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Students try their hand at natural farming



Children were taught the use of herbal pesticides. (Above) Students from Anna Gems Science Park School, Kotturpuram

This October, 575 school children attend workshops on organic and Vedic natural farming conducted by Parampara at its Bharatiya Vedic Krishi Parampara (BVKP) farm at Kairambedu Village, Guduvancheri.

The project aims to revive traditional Indian farming practices, which are ecologically sustainable and enriching, and based on holistic knowledge and understanding of natural processes.

Students from Padma Seshadri Bala Bhavan, T. Nagar and Anna Gems Science Park School, Kotturpuram, participated in the ‘farming is fun’ workshops conducted by the organisation.

Four workshops were held in the month, where children interacted with BVKP farmers and learnt about aspects of natural farming and the challenges in agriculture today.

The children were taught the process of making and the use of herbal pesticides, making Panchagavya (a cow-product based growth stimulant and

immunity booster for plants) and the techniques of making soil naturally fertile.

Children also had hands on experience on farming activities like transplanting paddy saplings and allied farm activities like weaving and winnowing, feeding the cows and taking care of them, said a press release.

Educational Institutions/ others interested in getting this farming experience can contact Bharatiya Vedic Krishi Parampara at 24991516/ 9600178324.

A model in mixed farming



The 20-foot-tall pepper plant at the farm of C Mohandas, former Principal Scientist, ICAR, in Kanyakumari district of Tamil Nadu.

Farm yard manure is applied in alternate years and hand weeding is carried out around the base of pepper vines while taking care not to disturb their base

The two-decade-old farm located in a slope at Erithavoor village near Maruthencode of Kanyakumari district, Tamil Nadu, has turned out to be a model. It is surrounded by paddy and banana fields. The one-hectare land is free from diseases and pests as no insecticide, nematicide, fungicide or weedicide is used. The one-time paddy farm sports a different look now with arecanut trees draped in pepper vines along rows of trenches filled with water almost all through the year.

When C. Mohandas, former Principal Scientist, Indian Council of Agricultural Research, found growing paddy labour-intensive, he switched to banana. From 1995, he started to experiment with mixed farming, using trench irrigation. As the erstwhile paddy field always had water stagnation in 11 months of the year, it had to be drained periodically. Hence, small drainage channels were dug and the mud was used to create long bunds around arecanut trees. Whenever they dry up, the silt is used to improve the health of the soil. Only surface water is used for irrigation in this rainfed farm.

As the arecanut trees grew up, Mr. Mohandas obtained Karimunda variety pepper's runner shoots from Indian Institute of Spices Research, rooted them in poly bags and planted them at the base. Harvest of pepper started in 1997 and now Mr. Mohandas is able to pluck pepper two to three times a year because of the copious water running in trenches. "Mine is a disease-free farm. I occasionally use one-tenth of the recommended level of chemical fertilisers, but no pesticides or insecticides. Pests are found in the nearby paddy field, which uses chemical agents. Against the normal height of 10 feet per climber, my plants go up to 20 feet," says Mr. Mohandas.

In the last few years, the only investment for him is on labour. He also raises banana, ginger, turmeric and amorphophallus as inter-crop and grows fish in the streams. Goats used to be reared using weeds obtained from the farm and the goat manure was recycled into the farm. Farm yard manure is applied on alternate years and hand weeding is carried out around the base of pepper vines while taking care not to disturb their base. The income is from pepper, arecanut, inter-crops and fish, besides pepper saplings. He reaps an average

of 500 nuts per arecanut tree. Nurseries of climbers and bush pepper, which is ideal for home gardens, are raised at the farm.

Mr. Mohandas claims that the yield in the farm is increasing. It was two kg dry pepper in April-May and September 2014 in the off-season and went up to six kg per climber during December, the main season. As no pesticide was used for over two decades there is a build up of a number of predators and parasites of pathogenic insects and fungi. Runner shoots in the farm are used to produce about 10,000 rooted cuttings, which are sold at Rs.15 each. About 5,000 bush pepper seedlings are raised from lateral branches. About 1,000 orthotropic shoots are also used to produce seedlings which are sold at Rs.25 each. He uses locally designed humidity chambers to enhance rooting. “There is a big demand now for pepper and saplings. The demand has been amplified by the crop failure in nearby Kerala,” says Mr. Mohandas.

More details about the farm can be had from C. Mohandas, 29/194 Pastor’s Lane, North Street, Marthandam. Kanyakumari District, Tamil Nadu. Phone: 9843643646, 04651-274607.

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Now, rain guns to save crops

The State government will save the standing crops of paddy, chilli and cotton by procuring rain guns, Minister for Agriculture Prathipati Pulla Rao told *The Hindu* on Friday.

Mr. Pulla Rao said a final agreement would be signed in a day or two with the firms providing rain guns to provide wetting to parched lands under the NSP Right Canal.

The rain guns could pump jets of water covering large areas. But they should be used with caution during flowering season. Farmers would be provided assistance in using rain guns.

“We are working on an agreement under which both the State government and the farmers will share the cost of wetting. We are estimating wetting of each acre will cost about Rs.3,000 to Rs.3,500 and soon we will launch rain

guns in 10,000 acres under NSP command area this year and in next year, we will cover 10 lakh acres,” Mr. Pulla Rao said.

Soil testing lab to be restarted

The Agriculture Department has initiated measures to revamp the soil testing laboratory in Nanjangudu, which was closed for a year now.

A technical team from Bengaluru had examined the machineries at the soil testing laboratory and it would soon replace certain parts in the machinery to ensure enable it to start functioning.

