Indian Journal of Extension Education
Vol. 56, No. 3 (July-September), 2020, (1-9)

ISSN 0537-1996 (Print)
ISSN 2454-552X (Online)

Reorienting Priorities of Extension and Advisory Services in India during and Post COVID-19 Pandemic: A Review

Mahesh Chander[1] and Prakashkumar Rathod[2]*

ABSTRACT

Extension and Advisory Services (EAS) are delivered by millions of extension professionals representing the public, private and civil society located across the globe and have been helping in addressing farmers' needs over the years, including during COVID-19 pandemic situation. However, public sector has been a major agency dealing with EAS in India and is facing several challenges and constraints to fulfil the demands of farmers on timely basis. The challenge today is to change the organizational culture to incorporate innovation as a core value and to institutionalize the emerging paradigms. Further, different strategies and measures need to be taken to ensure timely and quality EAS by reorienting extension priorities in such emergency situations and later too. In this context, an effort to review the extension mechanism across India and also has focused on reorienting extension priorities post COVID-19 scenario. The study has highlighted on strengthening extension and feedback mechanism, improving research-extension linkages, capacity building, public-private partnership (PPP), developing infrastructure, mass media support and use of Information and Communication Technologies (ICTs) etc. to improve the efficiency as the time demands. The paper concludes that reorienting extension priorities is very essential with a vast network of various stakeholders by adapting effective approaches like utilization of social media, human resource development, PPP, farmer groups etc. during and post pandemic scenario. Further, empirical efforts are also needed to develop reliable, location-specific, participatory, gender-sensitive and inexpensive extension methodologies and materials to meet the demands during such crisis. Further, developing countries like India have to invest in terms of various resources like financial, human resource etc. for promoting higher productivity and sustainability through EAS.

Keywords: Extension priorities, Extension and Advisory Services (EAS), Public-Private Partnership (PPP), Research-Extension Linkages, COVID-19 Pandemic

INTRODUCTION

Extension and Advisory Services (EAS) across the world have been helping in addressing farmers' needs over the years. However, as the world struggles to fight the pandemic, farmers across the globe face the dual burden of inadequate health services coupled with timely extension services for sustaining their livelihoods (FAO, 2020). Further, it has also been reported that about 3–6 per cent increase in total production value could be achieved if only EAS services are provided the way farmers want on real time basis (World Economic Forum, 2018). Although EAS are delivered by millions of extension professionals representing the public, private and civil society located across the globe, public sector has been a major agency dealing with EAS in India. However, Swanson and Mathur (2003) depicted narrow focus of extension, lack of farmers involvement in extension

[1]Joint Director (Extension Education), ICAR-Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh
[2]Assistant Professor, Department of Veterinary and A.H. Extension Education, Veterinary College, Bidar, Karnataka
*Corresponding author email id: prakashkumarkr@gmail.com

programme planning, supply rather than market driven extension, lack of transparency and accountability, inadequate technical capacity, lack of local capacity to validate and refine technologies, inadequate communication capacity and inadequate operating resources and financial sustainability as other major challenges for Indian extension system. Further, a study conducted by Babu *et al*. (2012) indicated that quality and reliability of public extension system is still a constraint while, Rivera and Sulaiman (2009) indicated that public-sector extension agencies and extension workers are finding it difficult to translate their roles from the classical model of agricultural extension to the innovation system perspective. Slathia *et al.* (2012) stressed that to maintain trust among the farming community requires induction of professionally qualified personnel and their regular trainings.

Owing to static and inflexible nature of the organizations, where a top-down hierarchical approach continues (Raabe, 2008), farmers' see the quality of the information provided by the public extension staff as a major shortcoming (GOI, 2005) and information flow is considered to be supply driven and not need-based or area-specific (Raabe, 2008). Also, in a developing country like India, extension models are usually top–down structures, often located within the ministry of agriculture, not usually formally associated with universities (Boone 1989) and therefore, have poor linkages with research and extension. In this context, there must be innovations in EAS delivery that embrace different methods and offer flexible adaptations to cater to the needs of users across states, regions, and communities (Glendenning *et al.*, 2010). The challenge is to change the organizational culture to incorporate innovation as a core value and to institutionalize the emerging paradigms into research for development processes. Further, different strategies and measures need to be taken to ensure timely and quality EAS by reorienting extension priorities in such emergency situations and later too.

