By **Rasheed Sulaiman V**

SCALING UP CLIMATE-RESILIENT AGRICULTURE IN SOUTH ASIA

Farmers need support to adapt to the changing climate in South Asia, which has been adversely affecting agricultural production year after year. Extension and advisory services (EAS) can play a critical role in scaling up climate-resilient agriculture. However, their capacities to support farmers in adapting to climate change need to be substantially enhanced.

The agriculture-dependent populations of South Asia are the most vulnerable to climate change. With the increase in heatwaves and humid heat stress, interannual crop variability will negatively impact the low-income smallholder farmers the most. Rice farming, Thailand.

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South Asia is home to some of the world's most vulnerable countries to climate change. In the past decade alone, almost 700 million people—half of the region's population—were affected by climate-related disasters (Fallesen 2019). About half the South Asian population (ca. 800 million) are at risk of seeing their living standards and incomes decline as rising temperatures and more erratic rainfall reduce crop yields, make water scarce and push away more people from their homes to seek safer places (Mani et al. 2018).

The latest IPCC (2021) report noted that in South Asia, heatwaves and humid heat stress will be more intense and frequent during the 21st Century and point out that annual and summer monsoon precipitation will also increase during the same period, with enhanced interannual variability. The resultant productivity decline leading to food supply shortfalls and an increase in food prices are likely to directly affect millions of low-income smallholder farmers in South Asia, especially those who depend on agriculture for their livelihood. Climate change adaptation is, therefore, necessary for agricultural sustainability. Building adaptation in the agricultural system needs simultaneous attention to increasing production by adopting various technologies, embracing sustainable land management practices, building on local knowledge/culture and formulating enabling policy and institutional setups (Aryal et al. 2020).

Climate-Smart Agriculture

In principle, climate-smart agriculture (CSA) might help achieve higher production with reduced emissions. This would have been the easy answer to climate change impacts on agriculture if the issues were simple. But it is rarely that. For example, as smallholder farmers of South Asia, who are already facing a variety of climatic and non-climatic stresses, do not have the capacity to adopt new technologies due to limited access to natural resources, information and finance. Overcoming these barriers urges institutional and policy support (Pal et al. 2018).

The Food and Agricultural Organisation (FAO) of the United Nations (FAO 2013) defines CSA as "agriculture that sustainably increases productivity, enhances resilience (adaptation), reduces/removes GHGs (mitigation) where possible and enhances achievement of national food security and development goals". CSA is not a one-size-fits-all set of solutions to be adopted by every farmer. In each situation, its form needs to be defined by the context (such as the extent of vulnerability to the change in climate, varying community risk profiles, availability of resources and livelihood alternatives).

It can be applied to a single farm or over entire landscapes. It often needs the involvement of diverse agricultural stakeholders and coordination across different agricultural sectors and other related sectors including energy and water. Therefore, enhancing the capacity of farmers to manage risk and adopt effective climate change adaptation and mitigation strategies needs special attention. At the village or rural community level, the only reliable source of information and advisory support for farmers is the extension and advisory services (EAS). They, therefore, need to support farmers in adopting CSA practices.

FAO (2016) noted that while EAS has been contributing significantly to enhancing food security through their advice on improved technologies, they have not been very successful in accelerating the use of CSA, which demands a strategy that captures the synergies and manages trade-offs between food security, adaptation and mitigation. Based on a review of four cases of scaling up CSA in Sub-Saharan Africa (drought tolerant maize), Zambia (conservation agriculture), Vietnam (systems of rice intensification) and East Africa (index-based weather insurance), Sulaiman et al. (2018) observed that if EAS are to contribute significantly to the upscaling of CSA, the providers of the services should broaden their

Role of Extension and Advisory Services in scaling up climate smart agriculture

Farmers need support to understand the impacts of climate change and adopt climate smart agriculture (CSA) practices. This would involve changes in the behaviour, strategies and agricultural practices of millions of farmers worldwide. Extension and advisory services (EAS) have a crucial role in linking farmers with sources of new information and tools so that they can transition to CSA practices (Simpson and Burpee 2014). Moreover, only EAS have an explicit focus on supporting such change among rural communities. EAS personnel, especially those working at the field level, usually have a comprehensive understanding of the local vulnerability context and knowledge of the local support and service networks. Farmers are often more receptive to their suggestions, as they have long been supporting farmers with knowledge on new and improved technologies and practices. In many countries, EAS personnel have also supported the mobilisation of farmers' groups to deal with natural resource management and marketing challenges collectively.