The department is engaged in identifying farmer facilitators to be placed in the laboratory apart from the technical staff to conduct soil testing.

M. Mahanteshappa, Joint Director of Agriculture, told *The Hindu* that the laboratory building in Nanjangudu is in a bad shape and the department was planning to shift it to Mysuru.

He said that he would soon discuss shifting of the laboratory from Nanjangudu to Mysuru with district in-charge Minister V. Srinivas Prasad. If he gives consent, a proposal would be sent to the government, Mr. Mahanteshappa said.

Greens see red over use of weedicides

Migratory birds under threat in Mavoor wetlands



There is growing concern over the widespread use of weedicides in paddy fields by farmers in the Mavoor region.

Residents as well as environment workers from the Kanniparamba, Thengilakkadavu and Palliyol regions adjoining the Mavoor wetlands have raised concerns over the widespread use of weedicides in the paddy fields by farmers.

The poisonous chemical weedicides is likely to harm myriads of migratory birds and other native birds frequenting the area besides the people living in the locality.

Serious threat

Local people have complained that a number of small creatures including insects, frogs and small fishes were seriously threatened by the use of weedicides in the region.

“The birds including migratory ones risk their lives by eating these dead creatures,” says P. Unnikrishnan, an environment activist from the region. People, who reside in the nearby area of the wetlands, have complained to agricultural authorities about the issue.

They said that the chemical weedicides would also affect their lives as it would very easily enter their food chain with a few rains.

“The farmers, who use it extensively are ignorant of its consequences,” says K.M. Ali, a resident from Kanniparamba.

Since most of these weedicides used by farmers are not prohibited ones, the agricultural or the forest/wildlife department also are not in a position to take any strict action against them.

“What we can do at the maximum is to dissuade the farmers from using it by convincing them about its possible ill-effects,” says M. Anithabhai, agricultural officer from the Mavoor agriculture office.

“We can also suggest some organic alternatives for them if the issue is really serious,” says Ms. Anithabhai.

The agricultural officer said that she would visit the fields in the coming days for a detailed inspection of the case.

Sowing completed on half of the targeted area

Sowing has been completed on over 50 per cent of the targeted area for rabi season in Ballari district.

The targeted area for sowing was increased from 1.65 lakh hectares (ha) to 2.04 lakh ha with farmers taking up cultivation in areas left unsown in the kharif season and places where the crops were destroyed due to the failure of monsoon before October.

Jowar, Bengal gram, maize, horse gram, cowpea, sunflower, safflower and cotton are among the major crops cultivated during rabi.

So far cultivation has been completed on over one lakh ha. The break-up is as follows, (figures in bracket indicate the target) Bengal gram 67,788 ha (99,603 ha); jowar 18,143 ha (29,343 ha); maize 1,636 ha (4,095 ha), horse gram 655 ha (3,225 ha), cowpea 681 ha (1,562 ha), sunflower 10,017 ha (52,280 ha), cotton 236 ha (6,605 ha), and sugarcane 350 ha (725 ha).

Ongoing harvest

Sources in the Agriculture Department told *The Hindu* that sowing would further pick up after the ongoing harvest of kharif crops were completed.

“Rabi sowing will continue up to December 15,” Sharanappa Mudgal, Joint Director, Agriculture, told said.

Turmeric auctioned for Rs. 1.65 crore

Turmeric was auctioned for Rs. 1.65 crore at the Tiruchengode Agricultural Producers Cooperative Marketing Society here on Saturday.

While ‘Virali’ variety fetched a price between Rs. 7,155 and Rs. 9,789 per quintal; the ‘kilangu’ variety fetched a price between Rs. 6,425 and Rs. 9,160.

‘Panakali’ variety fetched a price between Rs. 6,000 and Rs. 12,500.

About 2,500 quintals of turmeric was auctioned for Rs. 1.65 crore, a press release of the society issued here said.

Coconut kernels were auctioned for Rs. 1.10 lakh at the Mallasamudram branch of the Tiruchengode Agricultural Producers Cooperative Marketing Society on Saturday.

While first quality coconut kernels fetched a price between Rs. 56 and Rs. 63.65 per bag, the second quality fetched a price between Rs. 38 and Rs. 46.95.

About 70 bags of coconut kernels were auctioned for Rs. 1.10 lakh, a press release said.

Export of oilmeals

The export of oilmeals during October 2015 is reported at just 13,716 tonnes against 2,38,703 tonnes in October 2014, that is down by 94 per cent.

The overall export of oilmeals during April-October 2015 is reported at 7,63,113 tonnes against 12,63,073 tonnes during the same period of last year, that is down by 40 per cent, according to the data compiled by The Solvent Extractors’ Association of India.

Soybean crushing is very much reduced due to continuous disparity and high price of domestic market affecting overall domestic availability of both oils and meals.



The export of soybean meal is at a historical low during current year and reduced month by month and reported 46,980 tonnes compared to 1,40,098 tonnes during the first seven months of the financial year 2015-16.

Similarly, rapeseed meal export is also reduced to one-third of last year. Also, capacity utilisation is at the lowest.

Industry is passing through very tough time and many plants are close down due to disparity in crushing and export, according to a press release.

The robust pace of soybean crushings and ample soybean supplies both in the northern and the southern hemisphere kept world market prices of soya meal under pressure and sharply below the year-earlier levels.

Soybean meal Argentina / Brazil origin being currently quoted CIF Rotterdam between \$360-370 per tonnes, where as Indian soybean meal is quoted at \$500 ex-Kandla.

India is totally out-priced in international market due to high price in local market, it added.

