

Water conservation in agriculture

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For the growth of any country, agriculture and industrial development are of utmost importance. Country like Pakistan where 70% of the population is directly or indirectly attached with agriculture, its importance is even more.

The agriculture sector produces major part of our GDP from crops like cotton, sugarcane, rice, and wheat and from export of fruits. The yield of major crops especially sugarcane has remarkably reduced in last two years. Apart from other factors, major problem is unavailability of water. Pakistan has one of the best irrigation system in the world called Indus system. It has an area of 13.10 million miles.

In Pakistan it is irrigating only 2.1 million square miles i.e. 70% of available water for irrigation comes from this system and remaining 30% comes from other recourses. The water level in the rivers varies from time to time. Rainfall plays an important role in the level and flow of rivers. In summer water flow is 100 times greater than winter due to monsoon. The available average water in rivers is 105 MAF. In summer the flow is 141.26 MAF, which is sufficient for the Rabi crops. Whereas in winter it reduces to 26 MAF, which creates a major gradient in winter for Kharif crops. Situation becomes even worst when there is lack of rainfall, as observed in the last three years.

Total storage capacity of Mangla, Terbela and Chashma dams were 15.7 MAF, which is now reduced due to accumulation of billions of tons of silt coming with water. This water shortage problem would have been resolved if dams were constructed of 100 MAF to save 45% of water going into sea, wasted. A dam cannot be constructed overnight it takes 4 to 6 years. And situation here is if we provide water to sugar cane then wheat suffers and if we provide water to wheat then other crops suffer. So we have to find ways and means for efficient use of water for crops. No doubt water conservation is a global issue these days. Different technologies are adopted all over the world for this purpose.

Some of these are drip irrigation, sprinkle irrigation and chemical technology. There is no need to go into details of drip and sprinkle irrigation, as all of us are well aware of these techniques. Their feasibility is limited to tube well irrigation. As 70% of irrigation in Pakistan is canal based, we need filter pumps to clean water and then make it flow with pressure in tubes and sprinkles, which involve heavy investment. The third option is use of (chemicals) water retainers in fields. In early 80's experiments were made on different acryl amides (which retain water) to use it for agriculture purpose and to cultivate deserts.

These types of chemicals have a special character that can retain water for days by making strong bonds with water. Experiments go on and ultimately potassium based acrylic amides were produced. They have the quality of retaining water for longer periods even at high temperatures. Lets see, use and application of this technology in the present scenario of water shortage in Pakistan.

Potassium acryl amides are special types of synthetic granules, which hydrates into transparent gel upon contact with water. One gram of such chemicals can retain on the average 300-400 ml water, for 10-15 days and hence acts as a small reservoir for plants. Their application in the fields is also simple. If first water is readily available then chemical is mixed with fertiliser and placed in furrows with seeds and if first water is not available within week then the chemical is used in hydrated form (gel). When we irrigate the field, crop takes its water share and remaining water is wasted due to seepage and evaporation depending upon the porosity of soil and temperature. These chemicals store water, which is wasted due to seepage and vaporation. Plants first takes water from soil and then its roots apply pressure on the hydrated chemical and squeezes out retained water.

In Pakistan, it is normal practice that sugar cane farmers give three lacks liter of water per acre to sugar cane crop. But sugarcane on the average utilizes only one lack liter, so two lacks liter of water is wasted. By using these chemicals, farmers can reduce their water requirement up to 1.4 lacks and double the irrigation time. So 50% water can be saved, by this conservation technique. Sugarcane area and yield both had decreased in year 1999 and 2000 due to water shortage. By using these conservation techniques we can overcome this problem. Kuwait and UAE have used this chemical technology and converted their deserts into green yards. Some companies in Pakistan have also successfully conducted experiments in different districts by using this technology. Need is not only to encourage and appreciate their work but also to take advantage of their expertise to overcome this water shortage problem. Sugarcane farmers have used these water retainers effectively in Bahwalpur, Khanpur, Okara, Rahim Yar Khan, Faisalabad and NARC Islamabad.