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STREAMLINING PUBLIC AGRICULTURAL EXTENSION IN INDIA: INDICATORS BEYOND REVENUE EXPENDITURE CONSIDERATIONS

Calls for reducing staff strength in public agricultural extension services is increasingly visible in policy circles, mainly due to revenue expenditure commitments and penetration of modern information and communication technologies. In this blog, A Suresh examines the argument in detail and emphasises the need to have a comprehensive overview.

CONTEXT

Agricultural Extension and Advisory Services (EAS) have played a critical role in increasing agricultural productivity and enhancing food and nutritional security in India and elsewhere. In India, the public sector EAS, represented mainly by the Department of Agriculture (DoA) at the state level, continues to play a very important role in supporting farmers with new knowledge. Some reports indicate that state agricultural departments are over-staffed, and therefore, the number of staff is to be reduced in view of revenue expenditure commitments as was reported in the case of Kerala's DoA (Department of Agriculture Development and Farmers' Welfare) recently (Indian Express 2021). While such analyses help to monitor the staff position, it suffers from a methodological weakness leading to far reaching, but faulty, conclusions.

The major issues include: use of a proper indicator for measuring staff strength keeping in view the extent of substitutability of public extension with private extension, the importance of a personal farm-specific advisory appropriate to the specific strengths and opportunities at the farm level, and the potential of using artificial intelligence (AI). At the same time, there is a need to curtail the common perception that public services, including agricultural extension services, in general are inefficient and wasteful. Each of these calls for deeper analysis.

Expert team visit to BLB affected paddy fields

IMPROPER INDICATORS

The total area under cultivation under each extension official is one indicator commonly used to measure the allocation of extension staff. A higher value is considered as more efficient in economic terms. But using this type of indicator often leads to conclusions serious enough to affect the future staffing pattern for agricultural extension, and thereby agriculture itself. Further, it could raise allegations about the efficiency of the staff of DoA – where the values are low. One major issue in this type of analysis is the lack of consideration of the number of agricultural holdings, or the number of farm families and average size of holdings, which are critical for organising an effective EAS system.

Considering only the total agricultural land of a state in comparison with total staff and ignoring the number of agricultural holdings and average size of holdings hides more than it reveals. Agriculture departments – comprised of allied departments, including Horticulture – in every state are primarily responsible for extension activities with regard to the dissemination of new agricultural technology, providing problem solving advisories and supporting development of appropriate skills that are needed to apply new knowledge. This is true for livestock and fisheries sectors as well. The basic unit of technology and knowledge dissemination even today continues to be farmers and farm holdings, and increasingly farmer organisations.


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Excess staffing? An agricultural officer for every 141 hectares in Kerala when Karnataka has one for 1,425 hectares

While Karnataka employs only 7,775, Telangana has an even fewer number of staff — 6,292 — in its agriculture department.

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In several states, where the population density is lower and land reforms have not been carried out effectively, the size of average operational holdings tends to be higher. In thickly populated states with a large number of farming households, the average operational size of a farm is low. At the all India level, the average operational holding size is 1.1 hectare as per the National Agricultural Census. Indian states exhibit wider variations. For instance, the average size of operational holding is 3.6 hectares in Punjab, 2.7 hectares in Rajasthan, 2.2 hectares in Haryana, 1.9 hectares in Gujarat, 1.6 hectares in Madhya Pradesh, 1.4 hectares in Karnataka, 1.0 hectare in Telangana, 0.95 hectare in Odisha, 0.8 hectare in West Bengal, and 0.2 hectares in Kerala. The share of smallholders is very high (more than 82% at national level), particularly in thickly populated states. This leads to higher costs in terms of time and effort, especially while catering to similar size of total agricultural land.

The Report of the Committee on Doubling Farmers' Income (Volume XI, 2017) of the Ministry of Agriculture, Government of India, shows that agricultural extension activities are under-staffed in comparison to the desired level. The Committee recommends that one extension official is to cater to the desired number of operational holdings – 400 in hilly regions, 750 in irrigated regions, and 1000 in rainfed regions. A higher value in this type of an analysis most probably indicates under-staffing and deterioration in quality of service. At the national level it is to the tune of 1162 holdings per official. The respective figures for some states are: Andhra Pradesh (undivided including Telangana) (3162), Karnataka (2428), Uttar Pradesh (1798), Kerala (1737), Bihar (1583), Gujarat (1395), Rajasthan (1254), Odisha (1230), West Bengal (1156), Tamil Nadu (976), Himachal Pradesh (886), Maharashtra (869), Madhya Pradesh (823), Punjab (753), Haryana (536), and Jammu and Kashmir (249) (GoI 2017) The figures within parenthesis indicate the number of holdings to be attended to by an extension official. Though the above values indicate only the number of officials in the public sector and excludes the private sector, given the low penetration of private sector in agricultural extension, it can be considered as an indicator that approximates the ground situation.

