**Efficient irrigation**

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Approximately 90 percent of Pakistan’s water goes towards agriculture. As the country’s population edges towards 250 million and its urban and industrial needs for water increase, this becomes untenable. If Pakistan is to reduce its water stress levels, it will have to ensure sustainable and efficient use of its water resources.

Our reliance on flood irrigation and overuse of groundwater resources is already having deleterious impacts on our increasingly limited water resources. Yet there is recognition that we need to make progress in this regard on an urgent basis. The National Water Policy 2018, a document that was developed after consensus among all provinces, speaks to this.

The urgent need to rationalise water use and adopt cost-effective and reliable methods for improved irrigation and crop productivity has led to discussions on the efficacy of high efficiency irrigation systems (HEISs). Such systems, which include drip and sprinkler irrigation, provide water directly to crops’ roots, leading to the more efficient use of water resources as opposed to the flood irrigation methodology, which is widespread in Pakistan.

The country has seen an emphasis on the development of HEISs in recent years. In particular, the Punjab government is giving a subsidy to cover 60 percent of the total cost incurred on the installation of HEISs under the Punjab Irrigated-Agriculture Productivity Project. The subsidy is being given to farmers who own land up to 15 acres. Corporate entities have also gotten involved. Under its ‘caring for water’ programme, Nestle has partnered with the Punjab government to install such systems on 152-acre land. This partnership allows the company to bear the remaining 40 percent of the installation cost that farmers owe.

As part of the Command Area Development of Jalalpur Irrigation Project, the provincial government is giving an 80 percent subsidy to farmers that install solar-powered high efficiency irrigation systems. The Pakistan Agriculture Research Council (PARC) has also set up a solar-powered high efficiency irrigation pilot project in Fateh Jang, where research is taking place on drip and sprinkler irrigation systems.

Although the potential for water conservation is significant when it comes to the use of high efficiency systems, capital and operational costs can be quite prohibitive especially for small landowners. Also, capacity gaps need to be addressed in terms of farmers’ understanding of the climate and soil conditions conducive for a particular high efficiency system.

While not as labour-intensive as flood irrigation, high efficiency systems do require a bit of technical know-how in terms of ensuring their long-term stability and sustainability. Water quality is also important in terms of their efficiency. Sediments in irrigation water can clog sprinkler or drip systems, resulting in time delays and additional costs for farmers.

However, the most pressing concern is the effective utilisation of high efficiency systems while simultaneously ensuring that water usage is constrained. Research shows that with a reduction in marginal costs of irrigation due to deployment of high efficiency systems, farmers could conceivably turn to high revenue water-intensive crops. This can result in further groundwater extraction and lead to a situation known as the Jevons paradox where a technology may improve the efficient use of a natural resource but does not necessarily reduce its consumption.

High efficiency systems have the potential to address some of our water challenges. Yet, given governance-related, administrative and operational issues, their sustainable adoption can face significant hurdles. It is in this respect that high efficiency systems need to be seen as part of broad-based systemic and integrated response to the country’s water management issues.

As such, we need a renewed focus on the food-water-energy nexus to address the challenges the country is facing vis-a-vis water governance and food security. This will require an understanding of the challenges being faced by, say, small landowners.

Herein, policies will need to address behavioural responses in the farming communities, particularly but not limited to, overutilisation of water, as a shift towards high efficiency systems take place. Also, there is a need for more in-depth research on the current high efficiency systems with regard to water use, social acceptability and technical concerns.

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