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● CHLOROPHILE

Back to basics with ZBNF

A zero-budget natural farming campaign shouldn't be debt-driven or a leap of faith, like Andhra Pradesh's

MEGA BUCKS WERE chasing Andhra Pradesh's drive to convert all its 60 lakh farmers to a form of regenerative agriculture that strikes at the root of the country's agricultural research, education and extension system. N Chandrababu Naidu—who, in his earlier stint as chief minister, was a champion of information technology—wanted to take the rice bowl's farmers back to the pre-synthetic urea age. The state was prepared to contract debt supposedly to make its farmers debt-free with Zero-Budget Natural Farming (ZBNF). Will the current chief minister YS Jaganmohan Reddy complete what Naidu began?

Andhra's initiative was perhaps in finance minister Nirmala Sitharaman's mind when she announced a "back to basics" move to "Zero-Budget Farming." We need to "replicate this innovative model through which in a few states farmers are being trained in the practice," she had said during her recent Union Budget speech. But why did she not back it with money? The programmes that ZBNF can draw from—Rashtriya Krishi Vikas Yojana (RKVY) and Paramparagat Krishi Vikas Yojana (PKVK)—have had a modest ₹200 crore increase in outlay to ₹4,050 crore.

According to the Rythu Sadhikara

Samstha (RySS), Andhra's official agency that is driving ZBNF, it will cost ₹16,452 crore for the state's 60 lakh farmers to make the switch by 2023-24. The cost of covering each farming household is ₹25,550, of which ₹1,000 is for one-time subsidy on inputs. The rest is for skill development, institution building, marketing support and management oversight. Apart from drawing on RKVY and PKVK allocations, Andhra was preparing to borrow from private and multilateral agencies. This was to be facilitated by the Sustainable India Finance Facility (SIFF) put together by the United Nations Environment Programme (UNEP), World Agroforestry Centre and BNP Paribas, the French bank.

There was much celebratory talk in the presence of Naidu at an event in Vijayawada in June last year. The Food and Agriculture Organization (FAO) representative said upscaling would need "visionary leadership" and "funding agencies." The FAO would be in the middle, providing knowledge. France, he said, had passed a law for "much more" natural farming. An offer of French experts and expertise was also made. BNP Paribas's global management committee member said that Andhra would be the first state of its size to have "purely natural agriculture." The bank was invested in achieving sustainable development goals (SDG); it

had projects worth \$175 billion. With the "incredible products" and "all those evidences" that ZBNF works in Andhra, "we have the argument to convince" investors like pension funds, he said.

But do India and Andhra Pradesh need to go back to basics and transit beyond France's "much more" natural farming to "purely natural" farming? Is the Green Revolution broken? Foodgrain production has been rising year after year, except when weather is very unfavourable. The net availability of foodgrains per person has increased from 395 gm per day in 1951 to 494 gm per day, despite the population increasing by 3.5 times during this period. This has been made possible by the extension of irrigation and the use of high-yielding varieties that are responsive to the application of fertilisers.

Andhra Pradesh's progressive farmers have been quick to adopt new technologies and improved practices. Although foodgrain production has declined from an average of 18.6 million tonnes to 15 million tonnes over the past 10 years, its farmers are moving in sync with changing Indian diets towards value-added fisheries, horticulture and livestock rearing. These have a greater share in its agri-GDP than field crops.

Padma Shri awardee Subhash Palekar's ZBNF is based on the stimulation of microbial activity in the soil. This is supposedly achieved by applying a bacterial culture made by fermenting cow dung and urine with additives like *besan* and jaggery. Mulching—spreading straw or crop residues on the soil surface—is meant to conserve moisture and suppress the growth of weeds. Aeration of the root zone area is insisted upon.

These are good agricultural practices. Even Green Revolution farmers are advised to add farmyard manure or vermicompost to enhance soil texture and microbial activity. Under Conservation Agriculture, ploughing is barred. Sowing is to be done with seed drills in fields where the previous crop's stubble is left to decompose naturally. ZBNF is called "zero-budget" because the income from subsidiary crops planted with the main crop compensates for cash inputs. This is not unique to ZBNF; it is advised for garden crops like coconut. Even aeration or *waaphasa* happens when drip irrigation is practised.

