

# INDIA PERSPECTIVES

Volume 34 | Issue 05 | 2020

## HERALDING A NEW WAVE

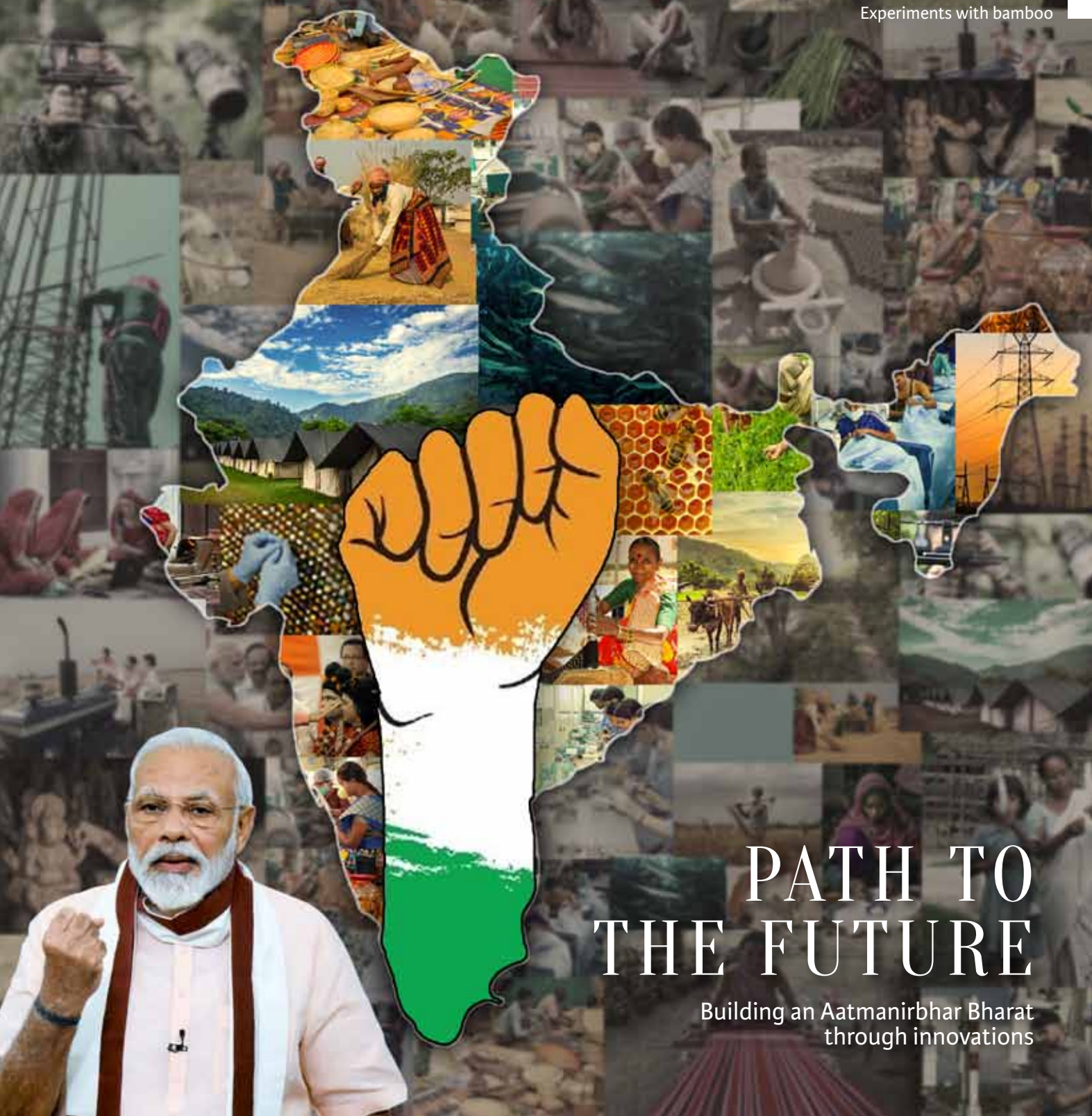
## India's appeal at the UN for sustainable world peace

## SOUND OF THE FUTURE

## Indian traditional instruments find modern avatar in electronic music

## THE MIRACLE GRASS

## Experiments with bamboo







# 29

NOVEMBER, 2020

### DEV DEEPAVALI

Celebrated 15 days after Diwali, Dev Deepavali is observed with much gusto in Varanasi and Prayagraj. The *ghats* (steps leading down to a waterbody) along the holy River Ganges, come alive with the twinkling lights of hundreds of *diyas* (earthen lamps). The religious significance of this light festival lies in the belief that on this day gods and goddesses descend on Earth to celebrate.

**WHERE:** Uttar Pradesh

# 30

NOVEMBER, 2020



### GURU NANAK JAYANTI

This festival commemorates the birth of the first Sikh Guru, Guru Nanak Dev Ji. Celebrations start two days prior to the day in gurudwaras and include a 48-hour-long recitation of the Guru Granth Sahib called Akhand Path, a procession called Nagarkirtan led by five men, referred to as the Panj Pyare, holding the Sikh triangular flag, Nishan Sahib, and a display of martial arts skills.

**WHERE:** Punjab and across the country

# 1-5

DECEMBER, 2020

### KONARK FESTIVAL

This five-day festival is held in the premises of the historic Sun Temple in Konark, Odisha. It brings together eminent artistes of national and international repute to perform Odissi, kathak, Bharatanatyam, Manipuri and other Indian classical, folk and tribal dance and music. Coinciding with this festival, an international sand art festival is also held at the nearby Chandrabhaga beach.

**WHERE:** Konark, Odisha





**4-6** DECEMBER, 2020

### KABIRA FESTIVAL

Dedicated to the mystic poet Kabir, this immersive festival is held in Varanasi (Benaras) and includes musical shows, heritage walks, literary discourses and enchanting boat rides. The highlights of the festivities are the morning musical sessions that are organised at the Gularia Ghat and feature Kabir veterans, and the evening music shows where artistes are staged on the river.

**WHERE:** Varanasi, Uttar Pradesh



**8** DECEMBER, 2020

### BODHI DAY

This event is celebrated as the day when Siddhartha Gautama attained Enlightenment under the Bodhi tree to become Lord Buddha or the 'Awakened One'. For Buddhists, this day is an opportunity to acknowledge the Buddhist principles of wisdom, compassion and kindness. Buddhists commemorate this day by meditating, studying the Dharma and chanting *sutras* (Buddhist texts). Some celebrate the day in a traditional way by preparing a meal consisting of tea and cakes.

**WHERE:** Across the country

**25** DECEMBER, 2020

### CHRISTMAS

Celebrated to commemorate the birth of Jesus Christ, Christmas is observed in all parts of the country with the grandest festivities happening in Goa, Kolkata, Delhi, Mumbai, Puducherry, Kerala, Mangaluru and Northeast India. Midnight masses are held and some churches recreate the manger where Christ was born as part of the festivities. Traditional Indian Christmas savouries like rich plum cakes, *kulkuls* (a sweet deep-fried curly snack), guava cheese or *perad*, rose cookies and *marzipans* (almond or cashew nut mixture that is shaped into desired designs) are relished.

**WHERE:** Across India





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# FOREWORD

The world watched as Indian Prime Minister Narendra Modi made a historic address at the United Nations General Assembly recently. PM Modi called for reformed multilateralism at the global body, to make it better equipped to deal with the realities of today's world. He also questioned for how long would India, which has been contributing immensely towards strengthening the UN, be kept out of the organisation's decision-making process.

In this issue of India Perspectives, we also delve into how India's diplomatic policies have always been guided by the vision of fostering and strengthening partnerships across the world and in all sectors of development, aspects that are reflected in the ideals and programmes of the Indian Technical and Economic Cooperation (ITEC), which represents an important arm of its soft power diplomacy.

We touch upon various aspects of Prime Minister Modi's vision of building an 'Aatmanirbhar Bharat' or self-reliant India, which is being powered by innovations in indigenous sectors. In agriculture, from experiments with bamboo, which has been a part of our agrarian tradition and is now being increasingly used to manufacture everyday utility objects, to farmers boosting their produce and income by cultivating native cash crops with high commercial demand, achieving self-sufficiency is the new focus.

Another robust initiative of PM Modi, 'Make in India', is helping the revival of India's tribal textiles. We talk about how with government support, textiles traditionally created by the country's tribal communities are back in demand. With the 'Fit India Movement' completing one year in 2020, we look at how this novel initiative is being seen as a measure to stay fit and boost immunity.

India has been surging ahead in the field of technology, ushering in not just a digital revolution, but also aiding wildlife conservationists and naturalists to preserve the country's rich and diverse flora and fauna. In this issue, read how innovations like molecular genetic tools are being used in the field of conservation biology.

We also explore India's scientific achievements through one of its most prestigious institutions, the Bhabha Atomic Research Centre (BARC), that has put the country on the global map of advanced research and development in the field of nuclear science.

Finally, we pay tribute to virtuoso vocalist and Padma Vibhushan recipient Pandit Jasraj, whose contribution to Indian classical music is incomparable and whose recent demise has left a void in the musical world.

Anurag Srivastava



# Call for reformed **MULTILATERALISM AT THE UN**

Over the years, India's position at the United Nations has become more prominent. In the backdrop of Prime Minister Narendra Modi's recent address at UNGA, Ambassador Asoke Kumar Mukerji explores the country's demands for a much-awaited reform of the global body, which will lead to sustainable world peace, security and development



A photograph from September 2019, in which India's Prime Minister Narendra Modi can be seen speaking at the United Nations General Assembly (UNGA), in New York, USA. This year, due to the ongoing global pandemic, the 75th UN General Assembly session was organised virtually and like other heads of delegations, PM Modi made his address during the General Debate of the UNGA session through a pre-recorded video message



A screenshot of PM Modi's recorded video speech for the virtual UNGA session, held between September 15 and 30, 2020

India's Prime Minister Narendra Modi reasserted the country's commitment to the United Nations (UN) during the 75th anniversary commemorative events of the world body this year. Three major themes resonated in his repeated calls for "reformed multilateralism". These were the urgent need to complete the process of democratisation of decision-making in the UN Security Council (UNSC); the positioning of development issues at

the forefront of the work of the UN; and transforming the functioning of the UN into a multi-stakeholder body to enable it to respond effectively to the challenges it faces.

The call for "reformed multilateralism" has become an integral part of India's foreign policy, seeking to maximise the country's participation in the multilateral system to accelerate its transformation into one of the major powers of the 21st century. India has contributed significantly to creating

### *The first UNGA virtual session*

Every September, member states have met in the legendary General Assembly Hall at the UN headquarters in New York for the annual session and its highly visible general debate. The modalities of the 75th session were very different. This year, because of the pandemic, world leaders stayed away and shared pre-recorded videos of their speeches to be broadcast.

The hall, however, was not empty, as the videos were introduced by a representative of each country, who was physically present

**IN ITS JOURNEY TOWARDS PROGRESS, INDIA WANTS TO LEARN FROM THE WORLD AS WELL AS SHARE ITS OWN EXPERIENCES WITH THE WORLD**

**Narendra Modi**  
Prime Minister of India



## PARTNERSHIP

During his speech, the Prime Minister recalled that India has contributed over 240,000 troops in more than 50 UN missions, with Indian soldiers suffering the maximum number of casualties among UN peacekeepers. **(Right)**

A contingent of the Indian Army that is a part of the UN peacekeeping forces



### Indian Army's contribution to the UN peacekeeping force

**The Indian Army is the largest troop contributor to United Nations Peacekeeping Missions, which maintain stability and negotiate peace settlement in turbulent regions of the world.**

- 240,000 Indians have served in 50 of the 71 UN peacekeeping missions established around the world since 1948
- India has a long tradition of sending women on UN peacekeeping missions
- In 2007, India became the first country to deploy an all-women contingent to a UN peacekeeping mission
- Indian peacekeepers have served in some of the most physically demanding and harshest environments, including South Sudan
- More than 160 Indian peacekeepers have paid the ultimate price in service to global peace, losing their lives serving under the UN flag

Source: <https://news.un.org/en/gallery/541602>

the contemporary multilateral system. A century ago, over 1.3 million Indian soldiers volunteered to serve in the victorious Allied armies that secured victory in the First World War, enabling India to sign the 1919 Treaty of Versailles and become a founder-member of the League of Nations. Over 2.5 million Indian soldiers volunteered to fight with the Allied armies during the Second World War, enabling India to sign the 1942 Washington "Declaration by United Nations" and subsequently the UN Charter in June 1945 in San Francisco. As a country with one-sixth of the world's population and a thriving democracy, India is a major stakeholder in a functional multilateral system.

Following his call for a multilateral approach to achieve sustainable peace and prosperity at the High-Level meeting of the UN's Economic and Social Council

(ECOSOC) on July 17, 2020, Prime Minister Modi made a strong pitch for reformed multilateralism "that reflects today's realities, gives voice to all the stakeholders, addresses contemporary challenges, and focuses on human welfare" at the UN's 75th anniversary summit on September 21, 2020. The Prime Minister's speech at the general debate of the UN General Assembly (UNGA) on September 26, 2020, provided the contours of India's vision of "reformed multilateralism".

At the core of this vision is India's belief that UN member-states "cannot fight today's challenges with outdated structures. Without comprehensive reforms, the UN faces a crisis of confidence." The only UN structure that obstructs the democratic principle of taking decisions by consensus or majority voting is the UNSC, where the veto powers of its five self-selected



## India will become an elected member of the United Nations Security Council for a two-year term, starting from January 2021. PM Modi said that the country “will not hesitate to raise our voice against the enemies of humanity, human race and human values”

permanent members overrides democratic decision-making.

The Prime Minister castigated the UNSC for failing to prevent conflicts, including civil wars, and terrorist attacks resulting in the deaths of many ordinary human beings, including hundreds of thousands of children. Millions of people uprooted by conflicts have become refugees. He said that this has happened despite the significant contributions made by many UN member-states to the UNSC to help maintain peace and security. The Prime Minister recalled that India has contributed over 240,000 troops in more than 50 UN missions, with India's brave soldiers suffering the maximum number of casualties among UN peacekeepers.

In June 2020, India obtained 184 out of 193 votes in the UNGA to be elected to a two-year term in the UNSC for 2021-22. This marked the eighth time since 1949 that over two-thirds of the UNGA has endorsed India's credentials to be elected to the UNSC. The Prime Minister pointed out that “the people of India have been waiting for a long time for the completion of the reforms of the United Nations”. He asked: “Today, the people of India are concerned whether this reform-process will ever reach its logical conclusion. For how long will India be kept out of the decision-making structures of the United Nations?”

In his remarks at the 75th anniversary summit, the Prime Minister referred to the

### PM Modi's virtual address at UNITED NATIONS GENERAL ASSEMBLY 2020

PM Modi made a 22-minute long speech in Hindi.



“For how long will India be kept out of the decision-making structures of the United Nations? A country, which is the largest democracy of the world...How long would a country have to wait particularly when the changes happening in that country affect a large part of the world?”

