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ACFI NEWSLETTER

APRIL 2023

Fundamentals of pesticide use, from powders, emulsions to pastes, baits

Dr. Tapan Kumar Mallick

The successful use of pesticides to control pests, plant diseases, and weeds depends not only on their toxicity with respect to the harmful organisms, but also to a considerable extent on the form of the pesticide. The formulation determines how a pesticide is used. The following formulations are manufactured for the protection of plants:

Powders (dusts) for dusting, wettable powders forming a suspension with water; granulated formulations both for treating plants and for incorporation into the soil; solutions in water and organic solvents; emulsifiable concentrates forming emulsions when diluted with water, microencapsulated formulations, and pastes. Pesticides are also used in the form of aerosols and fumigants.

Also prepared are poisoned baits, various antiseptic and insecticide soaps, paints, and insecticide paper. Powders (dusts) are a mechanical mixture of an insecticide, a fungicide or herbicide, and a well comminuted filler or carrier. In dusting, from 10 to 30 kg of the dust are used per hectare, therefore its pesticide content must be adequate to ensure the proper action of the formulation. Talc, pyrophyllite, chalk, kaolin, tripoli (diatomite), silica gel and various clays are used as carriers to prepare dusts. Preference is given to talc and pyrophyllite because they have a stratified structure and therefore adhere better to plants. In all cases, the substances used as carriers must never change the chemical properties of the pesticide (for example, alkaline and acidic carriers may cause the hydrolysis of the esters of phosphorus and other substances, carriers of hydrophilic minerals such as clay and kaolin become caked in moist conditions). To diminish unproductive dusting and losses due to the drift of fine and very minute particles, from 3 to 5 per cent of a mineral oil is added to dusts.

Wettable powders are powdered formulations of pesticides that yield stable suspensions when diluted with water. The use of pesticides in the form of suspensions has substantial advantages in comparison with dusts: the unproductive losses of the toxicants are decreased because they adhere better to plants and are retained better on them in the form of suspensions. Wettable powders must meet the following requirements: they must be stable in storage and not cake; this is achieved first of all because wettable powders are highly dispersed and contain 80 per cent of particles with a diameter of 3 u.m. In addition to the active ingredient and carrier, wettable powders contain surfactants and adhesives (stickers). The carriers used include silica gel, synthetic calcium metasilicate, bentonite, and kaolin. The surfactants include alkali metal sulphonates, the alkylaryl esters of polyethylene glycol OP-7 and OP-10, and also auxiliary substances-sulphite-alcohol slops, sulphite liquor, starch, and casein. Wettable powders usually contain 30-80 per cent of the active ingredient, 15-60 per cent of the carrier, 1.5-2 per cent of sulphite-alcohol slops, and 1-2 per cent of OP-7. For instance, simazine is prepared in the form of a 50 per cent wettable powder.

Granulated formulations are incorporated into the soil for controlling soil-dwelling pests, for intoxicating plants through their root system, and also for controlling surface pests by aerial dispersion.

Granulated formulations are prepared by impregnating ready granules of the minerals perlite and vermiculite with a pesticide and by granulating powdered formulations. Binders-synthetic resins or other adhesive components-are introduced into the composition of the formulation in addition to the pesticide and the carrier. Usually, bentonite and kaolin are used for quickly acting formulations with a short period of toxicity, and tripoli for formulations with more prolonged action.

The average diameter of a granule is from 0.25 to 5 mm. Small granules (from 0.25 to 1.5 mm) are distributed more uniformly over the surface of the soil and plants. Large granules (from 3 to 5 mm) are distributed less uniformly, which is of no special significance for systemic insecticides, but they act for a longer period. Granules with a diameter of 0.25 to 0.6 mm are used for application onto plants, of 0.5 to 1.5 mm (contact, contact-fumigation) for scattering over the surface of the soil, and of 2-3 mm (contact-fumigation) or 3-5 mm (systemic) for incorporation into the soil.

Solutions of pesticides in water and in organic solvents. Pesticides with a good solubility in water are prepared and used as aqueous solutions. They include certain herbicides (salts of MCPA, 2,4-D, and MCPB, diquat, banlen, etc.), insecticides, and fungicides. Aqueous solutions of pesticides are not convenient for storage and transportation, require large storage capacities, evaporate, and freeze in cold weather. Aqueous solutions wet leaves poorly because water has a large surface tension, therefore, surfactants such as OP-7 and OP-10 have to be added to them. Varnishes, lacquers, and paints to which insecticides, fungicides, or antiseptics have been added may also be related to solutions.

Emulsifiable concentrates are a solution of a pesticide in oil comminuted into fine drops coated with a protective layer of a surfactant. When diluted with water, they form stable emulsions that do not stratify for a long time. The oil droplets with the pesticide dissolved in them are the dispersed phase in such an emulsion, and water is the dispersing medium. Emulsifiable concentrates are prepared with the use of homogenizers. Two kinds of emulsifiable concentrates are distinguished. Those of the first kind are obtained by dispersing in water a solution of a pesticide in a solvent not miscible with water. It would be more proper to call them concentrated emulsions characterized by a high degree of dispersion and stable in storage. Emulsifiable concentrates of the second kind consist of a pesticide, a solvent, and an emulsifier. Hydrocarbons, esters, kreoline, etc. are the solvents, and calium sulphonates, OP-7, OP-10, and various soaps are the emulsifiers. To prepare an emulsifiable concentrate, the pesticide is dissolved in the solvent and mixed with the emulsifiers under heating to 40-80 °C.

Recent years have seen the introduction of what has been called Inverted emulsions, in which the pesticide dissolved in water is the dispersed phase, and oil is the dispersing medium; the fine droplets of the aqueous pesticide solution are embedded, as it were, in the large oil drops. Inverted emulsions are used for small-scale spraying; they adhere better to plants and do not evaporate.

Auxiliary substances (ingredients) are intended for improving the physicochemical properties of working compositions of pesticides. Auxiliary substances improving the physical properties of working compositions of pesticides are called bonifiers. When preparing dusts with a very low content of the active ingredient (1.5-2%), carriers are widely used. They must readily lend themselves to grinding, not cake in storage, disperse well when applied, and not cause decomposition of the pesticide in storage and when applied. Talc, kaolin, and the ash from electrical precipitators are used as carriers for dusts; silica gel, bentonite, kaolin, and infusorial earth are used for wettable powders.

Talc mainly contains magnesium silicate with the general formula $H_2Mg_3(SiO_3)_4$. When talc is ground, microscopic crystalline fragments are formed. It is not hygroscopic, is poorly wetted by water, and disperses well with a low moisture content. Its density is 2.7 g/cm3, and its free bulk mass is 0.8 kg/dm3.

Kaolin mainly contains aqueous aluminium silicate $A12O3 X X 2SiO2-2H2O$. It consists of microscopic amorphous particles, is well wetted by water and disperses well. Its density is 2.1-2.6 g/cm3, and its free bulk density is 0.3-0.4 kg/dm3. Kaolin as a carrier forms lighter dusts that are less suitable for aerial application because they are carried away more by air currents; it is better to use them for dusting by surface machines.

Surfactants have a major significance for improving the physical properties of working solutions of pesticides. They facilitate better covering and retaining of the solution on plants with poorly wettable leaf surfaces because they lower the surface tension, the air layer between the droplets of the formulation and the surface of a leaf being eliminated. Surfactants increase the viscosity of a solution and reduce the evaporation of the drops. The result is a longer duration of contact with the surfaces of plants.

Concentrates of sulphite-alcohol slops are used as emulsifiers of emulsions and stabilizers of suspensions, and also as wetting agents it lid spreaders of working compositions because they have a high surface activity and lower the surface tension of aqueous solutions. Liquid and Solid Soaps. In their chemical composition, these are potassium or sodium salts of various fatty acids. Liquid soap in its appearance is an ointment-like mass or a thick liquid ranging in colour from light yellow to dark brown. In its chemical composition, it is a mixture of potassium salts of unsaturated acids-oleic ($C17H33COOH$), linolic ($C17H31COOH$), etc. Liquid potassium soap is produced for practical use in which the content of fatty acids must be at least 40 per cent and of free alkali 0.1%. Soaps dissolve in water and yield strongly foaming solutions having a low surface tension, therefore they wet the integuments of insects and the leaves of plants very well. Aqueous soap solutions have an alkaline reaction owing to their containing free alkalies and salts of the alkali metals. If water contains salts of calcium, magnesium, barium, copper, or iron, the soaps react with them to form insoluble salts of these metals that precipitate. This lowers the wettability of the solutions, while the salt coagulates may clog the apparatus. This is why hard water must never be used to prepare solutions of pesticides with soaps. Soaps have insecticidal properties and their use in the form of 3-4% solutions gives satisfactory results in controlling aphids and thrips. Soaps have no phytocidal action. Solid laundry soap consists of sodium salts of high-molecular fatty, naphthenic, and resin acids. Sodium silicate and clay are added to impart hardness to the soap. The content of fatty acids, including unsaponified fat, must be at least 38-42 per cent. of free caustic alkali reduced to NaOH-0.2, of calcined soda and silicate-not over 3 and of clay-10 per cent.

The author is associate professor & former head, department of botany, Ananda Mohan College

G20 delegates to discuss food security, sustainable farming

3-day meeting of Agriculture Working Group begins in Chandigarh today

TRIBUNE NEWS SERVICE

CHANDIGARH, MARCH 28

The three-day second Agricultural Deputies Meeting of the Agricultural Working Group (AWG), all set to begin from tomorrow, will see the participation of delegates from 19 member countries, 10 invited countries and 10 international organisations.

Addressing a press conference, Joint Secretary, Department of Agriculture and Farmers Welfare, Ritesh Chauhan, said: "The second meeting of the AWG is an important platform for countries to come together and discuss ways to ensure sustainable agriculture, food security and nutrition. We are honoured to host the event in Chandigarh and look forward to fruitful discussions."

Chauhan added: "The AMIS Rapid Response Forum, which will be held on the first day of the meeting, is an important initiative to address the food market situation and identify capacity building needs. We hope that this forum will provide a vision for the future progress of the initiative."

Ritesh Chauhan (R), Joint Secretary, Department of Agriculture and Farmers Welfare, addresses media in Chandigarh. TRIBUNE PHOTO

DELEGATES WILL BE TREATED TO MILLET FOOD

- Apart from discussions, delegates will also get to experience the rich cultural heritage of Chandigarh
- They will be treated to millet food festival at Rock Garden, taken for an excursion to Sukhna Lake, followed by dinner and visit to Yadavindra Gardens in Pinjore
- The event promises to be a platform for countries to come together and work towards a sustainable future

During the second and third day of the meeting, member countries will focus on drafting the communiqué, which will address four thematic areas — food security and nutrition, sustainable agriculture with a climate smart approach, inclusive agricultural value chains and food systems, and digitisation for agricultural transformation. The inaugural address will be delivered by Minister of State for Commerce and Industry Som Prakash.

While the first meeting of the AWG was organised in Indore in February, the deliberations will conclude with the agriculture ministers' conference where the communiqué from the deliberations will be finalised. This meeting will take place in Hyderabad from June 15 to 17. In April, a meeting of Chief Agricultural Scientists will be held in Varanasi.

As many as 17 side events of G20 have been organised in Punjab, Haryana and Himachal Pradesh involving more than 4,000 participants to create awareness about G20 through public participation.

Organic farming sees more green shoots

AVINASH P. SUBRAMANYAM | DC
TIRUPATI, APRIL 17

Organic farming is steadily gaining popularity among farmers of Tirupati district, thanks to guidance being provided by the AP government's Rythu Sadhikara Samstha (RySS).

Many farmers in the district have stopped using fertilisers and pesticides. Instead, they are using organic inputs. Around 44,000 acres are currently under organic farming in Tirupati district. With farmers showing interest in this farming, another 20,000 acres will be going organic this year.

L. Desamma, who has taken up organic farming in Tirupati Rural with inputs from RySS, is growing vegetables like cluster beans, okra, lemongrass, spinach, peppermint, spring onions, cabbage, kasuri methi, amaranthus and betel leaves.

She has several customers who lift the products from her farm itself. Post all expenditures, she says she is able to save ?2 lakh annually.

- Many farmers in the district have stopped using fertilisers and pesticides. Instead, they are using organic inputs.
- Around 44,000 acres are currently under organic farming in Tirupati district.

"Nutritional quality of organically grown vegetables is higher. They also taste better," says Desamma. Her advice to other farmers planning to go organic is: "Put your money, energy and dedication into organic farming. It will pay you great dividends."