Need and Importance for Reorienting Priorities

EAS in the past have helped countries move towards meeting food needs, conserving natural resources and developing human and social capital. However, the need for new extension functionalities and job charts are echoed all over the world. Especially, the small holder farmers need real time solutions and become connected to the service providers (even at affordable costs). Over last few months, many organisations have realized that there's need for innovation and functional transformation to mitigate the crisis. Suddenly, there is a demand for shift in the approach of EAS from traditional face-to-face farm advisory to support farmers with marketing and use of ICTs in supply chain management. In this context, EAS organizations need to innovate continuously with the better functionalities like data driven personalized services in credit, insurance, markets, inputs supplies, aggregation models, traceability etc. (Meera, 2020) and improve the efficiency as the time demands. There are other aspects of transformation that should be simultaneously taken care such as building appropriate infrastructure with proper scales of economy, building relevant capacities of extension professionals, integrating the complex digital processes into the basic agricultural workflows etc. (Meera, 2020). In this context, different strategies and measures are necessary to reorient extension priorities and ensure food security. Also, as large numbers of migrants are returning to their respective villages, active support of the agriculture and allied departments in the states need to be emphasized at all levels. Hence, reorienting extension priorities is very essential with a vast network of various stakeholders involved in research, extension, education, marketing, agro-processing etc.

Changing Priorities of Extension and Advisory Services during and Post COVID-19

The authors have made an effort to identify the extension mechanism followed across India during COVD-19 pandemic scenario and also have focused on reorienting extension priorities post COVID-19 scenario. Some of the important components have been discussed in following section.

1. Strengthening Extension and feedback mechanism: The extension wing at different levels is looking after activities and ensures effective coordination with all agencies like ATMA, KVK, programmes and schemes of Extension. These agencies shall liaison and

encourage participation of private organizations and NGOs for their active involvement in delivery of extension services. Problems which need new technology to confront crisis have to be addressed and communicated as feedback to researchers. Such feedback in general is often missing due to poor linkage and feedback mechanism among research, extension and farmers leading to poor dissemination of agricultural technologies from researchers to farmers. Based on the farmers' feedback, the research can be field tested by various interdisciplinary teams on location and resource specific scientific recommendations. The feedback from multi-stakeholders in generation, development and transfer of technologies is highly necessary in the present scenario.

2. Improving Research-Extension linkages: The public system heavily suffers from failures of various issues like infrastructure, weak linkages and market structure failures. Hence, to improve the relevance, effectiveness, and efficiency of research outputs, stronger linkages are needed between the performers of research and its end users in the region. Developing a social network involving all the stakeholders of EAS for timely information dissemination to all agricultural subsectors is very essential at this point of time. An interaction between different multi-stakeholders should be organised at the grassroot levels to establish policy dialogues and programme plans for the future (Rathore *et al*., 2008). The experimentation through social media with innovative farmers not only helped in scaling the farmers' innovations but also institutional innovations at large and hence, the potential of social media need to be exploited to bring location specific and commodity oriented transformative changes in the agriculture extension delivery system (Nain *et al.,* 2019).

- ***Promotion of direct interface between farmers and scientists:*** There are relatively high costs attached to this direct mode of technology transfer and the outreach of scientists is limited. State and region level meetings between line departments and universities must be activated in the existing interface mechanisms. In these changing times, online media may be emphasized for organizing such meetings and activities.
- ***Research priority setting based on SREP:*** Micro-level extension strategies reflected in the Strategic Research and Extension Plans (SREPs) based on PRA and developed jointly by the district technology teams including the marketing department officials and scientists of the KVKs/ZRS or SAUs should formally feedback into the research systems. Participatory Technology Development is another way of connecting farmers with the scientists thus leading to need based researches.

3. Capacity Building in Extension: Three fourth respondents feels that even the education system cannot afford lock down (Bhati *et al.*, 2020), an optimal requirement of human resource to support various programmes must be worked out and steps can be taken to generate the same through involvement of Government Agencies, reputed NGOs and private sector. As a consequence of the pandemic, many young people and women need to be empowered to lead farming as heads of their households.

