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AGRI Titbits

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Agri Titbits is an effort to collect and preserve agricultural news, especially spices, appearing in newspapers and online media.

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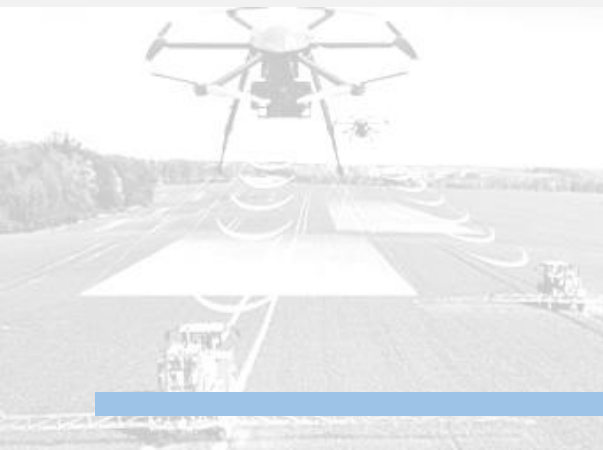
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Malayalam News

Here's what you should do with your old spices

WWW.NEWINDIANEXPRESS.COM FEB 13, 2019

WASHINGTON DC: Often the pantry is filled with old dry mustard powder and paprika of doubtful age and origin. And while you may think that it is time to turn it into compost, think again! They might still have some uses around the house.



Spices and herbs change phase states easily and once a spice is harvested, the clock begins ticking as the compounds turn from liquid to gas, reports Popular Science.

After a spice is created, it loses much of its potency in a year, and by three years, it needs to be replaced.

However, it does not necessarily mean that old spices should always be discarded. Adding heat can transform the product, enhancing its smell and taste.

Try throwing spices about a year or so old on the grill or in a dry pan right before using them. It is a key to capturing the flavours of some cuisines. Before using them, toast them to see if they are still alive.

One could also infuse oils. Infusions draw the compounds out of a spice or herb.

Seal the spices in oil for two to six weeks and then filter out the solid matter. Grind them before adding it to oil and put the jar with your oil in a simmering water bath for a few minutes as adding heat helps. For personal care or crafting supplies, use shelf-stable oil like jojoba. For cooking, use an oil you like to eat.

If you decide to use your spice outside the kitchen, first familiarise yourself with potential allergies. If you're planning to use up your spices for skincare products or scent diffusers, there are a few important things to note:

For starters, read up on any herb or spice you plan to use to ensure there's no major allergy risk or other potential injury. Furthermore, don't assume heat will solve the issue. Some allergens, like celery seed, are heat stable. Also, eating something is different from long-term contact with it. Check that the spices or their compounds do not have any adverse effect on you.

Furthermore, spices are a useful weapon against bad smells if you don't have time to get rid of the underlying causes. If you are cooking something pungent in the kitchen, clear it out

afterwards by boiling some oil spices in water. Volatile compounds have a low boiling point, so large amounts of old, bland spices will have a surprising amount of smell to them. Afterward, drain the water and put them out to compost.

For attires and books, sachets full of old spice give off their smell over time. For example, spices like cinnamon trick the mind into thinking that it is warmer than it actually is. Similarly, for summer clothes, try dried mint, coriander, or other spices that taste “cool” to you.

One can also throw the sachets in with stinky clothes to help bring down the stink. This also works wonderfully well with carpets. One can mix baking soda and spice in a ratio of two parts baking soda to one part spices. Shake it over the carpet, and vacuum it up after a few minutes.

If you dislike the smell of vinegar, add a small amount of spices to your homemade cleaners to give it a lift. You can spice up your candles as well, using the infused oils we’ve described above. Just pour them in with the liquid wax.

Also, dried whole herbs can be used on their own as decoration, and can remain fragrant for a surprisingly long time. They can also be used as colouring agents. One can mix together one cup of flour, 1.25 cups of cold water, and a tablespoon of neutral oil until it’s thick enough to paint with. These paints are children-friendly and have a good aroma as well. Some spices, like tumeric, can also be used as dye.

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Why Saffron Is the Most Expensive Spice in the World

READER'S DIGEST-18-FEB-2019

A couple pounds of the spice could set you back thousands of dollars.

Italian risotto, Spanish paella, and Indian curry all have something in common—saffron. People know the spice because of its very distinct flavor, bright color, and high price. Quality saffron can cost around \$3,000 for just two pounds.

Saffron’s reputation as the most expensive spice in the world is because of the growing process. Only a small part of the saffron flower—the stigmata—is actually used for the spice. So it takes some 75,000 saffron flowers to make just one pound of spice. The stigmata is delicate, so harvesting and drying them is a costly, manual job. These are the 10 most overpriced foods you’ll find on restaurant menus.

The plant is just as delicate as the stigmata itself. It only grows under very specific conditions, blooming for only one week of the year. They grow best in full sun and well-drained, rich soil in an area that’s dry in the summer. Indian, Iranian, and Spanish saffrons are the most popular types, though Americans mostly purchase the Spanish variety.

People are willing to pay so much for saffron thanks to the reported health benefits and hard-to-describe taste. Research shows saffron could improve mood, reduce PMS symptoms, aid weight loss, and more. In the past, the ancient Greeks, Chinese, and Indians used the spice for everything from perfume to medical potions, too. Here are 10 other healing herbs and spices.

If you try cooking with saffron, make sure not to buy the ground variety. Some sellers cut it with other spices like turmeric or paprika. Instead, buy from a trustworthy seller. This saffron has 850 perfect customer reviews and won't break the bank. Don't miss these 21 common food myths that are wildly untrue.

High prices boost mint cultivation

THE HINDU BUSINESSLINE-21-FEB-2019

India produces 80% of the world's mint supply and exports 75% of its output

The high price commanded by menthol oil in the international market, following the drop in supply of its synthetic variant, has propelled farmers to increase the area under mint cultivation. This year, the area under mint cultivation is estimated to touch 3,00,000 hectares, according to a scientist with the Central Institute of Medicinal and Aromatic Plants (CIMAP), a constituent laboratory of the Council of Scientific and Industrial Research.



The price of natural menthol oil, on an average, is more than ₹1,500 a kg, as there has been a decline in the availability of synthetic menthol oil, used mainly for non-food applications, said CSIR-CIMAP scientist Sanjay Kumar, who was here attending a conference on mint cultivation organised by FICCI on Thursday.

Natural mint oil is very much in demand because a fire last year in a plant owned by German chemicals major BASF, which produces a synthetic variant, crippled the supply, leading to an increase in the prices.

The prices of mint oil rose by more than 50 per cent in one year, prompting farmers to cultivate more. Synthetic menthol, which comes as a by-product of petroleum, can be manufactured at half the price of organic mint oil and whenever the latter's prices go up, particularly when they hit ₹1,000 and above, the demand for the synthetic oil shoots up.

According to SK Malhotra, Agriculture Commissioner of India, this year's menthol oil production in the country is estimated to be more than 30,000 tonnes. India exports nearly 22,500 tonnes of menthol oil annually.

"India produces 80 per cent of the world's mint supply, which supports the livelihood of more than 1 million small holder farmers. More than 70 per cent of Japanese mint oil and its derivatives produced in India are exported," said Nilanjan Banik, professor at Bennett University in Greater Noida, in a publication brought out for the conference.

“Uttar Pradesh accounts for nearly 80 per cent of mint produced in the country. But, many other States in the country are getting into mint cultivation of late,” said Kumar.

The price volatility is a major problem for mint. “The price of natural mint has been hit seriously since the introduction of synthetic mint oil in 2013-14, a year which saw the highest production of menthol oil,” said Kumar.

“The price was around ₹2,200 a kg in 2013-18, but it plummeted to ₹800 kg in 2014-15. Subsequently the prices started picked up as cultivation went down drastically. In 2017, mint prices moved up to ₹1,100 and they went up further in 2018 as synthetic menthol was in short supply,” said Himanshu Agarwal, director of KV Aromatics, a trading company. According to Kumar, farmers have been somewhat protected from price fluctuations since commodity exchange MCX started trading the aromatic commodity in 2006. “More than the farmers, traders are affected by the price volatility nowadays,” he said.

US-based confectionery maker Mars Wrigley has been working with Indian mint farmers since 2017. Because of its intervention around 20,000 farmers have adopted good agricultural practices in mint cultivation, helping them not only increase the yield but also reduce water usage by nearly 30 per cent, said Andrew Leakey, the company’s General Manager.

Curcumin-One of Nature's Most Potent Spices

DONEGAL NEWS-18-FEB-2019

Originating from South East Asia, Turmeric root has a long history in Ayurvedic medicine of health-giving properties. Used as a seasoning and the main ingredient in curry powder, this spice is a natural wonder of the healing world. In recent years there have been many studies to investigate its benefits in fighting disease many of which have shown it has major benefits for your body.

What gives the spice its bright yellow colour is Curcumin, which is extracted from the turmeric plant. Curcumin is the active ingredient that has been used in traditional therapies in India for thousands of years and is available in supplement form from health stores.

Curcumin is currently involved in numerous medical studies to examine the many potential uses in everyday health. Tradition tells us that its true power lies in its powerful anti-inflammatory effects and its antioxidant levels.

Eating garlic everyday keeps diseases at bay!

TIMES OF INDIA-25-FEB-2019

How about a delicious soup or salad with a hint of burnt garlic, sounds delectable, right! Well, not just a taste and aroma accentuating ingredient, garlic has some miraculous health benefits that will certainly surprise you. In fact, one raw garlic a day can keep so many diseases at away. Here's all you need to know about this garlic and how it can prevent as well as cure several lifestyle diseases.

Scientifically garlic is a part of the Allium family, which has a distinct strong smell, due to the presence of sulfur compounds. In fact, these sulfur compounds make garlic a powerhouse of nutrients that help in fighting various health issues. Here's all you need to know about this miraculous ingredient in your kitchen and how it can work wonders in treating several diseases.

Miraculous health benefits of garlic:

Fights the growth of cancer

Garlic hails from the allium family, which is enriched with sulfur compounds that help in stopping the growth of cancer cells and its proliferation in various parts of the body. According to a research published by The American Institute of Cancer Research, garlic has the ability to stop and reduce the growth of cancer tumours.

Helps you fight infections and allergies

Garlic has great antibacterial and antifungal properties, which helps in preventing as well as curing several diseases caused due to infections and allergies. It also helps in strengthening overall immunity. Daily consumption of garlic makes you less prone to diseases.

Reduces risk of heart attacks

Garlic a day can help in reducing the amount of triglycerides in your blood leading to an improved blood sugar level and heart health. Garlic helps in reducing the risk of blood clots, thereby reducing the risk of stroke and coronary diseases.

Skin and hair

Not only for good health but garlic is a great thing for hair and skin. It helps in protecting the skin from free radicals and slows down ageing. It helps in boosting collagen. Moreover, it also helps in treating fungal infections and other bacterial allergies. Garlic also works wonders on hair loss, application of garlic extract can help in reversing hair loss.

Spices can cause health problems through lead exposure, research reports

REPORTSHEALTHCARE.COM 23-FEB-2019

The research, published in the Journal of Public Health Management and Practice, observed lead poisoning cases associated with spices purchased abroad and describes how you can confirm that your spices are safe for consumption. It found that lead was in more than 50% of spice samples.