M. Rohith Rochan is a 27-year-old MBA graduate from Tirupati. He took to organic farming four years ago at his four-acre land in Kattakinda Venkatapuram village in Ramachandrapuram mandal. He has been growing groundnuts, pulses and sugarcane. He harvested 35,000 tonnes of sugarcane per acre during the last season.

"We are getting sugarcane saplings from Mandya, Mysore and Anakapalle. We use Jeevamrutham, Ghana Jeevamrutham, cow dung, and other natural fertilisers," says the young farmer. He is selling his organic produce from his outlet titled Aryas Natural Farming Products in Tirupati. Organic farming is being practised over 44,000 acres in Tirupati district, 50 per cent of it being paddy. Other products under organic cultivation are mango, lemon, vegetables including greens, and flowers.

Rythu Sadhikara Samstha projects that another 20,000 acres are expected to turn organic in Tirupati district. Farmers too are coming forward as organic farming reduces cost of cultivation and increases income.

"Though one cannot move from conventional to organic farming overnight, the long-term benefits are much higher. We are educating farmers about low-cost inputs, improved soil conditions, increased production and sustainability. It also improves public health," an RySS official pointed out.

IIT-M to develop eco-friendly technology to upcycle paddy waste

E T B SIVAPRIYAN
CHENNAI, DHNS

Researchers with the Indian Institute of Technology Madras (IIT-M) plan to develop an eco-friendly technology to upcycle paddy waste to manufacture raw materials for industrial applications, aimed at providing an additional source of income to farmers.

The researchers say paddy waste can be used to produce energy devices that can be used by the industry which can make a key contribution to reducing stubble burning and burning of other farm waste in North India.

The researchers are fostering a new 'Farm-Energy Synergy' through their work with organic waste, in-particular kitchen waste, to develop usable activated carbon, a key component in making supercapacitors, the IIT-M said.

"Supercapacitors, made from activated carbon produced from paddy waste, have many benefits to consumers across the electronics, energy, and agricultural sectors and can help develop self-reliance in the field," the institute said.

Currently, the sheer quantum of paddy waste generated is 760 lakh metric tons per year in India and farmers consider burning straw as the most low-cost and efficient alternative to tailing the straw into the soil, resulting in substantial pollution and a severe ecological problem.

Furthermore, burning reduces the potential utilization of biomass and the estimated loss for India alone is approximately Rs 92, 600 crore associated with this approach to farm waste management.

"Agriculture still continues to be at the heart of India's economy. This breakthrough technology that converts biomass such as paddy waste into activated carbon will have a significant bearing on our health, environment, and the economy," Prof Mahesh Panchagnula, Dean (Alumni and Corporate Relations), IIT-M said.

Dr Tiju Thomas, Associate Professor, Department of Metallurgical and Materials, IIT-M said the solution that researchers are identifying is a well-defined process as it will allow for the conversion of paddy waste to commercial standard carbon material and the use of the activated carbon to fabricate supercapacitors that comply with the market standard.

"The material will be implemented in the form of a suitable supercapacitor-based hybrid energy storage device," he said, adding that rendering the supercapacitors into a modular attachment will be helpful for energy solutions across the globe.

Activated carbon is useful not only for the energy segment but also for water treatment and pharmaceutical segments and biochar production, among others, the IIT-M said, adding that the devices it is making are useful for the energy segment and also for the mobility segment.

● FROM PLATE TO PLOUGH

THE OBVIOUS ANSWER IS TO INCLUDE MORE NUTRITIOUS AND CLIMATE-RESILIENT CROPS SUCH AS MILLETS AND PULSES IN THE PDS WHILE SCALING DOWN RICE PROCUREMENT

PDS & climate-smart agriculture

ASHOK GULATI
Distinguished professor, ICRIER
Views are personal

THE DEPARTMENT OF food and public distribution (DoF&PD) and, in particular, the Food Corporation of India (FCI) heaved a sigh of relief that the procurement of wheat so far has crossed 20 million tonnes (mt), a notch higher than last year. Three states—Punjab, Haryana and Madhya Pradesh (MP)—have contributed more than 98% to the central pool. Will FCI be able to procure 34 mt as estimated at the beginning of the season? Having recently visited Punjab and MP, my own assessment is that overall procurement of wheat will stop anywhere between 25-30 mt. In Khanna market in Punjab, which is supposed to be Asia's largest grain market, almost 80% of the purchases are being made by private trade.

Unseasonal rains have surely damaged the quality of grain in many pockets, and, accordingly, FCI has relaxed its quality parameters to accommodate lustre-loss or shrivelled grain, etc, for procurement. FCI hopes to procure at least 25 mt, which is sufficient for its public distribution system (PDS) needs. In any case, FCI has more than comfortable rice stocks that can provide ample cushion to substitute rice for wheat, if and when the need arises.

There is, however, uncertainty about the wheat production estimate this year, as was the case last year. Earlier, the ministry of agriculture and farmers' welfare (MoA&FW) had estimated 112 mt of wheat production. But, after the unseasonal rains, the revised estimate is yet to come.

Punjab, which seems to have faced rough weather just before the harvest time, is also in the process of estimating losses. But, our interactions with the Punjab Agriculture University (PAU) and several market functionaries and farmers have given us the impression that production of wheat this year is higher than last year, notwithstanding the unseasonal rains. No wonder, Punjab will be the biggest contributor to wheat procurement.

Uttar Pradesh, which produces almost twice the amount of wheat (about 35 mt) produced by Punjab (about 18 mt), remains a mystery. UP is estimated to procure 3.5 mt of wheat, but so far it has procured a meagre 0.12 mt. Unless it brings a surprise in May and June, the overall wheat procurement may stop well short of even 30 mt.

In any case, there was much to learn from Punjabi farmers during our visit. The wheat crop of those who had done zero tillage and had mulched paddy straw at the time of sowing wheat through Smart Happy Seeders was standing tall even in gusty winds.

Pavitar Singh Pangli in Ludhiana was expecting a yield of 24 quintals/acre (almost 6 tonnes/ha). But many others, whose crops were lodged due to heavy rains, were expecting much lower yields. Overall, as PAU vice-chancellor, Satbir Singh Gosal and his team of experts told us, on an average, Punjab will get about 20 quintals/acre.

Mulching of paddy straw acts as magic, increasing organic carbon in the soil. This is also being demonstrated on the fields of Borlaug Institute for South Asia (BISA) in Ladhowal, Ludhiana, where a passionate Uttam Kumar was taking care of his wheat crop ready for harvesting. Incidentally, this technology can be a good case for India to show to the agriculture group of G-20. PAU and BISA can lead here as a voice of the Global South.

The govt must upgrade at least 10% of the 500,000-odd Fair Price Shops as Nutritious Food Hubs (NFHs). These can stock have fortified rice, wheat, millets, pulses, fortified milk, edible oils, and eggs, etc

At the Centre, DoF&PD needs to be complimented for organising a *'chintan shivir'* under the leadership of secretary Sanjeev Chopra. One of the topics to focus on was how to leverage PDS to offer more nutritious food and also help make Indian agriculture more climate resilient. That's a great vision, worthy of lauding. The obvious answer, to my understanding, would be to encourage introduction of more nutritious food in PDS that is also climate resilient. Millets, pulses, and oilseeds would fit very well with these twin objectives. Also, one should not hesitate to go beyond these field crops and offer even milk and eggs. But, there are several operational challenges to provide a steady flow of these more nutritious foods.

One suggestion I can make to DoF&PD is to upgrade and declare at least 10% of their 500,000-odd Fair Price Shops as Nutritious Food Hubs (NFHs). These NFHs will have fortified, including bio-fortified, rice, wheat, millets, pulses, oilseeds (especially soyabean products with 40% protein), fortified milk and edible oils, eggs, etc.

PDS beneficiaries may be given electronic vouchers (like an e-food coupon in a food court) that can be recharged by the government 3-4 times a year. Our back of the envelop calculation shows that a family of 4.5 members currently gets a food subsidy of around ₹8,000/year through rice and wheat under PM Garib Kalyan Yojana. This amount can be loaded to e-vouchers of targeted beneficiaries. The NFHs would be upgraded with government assistance. It would create a demand for more diversified and nutritious food.

But then, the procurement of rice would have to be capped, starting with districts where water table has been depleting alarmingly. For example, Sangrur in Punjab has witnessed a fall of groundwater level by more than 25 metres during 2000-2019. Farmers of such districts could be incentivised to grow millets, pulses, oilseeds, etc, that are climate smart, use much less water and fertilisers, thus saving power and fertiliser subsidies.

The Centre and the states need to join hands to give a special package for carbon credits for growing such crops. Our rough calculations suggest that farmers can be rewarded about ₹10,000/acre (to be shared equally by the Centre and the states), as these crops would save that much fertiliser subsidy of the Centre and power subsidy of the states.

The *chintan shivir* of DoF&PD will have long-lasting effect on the agri-food system only if such ideas are further explored for rolling out through 50,000 Nutritious Food Hubs.

Fertilizer subsidy jumps 66 per cent on increase in DAP imports

Prabhudatta Mishra
New Delhi

India's urea import has dropped 17 per cent in 2022-23 fiscal, the second time in a row, thanks to increase in its domestic output and launch of nano-urea. However, a 30 per cent rise in import of Di-ammonium Phosphate (DAP) calls for further policy action as the overall fertilizer subsidy jumped 66 per cent to ₹2,54,800.05 crore last year.

UREA IMPORTS DOWN

According to latest official data, import of urea declined to 75.77 lakh tonne (lt) in last fiscal from 91.36 lt in 2021-22, that of Muriate of Potash (MoP) to 13.93 lt from 17.68 lt (-21 per cent). However, DAP import has surged to 70.83 lt from 54.62 lt and complex (combination of N, P and K) varieties to 27.52 lt from 11.7 lt (135.2 per cent). "There was an increase in domestic production of urea, particularly after revival of plants such as Ramagundam. It is natural to see its impact on import," said Arvind Chaudhary, Director General of the Fertilizer Association of India.

Urea production in last fiscal jumped 13.6 per cent to 284.94 lt from 250.72 lt in 2021-22. Domestic production of DAP (mainly through imported raw materials), which has a share of 38 per cent in its total annual availability, jumped 3 per cent to 43.47 lt from 42.22 lt. In case of MoP, India imports the entire requirement. In 2021-22 also, there was drop in import of urea and MoP, while the overseas purchase of DAP increased by almost 12 per cent.

DIFFERENT USAGE

On higher import of DAP, Chaudhary said both urea and DAP have different usage and should not be compared. There are several factors responsible in import, like cost effectiveness of imported material. When global prices of rock phosphate increased the entire subsidy benefit was not passed on to Single Super Phosphate (SSP), which became slightly costlier than DAP.

HIKE. DAP imports have surged to 70.83 lt in 2022-23 from 54.62 lt a year ago AFP

Import and consumption of urea largely depends on availability as it is completely controlled by the government. In case of potash and phosphorous, the selling price of these two fertilizers determine the consumption. The current MRP of DAP is ₹1,350/bag whereas that of MoP is ₹1,742/bag of 50 kg. The combined subsidy on phosphorus (P) and potash (K) was ₹86,122.23 crore in 2022-23, out of which the maximum amount was used for phosphorus to keep prices of DAP under check. Chaudhary said global price of DAP which reached as high as about $950/tonne last year has come down to $515-520/tonne now. Urea has also declined to $330/tonne (from $ 722 in May 2022).

The Fertilizer Ministry has estimated the subsidy in current fiscal to be lower than ₹1 lakh crore against Budget allocation of ₹1.75 lakh crore.

'Merely a proposal': Centre to SC on lifting pesticide ban

BHAVINI MISHRA & SANJEEB MUKHERJEE
New Delhi, 28 April

The government has told the Supreme Court in its affidavit that the proposal to lift the ban on 24 of 27 pesticides through its February draft gazette notification was "merely a proposal and has not attained finality".

"To follow the due procedure, the draft notification was published on February 15 to seek objections and suggestions from all stakeholders concerned (including the petitioners) within 30 days. The objections and suggestions that have been received from the stakeholders on the draft notification will be reviewed by the central government in consultation with the registration committee (RC), considering all aspects related to technical and scientific requirements, substitutes available, farmer's interest, safety of the pesticides, toxicity and efficacy concerns, updated status of required study and submission of data in compliance to recommendations of the various expert committees, etc., and a final decision will be taken accordingly," the Centre submitted.

Registration committee is a technical statutory body that evaluates the efficacy and safety of insecticides under the specified conditions for use in the country.

The controversy dates back to a May 2020 order of the government banning import, manufacture, sale, transport, distribution and use of 27 pesticides that were considered harmful to public health and safety. These 27 pesticides were widely used as part of the 66 contentious pesticides that were being reviewed by various bodies for several years for their toxicity. Some reports said the banned pesticides included 12 insecticides, eight fungicides and seven herbicides, comprising almost 130 formulations.