- ***Diploma Courses***: The Diploma holders can supplement the efforts of extension officers at the grassroot level by providing practical production guidelines to both, commercial and small-scale farmers helping them towards developing a sustainable agriculture and allied sector enterprise.
- ***Training of Para-professionals:*** The training programmes for para-professionals and similarly placed personnel must be undertaken on regular basis.
- ***Entrepreneurship and Vocational Training:*** Vocational training of rural youths and farm women in the areas of agriculture and allied sector needs to be augmented. There are various enterprises, which can be practiced on commercial scale and can be started with small investment on scientific lines by the rural youth.
- ***Farmers' training and Farmer led approach:*** Farmers' training and demonstration needs may be assessed in participatory mode so that area specific tailor-made training programmes are designed by effective linkages of organizations depending on

socio-economic background of the farmers. Progressive farmers after various scientific orientations can be encouraged to act as extension agents by giving them due recognition.

- ***Merging of Extension with other activities***: It is very pertinent to note that any programme can be successful when it is merged with extension activities. A carefully designed extension education campaign initiated before and after by the professional extension personnel would be highly beneficial.

4. Gender and Extension: Since there is a strong informal association of rural women with agriculture and livestock, it is necessary to create matching programmes and budgeting for women. The conventional training and extension programmes must be oriented to suit women also. It would be more effective, if women Extension workers disseminate the technologies to the women farmers both in formal and informal mode. Further, with a group mobilization approach few leading women farmers may be trained for transfer of technologies and deployed as link women extension functionaries between farmers and Department/NGO personnel.

5. Developing infrastructure in extension: The single-discipline, single-commodity based approach gradually must be replaced by an integrated systems-oriented research which demands high extension infrastructure at all the levels from village to central government and universities. The training infrastructure, by and large, is very poor in terms of facilities like hostel, classrooms, laboratories, audio-visuals, farms etc. There is a need to have equipments for print, photostat, content development and validation mechanism and printing of extension literature at state and central headquarters and universities. Further, equipments like display boards, audio-visual aids and mobile extension vehicles may also be needed at the institution or college level to reach the farmers. In this era of pandemic, the globe has realized the importance of online tools and media in transferring and sharing information apart from networking.

6. Role of public-private partnership in Extension: The public-private partnerships which do not exist effectively (Singh *et al*., 2013) can be one of the best modes of strengthening linkages among various stakeholders for effective research and extension activities. In this context, public-private partnerships should be the thought pattern and 'method of choice' underpinning the government's stance in extension. The ICAR draft policy of November 2012 recommends evolving appropriate models of public private partnership (ICAR, 2012). As per NASSCOM's 2019 report, India is home to more than 450 agritech start-ups, growing at 25 per cent annually and hence, new digital partnership may evolve among different agencies or start-ups for improving the impact of EAS (Meera, 2020). There is an interesting collaboration that was forged during COVID 19 i.e., between the multi-national Bayer and a Pune-based e-commerce firm AgroStar to deliver its products like seeds and pesticides to farmers (New Indian Express, 2020). Farmer gets services such as seeds and crop protection products along with the knowledge intensive advisories. AgroStar is fulfilling farmers' orders through its 500+ strong network of last mile delivery partners, who are doing doorstep delivery of agri-inputs while following hygiene and social distancing norms (New Indian Express, 2020). Experiences of institutional convergence of synergistic strengths illustrated the need for working together in spirit and action for translating maximum benefits and sustainable growth (Singh *et al.*, 2014)

7. Extensionists' competency development: Though the extension system has taken many pro-active measures to help farmers, there is a need for more involvement and formulation of innovative practices to enable them to address different challenges. EAS providers need to be properly equipped so as to address changes in the development scenario, as well as to meet the emerging demands and needs of farmers and FPOs, especially on agribusiness, value addition, and marketing (Wadkar, 2020). Extensionists need to be trained on next generation extension tools and media. COVID-19 like situations demands more knowledge and skills in social media and its uses, including the current tools, methods and models for crisis communication. Extensionists need to be equipped to use Facebook, WhatsApp, Twitter, YouTube, etc. They need to learn and master skills to disseminate information and monitor, track, measure, and analyse

social media traffic (Chander, 2020a). Besides, skills in mobilizing farmers and facilitating interaction are very much needed to secure coordination of different agencies to broker gains for farmers. Input output transactional costs can be reduced and social participation can be increased as a results of farmers' organisation into commodity groups (Parthiban *et al*., 2018).

