

The bane of Indian agriculture

Can it win the gamble against monsoons?



Analysts describe India's agriculture as a gamble with the monsoons. About 60 per cent of India's farms depend on rains, so the monsoons are indeed critical to India's agriculture, which accounts for a sixth of the country's economic output.

However, this perennial gamble can be turned in favour of the farmers. Science-based strategies being developed by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and its partners could greatly help vulnerable farming communities cope with drought, global warming and other associated effects of climate change.

Climate change is real and its implications are going to be borne by all, most especially the poorest of the poor. The impact of climate change on rainfall pattern is not going to be a temporary phenomenon. This is only the beginning and delayed monsoons, unexpected rains and heavy downpours are likely to be the rule rather than the exception.

We are also experiencing related impacts in terms of warmer temperatures for longer periods and long dry spells during the cropping season. *The Hindu* cites a World Bank report on the possibility of declining yields of major dryland crops in Andhra Pradesh together with the dropping of rice production in Orissa's flood-prone coastal regions by 12 per cent because of climate change.

It is therefore important to immediately implement a long-term strategy to cope with climate change and its adverse effects such as global warming, and more frequent drought and floods.

There is a direct link between water availability and poverty in the drylands. Studies conducted by ICRISAT in dryland villages of India since 1975 provide empirical evidence on the vulnerability of the poor to various risks and shocks and their inability to access physical, financial and social resources.

Unholy nexus

The unholy nexus of poverty, drought and land degradation in the dry lands can be broken by adopting a four-pronged science-based strategy developed by ICRISAT and its partners for drought mitigation.

First is growing drought tolerant and climate change ready crops to match the available length of the growing season and low soil moisture. ICRISAT and its partners from the Indian Council for Agricultural Research (ICAR) and State universities have developed and released several varieties of sorghum, pearl millet, chickpea, pigeon pea and groundnut, all of which are more drought tolerant than currently grown varieties. ICRISAT's gene bank with almost 120,000 accessions collected from 144 countries is the world's biggest repository for the genetic traits required to develop drought tolerant crops. The Government of India has supported ICRISAT in developing an advanced biotechnology laboratory to enhance breeding on drought tolerance in its mandate crops.

Second is contingent action to replace affected crops with those that are more drought tolerant. Farmers should grow other crops that mature earlier to escape drought. Short duration crops thrive and yield well even with scarce water as they mature before soil moisture gets depleted. For instance, in sorghum growing areas, farmers can plant pearl millet instead. Likewise, an action plan for producing seeds of dryland and other alternate crops should be put in place.

Third is the efficient management of natural resources, arresting land degradation, conserving soil moisture and harvesting water in the rainy season for supplemental irrigation. Towards this, ICRISAT recommends the adoption of integrated genetic and natural resource management, which aims at growing improved crops on soils conserved through natural resource management pursued through community participation.

Fourth is empowering stakeholders through capacity building, enabling rural institutions and formulating policies supportive of dry land agriculture. Capacity building builds social capital through knowledge sharing and strategic partnerships. Likewise, suitable institutional mechanisms for credit, market linkages, rural

infrastructure and other support services need to be ensured. The effectiveness of drought mitigation strategies depend on institutional arrangements available to provide regulation as well as technical and financial assistance.

Lessening risks



ICRISAT also recommends growing an array of crops together with livestock along with other income-generating activities that can lessen the risks of total crop failure and enhance farm income.

This foregoing science-based strategy has been showcased by ICRISAT and partners through a participatory development model with community watershed management as the entry point and improved livelihoods as the goal. The pilot model was developed at Kothapally, Andhra Pradesh. This model is being scaled out in 240 micro-watersheds in India and other Asian countries benefiting 250,000 people. A recent comprehensive assessment found out that watershed programmes can become growth engines of sustainable development in dry land areas.

Indian soils are both hungry and thirsty resulting in low crop productivity. The ICRISAT-led consortium observed that vast rain fed areas in Rajasthan, Madhya Pradesh, Andhra Pradesh and Tamil Nadu are critically deficient in micro and secondary nutrients such as zinc, boron and sulphur along with nitrogen and phosphorus. Hence, soil health must be improved urgently. Amendments with deficient micronutrients showed 30 to 70 per cent increased crop yields and balanced fertilizer application doubled crop productivity.

With climate change, water scarcity is likely to be exacerbated and countries need to efficiently manage available water resources. Along with the following, policies and programmes supportive of dry land agriculture need to be immediately formulated and implemented. Among these are:

- Increasing significantly public investments in dry land agriculture, including higher funding for agricultural research and rural infrastructure.
- Developing sophisticated techniques of predicting and forecasting the monsoons in the context of climate change.
- Enabling collective action and rural institutions for agriculture and natural resource management.
- Upscaling and outscaling the community watershed management model.
- Rehabilitating degraded lands and diversifying livelihood systems for landless and vulnerable groups.
- Recharging depleted groundwater aquifers and enforcing strong regulations on groundwater extraction.
- Pricing water and power to actually reflect their opportunity costs.
- Initiating government support for water saving options (e.g., drip irrigation and dryland crops). Specifying and enforcing clearly defined water rights in watershed communities. Including dryland crops in the minimum support price scheme.

The dry lands have been bypassed by the Green Revolution, but significant investments in improved water management and technological innovations including rural infrastructure, along with appropriate policy and institutional innovations, can have a significant impact in increasing agricultural productivity.

India should start investing for the long-term sustainability of the farming sector particularly in dryland agriculture. By doing this, India will enable its farmers to win the gamble with the monsoons for good (The Hindu, 5 July 2009)