Although the government reportedly gave the industry time to record their objections, the issue was not resolved. At the request of several major industry bodies, a panel was formed under the chairmanship of TP Rajendran, former assistant director general of Indian Council of Agriculture Research, and a well-known expert in the field. Though the results of this committee's findings were not made public, reports suggested that it had recommended retaining the ban on three of the 27 pesticides and freeing the rest.

There is some confusion on the contents of the findings and terms of reference of the committee itself, since civil society activists in their petition to the SC said they weren't aware of the findings, terms of reference and the process it followed to reach the conclusion. The Rajendran panel report, however, is available, industry players said.

Thereafter, the government modified the original ban order and issued a fresh draft in February 2023, retaining the ban on only three of the pesticides while freeing all others. Civil society groups approached the SC questioning the revised order.

The Supreme Court on Friday said the matter will be taken up after the summer vacation.

5 revolutions creating huge opportunities in TS

Telangana is the leader in yellow revolution of the country having 1.35 lakh acres under oil palm cultivation, and the State government is targeting to see 20 lakh acres over the next five years, says KTR

N SHARATH CHOWDARY
HYDERABAD

IN rural hinterland of Telangana, the five revolutions – green, white, yellow, pink and blue, are shaping up very well, creating huge opportunities in agriculture and food processing sector over the coming years. Each revolution has the potential to generate employment, wealth and more importantly livelihoods for people in villages.

"These five revolutions are effectively supporting the farmers, local youth, women from self help groups (SHGs) and the overall industry in the State. Telangana is the leader in yellow revolution of the country having 1.35 lakh acres under oil palm cultivation, and the State government is targeting to see 20 lakh acres over the next five years," Minister for Industries and Commerce KT Rama Rao told Bizz Buzz.

He said: "We have received investment commitments from various companies across all sectors. Patanjali Foods Ltd and Telangana State Cooperative Oilseeds Growers' Federation will invest Rs 1,050 crore each to set up palm oil processing facilities in Telangana."

Rama Rao further said that Telangana is witnessing growth in blue revolution with the world's largest integrated freshwater aqua hub being launched in 370 acres, right next to Rajarajeswara sagar Reservoir, which has 26 TMC (thousand million cubic feet) of water in Rajanna Sircilla district. Similarly, several such aqua hubs can be set up all over the State."

> Telangana is witnessing growth in blue revolution with the world's largest integrated freshwater aqua hub being launched in 370 acres, right next to Rajarajeswara sagar Reservoir, which has 26 TMC of water in Rajanna Sircilla district. Similarly, several such aqua hubs can be set up all over the State
>
> - KT Rama Rao, Minister for Industries and Commerce

"Mallana Sagar has 20 TMC and Kondapochamma Sagar has 15 TMC. In Siddipet district, there are many reservoirs now. There are five more reservoirs coming up in Palamuru by this August. Each of them is a potential aqua hub. The idea is to ensure fresh water fish and shrimps are reared here in cage culture. Only a tiny portion of the reservoir is utilised for this in a contained environment," he said.

The minister informed that four different companies – The Fishin' Company, Telar Fish Farms (Mulpuri Group), Rajanna Aqua Enterprises (Ananda Group) and Avanti Group – are investing around Rs 1,356 crore in this aqua hub in Rajanna Sircilla, creating annual exports worth Rs 1,000 crore and over 12,000 direct and indirect jobs. The hub is slated to see fish production of over 1.2 lakh metric tonnes a year.

"The State government has tied up with Ananda Group to set up a private aqua university in Rajanna Sircilla. All the new reservoirs that have been created in the State have such unique opportunity to create multiple aqua hubs as nobody can claim fishing rights here. It is not possible in case of the old lakes and reservoirs in the State," he added.

On the occasion, Telangana Food Processing Society Director Akhil Kumar Gawar said that The Food Conclave will be organised by the State government and it will go global in the coming years. This conclave is going to be an annual feature. The intensity and quality of deliberations will go up further with more participation of the stakeholders from the country and abroad during the next year event.

"Apart from investments, we have received a lot of policy suggestions from companies and experts across various sectors. While some of them pertained to the State government, a few are related to the Central government and the rest are about the agri-food ecosystem. The State will try to implement these suggestions and also send recommendations to the Central agencies to look into these," he said.

27 agri-food cos to invest ₹7,218 cr

BB BUREAU
HYDERABAD

AROUND 27 agri-food companies have signed MoUs with Telangana government to invest totally Rs 7,218 crore creating direct employment opportunities to about 58,458 people in the State during The Food Conclave 2023 held here.

The first edition of the annual event highlighted the need for increased investment in the production of agriculture, expanding supply food chain, and making policies that build both production and consumption.

The one-day conclave opened to a record-breaking number of attendees, with industry leaders and experts from all over the world flocking to the event to discuss the latest trends and innovations in agriculture.

Company	Investment (In Rs. Cr)	Nature of activity
Varun Beverages Limited & Four Zero LLP	929	Beverage manufacturing unit
Almond House Pvt. Ltd.	90	Snack Food
Wow Momo Foods Pvt Ltd	57	Central Kitchen for Momos
Jurala Organic Farms &Agro Industries LLP	550	Ethanol
Vivek Bio	251	Ethanol
Modi Naturals Limited	325	Distillery for ethanol, Solvent extraction of RBO, Oil Refinery RBO
Gayatri Agro Industrial Power Pvt Ltd (115 Cr) & Rajendra Feeds LLP (125 Cr)	240	Integrated Rice Mill & Maize Processing, Paddy storage and Edible Oil
Manikanta Group of Companies	185	Integrated Rice Mill Plant
Avanti Group of Industries	175	Food Ingredients (50 Cr), Aquaculture Health Care products (50 Cr) & PET Food (75 Cr)
Vidya Herbs Pvt Ltd.	127	Spices and Oleoresin Extraction
Karam Spices	82	Spice Processing unit
Telangana State Co-operative Oil Seeds Growers Federation Ltd. (TS Oil FED)	1055	Palm Oil Processing Plant
Patanjali Foods Limited (Ruchi Soya)	1050	Palm Oil Processing Plant
Pre-Unique India Pvt Ltd	500	Palm Oil Processing Plant
Matrix Palm Oil Industries Pvt. Ltd	213.7	Palm Oil Processing Plant
Tirumala Oil Chem India Pvt. Ltd	150.25	Palm Oil Processing Plant
KN Biosciences India Pvt Ltd.	150	Palm Oil Processing Plant
Vishwatej Oil Industries Pvt Ltd.	150	Palm Oil Processing Plant
Ramcharan Oil Industries	100	Palm Oil Processing Plant
Suven Agro Industries Pvt. Ltd	90	Palm Oil Processing Plant
Masqati dairy products Pvt. Ltd.	242	Processed milk, Icecream and milk powder
Heritage Foods Pvt Ltd.	150	Milk and Milk processing
Suguna Foods Pvt Ltd.	120	Chicken Processing Plant
Pork Cluster - Aamisha Foods Pvt. Ltd.	30	Pork processing unit
Pork Cluster- Ahara Technology	30	Pork processing unit
Rajanna Aqua Enterprises LLP (Ananda Group)	200	Fish Farming and Processing
Telar Fish Farms LLP (Mulpuri group)	106	Fish Farming and Processing
Total	7217.95	

Farmers suffer with spurious seed

P.V. PRASAD | DC
KURNOOL, APRIL 22

Cotton growers in the district are facing quality issues and a price fall due to the sway of spurious seeds in the local markets.

The maximum price registered was ₹ 8,200 per quintal on an average last week. Farmers say less than that was fetched during 2022. During the same period last year, the price was around ₹ 13,000 per quintal. Farmers are cultivating Brahma and Bunny varieties of cotton in the district.

Farmers spend ₹35,000-40,000 per acre for inputs. Most farmers of Adoni, Pathikonda, Aluru, Kodumuru and Mantralayam in Kurnool district prefer the commercial crop in vast areas, despite facing losses due to the presence of spurious seeds and vagaries of the weather.

The average cotton stocks that reach the Adoni Market Yard are around 10 lakh quintals a year. The yard received 5.10 lakh quintals this year, according to marketing department officials.

Farmers say that for the last two years, they have been incurring losses due to the problem of spurious seeds being sold by local traders. "We have been staging protests demanding stern action against them. This year too, we faced losses in terms of the low quality of cotton production," they said.

"Yet, the offer of ₹8,200 per quintal is a bit of relief to farmers this year. Production starts in October and continues up to April/May in three to four spells. The peak season is November and December. Last year, farmers were comfortable with a competitive price of ₹12,490 per quintal and the average price was ₹9,870 per quintal as the production was limited. Heavy rains lashed the district in November, adversely impacting the crop yield," said B. Srikanth Reddy, deputy director of marketing. Now, the average price is between ₹ 7,500 and ₹7,600, he stated.

A farmer from Kodumuru, R Srinivasa Reddy, said due to use of spurious seeds, cotton plant is growing abnormally and the poor flowering has been impacting the yield. "We are getting inferior quality cotton seeds at normal prices."

However, he expressed happiness that farmers are getting a price more than the MSP of ₹6,500 per quintal. The prices of last year were encouraging, he said, and suggested supply of quality cotton seeds to the farmers through RBKs, saying this would be a good effort from the government.

Now, ICAR aiming for toxic-free food crops

Frames a roadmap including stopping usage of pesticides and insecticides on crops during maturation

BB Bureau
New Delhi

THE Indian Council of Agriculture Research (ICAR) has chalked out a roadmap for chemical residue-free crops. The ICAR has decided that the practice of spraying pesticides and insecticides on crops from 15 days to harvesting must be stopped forthwith, official sources told Bizz Buzz. The objective is to check the entry of toxicity into the food chain.

The ICAR governing body has decided that ways have to be found to stop poison in food. It is of the opinion that the cultivation of crops carrying chemical residue must be aggressively discouraged, the sources said, adding that this is doable because spraying of crops at the stage of maturation is not required.

A big challenge is to sensitize farmers regarding the excessive use of chemical sprays with crops. The early stage spraying with chemicals doesn't come as residue in grains. Therefore, focus is on stopping it during the period 15 days prior to harvesting when grains have already matured.

There are already guidelines for spraying pesticides and insecticides; they specify the dos and don'ts. Farmers are recommended the dose and the dilution. Overdosing must be avoided. Spray operations should be conducted on cool and calm days. Sunny days are preferred. Hot sunny days must be avoided. The recommended sprayer should be used. Spray operations should be carried out in the wind direction. Spraying against wind direction is strictly prohibited. Also, spraying should not be done just before and immediately after rains.

There are also post-spray guidelines. Leftover spray solutions should be disposed of at safer places, like a barren isolated area. It should not be drained in or near ponds, water lines, etc.

Further, empty containers of pesticides should not be reused for storing other articles. In December 2021, the government had also announced the standard operating procedures for pesticide application by drones. All these efforts, the sources said, are aimed at not just checking poison enter the food chain, but also keeping the environment safe.

- Discouraging cultivation of crops carrying chemical residue
- Early stage spraying with chemicals doesn't come as residue in grains
- Focus on stopping it 15 days prior to harvesting

Use of pesticides major health hazard: Agri dir

Times News Network

Panaji: As compared to other states in India, Goa is using far lesser amounts of pesticides, said director of agriculture Nevil Alphonso while emphasising on the unsafe and indiscriminate use of pesticides in agriculture. He said unsafe use of pesticides is a major hazard to the environment and human health.

Speaking on the importance of creating awareness among farmers regarding proper and safer procedure to carry out pest management in paddy and vegetables, Alphonso said, "Pest management played a major role in minimising crop loss due to pests and diseases. Each farmer should have knowledge about types of insects and diseases which damage the crops and their control measures."

Ponda-based farmers recently received hands-on training in pest management from the experts at the Crop Care Federation of India (CCFI) for better crop protection methods. The training programme by the directorate of agriculture was held at Agri Bazar, Bethora, Ponda.

The CCFI members laid special emphasis on paddy and vegetables to help small and marginal farmers in Goa in increasing their crop yields by imparting specialised training on use of crop care products and agrochemicals along with correct use of fertilisers.

Alphonso underlined the importance of such training programmes in enhancing the expertise of the farmers and requested them to disseminate the techniques learnt in the training programme among their farming community in their respective locality.

Nine progressive farmers were felicitated on the occasion and plant protection safety kits were distributed to all the farmers at the event.

Grape crops damaged, over 50% drop in prices

Times News Network

Nashik: Unseasonal rain in Nashik district has not only damaged crops, but has also led to drop in grape prices by over 50% in the last one week.