Often, spices are greeted as a healthy mode to prevent the addition of excessive fats or salt to flavor meals. But a recent study found that some spices can possibly cause health problems through lead exposure.

The research team at the New York City Department of Health and Mental Hygiene examined consumer products regarding lead exposure. They tried more than 3,000 products between 2008 and 2017.

They found that the spices purchased overseas were at maximum risk of leading to lead exposure. The substances were part of lead poisoning cases and local store reviews. Spices were most freshly tested, with about 1,500 samples from 41 countries examineThe lead ead was found in more than half of the samples. More than 30% had lead greater than 2 parts per million (ppm). This concentration is the allowable limit for lead in certain food flavors.

It was also observed that spices purchased overseas had a greater level of lead content than those purchased in the U.S.

Researchers then examined the lead concentration in turmeric and Georgian kharcho suneli. Average lead concentrations below 2 ppm were found in spices when purchased locally in New York City. But same spices bought overseas had average concentrations exceeding 50 ppm.

Spices bought in Pakistan, Georgia, Bangladesh, Nepal, and Morocco had the highest lead levels. Mostly contaminated spices were in unmarked containers which did not display information of brand name.

The highest lead levels were found to be present in the Georgian spice kviteli kvavili, which is also called as a yellow flower. Examples of other contaminated spices purchased abroad comprised turmeric, chili powder, hot pepper, and paprika.

According to researchers, public health professionals should also be aware that spices could be a risk factor of lead exposure.

Get the lead out your diet

The lead exposure problem is nothing new. In the past, many studies have been conducted about contamination.

The U.S Food and Drug Administration (FDA) issued an import alert stating ports could keep loads from certain shippers. They targeted turmeric from Bangladesh and India.

Researchers found that on the basis of data, buying spices in the U.S. rather than online or when traveling overseas appears to be a moral way to protect people. This is because the spices that have been officially imported into the U.S. have the chance of going through screening upon import.

Nearly all spices are imported, but it has been found that lead levels appear to be utmost in those which were purchased outside of the U.S.

Researchers of the current study say individuals need to understand that spice contamination is a global issue.

In the U.S., extreme levels of lead have not been prominent in the “mainstream” U.S. spice production, which comprises major brands or major food companies.

Case studies have also noted higher lead levels in people who imported spices from countries like India, Pakistan, and the Republic of Georgia. Researchers noted the low levels of lead occur in the environment naturally.

Prefer to use safe spices

According to the researchers, buyers should be confident in the quality of spices if purchased by major brands which are sold at trustworthy stores. Major brands source spices have proper systems in place to ensure product quality and safety.

Also, people should not give up on herbs and spices consumption since they are healthy for us. You can grow herbs yourself and also purchase them locally.

If you use commonly contaminated spices, like chili, turmeric, and paprika, be sure to have your children’s blood lead levels tested yearly, especially children under 6 years old. Parents should inform their pediatricians about herbal remedies given to their children.

And everybody should buy spices and medicines in the U.S try to avoid the use of spices or medicine purchased online or sent overseas by family and friends.

Curcumin Holds the Key to Cure Cancer and Alzheimer's Disease

FNBNEWS.COM-24-FEB-2019

Turmeric, the golden spice of India, is truly a wonder component and filled with medicinal properties. While Indian ancestors were fully aware of its health benefits and thus, added it to daily consumption, Western science has now backed it up with a colossal amount of research.

The most important component of turmeric – curcumin – has powerful anti-inflammatory properties and is a strong antioxidant. However, the chemical composition of curcumin in turmeric is about 3% by weight. Thus, using turmeric as just a spice in daily food is not sufficient for one's body to experience its benefits. Moreover, curcumin is poorly absorbed into the bloodstream. This has boosted the demand for packaged foods that supply curcumin. For instance, there are curcumin tablets that help fight with age-related cell-damaging effects of free radicals in the body.

According to a research firm, Allied Market Research, the global curcumin market is projected to reach \$104.2 million by 2025, with compound annual growth rate (CAGR) of 8.9% during the period 2018–2025. More importantly, India is the largest manufacturer of turmeric as well as consumer of curcumin products. In fact, the firm states that India curcumin market was pegged at \$1.76 million and expected to reach \$2.95 million by 2024, with CAGR of 9% during the period 2017–2025.

Major market players such as BioMax Life Sciences Ltd, BioThrive Sciences, Konark Herbals & Health Care, SV Agrofood, Now Foods and Synthite Industries Ltd have been introducing new products to help consumers increase intake of curcumin. Recently, NutriCommit, a company that provides over 30 billion probiotics supplements, has launched its new premium turmeric curcumin product to help improve consumer's immune system, joint health and regulation of blood pressure.

Relation of cancer and curcumin

There are several research papers suggesting that curcumin has anticancer properties. However, most of the studies are taken in vitro. Scientists at the University of Illinois College of Engineering have discovered that curcumin could be considered as an effective candidate for killing cancer cells.

Curcumin is not naturally soluble in water; however, the team has developed a sophisticated metalocyclic complex using platinum as it can enable curcumin's solubility. Moreover, this synergy is found 100 times more effective to treat several cancer types including breast cancer cells and melanoma compared to when curcumin and platinum agents used individually. The study was published in the proceedings of the National Academy of Sciences of the United States of America.

Dipanjan Pan, an associate professor of bioengineering at the University of Illinois College of Engineering, stated, "We knew that platinum has been used as a cancer therapeutic agent in research. We wanted to explore its properties with curcumin. Our results state that curcumin works totally with platinum and show synergistic effects to kill cancer cells."

Curcumin helps improve mood and memory

According to a recently published story in the American Journal of Geriatric Psychiatry, curcumin holds the power to increase memory and reduce mood swings of patients suffering from Alzheimer's disease. Researchers observed the effects of curcumin on memory performance in patients with dementia and its impact on the microscopic plaques.

The study was conducted as a double-blind and placebo-controlled that involved 40 adults between the age group of 50 and 90 and suffering from mild memory complaints. The study participants were randomly set to receive either 90 milligram of curcumin twice in a day or a placebo for about 18 months. Moreover, every participant received a standard cognitive assessment at the beginning of the study as well as after every six months, scientists monitored the curcumin levels in their blood. After 18 months, about 30 participants underwent PET scans to identify the levels of amyloid and tau in their brains.

It was observed that those who took curcumin experienced remarkable progress in their attention and memory abilities as compared to those who received placebo. In fact, the study proved that the participants showed signs of progress in their memory by 28% and mild improvements in mood over the period of 18 months.

These studies proved that curcumin is more than just a spice that brings yellow colour to the food. In fact, our ancestors knew better than modern science and considered turmeric a vital component in daily meals. Now, science has backed up with numerous studies that prove curcumin might be just the thing we were looking for to cure chronic diseases such as Alzheimer's and even cancer.

Researchers convert carbon dioxide in to coal

DOWN TO EARTH MAGAZINE-28-FEB-2019

Researchers at RMIT University in Melbourne, Australia have for the first time developed a process to turn CO₂ into coal. The new process uses liquid metal as a catalyst to permanently and safely convert CO₂ into a solid form for storing

A team of researchers from Melbourne, Australia may have come up with the most practical panacea for global warming. They have managed to engineer gaseous CO₂ into solid carbon using liquid metal as a catalyst. This research which was published in the journal Nature Communications can become an efficient and safe way to remove atmospheric carbon.

Researchers from the RMIT University, have managed to solve a problem which scientists have been grappling with for a long time. "While we can't literally turn back time, turning carbon dioxide back into coal and burying it back in the ground is a bit like rewinding the emissions clock," said Torben Daeneke, an RMIT researcher in a media release.

The best technology thus far was CCS or carbon capture and storage. CCS which was first pushed as a fix for sequestration of greenhouse gasses was later dubbed as technologically unsound. The process involved capturing the gas, liquidifying it and injecting it deep underground. It was complicated, and there were widespread concerns about its economic viability and environmental soundness. There were also concerns about the possibility of leakages.

“To convert CO₂,” the media release said, “the researchers designed a liquid metal catalyst with specific surface properties that made it extremely efficient at conducting electricity while chemically activating the surface. The carbon dioxide is dissolved in a beaker filled with an electrolyte liquid and a small amount of the liquid metal, which is then charged with an electrical current.”

Earlier attempts to convert CO₂ into solid carbon have involved using very high temperatures, which is not possible when done at an industrial scale. But in this new process, CO₂ can be converted to coal at room temperature making it an applicable technology.

Another advantage of this process is that the carbon produced can be used as electrodes.

“A side benefit of the process is that the carbon can hold an electrical charge, becoming a supercapacitor, so it could potentially be used as a component in future vehicles,” said Dr Dorna Esrafilzadeh, a Vice-Chancellor’s Research Fellow in RMIT’s School of Engineering, and lead in this project.

The carbon got from this process can also be used to make synthetic industrial fuel.

Earthworm research spurs farmers to act

PHYS.ORG-21-FEB-2019

A study of England’s farmland has found key earthworm types are rare or absent in two out of five fields and has led to the majority of farmers affected vowing to change the way they farm.

The results indicate widespread, historical over-cultivation, and may explain observed declines in other wildlife, such as the song thrush, that feed on these worms.

The #60minworms project was the first comprehensive worm survey concentrating solely on farmland and was carried out by farmers themselves – 57 percent of whom said they would now change their soil management practices as a result.



The scientist behind the survey, Dr. Jackie Stroud, a NERC Soil Security Fellow at Rothamsted Research, said: "Earthworms are sensitive and responsive to soil management which makes them an ideal soil health indicator. The aim of this research was to find a baseline of farmland earthworm populations that would be useful and used by farmers to assess soil health now and in the future."

Biologists categorise earthworms by ecological role—with surface dwelling and deep burrowing worms the types most sensitive to farming practices, whilst the topsoil worms are generally unaffected by over-cultivation.

Earthworms perform a number of useful 'ecosystem services', and high numbers of earthworms have been linked to enhanced plant productivity.

This new citizen science project published today in the journal PLOS One, has revealed most fields have good earthworm biodiversity – meaning an abundance of all three types of earthworms were seen.

In Spring 2018, the average field had 9 earthworms in every spadeful of soil, with top fields having three times that number. One in 10 fields had high earthworm numbers of more than 16 worms per spadeful.

However, the study also revealed that 42 percent of fields had poor earthworm biodiversity – meaning either very few or none of the surface dwelling and deep burrowing worms were seen.

The absence of deep burrowing worms on 16 percent of fields is concerning, says Dr. Stroud, because they are 'drainage worms' with vertical burrows that aid water infiltration and ultimately helps combat waterlogging.

"The deep burrowing worms have slow reproduction rates so recovery in their populations could take a decade under changed management practices. In fact, we know very little about earthworm recovery rates."

More than 1300 hectares were surveyed from all over England for the project, including fields managed under arable, potatoes, horticulture and pasture.

Each farmer volunteered to dig 10 regularly spaced pits across their field to make the observations, and an identification guide allowed them to allocate any sightings to one of the three main types of earthworm.

The success of this pilot project has already led to a much larger study, which recently concluded, says Dr. Stroud.



"Working with farmers led to the redesign of the pilot survey, culminating in a shorter, more efficient field assessment and a co-created earthworm identification guide, to help improve farmer confidence in earthworm monitoring.

"These improvements were well received, with farmers all over the country spending an hour of their time digging five soil pits and assessing their earthworm populations in the Autumn."

Empowering farmers to survey their own soils would save about £14 million in soil health monitoring if rolled out nationally, she added.

