

From lab to land

We need new public-private partnership models to address Indian agriculture's weakest link — extension.

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Recently, I was in Gulbarga and Bidar, two dry districts of northeast Karnataka with annual rainfall of 750-850 mm that grow a lot of pulses: toor (pigeon pea), chana (chickpea), urad (black gram) and moong (green gram).

Pulses are often called “orphan crops”, being cultivated largely in marginal areas prone to moisture stress. The moment farmers have access to irrigation, they tend to shift from chana to wheat, or from toor to paddy. Even in Bidar’s 15 per cent or so area irrigated by wells/pump-sets or water from the Karanja dam project, the main crop is sugarcane.

Yet, pulses are important as a valuable source of protein for large sections of our population, whose diets are vegetarian and cereal-based. Also, India annually imports 3.5-4 million tonnes of pulses worth about \$2 billion; these will only rise unless domestic production keeps up.

Promoting pulses cultivation is, moreover, useful for soil rejuvenation. Being leguminous plants whose root nodules harbour bacteria that naturally “fix” atmospheric nitrogen, pulses

can save roughly one bag of urea per hectare for the succeeding crop. Their deep and extensive root systems help keep the soil porous and well aerated, while preventing formation of hard pans.

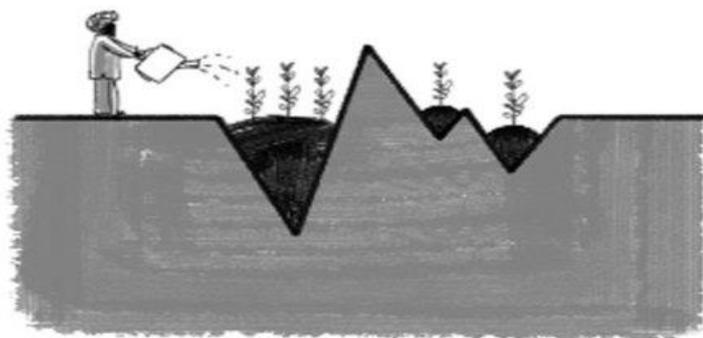
So why aren't we able to increase output? Are there ways to do it? I got some answers during my interactions with farmers, scientists and agricultural extension professionals in Gulbarga and Bidar.

One myth that needs busting is that the national agricultural research system has ignored pulses, further reinforcing their "orphan" status. The truth is, pulses are highly susceptible to diseases and pests, which are major yield-limiting factors. Our scientists, if anything, deserve credit for breeding improved varieties resistant to both disease and drought.

In Gulbarga, I met many farmers who harvested 18-20 quintals per hectare from TS-3R, a fusarium wilt fungus-resistant toor, developed by the University of Agricultural Sciences, Raichur. The local nondescript varieties, by comparison, yielded 7-8 quintals, that too under relatively disease-free conditions sans extended dry spells.

The same university's Agricultural Research Station (ARS) at Gulbarga has now come out with a new variety, GRG-811. It is resistant to fusarium wilt as well as sterility mosaic disease, caused by a virus that prevents the plants from producing flowers. Both TS-3R and GRG-811 mature within 160 days — as against 180 days or more for traditional toor cultivars — also making them less vulnerable to moisture deficiency during the crucial terminal pod-filling stage.

The problem in pulses is not really about breeding or research, but of taking the fruits of these to the end-user — the farmer. It is a failure more of "extension" than "research" — which is why what I saw in Gulbarga and Bidar makes for an encouraging story for Indian agriculture in general.



Till a decade ago, farmers in this region hardly grew any improved toor varieties — including Maruti and BSMR-736, officially “released” for cultivation in 1986 and 1996 respectively. “Even if we planted them, we did it our way because nobody told us how much seed or nutrients to apply,” as Basavaraj Pavadshetty, a 15-acre farmer from Tadkal village in Gulbarga’s Aland taluka, put it.