Grape farmers fear they may not be able to recoup even their production costs. "My one-acre vineyard is harvest-ready, but traders are not prepared to buy my grapes due to continuous rain over the past few days. I am worried whether the grapes will get sold at all," said Ashok Dhikle, a farmer from Niphad taluka.

He added, "In February, I had sold grapes at the price of Rs45 per kg, but traders are now quoting the very low rate of Rs12 per kg. How can I sell grapes at such a low rate when my production cost itself is Rs30-35 per kg?"

Arvind Bhalerao, another grape farmer, said, "I have rarely seen such continuous rains with hailstorms in the month of April. Around 25% of vineyards across the district are still ready to harvest, but unseasonal rains have damaged most of the rest. Moreover, the grapes that managed to survive the rain have no demand in domestic markets due to the damage they have sustained."

He further elaborated, "There is demand for grapes in the export market, but export-quality grapes are not available as the quality has definitely been affected due to the rains."

Ajit Pawar calls on CM & deputy CM for farmers' aid

Leader of Opposition Ajit Pawar on Wednesday called on chief minister Eknath Shinde and deputy CM Devendra Fadnavis to press his demand for financial assistance of Rs 50,000 per hectare and another Rs 1 lakh per hectare for horticulture crop following damage owing to unseasonal rain across the state. Pawar has estimated that the standing crop on nearly two lakh hectares has been completely damaged.

Toxic differences over pesticides

Industry is lobbying for total relaxation of a three-year-old veto but wants lethal chemical proscribed; panel head TP Rajendran says all 27 pesticides are harmless

SANJEEB MUKHERJEE
New Delhi, 26 April

THE BAN SAGA

- **July 2013:** Govt sets up the Anupam Verma panel to review 66 pesticides
- **Nov 2015:** The committee submits report
- **Dec 2015:** Registration Committee (RC) under the Insecticides Act accepts the report and the committee asks for review of 27 pesticides by 2018
- **Dec 2016:** Govt issues draft ban order on 27 pesticides based on the panel's recommendations
- **2017-18:** Govt constitutes two more committees to look at public feedback of the draft order
- **Dec 2019:** RC sets up a sub-committee to review ban on 27 pesticides
- **May 2020:** RC accepts the recommendations of the sub-committee on the ban and sends it to the ministry of agriculture
- **May 2020:** Govt notifies draft ban on 27 pesticides and gives 45 days for public feedback. It also forms another panel under TP Rajendran. Civil society says no information about its contents exists in the public domain
- **Feb 2023:** Draft prohibition order notified by govt on only 3 of the 27 pesticides earlier banned

Source: SC petition filed by Kavitha Kuruganthi & others

Ahead of the Supreme Court (SC) hearing scheduled for April 28 on the controversy over a ban on 27 pesticides, a section of industry has questioned the basis on which monocrotophos, considered one of the most harmful pesticides for human health, has been included in the list of 24 on which a ban was lifted by a draft order issued in February 2023.

But civil society representatives are questioning the draft on a very different ground. They are arguing that the move to dilute the original ban order on all 27 pesticides is wrong and overlooks several key factors.

The SC sought the Centre's reply in four weeks (from March 27, 2023) explaining the basis on which the original ban order was reversed and also placed on record the reports of the committee formed to review the ban.

The controversy dates back to a May 2020 order of the government banning the import, manufacture, sale, transport, distribution and use of 27 pesticides that were considered harmful to public health and safety.

These 27 pesticides were widely used as part of the 66 contentious pesticides that were being reviewed by various bodies over the past several years for their toxicity. Some reports said the banned pesticides included 12 insecticides, eight fungicides and seven herbicides, comprising almost 130 formulations.

Although the government reportedly gave the industry time to record their objections, the issue was not resolved. At the request of several major industry bodies, a panel was formed under the chairmanship of T P Rajendran, former assistant director general of Indian Council of Agriculture Research and a well-known expert in the field. Though the results of this committee's findings were not made public, reports suggested that it had recommended retaining the ban on three of the 27 pesticides and freeing the remaining ones.

There is some confusion on the contents of the findings and terms of reference of the committee itself.

This is because civil society activists in their petition to the SC said that they weren't aware of the findings of the committee, its terms of reference and the process it followed to arrive at the conclusion. But, industry players said, the Rajendran panel report is available.

Thereafter, the government modified the original ban order and issued a fresh draft in February 2023 retaining the ban on only three of the pesticides while freeing all others.

Civil society groups approached the SC questioning the revised order. Kavitha Kuruganthi, a petitioner in the case and convener of Alliance for Sustainable and Holistic Agriculture, demanded a total ban on all 27 pesticides as originally envisaged.

In a letter, she said that 21 of these 27 pesticides were classified as "highly hazardous pesticides" and 17 of them were in use when the Insecticides Act, 1968, came into force and these DRPs (deemed to be registered pesticides) have actually not been proven to be safe by any ex-ante risk assessment. Three of these pesticides are World Health Organization (WHO) Class IB pesticides and 13 are Class II pesticides — which mean they are acutely toxic.

A section of the pesticides industry, on the other hand, has demanded that the ban be scrapped but also has asked why monocrotophos still hasn't been included in the banned list. "Monocrotophos is highly toxic by all routes of exposure. It is classified as a highly hazardous pesticide by the WHO. We are not in favour of using this pesticide," Kalyan Goswami, director general of Agro Chem Federation, told *Business Standard* a few weeks ago.

Rajendran, the man on whose recommendations the government is believed to have revised its original order, said that all chemicals and pesticides including the toothpaste we use is harmful for human health. What matters is the dosage, the formulation composition and the way humans have been asked to use the product.

"One cannot simply say that all pesticides are harmful and all pesticides are to be banned based on hearsay. What is important here is what Indian medical records say on the harm that a particular pesticide has done to human beings or to those who are exposed to it over a reasonable period of time," Rajendran told *Business Standard*.

"In India," he went on to explain, "we have a record of harm that any said pesticide has caused to human health over a fairly long period, say 30-40 years, and not just in the last few years. Plus, the Central Insecticides Board (CIB) is regularly seized of matters related to the harmful impact of any pesticide and they are the ones competent to say whether any pesticide is bad or not."

On the clean chit his committee gave to 24 of the 27 originally banned pesticides, Rajendran said all of them, including monocrotophos, has been in use in India for the past 30 or 40 years and there is absolutely no data provided by agencies to claim that there has been any adverse health impact due to their use.

So why did his committee exclude three of the 27 pesticides from the clean chit? Rajendran said that this was because the manufacturers had stopped production of the three items in the country and they were not available anywhere. "The manufacturers themselves have given it in writing that they are no longer making these three pesticides, which have been removed from the free list," he said.

On why monocrotophos has not been kept in the list of banned pesticides despite it being on the WHO list of harmful chemicals, Rajendran said that the earlier formulation that was registered in the country was on the higher side of toxicity and the manufacturers had come out with a new formulation, which is already registered with the CIB and the old one has been withdrawn.

"All pesticides have a label in them specifying good agriculture practices, with right dosage, time of application, precautions to be taken and so on. If somebody violates that, it is that individual's problem and not a national or a government issue," Rajendran said.

Which of the arguments will convince the SC is still to be determined.

'El Nino to be moderate, its impact on monsoon minimal'

Amid predictions by global agencies that a return of El Nino conditions in the Pacific could weaken the south-west monsoon in India, India Meteorological Department (IMD) earlier this month forecast normal rainfall in June-September period. ***Mrutyunjay Mohapatra****, director general, IMD, spoke to* ***Sandip Das*** *on issues associated with the weather forecast. Edited excerpts.*

Q&A

What has been the status of El Nino conditions since the IMD's monsoon forecast?

Earlier this month, we gave a forecast that rainfall during June-September is likely to be in 'normal' range at 96% of the benchmark long period average (LPA). The next forecast for the monsoon will be made by the end of next month. Currently the El Nino is in "neutral condition". It is not a severe El Nino, but a moderate one which is likely to develop by July and its impact may be felt much later. There is no one-to-one relation between El Nino and Indian summer rainfall, as out of 15 El Nino years during 1951-2022, there were six years with normal to above normal rainfall.

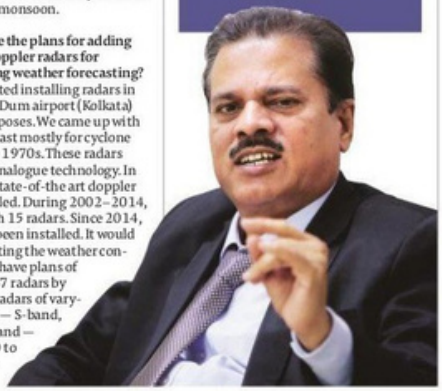
What are the other factors which would impact monsoon rains?

Indian Ocean Dipole (IOD), which assists monsoon rains, has been at a neutral position and is likely to be positive. Eurasian snow cover in January this year was the 9th lowest in the past 67 years. Eurasian snow has an inverse relationship with Indian monsoon. The negative impact of El Nino will be countered by positive IOD and low snow cover over the North Hemisphere and Eurasia that will ultimately result in a normal monsoon.

What are the plans for adding more Doppler radars for improving weather forecasting?

We started installing radars in 1950 in Dum Dum airport (Kolkata) for aviation purposes. We came up with radars on the coast mostly for cyclone detection in the 1970s. These radars were based on analogue technology. In 2002, the first state-of-the art doppler radar was installed. During 2002-2014, we came up with 15 radars. Since 2014, 22 radars have been installed. It would help us in detecting the weather conditions fast. We have plans of installation of 67 radars by 2025. Doppler radars of varying frequencies — S-band, C-band and X-band — are used by IMD to track the movement of weather systems and cloud bands, and gauge rainfall over its coverage area of 200 to 500 km. Doppler radars gauge the intensity of rainfall and impact area in real-time, which is beneficial for farmers as well as the local population.

The negative impact of El Nino will be countered by positive Indian Ocean Dipole and low snow cover over the North Hemisphere and Eurasia that will ultimately result in a normal monsoon



What is the current status of agri-advisory services provided by IMD?

Advisory to farmers is done through a public private partnership mode with the Indian Council of Agricultural Research (ICAR) institutes, state agricultural universities and departments. We provide weather forecast up to 15 days. Based on this forecast they evaluate the current status of agriculture in various districts and possible impact and actions are prepared twice weekly and communicated to farmers. Currently 3,100 blocks are providing agro-climatic services. In the remaining blocks, we have weather forecast not agro-advisory. All the 7,000 blocks are getting weather forecast through 200 district agro-meteorological units, 130 agro-met field units located in Krishi Vigyan Kendras and universities.

How do various industrial sectors source data provided by the department?

Many industries are taking our automatic programming inter-face where they access our digital data on weather conditions. For instance, the met department provides on and off shore weather forecast to offshore oil exploration companies such as ONGC, Reliance and Adani group. We provide aviation weather forecast covering specific requirements of the airlines. The ports and shipping industry is provided with customised forecast. Insurance sector, Indian Railways and the National Highway Authority are also provided our weather forecast. We will commence providing weather information to startups soon.

Would you like to comment on the role of private entities in weather forecast business?

In the US, the UK, Australia and others countries, weather forecast and early warnings are issued by the nodal agency like the IMD. There is credibility and accountability of the forecast provided by the government agencies. In case of application in various sectors such as insurance or agriculture, the private sector can play a role. For instance, through private-public partnership mode, IMD will provide technical support for setting up systematic observation and forecasting facilities in Maldives, Nepal and Bangladesh. The private sector will fund setting up these facilities.

Pesticide residue: Spices industry seeks better supply of approved chemicals

Our Bureau
Kochi

The non-availability of approved chemicals in spice cultivation came under scrutiny at a seminar on label expansion of pesticides.

While the government representatives pointed out the increasing use of off-label chemicals that aggravate pesticide residue problems, the stakeholders from the spice industry called for an improved supply of approved chemicals and the fixing of the maximum residue limit (MRL) in the spices.

With increasing detection of pesticides in spice produce in domestic and export markets, the issue of off-label pesticide use in spices has emerged as a major constraint in spice farming.

INEFFECTIVE. The use of off-label pesticides has led to growing instances of pesticides residue PTI

Inaugurating the event organised by the Indian Institute of Spices Research in collaboration with the Spices Board, JP Singh, Plant Protection Advisor to the Government, emphasised the need for urgent collaborative efforts from government organisations, regulatory bodies, and pesticide manufacturers to find practical solutions to empower the spice farming community with effective and safe plant protection options.

ROOT CAUSE

Ishwara Bhat, Director-in-Charge of IISR, pointed out that the lack of registered pesticides for spice crops favours the use of off-label chemical pesticides by the farmers often resulting in residue problems in the produce. He said only nine pesticides have approval for vegetatively propagated spices such as black pepper, small cardamom, and turmeric. Crops like ginger and tree spices such as nutmeg, cinnamon, and clove have no approved pesticides.