Healthy Soils were not a headline indicator for the draft DEFRA 25-year plan for the environment, so the DEFRA policy aspiration of achieving sustainable soils is currently unclear.

Despite this, soil health is widely regarded as vital for both farming and the environment.

Dr. Stroud said: "Decisions made above the ground, whether by farmers or policy makers, influence the billions of earthworms that are engineering the soil ecosystem below the ground.

"Earthworms influence carbon cycling, water infiltration, pesticide movement, greenhouse gas emissions, plant productivity, the breeding success of birds and even the susceptibility of plants to insect attack."

However, she added, as earthworms are sensitive to various farming practices, including tillage, rotations, cover cropping, organic matter additions, and pesticides, we need to do more to look after them.

"Crucially, working together with farmers, we now know typical earthworm numbers in agricultural soils and between us have developed a quick method for ongoing monitoring. Many farmers have reported they plan to survey again this Spring following benchmarking their fields last year.

"Soil health is complicated, but the path to doing things differently has to begin somewhere."

More information: Jacqueline L. Stroud et al. Soil health pilot study in England: Outcomes from an on-farm earthworm survey, PLOS ONE (2019). DOI: 10.1371/journal.pone.0203909

Biodiversity

New buzz around insect DNA analysis and biodiversity estimates

PHYS.ORG-27-FEB-2019

New buzz around insect DNA analysis and biodiversity estimates

The researchers cross a dry stream bed on the remote island of Hauturu, in search of samples.

In the face of declining numbers of insects across the globe, scientists continue to expand our knowledge about invertebrate organisms and their biodiversity across the globe. Insects are the most abundant animals on planet Earth—they outweigh all humanity by a factor of 17. Their abundance, variety, and ubiquity mean insects play a foundational role in food webs and ecosystems, from the bees that pollinate the flowers of food crops to the termites that

recycle dead trees. With insect populations dwindling worldwide, there are still new species being discovered.

Researchers on the remote forested island of Hauturu, New Zealand (also known as Little Barrier Island) have compiled a staggering inventory of invertebrate biodiversity using DNA sequencing, adding a significant number of invertebrates to GenBank—an open access database of all publicly available DNA sequences. The results are published this week in the Ecological Society of America's journal *Ecological Applications*.



The number of invertebrate species that exist globally is uncertain, and it is difficult to characterize entire invertebrate communities using traditional methods that require the examination of individual specimens by an expert taxonomist.

This is where DNA sequencing comes in. This method is hailed as a tool for resolving the biodiversity of earth's underexplored ecosystems. It allows for the identification of invertebrate specimens based on more efficient molecular analysis.

Andrew Dopheide—a researcher at the University of Auckland—and colleagues employed a combination of old-school field biology with next-generation DNA sequencing to explore the use of combined datasets as a basis for estimating total invertebrate biodiversity on Hauturu island. They collected specimens from leaf litter samples, pitfall traps, and the soil itself.

"In a New Zealand context, we are not aware of any other ecosystem-wide DNA-based surveys of terrestrial invertebrate biodiversity on this scale," explained Dopheide. "Additionally, there was no information about invertebrate biodiversity on Hauturu, despite this being one of New Zealand's most pristine and important natural ecosystems."

At the end of the study, they estimated that the above-ground community of invertebrates includes over 1000 arthropod species (having an exoskeleton, a segmented body, and paired jointed appendages), of which 770 are insects, and 344 are beetles.

The soil they sequenced yielded even richer samples. Soils are a promising substrate for DNA analyses of biodiversity because they contain diverse communities of organisms as well as biological debris including DNA molecules. Scientists know much less about soil communities than about above-ground communities.

From the soil samples they were able to estimate 6856 arthropod species (excluding mites), of which almost 4000 are insects.

Beetles (order Coleoptera) were most abundant, followed by sawflies, wasps, bees and ants (order Hymenoptera), flies (Diptera), butterflies and moths (Lepidoptera), and various Amphipoda—a diverse order of small, shrimp-like crustaceans that mostly occur in the ocean, but also in freshwater and some terrestrial habitats.

In total, they added over 2500 new DNA sequences to GenBank, which houses data from more than 100,000 distinct organisms, and has become an important database for research in biological fields.

"We were surprised that so few of the invertebrates were already represented in GenBank," said Dopheide, "which suggested that we had recovered mostly new or little-studied species despite using very traditional collection methods, and emphasized the lack of knowledge about these important organisms... It's likely that many of the invertebrates without DNA sequences in GenBank are indeed new species, but we don't know for sure."

With insect populations dwindling worldwide, at least there are still new species being sequenced and documented. This work by Dopheide et al. has marked the trail, and set the bar, for mixing old-school natural science with DNA sequencing to characterize species that dominate the structure and function of ecosystems... while marveling at how many of them are beetles.

Biodiversity has its value

INDIA TODAY-16-FEB-2019

China's ambitious Belt and Road Initiative (BRI), which entails development of infrastructure and investment promotion in Europe, Asia and Africa, has been received globally with a mix of appreciation and suspicion.

India's aversion to BRI is primarily economic and geostrategic, so the BBIN economic corridor is unlikely to account for the environmental. (Representational Image)

China's ambitious Belt and Road Initiative (BRI), which entails development of infrastructure and investment promotion in Europe, Asia and Africa, has been received globally with a mix of appreciation and suspicion. While the initiative aims to improve regional cooperation and connectivity on a trans-continental scale between China and some 65 other countries, its objectives of market expansion and value-chain diversification remain implicit.



Growth paradigm

Through the Silk Road Economic Belt (linking China to Central and South Asia and onward to Europe) and the New Maritime Silk Road (linking China to Southeast Asia, the Gulf countries, North Africa and on to Europe) China has proposed six economic corridors delineating their BRI designs. Many developing and underdeveloped economies like Nepal and Pakistan in South Asia, and a few in Africa, have viewed this as a big opportunity to develop infrastructure with major capital investment, paving the path for economic growth. India has been apprehensive of the BRI, and has given a cold shoulder to the Bangladesh-China-India-Myanmar (BCIM) economic corridor encompassed by the broader BRI scheme. A deeper analysis of BRI reveals that it is motivated by a selfish ambition to shift the development paradigm from export-led growth to consumption-led growth. China's export-

competitiveness is traditionally high due to low-cost labour. However, volatile international markets have made China think of boosting its domestic economy by increasing consumption starting from its 12th five-year plan. This has led to an increase in wages and salaries in China over the last decade, which has increased the labour cost. This has prompted China to contemplate shifting production lines to certain parts of the developing world where labour cost is low - eastern parts of India, Myanmar and Bangladesh definitely being on their mind. Simultaneously, India proposed the Bangladesh-Bhutan-India-Nepal (BBIN) economic corridor, and took the first step by signing a BBIN Motor Vehicles Agreement (MVA) in 2015. However, the deal has been stalled by the Bhutan Parliament on environment grounds. Bhutan perceives that too many vehicles can cause congestion, air pollution, making the agreement non-feasible with its Gross National Happiness (GNH) tenets. However, the MVA is just the tip of the broader connectivity and development objectives that the project intends to achieve. Such ambitions are largely driven by neoclassical numerical growth aspirations that hardly account for sustainability and conservation.

India mirrors China

This is true for both China and India, the Himalayan twins whose growth story has been bereft of the critical environment dimension and even comes at the cost of environment. The massive spurt in linear infrastructure has had a negative impact on biodiversity and led to increased wildlife mortality, restricted animal movement, pollution (chemicals, noise, light) and spread of invasive species, according to a recent paper published in Nature Sustainability journal by Fernando Ascensão and colleagues. A very recent assessment by the World Wide Fund for Nature finds that the proposed BRI and the terrestrial corridors overlap with important areas for biodiversity and natural resources. It reveals some startling facts: the six corridors overlap with 265 threatened species (39 critically endangered and 81 endangered species); 1,739 key biodiversity areas; and 46 biodiversity hotspots. It clearly suggests that BRI corridors will impact all the protected areas in their purview. The scale of its operation and the interest it garnered from many developing countries (which harbour the biodiversity hotspots and protected areas) has attracted more interventions on its conservation and sustainability aspect than the BBIN. Definitely, the scale of BBIN is much smaller, but similar concerns remain.

Ecological cost

While the Strategic Environmental and Social Assessments (SESA) and Environmental Impact Assessments (EIAs) of economic corridors have often been suggested, their efficacy and veracity is questioned. Still, there are global examples of well-planned, environmentally-sensible road developments including the proposed Serengeti Highway in Tanzania; and the Cross River Superhighway in Nigeria. In Bangladesh the Asian Development Bank forced the railways to create elephant overpasses. Since India is not part of the BRI, it is definitely saved from the vagaries that it could have posed for our ecosystem. India's aversion to BRI is primarily economic and geostrategic, so the BBIN economic corridor is unlikely to account for the environmental. Whether the BRI or BBIN, we need integrated impact assessment that evaluates ecosystem services (services provided for free by the ecosystem to the human community). While all human endeavours fundamentally depend on ecosystem services, the poor derive more value from these systems than from the economy, various studies on

ecosystem service valuation suggest. Therefore, they are often called "GDP of the poor." The monetary valuation of ecosystem services helps assess the value loss from mindless development of economic corridors. Placing these costs in the benefit-cost matrix of linear infrastructure could lead to a revision in designs or even in investment decisions.

Climate Change

Climate change is roasting the Himalaya region, threatening millions

NATIONAL GEOGRAPHIC-04-FEB-2019

The peaks and valleys of the Hindu Kush Himalaya mountain ranges are some of the most inaccessible, remote regions in the world today—but even the most isolated valleys have been touched by climate change, say the authors of a comprehensive new report about the vast region. The changes have already complicated life for the 240 million people who live amongst its crags and peaks, the authors say, and the effects are likely to snowball in the future.

Across the high mountain region, which stretches from Afghanistan in the west to Myanmar in the east, air temperatures have risen by nearly two degrees Fahrenheit since the start of the 20th century—and the cold temperatures have warmed up faster than in the rest of the world. In response, glaciers are retreating; permafrost is melting; and weather patterns are becoming more erratic, disrupting previously reliable water sources for millions and instigating more natural disasters.

“Mountains matter, and it's time we start paying attention to them,” says Phillipus Wester, chief scientist at the International Centre for Integrated Mountain Development, in Kathmandu and one of the lead authors of the report, which pulled together over 200 scientists and analysts.

Without immediate, global attention to curb future warming and effort from the countries within the mountain range to adapt, future climate change may tip the region into difficulties from which it will be challenging, if not impossible, to recover, the study warns.

Hot peaks and shifting snows

The Hindu Kush Himalaya encompass hundreds of the world's most iconic mountains, hold over 30,000 square miles of glacier ice—more than anywhere else in the world besides the poles—and sustain 240 million people in their peaks and valleys. The mountain ranges also cradle the headwaters of rivers like the Indus, Ganges, and Brahmaputra that provide water to billions in the lowlands downstream.

The high mountains are feeling the impacts of climate change already, and more intensely, than many other parts of the world, though it's not fully clear why.

“Even if global warming is limited to 1.5° [Celsius, or 2.7° Fahrenheit] by end of the century—and you could call it a miracle if that happens—the high mountains are likely to warm even more,” says Arun Shrestha, one of the lead authors of the report’s chapter on climate change and a climate scientist at ICIMOD. That number will spike up to at least 3° Fahrenheit by the middle of the century, he says—“quite a significant warming.”