“Even during these very difficult times of a raging pandemic, the pharma industry of India has sent essential medicines to more than 150 countries. India's vaccine production and delivery capacity will be used to help all humanity in fighting this crisis.”

“If century changes and we don't, then strength to bring changes becomes weak. If we assess the last 75 years of the United Nations, we see several achievements. But...there are also several instances that point to a serious need for introspection for the United Nations.”

“far-reaching” declaration adopted by world leaders and cautioned that unless the UN was comprehensively reformed, the vision of the declaration “in preventing conflict, in ensuring development, in addressing climate change, in reducing inequalities, and in leveraging digital technologies” would remain unfulfilled.

India’s call for reformed multilateralism focuses on the inter-linkage between peace, security, and development. An ineffective UNSC jeopardises India’s national efforts to achieve Agenda 2030’s Sustainable Development Goals (SDGs). The relevance of this observation for the work of the UN in the decade ahead was illustrated by the Prime Minister’s reference to some of India’s major development initiatives implemented since 2015. Showing how the UN member-states can “reform-perform-transform”, the Prime Minister listed

**“REFORM IN THE RESPONSES, IN THE PROCESSES, IN THE CHARACTER OF THE UNITED NATIONS IS THE NEED OF THE HOUR**

**Narendra Modi**  
Prime Minister of India

the “transformational changes” in India over the past five years that had enabled hundreds of millions of people to enter the formal financial sector, become free from open defecation, and get access to free healthcare services. The empowerment of women through promotion of entrepreneurship and leadership, access to micro-financing and paid maternity leave were integral to India’s non-discriminatory development policies. India was “one of the leaders in digital transactions”, PM Modi said, and the policy of “Self-Reliant India” would become a force multiplier of the global economy after the current Covid-19 pandemic is over.



A file photograph of Prime Minister Narendra Modi addressing UNGA for the first time on September 27, 2014, where he made his historic and successful proposal for the UN to declare June 21 every year as the International Day of Yoga. This illustrates a multiple stakeholder approach to reform multilateralism





The United Nations headquarters in New York City with flags of member nations

The Prime Minister committed India to “sharing experiences of our development” as a practical way to implement the principle of international cooperation on which multilateralism depends. This included a commitment to build on the supply of essential medicines by India to more than 150 countries to respond to the Covid-19 pandemic by leveraging India’s vaccine production and delivery capacity to “help all humanity”.

Based on its experience of implementing the SDGs, India advocated “a multi-stakeholder ground-based” approach to achieve the global goals. This required engaging “state and local governments, civil society, communities and people.” India’s international experience in implementing various global initiatives for a holistic approach to peace, security and development had similarly

been sustained by a multi-stakeholder approach.

The UN has already adopted a multi-stakeholder approach for its activities under the Tunis Agenda to respond to the emerging digital order, and Agenda 2030 to achieve the SDGs. The call for “reformed multilateralism” based on democratic decision-making, prioritising development, and including all stakeholders comes at a critical time for India’s foreign policy. India’s role as an elected non-permanent member of the UNSC and the incoming Chair of the G20 during 2021-2022 provides a window of opportunity for the country to play a leadership role to reform and transform the UN.



*Diplomat Asoke Mukerji was India’s Ambassador and Permanent Representative to the United Nations in New York (2013-2015)*

# STRENGTHENING THE PATH OF friendship



Prime Minister of India Narendra Modi (right) shakes hands with Mahinda Rajapaksa, Sri Lanka's Prime Minister, during a ceremonial reception in New Delhi, in February 2020

India and Sri Lanka reiterated their deep ties at the recently-held virtual summit between the Prime Ministers of both the countries. On this occasion, ex-diplomat **Gopalkrishna Gandhi** recalls the initiatives spearheaded by former External Affairs Minister, the late Jaswant Singh, and their current implications on the relations between the two neighbouring nations



**S**ri Lanka was in a grim situation throughout the 1990s. By 2000, the then President of Sri Lanka, Chandrika Bandaranaike Kumaratunga, was facing formidable challenges – militarily, politically, and personally. The separatist group Liberation Tigers of Tamil Eelam (LTTE) was intractable, volatile, and capable of doing its worst. India was observing the volatile situation, with its experience of the Indian Peace Keeping Force (IPKF, which was involved in peacekeeping in Sri Lanka between 1987 and 1990), and the assassination



of former Indian Prime Minister Rajiv Gandhi branded into its psyche. Suggestions were not lacking for an “armed intervention”.

In a speech made from Kelang, Himachal Pradesh, the then Indian Prime Minister, Atal Bihari Vajpayee, dismissed these ideas and said, in his lilting Hindi: *“Hum Lanka ki madad karne ko tayyar hein. Lekin Lanka ko bhi apni niti, apne nivasiyon ke bare*

**Top:** The two leaders during their virtual summit held on September 26, 2020. The virtual summit was the first official interaction between the leaders after they met in New Delhi in February this year.

**Bottom:** Tamil Hindu devotees at the Nallur Kandaswamy Kovil temple in Jaffna, Sri Lanka. The island nation is home to a large Tamil population and during the recent bilateral summit, PM Modi pitched for full implementation of a constitutional provision by the new Sri Lankan government to ensure devolution of powers to the minority Tamil community



**“THE RELATIONS BETWEEN INDIA AND SRI LANKA ARE THOUSANDS OF YEARS OLD. ACCORDING TO MY GOVERNMENT’S NEIGHBOURHOOD FIRST POLICY AND SAGAR [SECURITY AND GROWTH FOR ALL IN THE REGION] DOCTRINE, WE GIVE SPECIAL PRIORITY TO RELATIONS BETWEEN THE TWO COUNTRIES**

**Narendra Modi**  
Prime Minister of India

Indian Prime Minister Narendra Modi walks during a Buddhist ceremony at the Sri Maha Bodi temple in the north-central town of Anuradhapura when he visited the country on March 14, 2015. Buddhists believe that the Sri Maha Bodi, or holy Banyan tree to be the world's oldest and the most sacred tree



### Sri Lanka's PM Mahinda Rajapaksa commended the strong leadership shown by Prime Minister Modi in the fight against COVID-19 pandemic based on the vision of mutual support and assistance to the countries of the region

*mein, Tamil vasiyon ke bare mein, badalni chahiye. Is sambandh mein Lanka se batchit ho rahi hai. Aur hum samajhte hein ki koyi rasta niklega.* (We are ready to help [Sri] Lanka. But Lanka also has to make changes in its policy, about its residents, and Tamil citizens. We are in dialogue with Lanka on this. And it is our understanding that some way out will emerge.)

Jaswant Singh was the External Affairs Minister (EAM), Government of India, when in August of 2000, I was appointed the Indian High

Commissioner to Sri Lanka. I called on EAM Singh. He had returned only the previous night from a visit to Sri Lanka, and so he spoke to me from that fresh experience of the situation there. His was an unusual voice. Strong, deep and

with a tremor -- he sounded as if his thoughts were passing through a sieve of reasoning, controlled emotion and studied courtesy. He said, "Chandrika is a woman of courage. She has lost her husband, suffered an attack on her person, and seen a military reverse. Yet she stands firm. She said to her demoralised Army chiefs, 'we must fight back'. She means to do that." Then, moving seamlessly from English to Avadhi, he quoted Tulsidas from Aranya Kanda (a chapter) of the epic poem *Ramacharitmanas*:



*“dhiraj, dharma, mitra aru nari, apad kala parakhiye chari.* (Fortitude, righteousness, friends and womankind are tested in a crisis)”.

I asked if there was any chance that the LTTE would be receptive to proposals short of Eelam. “None”, he said. “For Prabhakaran [LTTE chief], a solution is not the solution. For him a perennial confrontation is what is needed. He has to keep the conflict going in order to survive.” He added, “But the effort [to find a solution] must continue. [We must] encourage the devising of a formula that will gain a wide measure of acceptance.”

Enlarging his reflection beyond the crucial Tamil question, he said, “We should not pivot our Mission and our representation on Jaffna, the Tamils and the LTTE. There is so much between us and Sri Lanka. There is the Buddha. There are cultural links

with Odisha, Andhra [Pradesh], and Kerala.” Adding, with a passing gleam in his eye, something I never forgot throughout my tenure in Colombo; “We should bring back some laughter and joy in our Mission there. There is too much gloom.”

“Charles Lamb, it is said,” I responded, “laughed in order not to weep”.

“Not that laughter,” Jaswant Singh explained, “but the laughter that complements the serious side.”

The EAM gave me, in under 20 minutes, a sensitive perspective on the fraught island state, the wholly legitimate aspirations of its Tamil population, the efforts of their democratic leaders to engage in political dialogue for an ‘Eelam minus’ solution in which real and satisfying devolution of powers could take place in the letter and spirit of federalism,

## Highlights of the virtual summit

The virtual summit between India and Sri Lanka was held on September 26, 2020. PM Narendra Modi and PM Mahinda Rajapaksa and discussed a wide range of topics to strengthen bilateral relations.

Among the several agreements reached, the two leaders agreed to:

- Enhance cooperation to combat terrorism and drug trafficking
- Strengthen cooperation between armed forces of the two sides, including through mutual exchange of personnel visits, maritime security cooperation and support to Sri Lanka in the spheres of defence and security.
- Facilitate an enabling environment for trade and investment between the two countries
- Work towards early realisation of infrastructure and connectivity projects, including ports
- Deepen cooperation in renewable energy with emphasis on solar projects
- Strengthen people-to-people ties by exploring opportunities in the field of shared heritage such as Buddhism, Ayurveda and Yoga. India will also facilitate the visit of Buddhist pilgrims from Sri Lanka in the inaugural flight to Kushinagar in Uttar Pradesh, where it is believed Lord Buddha attained Mahaparinirvana. Kushinagar’s airport was recently declared an international hub.
- Facilitate tourism by early establishment of an air bubble between the two countries



India has extended support to Sri Lanka on several occasions. Here, Indian Navy personnel can be seen off-loading emergency supplies from an Indian ship at Colombo harbour in 2017, in the aftermath of the island nation's worst floods in more than a decade

### The Indian grant to Sri Lanka of USD 15 million for promotion of Buddhist ties between the two countries will facilitate construction/renovation of Buddhist monasteries, cultural exchanges, and strengthening engagement of Buddhist scholars and clergy among other initiatives

PM Modi welcomes former Sri Lankan President Maithripala Sirisena to the founding conference of the International Solar Alliance in New Delhi in 2018. Recently, India announced that it is offering a Line of Credit worth USD 100 million to Sri Lanka for three solar projects in the neighbouring country, which were announced during the solar alliance conference

giving the island's north and east a sense of their common identity and destiny, the Chandrika government's efforts at forging consensus with the Sri Lankan opposition, and all this in the face of the relentless and dangerous obduracy of the LTTE.

Jaswant Singh's watch over the situation in Sri Lanka remained intense alongside his massive preoccupations with India's two other neighbours – Pakistan and China – and the in-depth and intricate conversations he was conducting with USA.

The years of terrorist frenzy are behind Sri Lanka now. In September

2020, as Jaswant Singh's six-year battle on life's horizon neared its end, a virtual bilateral summit was held between the two neighbours, with Indian Prime Minister Narendra Modi and Sri Lanka's PM Mahinda Rajapaksa discussing a wide range of topics. It was PM Modi's first such virtual bilateral engagement with a leader of a neighbouring country. For Prime Minister Rajapaksa, it was the first diplomatic engagement with a leader of a foreign country after he was sworn in as PM for the fourth time in August, 2020. PM Modi emphasised India's priority to its relations with







A Buddhist monk walks inside the Temple of the Tooth, a UNESCO World Heritage Site, in Kandy, Sri Lanka. One of the highlights of the virtual summit was PM Modi's announcement of a grant assistance of USD 15 million for the promotion of Buddhist ties with Sri Lanka

Sri Lanka, as he mentioned his government's neighbourhood-first policy as well as SAGAR (Security and Growth for All in the Region) doctrine. The Indian Prime Minister announced a grant of USD 15 million for the promotion of Buddhist ties between India and Sri Lanka. PM Modi urged the Government of Sri Lanka to address the aspirations of the Tamil people for equality, justice, peace and respect within a united Sri Lanka, including by carrying forward the process of reconciliation with the implementation of the 13th Amendment to the Constitution of Sri Lanka.

The agreements reached by the two leaders bore out Jaswant Singh's vision. Calling on the new government in Sri Lanka "to work towards realising the expectations of Tamils for equality, justice, peace and

dignity within a united Sri Lanka" was exactly what Jaswant Singh would have wanted to see and hear. He would have been particularly pleased by India's announcement of the grant to strengthen our Buddhist ties.

The Modi-Rajapaksa agreement is organically connected to the approach that former Prime Minister Vajpayee had spelt out in Kelang and Jaswant Singh had reiterated to me 20 years ago. A policy that India has always followed towards Sri Lanka, that of the "*mitra*" (friend) Tulsidas speaks of, which Jaswant Singh had quoted to me years ago.



Diplomat and author Gopalkrishna Gandhi served as the high commissioner to Sri Lanka (2000), and he was the governor of West Bengal (2004-2009). He is also the grandson of Mahatma Gandhi



# ITEC: 56 YEARS YOUNG Still Going Strong

The Indian Technical and Economic Cooperation (ITEC) reflects India's global vision of forming international partnerships in all sectors of development and has raised India's profile as a development partner across a wide interface of sectors, says former ambassador Pinak Ranjan Chakravarty



Since Independence, India's foreign policy has been guided by solidarity with other colonised and developing nations, based not just on shared ideologies but also on strong economic foundations. To fulfil this objective, a comprehensive

programme – the Indian Technical and Economic Cooperation – better known by its acronym ITEC, was launched by the Indian government in 1964, to provide assistance in technical and economic sectors to newly-independent countries and developing nations.

Prime Minister of India Narendra Modi (holding the green flag) launches the second Bhairab and Titas railway bridges in 2017. These bridges have been built with an end-to-end immigration facility between Dhaka (Bangladesh) and Kolkata (India). External Affairs Minister (EAM) Subrahmanyam Jaishankar (second from right) was also present



The ITEC programme was predicated on the belief that “it was necessary to establish relations of mutual concern and inter-dependence based not only on commonly-held ideals and aspirations but also on solid economic foundations. Technical and economic cooperation was considered to be one of the essential functions of an integrated and imaginative foreign policy”. ITEC, fully-funded by the Indian government, is an integral part of India’s foreign policy and represents an important arm of India’s soft power diplomacy, a phrase that came into the

international diplomatic vocabulary years later in the 1980s.

### THE REGIONAL TIES

ITEC is demand-driven and relies on innovative technological cooperation to fulfil the needs of developing countries. More than USD 2 billion has been spent on this programme since it began, benefiting thousands of students and professionals from around 160 countries.