8. Mass Media Support & Use of Information and Communication Technologies (ICTs): ICTs have created positive impact on income growth in developing and developed countries (Waverman *et al.,* 2005). In rural areas, ICTs can raise incomes by increasing agricultural productivity (Lio and Liu, 2006) and introducing income channels other than traditional farm jobs. Studies depicted that ICTs can improve incomes and quality of life among the rural poor (Goyal, 2010; Jensen, 2007). In this context, an effort to deliver information to rural masses through ICT, free or at nominal cost, can increase the timely and transparent flow of information to build or strengthen the innovation networks among different stakeholders (Chander and Rathod, 2015). Further, ICT's can also revolutionize the interaction through Information Kiosks, Telecentres, toll-free Call Centres, websites, mobile phones software applications etc. New advanced instruments like Personal Digital Assistants may be provided to the Extension agents for technical information, communicating, field recording, database maintenance and scheduling. It is important to use ICT in combination with the more traditional extension methods such as mass media, group meetings, field days, demonstrations and exchange visits with the objective to make the information available to all the stakeholders very effectively, efficiently and quickly. Community radio is also doing tremendous service during the lockdown by organizing pertinent programmes in local dialects, which makes them effective in conveying the desired information (Chander, 2020b). Partnering with community radio stations to broadcast information to farmers would be beneficial to their production. The scope of social media in offering EAS is tremendous during COVID-19 pandemic situation. Social media such as WhatsApp, Telegram, Facebook and YouTube are successfully used by extensionists to offer EAS. Plethora of studies have already indicated the benefits of using social media like whatsapp, youtube, telegram etc. (Thakur and Chander, 2018; Dileepkumar, 2020 and Tamizhkumaran and Saravanan Raj, 2020) but needs to emphasised on priority basis. Webpages of official websites of EAS offering institutes, containing advisory information on different relevant topics is being made directly accessible at free or very nominal cost. Hence, there is a need to synthesize learnings from different success stories and case studies and translate them into digital extension frameworks to formulate better extension strategies and policies. Extensive adoption of digital technology in EAS has been very successful during this pandemic and needs to continue in future too.

9. Market driven approach: Production and marketing of agricultural and allied sector products through creation of basic market facilities and market information for the farmers is very essential. As Swanson (2009) has pointed out that market-oriented extension is relevant in economies that are experiencing growth and changes in consumer preferences that create markets for high-value products, India can be effective in making some of their extension market-driven. Although creation of market or linkage with markets has been emphasized long before, but linking producers and small farm businesses to market and input agencies was very poor over the years. However, with an online marketing platform, the agricultural produce can also be traded at a location or with a buyer of choice. Farmers are being encouraged to use e-NAM facilities and hedge through futures and increased use of warehouse receipts (Prasad, 2020). A massive scaling up of a federal e-commerce platform for farmers and traders, known as the Electronic National Agricultural Markets or e-NAM, has given much needed impetus to the cause of smallholder farmers (Hindustan Times, 2020). There are currently 166,000 registered farmers across the country selling their produce by transacting from home and practising social distancing, with nearly half of the country's 1500 major farm-end commodity markets now going online. With more than 785 markets connected online, the e-NAM platform of India is considered one of the largest online agricultural produce market platforms (Hindustan Times, 2020). In the same way, market is also created through various social media tools like Facebook, WhatsApp etc. and needs to continue post pandemic situation.