Some parts of the region—the Tibetan Plateau and much of the northwestern edge of the mountain belt, including the Karakoram—are even more sensitive: under the 1.5° C (2.7° Fahrenheit) warming goals suggested by the IPCC last fall, those pristine peaks could see warming of over 3.6° F.

And without coordinated global efforts to curb greenhouse gas emissions, the numbers could creep even higher. If we continue on the current emissions path, the authors say, the high mountains would see temperatures more than 5.4° F higher by the end of the century. And if emissions creep higher, that number could rise to over 10° F. (Read about how carbon emissions will shape Earth’s future).

For farmers growing apples or grains on steep mountain slopes, that means they have to nudge their orchards higher upslope, chasing the cool nights and seasons necessary for their crops. For others, changing patterns of snow and rain leave formerly reliable streams and springs dry—or dangerous with the threat of disastrous floods.

Snowfall and rain patterns have also shifted as climate has warmed. Most snowfall in the high mountains along the eastern swath of the region falls during the summer, when the powerful monsoon noses up into the mountains. But in recent decades, that monsoon has weakened, starving the mountains of the snow that feeds glaciers and that provides key water to many farmers as it slowly melts through the springtime, right when they need water to get their crops planted. This monsoon is predicted to weaken further in the future, further disrupting critical water supplies to farmers that rely on it.

“We have to expect that with climate change, weather events will become more variable,” says Nina Bergan Holmelin, a researcher at Norway’s Center for International Climate Research who studies farmers and communities in the region. “The timing is so important. It’s much more challenging to deal with droughts and floods and intense rain and then nothing for a long time.”

Melting glaciers: Water changes and disasters compound

At the same time, many glaciers across the region—particularly on the Tibetan Plateau and on the eastern stretches of the mountain range, like the central Himalaya range and the Khumbu, where some of the most famous mountains of the world stand—have retreated by somewhere between 20 to 47 percent since 2000, say studies compiled in the report. “And under business-as-usual, 50 percent of the volume will be gone by the end of century,” says Joseph Shea, one of the lead authors of the report’s chapter on how the region’s ice is changing and a glaciologist at the University of Northern British Columbia in Canada.

An iceberg melts in the waters off Antarctica. Climate change has accelerated the rate of ice loss across the continent.

As sea levels rise, salty ocean waters encroach into Florida’s Everglades. Native plants and animals struggle to adapt to the changing conditions.

The western U.S. has been locked in a drought for years. The dry, hot weather has increased the intensity and destructiveness of forest fires.

Bunches of oil palm fruit are harvested by hand and then trucked to a mill in mainland Malaysia, where they are processed. Ancient forests around the tropics are being cut down to

In the high plains of Bolivia, a man surveys the baked remains of what was the country's second largest lake, Lake Poopó. Drought and management issues have caused the lake to dry up.

Climate change is impacting flora and fauna across the Arctic. Although scientists don't know specifically what killed this individual polar bear, experts warn that many of the bears are having trouble finding food as the sea ice they historically relied on thins and melts earlier.

Lake Urmia, in Iran, is a critical bird habitat and used to be a popular tourist destination. It is drying up because of climate change and management issues.

The Scherer power plant in Juliet, Georgia, is the largest coal-fired power plant in the U.S. It burns 34,000 tons of coal daily, pumping over 25 million tons of carbon dioxide into the atmosphere each year.

Ice melts on a mountain lake. Lakes around the world are freezing less and less over time, and in a few decades, thousands of lakes around the world may lose their winter ice cover entirely.

The Amazon is losing the equivalent of nearly one million soccer fields of forest cover each year, much of which is cut down to make way for agriculture. When forest is lost, the carbon it sequestered ends up in the atmosphere, accelerating climate change.

In Glacier National Park, forests are feeling the effects of early snowmelt and long, dry summers. The stresses on the park's flora are exacerbated by climate change.

Glacier and snow melt feeds into rivers, sustaining their flow. For the Indus, which gets about 40 percent of its water from glacier melt, that means that in the short term, there's actually more water coursing down from the high mountains.

As glaciers get smaller, though, that water supply to rivers like the Indus will likely dwindle, says Michele Koppes, a climate scientist at the University of British Columbia in Vancouver, who was not involved in the report. "Glaciers and snowpack are like big storage banks of water," she says. That water can be released slowly over seasons, decades, or even hundreds of years as the glaciers and snowpack melt. But climate change is forcing the melt to happen faster than it used to—so it is "drawing on their storage tanks," she says, leaving the communities and ecological systems that rely on that water vulnerable.

Changes to the glaciers also has another effect, says Sudeep Thakuri, a glaciologist at Tribhuvan University in Kathmandu who was not involved in the report: More melt means more water pools in lakes on top of the glaciers or at their lower snouts. Since 1977, he and colleagues found, the number of glacial lakes across the Nepal Himalaya has more than doubled.

But those lakes are often growing so fast and hold so much water that they can—and have—burst through the rockpiles holding them back, resulting in devastating outburst floods.

And as steep slopes that had been locked in place by frozen soils have thawed, rockfalls, collapsing terrains, and avalanches have become more common.

Since the 1980s, the changing climate conditions have driven an uptick in the disaster risk in the region, the report says, which will ramp up in the future.

Time for action

The science, in many cases, is still catching up to the lived experiences of the millions of mountain residents. In 2007, an IPCC global assessment report highlighted the dearth of scientific knowledge about exactly how climate had already and would continue to impact the critical, iconic, vast region in the future. At first, the panel suggested that the glaciers in the region would disappear completely by 2035. Glaciologists who knew the region pushed back—the situation was much more complex, they knew. But “what was clear was that we didn't have enough robust scientific research to say what was possible,” says Shrestha. “Of course, we knew they were shrinking, but we didn't know how much.”

So the challenge was set, and scientists from around the world dug into the knotty problem. Many of the glaciers of the region are in remote valleys or hard-to-access mountains, complex areas that make it particularly tricky for scientists to figure out how they are changing from satellite imagery. Scientists struggled to find enough good, reliable data across the vast swath of the mountain range.

Now, a coherent picture has emerged. And what it shows is a region that will face enormous challenges in the coming years, says Wester. The region, with its millions of residents and important resources for the downstream neighbors, has not gotten the international attention it deserves, he says.

“We know enough now to take action,” Wester says. “We can't hide behind an excuse that we don't have the data, that there's more research needed—now, we have 650 pages of assessment. 210 people came together for three years to look at this carefully. We know this is going to be tough, and we know enough to take action.”

How a British researcher helped lay principles for organic farming ...

ECONOMIC TIMES-02-FEB-2019

Agencies



While there are real scientific concerns, for example, in the way the organic movement is being conflated with opposition to GM crops, there is a real need for mainstream agriculture to engage with organic principles to offer viable alternatives.

Just over 85 years ago, on January 15, 1934, the region straddling eastern Nepal and northern Bihar was hit by an 8.0 magnitude earthquake. Over 10,000 people died and much of Patna was reduced to rubble. So was the Imperial Institute of Agricultural Research that had been established in 1911 in Pusa, [Samastipur](#) district, around 100 km away.

The British decided against rebuilding the institute in Pusa. Instead, it was recreated near the new capital of New Delhi, on what was dubbed the Pusa campus. This is now the [Indian Agricultural Research Institute \(IARI\)](#), part of the Indian Council of

Agricultural Research (ICAR), whose many organisations study everything from, alphabetically, [agroforestry](#) (Jhansi) to yaks (West Kameng, Arunachal Pradesh).

Within this vast network, an IARI regional research station in Indore might not seem too significant.

According to ICAR's website, this was set up in 1951 following an epidemic of wheat rust in central India and it now specialises in durum, the hard wheat used for semolina (sooji) and pasta. But another note links it to both the original Pusa institute and a person of considerable, if somewhat controversial, importance in agriculture.

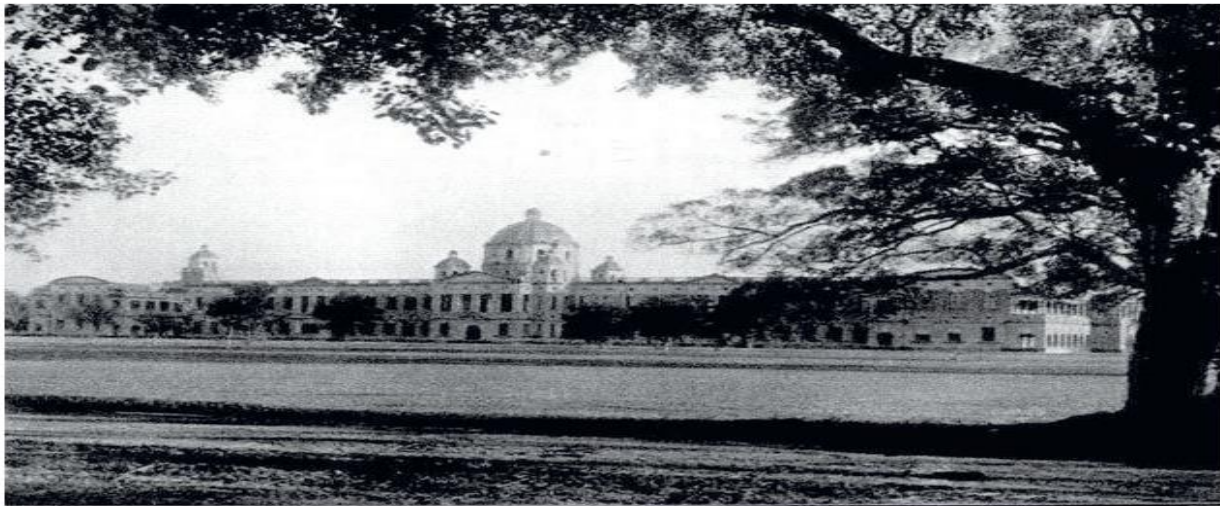
According to ICAR, the Indore research station was set up where the Institute for Plant Industry (IPI) used to exist.

IPI was established in the 1920s by the Maharaja of Indore, ostensibly to study cotton. But it also seems to have been a way to offer a research position to Albert Howard, a British agricultural scientist who first came to India in 1905 to work as imperial economic botanist at Pusa.

Howard's job was to develop Indian agriculture using modern crops and technology.

As with most British attitudes to India, the implicit view was our farmers needed to be educated to develop (and help British interests in the subcontinent). But Howard had a rather different attitude. He was a farmer's son, proud of his practical knowledge of agriculture, and he also had an unusual willingness to consider other viewpoints.

He acknowledged his wife, Gabrielle, as an equal partner in his scientific work, and would also ensure his Indian assistants got their full credit.



Imperial Institute of Agricultural Research in Pusa in Samastipur district of Bihar.

This open-mindedness led Howard to notice that crops in the fields of farmers outside the institute often seemed healthier than his own, even though they didn't use the latest techniques, like chemical fertilising.

He started studying their traditional methods- of animals raised alongside crops, with their wastes, and other plant wastes forming the only fertilisers. Howard was an expert in fungi and he theorised that traditional methods nurtured fungi and microbes in the soil, leading to better soil health than what was created by artificial means.

Howard's theories would lay the principles for the organic farming movement, but they proved too radical for his colleagues at the time. His biography, written by his wife, hints at conflicts, which lead to him being sidelined. But Howard realised that the princely states offered more liberties than the directly Britishruled provinces. Indore gave him a chance to continue his research without leaving India.