India-Israel FTA should be as wide as possible: Israeli Min

Israeli Minister M K Nir Barkat said he will hold discussions with the Indian side regarding an FTA between the two countries, negotiations for which have been going on for over a decade

NEW DELHI

THE proposed free trade agreement (FTA) between Israel and India should be as wide as possible to enable more and more trade as it brings people together, Israel's Minister of Economy and Industry M K Nir Barkat said on Tuesday.

The minister said he will hold discussions with the Indian side regarding an FTA between the two countries, negotiations for which have been going on for over a decade. "As a government to government I am going to be proposing to your ministers to naturally expand the free trade agreement, focus on business development in a smart way, share knowledge and experience as much as possible," Barkat said at a CII event during his visit here.

He said both sides will have to focus on complementary areas for the proposed free trade deal where India and Israel hold a competitive advantage. "It (FTA) should be as wide as possible to enable more and more trade as free trade brings the people together," Barkat said.

He added that Isreal has a lot to offer in sectors like agrotech, healthtech and foodtech and it

translates into a lot of trade from both directions. "So from my perspective, we are coming as open as possible," the minister said. The minister also wished that India and Israel double trade every two years. Replying to media queries on the event's sidelines, Barkat described the idea of I2U2 grouping of India, Israel, UAE and the US as "really smart".

"I think that the more time will flow you will see that the relationship and the bonding has a lot to offer because the UAE and Israel are small but well positioned. The American and the Indian economies are large and very complementary," he said. On alternate plans in the context of Chinese supply chain constraints and Russian sanctions, he said, geopolitical challenges in the world enable more creativity and more development.

EXPLAINED ECONOMICS

Why urea rules India's farms

Sales of the nitrogenous fertiliser have scaled new highs despite measures to check its use. What is the reason for this, what consequences can it have for crop yield, and what are some possible solutions?

HARISH DAMODARAN

IN MAY 2015, the Centre made it mandatory to coat all indigenously manufactured and imported urea with neem oil. This was followed by replacing 50-kg bags with 45-kg ones in March 2018, and the launch of liquid 'Nano Urea' by the Indian Farmers' Fertiliser Cooperative (IFFCO) in June 2021.

None of the above measures — checking illegal diversion for non-agricultural use, smaller bags, and increasing nitrogen use efficiency — have succeeded in reducing urea consumption.

Sales of urea crossed a record 35.7 million tonnes (mt) in the fiscal year ended March 31, 2023. Consumption did dip in the initial two years after neem-coating was fully enforced from December 2015, seemingly making it difficult for the heavily subsidised fertiliser to be used by plywood, particle board, textile dye, cattle feed and synthetic milk makers.

But that trend reversed from 2018-19. Urea sales in 2022-23 were about 5.1 mt higher than in 2015-16 and over 9 mt than in 2009-10, before the introduction of the so-called nutrient-based subsidy (NBS) regime in April 2010. All other fertilisers, barring single super phosphate (SSP), have registered much lower increases or even declines (see table).

The failure of NBS

Under NBS, the government fixed a per-kg subsidy for each fertiliser nutrient: Nitrogen (N), phosphorus (P), potash (K) and sulphur (S). This was as against the earlier product-specific subsidy regime.

Linking subsidy to nutrient content was intended to promote balanced fertilisation by discouraging farmers from applying too much urea, di-ammonium phosphate (DAP) and muriate of potash (MOP). These are fertilisers with high content of a single nutrient: Urea (46% N), DAP (46% P plus 18% N) and MOP (60% K).

NBS was expected to induce product innovation, besides more use of complex fertilisers (having lower concentrations of N, P, K and S in different proportions) and SSP (containing only 16% P but also 11% S).

However, the data reveals worsening of nutrient imbalance, with urea consumption rising by over a third since 2009-10. This has been largely courtesy of its maximum retail price (MRP) going up by a mere 16.5% – from Rs 4,830 to Rs 5,628 per tonne – post the introduction of NBS. The Narendra Modi government has, in the last one year, also brought back price controls on DAP, with companies not allowed to charge more than Rs 27,000 per tonne. It has led to the sales of both fertilisers soaring in 2022-23, at the expense of NPKS complexes and SSP.

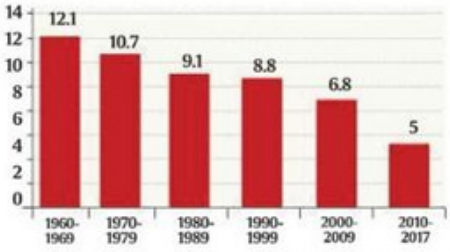
ALL-INDIA USE OF FERTILISER PRODUCTS

	UREA	DAP	MOP*	NPKS	SSP
2009-10	266.73	104.92	46.34	80.25	26.51
2010-11	281.13	108.7	39.32	97.64	38.25
2011-12	295.65	101.91	30.29	103.95	47.46
2012-13	300.02	91.54	22.11	75.27	40.3
2013-14	306	73.57	22.8	72.64	38.79
2014-15	306.1	76.26	28.53	82.78	39.89
2015-16	306.35	91.07	24.67	88.21	42.53
2016-17	296.14	89.64	28.63	84.14	37.57
2017-18	298.94	92.94	31.58	85.96	34.39
2018-19	314.18	92.11	29.57	90.28	35.79
2019-20	336.95	101	27.87	98.57	44.03
2020-21	350.43	119.11	34.25	118.11	44.89
2021-22	341.8	92.72	24.57	114.79	56.81
2022-23	357.25	105.31	16.32	100.73	50.18

*For direct application, excluding supply to complex fertiliser units.
Source: Fertiliser Association of India. (in lakh tonnes)

Gettyimages

CROP YIELD RESPONSE TO FERTILISERS



Source: J.C. Katyal, Indian Journal of Fertilisers, Dec 2019.

Imbalanced fertilisation

Fertilisers are essentially food for crops. They, like humans, need nutrients – primary (N, P, K), secondary (S, calcium, magnesium) and micro (iron, zinc, copper, manganese, boron, molybdenum) – for plant growth and grain yield.

During the Green Revolution, scientists bred semi-dwarf crop varieties that did not bend or fall over ("lodge") when their earheads were heavy with well-filled grains. These could, then, "tolerate" fertiliser application and produce more grain with higher doses. Over time, though, crop yield response to fertiliser use has more than halved: 1 kg of NPK nutrients yielded 12.1 kg of cereal grains in India during the 1960s, but only 5 kg during the 2010s (see chart). The underlying reason has been the disproportionate application of N by farmers.

More recent research – by Bijay Singh from the department of soil science at Punjab Agricultural University, Ludhiana – has established a decline in nitrogen use efficiency (NUE) itself. NUE refers to the proportion of N applied mainly through urea that is actually utilised by crops to produce harvested yields. Singh, in a 2022 paper, has estimated the NUE in India to have fallen from 48.2% in 1962-63 to 34.7% in 2018. The 34.7% NUE was below the global average of 45.3% and 53.3% for North America in 2018.

So, when Indian farmers are applying 100 kg of N, hardly 35 kg is being utilised, with the balance 65 kg unavailable to the plant. Some of the unutilised N may convert into organic form and become part of the soil nitrogen pool. This soil organic nitrogen may then undergo mineralisation (reconvert into inorganic ammonium form) and become available to the subsequent crops. The remaining unutilised N, however, escapes from the soil-plant system through hydrolysis (breakdown of urea into ammonia gas and its release into the atmosphere) and nitrification (below-the-ground leaching after conversion into nitrate).

The solutions

If applying more urea is counterproductive, the obvious solution is to reduce its consumption and promote products containing other nutrients in crop- and soil-specific combinations.

There are two approaches to cut urea consumption. The first is raising prices. The current per-tonne MRPs – Rs 5,628 for urea, Rs 27,000 for DAP and Rs 34,000 for MOP – are nowhere compatible with a 4:2:1 NPK use ratio generally considered ideal for Indian soils. But since increasing urea prices isn't politically easy, a second approach is to improve NUE – enabling farmers to harvest the same or more grain yields with fewer bags.

Fertiliser industry expert G. Ravi Prasad believes that the government should make incorporation of urease and nitrification inhibitors compulsory in urea. These are chemical compounds that inhibit the activity of urease (a soil enzyme that breaks down urea into ammonium and further to ammonia) and nitrifying bacteria (that convert ammonium to nitrate), making more N available to the crops. The government can bear a part of the cost of these chemicals, which are proprietary formulations of global plant nutrient solutions companies such as Koch and BASF.

Nano Urea is also primarily aimed at boosting NUE. The ultra-small size of its particles (20-50 nanometers, as against 1-4 millimeters for normal prilled/granular urea; 1 mm=1 million nm) is said to allow easier penetration through the stomatal pores of leaves. IFFCO claims that a single 500-ml Nano Urea bottle containing just 4% N can effectively replace "at least" one 45-kg bag of regular 46% N urea.

Nano Urea's limitation is that, being a liquid fertiliser, it can only be sprayed after the crop has developed leaves. It cannot replace normal urea for basal application at sowing time or even for the early crop growth stages. "Farmers are used to broadcasting fertilisers (uniformly spreading over the field). If the government wants to promote Nano Urea (for foliar application directly to the leaves), it may have to subsidise the cost of spraying," Prasad pointed out.

Bust myths on use of GM crops in aqua-feed: Experts

Our Bureau
Kochi

Fisheries and biotechnology experts have emphasised the need to bust the myths associated with the use of genetically modified (GM) crops as feed ingredients in India's aquaculture sector. They are of the view that GM crop-based products have huge scope in enhancing the supply of feed ingredients in aquaculture, promoting growth, disease resistance and reduction of input costs in aquaculture production.

They were speaking at an awareness workshop on the use of GM crops and their derivatives for the aqua-feed sector organised by the Biotech Consortium India Limited in association with ICAR-Central Marine Fisheries Research Institute . The workshop highlighted that the introduction of GM crops in the aqua-feed sector would also help reduce the mounting pressure on fishmeal and fish oil and maintain a sustainable aquaculture industry.

Vibha Ahuja, Chief General Manager of BCIL said GM crops come with several desirable traits such as insect resistance, disease resistance, and herbicide tolerance. Hence, using these would be beneficial to boost the yield. Cost analysis showed that the use of dried distillers grains with solubles (DDGS), a co-product from cereals in the distillery industry, can help reduce shrimp feed prices, she said. Most of the DDGS produced in the world are, however, of GM-corn origin and Indian feed producers can capitalise on the economic benefits, if they are open to use them as feed ingredients.

Low-cost, eco-friendly farming offers hope

BHARAT DOGRA

Seeing is believing. And this is true in the context of farming. No lectures and talks about low-cost, eco-friendly solutions can have the same impact as actually seeing the success of such efforts on the farm of a neighbouring farmer. If this success has been achieved by a small farmer of limited means, then the impact is even greater.

It is in this context that the impact of some relatively smaller efforts to improve farming goes much beyond the number of farmers they have been able to reach.

In eastern Uttar Pradesh, the examples set by several women farmers, working on small farms and helped by the Gorakhpur Environment Action Group (GEAG), has inspired several others. When I met Prabhavati at her small farm in Dudhai village (Sardarnagar block), she was growing as many as 52 food crops in a year organically, providing year round nutritious food to her family and almost always having some crop ready for sale in the market to meet cash needs.

Ram Rati's achievement was no less impressive. Using only organic methods she was growing 32 diverse food crops on one acre of land (apart from leasing another small plot of land), feeding her 11-member family all year and selling a part of the crop to bring in cash. At a time when there have been so many complaints about farmers not even being able to recover costs, calculations made on the basis of records kept by GEAG revealed her cost-earnings ratio to be 1:13.

In Vidarbha region of Maharashtra, from where there have been so many reports of acute distress of farmers, a project named Integrated Sustainable Agricultural Program or INSAP, implemented by YUVA-Rural, helped farmers in over 200 villages to reduce costs and improve net income significantly while spreading organic, eco-friendly farming methods.

In the villages of Washim and Akola districts that I visited, farmers happily talked about the improving prospects of their farms even though reports of distress were being received from other parts of the region. A key factor was the ready availability of a technology which reduced costs significantly while maintaining productivity and protecting the environment.

Sunjay Bhagat, a farmer of Washim district, said that he had incurred debts in his earlier high cost, chemical-intensive farming and had lost all hope in life. It was at this stage that he heard about INSAP and decided to give it a try. As his first experiments yielded good results, he was greatly encouraged and giving up all depressive thoughts, he worked with dedication on his farm. The results were so good that he can soon became a campaigner for INSAP, taking its message of environment-friendly, low-cost farming to more villages and farmers.