The ITEC Programme is essentially bilateral in nature. However, in recent years, ITEC resources have

Thirty participants from twenty countries visited the Indian Parliament during Indian Technical and Economic Co-operation's (ITEC) Capacity Building Program on International Economic Issues and Development Policy in 2019

**“WHEN INDIAN TECHNICAL AND ECONOMIC CO-OPERATION (ITEC) BEGAN IN 1964, ITS VISION WAS TO SHARE OUR RESOURCES AND CAPABILITIES WITH OTHER DEVELOPING COUNTRIES, IN ORDER TO CONTRIBUTE TO THE EVOLUTION OF A WORLD COMMUNITY BASED ON COOPERATION AND INTERDEPENDENCE.”**

**Narendra Modi**  
Prime Minister of India

## PARTNERSHIP

**Right:** Foreign students who visited India under the ITEC scholarship programme;  
**Bottom:** Participants during the practical session of the 3rd Special International Training Course at the National Institute of Wind Energy, Chennai, in 2019. The Ministry of New and Renewable Energy facilitated the event under ITEC



also been used for cooperation programmes conceived in regional and inter-regional context, such as UN Economic Commission for Africa, Commonwealth Secretariat, UNIDO, Group of 77 and G-15. ITEC's fundamental paradigm is bilateral cooperation but it has regional dimensions that have developed programmes with organisations

like Association of South East Asian Nations (ASEAN), Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), Mekong-Ganga Cooperation (MGC), African Union (AU), Afro-Asian Rural Development Organization (AARDO), Pan African Parliament, Caribbean Community (CARICOM), World Trade Organization (WTO) and Indian Ocean Rim - Association for Regional Cooperation (IOR-ARC) and India-Africa Forum Summit.

The ITEC Programme has evolved and grown over the years. Under ITEC and its sister programme SCAAP (Special Commonwealth African Assistance Programme), 161 countries in Asia, Africa, East Europe, Latin America, the Caribbean as well as Pacific and Small Island countries are invited to share the Indian developmental experience. The shared experiences have covered



areas like civilian and military sectors, projects, consultancy and feasibility studies, sending Indian experts in different domains, study tours for partner country officials and students, supply of equipment as gifts or donation requested and disaster relief. Disaster Relief is a vital component of ITEC and it focusses on food security and medical assistance for humanitarian relief.

## TRAINING MODULES

Training in digital technologies is a special feature that India offers in the domain of capacity building, under ITEC. Professionals from developing countries are offered unique training courses, both civilian

and defence, in different centres of excellence in India. In the civilian sector, the training offered includes a wide and diverse spectrum of disciplines ranging from IT, rural development and parliamentary practices to entrepreneurship, marine and aeronautical engineering etc. In defence, the training covers fields like security and strategic studies, defence management, marine and aeronautical engineering, logistics and management, etc. Over 12,000 scholarships for study in short and long-term courses in India's leading institutions are offered annually under ITEC. Partner countries are free to choose their personnel and the courses that are relevant for their

## Training under ITEC

**(a) Civilian Training Programme:** For Civilian Training Programme, around 12,000 scholarships are being offered to ITEC/SCAAP partner countries to attend the various training courses in India. The premiere institutions of India offer more than 300 short-term, medium-term and long-term courses during the year. The training programme is demand-driven and subjects selected are of interest to developing countries for their working professionals. The wide and diverse spectrum of skills and disciplines offered ranges from IT to rural development, parliamentary practices to entrepreneurship, marine to aeronautical engineering and so on.

**(b) Defence Training:** This covers training of personnel belonging to all the three wings of Defence Services - Army, Air Force and Navy - nominated by the ITEC partner countries in prestigious institutions like National Defence College, Defence Services Staff College, etc. The facility is also extended and availed of by some select developed countries on self-financing basis.



National Institute of Bank Management (NIBM), Pune, under the aegis of ITEC conducted an international training titled 'Role and Functions of Central Bank' in August 2019

### COMPONENTS OF THE ITEC/SCAAP PROGRAMME

- Training (civilian and defence) in India of nominees from ITEC partner countries
- Projects and related activities such as feasibility studies and consultancy services
- Deputation of Indian experts abroad
- Study tours
- Gifts/Donations of equipment at the request of ITEC partner countries

development needs. ITEC programmes are often moulded to suit the specific requirements of partner countries. Indian professionals are deputed upon request in a variety of sectors for teaching and imparting skills. Many among those who have studied or received training in India, have progressed to occupying important political, bureaucratic and military positions in their countries, thereby contributing to their countries' development and fostering closer ties with India.

As a result of different activities under this programme, there is now

a visible and growing awareness among other countries about India's competence as a provider of technical know-how and expertise as well as training opportunities, consultancy services and feasibility studies. These programmes have generated immense goodwill and substantive cooperation among the developing countries.

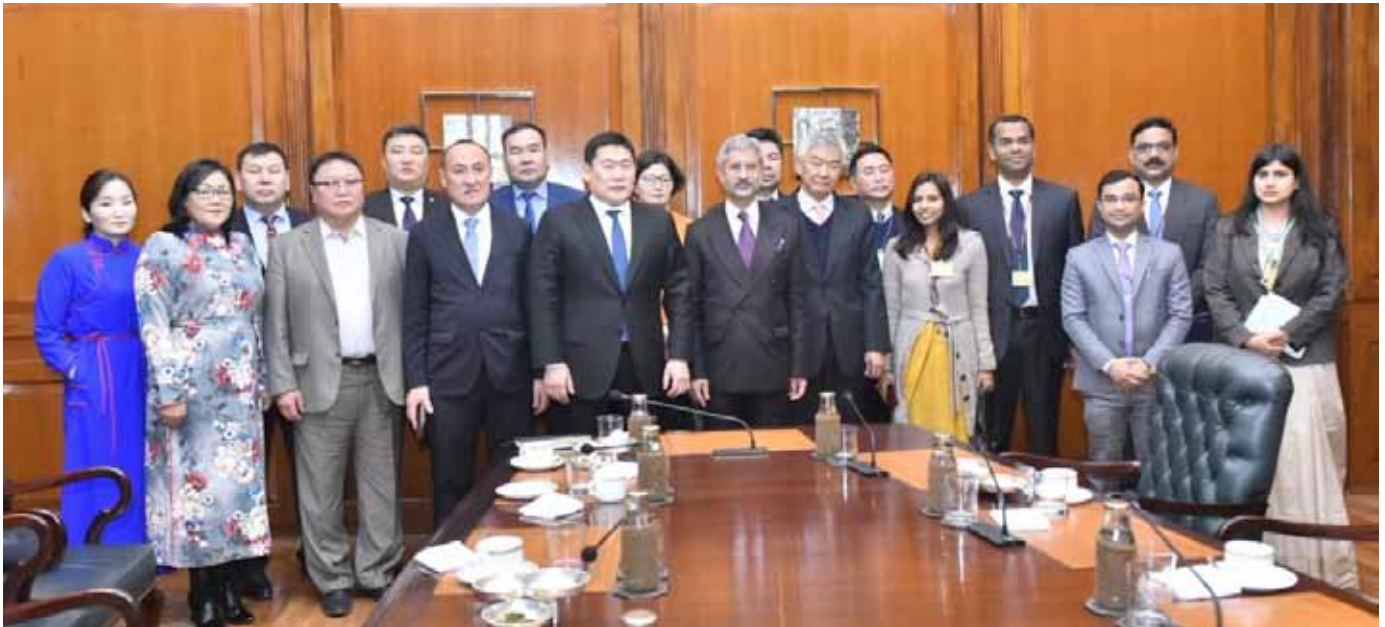
### LINES OF CREDIT

An important dimension of ITEC is the Lines of Credit (LoC), extended on soft terms to partner countries, for essential imports of goods and services, social welfare and

ITEC Day is celebrated annually on September 15 in all partner countries, bringing together ITEC trainees and students via their alumni networks and friendship societies



Prime Minister Narendra Modi unveiling the foundation stone of Atal Bihari Vajpayee Centre of Excellence at the IT Centre of the Mongolian University of Science and Technology located in Ulaanbaatar, the capital of Mongolia



**Top:** External Affairs Minister S Jaishankar (eighth from right) welcomes a delegation of Mongolian governors led by L Oyun-Erdene, chief cabinet secretary, Government of Mongolia. Their visit inaugurated the new ITEC Executive Program for Leadership and Policy training; **Bottom:** Under the ITEC program, National Academy of Customs Indirect Taxes and Narcotics (NACIN), Mumbai, conducted a five-day 'Exposure Visit of Senior Maldives Customs Officers' in January 2020

infrastructure projects. India's South Asian neighbours have received around 70 per cent of the grants under LoC. Indian companies taking part in ITEC programmes have established themselves in partner countries for contributing to infrastructural projects, independent of ITEC or LoC.

The ITEC-LoC partnership fosters friendship and solidarity, and is marked by national ownership of the partner country, since it is voluntary

and devoid of any pre-conditions. During the COVID-19 pandemic, many foreign trainees and students were unable to return home and arrangements were made for their continued stay.

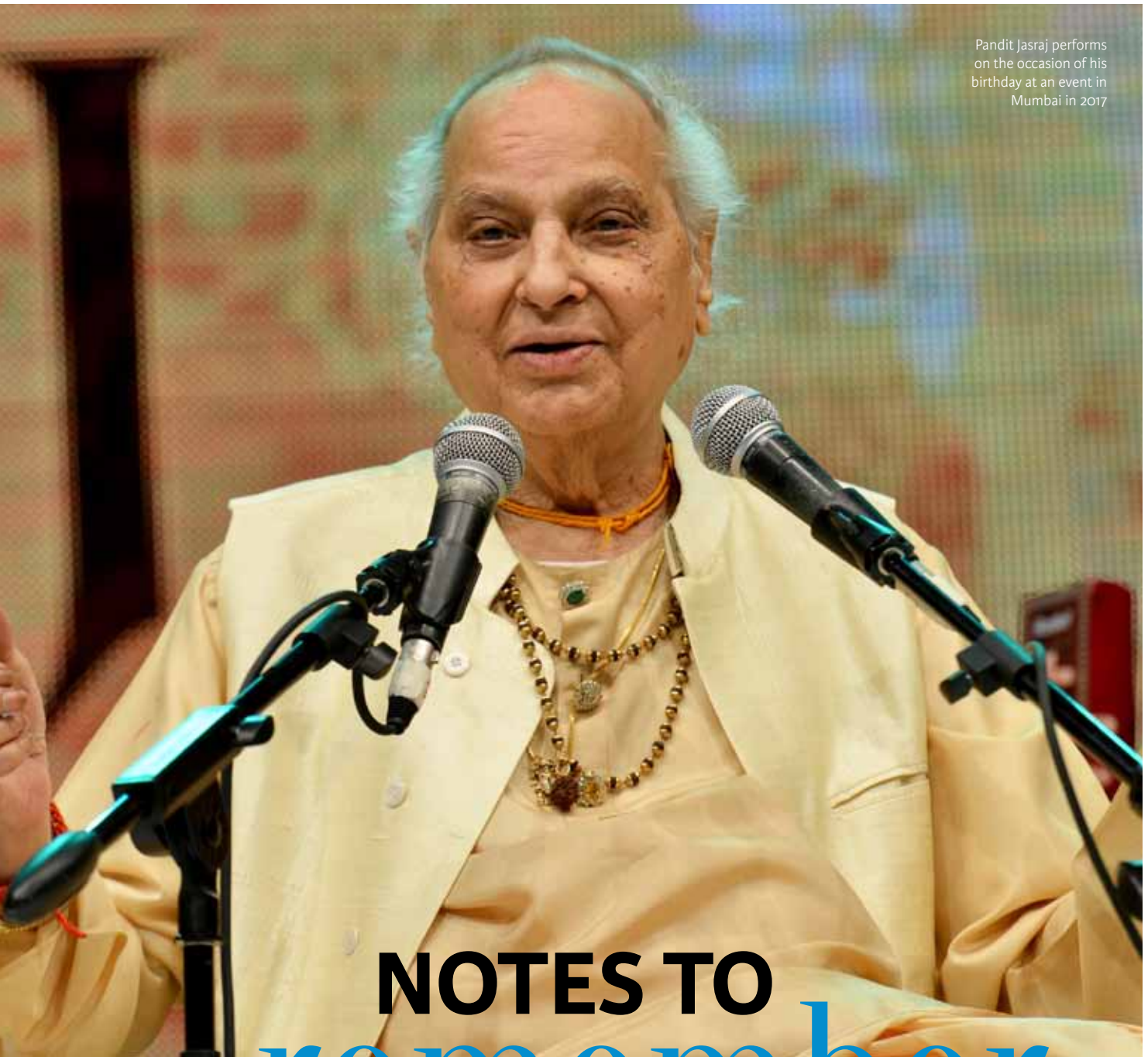
The growth of ITEC led to the Ministry of External Affairs to bring the management of ITEC and LoC under a new entity, called the Development Partnership Administration in 2011, for streamlining its work under a single vertical management structure. Today, ITEC/LoC has matured into a crucial pillar of India's development outreach and diplomacy, imbued with the civilisation heritage of "*Vasudhaiva Kutumbakam*" or the world is my family.



**Pinak Ranjan Chakravarty** is a former Indian ambassador and permanent secretary in the Ministry of External Affairs, Government of India. He is currently a visiting fellow at the Observer Research Foundation, a leading Indian think tank in New Delhi, and a regular media commentator.



Pandit Jasraj performs  
on the occasion of his  
birthday at an event in  
Mumbai in 2017



# NOTES TO remember

Pandit Jasraj was not just a virtuoso vocalist but also composed numerous *bandishes* and created a new form of *jugalbandi* that is named after him - Jasrangi Jugalbandi. As the country mourns the loss of this musical legend, we take a look at his life, work and achievements

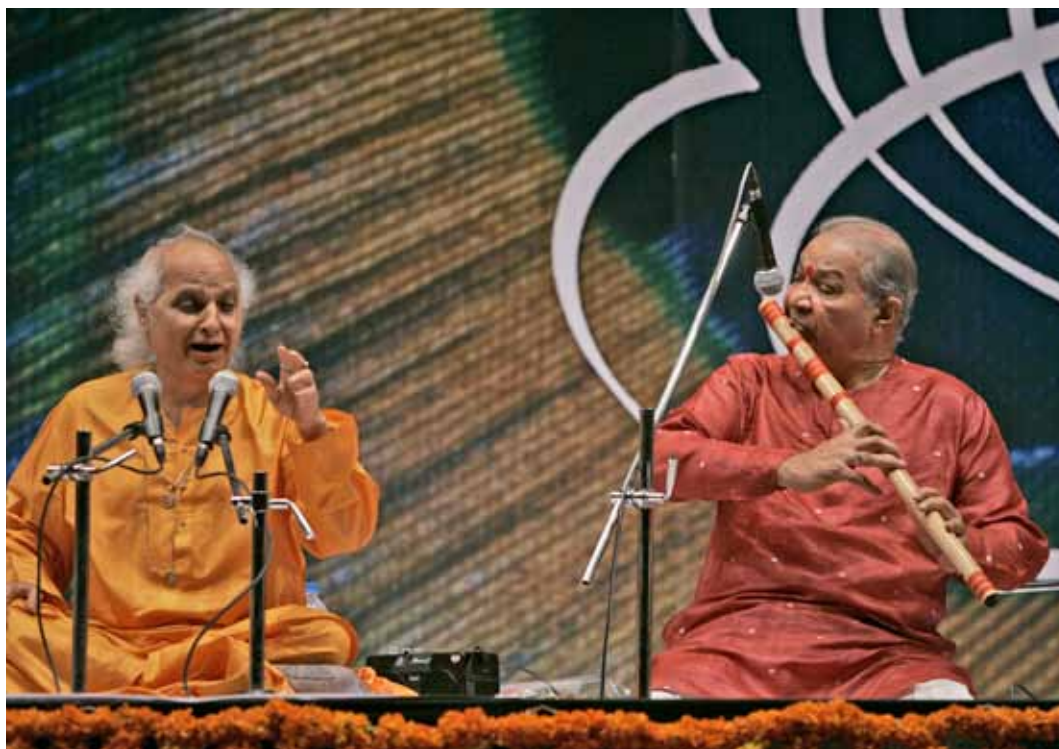
BY SUMAN DOONGA

**P**andit Jasraj needs no introduction. One of the most accomplished vocalists of Hindustani classical music of the north Indian style, he was known for his soul-stirring voice and multi-octave range. With his demise on August 17, at the age of 90, the Indian music fraternity not only lost a jewel but also the last member of a glorious generation of artistes that included the likes of Bade Ghulam Ali Khan, Pandit Bhimsen Joshi and Vidushi Kishori Amonkar, to name a few. Pandit Jasraj, fondly called Bapuji, has left behind an unmatched legacy for the Mewati *gharana*, a 19th-century musical style, which is safe with

his disciples and daughter, Durga Jasraj and his son Shaarang Dev. The doyen will also be remembered for popularising Haveli *sangeet*, a form of devotional music that is traditionally performed in temples and dedicated to Lord Krishna.

