

New generation delivery system

for scaling up the agro-techniques

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Presently, agricultural extension has been joined with diverse players and transformed from being public to pluralistic, top down to bottom up and broad based and demand driven instead of just technology transfer. For upscaling of technologies, the foremost priority should be given to strengthening the innovation, for which knowledge should be generated, disseminated and adopted at full scale. Upscaling of technologies aims to identify the appropriate innovations under constructive institutional arrangements, policies and financial investments at both local, National and international level in order to promote interaction between stakeholders to encourage the flow of knowledge. Innovative delivery systems for technology upscaling can be done through expert systems, Interactive Voice Response System Social and mass media, development of apps, Startups, Commodity groups and FPOs. In the era of digital and smart agriculture, technologies have to be scaled up through a right mix of conventional and pluralistic tools and approaches for benefitting the multitude clientele.

Keywords: Agriculture extension, Extension delivery systems, Upscaling technologies

GREEN Revolution heralded the journey of Indian agriculture towards the path of self-sufficiency in food grains. It also facilitated in increasing the farmers' income. Further, with respect to the Indian agriculture, total food grain production has touched an all-time high value of 292 million tonnes in 2020. Agricultural growth rate in the 11th Five Year Plan (2007-12) has remained below 4.0% per year. The 12th Five Year Plan (2012-17) though anticipated a minimum of 4% growth rate in agriculture but it again remained only 1.6%. Albeit, this glorious feat was accomplished using the tool of agricultural extension. Thus, agricultural extension acted as a pivot for realizing the growth potential of farm sector against the widening demand–supply pressures, and for ensuring sustainable, inclusive, and pro-poor agricultural and economic development. Indian public sector extension system, however, has been constantly

scrutinized in the recent time because of the challenge of enhancing relevance, efficiency, and effectiveness of the public sector agricultural extension system in meeting its organizational goals and objectives remains unresolved. Agricultural extension has, therefore, been now joined with diverse players and transformed. Agricultural extension systems in the post-Independence era comprise State Departments of Agriculture, voluntary organisations, commodity boards and frontline extension of SAUs and ICAR institutes as well the KVKs network.

The spatial variations in the performance of Indian agriculture necessarily direct to evolve the region- and situation specific pathways. For example, the regions receiving low and uncertain rainfall (arid and semiarid agro-eco situations) need priority for improving farm productivity and rural income. Likewise, farm producers located far-off and those

unreached still suffer most from lack of access to appropriate services (credit, inputs, market, extension, etc.). Anticipating this context, for scaling up the wide range of objectives and target groups, the Indian state has to employ a wider option of approaches. Embedded extension services require to be fortified with input supply and contract farming by the private sector, and there is a need to work well for medium to large farmers in well-endowed regions. Community-based method specifically holds immense potential for natural resources management and involvement in managing common property resources as well as the value chains. Mobile phone enabled information dissemination will become part of or shall complement well to all other extension services. Hence, to derive advantages to the fullest extent in moving to pluralistic systems, comparative advantages and specific functions of different actors

have to be well comprehended and utilized. This article attempts to conceptualize the technology upscaling phenomenon and delineate the possible delivery systems for it in Indian context.

The why and what of scaling

The basic philosophy of scaling of information and technology begins with reframing purpose using systems thinking. In each of the organizations involved in the dissemination learning group, an initiative has to begin at a community level. As organizations and their partners advance scaling strategies, they may experience the need to clarify or reframe their purpose, since scaling activities often differed from the organization's typical or previous activities. It was further clarified that this happens in two major ways, which can be identified as cross-cutting strategies: 1) by making scale and impact a conscious choice, and 2) by analysing root causes using systems thinking, and clarifying the purpose of their innovation. Once they made scaling a deliberate choice, participants employed many strategies to spread their social innovations and challenge the systemic problems at the root of their issues. Their chosen strategy depended on the founding conditions of their organization, the context surrounding their issue, the resources and support they could access, choices they made about who to partner with and how to achieve impact, and the windows of opportunity - political, cultural and social - that emerged.

Concept of upscaling

World Bank has defined upscaling of technologies as the replication and adaptation of techniques, ideas, approaches, and concepts to achieve an increased scale of impact. It aims to efficiently direct the socio-economic impact of the technology to smallholder farmers and increase in scale of coverage of that technology. For upscaling of technologies, the foremost priority should be given to strengthening the innovation, for which knowledge should be

generated, disseminated and adopted at full scale. Low sustainability of technologies could be a major hindrance in upscaling the technologies because they have limited scale as well as low impact of adoption. Upscaling of technologies infers to reframing the strategies vis-à-vis bridging the gap between research and farming to bring the desirable change in the behaviour of clientele. It aims to identify the appropriate innovations under constructive institutional arrangements, policies and financial investments at both local and international level in order to promote interaction between stakeholders to encourage the flow of knowledge.

Upscaling of technology can happen in horizontal, vertical and diagonal direction. Horizontal upscaling refers to replicating proven technologies or innovation, in new geographic areas or target clienteles. Vertical upscaling refers to catalyzing institutional and policy change. Diagonal upscaling refers to adding project components, altering the project configuration or changing strategy in response to changing institutional arrangements.

Strategies for scaling up

In social entrepreneurship and social enterprise studies, the emphasis on "scaling for impact" often reflects a product and consumer orientation, synonymous with diffusion or replication. However, scaling social innovations to bring larger-scale change involves a more complex and diverse process than simply 'diffusing' or spreading a product or model. It is important to learn about the process of how social systems and institutions can be deliberately impacted through the work of organizations, foundations, and other agents of change. Following strategies may be tested and acted upon.