Palekar draws glances from the agricultural research establishment when he says that "the output of the Green Revolution is only destruction: of the soil, water, environment and human health." He blames it for cancer, diabetes, and even AIDS. For him, it is a conspiracy to

create dependency among farmers for fertilisers, pesticides and hybrid seeds.

Palekar's science is questionable. According to him, only the dung of Indian cows is effective as a soil inoculant. That of the black-coloured Kapila cow is the best. For fermentation, the dung should be fresh and cow urine as old as possible. Palekar says the dung of one Indian cow can fertilise 30 acres. (Palekar estimates it at 11 kg per day, but how can it be uniform?) Peter Carberry, the director general of ICRIASAT, the Hyderabad-based international agricultural research institute, said this was "clearly inadequate." He made the observation in his lecture to the National Academy of Agricultural Sciences in New Delhi. Carberry said the recommendation of a practice must be based on prior evidence gathered as per scientific protocols.

Carberry was dismayed by NITI Aayog vice-chairman Rajiv Kumar's effusive endorsement of ZBNF in a two-part article in a financial daily in April. He said it was an innovation that could be readily exported (how, if the dung of indigenous cows is required?) without awaiting certification from 'respected foreign institutions.' (His quotes.)

This writer visited Palekar's village, Bellur, in Amravati district and found none of the farmers practising ZBNF. The caretaker of his farm did not know the recipe of *jiwamrita*, the soil inoculant, or *beejamrita*, the anti-fungal coating for seeds. He said he had applied the dung of six cows and six bulls (10 tractor-trolley loads) to the 11-acre farm, when according to Palekar one cow is enough to fertilise 30 acres.

Palekar said there was no need to apply *jiwamrita* after three years by when the field's microbial level would have reached saturation point. Does anyone fertilise a forest, he asked. The objective was to make the farm as regenerative as the forest. When Vijay Kumar Thallam, the co-vice-chairman of the RySS, was told about Carberry's remarks, he said every acre of land had 78,000 tonnes of nitrogen. He was referring to nitrogen in the air, which soil microbes would make available to plants through ZBNF. Were we not feeding ourselves before urea (that is, the process for manufacturing it was invented in 1908), he asked. (Diseases and food inadequacy kept populations in check, actually.)

This writer has met or spoken to four farmers who say ZBNF works for them. Two of them were growing garden crops like coconut, areca, banana and betel leaves. C Sanjeeva Reddy, 66, of Ashok Nagar, Anantapur, said his Sona Masuri rice yields from 33 acres of own and leased fields were slightly less than chemically-grown rice, but he got three times the price. He has his own brand: Prakriti Vyasaayam.

But MVS Nagi Reddy of Vijayawada, who also practised ZBNF for 10 years, had a different story. His rice yields under ZBNF were 20% below the average and he was not able to convince farmers in his village or the block. An MSC in genetics and plant breeding from the University of Allahabad, Reddy has now restricted ZBNF to half an acre of paddy for own consumption. "I need profits for my family," says the farmer who was an advertisement for ZBNF. Now he rears fish on 80% of his family's 100-acre farm. On the rest, he grows rice and pulses the conventional way.

"The success of the Green Revolution has enabled us to criticise the Green Revolution," says agricultural economist and NITI Aayog member Ramesh Chand. The problem with chemical agriculture is injudicious use. He says India will not be able to afford chemical-free agriculture. But it can use less chemicals.

The back-to-basics leap must await the results of ZBNF trials being conducted at four locations under the aegis of the Indian Council of Agricultural Research and an investigation by a committee appointed by the NITI Aayog.

The back-to-basics leap must await the results of ZBNF trials being conducted under the aegis of ICAR and an investigation by a committee appointed by the NITI Aayog

Ending water crisis in India

PP SANGAL

The author is a former ISS and UN consultant



Unlike oil, water has no substitute

IN HIS MANN KI BAAT 2.0, PM Narendra Modi—the first after his re-election—pitched for water conservation to be made into a mass movement in India, amid reports of depleting water resources due to several reasons. In India, agriculture consumes nearly 80% (65% in China) of fresh water and the rest 20% is used for drinking and other household activities. Thus, and rightly so, the government launched the Jal Shakti Abhiyan (JSA) on July 1.