Training of farmers under *Bharaitya Prakritik Krishi Paddhathi*

Another serious issue is the extent to which the indicator covers the uniqueness of the farming system and cropping pattern in vogue in any particular state. The same piece of land is cultivated multiple times in a year leading to higher cropping intensity. Homestead farming with a large level of crop diversification is in practise in some states – for instance in Kerala, where several crops are cultivated on the same piece of smallholding in the perennial crop dominated cropping system. This diversified cultivation demands a range of information, training and skills, for implementing the diversified crop-targeted schemes and programmes of the government. This makes measuring agricultural extension staff requirement based only on the total cultivated area inadequate and misleading. Similarly, considering food production per official also turns out to be inadequate as several crops are of a commercial nature such as cotton, rubber, and spices. Using value of output for crops per official would make it overly sensitive to crop combinations and market forces.

The spectrum of services being undertaken by public extension service is quite diverse and doesn't stay confined within the limited role of 'extension services', in its true meaning. In addition to the regular duties of dissemination of knowledge and technical intervention, the staff of agricultural departments, such as agricultural officers, undertake multiple responsibilities. It includes implementation of government schemes, government-sponsored crop insurance, support to procurement and marketing operations, supply of agricultural inputs including seeds and fertilizers, quality checking and

Distribution of coconut seedlings through the DoA

certification, disbursal of subsidies and other financial support, crop loss estimates, etc., just to mention a few. These activities and responsibilities are to be factored in while evaluating the effectiveness of the department and its activities. Thus, the indicators to be used for determining adequacy of staff need to be sensitive to the uniqueness of the farming system and changing pattern of professional responsibilities.

Contextualising private extension services

Predictions were ripe even two decades back that private extension would replace public agricultural extension services in India. Indeed, many new service providers and institutional arrangements in agricultural extension have emerged, especially during the last two decades (Sulaiman 2012). Private extension services found a place particularly for high value commercial crops, livestock and fisheries. However, private extension services did not replace the demand for public extension services. Three significant variables need to be factored in here.

Firstly, the demand for agricultural extension (say, information) could be elastic with respect to farm income. There are not many studies that have inquired into the economic aspect of demand for private extension services, except a few isolated attempts covering selected crops/enterprises and regions. However, it can be safety anticipated that the demand would be income elastic and sensitive to farm income in the sense that a change in farm income would effect a more than proportionate change in the demand for extension services. Given the slow growth of farm income on a unit level, as has been widely reported in India in the context of farm distress, demand growth would be much lower. This could largely explain the slow growth of private extension in India for several crops and vast geographical regions.

Promoting vegetable cultivation under fallow lands

Secondly, the capability of private extension to cover demand for diverse agricultural extension services in the varied geographical regions of India is yet to be established (Sajesh and Suresh 2016). Agriculture, by and large, happens in the remote corners of the countryside with low infrastructure development, which precludes fast emergence of private extension. Private extension largely happens along with contract farming and as promotional efforts by companies offering inputs like seeds, fertilizers, and chemicals in crops; veterinary services in livestock; and feeds and fingerlings in fisheries. The demand for private extension to a large extent comes about due to the relative

unavailability of public extension services due to poor recruitment of extension staff and inaccessibility to their services, mainly due to inadequate infrastructure development and pre-occupation with paper work. Therefore, the rising demand for private extension in non-commercial agriculture can be largely viewed as mere filling up of the space being vacated/not occupied by public extension personnel on account of the inadequate staff strength rather than as a demand for better quality extension. This is not to convey any disrespect on the quality of service offered by private or public extension, but to highlight that demand for extension is primarily an issue of availability and accessibility rather than an issue of quality – to the great mass of Indian peasants. Quality issues follow quantity issues, including accessibility.

Providing problem solving advisory support at the farm level

Thirdly, the common property nature of agricultural information and extension requirements largely warrant development of public extension. The issues facing agriculture in a region largely dependent on weather, availability of resources including water, management of pest and diseases infestations, livestock diseases (for example, foot and mouth disease), water quality issues for aquaculture in common waters (water contamination), market forces (prices and market intelligence), agronomic requirements, etc., which are all of a common nature can be solved effectively when a large number of persons adopt better management measures. Rivalry and excludability, the major attributes that characterise private resources, are not tenable in such cases.

Substitutability of extension personnel with technology

One widely propagated myth is that the newer developments in modern Information and Communication Technologies (ICTs), including Artificial Intelligence (AI) would reduce the need for extension personnel. At the outset, it appears true to a limited extent as disseminating simple information to farmers is relatively easier through mobile phones. The penetration of internet and mobile phones has helped agricultural extension services to overcome the boundaries of scalability and geographical constraints (Mittal et al. 2009). Research suggests that ICTs have helped farmers in sharing information and its wider adoption. AI is capable of effecting a tectonic shift in all spheres of human activity. Together with space technologies, AI can be effectively used for management of agricultural operations.