Rabi crop sowing

Around 84 lakh hectares of land have been sown under rabi crops as on November 6, 2015, as compared to 87.27 lakh hectares in the same period in the previous year.

Area under wheat, the main rabi crop, stood at 2.76 lakh hectares, pulses 28.65 lakh hectares, coarse cereals 32.52 lakh hectares, oilseeds in 19.91 lakh hectares and rice in 0.12 lakh hectares, according to the latest figures available with the Agriculture Ministry.

Rabi sowing starts from October while harvesting begins from March.

Foundation stone ceremony of Agri varsity on November 16



Union Minister of State for Science and Technology Y.S. Chowdary has called for extensive use of technology in agriculture

Union Minister of State for Science and Technology Y.S. Chowdary said the foundation stone for the State Agricultural University would be laid on the premises of the Regional Agricultural Research Station, Lam, on November 16. Union Minister for Agriculture Radha Madhav Singh will be the chief guest at the function.

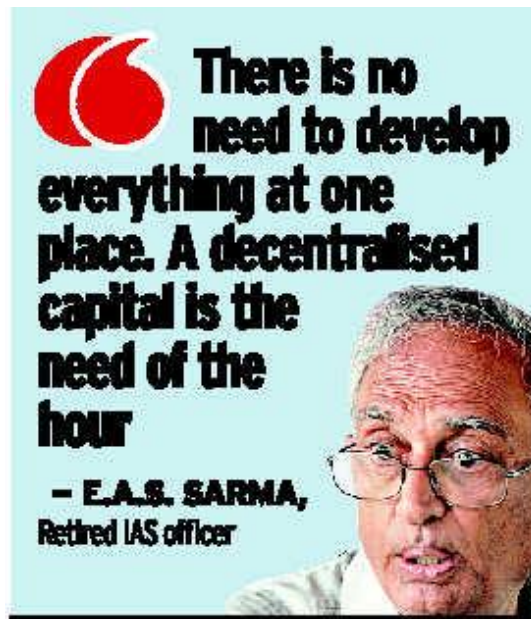
Speaking on the sidelines of the Agricultural Technological Day celebrations organised to commemorate the 115th birth anniversary of Acharya N.G. Ranga at the Regional Agricultural Research Station, Lam, Mr. Chowdary said there should be no doubt over the special package or special status either, as Prime Minister Narendra Modi had promised he would implement every promise made to the State.

Modern farming

Earlier, Mr. Chowdary called for extensive use of technology in agriculture and said innovations in farm technology would end farm distress. “Drip and sprinkler irrigation, a technology imported from Israel, is widely being used by farmers cultivating horticultural crops in the State.

Modern farming practices in cotton and paddy have considerably reduced dependence on farm labour,” he said. The Minister also inaugurated an exhibition on modern farm technologies organised by the Department of Agriculture.

‘Fruits of development should reach all sections’



The fruits of development should reach all sections of people with least possible damage to environment. Unfortunately, successive governments are

bulldozing the interests of 90 per cent of the common people in their bid to protect 10 per cent of the rich investors, according to social activist and retired IAS officer E.A.S. Sarma.

At an introduction of the book: 'Development – destruction', written by late Balagopal, human rights activist, organised by the Human Rights Forum (HRF) here on Sunday, he said that Balagopal had analysed the issue from different perspectives. The government should make available the natural resources and abstain from snatching them away in the name of development.

Referring to the 'Abhivruddhi ganthalu' mentioned in the book, Mr. Sarma said that it was unfortunate that the judiciary was also viewing social activists as 'obstacles to development', when they were opposing the government policies of destructive development. Ignoring the warning of the Sivaramakrishnan Committee that the Vijayawada region was prone to floods, Chief Minister Chandrababu Naidu was bent on building the capital in Amaravati. Around 50,000 acres of fertile agricultural land was being destroyed to hand them over to real estate developers. Ch. Suryanarayana Murthy, a farmer who was being forced to part with his 9.2 acres of land for the Kakinada SEZ, explained how he was being victimised for his refusal to surrender meekly. He said Mr. Naidu, who had assured him of his support when he was in the Opposition, was not responding to his plea for restoration of the land. HRF leader Vasu also spoke.

Water level in dams goes up

Rains accompanied by thunderstorm continued to lash parts of Tuticorin district since Saturday night. It rained heavily at midnight. Poorly maintained and rain-battered roads had been causing hardship to vehicle-users.

Farmers were happy as the timely rain was beneficial to them. K.P. Perumal, district secretary, Tamil Nadu Farmers' Association, said that rain-fed crops such as black gram, green gram, maize, cumbu and sorghum could be

cultivated, thanks to the rain. More amount of rainfall was expected in the coming days to raise crops on rain-fed tracts, he said.

The consistent rainfall following the onset of northeast monsoon increased storage level in waterbodies in the district. Out of the 53 system irrigation tanks, water level reached the brim in 20 tanks and crossed halfway in 33 tanks, sources told *The Hindu*. In Korampallam basin division comprising 54 non-system tanks, water level was 25 per cent in all the tanks, the sources added.

The copious rain in the recent days in Tirunelveli district also gave rise to water level in almost all dams. There was a phenomenal increase in the flow of water into dams. In Gadanathi reservoir, inflow was 97 cusecs until October 26, but after rains it received 839.24 cusecs. In Papanasam dam, the flow during the last month was 870.42 cusecs, but in November the inflow was 2,327 cusecs. In Manimuthar dam, the inflow was 1,220 cusecs in this month whereas it was just 436 cusecs last month.