No matter how good such efforts, the landless generally cannot benefit from them. The ABSSS, working in Patha area of Bundelkhand among Kol tribals who were toiling in conditions of near bondage, gave highest priority to obtaining actual occupation of land which they had been allotted under the land reform programme but had not been able to cultivate for years. Success in this as well as in bonded labour abolition created the conditions in which landless workers, some of them bonded, could emerge as small farmers. The next stage was to take up water conservation work (which won a national level award as well) with community participation and now even the poorest of the poor could benefit from small irrigation works to obtain good productivity on their land.

More recently in the same Bundelkhand region, a voluntary organization named Srijan has teamed up with five other organizations (CARD, Arunoday, ABSSS, HARTIKA and YKVM) to create a consortium for implementing a programme called the Bundelkhand Initiative for Water, Agriculture and Livelihoods. Aimed at securing sustainable livelihood improvement and enhancement of income of about 118,000 farmers in 1,000 villages of nine districts, this programme has already reached about 30,000 farmers.

Some of its highlights so far have been the properly planned digging of pits (dohas) in rainwater channels or nullahs to conserve water for use over a longer time, renovation of existing water sources, spread of cost reducing and sustainable farming technologies, setting up about 170 centres in various villages as hubs for such farming practices, creating small forests based on dense growth of mixed indigenous species of trees, kitchen gardens, mini-orchards and multi-layer vegetable gardens. Several farmers with very small plots of land have also been able to increase their income significantly by growing multi-layer vegetable farms.

Most of these efforts have given special attention to the needs of small farmers and to their need to keep down costs of cultivation. This attracts a lot of farmers as the need for reducing costs significantly while maintaining productivity is felt acutely by most of them. In fact, several dedicated farmers have even managed to improve productivity while reducing costs. The fact that ecologically protective farming methods are at the same time strengthening the base of farming in the form of improved soil and water conservation holds out the promise of even better progress in years to come. Such efforts should be encouraged by the government and the lessons emerging from such work of proven success and promise can help to improve government programmes which have a much wider reach.

(The writer is Honorary Convener, Campaign to Save Earth Now. His recent books include India's Quest for Sustainable Farming and Healthy Food, A Day in 2071 and Man over Machine.)

Punjab govt sets up panel to look at alternative crops to paddy

Punjab Chief Minister Bhagwant Mann on Thursday said he has formed a committee under the chief secretary to look at alternative crops that require less water compared to paddy. Mann said sowing of the paddy crop over the years has led to several problems including depletion of underground water table and issues related to stubble burning. He said he has formed a committee under the chief secretary which will meet farmers in different villages and see which crops consume less water and bring more income to farmers as a replacement of paddy. The committee will submit the report to him, he said in a video message. The CM said his government was taking steps to promote basmati, cotton, moong and pulses. He said his government wanted to increase the area under the cotton crop. The CM said from April 1, canal water will be made available for irrigating cotton crop up to tail ends. He said 33 per cent subsidy was being given on cotton seeds which are certified by the Punjab Agricultural University (PAU).

Social enterprise incubator Villgro nurturing startups to solve India's agriculture water crisis

KUMUD DAS

Villgro supported the startups with grant capital of total Rs 3.25 cr with average ticket size being Rs 35 lakhs. The social enterprise incubator has also enabled follow-on fundraise of Rs 30 cr

Nearly 80 per cent of India's freshwater are consumed by agriculture, but in an inefficient way. With most of country's rural households dependent on agriculture, millions of lives are at stake.

Social enterprise incubator Villgro, in 2019, collaborated with Hindustan Unilever Foundation (HUF) and launched 'Ag-Water Program' to solve India's agricultural water crisis. Under this programme, Villgro has identified, accelerated and scaled up some of the prominent enterprises working in the agricultural water space today. Maithili Rege, Associate Sector Lead (Agriculture), Villgro in an interview with *Bizz Buzz*, says, "Villgro's theory of change believes that social entrepreneurs will lead the transformation of the Indian agriculture sector by catalysing existing government and corporate initiatives through their innovative solutions. Little support at the early stages for market-based models helps them take root, making future growth independent of donor funds. The water impact at the model's core will scale with it"

Maithili Rege, Associate Sector Lead (Agriculture), Villgro

Going forward, we want to broaden our scope of intervention to supporting startups with solutions that can reduce pressure on land and water systems and make smallholder farmers climate-resilient

WHAT is Ag-Water Program? Please give a brief.

Nearly 80 per cent of India's freshwater are consumed by agriculture, but in an inefficient way. If we want to solve the problem of water in India, it has to start with agriculture. With most of country's rural households dependent on agriculture, millions of lives are at stake. The complexities of the challenge have inhibited stakeholders from finding solutions on their own. While NGOs don't have access to the latest innovations, tech-savvy social entrepreneurs don't have access and reach to farmers and communities. In 2019, Villgro and the Hindustan Unilever Foundation (HUF) came together and launched a programme to identify and support social entrepreneurs to solve India's agricultural water crisis.

What was the vision and goal of this programme when it was initiated three years ago?

Our goal was to identify and support the most innovative startups improving the use of water in agriculture, and helping them scale. Villgro's theory of change believes that social entrepreneurs will lead the transformation of the Indian agriculture sector by catalysing existing government and corporate initiatives through their innovative solutions. Little support at the early stages for market-based models helps them take root, making future growth independent of donor funds. The water impact at the model's core will scale with it.

In 2019, Villgro and the Hindustan Unilever Foundation (HUF) came together and launched 'Ag-Water Program' to solve India's agricultural water crisis. Under this programme, Villgro has identified, accelerated and scaled up some of the prominent enterprises working in the agricultural water space today

What was the plan of action/strategy to address the problem statement and the approach for its implementation?

We took a broad lens to the problem of water use in agriculture, looking at solutions from different angles:

- Technology: Solutions directly influencing water usage in agriculture through a tech intervention.
- Farmer behaviour: Solutions that incentivise farmers to grow water-efficient crops and adopt climate friendly cultivation practices by improving the agriculture value chain and providing market access for their produce. Also focuses on accelerating women entrepreneurs.
- Sandbox to test early stage innovations: Enabling early stage startups that help rural communities use water more efficiently, test and validate their idea in the field.

We enabled these different types of startups to scale by supporting them through expert mentors, technical assistance for product development, marketing and impact monitoring. We also supported them with field pilots.

How many enterprises have been incubated under this programme? Please introduce us to a few and what were the key measures in selecting them?

After screening 3,500 enterprise profiles, we selected the nine most impactful start-ups. We evaluated their business models for impact potential and financial viability. We evaluated their teams for their passion and ability to solve the problem.

Few startups selected under the programme are:

1. CultYvate - Selected for its tech solution which leads to efficient use of water in paddy cultivation. CultYvate's IoT-enabled cloud-based smart irrigation system provides precise irrigation and fertigation advisories based on the crop needs. The soil moisture sensor (fixed in the field) understands the water demand based on the type of the crop, its age, the soil texture and daily weather conditions.
2. Urdhvam - Selected for its tech solution which revives existing, failed and low-yielding borewells used for irrigation. Urdhvam's Borecharger tool - Using IT, IoT, robotics increases the yield of failed or low yielding borewells as enabler, thereby providing safe and sustainable water for drinking, domestic and irrigation needs of farmers and making villages/habitations sustainable for future generations.
3. Kritsnam - Selected for its data driven water management solution which enables equitable distribution for agriculture, drinking and industrial purposes. Kritsnam empowers customers with water intelligence. The company's decision-making systems for water management are developed using a combination of ground IoT sensors, remote sensing, user inputs and crowdsourcing data.

Can you tell us about the current size, growth, and profitability of the enterprises onboarded at large?

Revenue at the portfolio level during the last FY22 was Rs 8.54 crore which jumped to Rs 14.11 crore during April 2022 to Feb 2023 showing a 1.65 times jump.

Please elaborate on the opportunities provided to enterprises in terms of grants, funds, equity, etc. Have any of these enterprises received follow-on investments?

Villgro supported the startups with grant capital of total Rs 3.25 crores with average ticket size being Rs 35 lakhs. Villgro also enabled follow-on fundraise of Rs 30 crore.

What is the total number of jobs created and lives impacted directly or indirectly?

As many as 21,000 lives have been impacted (direct and indirect)

Which enterprises stand out in terms of impact, profitability, growth, creation of jobs, and overall improvement in livelihoods?

CultYvate, Urdhvam and Kristnam stand out from the programme

1. CultYvate
   - Farmers reached - over 600
   - Litres of water saved - over 150 crore
   - Acres under sustainable cultivation - over 1,200
2. Urdhvam
   - Borewells recharged - over 1400
   - Litres of water recharged - over 20 crore
   - Lives improved - over 15,000
3. Kritsnam
   - Litres of water monitored - over 1300 crore
   - Follow on funding raised - over Rs 15 crore

In the past three years, how much improvement has the Ag-Water Program been able to bring to solve the water crises? What are Villgro's upcoming plans to address the issue?

In last three years, the programme identified, accelerated and scaled up some of the prominent enterprises working in the agricultural water space today. It had considerable success across multiple dimensions.

- Liters of water saved - 160 crore
- Liters of water monitored to enable decision making- 1,300 crore
- Liters of groundwater recharged- 20 crore
- Follow on funding raised by the startups - Rs 30 crore
- Acres under sustainable cultivation - 2,500
- Lives touched - 21,000

Upcoming plans: The impact created by our portfolio startups proved once again that market-based solutions can create deep and potentially lasting impact. Through this programme, Villgro got a chance to dive deep into learning about the activities that put pressure on land and water systems. We also see the struggles faced by farmers only increasing with climate change. But to solve these complex problems, we need multiple players to come together. So going forward, we want to broaden our scope of intervention to supporting startups with solutions that can reduce pressure on land and water systems and make smallholder farmers climate-resilient.

How has HUF contributed towards the Ag-Water program as a partner?

The partnership reflected a synergistic approach between HUF and Villgro where HUF supported Villgro in screening start-ups and providing access to its on ground implementation partners for field pilot and scaling up of solutions.

How far have Villgro and HUF been able to push the incubated enterprises in the right direction?

Through this programme, Villgro has supported some of the more successful startups shaping the use of water in agriculture today. This is evident from the business growth and impact numbers as shared above.

Fertiliser sales up 2% in Apr-Feb of FY23

94 units shut as Centre acts against illegal fertiliser sale

Cabinet nod to 80% subsidy on certified millet seeds

Govt To Roll Out MP State Millet Mission Scheme In All Districts

Be wary as climate change can put economy and human survival at risk

Human life depends on nature's bountiful in the form of forests, rivers, oceans and earth

Dr Narendra Mairpady

CONCERNS are being expressed throughout the world about the substantial risks to the economy, financial sector's stability and loss of life due to climate change. These come in the wake of an unprecedented rise of extreme weather catastrophes like heat wave, wildfires, hurricanes, earthquakes, abnormal rainfall, cloud bursting and unseasonal rainfall. Each has caused substantial destructions, including taking a heavy toll of lives and economic losses. These have adversely impacted health, food security, water availability and an alarming dearth of clean water.

Recent instances like the massive earthquake at Turkey not killed many people but also caused damages estimated at $ 34 billion, roughly four per cent of the annual output.

In India, recently we witnessed the issues of subsidence-hit Joshimath town in Chamoli district in Uttarakhand. Extreme heat waves, which will not only have a bearing on the day to day life of people but also affect the availability of water, reduce food production or cause damage to standing crops. It is reported that for every one degree increase in temperature, the yield of wheat, soybean, mustard, groundnut, potato and such other food products are expected to decline by up to seven per cent. There is also the threat of E1 Nino, observed every 3-5 years, which will affect normal monsoon that is paramount for the success of our agriculture.

We are all aware of the importance and significance of 'nature' in our life. In fact, our very existence depends on nature's bountiful benefits like our forests, rivers, oceans and earth. However, humans, for their selfish benefits, have exploited all natural resources, forests and excessive land use.

In the words of Karen Ellis, Chief Advisor, Economics and Development WWF-UK, "If we start to understand the value of nature to our society and economy, we will recognise the importance of living in harmony with nature rather than destroying it for short-term gains. So many governments and businesses around the world are now realising this, and starting to act- it gives me real hope for the future".

As per the latest The Living Planet Report 2022 there has been an average decline of 69% in species population since 1970.

According to the report "the evidence is unequivocal- we are living through the dual crises of biodiversity loss and climate change driven by unsustainable use of our planet's resources "

United Nations' Intergovernmental Panel on Climate Change "has warned that humanity is not doing enough to limit the effects of climate change. IPCC noted the nearly half of the world population was already vulnerable to increasingly dangerous climate impacts".

