Reducing the dependency on monsoon: practising water efficient agriculture through cost-effective technologies

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Water and agriculture are closely linked. India, a primarily agrarian country has 60 per cent of its net sown area under rain-fed conditions. The National Rainfed Area Authority has estimated that 77 per cent of pulses, 66 per cent of oilseeds and 45 per cent of cereals are grown under rainfed conditions. Indian agriculture is thus undoubtedly dependent on the amount of monsoon rains. The south-west monsoon (June-September) brings about 80 per cent of rains in the country. Good monsoons have meant enhanced agricultural production and correspondingly a weak or bad monsoon has lowered production impacting the economy. Monsoon therefore is often regarded as the driver of Indian agriculture. Table below indicates the trends in SW monsoon and production of two major food grains –rice and wheat across the past decade.

Year	Status of Monsoon	Production of Rice (MT)	Production of Wheat (MT)
2002-03	***Below Normal Monsoon - Drought Year***	***71.82***	***65.76***
2003-04	Normal Monsoon	88.28	72.11
2004-05	***Below Normal Monsoon - Drought Year***	***83.13***	***68.64***
2005-06	Normal Monsoon	91.79	69.35
2006-07	Normal Monsoon	92.76	74.89
2007-08	Normal Monsoon	96.69	78.57
2008-09	Normal Monsoon	99.18	80.68
2009-10	***Below Normal Monsoon - Drought Year***	***89.09***	***80.80***
2010-1	Normal Monsoon	95.98	86.87

1 2011-12	Normal Monsoon	105.30	94.88

Source: DAC data book and IMD Reports

Data above clearly indicates the decrease in the production of rice in wheat during the years of drought - 2002, 2004 and 2009 in our country. In the three years of the drought, one can see significant decrease in production as compared to preceding/ subsequent years where the rainfall has been normal. The decline in production was maximum in 2009 which is considered as one of the worst dry year in the past 37 years. Therefore, there exists a direct correlation with the nature of monsoon and agricultural production.

Rains in India are uncertain and are unevenly distributed in time and space. Figure 1 indicates the average annual rainfall across all the districts of the country. The amount of rainfall varies from less than 500 mm in districts of western Rajasthan to more than 1,500 mm in the north east. Figure 2 indicates the major rainfed districts and their main crops. The rainfed rice production system is mostly prevalent in eastern and north eastern parts of India whereas the coarse cereals are mainly confined to western and central parts of the country.

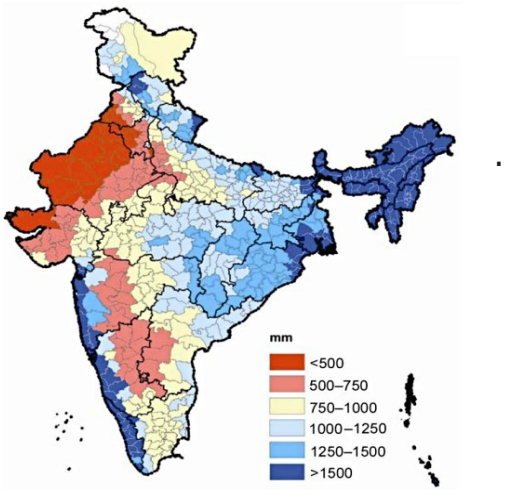

Figure 1: District wise average annual rainfall
Source: Current Science

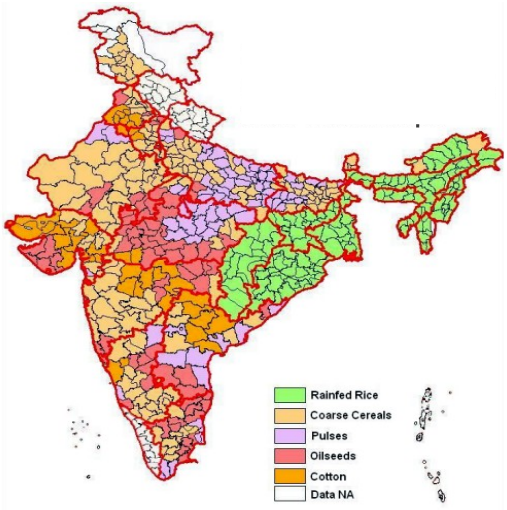

Figure 2: Rainfed districts and their main crops
Source: NRAA, 2012

The India Meteorological Department (IMD) has predicted below normal rainfall during the upcoming monsoon season, with a rainfall of 95 per cent of the long period average [LPA]. The prediction comes with a margin of a plus or minus five per cent error. According to IMD, their models indicated that there was a 33 per cent possibility of the rainfall being between 90 and 96 per cent of LPA and 35 per cent that it will be between 96 and 104 per cent of the LPA during the four month season from June to September. Monsoon rain in the range of 96-100 per

cent of the long-period average is considered normal. Similar predictions have been done by organisations across the world. A forum of meteorologists under the aegis of the World Meteorological Organisation had also predicted a weak monsoon over most parts of the country this year. Skymet, a leading private meteorological agency predicted that rainfall during the four months of monsoon in India is expected to be 94 per cent of LPA.

The warning of a weak monsoon has had the administration take cognisance and take measures to gear up with the scenario. It is learnt that the Hyderabad based Central Research Institute for Dryland Agriculture, under the Indian Council of Agricultural Research (ICAR), has prepared a plan for more than 500 districts across the country which the Centre is sharing with all the state governments. The situation is more important this year because the impact of the poor monsoon will coincide with the formation of the new government in New Delhi and the incumbent government will face mammoth task of addressing the challenge. This comes with the background of rising prices which has been a major electoral issue in the on-going parliamentary elections.

The present scenario calls for making agriculture in India drought resistant. There is also a need to employ methods to increase water use efficiency in agriculture to realise the objective of more crop per drop. Centers for International Projects Trust (CIPT), the India entity of the Columbia Water Centre, affiliated with the Earth Institute, USA has undertaken various low cost innovations which have reduced the usage of water for the production of cereals – rice and wheat.

In Punjab, CIPT in association with Punjab Agricultural University have demonstrated significant amount of water savings through the use of low cost tensiometer. While working with 8,000 farmers in Central Punjab, significant water savings to the tune of 12-15 per cent have been achieved. There is add on benefit in terms of the reduction in energy usage for groundwater extraction. CIPT plans to introduce low cost soil moisture sensors which will provide accurate estimation of soil moisture for farmers to irrigate their fields and will be more convenient to use.

In Gujarat, CIPT has been pilot testing the use of GW-11 variety of wheat with farmers in Mehsana district of North Gujarat. GW-11 is a drought resistant variety with yields comparable to the traditional variety of wheat. CIPT is in the process of undertaking yield measurements of GW-11 crop harvested this year and analyse the production with number of irrigations done. Initial findings indicate lesser irrigations in GW-11 variety of wheat by the farmers in the study area.

It is time for low cost innovations like these which not only reduce water usage in agriculture but also make farmers less vulnerable to changes in climate, in particular the monsoon. The success likes in designing simple solutions which have the potential for wider adoption.

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