Inflow in Ramanathi dam increased from 45.60 cusecs in October to 195.29 cusecs in November. There was also a substantial increase in inflow in Karrupanathi dam (from 61 cusecs to 305 cusecs), Vadakkupachayar (from 39 cusecs to 79 cusecs), Kodumudiyar dam (from 59.95 cusecs to 63.17 cusecs) and Adavinainarkovil dam (from 57 cusecs last month to 89 cusecs now), the sources said.

Turmeric farmers asked to take disease prevention measures

With incidence of diseases found in patches of turmeric fields in the district and in nearby districts, the farmers have been advised to take preventive measures to control the disease during tuber formation stage.

The scientists at the Krishi Vigyan Kendra in Sandhiyur, A. Sudha and N. Sriram, said that turmeric is an important commercial spice crop grown in the region. But heavy wind and winter season can damage leaves and affect rhizome development.

Rhizome rot

The turmeric rhizome rot is a major disease in turmeric with a yield reduction of 40 to 60 per cent.

The disease spreads through affected rhizomes and infested soil resulting in collapse of the plant and decay of rhizomes.

Hence the soil should be treated with *Trichoderma viride*, a fungus and a biofungicide, while the seed rhizomes should be treated with 0.25 per cent copper oxy chloride for 15 minutes.

Also the rot affected rhizomes should be drenched with 0.25 per cent copper oxy chloride, they added. For leaf spot and blotch diseases, foliar spraying should be done, the scientists said. For details contact the KVK office at 0427-2422550.

For leaf spot and blotch diseases, foliar spraying should be done

Increased inflow into Mettur Dam brings cheer to farmers



S. Ashokan (second right), Chief Engineer, PWD, Tiruchi, inspecting the Stanley Reservoir in Mettur, Salem district on Saturday.

The good inflow into Mettur Dam for the past few days due to widespread rainfall in the catchment areas of Cauvery river has brought cheer to both the farming community and official machinery.

The water level in the Mettur Dam has risen by ten feet in the last four days and the sustained inflow will enable the release of water for *sambacultivation* till February, S. Asokan, Chief Engineer, Public Works Department, Tiruchi region, told reporters after inspecting the dam on Saturday.

Mr. Asokan said during the current crop season till November 6, 82.73 tmc of water has been released for the delta region and another 4.04 tmc for cultivation in East-West canal system.

The water level in the Mettur dam stood at 75.1 feet on Saturday evening and the inflow was 20,637 cusecs.

About 500 cusecs of water is being released for delta region. The storage level stood at 37.65 tmc against its full capacity of 93.470 tmc.

Mr. Asokan said increased inflow into the Mettur dam for the past few days has raised the expectations of the department of releasing the water for farm activities throughout this season.

The water level in the dam is expected to reach 90 feet mark soon, if heavy inflow continued for few more days that will help the department release water for samba cultivation in the delta districts till the end of February.

Mr. Asokan said that the PWD has forwarded a proposal to the State government for the renovation of Mettur dam at an outlay of Rs. 10.72 crore. With the green signal from the State government, the renovation works will commence shortly with the concurrence of the Centre.

M. Chinraj, Superintending Engineer, PWD, Salem and R. Subramanian, Executive Engineer, Mettur Dam, accompanied Mr. Asokan.

Rain lashes Tuticorin

Rains lashed Tuticorin and many parts of the district since midnight on Friday. Residents were happy over the cold weather in the wake of rains.

The downpour was intermittent on Saturday and left many roads leading to Tuticorin Town waterlogged and battered. Vehicular traffic was badly affected.

George road in Tuticorin was the worst hit following rains. Sankaran, a resident, said no efforts had been taken by the authorities to prevent waterlogging.

Even mild rain resulted in waterlogging often on this George road, he said. However, farmers relying on rainfed cultivation were a happy lot.

P. Murugesan, general secretary, Southern Dry Land Farmers Association, Pudur, told *The Hindu* that farmers were expecting a high yield of crops such as black gram, green gram, maize, cumbu, chillies and small onion.

Unlike the previous year, chilli cultivation would go up this year and intercropping of small onion was also done mostly in Vilathikulam.

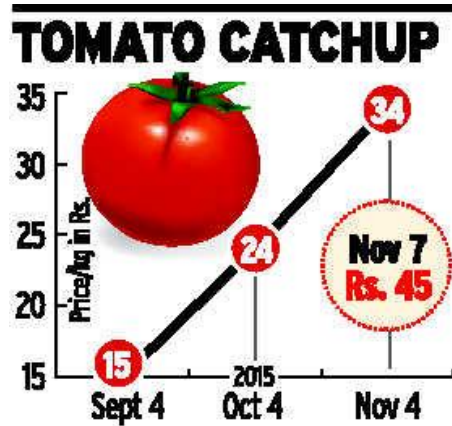
Since a considerable yield of small onions was expected in the approaching season, the association demanded a market place for small onions at Vilathikulam.

Tiruchendur and Srivaikuntam received the highest amount of rainfall of 95 mm each in the district. Kayalpattinam stood next with 92.20 mm rainfall.

Rainfall recorded in other rain gauge stations (in mm) include Tuticorin 28.70, Kadalkudi 15, Vaippar 17, Vilathikulam 19, Kovilpatti 2, Ottapidaram 21, Sathankulam 62.60, Keela Arasadi 5, Ettayapuram 2, Maniyachi 24, Vedanatham 20 and Surangudi 24, Kalugumali 7, Kadambur 8 and also Kayathar 9.