The objective of JSA is to take measures for rainwater harvesting, water conservation and replenishing water bodies for meeting acute shortage of water. Today, India conserves only 8% of the rainfall it receives, which is among the lowest in the world, and we need to change this. Further, only 4% of world's water resources are available to us, and we have to provide for 16% of world's population. Thus, our huge water shortage is sure to land us in a critical situation, if urgent steps are not taken. We are already seeing water shortage in Tamil Nadu, Rajasthan, Uttar Pradesh, Telangana and Haryana. NITI Aayog's report of 2018 asserts that that groundwater in 21 cities of India is set to plunge to bare minimum levels by 2020. Is it not alarming?

Although water crisis is now a worldwide phenomenon (two-thirds of the global population is living under water-stressed conditions and, by 2025, about 1.8 billion people are expected to face absolute water scarcity), but it is much worse in India due to mismanagement of water usage in agricultural operations. The latest available World Bank statistics show that while India produced \$0.5 of agricultural GDP (in 2010) for a litre of fresh water, this figure is \$1.6 for China (in 2012) and \$3.9 for Israel (in 2004)—a success story in efficient use of water for agriculture. In fact, there has been no increase in agricultural output per unit of water usage in our country during the last three decades. In view of this grim scenario, the following measures are suggested:

- Recycle sewage and other household waste water by setting up water-treatment plants, using innovative technologies, and reuse the extracted water for irrigation. Singapore, Windhoek (capital of Namibia) and Israel are great examples of treating such water for reuse and even for drinking.

- Increase awareness among the masses about scarcity of water and the dire need of conserving it by organising programmes/public meetings on efficient use of water.

- Impose suitable penalties for wasting and polluting water, and also limit per capita use of water and impose fines for exceeding the limit. Perhaps there would be no need for doing so once people are made aware of the problem.

- Traditional water conservation/harvesting methods like constructing farm ponds, check dams, gully plugging, dug wells, borewells and artificial glaciers in Ladakh; Tamaswada Pattern *nallahs* treatment in Maharashtra; soak pits in Punjab; and watershed development and management in Maharashtra and Madhya Pradesh—which have become defunct in some parts—must be revived.

- Agricultural universities should take a lead in advising farmers on suitable cropping patterns, taking into account soil and other climatic conditions of a region, to save water.

- Promote use of drip irrigation and sprinklers.
- In urban areas, there is water theft and also loss of clean water due to slackness on the part of water management bodies. This is due to inferior water service infrastructure and its poor maintenance. This needs to be corrected by adopting strict procedures for compliance and monitoring.

- Though it may be an unpopular measure in the existing political environment, the practice of providing free or subsidised water and power to farmers must be stopped. This would not matter much for big farmers as they are not liable to pay income tax as others do. Of course, small and marginal farmers may need to be compensated for this loss by increasing the MSP for their produce. Here it must be mentioned that free power to farmers not only leads to excessive withdrawal of groundwater, but also increases soil salinity, which jeopardises farm sustainability.

- It is learnt that, while launching JSA, the government announced reorientation of MGNREGA towards water conservation and harvesting by reserving 75% (instead of 67% in 2018-19) of 2.58 billion person-days expected to be generated during 2019-20. To walk the talk, it would be necessary to provide adequate funds to complete all pending water storage projects in states.

To sum up, although water crisis in urban areas normally attracts governments' attention, it is the inefficient agricultural sector that is largely contributing to this situation in India. We hope the Centre and states will pay heed to these steps, else JSA would not be able to achieve its objective.

Remember, unlike oil, water has no substitute.

EDUCATION LOANS

OBVIOUSLY HAVE ALWAYS BEEN at the helm of political and economic debates, and the recent controversy around the government trying to pull down the NSSO report on jobs earlier this year had brought this topic to the limelight again. The recently published Periodic Labour Force Survey (PLFS), released after the new government was sworn in, not only talks about unemployment levels, but also emphasises on education levels in its sample design.