IARI's regional station in Indore

Howard developed and popularised what he called the Indore process, a method of combining animal and plant wastes to ensure rapid decomposition into a form that could be used in farming -- a scientific system for composting. This attracted attention both in India and abroad. In 1935, shortly after Howard had retired, The Times of India reported on how the Indore process had been taken up "in East Africa, the Central Provinces of India,

the Punjab, the United Provinces and Sind, where important crop improvements had resulted." Mahatma Gandhi also heard about it and felt it fitted his concept of village technology. It isn't clear if he ever met Howard, but he did visit IPI and examined the process. This was recently acknowledged by ICAR, with its "Kisan Gandhi" float during this year's Republic Day parade. ICAR's website explains that was inspired by Gandhi's "promotion of Swadeshi breeds, organic agriculture and goat milk for better health" and mentions his visiting IPI in 1935 to study the Indore process.



Indian Council of Agricultural Research's Republic Day tableau.

ICAR's website notes proudly that this float was awarded first prize in a ceremony on January 28, with Defence Minister Nirmala Seetharaman doing the honours. Perhaps it's not a coincidence then that the BJP government has shown a real interest in organic farming.

In his first budget in 2014, Finance Minister Arun Jaitley allocated ₹150 crore towards development of a soil health card, a concept that seems to stem directly from Howard's systematisation of what he learned in India. BJP governments in states like Uttarakhand and Himachal have gone even further in promoting organic farming.

But does ICAR really support organic farming, beyond using it for floats? Globally, the agricultural research establishment has been notably hostile or dismissive of organic farming. For example, a recent study from Sweden suggested that shifting to organic farming might have higher environmental costs because its lower productivity would require more land in cultivation. What is really instructive is how this fairly technical point was used as evidence that organic farming was "Not Worth the Hype", as one commentator's piece was titled.

What such views don't acknowledge is the wider benefits of organic farming --from lower input costs for farmers, less harm caused from pesticides to the wider environment and fresher produce for consumers. One notable achievement of organic farmers is how they have managed to break the restrictions of wholesale markets to supply direct to consumers.

And while there are real scientific concerns, for example, in the way the organic movement is being conflated with opposition to GM crops, there is a real need for mainstream agriculture to engage with organic principles to offer viable alternatives.

With both the history of Howard's learnings and current government support, India could offer a real chance for agricultural research to break through these divides between organic and mainstream agricultural research. Perhaps ICAR could take a lead with an institute dedicated to organic farming research-maybe even on that original Indore site now named after Albert Howard.

10 New Vegetables Varieties & Improved Soil Testing Meter Released

KRISHI JAGRAN (PRESS RELEASE) (BLOG)-08-FEB-2019

Indian Agricultural Research Institute has been the paragon of excellence in agricultural research and education in India. The varieties and technologies developed by IARI have been instrumental in enhancing crop productivity as well as the income of farmers manifold besides attaining national food security. It has also provided leadership to the National Agricultural Research System for advancements in agricultural research, education and extension.



It is a matter of immense pleasure and pride for the Hon'ble Director to present before you the school-wise Institute's significant accomplishments.

School of Crop Improvement

The population of India is estimated to reach 1.66 billion by 2050. Feeding the growing population is a major challenge in view of the depleting natural resources such as land and water, fragmentation of land and adverse effect of changing climate on agriculture. The research efforts at Indian Agricultural Research Institute are focused on developing crop varieties with resistance to biotic and abiotic stresses, high yield and improved grain and nutritional quality.

During 2018-19 the institute released a rice variety named "Pusa Sambha 1850" for Chhattisgarh and Odisha. This is a high yielding, non-basmati medium slender grain variety with resistance to blast disease.

The institute is also credited with the release of Maize hybrid "Pusa Super Sweet Corn 1" with

high sweetness and good fodder quality.

Two new wheat genotypes (HI 1612 and HD 8777) developed by ICAR-IARI, Regional Station,

Indore were notified by CVRC vide gazette notification number S.O. 1379(E).

HI 1620, a bread wheat genotype developed by ICAR-IARI, Regional Station, Indore was identified for release under timely sown, restricted irrigation conditions of North Western Plains Zone. HI 1620 has significant yield advantage (up to 13.4%) over the checks. In Pearl millet, the neutraceutical grain, a number of inbred lines such as PPMI 903,

PPMI 904, PPMI 906, PPMI 952, PPMI 958 and PPMI 959 having high iron (72-113ppm) and zinc content (40-55ppm) have been developed.

In chickpea, high yielding extra-large kabuli chickpea (>50g/100 seeds) genotypes having export potential, tall and erect plant types suitable for mechanical harvesting and determinate type to improve its adaptation to cool climate and high fertility areas have been developed.

In pigeonpea, extra early and early varieties with determinate growth habit, dwarf stature and amenable to mechanical harvesting have been developed for crop diversification and enhancing pulse productivity.

A total of 1554.23 quintals of quality seed was produced including 928.3 quintals of breeder seed of different crops for promoting quality seeds among the farmers. Under participatory seed production programme, a total of 553.6 quintals of wheat seed (TL) of different varieties was produced.

School of Basic Sciences

The basic and strategic research work carried out at Division of Plant Physiology led to the identification of novel donors for tolerance to drought and heat stresses and nitrogen use efficiency, and genes and promoters for abiotic stress tolerance.

Towards bridging genotype-phenotype gap, phenomics and Genome-wide Association analysis

(GWAS) carried out at “Nanaji Deshmukh Plant Phenomics Centre”. Machine learning and Artificial Intelligence based analysis are being employed in phenome data analysis. This led to the identification of germplasm lines of rice and wheat with >20% higher water use efficiency (WUE) as compared to the known checks viz., Nagina 22 and C306, respectively, and QTLs for WUE.

School of Horticultural Science

“Pusa Aditi” grape hybrid was released by the Delhi State Variety Release Committee for its commercial cultivation in NCR region. Grape Hybrid- Pusa Swarnika (Hur x Cardinal) a sweet and big berry type was released during Convocation-2018.

Five mango hybrids, namely, H-11-2, H-8-11, H-3-2, H-1-5 and NH-7-2 have been performing consistently better in terms of regularity in bearing, yield, red peel colour and desirable fruit quality traits were identified for multiplication and further evaluation on a large scale. In mango, polyembryonic rootstock Odor was identified as potential rootstock for Pusa Arunima for improving yield and fruit quality.

Two varieties viz. cherry tomato ‘Pusa Cherry Tomato-1’ and onion ‘Pusa Sobha’ have been released and notified by CVRC for cultivation under protected condition in Delhi NCR and major onion growing states of the country, respectively. Onion variety ‘Pusa Sona’ has been released by All India Network Project on Onion and Garlic and recommended for notification by CVRC.

Ten new varieties, viz. Longmelon 'Pusa Utkarsh', round melon 'Pusa Raunak', cucumber (parthenocarpic, gynoecious) 'Pusa Seedless Cucumber-6', muskmelon 'Pusa Madhurima' & 'Pusa Sarda', brinjal 'Pusa Safed Baingan-1' & 'Pusa Hara Baingan-1', okra (resistant to YVMV) 'Pusa Bhindi-5', garden pea 'Pusa Prabal' and chenopodium 'Pusa Bathua Green' and two hybrids viz. sponge gourd 'Pusa Shrestha' and bitter melon 'Pusa Hybrid-4' have been released for cultivation in Delhi NCR region and recommended for notification.

A total of 1.5 q breeder seeds and 12.39 q TL seeds of IARI vegetable varieties were sold a revenue of Rs. 9.47 lakhs was generated.

School of Plant Protection

Novel bioegel based green biocontrol formulations of entomopathogenic nematode, *S. thermophilum* have been developed, employing natural hydrophilic polymer and organic acid cross-linked hydrogel. Novel strategy of enhancing survival of EPN juveniles through arresting lipid metabolism has been employed. The prepared formulation exhibit shelf life of more than 4 months at 35°C hitherto unknown range reported so far.

School of Natural Resource Management

An Integrated Farming System (IFS) Model has been developed by the Agronomy Division of IARI, for ensuring livelihood security of small and marginal farmers. This 1 ha area IFS model intended for generating year-round income from appropriate integration of crops, dairy, fishery, duckery, biogas plant, fruit trees and agro-forestry, provided net returns of Rs 3,78,784/ha/year with an employment generation of 628 man-days.

The soil testing tool, named Pusa Soil Test and Fertilizer Recommendation (STFR) Meter, has been improved to analyze fourteen parameters viz., pH, EC, OC, available nutrients [(derived N), P, K, S, Zn, B, Fe, Mn and Cu], gypsum requirement and lime requirement. This soil testing kit can be used for generating soil health card. It is widely licensed and a few firms have already brought it in the market.

The WTC has developed an early agricultural drought monitoring and assessment technique in collaboration with the University of Nebraska, Lincoln, USA and was successfully validated on two distinct drought prone regions namely, Marathwada and Karnataka.

The eco-friendly wastewater treatment technology of the Centre was recently commercialized to the UP Jal Nigam for developing an eco-friendly wastewater treatment facility of 100 KLD capacity at the residential boarding school of the Jawahar Navodaya Vidyalaya at Kasiram Nagar in Uttar Pradesh and of 50 KLD capacity at the All India Women's Conference office at New Delhi.

Two unique state of art facility i.e. T-FACE (Temperature-free air carbon dioxide enrichment) and Controlled Environment Glasshouse (CEG) has been developed to study the interactive effect of temperature and CO₂ on productivity and quality of crops.

Farm mechanization assumes greater significance for energy and input use efficiency. Two patents were obtained during 2018 - one for animal feed crusher (1986/DEL/2004) (Patent No: 283378) and powered animal feed mixer (1983/DEL/2004) (Patent No: 302775). A digital seed rate calibration system has been developed for precise seed rate.

More than 20 states of India have been benefitted by Pusa biofertilizer technology. Pusa biofertilizers have covered more than 11,000 ha of land during last six years, both in organic and integrated nutrient management of different crops.

School of Social Sciences

It has been estimated that about 494 million tonnes (mt) of dry crop residue was produced annually in India from the 26 crops. About 112 mt of crop residue was available as surplus for bioenergy production.

The impact of Pusa Rudhira variety (Carrot) has been evaluated. The direct R&D cost invested in varietal development is Rs 1.85 crore at the 2014-15 price. The net returns from Pusa Rudhira was Rs1.61/- lakhs / ha and BCR was1.54, which was higher when compared to the other competing carrot varieties, respectively.

The Indian NARS Statistical Computing Portal developed by IASRI is being extensively used throughout NARES and helped the researchers in analyzing their data in an effective manner. On an average there are more than 300 log-ins per day.

KRISHI Portal (<http://krishi.icar.gov.in>) has been enriched through providing links of several online resources available/developed at different ICAR institutes.

An institutional mechanism for upscaling IARI Post Office Linkage Extension model has been developed with Department of Posts, Government of India. Through this model, 2.3 tonnes of IARI paddy varieties were disseminated in 46 districts of 12 states. Similarly, 2.76 tonnes of IARI wheat varieties were disseminated in 9 districts of 6 states. Social learning and convergence approach of extension have been found useful for climate change adaptation.

