

WHY INVESTMENT IN R&D HAS NOT IMPROVED AGRICULTURE PRODUCTIVITY?

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It has always been stated that agriculture is the backbone of Pakistan's economy. But unfortunately, this backbone is weakening with the growing age. A snapshot since the 1960s, when agriculture was contributing more than 43 percent of GDP, surviving through the lowest of 18 percent and currently standing at 22.3 percent, tells us the story of asymmetrical performance and neglected potential of the sector. Looking down for the reasons, one may easily find many, but a lack of research and failure to deliver development (R&D) is common in every model for Pakistan.

One cannot deny the role of R&D in the development of any sector. Globally, R&D has historically been a cornerstone of innovation and economic growth, particularly in technology, healthcare, and agriculture sectors. Global R&D investment has seen a substantial increase over the decades. Adjusted for inflation, global R&D investment has tripled over the past 30 years, growing from \$672 billion in 1992 to over \$2.2 trillion by 2021. Even in our region, China is leading the game. In 2001, China's R&D budget was 0.94 percent, R&D expenditure to GDP ratio, then after a decade was almost doubled (1.78 percent) and now after two decades, this ratio has increased to 2.43

percent. After looking at these numbers, no wonder why China has taken the place of the world's second-largest economy.

When it comes to Pakistan, it has always been portrayed that investment in R&D in agriculture has not yielded any increase in productivity. But what is that investment actually? According to the World Bank's latest update, R&D expenditure as a percentage of GDP in Pakistan was 0.164 percent in 2021. Whereas India has a 0.8 percent R&D expenditure to GDP ratio for the same year. In this 0.164 percent, how much could have been spent on agriculture R&D of Pakistan? Definitely very little.

Besides the low investment, one must also look for other factors that explain why it is not improving agricultural productivity in a multiplier effect. Firstly, it's the organizational complexity. In Pakistan, there are always long, complex, and inefficient procedures to do anything. Even the cumbersome documentation time in collaboration between public and private sector or research organizations frustrates the researchers.

Secondly, most of the R&D institutes/organizations are funded by the government, and lack of commitment is a norm therein. However, inefficient human

resources is another offshoot of this norm. Therefore, the R&D workforce lacks the basic commitment and devotion to serve their purpose.

Thirdly, multi-dimensional stratification within research-related organizations is weakening the growth impact. There is also a culture of seniority in almost every such organization in Pakistan. Employees or researchers are not characterized by their grades, degrees, and knowledge; instead, they are only seniors and juniors. In my own experience, juniors are not allowed to do anything in their way. In a government setup, one has to follow what is already routine. Especially in labs, there are equipment which are accessible to some particular people, and juniors are not allowed to even touch them.

Fourthly, Pakistan also lacks competent researchers for one reason or another, like a huge brain drain. The developed countries attract competent researchers all around the world through their specially designed brain pool programs. The young people of the country, even in the government sector, want to go abroad to have a better life, make contributions, and seek opportunities for advanced-level research.

Even after the existence of the above weaknesses, if success/innovation happens, there is another list of issues regarding the implementation of the agriculture sector. Almost every government project in the agriculture sector accompanies research-based innovation or public-sector innovation. But again, the cycle begins with complex procedures, time lags, lack of commitment, and organizational culture. Finally, it goes into the implementation phase through different wings or directorates of the agriculture department.

In the next phase, when it arrives at the district level and then to farmers, no one cares about the output, productivity, and benefits of the agriculture sector and the economy. The basic staff of the agriculture department only cares about the targets of the projects that are assigned to them. The staff goes to the big farmers of the area and requests them to register their names. Usually, landlords having large land holdings are generous enough to use their name for projects and schemes. And most of the time, these landlords take huge benefits from government schemes, especially subsidy schemes. In this whole practice, a real farmer, i.e., a small farmer, remains excluded from the scheme/projects, who is supposed to be the target beneficiary of the project or innovation. Even if these small farmers are approached, they are never ready to listen and do not have any interest in adopting something new due to stressed economic conditions.

I remember a project implemented in the province of Punjab named Extension 2.O, in which agriculture department staff had to take soil samples from farmers' land, then district soil labs of the area analyzed those samples and made soil health cards. That soil health card carried information regarding soil and its health and the recommended dose of fertilizers. It was something very useful and cost effective for farmers and farmers did not need to make any efforts. Sadly, farmers were not even interested in this. And the farmers who received those soil health cards did not bother to read them; following those recommendations is a far story. The big reason behind farmers' attitude is their illiteracy. So, they did not take any interest in soil health cards. More than half of the farming community cannot read and write. The only thing in which they are keenly interested is the cost-benefit ratio of their crops.

Apart from R&D, the agricultural productivity of Pakistan is not improving due to other certain reasons. The cost-benefit ratio is taking the lead. Inputs prices surging day by day. On the other hand, farmers are not getting fair benefits from their crops. Uncertain market prices of their produce are making the situation worse for them. A recent example is the wheat price of 2024. Before sowing, the market price of wheat was around Rs. 5000 to 5500 per 40kg, but when the crop was harvested, no one was buying it even at the support price of Rs. 3900 per 40 kg.

Keeping all these reasons aside, if we take a step back and look at the larger picture, maybe it is the economy that is transforming. The statistics tell us the share of the Services sector is growing (52.19% of the current share in GDP), followed by the industrial sector. Maybe it is high time to accept the reality and need to move the direction of resources from subsistence agriculture to manufacturing or services. Many developed countries have opted for other sectors over agriculture; South Korea is an example. Pakistan assisted South Korea with \$378,000 and plenty of wheat during their war from 1950-53. It was the third-biggest financial contribution that South Korea received. After its separation from North Korea, South Korea was also an agriculture-based economy, but then it moved to manufacturing. This shift made S. Korea one of the leading economies of Asia.

However, every country has its unique circumstances. If we have to stick to agriculture, we need a clear and strategic plan. First, the government should significantly boost its investment in agriculture and encourage private companies by offering tax breaks and grants. Simplifying the processes within research

organizations and holding them accountable will make them more efficient. At the same time, we should invest in the people who work in agriculture by offering specialized training programs for ground-level staff. And there is a need to provide competitive incentives to keep talented individuals from leaving the country or brain drain. Furthermore, aligning R&D efforts with the needs of farmers, especially smallholders, is crucial. This can be done by involving farmers in the research process and improving extension services with modern digital tools to ensure new technologies reach the farmers who need them most.

We also need to improve market access by developing better infrastructure and offering financial incentives, so farmers can easily adopt new innovations. Building strong partnerships between the government and private sector is essential for driving agricultural innovation, whether through joint ventures or creating hubs where different stakeholders can collaborate. These approaches will lead us to have more fruitful R&D in agriculture sector.

Policy changes that support sustainable farming practices, backed by regulations and incentives, will ensure long-term productivity and protect the environment. Lastly, setting up a strong monitoring and evaluation system, with continuous feedback from those involved, will help us adapt and refine our strategies over time. This approach will lead to a more resilient, innovative, and sustainable agricultural sector, helping Pakistan grow economically and ensuring food security for its people.

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