According to the UN report, "Land degradation now affects half of the world's population and its economy. Damage to soils and water, has dire consequences for humanity. The economic returns of restoring land and reducing degradation, greenhouse gas emissions and biodiversity loss could be as high as $140 trillion every year-up to 50%more than $93 trillion global GDP in 2022."

Every April 22 is celebrated as World Earth Day to promote awareness and to show our commitment to save the planet.

This year its theme was 'Invest in our Planet', which emphasised the need to take immediate action to protect our planet by addressing problems related to climate change and environmental challenges. Let us all rise up and come together to do out bit to save nature and the environment by reducing emissions, food wastage and pollution, reclaiming degraded land, responsible use of water, protecting and preserving forests, planting trees, respecting the freedom to live of birds, animals, insects, and other wildlife animals. There is also a necessity to consume less meat and avoid excessive killing of animals.

All of us are aware of the dangers coming from climate change like global temperatures have risen abnormally in recent years.

According to the World Economic Forum (WEF) global carbon dioxide emissions have risen to record highs last year. Such CO2 emissions are causing the greenhouse effect, trapping heat and making the earth 1.11 degrees warmer. This will lead to lot of health issues.

According to World Health Organisation (WHO) "climate change is the biggest health threat facing humanity as will take 2.50 lakh lives every year between 2030 and 2050 through heat stress, malaria and malnourishment.

Prime Minister Narendra Modi has given a call for Mission 2070 - A Green New Deal for Net-zero India. Accordingly, India has submitted its first NDC in 2016 that included a number of qualitative and quantitative elements like a target of 49% installed electricity generation capacity from non-fossil based energy resources by 2030, a target to use 5% biodiesel in railways, a commitment to reduce economy-wise emissions intensity with respect to GDP by 33-35% below 2005 levels by 2030, a carbon removal target of creating an additional carbon sink of 2.5-3 billion metric tons of CO2 equivalent through additional forest and tree cover by 2030, an intent to continue economic development while decarbonising and increasing adaptation actions.

According to the Mission, the country's transition to net-zero economy would create over 50 million jobs and contribute more than $one trillion in economic impact by 2030 and around $15 trillion by 2070. It should be the coordinated and collective efforts of all stakeholders both Central and State Governments, corporates, regulators, financial institutions and every citizen to involve, engage and take effective steps and climate change mitigating efforts for achieving 'Green Economy'. A lot of action has already been taken in terms of alternative energy like solar, wind, hydropower, electricity vehicles, corporates adopting ESG and initiating actions to reduce carbon emissions, disclosure by Business Responsible and Sustainable Reporting and establishing a National Hydrogen Mission.

The RBI had last July issued a discussion paper on climate change. After receiving feedback, the bank stated in February it would issue three guidelines providing framework for how Indian banks may accept deposits invested in Green activities, another framework for disclosing climate-related financial risks and guidance related to climate scenario analysis and stress testing. RBI has since issued guidelines for Green deposits.

Climate change and environmental setbacks put at risk several factors, including economic risk, financial and human survival, which can have both short-term and long-term negative impacts. Developed and developing countries have to work together to reduce the heat levels by limiting warming to 1.5 degrees by the end of the century. This is a bold step towards mitigating climate change.

Commemorating the World Environment Day, India has given a new slogan of "Vasudhaiva Kutumbaka" or " One Earth, One Family , One Future ".

Essentially, the theme affirms the value of all life-human, animal, plant and microorganisms - and their interconnectedness on the universe. The theme also spotlights LiFE (Lifestyle for Environment) , with its associated, environmentally sustainable and responsible choices, both at the level of individual lifestyles as well as national development, leading to globally transformative actions resulting in a cleaner, greener and bluer future.

This is an opportunity for all of us towards saving earth, environment and the planet to ensure a secure future of the future generations.

(The author is former Chairman & Managing Director of Indian Overseas Bank)

NEWS DIGEST

Illegal pesticide godown raided

Deep-tech startups deal with fundamental problems

Using satellites, AI & cloud for agri insights

Making agri practices climate-smart

DEVINDER SHARMA

THIS is something that I sometimes wonder. If G-20 members have to do what the rich developed countries have been telling us to do, what is the way out for developing countries to chart a new pathway to emerge out of the climate crisis?

It was dismaying to read reports of the firstday's happenings of the second Agricultural Deputies Meeting (ADM) of the Agricultural Working Group (AWG) under India's G-20 Presidency that began at Chandigarh on Wednesday last.

I wasn't expecting the G-20 agricultural deputies to endorse the vision, howsoever questionable, that has time and again been spelled out by billionaires like Bill Gates and by technology-rich conglomerates.

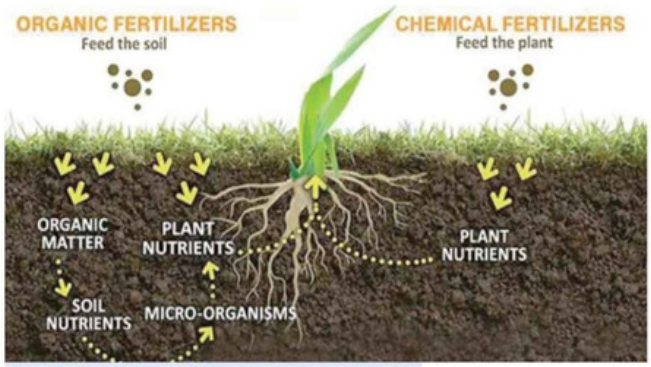
Focusing on four thematic issues – a) current challenge of food security and nutrition; b) sustainable agriculture with a climate smart approach; c) inclusive value chains and food systems; and, d) digitalisation for agriculture transformation – is on the same lines as various other initiatives across the globe. Just the other day, Chandigarh-based 'The Tribune' reported that India had signed the controversial UAE-American led Agriculture Innovation Mission for Climate (AIM4C). Accordingly, the $8billion initiative that India joined has 275 partners, including 42 governments. It also has PepsiCo and the meat producer JBS on rolls.

This follows the US President Joe Biden's programme to invest $3.1 billion for climate-smart agriculture, under which the US Department of Agriculture gets a grant for 141 experimental projects. Although his Agriculture Secretary Tom Vilsack calls it a 'transformational' new era for American agriculture, there are many others who question the misplaced reliance on sophisticated technology as the saviour. Tyler Lark from the University of Wisconsin-Madison has been reported as saying: "Agriculture is a huge contributor and has the potential to be a big part of the solution. The risk is that the potential carbon savings and greenhouse gas benefits are overstated."

When I look at the two aforementioned international initiatives to move towards environment-friendly agriculture and compare it with the food security challenges that the agriculture deputies of G-20 countries are coming up with, I don't see any formidable change being proposed in their understanding and a different but grounded perspective as well as approach. It is on the same flawed lines, thereby bringing out a severe drought that currently exists among bureaucrats.

With the first meeting that was held at Indore some weeks back also drowned in the same faulty projections, the second deputies meeting was expected to be opening up to innovative and progressive farmers and civil society representatives. But that didn't happen. This is essentially because bureaucrats continue to maintain a tight control.

Several studies have shown that as farming in the Green Revolution era got more industrialised, higher were the greenhouse gas emissions from agriculture. The non-profit Environment Working Group (EWG) estimates that if no drastic measures are taken, emissions from US agriculture will increase three times by 2050, increasing to 30 per cent, from the existing levels of 11 per cent.



What surprises me is that the G-20 agriculture deputies too feel obligated to promote the agenda of the developed countries. They can instead propose and build up on the inherent strengths of the developing countries, where communities over the centuries have lived in peaceful coexistence with nature and environment. much headway can be made if we appreciate, recognise and learn from the communities that had lived in tune with environment. Let's not be ashamed to learn from the communities in the developing world

I am amused when I see discussions around inclusive value chains and the food systems at a time when a spate of acquisitions and mergers have brought control and power in the hands of a few commodity giants. Cargill, the largest player, has already acquired 113 smaller companies and now controls 75 to 90 per cent of the global trade in grains.

A study by non-profit ETC has shown that over the years just four corporations control 60 per cent of the agrochemical markets and just two companies have 40 per cent control over the seed markets. It will, therefore, be interesting to know how the G-20 expects to make the agricultural supply chain inclusive.

In one of my earlier columns, titled: "India should use G-20 Presidency to rebuild food security, agri narrative" (Bizz Buzz, Feb 17) I have explained at length the implications of enhanced digitalisation, Artificial Intelligence and climate smart agriculture. I also believe in technology, but to avoid the risk of being repetitive, the overt emphasis on technology as the saviour is not going to be helpful for the simple reason that technology is actually a major part of the problem. While a magical technological package is being proposed, and with billionaires financing a global campaign to build up a narrative as if technology has the solutions, in reality the technological giants see a huge profit here given the proprietary control it can yield.

Nevertheless, fighting climate change is a two-way process. A lot of learning has to come from farming communities in the developing countries, which have, over the centuries, demonstrated the skills to live with nature. Instead of dismissing this as a sign of backwardness or of failure in applying the principles of modern scientific and technological prowess, much headway can be made if we appreciate, recognise and learn from the communities that had lived in tune with environment. Let's not be ashamed to learn from the communities in the developing world.

This reminds me of a dinner meeting I had several years back with the then British Minister for International Affairs, Hillary Benn. I was invited to a London meeting, which the Minister was having with leaders of the civil society. These stakeholders were discussing what initiatives Britain could undertake under DFID to promote sustainable farming practices in India. While everyone came up with a lot of suggestions, and when asked if I could also list a few expectations that Indian farmers would have from DFID, my answer was very simple. "I don't understand how is Britain qualified to suggest sustainable farming practices to India when its own agriculture is devastated. With hardly one per cent population remaining in agriculture, and that too faced with huge environmental consequences, my suggestion would be to instead to learn from the Indian farmers," I replied in a matter-of-fact tone.

Let there be a two-way channel for building sustainable agriculture practices. This of course was not acceptable to most of the civil society leaders present. While I acknowledge that what I said did hit the white supremacy (as I could feel), what surprises me is that the G-20 agriculture deputies too feel obligated to promote the agenda of the developed countries. They can instead propose and build up on the inherent strengths of the developing countries, where communities over the centuries have lived in peaceful coexistence with nature and environment. India can, and should, take a lead in rewriting the climate agenda for sustainable agriculture. It can't leave it to a team of agriculture deputies.

(The author is a noted food policy analyst and an expert on issues related to the agriculture sector. He writes on food, agriculture and hunger)

Cotton exports may hit 19-year low

RECESSION IMPACT. Poor demand due to economic slowdown affects shipments; USDA pegs them at 23 lakh bales

Subramani Ra Mancombu
Chennai

Cotton exports will likely decline to a 19-year low this season (October 2022-September 2023) on poor demand for importing nations in view of the economic slowdown in the US and Europe.

According to the US Department of Agriculture (USDA) "Cotton: World Markets and Trade", Indian cotton exports are projected lower by 500,000 bales this month to 1.8 million (US bales of 227.72 kg or 23.05 lakh Indian bales of 170 kg), roughly equal to its import forecast.

"So far, only 9.5 lakh bales (170 kg) have been exported since the beginning of the season in October. I see exports not exceeding 20 lakh bales," said Anand Popat, a Rajkot-based trade in cotton, yarn and cotton waste.

MORE IMPORTS?

If Popat's estimates turn out to be true, then cotton shipments will drop to the lowest seen when Indian began planting genetically-modified cotton.

"Exports have historically exceeded imports by a significant margin, and the last time that imports exceeded exports was nearly 20 years ago," the USDA's report said. Data show that cotton exports in the 2004-05 season were 10 lakh bales after which shipments from the country surged to top 100 lakh bales in early 2010s.

The Cotton Association of India, a body of traders, has estimated exports at 30 lakh bales against 43 lakh bales last season.

HOLDING BACK. The International Cotton Advisory Council said that farmers have been parting with their produce slowly this season, expecting better prices

BANGLA ONLY BUYER

"Shipments of cotton this year have been minimal. Only Bangladesh seems to be buying some quantity. Other imports have not shown interest," said Ramanuj Das Boob, a sourcing agent for multinational companies in Karnataka's Raichur.

"One of the biggest drawbacks in exports this year is that China has not imported. It seems to be sourcing its needs locally. Even Bangladesh has imported less as it is facing foreign exchange problems," said Popat.

TO CONTINUE TILL H2

Prabhu Dhamodharan, Convenor, Indian Texpreneurs Federation, said demand for Indian cotton abroad may not pick up until the second half of the current fiscal.