### MELODIOUS YEARS

Born into a musically-inclined family in Haryana, he learnt to play the tabla at an early age under the tutelage of his elder brother Pandit Pratap Narayan and went on to hone his vocal skills under his other older brother, Pandit Maniram. Blessed with a sonorous voice, perfect diction, and clarity in *sur* (tunes) and *gayaki* (singing), Pandit Jasraj's music was



Pandit Jasraj (left) with renowned flautist Pandit Hariprasad Chaurasia at a Mumbai-based event in 2005



#### Narendra Modi

##### Prime Minister

The unfortunate demise of Pandit

Jasrajji leaves a deep void in the Indian cultural sphere. Not only were his renditions outstanding, he also made a mark as an exceptional mentor to several other vocalists. Condolences to his family and admirers worldwide. Om Shanti.



#### Lata Mangeshkar

##### Vocalist

*Mahan shashtriya gayak aur maa Saraswati ke upasak Sangeet Martand Pandit Jasraj ji ke swargwas ki khabar sunkar mujhe aseem dukh hua. Ishwar unki aatma ko shanti de main yehi prarthana karti hun. (I am deeply saddened by the news of Pandit Jasrajji's demise. I pray that his soul rests in peace)*



#### AR Rahman

##### Musician and composer

RIP Pandit Jasraj. Indian classical music has lost one of its shining stars.



#### Shankar Mahadevan

##### Singer

Devastated after hearing the news that *sangeet martand* Pandit Jasraj has moved on to the next dimension. A big void in the world of Indian Classical music. His music will live on...



### Pandit Jasraj's association with the youth

Pandit Jasraj had played a pivotal role in helping SPICMACAY (Society for Promotion of Indian Classical Music and Culture Amongst Youth), a global movement to promote Indian heritage and culture. He had inspired the youth across the world during the society's events through spellbinding recitals. His last programme with the society was on June 2020, where he shared his experiences and memories associated with this movement. Dr Kiran Seth, founder of the movement, said, "Pandit Jasraj was a great musician and a very giving person. He agreed to help us promote Hindustani classical music among the young generation in our initial years without hesitation. My deepest respect and gratitude to this lovely human being."

characterised by an interplay between musical notes and words to evoke the desired mood and emotion.

Pandit Jasraj's family eventually shifted Calcutta (present day Kolkata) in 1946 where he and his brother, Pandit Maniram, worked at All India Radio as artistes. He spent 13 years in the city, where he did his daily *riyaaz* (practice) for over 10 hours. The city also introduced him to Som Tiwari (a disciple of Pandit Maniram), Pandit Vijay Kichlu and Ustad Ali Akbar Khan (who lived a few houses away from Panditji's residence), all of whom inspired and encouraged him. During his stay in Calcutta, he also attended concerts where musical greats like Pandit Ravi Shankar performed. In the words of noted vocalist Pandit Ajoy

Chakrabarty, "I was introduced to him in 1981...I was not particularly familiar with his Mewati *gharana*; his style of singing followed that of Dr Pandit Askaran Sharmaji. It deviates a little from hardcore classical music. After Bhimsen Joshi's demise, he was one of the senior-most vocalists in Indian classical music. Today, I feel the pain of losing a senior."

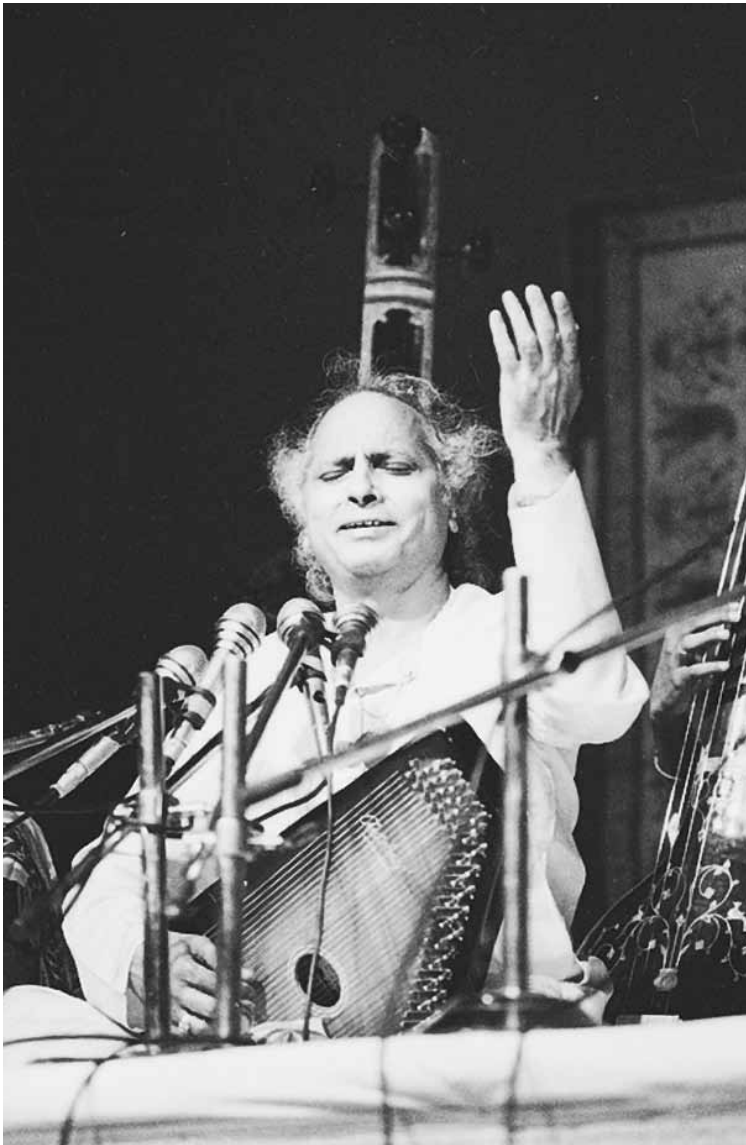
### LIFE, WORK AND HONOURS

The history of Indian classical music is rich with stories that narrate how the weather changed when an artiste sang a particular *raga*. Pandit Jasraj was one of them. In an interview, his daughter had recounted how in Varanasi, in the summer of 1996, a dust storm formed when the vocalist



Kathak legend Pandit Birju Maharaj (extreme right) greets Pandit Jasraj (centre) during the Sumitra Charat Ram Award, 2014, in New Delhi, as the then Union Finance Minister Arun Jaitley looks on





An archival photograph of Pandit Jasraj during a concert in New Delhi in 1992

started singing the *Dhulia Malhar raga*, which is usually sung before the onset of monsoon.

Pandit Jasraj is credited for composing over 300 *bandishes* (musical compositions) and his melodic rendition of verses penned by great saints and poets. His research in Haveli *sangeet* had yielded beautiful compositions in the devotional genre too. He created a novel form of *jugalbandi* (a duet between artistes) called Jasrangi Jugalbandi, which is styled on the ancient principle

of *murchana* (a form of *jugalbandi* between a male and female vocalist singing different *ragas* in their respective scales at the same time).

According to the virtuoso, the purpose of his music and voice was not to self-express or garner praise but godliness. They were mere means to be one with the Almighty because, for him, music was worship. He considered his journey in music as a divine one and often spoke about how God had chosen him. Time and again, he had recounted how Lord Krishna had appeared in his dreams and asked him to sing for Him. This is, perhaps, the reason why, his voice and compositions transcend to a divine plane.

For his vast body of work and love towards his art, he was honoured with innumerable awards, including the Padma Vibhushan, Padma Bhushan and Padma Shri, Sangeet Natak Academy Award, Dinanath Mangeshkar Award and the title of Sangeet Martand from the Government of Haryana. His international honours include that of Excellent Musician conferred by the Harvard University Art Museum.

The country will remain forever be indebted for his contributions to Hindustani *shashtriya sangeet* (Indian classical music). His soulful voice and his values will be remembered by generations to come.



**Suman Doonga** is an educationist and social worker with a passion to preserve and promote Indian art and culture. Her vision is to preserve and enrich the Indian classical arts and to encourage the current and future younger generations to make it an integral part of their lives.



Sports is an active way to remain fit. Sports will be made an intrinsic part of school curriculum under the New Education Policy (NEP) 2020

# A DOSE OF health

The Fit India Movement was launched by Prime Minister Narendra Modi for the overall well-being of the country's citizens. On the occasion of the movement's first anniversary, we take a look at the milestones it has achieved and how it is becoming a mass campaign

BY ABHISHEK DUBEY

**O**n August 29, 2019, celebrated as National Sports Day in India, Prime Minister Narendra Modi launched the Fit India Movement at Indira Gandhi Indoor Stadium, New Delhi. Fit India is a nation-wide campaign aimed at encouraging people to include physical activities and sports in their everyday lives. Combine this initiative with the Prime Minister's other flagship drives such as Swachh Bharat Abhiyan and International Day of Yoga and the underlying narrative becomes clear – to transform a country with

one of the most ancient civilisations and which presently is home to the largest population of youngsters, to a cleaner and fitter nation. The fact that the entire world is going through one of the worst pandemics in human history puts the necessity of this vision in true perspective.

Within a year of its launch, the Fit India Movement has not only gained momentum but was also termed as 'Hit India Movement' by PM Modi on its first anniversary. To mark the occasion, the Prime Minister held the 'Fit India Dialogue', a virtual meet, where he interacted with fitness icons and enthusiasts



Prime Minister Narendra Modi during the launch of Fit India Movement at Indira Gandhi Stadium Complex on August 29, 2019, in New Delhi, India

**BECOMING FIT IS NOT AS DIFFICULT AS MOST THINK. IT JUST REQUIRES A LITTLE DISCIPLINE. 'FITNESS KI DOSE, AADHA GHANTA ROZ'. EVERY INDIAN SHOULD PLAY SOME GAME OR DO SOME FITNESS ACTIVITY, BE IT TENNIS, BADMINTON, KABADDI. IT HAS TO BE FOR AT LEAST HALF AN HOUR.**

**Narendra Modi**  
Prime Minister of India

**ONE CAN REMAIN FIT AND HEALTHY BY USING WHATEVER THEY HAVE, IT ONLY REQUIRES A DETERMINED THOUGHT TO DO SO. I ALWAYS TELL PEOPLE THAT ONE CAN DO ESSENTIAL PHYSICAL DRILLS AT HOME IN AN 8X10 SQ FT SPACE WITH BARE MINIMUM FACILITIES.**

**Milind Soman**  
Actor and fitness influencer



### A fit initiative

Kiren Rijiju, Union Minister for Sports and Youth Affairs, launched the 'Fit India Freedom Run' to celebrate India's 74th Independence Day. This run (held between August 15 and October 2, 2020) was conceived to meet the needs of fitness in these unprecedented times, while adhering to social distancing norms. This unique idea was based on the concept of a virtual run, which obliterated the general requirement of a public gathering. Participants walked or ran along a route of their choice and at their time of convenience. This event reached more than 30 crore people on social media and saw a staggering participation of more than two crore people!

**“FOCUSSED ON PHYSICAL FITNESS AND DIET HAS BROUGHT ABOUT CHANGES IN ME. JUST LIKE CRICKET, OUR LIVES HAVE ALSO GOTTEN FASTER AND DEMANDING. IF WE ARE NOT KEEPING UP WITH IT, THEN WE WILL BE LEFT BEHIND.”**

**Virat Kohli**

Captain, Indian cricket team

from across the country, including Indian cricket captain Virat Kohli, celebrity nutritionist Rujuta Diwekar, fitness influencer Milind Soman, Paralympian Devendra Jhajharia and ace footballer Afshan Ashiq. The meeting, held on September 24, 2020, also saw participation from Kiren Rijiju, Union Minister for Sports and Youth Affairs.

### THE THREE PILLARS

The Fit India Movement stands on the three strong edifices. The first pillar says that the movement is a continuous activity and an intrinsic part of everyday life. It is not just an annual calendar event. Interacting with the audience during the 'Fit

India Dialogue 2020', the Prime Minister stressed on the inclusion of a fitness regime in our lifestyle on a regular basis. He said: “*Fitness ki dose, aadha ghanta roz* (a dose of fitness for half an hour daily).” He added that a family that plays and exercises together develops an emotional bonding, which has been proved during the lockdown period.

The second pillar is that everyone, regardless of age, can be a part of the movement. Stressing on this factor, PM Modi launched 'Fit India - Age Appropriate Fitness Protocols' for three age groups: 5-18 years, 18-64 years and those above 65 years of age, during the anniversary celebrations. These



Regular practice of yoga ensures physical, psychological and mental well-being



**Top:** Joggers at Mumbai's Marine Drive

**Right:** Anganwadi workers practise yoga with all precautions in Beawar, Rajasthan



protocols have been developed by an expert committee, comprising such noted personalities as Dr KK Deepak, professor and head of the department - Physiology, All India Institute of Medical Sciences (AIIMS); Dr P Majumdar, head of Sports Science, Sports Authority of India; and IV Basavaraddi, advisor, Ministry of AYUSH, to name a few.

The guidelines even categorise the exercises and yoga *asanas* one should practice according to age, the duration and the number of rounds for each *asanas*. For example, *tadasana* (palm tree pose) and *dhanurasana* (bow pose) are listed for the 18 to 35 years' category;

*vakrasana* (seated spinal twist pose) and *setubandhasana* (bridge pose) are advised for those between the age of 35 and 50 years. For those between 50 and 65 years, the protocol suggests practicing *anuloma-viloma* (alternate nostril breathing) along with *sukhasana* (easy pose) and *shavasana* (corpse pose).

