A harvester in Nagaon district, Assam

FARMING THE FUTURE

Modernisation of Indian agriculture needs consistent gains in productivity By AMIT KAPOOR and ANANYA KHURANA

HE ECONOMIC SURVEY of India for 2024-25 portrays agriculture as the "sector of the future". However, this future may remain bleak unless all the inefficiencies plaguing the sector are identified and addressed. While the agriculture sector contributed only around 16 per cent to the country's GDP in FY24 (current prices), it remains the leader in employment, supporting about 46 per cent of the total workforce. On the upside, the real value added per worker in Indian agriculture has grown over the years, albeit slightly. However, its growth has been inconsistent due to constraints from systemic inefficiencies in the sector.

This can be attributed to hurdles at the pre-harvest and postharvest stages on the production side of agriculture.

PRE-HARVEST BOTTLENECKS

The fact that many farmers still rely on manual labour or traditionally labour-intensive tools for farming due to limited access to affordable machinery keeps labour costs high. In an attempt to resolve this issue, the government has launched the Sub-Mission on Agricultural Mechanisation, a flagship initiative of the Department of Agriculture & Farmers' Welfare to encourage technology-driven, climate-smart, and precision agriculture practices. Under this, custom hiring centres were introduced in 2014-15, as a step towards inclusive farm mechanisation. However, the persistent disparity in the statewise provision of agricultural machinery as a service on a rental basis seems to be correlated with the accessibility of the state and its intensity of agriculture. As of October 2023, 74, 144 custom hiring

THE GOVERNMENT LAUNCHED THE SOIL HEALTH CARD SCHEME IN FEBRUARY 2015 TO PROVIDE FARMERS WITH DETAILED INFORMATION ABOUT THE NUTRIENT STATUS OF THEIR SOIL AND RECOMMEND BALANCED PROPORTIONS OF FERTILISER USE TO IMPROVE SOIL HEALTH AND PRODUCTIVITY

centres were registered in the country, out of which more than one-third (32.2 per cent) were concentrated in the agriculturally dominant states of Punjab, Haryana, and Uttar Pradesh (UP); followed by Andhra Pradesh, Telangana, and Tamil Nadu, having almost 30 per cent custom hiring centres. In comparison, custom hiring centres are sparsely located in the northeastern states, namely Arunachal Pradesh, Assam, Mizoram, Meghalaya, Nagaland, Sikkim, and Tripura, highlighting the scope for investment to improve the agricultural efficiency of the region.

Similarly, as a large part of Indian agriculture is still rain-fed, natural calamities such as droughts or floods can drastically reduce agricultural output. Especially under such circumstances this implies the sector's vulnerability to pest infestations and insect attacks, resulting in an increased risk of improper usage of fertilisers and/or pesticides. In addition, most farmers in the country lack access to the latest knowledge, inputs, and agricultural practices to minimise crop damage. These issues reiterate the paucity of investment in agricultural research and development and agricultural extension services. Nonetheless, the government launched the Soil Health Card (SHC) scheme in February 2015 to provide farmers with detailed information about the nutrient status of their soil and recommend balanced proportions of fertiliser use, to improve soil health and productivity. Overall, in 2023-24, 41.12 lakh SHCs were generated, but they were unevenly spread across the states. More than 50 per cent of SHCs were generated for soil samples taken from the states of UP, Madhya Pradesh, West Ben-

gal, Haryana, Assam, and Rajasthan, indicating unequal statewise efficiency of the SHC scheme in the country.

The Sub-Mission on Agricultural Mechanisation also provides financial assistance to custom hiring centres to purchase drones and provide them to farmers on a rental basis. Likewise, financial aid is offered to the farmers, especially the small and marginal, Scheduled Caste/Scheduled Tribe (SC/ST), women, and farmers in the Northeast, for individual ownership. It is observed that Andhra Pradesh, Madhya Pradesh, and UP, which have extensive cultivable land and a high number of small and marginal farmers, also have the highest number of drones that can be used for crop monitoring, precision spraying, and soil health mapping. For instance, the government of Andhra Pradesh is in the process of deploying Kisan Drones for a variety of uses in the agriculture and allied sectors of the state. As one of the first steps, the state government plans to establish 875 drone service centres, at a 40 per cent subsidy offered for their set-up. This could encourage the participation of private players and cooperatives as well.





Soil Health Cards Generated in India (2023-24)

POST-HARVEST BOTTLENECKS

Despite various policy efforts aimed at modernising Indian agriculture through improved inputs and mechanisation, a major chunk of its output faces post-harvest losses. According to the National Bank for Agriculture and Rural Development (NAB-ARD), India suffers a loss of about \$18.5 billion annually, ascribed to post-harvest losses. This can be attributed to inadequate access to fair and transparent markets and storage infrastructure, leading to poor price realisation and wastage.

Relatively larger Indian states such as UP, Maharashtra, Madhya Pradesh, Gujarat, and Tamil Nadu, with a stronger agricultural sector, a more robust network of mandis linked to the Electronic National Agriculture Market (e-NAM), and cold storage infrastructure, seem more prepared to reap the benefits of better price realisation. Other states, especially those in the Northeast or categorised as Union territories, could follow their lead.

Till now, India's focus in terms of agricultural policies and interventions has largely revolved round two ends of the farming spectrum—inputs and outputs. On the one hand, significant emphasis has been laid on the subsidised provision of agricultural inputs, such as seeds, fertilisers, credit, and machinery to farmers for decades. On the other hand, efforts have also been directed towards strengthening the market for the trade of agricultural produce. For instance, ensuring price support, procurement, and improving market access through the provision of minimum support prices (MSP) for crops and the establishment of Agricultural Produce Market Committees (APMC) across states are some of the measures taken. However, what lies between these two ends of the spectrum is the missing middle of agricultural services that connects traditional farming with modern efficiency.

As India aims to secure its food future amidst climatic, demographic, and economic pressures, agricultural services need a leg-up. Offering better and more equitable intermediary support to farmers via the provision of agricultural services at the pre-harvest and post-harvest stages can help the country's agriculture sector unlock the next phase of growth. As a starting point, it would enable seamless operations at each step of the agricultural value chain that would improve labour productivity and overall farm efficiency. In other words, optimising the distribution and delivery of agricultural services that facilitate farm mechanisation, soil monitoring, crop and weather advisory, logistics, storage, and other extension support can minimise labour costs and post-harvest losses, and improve

soil health, crop yields, and market access. This can eventually enhance farmers' income-earning capacity. Additionally, a robust ecosystem of agricultural services can reduce the sector's overdependence on manual labour and free up human potential for more productive alternate employment. Thus, investing in the upskilling of rural youth as agricultural service providers should also be given due consideration. This would not only create more diversified and gainful employment opportunities in rural areas but also enhance the delivery of agricultural services. Ultimately, with the right training and support, rural youth can become the tech-savvy backbone of a smarter, more sustainable and efficient agricultural future.

At present, the underdevelopment of agricultural services is a critical yet often overlooked factor behind the systemic inefficiencies in Indian agriculture. This acts as both a symptom and a cause of stagnation in the sector. For the modernisation of Indian agriculture and its sustainable growth, its productivity gains must be consistent and inclusive, and the integration of agricultural services can be a game-changer.

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Source Soil Health Dashboard, Department of Agriculture & Farmers' Welfare