"Export demand for cotton will be muted this year. Capacity utilisation in other textile manufacturing countries is at lower levels and will inch up only gradually and move towards a steady state of business status in H2 of FY24," he said.

The International Cotton Advisory Council (ICAC) said cotton arrivals in India had been delayed, resulting in its production estimates being lowered twice. It has currently lowered Indian cotton production projections to 305.88 lakh bales.

"The arrival numbers have been unusually low, possibly because farmers — who so recently enjoyed near-record-high prices — are holding onto their cotton in the hope that prices, which have dropped recently, start to trend upward again," the ICAC said.

This season, farmers have been parting with their produce slowly expecting better prices. Their expectations stemmed from the record prices of ₹12,000 a quintal they fetched last season for *kapas* (unprocessed cotton).

Adapting to climate change is imperative

AS MITTAL

For a country like ours, which experiences almost extreme weather conditions every year, resilience building must be given top priority

The agriculture sector is highly vulnerable to climate change and is a big challenge for the agrarian economy. Food-bowl Punjab and Haryana farmers' fetish for unsustainable big cereal wheat this time has begun to hurt, as returns diminish due to climate challenges. The climate challenge farmers faced this time was erratic rainfall at the end of March, while crops were ready to harvest, likely to affect the yield significantly. In the case of Punjab, the initial deliberation by the agriculture department has indicated that at least 40 per cent of 35 lakh hectares of wheat sown is impacted by rain, winds, and hailstorms.

The serious challenges from climate change-induced impacts of erratic rainfall and the heat waves are not just a threat to our food security and nutrition as well as to the livelihood of 45 per cent of the country's population that depends on farming. It has an impact on their crop loan cycle to return on time to get fresh lending and to invest back into their farms.

Policymakers, agri-scientists and farmers must come together to confront the challenge of climate change. Various climate change policies are established at international, national and state levels to address the impacts of climate change. Traditionally, the focus of such policies remained on mitigation instead of adaptation measures. Adaptation actions are needed to respond to climate change as these actions help reduce vulnerabilities.

Overuse of resources like water, soil, fertilisers and pesticides to boost yield resulted in Green-House Gases Emissions (GHGs). Take the example of Punjab, after the implementation of the Food Security Act; the nation is again looking toward Punjab, but Punjab farmers need to conserve its soil and water management along with adopting diversification in agriculture.

Why are the funds dwindling?

However, the National Mission on Strategic Knowledge for Climate Change (NMSKCC) seeks to build a dynamic knowledge system that would inform and support action for responding effectively to the objective of ecologically sustainable development making agriculture climate resilient.

The National Adaptation Fund for Climate Change (NAFCC) was established in 2015 to meet the cost of adaptation for the States but why are the funds dwindling to address this serious challenge? The grants released under NAFCC fell from ₹350 crore in 2015-16 to ₹27.76 crore in 2022-23, while the sub-committee of the Ministry of Finance estimates the cumulative expenditure for adapting to climate change at ₹ 85.60 lakh crore by 2030.

Research and development is the bedrock of climate resistance agriculture but the minuscule investments in R&D impede the ability of science and technology research to tackle multiple challenges. As per the Indian Council of Agriculture Research, around 85 per cent of their budget goes towards salaries and other administrative/establishment expenditures, with little left for research. The same is with state agriculture universities facing a financial crunch for R&D work. The total R&D expenditure in India as a percentage of agricultural GDP has been stagnant at 0.3 to 0.5 per cent in the last two decades. It is much lower than in the US (2.8 per cent), China (2.1 per cent), South Korea (4.3 per cent), and Israel (4.2 per cent).

> POLICYMAKERS, AGRI-SCIENTISTS AND FARMERS MUST COME TOGETHER TO CONFRONT THE CHALLENGE OF CLIMATE CHANGE. VARIOUS POLICIES ARE IN PLACE AT INTERNATIONAL, NATIONAL AND STATE LEVELS TO ADDRESS THE IMPACTS OF CLIMATE CHANGE

For a country that experiences almost extreme weather every year, adaptation and resilience building must be a priority. India needs more granular risk analysis that can help target appropriate adaptation action locally while making new infrastructure climate resilient and strengthening early warning systems.

An analysis by the Council on Energy, Environment, and Water found the frequency and intensity of extreme climate events increasing by almost 200 per cent since 2005 and three out of four districts of India are facing extreme climate change. Experts' analyst estimates show that climate change might reduce global agriculture productivity by 17 per cent by 2030. According to a study by the World Meteorological Organisation, India is estimated to have suffered an average annual loss of more than ₹6 lakh crore from climate-induced changes.

The way forward:

To face these risks, adaptation is the key factor. Farmers should start promoting sustainable integrated agriculture practices that could enable them to lower their vulnerabilities by higher crop diversity from staples to high-value crops, fruit and vegetables. Integrated farming with the inclusion of dairy, poultry, beekeeping, fisheries and mushroom cultivation can give additional high-energy food without affecting the production of food grains. There are four sustainable ways farmers can produce more food.

First, Farmers need handholding in the early phases. Support them for knowledge exchange with skill-intensive practices. Second, support technology innovation and adaptation to minimise their vulnerability. Third, Instead of input-based subsidies for fertiliser and power, incentivising outcome-based support could encourage innovation. Four, and the most significant, is enhanced research and development for impact studies compared with conventional farming across agro-climatic zones.

(The writer is vice-chairman of Sonalika Group, and vice-chairman (Cabinet Minister rank) of Punjab Economic Policy and Planning Board)

Green skill development programme in India

Dr Mukesh Kwatra
New Delhi

Sustainable development is becoming more and more crucial as the globe struggles with issues like pollution, climate change and the loss of natural resources. By boosting renewable energy, lowering greenhouse gas emissions, and expanding access to clean water and sanitary facilities, India has made considerable strides toward sustainable development in recent years. The Green Skill Development Program (GSDP) is one of India's most important efforts to promote sustainability.

The National Skill Development Corporation (NSDC) is in charge of implementing the GSDP, which was introduced in 2017 by the Ministry of Environment, Forest, and Climate Change (MoEF&CC). The course aims to develop a pool of qualified workers in the environment and forest sector, including renewable energy, pollution control, and biodiversity preservation. It focuses on giving young people, especially those from rural and poor areas, training and certification in a variety of "green skills" for the nation's sustainable growth.

Green skills

Green skills refer to the knowledge, abilities, and expertise required to develop and implement environmentally sustainable solutions in various industries and sectors. These skills are related to environmental protection, renewable energy like solar and wind energy, sustainable agriculture, waste management, and other areas that support sustainable development.

The GSDP has identified 80 different green skills that are in demand in India. These skills are categorised into various sectors like biodiversity conservation, environmental management and pollution control, renewable energy, energy efficiency, waste management, sustainable agriculture, climate change mitigation and adaptation, sustainable water management, eco-tourism, sustainable building designs, and sustainable construction.

Dualistic strategy

The GSDP has a two-pronged approach. On one hand, it provides training for the enhancement of skills and knowledge to those who are already working in the environmental sector, such as forest guards, park rangers, and environmental scientists. On the other hand, it aims to create a new workforce of skilled individuals who can contribute to better management and conservation of the environment in various sectors, such as waste management, renewable energy, sustainable agriculture, etc.

National skills qualification framework

The GSDP is designed to cater to the diverse needs of the industry and the environment sector and is aligned with the National Skills Qualification Framework (NSQF) to ensure standardisation and recognition of skills.

Scope of GSDP

The GSDP has a wide scope and covers various regions and communities across India. It has partnered with several institutions, both government and non-governmental, to implement the programme. These institutions include the Indian Institute of Technology (IIT), the Indian Institute of Forest Management (IIFM), the Wildlife Institute of India (WII), the Centre for Environment Education, and the National Institute of Solar Energy, among others. The programme has also collaborated with state governments particularly the forest departments and pollution control boards to ensure that it reaches all regions of the country.

Benefits of GSDP

The GSDP has several benefits, both for individuals and for the country as a whole. For individuals, it provides an opportunity to gain new skills and knowledge in a growing sector. It also enhances their employability and opens up new job opportunities. For the country, it creates a skilled workforce that can contribute to its sustainable development. It also promotes the conservation and management of the environment.

The GSDP has helped contribute to the growth of the green economy in India. According to a report by the NSDC, the programme has trained over 2 lakh candidates in various green skills and has placed more than 60,000 candidates in jobs in the environment sector. The programme has also created self-employment opportunities for many of the trainees, who have started their own ventures in areas such as organic farming, eco-tourism, and renewable energy.

Recognition

The GSDP has also been recognised and appreciated by various national and international organisations for its innovative approach and impact. In 2019, the GSDP was awarded the Future Policy Gold Award by the World Future Council, in recognition of its contribution to sustainable development and green skills. The programme has also been acknowledged by the United Nations Environment Programme (UNEP) and the International Labour Organization (ILO) as one of the best practice in green skills development.

Challenges

The GSDP has faced some challenges in its implementation. One of the challenges is the lack of awareness among the general public about the programme. Besides, there is a dearth of interest among the industry and employers in hiring green skilled workers. Another challenge is the lack of adequate infrastructure and resources in some areas. The GSDP is a step in the right direction. The programme has the potential to contribute significantly to India's green economy and environmental conservation efforts. With the right support and resources, the GSDP can create a skilled and trained workforce that can drive sustainable development and contribute to the well-being of society, the country, and the ecosystems.

(The writter is the founder of Smiling Tree)

Four products from Goa set to get GI tag in less than 3 months

CAI reduces cotton crop estimate by 10L bales for 2022-23 season

The total cotton production in the last season was estimated at 307.05 lakh bales

Tomar issues crop-specific SOPs for pesticide application through drones

FE BUREAU
New Delhi, April 20

AGRICULTURE MINISTER NARENDRA Singh Tomar on Thursday released standard operating procedures (SOP) for the application of pesticides using drones for 10 crops including rice, wheat, cotton and maize.

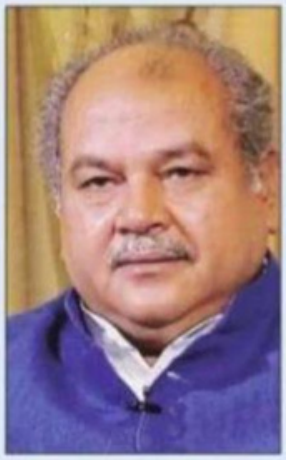
Officials said that drones help in optimum use of soil nutrients and pesticides; there are reports of farmers saving around 20% of their cost of application and reduction in health hazards associated with manual spraying.

"Drone technology has been accepted by the government in the agriculture sector, and in reducing the cost of agriculture and avoiding the side effects of pesticides, farmers will get extensive benefits from drones," Tomar said while releasing the SOP.

The SOPs also cover crops such as groundnut, pigeon pea, soyabean and sugarcane.

Under the agricultural mechanisation sub-mission, Indian Council for Agricultural Research (ICAR) institutes, Krishi Vigyan Kendras and state agriculture universities, as well as other state and central government agricultural institutes and undertakings engaged in agricultural activities are provided financial assistance at 100% of the drone cost, up to ₹10 lakh per drone, besides contingent expenses for demonstration of drones in the farmers' fields.

> Drone technology has been accepted by the government in the agriculture sector... In reducing the cost of agriculture and avoiding the side effects of pesticides, farmers will get extensive benefits from drones."
>
> NARENDRA SINGH TOMAR, AGRICULTURE MINISTER



Farmer producer organisations (FPOs) are given grant-in-aid at the rate of 75% for the purchase of drones for a demonstration on farmers' fields.

To provide agricultural services through the use of drones, financial assistance is given at the rate of 40% of the original cost of the drone by central hiring centres (CHCs) to farmers' cooperative societies, FPOs and rural entrepreneurs for the purchase of drones, subject to a maximum of ₹4 lakh.

In August 2021, the ministry of civil aviation had notified the drone rule to provide necessary regulatory framework for the commercial use of drones.

Subsequently, the government liberalised the scope of drone rules by introducing the PLI scheme for boosting drone manufacturing by private companies. PLI provides for an incentive of ₹120 crore, over three financial years. Currently the cost of each drone is around ₹7 lakh-8 lakh.

According to industry estimates, there are more than 1,000 drones used for agricultural purposes. In the next one year, there would be around 3,000 drones in operation for agricultural use.

Last year, the agriculture ministry had released standard operating procedures for the use of drones in pesticide and nutrient application.

With the civil aviation ministry relaxing the relevant rules, a clutch of firms, including IoTechworld Aviation and Garuda Aerospace, have firmed up plans to manufacture and sell such drones for farming.

India begins sector-wise analysis of EU carbon tax

Expert moots ban in '09 WHO study, spares pesticide in '22

Draft Now Removes 24 Of 27 Formulations From Ban

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