The third pillar says that this initiative is holistic and participatory, and aims to become a people's movement.

## THE VISIBLE TRANSFORMATION

During the launch of the campaign in

## Fit India: the journey

In its first year, various activities have been undertaken under the aegis of Fit India Movement.

1. On October 2, 2019, the Fit India Plog Run was organised. A two-kilometre plogging event was carried out at 55,000 locations across the country with over 30 lakh participants.
2. Fit India School certification was launched on December 2, 2019. More than 1.66 lakh schools registered themselves fit India schools and committed to let their students play for one period every day. This week was celebrated in approximately 15,000 schools in the month of November-December, 2019, on the call of Prime Minister Narendra Modi in *Mann Ki Baat*.
3. A Fit India Cyclothon was conducted all over India on January 18, 2020. Around 16,000 events were organised, which saw participation of more than 35 lakh people.
4. During the COVID-19 lockdown period, initiatives like Fit India Active Day Series - an exclusive digital fitness series for families and children - were organised.

**“YOUR [PM MODI] APPEAL FOR ‘VOCAL FOR LOCAL’ IS THE NEED OF THE HOUR. WE SHOULD NOT LOSE HEALTH, BUT WEIGHT. WE SHOULD EAT HOME-MADE FOOD AND AVOID PACKAGED FOOD. THIS IS THE SECRET TO GOOD HEALTH.”**

**Rujuta Diwekar**  
Celebrity nutritionist

**“IT IS VERY IMPORTANT TO REMAIN FIT BECAUSE A FIT COUNTRY IS A SUCCESSFUL COUNTRY. OUR PRIME MINISTER’S PERSONAL INVOLVEMENT AND HIS CLARION CALL TO THE INDIAN YOUTH HAS REALLY MADE A DIFFERENCE.”**

**Devendra Jhajharia**  
Paralympic gold medallist

2019, PM Modi had said that Fit India will be a step towards curbing rising instances of lifestyle disorders and non-communicable diseases (NCDs). Throughout the year, various events have been organised under the aegis of the Fit India Movement like the Fit India Freedom Run, Plog Run, Cyclothon, Fit India Week, Fit India School Certificate and various other programmes. The Prime Minister has also spoken about it in his public addresses. It is encouraging to note that over the last one year there has been a perceptible change and increased awareness among Indians about staying fit. A fact corroborated by Union Sports Minister Kiren Rijiju, when he said, “More than 10 crore people have participated in the Fit India campaign since its launch.”

A larger number of people are exercising regularly and there have been changes in food habits as well. Speaking during the anniversary celebrations, PM Modi said that he is happy that “healthy eating is becoming a part of people’s way of living”.

### Why we need ‘Fit India Movement’

#### Indians shy away from physical activity

**54%** Indians are physically inactive  
Less than **10%** engage in recreational physical activity

#### Burdened with diseases

**13.5 cr** Obesity  
**7.2 cr** Diabetes  
**4.2 cr** Thyroid disorder  
**8 cr** Hypertension  
**5.5 cr** Cardiovascular disease

Source: Indian Council of Medical research (ICMR)

To make the movement even more effective, the National Education Policy 2020, states that sports and sports-integrated education are to be made mandatory in the school curriculum and will not be seen as only extra-curricular activities. It is, therefore, safe to

### Staying fit is easy

- Moderate activity for at least 150 minutes per week lowers risk of cardiovascular disease (coronary heart disease, stroke, and heart failure) by 20% and overall risk of death by 28%.
- Health benefits rise when weekly activity is increased up to 750 minutes.
- Physical inactivity leads to global economic losses of US \$67.5 billion from health-care expenditure and lost productivity.
- Non-communicable diseases like diabetes and heart disease linked to inactivity and unhealthy diets cost India \$6.2 trillion between 2012 and 2030.
- WHO has set a global target to reduce physical inactivity by 10% by 2025, and 15% by 2030.
- Regular physical activity improves muscular and cardiorespiratory fitness, improves bone and functional health, reduces risk of hypertension, coronary heart disease, stroke, diabetes, various types of cancer (including breast cancer and colon cancer), and depression; reduces the risk of falls and hip or vertebral fractures; and improves weight control.

Source: The Lancet Global Health 2018; Lancet First and Second Series on Physical Activity





**Top and bottom:** A moment captured from the virtual 'Fit India Dialogue' hosted by PM Modi to mark the first anniversary of the Fit India Movement held on September 24, 2020; The promotional poster of the Fit India Dialogue that saw participation from such fitness enthusiasts as Virat Kohli, Milind Soman and Rujuta Diwekar

hope that the impact of this change is going to be transformative in terms of encouraging students to follow their passion and opt for sports and physical activities as viable career options.

The Fit India Movement has completed its first year at a time when humanity is fighting against the worst pandemic it has had to face in the recent years. This trying time has come as a wake-up call for the course-correction required in our lives – to stay physically and mentally fit, eat right and be healthy.

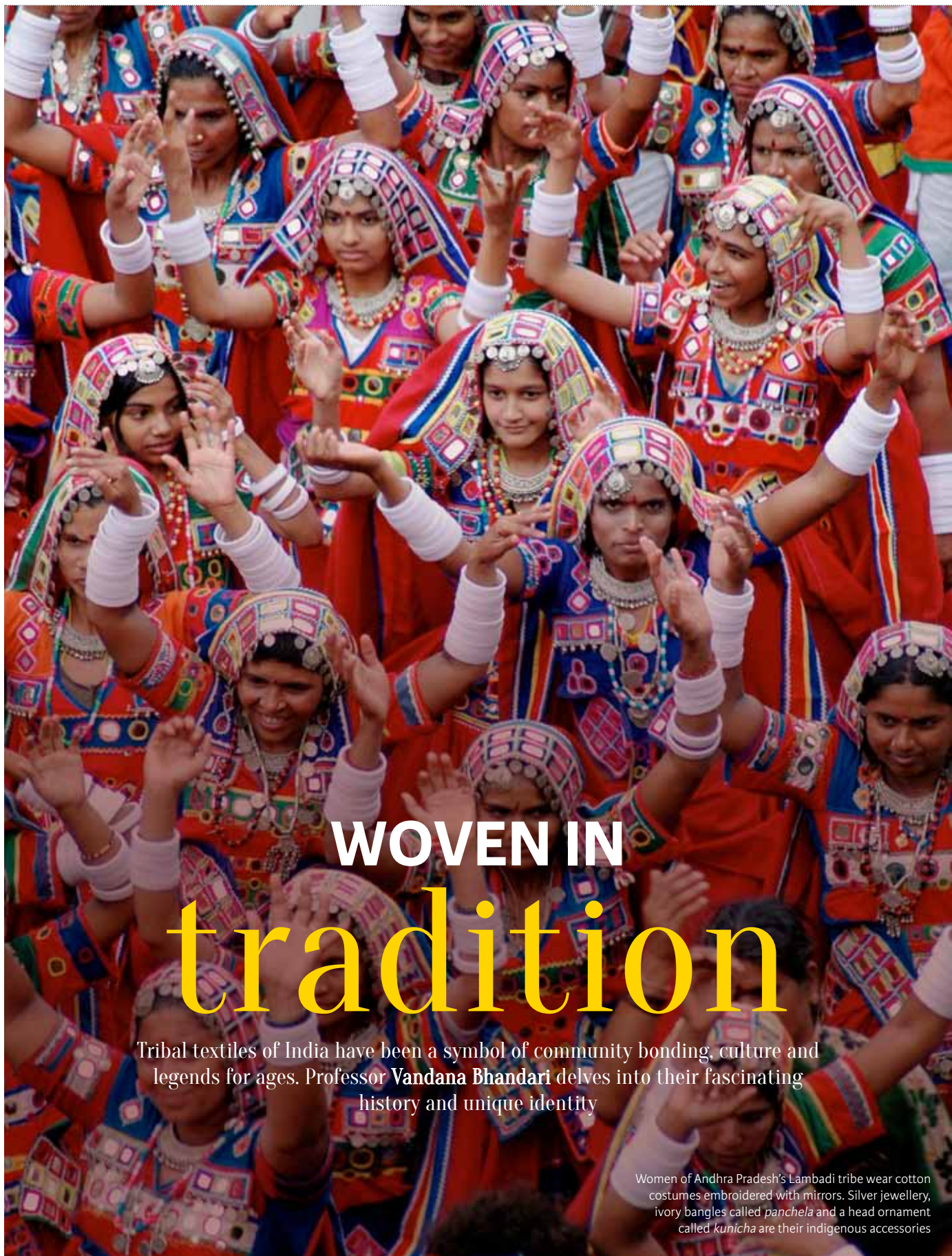
Globally, there is an increased consciousness about the imperative need for fitness. The World Health Organization has come up with a global strategy on diet, physical activity and health along with recommendations.

If Indians, armed with the ancient knowledge of health and fitness imparted through yoga and Ayurveda, are able to make the principles of 'Fit India' an intrinsic part of their lives, the country can look forward to becoming a healthier, stronger and confident nation.



**Abhishek Dubey** is India's foremost sports journalist, who has covered international sports for over 15 years now. He plunged headlong into sports journalism at a very young age and ended up leading cross-functional teams. He is the author of three critically-acclaimed books and is currently the National Advisor at Prasar Bharati Sports, India's state broadcaster.





# WOVEN IN tradition

Tribal textiles of India have been a symbol of community bonding, culture and legends for ages. Professor **Vandana Bhandari** delves into their fascinating history and unique identity

Women of Andhra Pradesh's Lambadi tribe wear cotton costumes embroidered with mirrors. Silver jewellery, ivory bangles called *panchela* and a head ornament called *kunicha* are their indigenous accessories



**B**e it the eponymous textile of Sikkim's Lepcha tribe, the Muga weaves of Assam or the Bomkai textile woven in Odisha's Bomkai village - indigenous textiles are not just an integral part of the demography they hail from but also find a place in modern fashion sensibilities. Today, with Indian designers turning to the vast repertoire of the country's unexplored traditional fabrics for inspiration, many of the nation's lesser-known materials and weaving techniques from remote tribal communities are being brought into the limelight. Adding to the

impetus has been Indian Prime Minister Narendra Modi's constant encouragement to weavers and craftspeople from rural areas, both through policies and personal appeal. He has often donned indigenous garments, including the Assamese *gamosa* (traditional white cloth with red borders and motifs) and the Himachali *topi* (cap) during his public appearances, giving these pieces of clothing their much-deserved recognition.

In India, textiles of a community are a part of its social fabric, culture and everyday life. This becomes even more pronounced in tribal villages, where the communities

Men of Tamil Nadu's Toda tribe wearing the traditional *puthukuli* shawl adorned with Toda embroidery, which received the Geographical Indications (GI) certificate in 2013





are closely knit even today. Fabric patterns symbolise the socio-cultural identities of tribes across India – from Madhya Pradesh, Bihar and Odisha to Assam, Arunachal Pradesh and other Northeastern states. Often, the motifs and embroideries created on such textiles depict the profession a particular tribe is engaged in. For example, the *bhalka* (spear or arrowhead) motif of the Gadia (or Gadulia) Lohar, a community of blacksmiths from Rajasthan, who travel from one village to another on bullock carts to repair farming and household equipment. The design

prominently features in the costumes worn by the community.

### WEAVES OF THE NORTHEAST

The Northeastern region of India is home to several tribal communities and each tribe has its unique weaving tradition, set of motifs and even colours. The weaving skills are handed down through generations and is mostly practiced by women, primarily using the traditional backstrap loom.

The textiles of the Northeastern region thrive on a web of stories and legends drawn from folk traditions,

Scenes from a weavers' cluster (left to right) a fly shuttle; women working on a traditional loom, a finished shawl and hand-stitched patterns on cotton cloth



The tribal communities of Bastar in Chhattisgarh and the neighbouring Koraput region of Odisha use a natural dye called *aal* to colour cotton cloth



**Top:** Men of Rajasthan's Rabari tribe in their traditional cotton garment, which helps in keeping them cool in the hot desert summer. They can also be seen sporting bright turbans and indigenous jewellery; **Bottom:** Indian Prime Minister Narendra Modi with a Meitei Lengyan draped around his neck. This is a traditional Manipuri scarf

customs like marriages, and festivals. For instance, the legend of *Tejimola*, a popular Assamese folktale of a young girl, mirrors the symbolism of Assam's iconic handwoven drape, the *mekhela chador* (*saador*). The story references Tejimola's *paat mekhela* – *riha* (mulberry silk garment), a precious gold brocade *saador* (or drape), and the protagonist's sentimental relationship with the garment.

Similarly, the traditional attire of Assam's Karbi women, *pe-kok* (an upper body drape pinned above the right shoulder), which is worn with *pinicamflak* (donned from waist to knee), is dotted with colourful motifs and patterns representing their marital status.

For women of the Tripuri community, one of the largest tribes in Tripura, the traditional garment *riha*, which is draped on the upper body, showcases their culture

and tells stories of their lives. In Arunachal Pradesh's Adi community, women weave their traditional textiles on the *gekong-galong* (an indigenous bamboo loin loom). The *gale* fabric, the signature wrap-around skirts the women wear, are produced on this loom. According to





## Woven in silk

Assam is also famous for Eri silk that is known for its warmth and texture. Eri silk derives its name from 'erranda', an Assamese word for castor leaves on which the silkworm feeds. Along with *muga* and *tussar*, Eri is a wild silk and was traditionally cultivated by tribals in forests. Unlike conventional silk, Eri has a muted finish and feels closer to cotton. Usually used for making shawls, throws and covers, it gets softer and brighter with everyday use. The Mishings are known to rear their own Eri worms (*eri polu*), but only enough for personal use.



legend, spiders taught these women how to weave.

The Mishing (Misin) tribe from Assam's Majuli island weave on peddle bamboo frame looms, and the fabric's identity are the patterns of sun (*doyni*) and the moon (*polo*) – said to be the mother and father of the tribe, respectively. A recurring

design on a Mishing weave is the diamond that represents the *chang ghar*, a house that is built on a raised platform, to protect the inhabitants from floods.

Designs inspired from daily life are also found on the Assamese *gamosa* (*gamcha*), which is gifted within the community as a mark of respect. It is also used as hand towels, turbans or often draped around the neck.

## EMBROIDERING TRADITION

Embroidery practised among tribal groups is a part of the diverse needlework tradition of India. Vibrant colours and intricate techniques combined with environment-inspired motifs narrate the tales of people whose lives are in sync with nature. Beadwork is popular among the Bhil and Rabari tribes of Madhya Pradesh, Gujarat and Rajasthan.



**Top:** An Assamese woman weaves traditional cloth for Bihu festival

**Left:** Such ceremonial costumes as *mekhela saador*, worn by women, and *gamosa*, donned by men, form an integral part of Assamese festivals





Women of Arunachal Pradesh's Singpho tribe wearing a special dress adorned with silver pieces known as *kumphong plong*

Rabaris generously use mirrors of various shapes and sizes in their embroidery and incorporate thread fringes, glass beads and plastic buttons to edge corners.