10. Role of Farmer producer Organizations (FPO) and Farmers Groups/associations: The extension approach needs to be changed from individual to group or association approach to have effective decision making. The Interest Groups, SHGs or Cooperatives have been very successful models for effective production or marketing. In the similar way, farm women or youth may also be promoted in the form of Joint Liability Groups for effective production and marketing. Very recently, FPOs have become an integral part of coordination and convergence of EAS along with ATMA and KVK in the district during this crisis. This has become a mechanism at district level through which FPOs are involved in accepting and sharing in the times of COVID-19. The Indian government directed state governments to make efforts to connect FPOs to the processing industry, exporters, bulk buyers and big retailers to maintain the supply line. This will help FPOs get remunerative prices for their produce and help track transportation online. Various state governments allowed FPOs to sell their produce by facilitating packaging, transport and marketing of their produce by relaxing limitations and providing certificates to them. Farmers' organizations and agro-dealers (small-scale operations that stock farming inputs) also play a key role in bridging extension services to farmers, especially when they are already equipped with ICT tools. In Maharashtra, for example, 265,000 farmers' organization members are using WhatsApp for exchange and learning purposes (Even and Nyathi, 2020). Further, this is also the time for strengthening and gearing up farmers groups and cooperatives to play a major role in aggregation and distribution of agriculture and allied farm produce. Some of the examples in different states of India (Nikam and Kale, 2020; Kanatt and Jos, 2020; Patil *et al*., 2020 and Shabong, 2020) depict the fact that multistakehlder linkages and ICT can successfully benefit the farmers. The potential of FPOs and cooperatives needs to be effectively utilized by EAS to help farmers sell their products and share information and updates on farming post pandemic scenario also.

11. Farmers as Extension Agents: The extension systems must promote innovative farmers to play local "farmer professor" roles to scale up the enterprises among different groups of farmers which can lead to effective market-driven extension system (Davis *et al*., 2010). The experienced farmers in Indian context needs to be encouraged to act as EAS providers with very nominal incentives. These farmers who stay in their own villages act as resource persons in villages and need not depend on the external extension agents regularly. In some situations, if the movement of project staff and government extension agents is restricted, the services of these farmers may be utilized for EAS by preparing pre-recorded videos and picture-based materials to provide quality training to their peers in the villages. Further, these farmers can also conduct trainings and field visits of their peers in smaller groups, following COVID-19 guidelines.

12. Role of Institutions and Organizations: Since the extension efforts by ICAR institutes have very limited reach (Chander *et al*., 2010), efforts for effective university curricula involving farmers, private sector and other organizations can be planned. In this context, different universities or institutions and their associated KVKs are issuing location specific advisories on crop, livestock, fisheries and related matters using information and communication technologies (ICTs). Also, several information related to markets, availability of critical inputs, maintaining social distance, facilitating the installation of Aarogya Setu app, immunity enhancing protocol, etc. are being shared by these institutions. Interestingly, extension organizations in last few months have tried to solve immediate problems of farmers through online mode. The pandemic has compelled extension organizations and personnel to explore different online channels to remain connected with the farmers and other stakeholders. EAS is increasingly depending on these online resources indicating the fact that digital extension efforts have been emphasized during this pandemic. However, the organizations and institutions need to continue these transformational changes in EAS post pandemic. These universities and institutions may establish internship and exchange programmes for under-graduate and post graduate student with a task to develop different extension models and improve their performance to bring them on par with private organizations. Further, these institutions need to have package of practices including "Do's & Dont's" which farmers can follow to confront the crisis and also should have provision to update them regularly.

13. Investment in EAS: The economic studies from developing and developed countries have indicated that high monetary returns to extension activity (Gill 1991, Chand *et al*., 2011) provide solid evidence as investment with high returns. However, in recent years, the GOI has spent only about 0.14% of Agricultural Gross Domestic Product (GDP) on extension services (Chand *et al.*, 2011). Further, in case of animal husbandry, Chander and Rathod and (2013) have recommended that each State should create an extension and training wing at state headquarters with regional/local wings, staffed and equipped with trained livestock extension specialists, audio-visual (AV) equipment and mobile publicity vans along with budgetary allocations of at least 10% of the departmental budget for extension activities. Hence, in the present situation, the government have to invest considerable budget for EAS in the years to come.

14. Strengthening Government Schemes and programmes: Post-pandemic, the demand for agricultural products is expected to increase with a major focus on health-conscious population. It is also good time to bring primary processing and marketing facilities closer to the farm gates and help producers gather market intelligence and manage the value chain better with digital agriculture tools. In this context, significant funds (Rs. 1 lakh crore) have been allocated for building infrastructure projects. Similarly, Rs 10,000 crore has been announced for the formalisation of micro food enterprises and Rs 20,000 crore for the Pradhan Mantri Matsya Sampada Yojana for the development of marine and inland fisheries. Most of these announcements are meant for developing infrastructure in marketing and processing, which may take much longer than expected (The Wire, 2020). However, the immediate challenges are in terms of providing EAS and village-level marketing and logistic solutions.