Centre for Technology Assessment and Transfer (CATAT) is disseminating IARI technologies under its outreach extension programme at different locations of the country using different approaches like development of model villages through integrated approach, National Extension Programme through Linkages with NARS (17 ICAR Institutes/SAUs) and partnership with 28 Voluntary Organizations.

Two Seed Hubs, one in Northern India and another in Eastern part of the country, have been established under the IARI-VO collaborative programme.

To promote the direct interface of scientists with the farmers and strengthen the lab to land process, Mera Gaon Mera Gaurav programme is being implemented by IARI in 120 cluster comprising of more than 600 villages in NCR.

Zero-waste industry cashes in on crop residue

THE TRIBUNE-17-FEB-2019

The manifold increase in grain production has helped India fight poverty and hunger over the decades. However, 4.5 crore children below the age of five years are still malnourished, which underlines the urgency for meeting the nation's nutritional needs. Specifically, protein and vitamin deficiency are among the major concerns. Mushrooms fit the bill to overcome this deficiency. Mushrooms have low calorific value, are rich in protein and have all essential amino acids required by humans. They have 4-12 times more protein than fruits and two times more than vegetables. Mushrooms are rich in minerals, including selenium (anti-cancer) and copper (heart-protective). Low in sodium and high in potassium content, they are suitable food for persons suffering from blood pressure fluctuations. Mushrooms have vitamin B, C, D and E; they are the only vegetarian source of vitamin D and B12. They are also known for their medicinal properties; their effects can be antioxidant, antiviral, antibacterial, antiparasitic, antifungal, detoxicative, hepatoprotective, antidiabetic, neuroprotective, neuroregenerative etc.



Presently, mushrooms are being cultivated in more than 100 countries. China, the US, Netherlands, France, UK, Poland, Spain, Germany and Japan are the leading countries in production. In India, mushroom cultivation started in the 1960s at Solan in Himachal Pradesh. Considering the tremendous potential of the crop, the Indian Council of Agricultural Research (ICAR) established the Directorate of Mushroom Research (formerly known as the National Research Centre for Mushroom Research and Training) in this city in 1983. In 1997, Solan was declared the 'mushroom city of India'. Across the country, commercial production reached 1.55 lakh tonnes in 2017-18.

There are about 3,000 prime edible mushroom species and around 100 have been cultivated so far. In India, five varieties — *Agaricus bisporus* (white button), *Pleurotus* (oyster), *Volvariella* (paddy straw), *Calocybe* (milky) and *Lentinula* (shiitake) — are grown commercially. The Indian mushroom industry focuses on the white button variety, which accounts for around 74 per cent of the total production. The remaining 26 per cent is accounted for by the oyster, paddy straw, milky and shiitake varieties.

In northern India, button, oyster and milky varieties are cultivated the most. Button mushroom production in northern India comes both from environmentally controlled units and seasonal cultivation, while the oyster mushroom is grown round the year in normal rooms, huts and polyhouses. Haryana is the leading state in button mushroom production,

followed by Himachal Pradesh, Punjab, Uttarakhand and Uttar Pradesh. Small quantities of mushrooms are also produced in Jammu and Kashmir. Seasonal cultivation of button mushroom in north India takes place from September to March. Farmers produce compost using wheat and paddy straw.

Oyster mushroom is mainly grown in Uttarakhand, Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Madhya Pradesh and the north-eastern states. The ICAR-Directorate of Mushroom Research has identified various species of oyster mushroom for different regions. The directorate also developed the first non-browning variety (NBS-5) of the white button mushroom with high yield and zero-energy poly tunnel for low-cost compost production.

It is a zero-waste industry as the spent mushroom compost (SMS) left after harvesting is suitable as organic manure for horticultural and cereal crops. The addition of SMS improves soil health and controls several diseases. Mushroom cultivation has the potential to resolve the issue of agro waste management. It is estimated that India generates 700 million metric tonnes of agricultural waste. Mushroom farming is ideal for utilising the straw and addressing paddy straw burning in the northern region.

Being an indoor activity, production is suited for farm women. Mushroom production and spawn (seed) production provide ample opportunities for small farmers, landless labourers, women and jobless youth to gain self-employment. The crop can be grown through vertical farming, which reduces the land pressure for production. High cropping intensity enables growers to produce maximum protein per unit of time and area. Due to high productivity, it also ensures high returns in the shortest time.

With a population of more than 120 crore, India is a huge market for mushrooms. However, due to lack of awareness, consumption is quite low in India (about 80 gm per capita per annum compared to the global average of 5-6 kg per capita per year). There is a need to generate awareness among the people about the mushroom's multifarious benefits so as to increase its demand in the country.

IISR in Print

Fall in turmeric prices on low demand, higher crop

THE HINDU BUSINESSLINE-12-FEB-2019

Growers seek inclusion of the cash crop under price support scheme by the Centre

Turmeric prices are ruling lower than the same period last year, as the new crop has started arriving in the key-producing regions of Tamil Nadu and Telangana on sluggish demand and expectation of a higher crop.

This is mainly on account of an increase in acreages, primarily in Maharashtra.

Lower prices at the beginning of the marketing season has started to trigger demand from growers for inclusion of turmeric under the ambit of the minimum support price (MSP) scheme.

The prices of turmeric at the beginning of the marketing season are ruling lower by at least a tenth in various markets, such as Erode and Nizamabad, over the same period last year on sluggish demand, as stockists are staying away from the markets.

Prices have come down by ₹8-10 per kg in Nizamabad and by ₹8 per kg in Erode over the past two months, said Premchand Motta, a leading spices broker.

“The demand is less right now, and will pick up from April 15 onwards,” he said.

Motta estimates the 2018-19 crop to be in the region of 90-92 lakh bags of 70 kg each, higher than previous year’s 71-75 lakh bags.

In Nizamabad, turmeric prices are between ₹40-60 per kg, mainly due to the higher moisture content in the produce being brought by farmers to the markets, while in Erode the prices are hovering between ₹55-72 per kg.

“The demand is slow this year. Normally, it comes in from January 15 and peaks during March. But this year there is hardly any demand,” said RKV Ravishankar, President of Erode Turmeric Merchants Association .

Also, the turmeric crop is higher this year on rise in acreages and the adoption of high yielding varieties by farmers. This is despite water shortages impacting the yields in some areas.

‘Include under MSP’

As prices at the beginning of the season are ruling lower, officials of the Telangana agriculture department recently urged the Commission for Agricultural Costs and Prices (CACP) to include turmeric under the MSP scheme. Considered a cash crop, turmeric is not currently among those 25 crops for which a support price is declared by the Centre. Sarampally Malla Reddy, Vice-President of the All India Kisan Sabha, said the prevailing prices are not remunerative for the growers as the cost of cultivation is on the rise.

Reddy demanded that the Centre should consider turmeric among the list of crops for which the MSP is declared. “The Centre should announce a MSP of least ₹10,000 per quintal for turmeric,” Reddy added.

According to the Indian Institute of Spices Research (IISR) in Kozhikode, the overall area under turmeric is on the rise in recent years.

“As per the information received from Telangana, the area under turmeric this year (2018-19) is around 50,000 ha which is a decline of 3,000 ha last year. Similarly in Tamil Nadu, area has decreased to 23,647 ha in 2018-19 from 25,500 ha in 2017-18. But from Maharashtra, it is learnt that the area under turmeric has increased substantially this year and hence they are expecting an increase of 15 per cent in turmeric production in 2018-19,” said Homey Cheriyan, Director, IISR.

The average area under turmeric cultivation in Maharashtra for the last five years stood at 13,494 ha.

Further, Cheriyan said, that as per the information received from various states, the first advance estimate arrived for production of turmeric in the country for 2018-19 is 11.49 lakh tonnes.

This is marginally higher than 11.33 lakh tonnes produced last year.

New variety

Cheriyan said that the short duration and high yielding variety — **IISR's Pragati**, released in 2017 — has been gaining traction among farmers. The IISR Pragati, which takes only 180 days to harvest, provides a 30-34 per cent yield increase over the national and local turmeric varieties.

It provides an average yield of 38 tonnes per hectare (fresh rhizomes), which can go up to 52 tonnes per hectare under favourable conditions.

India is the largest turmeric producer and accounts for 80 per cent of the global production and demand for the commodity.

India exported around 1.07 lakh tonnes of turmeric valued at ₹1,035.67 crore during 2017-18, according to the Spices Board.

GENERAL

Scientists create molecular 'baits' for trapping virus' known to infect ...

FIRSTPOST-06-FEB-2019

Scientists have created molecular "baits" that can trap any virus known to infect humans, a tool that can be used to efficiently conduct global disease surveillance and cost-effectively control outbreaks.

During the Zika virus outbreak of 2015-16, public health officials scrambled to contain the epidemic. The problem was, there just are not many Zika virus particles in the blood of a sick patient. Looking for it in clinical samples can be like fishing for a minnow in an ocean.

Scientists at Broad Institute in the US have developed a computational method called Compact Aggregation of Targets for Comprehensive Hybridization (CATCH) to overcome this hurdle.

The method can be used to design molecular "baits" for any virus known to infect humans and all their known strains, including those that are present in low abundance in clinical samples, such as Zika.

The approach can help small sequencing centres around the globe conduct disease surveillance more efficiently and cost-effectively, which can provide crucial information for controlling outbreaks.

"As genomic sequencing becomes a critical part of disease surveillance, tools like CATCH will help us and others detect outbreaks earlier and



generate more data on pathogens that can be shared with the wider scientific and medical research communities," said Christian Matranga, a co-senior author of the study who has joined a local biotech startup.

CATCH allows users to design custom sets of probes to capture genetic material of any combination of microbial species, including viruses or even all forms of all viruses known to infect humans.

Users can easily input genomes from all forms of all human viruses that have been uploaded to the US National Center for Biotechnology Information's GenBank sequence database.

The programme determines the best set of probes based on what the user wants to recover, whether that's all viruses or only a subset.

Sri Lankan spices to enter new global markets in 2019

XINHUA-19-FEB-2019

COLOMBO, Feb. 19 (Xinhua) -- Sri Lanka's lucrative spice industry is targeting a revenue of 500 million U.S. dollars in 2019 following its entry into new global markets as well as increasing exports of pepper, cloves, and nutmeg, local media reported Tuesday.

To achieve the target, the spice industry aims to export Sri Lanka's popular cinnamon, pepper, nutmeg, and cloves, to new markets such as Russia, Uzbekistan, and Kazakhstan this year, former Spice Council Chairman Nanda Kohona told the local Daily FT, on the sidelines of the launching ceremony of the Global Spice Road Symposium.

According to Sri Lanka's Central Bank, spices earned 330.3 million U.S. dollars in the first 11 months of 2018 but this was a 11.6 percent drop compared to the same period in 2017.

"Most of our cinnamon is exported to Mexico and South American countries, and a fair percentage goes to the European Union. We're looking at new markets like Russia, Uzbekistan, and Kazakhstan, which are coming up now and looking for spices from Sri Lanka. The demand is not only for cinnamon but pepper, cloves and nutmeg as well," Kohona said.

Cinnamon is the highest income earner for Sri Lanka's spice sector followed by pepper.

Sri Lanka produces about 17,000 tons of cinnamon and 35,000 tons of pepper per year.

The spice industry expects production to recover on better weather conditions this year.

The world's biggest spice company is using AI to find new flavors

CNN-04-FEB-2019

San Francisco (CNN Business) After 130 years, it can be hard to come up with new flavors, so the world's largest spice company is becoming the latest food producer to turn to artificial intelligence for help.