Now, tomato prices begin to soar

People making a beeline to purchase tomatoes at Rythu Bazaar in Vijayawada on Saturday. Photo: Ch. Vijaya Bhaskar



After onions and red gram, it is now the turn of tomato prices to go through the roof this season. In a span of one month, the price of the vegetable has soared from Rs.16 per kg to Rs.45 in Vijayawada, depending on quality and class of outlet. In the supermarkets, it is being offered for Rs.45-50 per kg, while pushcart vendors are extracting Rs. 48. In Kurnool, the retail price is veering between Rs.50 and Rs.60 a kg in the open market.

“As it is, we are burdened by the rising prices of red gram. Now tomatoes are being sold at Rs.45 a kg and at this rate, it is tough to manage the monthly budget, forget about festival celebrations,” said Mr Narayana Rao, a buyer at the Vijayawada Rythu Bazar.



Agriculture officials said the escalating prices are due to slacks arrival of stocks in the markets. On an average, the PWD Rythu Bazar in Vijayawada gets 400-600 trays each containing 25 kg everyday. On Saturday, just about 100 trays arrived.

A majority of the stocks arrive from the tomato hub Madanapalle, which is normally famous for distress disposals by farmers during frequent gluts. This time, however, the harvest has been poor, and the arrivals have declined. The next pick is not due for arrival until next month. Prices will be high until then, and will certainly drop by Rs 5-10 and remain stable until next February, explained a Rythu Bazaar official.

The poor crop currently is mainly due to deficient rainfall in tomato country, mainly Madanapalle, according to the assistant director of marketing in Kurnool, Mr Satyanarayana Chowdary.

In the Kurnool Rythu Bazar, a major tomato market, growers have been bringing in only about 70 quintals in the last three days, as against 120-160 quintals a day earlier, the estate officer Hanumantha Rao said. Curiously enough, tomato prices may have something to do with onion prices. When onion prices began to soar a few months ago, farmers in some growing districts switched to the bulb hoping to make a killing. As a result, acreage dropped and production dropped.

The tomato market has also experienced a change in some procurement practices. Of late, private agents have been going to the farmers' fields to buy at the gate. Farmers were offered no more than the price they would get at the Rythu Bazaars, but that was a welcome proposition to them, as they would save on transportation costs. As a result, the market has passed further into the hands of middlemen, officials said.

(With inputs from V. Rakesh Reddy in Anantapur and M.V. Subramanyam in Kurnool)

Butter producers face functional constrains

A view of butter production at Uthukuli cluster.

Uthukuli town near Tirupur well-known for its delicious butter for the past half-a-century produces around three to five tonnes of butter every day. It finds its market within Tamil Nadu and other States.

But, the constraints faced by the micro and small scale butter producers have been affecting the business growth during the past many years.



“Business have not grown for almost a decade now”, K. Saminathan, manager of Uthukuli Sarvodaya Sangh which coordinates many a dairy activities of the butter producers for the past 50 years, told .

The main problems cited by the butter producers are the poor price realisation due to absence of cold storage facilities, inadequate support for cattle growers to overcome fodder shortages in dry seasons and lack of good train connectivity from Uthukuli to transport the butter, among few others.

“If the authorities did not intervene to support the business, the butter production can even vanish very soon”, said P. Ramasamy, who has been producing butter for the past 35 years.

He pointed out that the producers can fetch attractive prices to commensurate with the raw material cost hike only if cold storage facilities were created. “Otherwise, we will be forced to sell on a daily basis affecting the bargaining power”.

Similarly, inadequate train connectivity is forcing the butter producers to depend on the road couriers, the transportation charges of which have been going up steadily.

“Uthukuli being a small station, only very few trains stop here. Of them, only one train (i.e. Mangalore-Egmore express) is useful to us. Due to this, we have been sending bulk of the cargoes by road at higher costs.

Considering the cluster's importance, stoppages should be allocated for more long distance trains", said the butter producers.

The producers are also worried about the tendency shown by farmers to sell the cattle when fodder shortages come in summer. "Unless the government supports farmers, it will have a cascading effect on butter production".

Decoding the colours on a butterfly



The lower surface of the wing shows better mimicry than the upper

For the wildlife enthusiast, the bright colours, rings, spots and stripes on the wing of the butterfly represent the pinnacle of nature's beauty. However, how does a predator — a bird or a larger insect — view the wing colouration and the rings? Does it tilt the balance in favour of the butterfly in this millennia-old battle of survival in the evolutionary war that is described by biologist Richard Dawkins as the 'Greatest Show on Earth?'

A study by scientists from the National Centre for Biological Sciences (NCBS), Bengaluru and the National University of Singapore (NUS) investigate how well butterfly mimics resemble their 'models', and finds the complexities that drive the evolution of mimicry.

Researchers studied over 200 specimens from the lush Western Ghats forests of 'unpalatable' butterflies that serve as models to 'palatable' butterflies. For instance, the *Danaus chrysippus* (plain tiger or African monarch butterfly) protects itself from predators by injecting unpalatable alkaloids from plants during the larval stage. This protection from predators allows it to fly

“leisurely” without threat of the predator. It isn’t surprising then that the ‘palatable’ Danaid Eggfly (*Hypolimnas misippus*) has evolutionarily learnt to mimic the look of the plain tiger in an effort to fool predators into avoiding eating it.

The predator’s point of view was obtained through the visual modelling of the avian colour vision (which differs from the colours and patterns perceived by humans).

The study, published in the latest edition of the journal *Evolution*, quantitatively shows that female butterflies were better mimics than their male counterparts. Krushnamegh Kunte from NCBS explains: “Female butterflies carry heavy loads of eggs, which impairs their escape flight when they are attacked by birds and other predators. Because of this risk of predation, female butterflies are under intense natural selection to be very good mimics.”