Theoretically, for a large number of youth, education should have a significant bearing on one's employment prospects. According to the All India Survey on Higher Education (AISHE) 2017-18, 36.6 million students enrolled for higher education, up from 34.2 million three years ago. More than 75% of institutions of higher education in India are private. As a result, the cost of education has been ever increasing without much of a check. Inflation in the education category has averaged about 7% since 2012, with school and college fees continuing to take a substantial share of households' income. Exorbitant fees and donations in medical and engineering colleges are not unheard of. Even premier public institutes like the IIMs and IITs have seen a manifold increase in their fees over the last decade.

With this rising fee burden, most candidates have to depend on education loans

Financing to yield the dividend

If education ensures good jobs to students, banks will be more willing to lend money to them

ANUJ AGARWAL & RAUNAK SALUJA

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to education loans disbursed. Outstanding education loans distributed by scheduled commercial banks stood at ₹675.5 billion at the end of fiscal 2019. These loans are designed to offer students a flexible repayment plan once they start earning (with a moratorium period), a discounted interest rate over other personal loan items, and a tax benefit on interest repayment. It may be argued that these loans allow a sense of opportunity for students to get good education. With a huge chunk of young population, increased awareness, rising aspirations of the youth and new job opportunities, one would expect the disbursement of education loans to increase.

However, according to CRIF High Mark, a credit bureau, education loan disbursements have reduced by 25% in the last four years. High NPA levels and high default rates in education loans are leading to this decline. Banks are reluctant to lend to students who are economically-disadvantaged and whose families are unable to put up a collateral, or those who, in their opinion, might not end up getting a job. Also, the ticket size of loans is increasing. This rise in ticket size can be attributed to higher education becoming costlier. With increasing fees at premier Indian institutions and increased number of students opting for higher studies outside India, the



volumes in the ₹20-lakh-plus segment have grown by six times over the last five years. Banks are willing to fund big-ticket loans and avoid loans up to ₹4 lakh, which fall under priority lending and need no collateral. As reported by many bankers, these small ticket and priority sector loans record the highest number of defaults and NPAs. Public sector banks have excessive bureaucracy, documentation and formalities before they give lower-ticket loans without collateral. Most private banks have tie-ups with educational institutions and lend only to their students.

From a bank's perspective, this makes complete business sense. But it doesn't

really bode well for the society and economy at large. With rising costs of education, the inability to access finance deprives students the opportunity to undertake higher studies. This adversely impacts the ability of the candidate to secure quality education, and, in turn, perhaps a steady stream of adequate income flow in the future. While banks are willing to fund higher-ticket loans for students going to premier institutes or students abroad, this leaves a major chunk of students at a disadvantage—leading to increase in inequality in terms of opportunity to get good education, as well as to earn good living in the future. Many NBFCs have come forth to hand out education loans, but usually they need to be backed by a collateral, which makes availing them a bit difficult for students. This might even put families of students in a tight spot who would have to pledge their family assets as a collateral to secure loans.

While willingness to pay back the loan is a necessary condition, one of the prime reasons for defaults on education loans is the inability of students to payback loans. This could be due to the inability to secure a job, or even if one secures a job, the inability to secure an adequately-paying job. Salaries for students graduating haven't kept pace with increased cost of education. The employability of Indian students has been questioned in multiple reports and

commentaries. According to AISHE 2017-18, 36.4% of undergraduate students enrol for arts, humanities, social sciences, which, anyway, have not been able to command the necessary traction in our social as well as professional circles. Around 31% enrol for science, and engineering & technology. According to Aspiring Minds, the talent evaluation company, over 80% of the engineering graduates are unemployable for any job in the knowledge economy. Many industry veterans, too, have voiced their concerns over the skill and employability of Indian engineering graduates.

This leads us to a vicious circle—high cost of education, poor access to finance to fund higher education, poor employability, inadequately paying jobs, defaults on education loans, reluctance by banks to advance education loans. All this can be effectively dealt with by improving standards and quality of Indian education. The draft National Education Policy 2019 does well in identifying the major problems and challenges with higher education in India. If the education undertaken can ensure a well-paying job to students, banks would be more than willing to lend money to them without the fear of default. This will result in reduction in NPAs, and banks will be more willing to lend to a wide spectrum of students. Easy access to finance education will go a long way in making the most of our asset—the demographic dividend.