However, it cannot be anticipated that it would result in large-scale displacement of personalised agricultural extension services, given the social and economic milieu. Experience suggests that developments in ICTs cannot be a substitute for human intermediation in solving problems of agriculture - ICTs can only be an aid (Sulaiman et al. 2012). This is because farmers need not only information, but also motivation, training, and skill development for behavioural change. Smallholder dominated agriculture (accounting for more than 82% of total farm holdings) make it more nuanced. Another issue is the perceptible digital divide (both social and gender related) that exists in India in terms of access to internet and mobile telephony. The COVID-19 pandemic has thrown open the issue of unequal access to resources and technology more glaringly. With the emergence of newer value chains and institutions, economic activities would be more and more diversified and the matrix of information and services demanded would be diverse. Therefore, co-existence of various agencies and aids that harness complementarity rather than substitution of personnel with technology is a more plausible scenario in the near future.

Training farmers at the field level

Economic contribution of extension services

There is a need to evaluate the contribution of agricultural extension activities in enhancing agricultural productivity and meeting the food and nutritional security of India. Agriculture being a state subject, the public extension service primarily operates through the state line departments dealing with agriculture, horticulture, animal husbandry, fisheries, soil and water conservation, etc., to mention a few. The Union Government undertakes various extension activities mainly through the district level Krishi Vigyan Kendras (KVKs), supported by the Indian Council of Agricultural Research (ICAR). The research institutions under ICAR and state agricultural universities (SAUs) also undertake extension activities on a limited scale. Various commodity boards are also engaged in commodity specific extension activities (Sajesh and Suresh 2016).

These extension activities have generated commendable economic returns by aiding increase in production and productivity of agriculture in India, thereby remarkably keeping the food production

growth above the population growth rate (generally). It has also helped to boost export of agricultural commodities. A meta-analysis done on the contribution of agricultural extension in India has shown an IRR of 75%, one among the highest in the world (Pal 2017). Agricultural research and extension has emerged as investment avenues making it one among those with the highest impact in reducing poverty in India. Still the investment in agricultural extension in India is quite low. Agricultural extension expenditure as a share of the agricultural GDP in India (extension intensity) is about 0.18%, on average, for the period of 2011-2013. This is less than half of the research intensity (0.40%, which is also low), and much less than that in many other countries (Pal 2017). Given this background, calls for further scaling down of staff strength challenges economic logic.

More nuanced is the philosophy on which the call for scaling down the operation of public departments mostly rests: reducing revenue expenditure of the state (mainly, towards salaries). The size of public expenditure increases with the growth of the economy and population - due to expansion of traditional functions, coverage of new functions, expanding the sphere of public goods, and several other changes (e.g., Wagner's law, Musgrave and Peacock 1958). There could be corresponding changes in public employment, though not necessarily in proportion. The demand for public services could enhance public employment at different levels of administration, central, state and local bodies, depending on the extent of devolution of power. The common belief is that the Indian public administration is over-staffed. The empirical evidence has something surprising to offer in this regard. India has only a fifth as many public servants as the United States of America, relative to population (as on 2011), that is, 1623 public servants per 100,000 residents in India compared to 7681 for the United States (Swami 2012). This could largely get reflected in agricultural extension as well.

Pest Diagnosis in Chilli

One variable that undermines operations of the proportionality mentioned above, is the technological development and automation which enhance the efficiency of the public servant, thereby reducing their number, given a specific work load. The diversification and expansion of the economy negates the personnel-technology substitution effect to a large extent, and could even lead to an increase in the demand for public servants. This is particularly so as the economy gradually turns into a right-based one and more accountable; for example, the rights to food and information. However, the intensity of such a substitution differs across sectors. The scope for reduction of public servants in agriculture is not as robust as in industry or service sectors, as the number of farm holdings in India is increasing, and every farmer is an entrepreneur in her own way. Further, the newer programmes for the agriculture sector are more and more knowledge and skill intensive.

CONCLUSION

The public agricultural extension expenditure has provided gainful economic returns over a period of time, and helped in transforming Indian agriculture. The increasing call for reducing staff strength based on revenue expenditure largely misses the wood for the trees. The notion that technical developments in ICTs, including AI, would be a substitute for the need for personnel intermediation in extension service is farfetched. Further, it belies the trend in the number of agricultural holdings, diversification of agricultural activities, and intensity of skill and knowledge demanded for agricultural

operations in the globalised value chains. The structural rigidities and institutional complexities in a society as diverse as India is another factor to be reckoned with. Notwithstanding the inequity in access to digital technologies, it can be best thought that technological developments will have a meaningful co-existence with personalised extension. The substitution effect would be subdued and a rather complementary relation could be expected. The indicators selected to streamline the extension personnel need to factor-in the complex social, economic, institutional and agro-ecological milieu. The great contribution of agricultural technology and its dissemination in ensuring agricultural growth, meeting food and nutritional needs, and livelihood generation is to be considered while selecting indicators for streamlining agricultural extension activities and staff positions.

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Dr A Suresh, Principal Scientist, Agricultural Economics, ICAR-Central Institute of Fisheries Technology, Kochi, India. Views are personal and not necessarily of the organisation he belongs to
Email: sureshcswri@gmail.com

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