But today, 50 per cent of Gulbarga’s toor area is under TS-3R that was released only in 2009. BSMR-736’s coverage in Bidar has, likewise, gone up substantially in the last five to six years. The impetus has come mainly from non-governmental agencies like the Indian Society of Agribusiness Professionals (ISAP) , which have worked on the ground to induce farmers to adopt the high-yielding varieties.

The ISAP, in 2009, procured 140 quintals of seeds of TS-3R and BSMR-736 from the ARS Gulbarga. It distributed these among some 3,000 carefully chosen farmers — 1,500 in Gulbarga, 1,000 in Bidar and 500 in Raichur — for planting at the rate of four kilogrammes per acre. The lead farmers, who also provided the land for demonstration trials showcasing cropping practices based on the university’s recommendations, harvested 7-8 quintals of grain each. They, then, saved 40 kg of this as seed for sowing by 10 others in the following kharif season. In the process, a “ripple effect” through seed production and demos on farmers’ own fields was created.

Besides, there was exposure to new cultivation practices — from soil testing (for determining which fertiliser or micro-nutrients to apply and how much), sowing methods (dibbling or transplanting, as opposed to simple scattering or putting seeds behind the plough) and optimal spacing (both row-to-row and plant-to-plant), to drip irrigation and water recycling.

In Bidar, I saw farmers raising soya bean and long-duration BSMR-736 toor in alternate rows, while obtaining 19-20 quintals per hectare each from both crops. The two were planted simultaneously in the second week of June, with the soya bean harvested by mid-October and the toor in early-January. They even inter-cropped toor with 60-70 days moong or 80-90 days urad varieties. Again, it was extension and the right “package of practices” that mattered.

The ISAP’s intervention further extended to the promotion of mechanisation, value addition and market linkages via farmer producer organisations (FPOs). This has particular significance for pulses, where the growers are predominantly resource-poor.

The Jai Kisan Souharda Multipurpose Cooperative in Bidar’s Bhalki taluka has 1,000 farmer-members, of whom only six own tractors. But their FPO has five tractors and matching implements — rotavator, mouldboard plough, subsoiler, seed-cum-fertiliser drill, rotary

mulcher and multi-crop thresher. Thus, individual growers who cannot afford these machines — entailing a total investment of Rs 50 lakh, subsidised up to 75 per cent by the state government — are now able to custom-hire them from the FPO.

The Jai Kisan FPO even has its own mini dal mill with a capacity to process 40 quintals of raw grain per day. Raw toor currently fetches about Rs 5,000 per quintal, as against Rs 7,500 for milled dal. At 70 per cent dal recovery, price realisation of Rs 75 per kg on dal and Rs 30 per kg on by-products (husk, broken, etc), and Rs 300 processing cost, the net return from selling milled toor comes to Rs 5,850 per quintal. Farmers, in other words, are deriving an extra Rs 850 per quintal through value addition.

Last year, the FPO also bought 3,515 quintals of chana from its members. This chana was delivered to the NCDEX's spot exchange platform at the government's minimum support price of Rs 3,100 per quintal, when the ruling market rate was Rs 2,500-2,600.

We need more such extension models focusing on end-to-end interventions, rather than one-time frontline demonstration trials. This can happen through the public farm research system partnering with non-government players, for whom such lab-to-land transfer of knowledge may actually make business sense.

The ISAP's work has been supported by Morocco's Office Chérifien des Phosphates Group (OCP), the world's largest phosphatic fertilisers maker. Since phosphorous is the most vital plant nutrient in pulses, it suits the OCP's interests to fund extension activity among toor and chana farmers.

Surely, there will be many more — be it Mahindra, Rallis India, ITC or Cargill — who may see value in taking the work of public-sector breeders to farmers. The latter are, after all, the buyers of their tractors and crop-protection products, if not suppliers of raw commodities.

Shared prosperity is ultimately in everybody's interest.

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