McCormick -- the maker of Old Bay and other seasonings, spices and condiments -- hopes the technology can help it tantalize taste buds. It worked with IBM Research to build an AI system trained on decades worth of data about spices and flavors to come up with new flavor combinations.

The Baltimore, Maryland-based company plans to bring its first batch of AI-assisted products to market later this year. The line of seasoning mixes, called One, for making one-dish meals, includes flavors such as Tuscan Chicken and Bourbon Pork Tenderloin.

Hamed Faridi, McCormick's chief science officer, told CNN Business that using AI cuts down product development time, and that the company plans to use the technology to help develop all new products by the end of 2021.

This isn't the first time AI has been used to finesse food. But it's just starting to become serious business. Brewer Carlsberg, for instance, is using sensors and machine learning to [predict how beer will taste](#). Some companies are wholly devoted to the idea of using AI to spruce up food and drinks, such as [Foodpairing](#), which uses data analysis and machine learning to help restaurants come up with new menu items and cocktails.

In McCormick's case, the AI system was trained on data about raw ingredients, seasoning formulas, sales, trend forecasts and consumer tests of products. It can suggest formulas (such as for a new kind of seasoning) that it predicts will be novel.

Faridi said that the company's developers -- most of whom are food scientists, chemists, chemical engineers, nutritionists, or chefs by training -- typically create a new product by starting with a basic recipe (for, say, gravy or mustard) called a seed formula and building up from there.

A potential product may go through 50 to 150 iterations before McCormick settles on a final formula, Faridi said. It will then be tested in a lab, with sensory experts and then with consumers. The whole process can take anywhere from two weeks to six months.

A new McCormick recipe mix was created with the help of AI from IBM Research.

Faridi said McCormick's use of AI can reduce the time it takes to create a new product by two-thirds.

Because getting products to market fast can be a problem for all kinds of consumer-g geared large companies, the move makes sense to Erin Lash, an analyst at investment researcher Morningstar covering the packaged food and household and personal care industries.



"I think a number of firms are looking for ways to address that and grease the wheels of their own innovation cycle," she said.

With AI, the recipe developer still identifies a seed formula to start, and may set some parameters for ingredients that shouldn't be replaced in a recipe. The system will suggest new formulas, which McCormick's product developers can refine and taste, then send on for consumer testing (and, perhaps, eventually turn into real products). The system also improves over time with feedback it gets from developers, according to Faridi.

So far, AI has led to some flavor combinations that humans might not otherwise consider because of cultural biases about what will taste good to whom, said Richard Goodwin, principal research scientist at IBM.

For example, one developer was working on a recipe for pizza seasoning, and the AI suggested adding cumin. Though it's outside the norm for pizza spices, she tried it, and liked it. But there are misfires. At one point, while trying to get AI to produce a new rice dish recipe, the computer removed rice from the list of ingredients and replaced it with salt, Goodwin said. "It created a very nice seasoned salt," he said. "But wasn't what the product developer was tasked with developing."

The Latest Trends In Flavors And Spices

FORBES-17-FEB-2019

In 1950, the average home kitchen held 10 spices, seasonings and extracts. Today that number is over 40. Eating at home is growing - 83% of Americans say they are eating more

at home and going to restaurants less. The perimeter area of major supermarkets, where the fresh products are sold, is growing at twice the rate of the core area where packaged products are located. Consumer trends are all pointing towards more interest in freshness, flavors from all over the world, and healthier alternatives. So where do foods and flavors go from here?

To find out, I spoke with a number of people including Brendan Foley, President of Global Consumer and Americas Region at McCormick, the world's largest purveyor of spices, with revenue of over \$5 billion. Foley and others points out these trends:

The increase in cooking at home means greater impact of consumers' decisions and less influence from professional chefs. That makes it more important for food and flavor companies to reach consumers directly and that means more presence on social media. Foley of McCormick says, "the phone eats first." He means that so often, completed dishes are shared on social media and seen by Instagram, Facebook and Pinterest viewers before they're ever eaten by people.



Heat – Pepper is on the rise. Foley says the use of pepper allows a consumer to make a dish their own and is a great shortcut to experiment with flavor.

Seeds – Seeds are now perceived as high in nutritional content and an excellent add-in for many foods that add texture and visual appeal. Seeds also absorb flavor, increasing the impact of flavor and spice, making them great catalysts for more memorable tastes.

Convenience – As with so many other aspects of consumer behavior right now, the need for convenience (so important for many trends including the growth of Amazon) is a key factor in the spice business. McCormick has seen an increase in pre-mixed blends of spices that allow consumers to experiment in ways they could never do on their own. Truffle salt is a good example of a popular flavor trend but something a consumer would find difficult and time-consuming to create on their own. East African flavors are another new trend, including a spice blend for grilling called Berbere that includes chili pepper, garlic, ginger and basil. It's a hard combination for a consumer to get right by making it from scratch but a pre-mixed blend can easily personalize a dish. Not coincidentally, that kind of value-added product is a higher margin sale for the spice purveyor.

Fewer recipes – More consumers are taking pride in creating their own dishes without structured recipes.

Salt – I'll start by admitting: I have no data on this one. But salt is everywhere. You'll see it in the mythical Himalayan salt which is now on fashionable dining tables, despite no evidence that it's better for taste or health. If you have a beauty routine, there's a good chance that salt is there too, in your bath, on your face and in your body scrub. Growth in table salt is also positively impacted by the questioning of the deleterious effects it has long been believed to have on heart health.

As with all good consumer trends, there are now startups specializing just in salt. Jacobsen Salt Co. hand-harvests salt from Netarts Bay on the Oregon coast. Their products include not just table salt, but (delicious) salty candies including caramels, honey nut chews and licorice.

What's Happening At Retail

Spice and flavor can also be its own retail venue. That's the point of Savory Spice, a 28-store retail chain that sells 554 varieties of spices and flavors on its website and in its stores. Savory Spice is attempting to be big by being small, making flavors personalized to keep consumers coming back. Savory Spice also develops proprietary content on its website that is relevant to people who are interested in curating food and flavors. Savory Spice's founders, Janet and Mike Johnston, told me "the world and the internet have made exotic food less exotic, and spices are an easy way to...bring the flavor of another culture and a region to your home quickly." For example they said, "cumin wasn't one of the spices in our spice cabinets growing up. But now it's a top five spice for us. It's a critical flavor for Mexican, Indian and Moroccan [foods]... and you can't make a chili powder without cumin for Tex-Mex."

Savory Spice is also seeing trends in spices that are hard for consumers to access on their own, like black garlic. It's a fermented garlic, originally from Korea but now grown in the US. It gets buried and fermented for a month and it's now a trending ingredient in hummus. Accessing those more exotic flavors is a key advantage for a specialty retailer like Savory Spice.

Where This Goes

Bringing unique experiences to consumers is the challenge for an industry that was built having consumers take salt and pepper off the shelf for replenishment. In that way, the food and flavors business is facing the same issues as other consumer products businesses. Consumers want it conveniently and they want it personalized. They want to make more of their own foods and have it be identifiable as something they did themselves uniquely. Whoever gives them that on a mass basis can win.

Spices in distress: Pepper imports flouting minimum import price ...

FINANCIAL EXPRESS-27-FEB-2019

The Union government imposed an MIP for pepper at CIF value of Rs 500 per kg to protect the interests of farmers in December 2017.

Import duty of pepper was fixed 70% to protect the interest of the Indian pepper growers but concessions were granted to Sri Lanka under SAFTA, ISFTA and ASEAN agreements.

Domestic pepper market is under stress due to the open imports of the commodity flouting norms of MIP (minimum import price), according to Jojan Malayil, former president of India pepper and spice trade Association and CEO of Bafna Enterprises.

He added that approximately 25,000 tonne of imported pepper has found its way into the domestic market.

The Union government imposed an MIP for pepper at CIF value of Rs 500 per kg to protect the interests of farmers in December 2017. The decision was based on the proposal of the state-run Spices Board that cheaper imports of the commodity is putting pressure on the domestic market.



Import duty of pepper was fixed 70% to protect the interest of the Indian pepper growers but concessions were granted to Sri Lanka under SAFTA, ISFTA and ASEAN agreements.

Jojan said Indian imports of pepper has been on the increase and stands at 36,307 tonne in 2018 as against 21,949 tonne in 2015.

“Export of pepper from Vietnam to Nepal and Myanmar has also increased to 5735 tonne in 2018 as against 115 tonne in 2015. During 2017, exports to these countries were 2435 tonne,” he added.

Unscrupulous and unchecked imports of low priced ‘other origin black pepper’ into India is destroying the country’s reputation as the origin of high quality pepper and simultaneously damaging the livelihood of farmers, All India Spices Exporters Forum (AISEF) had said earlier.

There are also reports of cross border smuggling of black pepper through Nepal and Bangladesh. This is supposed to have been sold into the domestic market adversely affecting our farmers and the consumers, AISEF sources said.

The government move has not stopped the imports of pepper but has hit ‘export oriented units’, who import pepper and export it after value addition. “So the issue is not imports by value added processors but open imports flouting norms of MIP. MIP was strictly enforced on value added processors for eight months and kicked them out of business to other origins,” Jojan said.

Unesco, Kerala government agree to reinvigorate Spice Route Project

THE NEW INDIAN EXPRESS-21-FEB-2019

KOCHI: Unesco will cooperate with the Kerala Government to promote heritage projects as part of the Spice Route project in the state. A delegation from Kerala held a meeting with Unesco officers in New Delhi the other day in which representatives of 10 foreign countries also attended.

The delegation from Kerala comprised Finance Minister Thomas Isaac, Tourism Minister Kadakampally Surendran, Tourism Secretary Rani George, Kerala Tourism head P Bala Kiran, Muziris Heritage Project (MHP) MD Nowshad P M, MHP consultant Benny Kuriakose and Kerala History Research Council chairman P K Michael Tharakan.

The delegation held a meeting with Eric Falt, Director and Unesco Representative for Bhutan, India, Maldives and Sri Lanka. The meeting was attended by ambassadors and representatives of Netherlands, Portugal, Myanmar, UK, Iraq, Afghanistan, Iran, Indonesia and China.



“It was a fruitful meeting as the Unesco agreed to cooperate with us in developing and promoting the Spice Route project. Unesco will cooperate with various programmes to be organised as part of the Spice Route project which intend to promote the heritage and culture of the state. It will facilitate knowledge sharing and research activities with other countries which had historical trade links with Kerala,” MHP MD P M Nowshad said.

As Kerala is promoting heritage tourism, the collaboration of Unesco will benefit the state immensely. The Netherlands has promised to collaborate in the development of Alappuzha heritage project. Researchers from Kerala can associate with experts in the Netherlands. Similarly, assistance will be provided to digitise archives related to heritage projects in the state.

“We are not looking for any financial aid from Unesco. However, technical assistance by facilitating the involvement of foreign nations in preserving heritage sites and managing the archives of the state will help the project. It will also help in expanding research activities conducted on Kerala heritage to foreign nations,” he said.

Spice Route international conference in August . At the meeting, a decision was taken to organise the international conference in Kerala from August 7 to 9. The conference will be attended by scholars from 29 nations which had historical connection with Kerala. “The venue of the project is yet to be finalised. It may take place in Kochi or Alappuzha. During the conference, the delegates will be taken to Muziris and Alappuzha heritage sites,” a Tourism Department officer said.