- Identification of potential areas where technologies can be promoted.
- Establishment of backward and forward linkages with different layers.
- Develop a model plan for the entrepreneurs and innovators in

crop production.

- Provide location specific information rather than general information for the entire zone/region.
- Information should be provided to the farmers about complete package of practices of latest technologies through various extension methods for better uptake and utilization.
- Training and message through mobile phones and other associated gadgets can help for faster dissemination in the present era.
- Blending of traditional (personal contact, demonstrations, etc.) and latest methods (expert system, radio and TV talk, video films, magazines, newspapers, etc.) should be used to communicate the message timely and repeatedly to ensure that farmers adopt the right technology.
- Progressive farmers should be encouraged to help the extension workers in delivering the latest message to fellow farmers. Kisan Clubs, NGOs operating in various states should also be encouraged to send the messages to other farmers. In the changing global scenario, Information and Communication Technologies (ICTs) play a major role in technology storage, dissemination and adoption. Information dissemination through ICTs are quick, time saving, cheap and can be reached even in areas where humans find difficult to reach. ICTs include telecommunication technologies such as telephone, cable, satellite and radio, as well as digital technologies like computers, intranet, internet, software and mobile applications, and mobile phones.

Innovative delivery systems for technology upscaling

Use of expert system: Expert systems are e-developed by various institutions for farmers on different crops. These decision support systems need to be popularized in local and vernacular languages.

Development of apps: More than hundred apps have been developed by ICAR on different facets of agriculture which serve as an

important tool for farmers to gain knowledge. Simply by downloading these apps on their mobile phones farmers can easily use them. For example, two such Apps- one on wheat crop *Gehoon Doctor* (Wheat Doctor) <https://play.google.com/store/apps/details?id=com.Gehoon.GehoonDoctor>, and another on barley crop *Jau Jankari* (Barley Knowledge App) (<https://play.google.com/store/apps/details?id=barley.agriculture.barley>) are very much usable. By downloading these two apps, farmers can access information on management of insects, pests and diseases of wheat and cultivation practices of barley.

Agri startups: It is a matter of fact that the Government of India has envisioned a target of doubling the farmers' income by 2022. Schemes like the government's Startup Agri India scheme, the *Digi Gaon* (Digital Village) initiative, and Bharat Net project will be working together towards making this a reality. Initiatives like agri-hackathons can also bring together aspiring entrepreneurs from diverse sectors. Today, the agriculture sector is witnessing a number of startups in India, including everything from organic farming and equipment rentals to connected supply chains and cloud-based analytics. Some of the examples of these Startups are Farm2Fork, Agribolo, Agrowave, Truce, Farm Again, Crofarm, Aibono, Gold Farm, Earthy Tales, Earth Food, Organic Thelawala, etc.

Formation of commodity groups and FPO: There is a need to mobilize farmers for the formation of farmers groups such as Organic crop growers association, Seed growers association, and Conservation agriculture association for the benefit of farming community. If cultivation is done with formation of groups then bulk purchase of critical inputs such as seed, fertilizer, plant

protection chemicals can be done at cheaper rates. Pooling of all farm produce and selling it in large volume can be done at a much higher price. Now, many FPOs are involved in marketing of the farm produce at their own outlets or with commercial outlets.

Use of mass media: Mass media is a powerful tool for dissemination of information and technologies to the farmers and other stakeholders. For instance, ATARI, Kanpur, is regularly using print media for mass awareness of recent developments in wheat and barley. The expert team is regularly visiting the Doordarshan (DD) national and DD Kisan channels in various programme related to these crops. Through *Krishi Darshan* (Agricultural show channel), *Vichar-Vimarsh* (Discussion), *Samvad* (Talk Show) and *Prashna Manch* (Question Answer Session) on DD National/DD Kisan Channels, regular efforts are made to reach maximum number of farmers.

Linking farmers with toll free number: Many institutions have developed their toll free numbers for use by the farmers. By dialing this number anyone can get information on wheat and barley related aspects. They can also talk to the experts based on the queries raised.

Advisory services through SMS: This could be another option for posting bulk messages for large number of farmers in single shot with minimum use of time and resources. Many institutes and departments are having the list of farmers to whom messages are sent on topic concerned at a regular interval. The list of farmers may be updated to increase the coverage.

Use of Interactive Voice Response System (IVRS): IVRS is an alternate digital mode of transfer of technologies. The technology lets the farmers to interact with a computer-operated phone system. Such

interactive option facilitates the farmers to understand and clear the doubts on package of practices.

Use of social media: Now a days, every department and institution has its own social media pages like Facebook and Twitter as well as a YouTube Channel which is regularly posted with new technologies and information. Even the live telecast of different activities of the departments may be done through the Facebook page. Through twitter account also, regular information on modern technological development may be shared and tagged with other related accounts for wider access.

SUMMARY

Agricultural extension is envisaged as a crux for realizing the growth potential of farm sector as well as in ensuring sustainable, inclusive, and pro-poor agricultural and economic development. As a subject, agricultural extension has evolved and transformed a lot, from public to pluralistic, from top-down to bottom-up and from being a transfer of technology to a broad based and demand driven subject. In order to derive the maximum possible benefits of the tools and techniques of modern agricultural extension, it is mandatory to identify the role of different actors along the commodity value chain for comprehending and utilization. In the era of digital and smart agriculture, the latest crop production and protection technologies have to be scaled up through a right mix of conventional and pluralistic tools and approaches for benefitting the multitude clientele.

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