For male butterflies, the quest for sexual advantage — colours that attract mates — seems to have affected its ability to mimic, and in many species the males look completely different from females. Do their offspring — which inherit genes of mimicry as well as colours of sexual advantage — see their offspring struggle to mimic?

Surprisingly, no. The study finds that evolutionary needs trump any genetic dilution. Another surprising result thrown up is that the lower surface of the wing shows better mimicry than the upper surface which is seen in a butterfly’s flight path. This, says Mr. Kunte, could be because the butterfly is more vulnerable at rest (when its folded wings displays the lower surface) than at flight.

Coconut products exports earn over Rs.700 crore

Helped by a substantial increase in demand for activated carbon and virgin coconut oil, coconut products exports from the country exceeded Rs.700 crore during the first half of the current financial year, an increase of five per cent over the same period last year.

Figures from the Coconut Development Board show that 31,810 tonnes of activated carbon worth Rs.334 crore was exported during the first six months of the current financial year. Export of 3,717 tonnes of coconut oil earned Rs.85.55 crore during the period. Virgin coconut oil exports stood at 490 kg worth Rs.16.64 crore. The United States was the major destination for activated carbon from India. The country imported more than 9,000 tonnes of the product worth Rs.93.44 crore. The United Kingdom and the Netherlands were the other major importers.

The United States was also a major importer of virgin coconut oil. Export of dry coconut stood at 8,516 tonnes, worth nearly Rs.90 crore. Pakistan and Bangladesh account for bulk of the dry coconut imports from India.

Export of husked coconut from the country for the period stood at 16,387 tonnes, worth over Rs.60 crore. The major consumers of husked coconut from India included the UAE, the UK, and Kuwait.

The first six months of 2015-16 also saw import of coconut products into India worth Rs.191 crore. The major items of import are copra expeller cake, coconut fatty acid, coconut shell charcoal, and coconut oil. Coconut oil imports stood at 3,313 tonnes worth Rs.27.95 crore.

Supermarket launches mobile app

Sabari Stores, a supermarket on Vilankurichi Road, has taken a step towards becoming a virtual supermarket. It has launched a mobile application (an Android) for customers to place orders for grocery, household, personal care and beverage items.

According to R. Natarajan of Sabari Stores, a four-member team worked for almost a year to develop the application. In the next phase, the application will be available on iOS, the service will be extended to more areas in the city.

Mr. Natarajan says that the store on Vilankurichi Road has 7500 products in 16 broad categories and it already offers home delivery service. Now,

customers can place orders by downloading the application and either pick up the products at the shops or get it home delivered. “In the last three months we received 45 orders,” he says.

The application is mainly for office goers who might not be able to come to the shop to buy products. There are several online stores.

But, the mobile application has an advantage as customers can place orders on their phone. Customers are using the application mainly to buy grocery products, he adds.

A four-member team worked for almost a year to develop the application



Chandigarh should adopt vermicomposting: Ecologist

The city is facing several environmental issues. City-based senior ecologist Professor R K Kohli speaks on how these challenges can be met



Professor R K Kohli

What are the ecological implications of exotic trees in Chandigarh?

Seventy per cent of exotic flora comprise three invasive species: Lantana camara, Ageratum and Parthenium ([Congress](#) grass). According to a study, the protein present in the pollen of these trees causes allergy and asthma.

Do you think these harmful effects of exotic trees should be considered by environmentalists and action be taken in this regard?

I'm a propagator of indigenous trees. It is debatable whether we should retain exotic trees or change them. They have been there for more than 53 years, so why should we now call them 'unwanted'. Our bodies must be used to these by now. But, it could be a problem for the new population. I suggest that whatsoever new plantation we do, it should be of indigenous trees. Let them dominate over exotic ones. In Chandigarh, roads are identified by trees, and we should not change this character.

Many of these invasive exotic species are taking over natural areas and hampering natural vegetation. Has any government body taken up this issue?

Yes. The UT Administration had started a Parthenium eradication programme in the 1980s. Parthenium is a weed of the urban unattended land. It overpowered the local grass, leading to fodder famine because cattle do not feed on exotic plants. *Zygogramma bicolorata*, which is a species of beetle, was brought from Mexico to Bangalore to eat away Parthenium. This beetle was also brought to Chandigarh for the same purpose. But I objected as this beetle starts eating other plants and crops, like the Lantana bug which became a problem in Nainital.

Which, according to you, are the most favourable indigenous trees?

Acacia (amaltas), Arjun, jackfruit. In fact, most indigenous trees are good. But people have a tendency to consider exotic species to be good. Chandigarh has another distinct feature. There is bougainvillea on road dividers. It is ornamental, insects do not eat it, it forms a bio-wedge, leaves

start from the ground level, has flowers of different colours, and it grows at a height where it absorbs exhaust of vehicles. This is a good plan for an urban road divide.

What is your opinion of the increasing motorisation rate in Chandigarh due to a pro-car urban design, as indicated by a study done by a Delhi-based environment research institute?

We keep weeping over air pollution, but there is no bar on the number of cars that are produced. The population density of Chandigarh is also among the highest in the country, close to Delhi.

Is that a sign of danger?

Yes. More people, more pollution, more problems. But the pollution load in Chandigarh is lower as compared to any other city due to the management of its green cover. This is the beauty of the city. You will find plants in most of its households. In spite of the city being land-locked, having no agricultural activities, and being dependent on nearby villages for food, it is one of the good cities.

What do you think the green cover of Chandigarh will be like in the future?