It was in 2014 the Unesco signed an MoU with Kerala Tourism Department to launch the Spice Route Project. However, other than organising a culinary event in 2016, the project did not progress much. It was in recent years, the government decided to rediscover the Spice Route Project by partnering with the Unesco.

Representing Kerala

The delegation from Kerala comprised Ministers Thomas Isaac and Kadakampally Surendran, Tourism Secretary Rani George, Kerala Tourism head P Bala Kiran, Muziris Heritage Project MD Nowshad P M, MHP consultant Benny Kuriakose and Kerala History Research Council chairman P K Michael Tharakan.

മുരിങ്ങയിലയുടെ പൗഡർ ഓൺലൈൻ വിപണിയിൽ; കിലോയ്ക്ക് 1000 രൂപയോളം

Feb 14, 2019,

മുരിങ്ങ "സൂപ്പർ ഫുഡായി" മാറുകയാണ്. ഒരു കിലോ മുരിങ്ങയില പൗഡറിന് ഓൺലൈൻ വിപണിയിൽ 1000 രൂപയോളവും മുരിങ്ങയുടെ കുരുവെണ്ണയ്ക്ക് ലിറ്ററിന് 4000 രൂപയോളവുമാണ് വില. പോഷകമേന്മയുള്ളതിനാലും (വിറ്റമിൻ സി ഓറഞ്ചിൽ ഉള്ളതിന്റെ ഏഴിരട്ടി, വിറ്റമിൻ എ ക്യാരറ്റിൽ ഉള്ളതിന്റെ പത്തിരട്ടി, കാൽസിയം പാലിലുള്ളതിന്റെ 17 ഇരട്ടി, പ്രോട്ടീൻ യോഗർട്ടിൽ ഉള്ളതിന്റെ 9 ഇരട്ടി, ഇരുമ്പ് സ്പിനാച്ചിൽ ഉള്ളതിന്റെ 25 ഇരട്ടി ...എന്നിങ്ങനെ) ജീവിതശൈലി രോഗങ്ങൾക്കുള്ള ഔഷധമെന്ന നിലയിലുമാണ് മുരിങ്ങയ്ക്കു പ്രസക്തി ഏറുന്നത്. കൊളസ്ട്രോൾ , ഹൃദ്രോഗങ്ങൾ, പ്രമേഹം, ഗൗട്ടിനോടും മറ്റും അനുബന്ധിച്ചുണ്ടാകുന്ന വീക്കവും വേദനയും എന്നിവയൊക്കെ അകറ്റാൻ മുരിങ്ങയിലയിലെ ഘടകങ്ങൾക്കൊക്കും.

മുരിങ്ങയില സോളാർ ഡ്രയറിലും മറ്റും ഉണക്കി പൊടിച്ചുണ്ടാക്കുന്ന പൗഡറിന് ഔഷധ-പോഷകമേന്മ കൂടുതലാണ് . മുരിങ്ങക്കുരു ചൂടാക്കാതെ യന്ത്രസഹായത്തിൽ ആട്ടിയെടുക്കുന്ന എണ്ണ പ്രകൃതിദത്തമായ കോസ്മെറ്റിക് ലേപനമായും മസ്സാജ് ഓയിലായും പ്രിയം നേടിയിട്ടുണ്ട്. മുരിങ്ങ ഉൽപ്പന്നങ്ങൾ നിർമ്മിച്ചു നാട്ടിൽ വിപണനം ചെയ്യുകയും വിദേശത്തു കയറ്റി അയയ്ക്കുകയും ചെയ്യുന്ന നിരവധി സംരംഭങ്ങൾ തമിഴ്നാട്ടിലുണ്ട്.

മുരിങ്ങയില പൗഡർ, മുരിങ്ങക്കുരുയെണ്ണ എന്നിവയ്ക്ക് പുറമെ മുരിങ്ങയില ഓണ്ണറ്റ് , ക്യാപ്സ്യൂൾ, എനർജി ബാർ, മുരിങ്ങാ ടീ, മുരിങ്ങപ്പൂവ് ഉണക്കിയത് തുടങ്ങി ഇരുപതോളം ഉൽപ്പന്നങ്ങളാണ് ഇവരുണ്ടാക്കുന്നത്. മുരിങ്ങയുടെ ആഗോള വിപണി ഏഴ് ബില്യൺ ഡോളറിന്റേതാണ്. ഉൽപ്പാദനത്തിലും കയറ്റുമതിയിലും ഇന്ത്യ തന്നെയാണ് മുന്നിൽ.

കേരളത്തിൽ മുരിങ്ങയുടെ വാണിജ്യ കൃഷി ഇല്ല. വരൾച്ചയെ നന്നായി ചെറുക്കുന്ന, രോഗകീടബാധ കുറവായ ഈ വൃക്ഷ പച്ചക്കറിയുടെ വാണിജ്യ കൃഷി നാം കൂടുതൽ പ്രചരിപ്പിക്കേണ്ടിയിരിക്കുന്നു. മുരിങ്ങയിലയ്ക്കു ചീരയോളമോ അതിലേറെയോ വില കിട്ടുന്ന സ്ഥിതിയാണ് വരുന്നത്. മുരിങ്ങയില പൗഡറിന്റെയും മറ്റും നിർമാണം ചെറുകിട വ്യവസായമായി ഏറ്റെടുക്കാനും സാധ്യത കുറവല്ല.

കുടുംബിനികൾ കൂട്ട് കുറ്റിക്കുരുമുളക്

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കുറ്റിക്കുരുമുളക് കൃഷി ചെയ്യുന്ന വിധമാണ് ഇവിടെ വിവരിക്കുന്നത്.....

വീട്ടമ്മമാർ കൃഷിയിൽ അൽപം താൽപര്യം കാണിച്ചാൽ കുറ്റിക്കുരുമുളക് തൈകൾ വീട്ടിൽ തന്നെ തയ്യാറാക്കാം. തൈകൾ നട്ടു പരിചരിച്ചാൽ ആദ്യ വർഷം തന്നെ നല്ലവണ്ണം കായ്ച്ചു തുടങ്ങും .

ഒരു ചെടിയിൽ നിന്ന് കുറഞ്ഞത് 250 ഗ്രാം മുളകെങ്കിലും കിട്ടും. നന്നായി കായ്പിടുത്തമുള്ള കുരുമുളക് ചെടിയുടെ പ്രധാന തണ്ടിൽ നിന്നും വശങ്ങളിലേക്കു വളരുന്ന പാർശ്വ ശിഖരങ്ങൾ മൂന്നു മുതൽ അഞ്ചു വരെ മുട്ടോടുകൂടി മുറിച്ചെടുത്ത് അതിലെ ഇലകൾ ഞെട്ടൽപ്പം നിർത്തി മുറിക്കണം . നന്നായി വിളവേകുന്നതും 8-10 വർഷത്തോളം മൂപ്പുള്ളതുമായ മാതൃകൊടിയിൽ നിന്ന് ഒരു വർഷം പ്രായമായ ശിഖരങ്ങളാണ് മുറിച്ചെടുത്ത് വേരോട്ടമുണ്ടാക്കാൻ നടങ്ങേണ്ടത്. നല്ല, വിസ്താരമേറിയ ഉദ്ദേശം 45 സെന്റീമീറ്റർ ഉയരവും 30 സെന്റീമീറ്റർ വ്യാസവുമുള്ള ചെടിച്ചട്ടിയുടെ അടിഭാഗത്ത് ദ്വാരമിട്ട് ചരൽ, ഓട്ടു കഷ്ണം എന്നിവ നിരത്തിയിടണം. ശരിയായ നീർവാർച്ച ലഭിക്കും. 2:1:1 എന്ന അനുപാതത്തിൽ മണ്ണ് ,മണൽ ,ചാണകപ്പെടി എന്നിവ കലർത്തിയ മിശ്രിതം ചട്ടയിൽ നിറയ്ക്കണം .

ഇങ്ങനെ നടീൽ മിശ്രിതം നിറച്ചു വെച്ച ചട്ടയിൽ പാർശ്വ ശിഖരങ്ങൾ നടാം. നഴ്സറിയിൽ നിന്നും പോളി ബാഗിൽ നട്ടിരിക്കുന്ന ബുഷ് പെപ്പർ നടീൽ തൈകൾ ലഭിക്കും . ഇതു വാങ്ങി ചട്ടിയുടെ നടുഭാഗത്തിറക്കിവെച്ച് കവർ ബ്ലേഡിനാൽ മുറിച്ചുനീക്കി നല്ല ബലത്തിൽ ചട്ടിയിൽ നടണം . സ്വന്തമായി നമ്മുടെ വീട്ടുപറമ്പിൽ തന്നെ കുറ്റിക്കുരുമുളക് തൈകൾ തയ്യാറാക്കുമ്പോൾ വേരുപിടിക്കാനൽപ്പം അമാന്തമുണ്ടാവാറുണ്ട് . ഇതിനു പരിഹാരമായി പാർശ്വ ശിഖരങ്ങൾ മുറിച്ചുയടനെ

വേരുപിടിക്കുന്ന ഹോർമോണിൽ മുക്കി നട്ടാൽ മതി. ഹോർമോൺ ലായനിയിലോ ഹോർമോൺ പൊടിയിലോ പാർശ്വ ശിഖരത്തിന്റെ ചുവട് മുക്കി നടണം. ഇൻഡോൾ ബ്യൂട്ടയറിക് ആസിഡ്, സെറാഡിക്സ് ബി 2 ,കെരാഡിക്സ് ,റൂട്ടെക്സ് എന്നീ പേരിലെല്ലാം വേരുപിടിത്ത ഹോർമോൺ ലഭ്യവുമാണ് .

45 സെക്കൻഡ് നേരം ലായനിയിൽ കമ്പുമുക്കിയിട്ടാണ് നടങ്ങേണ്ടത്. ചെടിച്ചട്ടിയിൽ വേരു വന്നതിനു ശേഷം മൂന്നു മാസത്തിലൊരിക്കൽ കാലിവളം 50 ഗ്രാം വീതം മണ്ണിലിളക്കിചേർക്കണം. മണ്ണിര വളം ചേർക്കുന്നതു നല്ലതാണ്. സ്യൂഡോമോണസ് ലായനി ചുവട്ടിൽ ഒഴിച്ചു കൊടുക്കാം. ട്രൈക്കോഡെർമ -വേപ്പിൻപിണ്ണാക്ക് മിശ്രിതം ഇടയ്ക്ക് ചേർക്കുന്നതും നല്ലതാണ് .

ചെടി വളർന്നു വരുന്നതിനനുസരിച്ച് വശത്തേക്ക് വളരുന്ന ശാഖകൾ മുറിച്ചു നേരെ നിർത്തി കുറ്റി രൂപത്തിൽ നിലനിർത്താൻ ശ്രദ്ധിക്കണം. വീട്ടാവശ്യം നിറവേറ്റാൻ 3-4 ചെടിച്ചട്ടിയിൽ കുറ്റിക്കുരുമുളക് നട്ടാൽ മതി. ചെടിച്ചട്ടിയിൽ നല്ല നിറം തേയ്ച്ചാൽ വീടിനു മുകളിലും ഉദ്യാനത്തിലും കുറ്റിക്കുരുമുളക് നല്ല ഭംഗിയായിരിക്കും. വെറ്റില ,തിപ്പലി എന്നിവയും ഇങ്ങനെ നടാം.