, high data charges low network coverage have been detrimental to embrace online communication.
11. **Other challenges related to COVID-19:** Lack of awareness on COVID-19, its symptoms and treatment, not following social distance measures, not aware of self-immunization and precautionary measures, not aware of caring vulnerable family members with comorbidity conditions and denying the usage of sanitizers owing to the hazardous nature of chemical composition were the other issues of the functioning of the agripreneurs.

5. The Way Forward

Agri-business is one of the main pillars of food security in developing countries. Besides, agri-tech is considered as one of the remedies for the agriculture woes of India. Due to the COVID-19 crisis, some of the persistent problems faced by Indian agriculture have been established. From the reviews and findings, it is observed that the COVID-19 pandemic has created panic in all walks of life. Hence there is a need for adaption to these challenging conditions which requires a set of multipronged approaches at various levels.

A. Individual level

- More young agripreneurs need to be proactively involved in agricultural research and extension organizations as local level aides to create a network with the farming community to boost agripreneurship as they are the future entrepreneurs.
- Favourable conditions should be provided to retain the Youth Migrant Entrepreneurs (YMEs) who are educated and comfortable with technology to earn a higher income by helping them set up their micro-enterprise. Also, premier national institutions should support and mentor them for taking-up social entrepreneurship in rural India.

B. Organizational level

- Formulation of effective online media usage policy is the need of the hour. The agripreneurs and farmers must be trained to adapt to the crisis. Efforts are needed to improve their skillset in the utilization of online media tools.
- Nurturing entrepreneurship in agritech and food production is also critical for strengthening the agricultural ecosystem and introducing innovation and disruption in the much-needed areas of food production.

C. Infrastructural level

- Basic infrastructure facilities at markets and transportation facilities with precautions need to be adopted to ensure the safety of the stakeholders.
- The government should arrange free WiFi facilities in public places and common gathering.
- Special attention and infrastructure facilities should be given to the micro, small and medium enterprises, running with raw materials from the agriculture and allied sector to support the rural economy.

D. Policy level

- The policy guidelines of both the central and state governments should be synergistically integrated.
- The government should mainstream the agripreneurs' services along with existing developmental schemes and projects for a better impact by a public-private partnership.
- To meet the demand for agricultural commodities, investments in key logistics must be enhanced. Moreover, e-commerce and agripreneurship, agri-startups need to be encouraged with suitable policies and incentives.

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