I think there will not be much change. There is a national character to the city, there are rules and regulations. For example, the New Chandigarh coming up near Mullanpur has been declared as a low population density area, with 200 people per square km, compared to over 9,252 people per square km in Chandigarh. The population load of Chandigarh will be shared

by New Chandigarh, like it is in Delhi. New Chandigarh will also have more trees.

There is also a problem of burning of fall leaves in the city. What do you have to say about this?

The law does not allow burning of leaves. But people still do it, and it is a hazard. So, where to take these dry leaves? Vermicomposting reaps rich manure. It is difficult on a large scale, but can be done on a small scale in households, institutions, colleges, hospitals and hotels. The government is looking for options where these leaves can be sent to a factory where briquette are formed, which are sent for burning. So, that type of a plant came up in Mullanpur. Panjab University (PU) had one such plant in 2003, when Neeru Nanda was UT Adviser. As long as she was here, every hostel at PU had its own vermicompost plant, where kitchen waste would be processed every day. With her transfer, it all stopped.

So, you believe that vermicomposting is the best way to manage waste in the city?

Yes. But things like onion, lemon, milk and cooked food cannot undergo vermicomposting. They can be sent to a briquette plant. It is ironical that we buy manure from the market when it is freely available in Nature. The problem is that we tend to take a path of least assertion. Nobody wants to make an effort to recycle waste. Chandigarh has educated citizens, there is lot of energy in the youth here, they have ideas, if they do it, they will get lot of visibility and appreciation. But, nobody does it.

How can the problem of air pollution due to burning of paddy stubble in the region be addressed ?

When farmers burn agricultural waste, air pollution is only one aspect. Soil becomes compact, thereby killing microbes and weeds. The solution is to plough it along with the stubble, flow water, and let it stay for sometime, which was called fallowing in old times. We started such intensive agriculture that we killed our pests. We need our friendly insects. Root aeration is needed. If farmers know the damage, they will not do it.

There has been unprecedented depletion of agricultural cover in the region. Farmers are selling land, and real estate markets are coming up.

Nobody is interested in providing crop insurance to farmers. When we talk about problems, we talk about marginal farmers, but our policies cater to big farmers. Small farmers are upset, frustrated, so they prefer to sell their land.

- See more at: <http://indianexpress.com/article/cities/chandigarh/chandigarh-should-adopt-vermicomposting-ecologist/#sthash.eodAhFpk.dpuf>

Research centre comes up with seedless orange

This year, 2000 plants of the new variety distributed.

A new seedless orange has been developed by the National Research Centre for Citrus (NRCC), Nagpur.

“There has been a demand for seedless oranges for many years. We have been working on the project for a few years now,” NRCC Director M S Ladaniya told The Sunday Express.

Named NRCC Nagpur mandarin seedless-4, it was developed by selecting a plant from the orange (Nagpur mandarin) crop that had, by genetic mutation, seedless fruits.

“Worldwide, the trend is to have seedless fruits for easier consumption. Many orange growing countries developed their own seedless oranges. Countries like Israel, Spain, Japan and China have their seedless variety of oranges. The seedless-4 variety has yield potential of 27.15 tonne per hectare. Tests have shown that it produces about 98 kg fruits per plant at plant age of 10-15 years,” Ladaniya said.

While a normal orange has an average of 12.68 seeds, the new variety has only 2.57 seeds per fruit. “This has been demonstrated by a nine year field data,” Ladaniya added.

This year, about 2000 plants of the new seedless variety were produced and distributed to progressive farmers, nursery men, government departments and Krishi Vigyan Kendras (KVK) across the country, according to Ladaniya.

“This seedless variety is already planted at Warud and Paratwada area of Maharashtra in farmers’ field at 4 locations for demonstration,” he added. The seedless variety has bigger fruit, high yield (679 fruits/plant), medium large plant growth, deep orange colour fruit at ripening, sweet, good flavour and juicy, fruit weight of 145.9 gram, fruit size 61.61 X 70.23 mm, peel thickness 3.24 mm, number of segment per fruit 10.02, TSS 10.44, acidity 0.72 pc, juice 46.06 pc.

The Nagpur mandarin variety with seeds yields 520 fruits per year per plant.

Could pesticides in food lead to obesity?

Increasing number of studies now report that exposure to chemicals during critical periods of development at low doses alters developmental programming resulting in obesity.



Numerous studies have stated that chemicals such as pesticides DDE, HCB, organo-phosphates, heavy metals and solvents cause weight gain, possibly by interfering with weight regulating hormones, neurotransmitters and altering the nervous system.

Chemicals including chemical pesticides and solvents in our food have been associated with increased risk of cancers, auto-immune diseases, neurological problems, reproductive and birth defects. However, what is new is the role for chemical toxins in the development of obesity and associated conditions including diabetes, heart disease and high blood pressure.

For the first time, a novel idea published in the Journal of Alternative and Complementary Medicine in 2002, postulated the role of chemical toxins in the development of obesity. This hypothesis led to the review of data

showing that the current epidemic of obesity coincides with the marked increase in the industrial use of chemicals in the last 40 years. Numerous studies have stated that chemicals such as pesticides DDE, HCB, organophosphates, heavy metals and solvents cause weight gain, possibly by interfering with weight regulating hormones, neurotransmitters and altering the nervous system. These chemicals are also being included in the obesogen category, which refers to molecules that inappropriately regulate fat and lipid metabolism to promote obesity.