Embroidery is also a speciality of Andhra Pradesh's Lambadi tribe residing in *tandas* or *thandas* (settlement of the tribe). It is said the Lambadis originally belonged to Rajasthan but eventually spread out to Karnataka, Andhra Pradesh and Maharashtra. The women of the tribe ornament themselves and their costumes extensively and often embroider on old and used pieces of cloth with decorative stitches.

For the Toda tribe from Tamil Nadu's Nilgiri Hills, embroidery

is a work of pride. Known as *pugur* in the Toda language, this tradition is passed down generations, and uses a darning stitch (rows of adjacent straight lines). Patterns like the sun, moon, stars, peacocks, butterflies and flowers, stitched in mostly crimson and black, feature prominently in their fabric. Their traditional embroidered shawl called *puthukuli* holds immense significance as it stands for both aesthetics and dignity.

The tribal communities of Bastar in Chhattisgarh and the neighbouring Koraput region of Odisha use a natural dye called *aal* to colour cotton cloth. Weavers of the Tokapal, Nagarnar and

### In the spotlight

Apart from holding socio-cultural significance for indigenous populations, tribal-origin textiles have become a part of contemporary Indian fashion and combine traditional creativity with new-age commerce.

Several young designers from the Northeast have introduced local-flavoured collections that showcase the unique history of the region. Jenjum Gadi from Arunachal Pradesh has worked with Nagaland's Ioin loom weaves, where the fabric is woven on a bamboo loom strapped around the weaver's lower back.

Shillong-based Daniel Syiem's label, which was launched in 2011, incorporates Meghalayan textiles and garments.

Imphal-based Richana Khumanthem has a penchant for narrating the lives and sartorial stories of such Manipuri communities as the Meiteis along with the Kuki and Naga tribes.

For the Toda tribe from Tamil Nadu's Nilgiri Hills, embroidery is a work of pride. Known as *pugur* in the Toda language, this tradition is passed down generations, and uses a darning stitch

Kondagaon villages of Bastar are well known for their weaving skills. They work on pit looms with unbleached cotton yarns to create a fabric called *pata*, whose borders are dyed with *aal*. These fabrics are predominantly worn by women of the Muria and Maria communities and showcase their social status.

*Aal* is also used in the *mirigan sai* (weaver's section) of Kotpad, a small town in Odisha's Koraput district. Here, bundles of yarn, treated with castor oil and dung, are immersed in *aal* to yield vibrant red, rusty maroon and brown shades. Often pieces of iron sulphate are added to the dye baths for darker hues. The process of treating, dying and drying the yarn is a labour-intensive process and takes



**Top:** A woman from Odisha's Bonda tribe wearing traditional jewellery;  
**Right:** Women of the Madia tribe dressed in red saris and religious headbands in a village in the Bastar district of Chhattisgarh





**Top:** Women from the Tangkhul tribe of Manipur sporting the traditional *changkhom* shawl during a wedding ceremony;

**Above:** A tribal woman making embroidery on an ethnic dress

about a month to complete. Weavers then weave these yarns on pit looms into resplendent saris that have moved on from being sold in the bazaars of Koraput to international markets and e-commerce sites. The Kotpad handloom fabric received a Geographical Indications (GI) certificate in 2005.

Recently, speaking at an international webinar on Indian textiles, PM Modi said that naturally-coloured cotton and silk have a long and glorious history, and the diversity

in textiles shows the richness of the country's culture. He added there is something unique about the textile traditions in every community, every village and every state, highlighting the rich textile traditions of the nation's tribal communities.

The story of tribal textiles is not necessarily only that of history and tradition but also one of resurgence and progress. Today, many of these lesser-known fabrics are coming to light. The craftsmanship of these indigenous fabrics not only contribute to the Prime Minister's Make in India campaign but also provide impetus to the artisans and encourage sustainable fashion.



**Vandana Bhandari** is a professor at National Institute of Fashion Technology. She brings new dimensions to the research of textile traditions and sustainability of crafts in India. Her teaching focusses on traditional Indian textiles, Indian dresses and craft studies, and encompasses economic sustainability for artisans.



# THE TECHNOLOGY Powerhouse

The Bhabha Atomic Research Centre has made unsurpassable contributions to all sectors of nation building. From power generation and national security to agriculture, healthcare, waste management, water technologies and food processing, the research and innovations of the premier nuclear research institute have put it on the global map

BY REMYA HARIDASAN



The iconic view of the CIRUS (dome-shaped) and DHRUVA nuclear research reactors at Bhabha Atomic Research Centre (BARC) in Mumbai

**N**estled in the lap of Trombay Hills, on the shores of the Arabian Sea in Mumbai, stands India's premier institution for nuclear research, the Bhabha Atomic Research Centre (BARC). True to its motto "Atoms in service of the nation", the sprawling 1,100-acre establishment houses eight nuclear research reactors and several laboratories engaged in cutting-edge multidisciplinary research to harness nuclear energy for the benefit of the nation. It is imperative to say that BARC nurtures research not only to cater to the needs of the nuclear sector but also of the society at large, in the form of researches in agricultural, healthcare, waste management, treatment of water, food processing, etc. The vast applications that the research at BARC caters to make it a magnanimous institution of the country that is not only at the forefront of technology at a national level but has also helped India achieve a strong standing in the global arena of science and technology.



**Top:** The new APSARA-U (upgraded) research reactor was built with the aim of enhancing indigenous radioisotope production for several applications including nuclear medicine and research in nuclear physics, material science and radiation shielding; **Bottom:** The Kaiga Atomic Power Station (KAPS) in Karnataka, which broke the world record for longest continuous operation

**“IT IS A MATTER OF NATIONAL PRIDE THAT INDIA HAS DEVELOPED COMPREHENSIVE CAPABILITIES IN THE ENTIRE GAMUT OF [NUCLEAR] FUEL CYCLE OPERATIONS. INDIA IS ALSO AMONG THE SELECT GROUP OF COUNTRIES WHICH HAVE THE ABILITY TO RECOVER PLUTONIUM FROM IRRADIATED NUCLEAR FUEL AND USE IT TO PRODUCE POWER IN THERMAL AS WELL AS IN FAST REACTORS. THIS PATH WILL ENSURE FOR US A LARGE QUANTUM OF NUCLEAR POWER ON A SUSTAINABLE BASIS.”**

**Narendra Modi**  
Prime Minister of India





**“FOR THE FULL INDUSTRIALISATION OF THE DEVELOPING COUNTRIES, FOR THE CONTINUATION OF OUR CIVILISATION AND ITS FURTHER DEVELOPMENT, ATOMIC ENERGY IS NOT MERELY AN AID, IT IS AN ABSOLUTE NECESSITY. THE ACQUISITION BY MAN OF THE KNOWLEDGE OF HOW TO RELEASE AND USE ATOMIC ENERGY MUST BE RECOGNISED AS THE THIRD EPOCH OF HUMAN HISTORY.”**

**Dr Homi Bhabha**

## THE BEGINNING

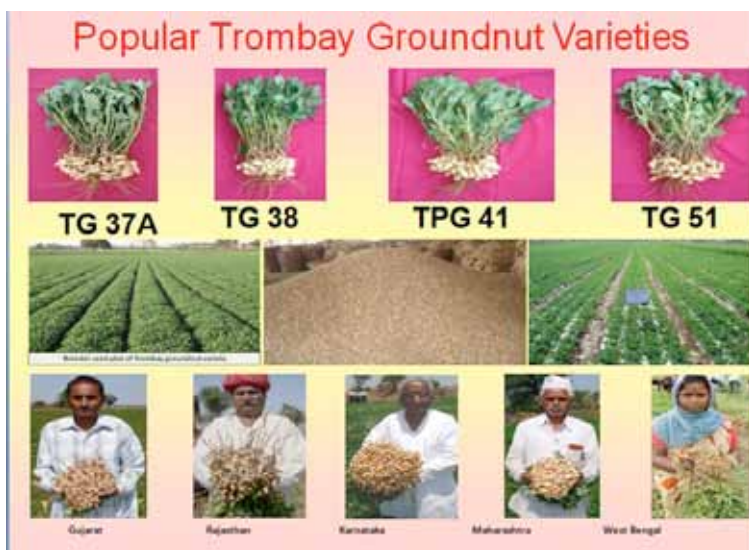
It all started with the futuristic vision of noted scientist and visionary Dr. Homi Jehangir Bhabha, to build a stronger India by harnessing the power of atomic energy. Dr. Bhabha, known as the “Father of the Indian Nuclear Program”, established the Atomic Energy Establishment, Trombay (AEET), in 1954, for promoting multidisciplinary research in nuclear science and engineering. After his demise, AEET was renamed as Bhabha Atomic Research Centre, in 1967.

The high-yielding Trombay groundnut varieties, developed by BARC, have led to record harvest in states like Gujarat, Andhra Pradesh, Maharashtra, Karnataka, Odisha and Rajasthan

## POWERING THE NATION

The true legacy of BARC lies in its world-class research reactors, which provided the windows to study and understand nuclear radiation and its effects, and gave India the confidence to venture into nuclear power generation. BARC currently has two operational research reactors, namely APSARA-U (upgraded) and DHRUVA. Six older research reactors have been decommissioned, of which, the APSARA reactor was Asia’s first nuclear reactor set up in 1956. The new APSARA-U (its upgraded version) achieved criticality in September 2018.

The knowledge gained from the research reactors helped India to gain self-sufficiency in nuclear power generation and today, the 22 operating nuclear power reactors of the country, contribute 1.8 per cent (6,780 MW) of the total electricity generated in the country. In December 2018, a 220 MW unit of the Kaiga Atomic Power Station in Karnataka, broke the world record for the longest continuous operation (962 days) of a nuclear reactor. The previous record was of 940 days. This achievement is testament to India’s advancement





in nuclear reactor technology, both in terms of the advanced electronics and instrumentation, which is responsible for the safety and control of the reactor, and the strength of the structural materials that can withstand extreme conditions of temperature, pressure and radiation.

### AGRICULTURE

In agriculture, BARC has developed 47 crop varieties, having improved characteristics like higher yield and improved disease resistance, which have been released for commercial cultivation in the country. Some of the very popular varieties are groundnut and rice, which are grown extensively. Other crop varieties include mustard, mung bean, cow peas, chick peas, etc.

### HEALTHCARE

Bhabhatron, the radiotherapy device developed by BARC, has revolutionised

cancer treatment in the country by providing an affordable, high-performance Co-60 teletherapy machine. Bhabhatron units are installed in many cancer hospitals in India and are also exported to the Middle East, Africa, South America and Eastern Europe.

### FOOD PROCESSING

BARC does extensive research in radiation processed foods. Because of shelf life extension, such food products are both exported and sold in domestic markets. This has greatly helped in the preservation, storage, distribution and export of large quantities of agricultural produce. The wholesomeness and nutritional adequacy of irradiated food has been well accepted nationally by Ministry of Food Processing Industries and internationally by World Health Organization (WHO).

### BARC facts

BARC's core mandate is to sustain peaceful applications of nuclear energy, primarily for power generation. Amongst other areas of research, BARC has extensive research programmes in life sciences i.e, health, food, agriculture, waste management; water chemistry i.e. heavy water production, water desalination and purification; high energy particle physics, accelerator and laser technologies; Electronics and Instrumentation for power reactors and other nuclear facilities. In defence applications, BARC is involved in the indigenous design and development of India's fleet of nuclear-powered submarines and also plays a pivotal role in India's nuclear weapons programme.



**Above:** Groundnut farmers across the country have greatly benefitted from the Trombay groundnut varieties;  
**Right:** The Bhabhatron device



### Bhabhatron, the radiotherapy device developed by BARC, revolutionised cancer treatment in the country by providing an affordable, high-performance Co-60 teletherapy machine

#### *Training school*

The Training School at BARC is one-of-its-kind and has a very efficiently sustained system of training hundreds of young, qualified scientists each year to take up the mantle of empowering India through advanced nuclear research. It was established by Dr. Homi Bhabha in 1956, who envisioned a future for India where we would not have to look abroad for experts in atomic energy by building our own specialised scientific workforce within BARC. Graduates and postgraduates in the streams of Physics, Chemistry, Metallurgy and Engineering are selected to undergo training in nuclear sciences and engineering who finally join as Scientific Officers in BARC and other DAE institutions.

#### **NON-NUCLEAR VENTURES**

BARC has proven its mettle even in technologies that do not use radiation. Some of the noteworthy achievements include technologies for water treatment, waste management and material research.

There are several technologies related to water, including ones that detect contamination and produce clean drinking water. Domestic water purifiers that are completely passive; kits for the detection of chromium and fluoride, and removal of fluoride, iron and arsenic from water, and a membrane pouch for water purification, which is especially useful during natural disasters, are some of the promising indigenous technologies developed by BARC and are being deployed at a large scale.

The Nisargruna plant is a successful technology developed by BARC for composting biodegradable waste to high quality manure and methane gas. It can be easily set up to treat wet waste directly at the source, like in kitchens or canteens of big hospitals, hotels, factories and residential complexes.

In advanced material research, a recent feat achieved by BARC is the Bhabha Kavach, a light-weight bulletproof jacket for the armed forces. These are made of high ballistic performance composite sheets (called BARC Nano-Sheets) which make the jackets weigh only about 6.6

**Left:** A bicycle-mounted dual-powered (solar and pedal) water purifier developed by BARC; **Bottom:** Water purifiers developed by BARC are commercially available. The device here depicts a Ultra-filtration and RO combined membrane based water purifier



**Right:** Nisargruna biogas plants, set up at nearly 160 locations across the country, are effective means of biodegradable waste treatment and also produce useful by-products like manure and methane gas;  
**Below:** Light-weight bulletproof jackets developed by BARC called Bhabha Kavach for the armed forces



kg compared to the 17 kg weight of conventional jackets.

### COVID-19 EFFORTS

The major developments by BARC in the fight against COVID-19 include use of radiation for disinfection of PPE kits for sterilisation/reuse, design of high-quality masks and development of a low-cost diagnostic kit.

### THE INTERNATIONAL STAGE

BARC, as a part of the Department of Atomic Energy (DAE), is contributing

significantly to some of the mega-scale science projects being implemented through international collaboration. Some of these projects include the Large Hadron Collider (LHC) with CERN, Facility for Anti-proton and Ion Research (FAIR), India-based Neutrino Observatory (INO), etc.

BARC, with a strong workforce of 14,000 employees including 4,500 scientists, continues to strive to achieve security for the nation in terms of energy, agriculture, health, water, food and homeland security, using the power of the most humble atom.