Government programs like PDS, MDM, and ICDS are the best possible delivery channels to leverage healthier and nutritious food products in India. Further, MGNREGA is also one of the solutions for time being to employ the labourers who has returned to their villages due to lockdown. As a safety net, MGNREGA guidelines have to be modified and permission given to use the programme's labour in farm related marketing activities. The huge number of migrants that have returned home due to lockdown (resulting in reverse migration) should also be provided opportunities to work as labourers under MGNREGA. Further, EAS agencies also needs to educate the farmers about machineries for smooth procurement and marketing operations apart from information about different inputs and their role in farm production.

CONCLUSION

The authors have made an effort to review the extension mechanism followed across India and also have focused on reorienting extension priorities post COVID-19 scenario. The paper has highlighted on strengthening extension and feedback mechanism, improving research-extension linkages, capacity building, public-private partnership (PPP), developing infrastructure, mass media support and use of Information and Communication Technologies (ICTs) etc. to improve the efficiency as the time demands. The study concludes that reorienting extension priorities is very essential with a vast network of various stakeholders by adapting effective approaches like utilization of social media, human resource development, PPP, farmer groups etc. during and post pandemic scenario. Further, empirical efforts are also needed to develop reliable, location-specific, participatory, gender-sensitive and inexpensive extension methodologies and materials to meet the demands during such crisis. Further, developing countries like India have to invest in terms of various resources like financial, human resource etc. for promoting higher productivity and sustainability through EAS.

Paper received on : June 27, 2020
Accepted on : July 18, 2020

REFERENCES

Babu, S.C., Glendenning, C.J., Asenso, O.K. and Govindarajan, S.K. (2012). *Farmers' information needs and search behaviour — A Case study in Tamil Nadu, India,* IFPRI Discussion Paper 01165, International Food Policy Research Institute, Washington, DC.

Bhati, S., Vatta, L. and Tiwari, S. (2020). COVID-19- Response from Education System, *Indian Journal of Extension Education*, **56**(2), 10-15.

Boone, E.J. (1989). Philosophical foundations of extension. Foundations and Changing Practices in Extension. pp. l–9. (Ed.) Blackburn DJ. University of Guelph, Guelph, Canada.

Chand, R., Kumar, P. and Kumar, S. (2011). Total Factor Productivity and contribution of research investment to agricultural growth in India. Policy paper no 25, National Centre for Agricultural Economics and Policy Research (NCAP), New Delhi, 74p.

Chander, M. (2020a). What Can EAS Do to Support Indian Farmers? Agriculture Extension in South Asia, Blog no-107, April, 2020. Available at: https://www.aesanetwork.org/covid-19-what-can-eas-doto-support-indian-farmers/

Chander, M. (2020b). COVID-19 Crisis in India: How Extension and Advisory Services Can Help. Online blog. Available at: https://www.agrilinks.org/post/covid-19-crisis-india-how-extension-advisory-services-can-help

Chander, M. and Rathod, P. (2013). Investment in livestock extension activities by State Departments of Animal Husbandry (SDAH) in India: An appraisal, *Indian Journal of Animal Sciences*, **83**, 185–189.

Chander, M. and Rathod, P. (2015). Livestock Innovation System: Reinventing public research and extension system in India, *Indian Journal of Animal Sciences*, **85**(11), 1155–1163.

Chander, M., Dutt, T., Ravikumar, R. and Subrahmanyeswari, B. (2010). Livestock technology transfer service in India: A review, *The Indian Journal of Animal Sciences*, **80**, 1115–1125.

Davis, K., Swanson, B., Amudavi, D., Mekonnen, D.A., Flohrs, A., Riese, J., Lamb, C. and Zerfu, E. (2010). In-depth assessment of the public agricultural extension system of Ethiopia and recommendations for improvement. IFPRI Discussion Paper 01041. Washington D.C.