The fact that obesity is undoubtedly related to faulty eating, sedentary lifestyle and is a complex interaction between genetic behaviour and environmental factors, is well established. However, the relationship between toxic chemical components in the food chain contributing to the escalation of the obesity epidemic is believed to begin even before birth. It suggests that perinatal and early developmental exposures to environmental chemicals may play a role in the development of obesity later in life. A study published in 2007 in the journal 'Environmental International' measured concentrations of widely used pesticides and chemicals in blood samples of 700 pregnant mother-child pairs in Greece. A 10-fold increase in the mothers' pesticide concentrations was associated with higher risks of generalized and abdominal obesity, higher blood pressure and increased body weight in the children.

The scientific hypothesis that adult health and risk of diseases begins in fetal or early neonatal periods is not unique and new. Increasing number of studies now report that exposure to chemicals during critical periods of development at low doses alters developmental programming resulting in

obesity. Increasing evidence also links the widespread exposure to pesticides to the global epidemics of type-2 diabetes and obesity. A 2015 animal study published in the journal 'Environmental Research' reported that mice exposed to a commonly used pesticide (organophosphate), showed increase in food ingestion, blood glucose, cholesterol and body fat regulating hormones including ghrelin, leptin and insulin.

Identification of these obesogens, originating from pesticides and chemicals in our food and gene-environmental interaction is an exciting area of future research in the wake of the growing uncapped epidemic of obesity. Meanwhile, a healthy diet, regular physical activity, stress management, along with 'adopting organic' is surely a prudent approach to safeguard our well being.



THE TIMES OF INDIA

[Tea sector seeks inclusion under Union agriculture ministry](#)

The state's tea sector has raised questions about its classification and asked if it should be put under the Union agriculture ministry, as opposed to remaining under the commerce ministry, to best serve the industry's needs and help earn good revenue.

The issue was raised at North Eastern Tea Association (NETA)'s biennial meeting recently.

The NETA, which represents medium-sized tea plantations, argued that though tea is now under the commerce ministry, the Centre should take a fresh look at the classification as small growers contribute significantly to the total tea production in the country.

Many in the industry have proposed to include the tea sector in the agriculture ministry. They maintain that if it is brought under the agriculture ministry, small growers will be able to access bank loans at lower interest rates than that fixed for industries.

Tea is governed by a central legislation, Tea Act, 1953. Representatives of the sector said the industry could well be classified under the agriculture ministry.

"Though traditionally Indian tea is produced by the organized sector, which has a huge corporate presence, in the last 35 years more and more small growers have come to the fore, making a huge contribution to overall production. At present, one-third of the tea produced in India is from the green leaf of small tea growers," NETA adviser Bidyananda Barkakoty said.

Assam alone has nearly 1,00,000 small tea growers contributing to about 45% of the state's total tea production. India's production in 2014 was 1,207.31 million kg, of which 610.97 million kg came from Assam.

Barkakoty argued that as an agricultural crop, tea is subject to the same limitations that characterize the agro sector, like dependence on nature and climatic conditions, among others.

"Therefore, we appeal to the Centre to give a serious thought to whether the tea sector should be brought under the Union ministry of agriculture or continue under the Union ministry of commerce and industry," Barkakoty added.

[Acoustic device helping scare away animals from crops](#)

There was a hue and cry recently over the gunning down of eight nilgais allegedly destroying crops on farms in Katol and Narkhed tehsils, with sharp criticism from wildlife conservationists too. In contrast, the Gondia forest division has successfully implemented an 'acoustic animal dispersal technique' to scare away herbivores degrading crops.

Gondia is perhaps the first district in the state to implement the new technique on a trial basis. The cost of each device is 33,000, which is cheaper than solar fencing. These devices are used on a large-scale in Karnataka by coffee cultivators.

"The instrument, known as Harmony Q3, operates on solar energy and has been installed on a pilot basis at 10 places in Gondia district in vulnerable Sadak Arjuni, Tiroda, Amgaon and some other places," said deputy conservator of forests (DyCF) Jitendra Ramgaonkar. "The device emits recorded roars of tigers and leopards, which are an original reproduction of the voices of carnivores. The best part is that the small equipment operates automatically after sunset and shuts down around sunrise," said Ramgaonkar.

Some 50% of Gondia's geographical area is forested. With some 2,500 sq km of the 5,000 sq km area having forest, damage to crops by wild animals is a big issue. The Gondia division has paid over 1.44 crore towards damage to crops in the last three years (2012-15) in a total of 3,267 cases. The number of cases may be even more unofficially.

To handle the sensitive issue, 10 such acoustic animal dispersal devices are working to scare away herbivores approaching the crops during night. The device covers an area of 700 metres, and during the night its sound travels far.

The sound is so real that in Malkanpur village, people had once even come out of their homes with sticks during the night, fearing a fight between two tigers near their village, said Ramgaonkar.

Buoyed by the success and feedback, even Gondia Congress MLA Gopal Agrawal is pushing for its promotion. "I've spoken to forest minister Sudhir Mungantiwar, forest secretary Vikas Kharage and principal secretary to chief minister Praveen Pardeshi to promote the equipment in entire Gondia district," Agrawal told TOI.

BJP MLA from Katol Ashish Deshmukh, who brought in shooters to gun down eight nilgais in his constituency, could learn some lessons from Agrawal.

"Gondia is one of the worst hit districts due to animal conflict. Yet, I strongly feel that killing herbivores is not a solution. Even former MLA

from Sakoli Dayaram Kapgate has installed the equipment in his farm," said Agrawal. "Harmony 3 device should be supplied to farmers on subsidy. I will seek funds under Gondia DPDC," the Congress MLA said.

The Gondia forest division too is persuading those seeking crop damage compensation to procure Harmony 3. "We are also taking feedback from gram panchayats to promote the device," said Ramgaonkar.