*Remya Haridasan worked at the Bhabha Atomic Research Centre, Mumbai, for six years and is currently working as a scientist on deputation to the Office of the Principal Scientific Adviser to the Government of India, New Delhi*



# THE WONDER grass



Bamboo has been an integral part of India's culture for centuries. The government, led by Prime Minister Narendra Modi, is working towards strengthening India's position in the global bamboo market by implementing schemes that not only benefit the cultivators but also provide impetus to craftsmen and entrepreneurs to display their art in the Indian urban and international markets

BY YOGESH SHINDE

One of the varied applications of bamboo is in the manufacture of garden accessories like swings

**B**amboo, often referred to as the 'green gold', is an integral part of India's culture and heritage. According to ancient Indian tradition, bamboo is associated with a person's everyday life - from birth to death. It is said that in the Vedic period, after childbirth, the umbilical cord was cut with a bamboo knife, owing to the plant's antibacterial properties. Among Hindus, the last rites of a person are traditionally carried out on a *bier* (platform) made with bamboo poles. Not just this - from being used as a food ingredient to being required in construction, this wonder plant forms an integral part of rural Indian lifestyle even today.

Applications of this versatile grass include the traditional manufacture of toys, *tokris* (baskets) and *khatiyas* (beds), and the creation of such modern-day utility objects as toothbrushes, pens, keyboards, desk organisers, straws, and even watches and speakers! Recognising the versatility of this plant and its importance to the growth of the rural economy, the Indian government has taken several steps to promote its cultivation. In his *Mann ki Baat* address made on July, 2020, India's Prime Minister Narendra Modi highlighted the



Indian Prime Minister Narendra Modi (second from right) interacting with bamboo entrepreneurs at an exhibition held in 2018, in New Delhi, on the occasion of World Environment Day (June 5). The 2018 edition of the event, with the theme 'Beat Plastic Pollution', was hosted by India

**“SKILLED ARTISANS ARE MAKING BOTTLES, TIFFIN BOXES AND VARIOUS OTHER ESSENTIAL PRODUCTS WITH THE BAMBOO IN ASSAM, TRIPURA AND MANIPUR...THE NORTHEASTERN STATES HAVE BEEN GROWING THE PRECIOUS RESOURCES OF BAMBOO. IF ANYONE STUDIES THE NUMEROUS ESSENTIAL PRODUCTS, THEY WOULD NOT BELIEVE THAT THESE VERY HELPFUL UTILITY ITEMS ARE MADE OF BAMBOO. BESIDES, THESE BAMBOO-MADE PRODUCTS ARE VERY ENVIRONMENT FRIENDLY AND HYGIENIC.”**

**Narendra Modi**  
Prime Minister of India



### *Bamboo relevance*

One of the main reasons why bamboo is an apt substitute to timber and plastic is its growth rate. It is known as the fastest growing grass in the world, as documented by Guinness World Records (grows about 2.5 ft per day).

In India, bamboo grows about one foot per day (average) during monsoon. Owing to its rapid growth rate, it can absorb about 33 per cent more carbon dioxide from the air, leading to a cleaner environment.

Another advantage of bamboo is that it matures in a span of 3.5 to 4 years. A full grown bamboo stands at 60 ft with a diameter of 3.5 inch. When cut from one feet above the ground and treated properly, the root can be used for almost 100 years.

Another reason why bamboo alternatives are a call of the hour is because it provides business opportunities to local craftsmen.

Bamboo is a soft and pliable material that can be moulded by hand, therefore omitting the need for heavy machinery. Most tribal artisans use a small knife to scrape bamboo slivers and make decorative objects, jewellery and utility materials by hand.

benefits of bamboo products created in the Northeastern states of Assam, Tripura and Manipur, and lauded the artisans. Bamboo-based products not only contribute to the Indian economy but also to the Prime Minister's Make in India and Aatmanirbhar Bharat Abhiyan through self-reliant agriculture.

### **THE BIG MOVE**

One of the biggest steps that the

government, led by Prime Minister Modi, has taken towards the benefit of bamboo cultivators has been to amend the Indian Forest Act, 1927 that identified bamboo as a tree. After the amendment, bamboo is now recognised as a grass. This rectification made in 2016 removed several restrictions and confusions that hindered the trade and transportation of bamboo. This much-welcome move now allows



**Left:** Eco-friendly trash cans made with bamboo at Jorethang Market road in Sikkim; **Bottom:** A colourful bamboo cabin with a thatched roof near Kaziranga National Park, a UNESCO World Heritage Site, in Assam







**Above:** Bamboo is also used in India's performing arts. Here, a group of folk artistes from Nagaland perform a bamboo dance; **Right:** Bicycles, eco-friendly modes of travel, can be upgraded by replacing the crossbars, frames and rear brakes (usually metal-made) with bamboo



With the wealth of bamboo in India and a growing industry, the country should aim to establish itself in global markets for both engineered and handcrafted products

bamboo farmers to transport their produce anywhere in the country without the hassle of obtaining a pass.

This has also benefitted several indigenous manufacturers and contributed to the country's overall economy, too. In India, kite-making is a high revenue-generating business (approximately INR 700 crore). With the earlier law in place, bamboo, which is used to make the frame of the kite, could not be transported from other cities and had to be imported from China.

Declaring bamboo as a grass has not only curbed the import but has also added to the production value.

The government launched the restructured National Bamboo Mission (NBM) in 2018-19 for the holistic

development of the sector. The Mission is being implemented in a 'hub (industry) and spoke' model, with the main goal of connecting farmers and increasing supply of appropriate raw material to domestic industry. The Mission has been adopting various schemes to promote the bamboo product industry. It envisages promoting holistic growth of the bamboo sector by adopting area based regionally differentiated strategy, increasing the area under bamboo cultivation and marketing. Under

### *Legend meets reality*

There is a concept in Hindu mythology called the *kalpavriksha*, a tree that fulfills all wishes, which, in theory, meant that parts of the tree can be used to make any object of use. Bamboo, although identified as a grass, is like that tree. It can be used to make a wide range of items, including jewellery; such cutlery as spoons and spatula; combs; notebooks and more. Moreover, no part of the grass goes to waste – its roots find application in Ayurveda while its shoots are used to add flavour to food and in making pickles. Bamboo has slowly made its way into fashion too, with designers utilising its anti-bacterial properties to create sustainable and healing fabrics. Even the leaves are used to make compost.

the Mission, steps have been taken to increase the availability of quality planting material by supporting the establishment of new nurseries and strengthening of existing ones. To address forward integration, the Mission is working to strengthen the marketing of bamboo products, especially handcrafted objects. The restructured NBM was launched with an outlay of INR 1,290 crore to promote the industry. Along with this are the capacity-building and

training programmes to enhance the skills of artisans to manufacture value-added products that can tap into both the Indian urban market and the global one. Worldwide, the bamboo market size was valued at USD 68.8 billion in 2018 and is expected to grow at a CAGR of 5 per cent between 2019 and 2025. Growing investments focussed on infrastructure development, increasing use of sustainable building/ construction resources,



**Top:** Women working at a bamboo product manufacturing unit in Pimpri Chinchwad, a city close to Pune



**Bottom:** Craftsmen creating beautiful objects and selling them is a common sight in most Indian *melas* (fairs). Here, artisans make utility and storage objects with bamboo at a *mela* in Kolkata





Several bamboo poles are tied with ropes to make buoyant rafts. Here, a man navigates a bamboo raft on the Periyar river in Kerala

and rising consumer awareness regarding the uses and benefits of bamboos are expected to drive the market growth over the forecast period.

### **AIDING INDEPENDENT FARMERS**

It is PM Modi's vision to double farmers' income by 2020 and this is where bamboo can help significantly. Even with the The Farmer's Produce Trade and Commerce (Promotion

and Facilitation) Bill, 2020, and the Farmers (Empowerment and Protection) Agreement of Price Assurance and Farm Services Bill, 2020 - which ensure that farmers get better prices for their produce without being subject to the regulation of *mandis* or agri-markets - farmers cultivating bamboo will reap an added advantage, without much effort. A bamboo grove does not require a substantial area and can be grown along the border of a farm and even a backyard.

The cost of maintenance is also minimal as it does not need pesticides or a continuous water supply.

There are families near Pune who grow bamboo

Recently, Union Minister for Agriculture and Farmers' Welfare, Narendra Singh Tomar, launched 22 bamboo clusters in nine Indian states, including Gujarat, Assam and Tripura

### INDIA'S BAMBOO MAP

India has as many as 136 different bamboo species (approximately) and is the second-largest producer of bamboo in the world.

The length of a bamboo depends on the area of cultivation. While the ones in Maharashtra grow to a maximum height of 40 ft, the ones in Northeast India can reach a staggering height of 120 ft.

Bamboo survives natural disasters. Mishing, an indigenous tribe of Assam, uses bamboo in the construction of their houses, called *chang ghar*, to protect them from floods.

Though Madhya Pradesh has the largest area under bamboo forests, bamboo culture thrives in the Northeastern region. From using tender bamboo shoots in delicate food recipes to cooking rice in the hollow of raw bamboo, it is a part of everyday life.

**Top:** The *kulo*, a traditional plate, used in several religious festivals of east and Northeast India is made with bamboo. This object is also used in the ancient practice of winnowing to separate gram from chaff;

**Bottom:** Bamboo-made products ranging from bags and mats to home decor items at Dilli Haat, a market in New Delhi

groves around their home, where every grove generates about 200 poles, annually. Each pole is then sold at INR 400. In fact, on June 27, 2019, the Maharashtra government approved the Atal Bamboo Samriddhi Scheme, which envisaged the supply of tissue culture bamboo sapling to 750 farmers (approximately) in every district of the state at subsidised rates. The state government had also proposed INR 25 crore for the same.

Recently, Union Minister for Agriculture and Farmers' Welfare, Narendra Singh Tomar, launched 22 bamboo clusters in nine states and said that the country is now gearing up to increase exports of bamboo products. The bamboo clusters will be set up in Madhya Pradesh, Gujarat, Maharashtra, Odisha, Assam, Nagaland, Tripura, Uttarakhand and Karnataka.

Addressing the event, the minister called upon the states to take forward the objectives of NBM. "The support being given by the (NBM) to local artisans through locally grown bamboo species will also actualise the goal of 'Vocal for Local,'" he said, adding that this will help increase farmers' income and reduce dependency on import of raw materials. With the wealth of bamboo in India and a growing industry, the country should aim to







## One of the biggest steps that the government, led by Prime Minister Modi, has taken towards the benefit of bamboo cultivators has been to amend the Indian Forest Act, 1927

**Top:** In Northeast India, rice is cooked in bamboo shoots for the latter's distinct flavour texture. Here, biryani is prepared in hollow bamboo shoots;

**Right:** Tokris (baskets) feature prominently in rural Indian kitchens and are used to store flatbreads, fritters, and even fruits and vegetables

establish itself in global markets for both engineered and handcrafted products, he added.

In October, 2020, an independent forum was launched with an aim to give a boost to the bamboo sector by promoting entrepreneurship, research and trade of high-quality bamboo products in a sustainable manner. A brainchild of former Union Minister Suresh Prabhu, the India Bamboo Forum aims to bring together a voluntary group of 55 leaders in the bamboo sector. The former minister said that in India, the bamboo industry has the potential to positively impact 4 million small farmers and around 1.5 million micro entrepreneurs associated with it in the next five years.

The Government of India has taken several major steps to

develop the bamboo sector with an aim to address such various issues as sustainable livelihood, climate change mitigation and land degradation. With the impetus and support provided by the government towards the holistic promotion of bamboo, its cultivation and production, and the work being done by private entrepreneurs, India is well on its way to strengthening its position in the global bamboo market and also becoming a cleaner and greener nation.



**Yogesh Shinde** is an agricultural entrepreneur working towards popularising bamboo and the varied products that can be made with the wonder grass. He is the founder of Bamboo India, a venture that not only manufactures sustainable bamboo products but also employs farmers from the villages of Velhe, Bhor, Panshet and Mulshi, all adjacent to Pune.



# **FUSION** Beats

Carrying on the tradition of Indo-Western fusion, where Indian musical instruments are played with foreign devices, musicians are creating a whole new genre called electro-music. A peek into the rising popularity of this musical form

BY DR NAMAN WAHAL



**M**usic transcends the barriers of geography and language. It unites people across the globe as multiple genres, artistes and styles merge to keep the excitement flowing. One of the most interesting genres that not only thrills music aficionados but also brings people and cultures together is Indo-Western fusion. This musical style, where compositions are played with a traditional Indian instrument and a foreign musical device, has existed for quite some time.

On June 1966, the audience gathered at the Recreation Ground in Bath, a city in the county of Somerset, the UK, listened with

rapt attention to the melodious classical duet performed by the late Indian sitar virtuoso Pandit Ravi Shankar and American violin maestro Yehudi Menuhin. A year later, this collaboration was recorded in an album aptly titled *West Meets East*. Then, in 2007, came the Grammy Award-winning album *Global Drum Project* that had Indian tabla master Zakir Hussain matching beats with noted American drummer Mickey Hart, Puerto Rican conga (drum) master Giovanni Hidalgo and Nigerian artistes - Babatunde Olatunji (drummer) and Sikiru Adepolu (percussions).

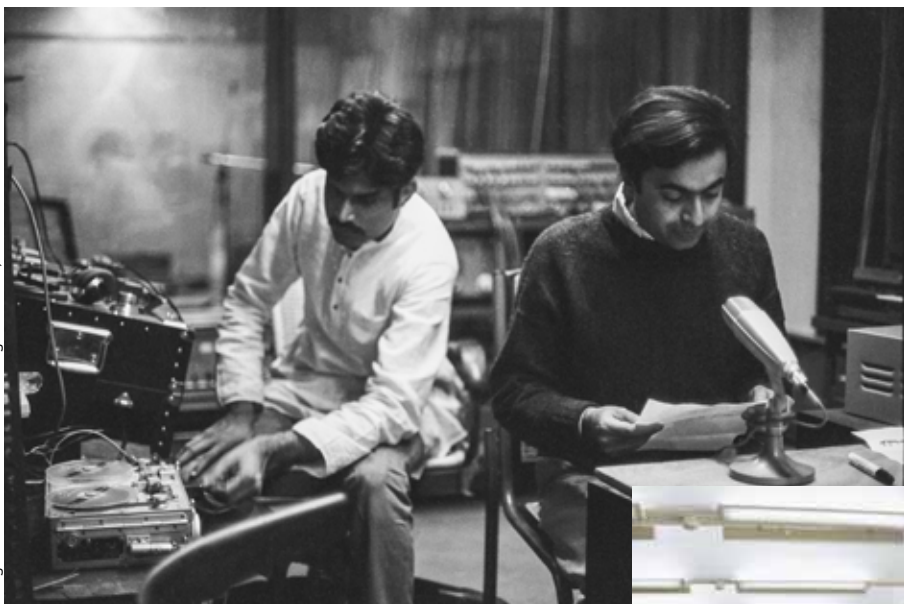
With time, music has evolved and so has the way India perceives fusion compositions. While collaborations

A 1965 archival image of Indian sitar virtuoso Pandit Ravi Shankar (right) performing with American violin maestro Yehudi Menuhin



## MUSIC

Image: National Institute of Design-Archive, Ahmedabad



**Left:** Sound engineers at National Institute of Design's (NID) sound studio engaged in taping and voice-over work;

**Below:** UK-based Indian musician Paul Purgas listens to the recorded electro-music tapes that he discovered in NID's archives

amongst classical artistes continue to mesmerise audience the world over, a new form of musical amalgamation has evolved – that of electronic music. Popularly called electro-music, this genre, brings together the melodies of Indian classical instruments and electronically-produced sounds to result in a captivating track. The genre is now making its way to mainstream music, owing to the ceaseless entourage of artistes who travel across the world to create something unique and contemporary, attuned to the taste of millennials.