Dileepkumar, T. (2020). Exploiting the Potential of Whatsapp to Help Farmers Market During COVID-19. Agriculture Extension in South Asia, Field Notes-6, May, 2020. Available at: https://www.aesanetwork.org/field-notes-6-exploiting-the-potential-of-whatsapp-to-help-farmers-market-during-covid-19/

Even, M.A. and Nyathi, P. (2020). Maintaining critical extension services for smallholders during COVID-19. IFSD Blog. Available at: https://www.ifad.org/en/web/latest/blog/asset/41957955.

FAO (2020). In: Meera, S.N (2020) Is COVID crisis a tipping point for transformational changes in digital extension? Agriculture Extension in South Asia, Blog no-125, June, 2020. Available at: https://www.aesanetwork.org/blog-125-is-covid-crisis-a-tipping-point-for-transformational-changes-in-digital-extension/ .

Gill, D.S. (1991). Economic returns to expenditure on agricultural extension system, *Journal of Extension Systems*, **7**, 44-61.

Glendenning, C.J., Babu, S. and Asenso, O.K. (2010). *Review of agricultural extension in India - Are farmers' information needs being met?* IFPRI Discussion Paper 01048, Washington, D.C.

GoI (Government of India) (2005). *Situation assessment survey of farmers: Access to modern technology for farming*, NSS 59th round, January-December 2003. National Sample Survey Organization, Ministry of Statistics and Programme Implementation, GoI.

Goyal, A. (2010). Information, direct access to farmers, and rural market performance in Central India, *American Economic Journal: Applied Economics*, **2**, 22–45.

Hindustan Times (2020). Govt plans major agricultural reforms post-coronavirus. News published on 3rd May, 2020. Available at: https://www.hindustantimes.com/india-news/govt-plans-major-agri-reforms-post-corona/story-EISmhgFEzDaI4386TorfwM.html

ICAR (2012). Policy for higher agricultural education. ICAR, New Delhi. www.icar.org.in/files/Draft-Policy-21-11-2012%20.pdf.

Jensen, R. (2007). The digital provide: information (technology), market performance, and welfare in the South Indian fisheries sector, *Quarterly Journal of Economics*, **122**, 879–924.

Kanatt, P.T. and Jos, J. (2020). Crisis Management Through Agile Intervention – Helping Pineapple Growers in Kerala. Agriculture Extension in South Asia, Field Notes-4, April, 2020. Available at: https://www.aesanetwork.org/field-notes-4-crisis-management-through-agile-intervention-helping-pineapple-growers-in-kerala/

Lio, M. and Liu, M.C. (2006). ICT and agricultural productivity: Evidence from cross-country data, *Agricultural Economics*, **34**, 221–228.

Meera, S.N. (2020). Is COVID crisis a tipping point for transformational changes in digital extension? Agriculture Extension in South Asia, Blog no-125, June, 2020. Available at: https://www.aesanetwork.org/blog-125-is-covid-crisis-a-tipping-point-for-transformational-changes-in-digital-extension/ .

Nain, M.S., Singh, R. and Mishra, J.R. (2019). Social Networking of Innovative Farmers through WhatsApp messenger for Learning Exchange: A study of content sharing, *Indian Journal of Agricultural Sciences*, **89**(3), 556-558.

New Indian Express (2020). Bayer ties up with AgroStar to deliver products to farmers during lockdown. News published

on 27th April, 2020. Available at: https://www.newindianexpress.com/business/2020/apr/27/bayer-ties-up-with-agrostar-to-deliver-products-to-farmers-during-lockdown-2135977.html

Nikam, V. and kale, R. (2020). Unshackling Farmer Producer Organisations from COVID – 19 Lockdown. Agriculture Extension in South Asia, Blog No-110, April, 2020. Available at: https://www.aesanetwork.org/blog-110-unshackling-farmer-producer-organisations-from-the-covid-19-lockdown/

Parthiban, S.R., Nain, M.S., Singh, R., Anbukkani and Naik, V.R. (2018). Process of organisation and Assessment of Socio-Economic benefits of Tamil Nadu Mango Growers Federation (TAMAFED) in Tamil Nadu state, *International Journal of Current Microbiology and Applied Sciences*, **7**(Special Issue), 1-8.