mandate, partner with other relevant actors in the agricultural innovation systems (AIS), increase their level of engagement with the research aspects, prepare for long-term efforts and seek to influence the enabling environment through policy advocacy. Lack of these crucial capacities to promote CSA at different levels have been identified as one of the significant weaknesses of EAS, which constrain it from supporting up-scaling CSA. Apart from these, several institutional and policy bottlenecks in the wider enabling environment also limit EAS from playing an important role in promoting CSA.

Extension and Advisory Services in scaling up climate-smart agriculture in South Asia

Though the public sector dominates the EAS provision in South Asia, the private sector and non-government organisations (NGOs) are increasingly supporting farmers with new knowledge and information related to CSA. EAS has been promoting technologies, such as stress-tolerant varieties, conservation agriculture, rainwater harvesting methods, including the construction of farm ponds and water-efficient irrigation systems with an emphasis on drip irrigation mechanisms. It has also been providing farmers with weather advisory services to allow them to adapt better to climate change. Through the promotion of integrated pest management, organic farming practices, conservation agriculture, crop rotation and agro-forestry, EAS has also been coming up with solutions for climate change mitigation. Mechanisms, such as climate field schools and seed banks, have also been conducted. There have been concrete efforts to organise farmers for collective action to better deal with climate risks. Increasingly, remote sensing and weather insurance are also being used to deal with climate risks. Wherever these approaches are promoted, there has been a positive impact.

However, EAS in South Asian countries face several challenges in scaling up these efforts. A South Asia Policy Dialogue organised jointly by Agricultural Extension in South Asia (AESA), IRRI South Asia Regional Centre (ISARC), the Centre for Research on Innovation and Science Policy (CRISP) and the Sri Lanka Network of Agricultural Extension and Advisory Services (NAEASSL) at Colombo, Sri Lanka, on October 5, 2018, identified the following challenges faced by EAS in scaling up CSA:

Lack of adequate research support: This has three dimensions. Firstly, there is minimal documentation of successful and cost-effective CSA technologies. Secondly, adaptive research support that aids the understanding of EAS on what works in different agro-ecologies and farming systems is limited. Thirdly, the lack of adequate and systematic evaluation of CSA practices in farmer fields in diverse locations/contexts also constrains EAS promotion and adoption of these practices by farmers. The majority of the research on CSA focuses on crops and very little on livestock and fisheries. There is also minimal extension research in this area, and practically no guidance is available on the type of approaches (demonstrations, training, climate field schools, ICTs, use of master trainers and para extension workers) that effectively address the different parts of CSA.

Lack of capacities to scale up CSA: There are several significant capacity gaps within EAS. At the field level, EAS personnel lack sufficient understanding of CSA mainly due to limited exposure to associated technologies and practices. Many EAS functionaries at the field level lack capabilities critical for community adaptation to climate change, such as mobilising farmers into groups, mediating conflicts, or organising climate field schools. The middle and senior-level staff of EAS lack capacities for coordinating the activities of various agencies that are critical for scaling CSA.

At the organisational and enabling environment levels, the existing mechanisms for capacity development are not supporting the development of these capacities partly due to a lack of awareness on how EAS could support the scaling up of CSA. The paucity of adequately trained trainers and lack of training manuals on CSA appropriate to different levels of staff are other significant constraints. Keeping this in view, the Center for Research on Innovation and Science Policy (CRISP) and International Rice Research Institute (IRRI) recently developed a Training of Trainers Module on Enabling Extension and Advisory Services (EAS) for CSA for the Government of Odisha, India (Onima et al. 2020). However, there are no processes for continuous capacity upgradation of EAS personnel. Funds specifically earmarked for capacity development in CSA are also needed to enable EAS to perform this role.

Endnote

The implementation of CSA innovations calls for appropriate solutions adapted to the technical, institutional and policy-related needs of the stakeholders involved in EAS in South Asia. However, to do this more effectively, their capacities at different levels need to be significantly enhanced.

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