Patil, M., Dixit, S., Gahukar, S. and Seshadri, A. (2020). Supporting Chili Farmers to Cope with Covid-19 Lockdown: A Case from the Tribal Areas of Palghar, Maharashtra. Agriculture Extension in South Asia, Field Notes-7, April, 2020. Available at: https://www.aesanetwork.org/field-notes-7-supporting-chili-farmers-to-cope-with-covid-19-lockdown-a-case-from-the-tribal-areas-of-palghar-maharashtra/

Prasad, R.M. (2020). Everything can wait, but not Agriculture in the time of COVID-19. Agriculture Extension in South Asia, Blog no-112, April, 2020. Available at: https://www.aesanetwork.org/blog-112-everything-can-wait-but-not-agriculture-in-the-time-of-covid-19/.

Raabe, K. (2008). *Reforming the agricultural extension system in India: What do we know about what works where and why?* IFPRI Discussion Paper 775. Washington, D.C.

Rathore, S., Intodia, S.L. and Singh, R.P. (2008). Analysis of research – extension – farmer linkage in the Arid Zone of India, *Indian Research Journal of Extension Education*, **8**, 69–72.

Rivera, W.M. and Sulaiman, V.R. (2009). Extension: Object of reform, engine for innovation, *Outlook on Agriculture*, **38**, 267–73.

Shabong, C.S. (2020). 1917 iTeams – How Department of Agriculture & Farmers' Welfare, Meghalaya, is supporting farmers during the COVID-19 Lockdown. Agriculture Extension in South Asia, Field Notes-1, April, 2020. Available at: https://www.aesanetwork.org/covid19-fieldnotes1/

Singh, K.M., Meena, M.S. and Swanson, B.E. (2013). Extension in India by public sector institutions: An overview. Munich Personal RePEc Archive (MPRA) Paper No. 49107. http://mpra.ub.uni-muenchen.de/49107/.

Singh, R., Nain, M.S., Sharma, J.P., Mishra, J.R. and Burman, R.R. (2014). Institutional convergence of synergistic strengths for developing women agripreneurs, *Indian Journal of Extension Education*, **50**(3&4), 1–7.

Slathia, P.S., Paul, N., Nain, M.S., Nanda, R. and Peshin, R. (2012). Credibility crisis among Agriculture Extension Functionaries in Jammu & Kashmir, *Indian Journal of Extension Education*, **48**(1&2), 68-73.

Swanson, B.E. (2009). Changing extension paradigms within a rapidly changing global economy. Proceedings of 19th European Seminar on Extension education: Theory and practice of advisory work in a time of turbulences, pp. 113–117.

Swanson, B.E. and Mathur, P.N. (2003). *Review of the Agricultural Extension System in India*. The World Bank Report, July 2003.

Tamizhkumaran, J. and Saravanan, R. (2020). YouTube – An Effective Tool for Extension and Advisory Services. Agriculture Extension in South Asia, Good Practice Note-34, June, 2020. Available at: https://www.aesanetwork.org/youtube-an-effective-tool-for-extension-and-advisory-services/

Thakur, D. and Chander, M. (2018). Social Media in Agricultural Extension: Benefits and Challenges under Indian Context, *Asian Journal of Agricultural Extension, Economics & Sociology*, **27**(2), 1-8.

The Wire (2020). Is the Agricultural Package Addressing Challenges Small Farmers Face in a Pandemic? News published on 22nd May, 2020. Available at: https://thewire.in/agriculture/small-farmers-covid-19-package

Wadkar, S. (2020). Collective Action in Maharashtra to Deal with COVID-19 and its Impact on Agriculture. Agriculture Extension in South Asia, Blog no-111, April, 2020. Available at: https://www.aesanetwork.org/blog-111-collective-action-in-maharashtra-to-deal-with-covid-19-and-its-impact-on-agriculture/

Waverman, L., Meschi, M. and Fuss, M. (2005). The impact of telecoms on economic growth in developing countries. Vodaphone Policy Paper Series 2:10–24. http://www.vodafone.com/ content/dam/vodafone/about/public_policy/policy_papers/public_policy_series_2.pdf.

World Economic forum (2018). In: Meera, S.N. (2020) Is COVID crisis a tipping point for transformational changes in digital extension? Agriculture Extension in South Asia, Blog no-125, June, 2020. Available at: https://www.aesanetwork.org/blog-125-is-covid-crisis-a-tipping-point-for-transformational-changes-in-digital-extension/