### THE GREAT INDIAN EFFECT

It was in 1969 when Indian classical musician Gita Sarabhai brought the



Image: Paul Purgas

Moog synthesizer (named after its American inventor Bob Moog) to India. Said to be one of the world's first commercial synthesizers, it changed the landscape of music forever. The Moog allows the creation of modular sounds through an array of modules like filters, oscillators, etc. The National Institute of Design (NID) in Ahmedabad was one of the first recipients of this device in India.

**In the last 10 years, with increasing global exposure, India has seen a remarkable rise in specialised studios dedicated to the experimentation and creation of electronic sounds**



For the next four years, sound engineers at the NID's Electronic Music Studio created some phenomenal music under the supervision of noted American pianist and experimental music composer David Tudor. These melodies, believed to be a few of the first works of minimal techno and Indian electronic music, were composed with the Moog synthesizer, tape-recorded, archived as academia and eventually forgotten, only to be re-discovered by UK-based Indian musician Paul Purgas in 2017.

One of the earliest recorded albums to feature melodic Indian ragas performed on a synthesizer in sync with machine rhythms was *Ten Ragas to Disco Beat*, recorded in 1982 by Charanjit Singh, a noted Bollywood musician. These melodies actually formed the base of House,

a musical subgenre that started in Chicago a year later. Over the next 20 years, Indian instruments like the sitar (string instrument), the tabla (a pair of small hand drums) and the bansuri (Indian bamboo flute), along with Indian vocals, made their way into electronic music experiments happening across the world.

### ELECTRONICA INDICA

The resonating beat of the tabla found its electronic avatar with Talvin Singh, a Suffolk-based music producer of Indian origin. Singh trained in tabla under the tutelage of Pandit Lachman Singh in Punjab as a teenager and is credited for creating the now popular musical subgenre Asian Underground. This subgenre led to the rise of Britpop and the UK bhangra music scene that produced such sought-after artistes as Bally Sagoo and Panjabi MC.



Talvin Singh performs at the 1999 Mercury Prize ceremony in London. His debut album *OK* won top honours at this event

**MUSIC HAS NO BORDERS. BEATS, RHYTHMS AND SCALES FROM ALL OVER THE WORLD ARE CONNECTED. WHAT WE NEED TODAY IS PEACE AND PIECES."**

Talvin Singh,  
musician

**I ATTAINED A SENSE OF SERENDIPITY AFTER A CONSCIENTIOUS JOURNEY OF OVER TWO DECADES, WHEREIN I HONED MY TASTE IN MUSIC, ESPECIALLY THE CONFLUENCE OF WORLD FOLK, INDIAN CLASSICAL MUSIC AND ELECTRONICA."**

Vishal Malik aka OMA,  
techno-music artiste



## Tablatronic

A unique innovation by Talvin Singh in 1990, tablatronic is a captivating amalgamation of tabla and computer-generated electronic music. With addition of pedals and internal microphone, beats and scales are modulated, processed and seamlessly integrated with the rest of the electronic track.

Rooted in tradition, Singh's experiments primarily involve the marriage of traditional Indian instruments and sensibilities with Western elements. His debut album *OK* won him the prestigious Mercury Music Award which grabbed the attention of musicians worldwide. Singh's rise in the late 1990s marked the beginning of a new wave of electronic sound that had a global appeal.

The 21st century finally saw the development of India's very own electro-music scene with such music festivals as SuperSonic, NH7 Weekender, Magnetic Fields and Enchanted Valley Carnival not only being organised in the country but also inviting participation of electro-music artistes from all over the world.

In the last 10 years, with increasing global exposure, India has seen a

remarkable rise in specialised studios dedicated to the experimentation and creation of electronic sounds. This new genre of music has, today, become a multi-million dollar industry. Many Indian artistes like Anish Sood, Arjun Vagale, Sahej Bakshi (stage name Dualist Inquiry), Vishal Malik (popularly known as OMA), Praveen Achary and Udayan Sagar (stage name Nucleya) have now carved a niche for the Indian element in electronic music worldwide.

## TAKING CENTRE STAGE

India's impact on world music has been tremendous and praiseworthy, be it classical fusions like those of Pandit Hariprasad Chaurasia with celebrated Jazz guitarist John McLaughlin (the US) or British rock band Coldplay with the popular music composer AR Rahman.



(Clockwise from left): Dutch DJ Tiesto (Tijs Michiel Verwest) often uses the music of Indian instruments in his tracks; American DJ and electronic music producer Marshmello collaborated with Indian music composer Pritam Chakraborty in 2019 for a track titled *Biba*





Midival Punditz, formed by Gaurav Raina and Tapan Raj, is one of the most popular names in the Indian electro-music scene

## Some of the first works of minimal techno and Indian electronic music were composed with the Moog synthesizer at National Institute of Design, Ahmedabad

With electronic music, the story is getting more profound. Many popular international DJs, including TroyBoi (Troy Henry), Marshmello, Deadmau5 (Joel Thomas Zimmerman), Tiesto (Tijs Michiel Verwest) and the late Avicii (Tim Bergling) have prominently used Indian musical elements in many of their compositions. This connection has grown organically and consistently, and the rise of Indian labels like Wind Horse Records, JuiceBox Music and Contrabass Records has simultaneously fuelled the flame of electronic music in India.

Today, as Indian music lovers continue to nurture their passion for classical and folk melodies, the world electronic music seems to be

influenced more by Indian elements. As the world slowly emerges from the COVID-19 pandemic, an unprecedented rise has been noted in worldwide collaborations through online events. It

would be interesting to see the growth of electronic expression in coming times.

As the world slowly adapts to the new norms of socio-cultural experience, it is expected that Indian music, be it the much-celebrated Indian classical genre accompanied with traditional instruments or the new genre of electro-music, all will find the same amount of appreciation in the global community. Until then, let's patiently wait and prepare for when the new beat eventually drops!



**Dr Namal Wahal** is a surgeon trained at All India Institute of Medical Sciences (AIIMS), New Delhi. A trained tabla player, Wahal also performs as a House and Techno DJ incorporating sounds of traditional Indian instruments and world music.

A male leopard at  
Jhalana Forest Reserve  
in Jaipur, Rajasthan

# ON A WILD track

Wildlife protection and conservation in India have hugely benefitted from the advancements in technology. Herpetologist and conservationist **Nirmal Ulhas Kulkarni** explains how scientific innovations are ensuring the tracking of species and aiding in the fight against poachers

**T**he fields of ecology and biodiversity have come a long way in India in the last few decades. They have seen a visible transformation from a largely observational, field-related exercise to a blend of various subjects. Conservation biology has gained immensely from major scientific advancements, ranging from molecular genetic tools to space technology.

Information on ecological aspects of several species that could not be obtained earlier due to their



cryptic nature or rarity is now easily accessible through these cutting-edge techniques. Such information is useful in conservation planning with respect to current actions required and future directions to be taken.

One of the first cases of technological intervention in Indian wildlife conservation was in the late 1990s at Nagarhole Tiger Reserve, Karnataka, to monitor large cats under the guidance of noted conservation zoologist and biologist Dr Ulhas Karanth. In the early 1990s, Dr Karanth and his team began long-term experiments with the help of camera traps to estimate the abundance of tigers in the Nagarhole Tiger Reserve. This was the first time

in India that a wildlife population was being sampled in a systematic and laborious manner with a defined grid system. Ever since then, camera traps have been consistently deployed for an array of wildlife monitoring purposes in behavioural and ecological studies.

Today, new-age heat and movement sensor camera traps that can record images and videos in low light as well as conserve battery power have become tools of necessity for wildlife managers as well as conservation scientists across the country. Camera trap exercises result in capturing data that are used to estimate population size, species richness, site occupancy

Baby elephants stay close to their mothers in Jaldapara National Park in Dooars, West Bengal. These gentle beasts have been declared the national heritage animal by Government of India





An Olive Ridley turtle. These species of turtles annually flock to Odisha's coast and Maharashtra's Velas beach to lay eggs. Several wildlife conservation organisations work for the protection of the turtles. They carry the female turtles to a hatchery where they lay their eggs in a safe environment before escorting the little ones back to the sea

### Camera traps have been consistently deployed for an array of wildlife monitoring purposes in behavioural and ecological studies

or relative abundance indices among other ecology-based studies. Currently, almost every wildlife habitat and wilderness area in India is under some form of camera trapping exercise, be it to assess fish fauna associated with seagrasses in the islands of Havelock and Henry Lawrence in Andaman and Nicobar Islands; monitor and conserve wild animals, including leopards, in the forest reserve of Jhalana in Jaipur, Rajasthan; track movements of the elusive snow leopards in the farthest reaches of the Himalayas or to study the distribution and habitat patterns of the Asiatic black bear in the Senchal Wildlife Sanctuary located

in Darjeeling, West Bengal.

Another use of high-end technology deployed in wildlife research leading to conservation is a

radio telemetry device. The use of tracking collars is, today, one of the most common methods of monitoring large mammals in India. The list includes tigers, elephants, rhinos and a host of other animals. Radio tracking involves fitting the study animal with a radio collar or a radio device that emits signals. While these collars are designed to minimise impact on the animals' behaviour and to maximise their detectability, there are rigorous checks that are in place to ensure that the target species are not harmed by this method of study. Most radio telemetry studies are structured on conservation and



ecology-based modules that are required to understand animal behaviour, including conflict, human-wildlife interactions, wildlife diseases and habitat range, size etc. One of the first projects to use radio telemetry of king cobras was in Karnataka's Agumbe settlement, led by noted herpetologist Romulus Whitaker, of the Agumbe Rainforest Research Station.

In the current times, a project is being undertaken for arresting elephant deaths due to train collisions in north West Bengal. The project is a collaboration between the West Bengal Forest Department, Wildlife Institute of India (WII), Central Scientific Instruments Organisation (CSIO), Chandigarh, and the Ear to the Wild Foundation. The

project includes developing sensors aimed to detect elephant movement on railway tracks so that speeding trains can be alerted to slow down and avoid unnecessary deaths of Asian elephants. Once this project is successful, the deployment of high-end sensor technology, coupled with satellite connectivity and solar powered devices, will signal a new beginning for India's human-wildlife



**Top:** A camera trap sensor. These devices are used for an array of wildlife monitoring purposes

**Left:** An ornithologist uses a radio telemetry device to track the moving patterns of birds



**Left:** An Asiatic black bear (*Ursus thibetanus*). These are usually found in northern parts of India and can also be spotted in the national parks of Ranthambore, Nandapha and Kaziranga; **Bottom:** Tigers at the Nagarhole Tiger Reserve, Karnataka. According to a report recently published by Union Minister for Environment, Forest & Climate Change Prakash Javadekar, more than 125 adult tigers roam in 644 sq km protected area of the reserve

Modern science-based technological breakthroughs have been made simpler and accurate with the introduction of DNA tests



conflict mitigation measures. India is on the right path here and results will follow soon.

All species are essentially spatial communities and exhibit competitive behaviour when it comes to sharing their physical space and resources. Territorialisation of species and their behaviour need a strong mapping and analysis of demographics layered over the geographical and physiographical patterns and processes. Monitoring and mapping of this data over regional and temporal scales offer insights into population density, distribution, spatial

heterogeneity and movement of the species, and its relation to the geographical aspects of habitats and large-scale environmental changes. Thus, spatial ecology and Geographic Information System (GIS) or remote sensing have become vital tools in mapping change in the fields of ecology and conservation.

Molecular ecology and conservation genetics have contributed immensely to unravelling patterns and understanding the processes behind species' histories and geographic distributions. Due to strong and deep synergy between bio-technology and information technology in recent times, India's





A Royal Bengal tiger with cubs in Ranthambore National Park, Rajasthan

anti-wildlife crime agencies now have a strong base to identify and nail poachers and wildlife crime syndicates. Modern science-based technological breakthroughs have been made simpler and accurate with the introduction of DNA tests. Stellar contributions in this regard have been of Centre for Cellular and Molecular Biology (CCMB) and Dehradun-based Wildlife Institute of India (WII), who have developed a first-of-its-kind procedure to identify species of the animal from parts that have been confiscated. Today, wildlife investigators need just a tiny piece of flesh, a drop of blood, a bunch of hair or a piece of bone, etc. for a test and results are available in record time. These DNA tests bypass the hurdles of poorly-preserved animal

samples and even the quantity of samples. Scientists are now able to isolate the unique signature in the DNA fragment of the animal and quickly match it with the rapidly-expanding database of signatures from the animal world. The WII already has a signature bank of about 2,000 known animal species, which is expanding every year.

In 2010, the Indian government's National Tiger Conservation Authority (NTCA) launched the Monitoring System for Tigers: Intensive Protection and Ecological Status (M-StrIPES), a software-based

**The use of radio telemetry device or tracking collars is, today, one of the most common methods of monitoring large mammals in India**

### Innovative technologies

The Wildlife Conservation Society (WCS) India collects data by deploying sound recorders in the forest. Recorded files are analysed by the Nature Sound Analyzer. This information on animal habitat is critical for the demarcation of forest areas as protected zones or organising a response against illegal poaching and trade of endangered species. The primary technologies used are Digital Signal Processing (DSP) and Artificial Intelligence (AI).

monitoring system, across Indian tiger reserves. The primary objective of this cutting-edge software system is to strengthen patrolling and surveillance of India's National Animal, the Bengal tiger (*Panthera tigris*/ *Panthera tigris tigris*). Field staff in tiger reserves are equipped with handheld Global Positioning System (GPS) devices to capture data relating to tiger sightings, deaths, wildlife crime and ecological observations, while patrolling in their respective beats and ranges. The software system maps the patrol routes of forest guards and all resulting data is centralised and analysed in a geographic information system (GIS). This provides real-time information for wildlife managers to effectively enhance protection

as well as habitat management measures and ensure long-term conservation of sensitive large cat habitats. An additional outcome is the evaluative impact of human pressures, including tourism, encroachment and cattle grazing, in the respective target areas.

Introduction of molecular studies (PCR based DNA sequencing) in India provided a platform for a non-invasive method of sampling, identifying and maintaining the identity of the species facilitating conservation efforts. PCR-based molecular studies offer an avenue for analysing damaged and degraded samples, including fossils, which helps in connecting the past and the present species, which, in turn, prioritise the conservation efforts

A one-horned rhinoceros in Kaziranga National Park, Assam. According to World Wildlife Fund (WWF), this park houses the largest number of this species in the world







**Top:** A snow leopard on prowl. The Uttarakhand forest department, along with the United Nations Development Programme, will develop India's first conservation centre for snow leopards in the forests of Uttarkashi; **Bottom:** Amur falcons annually migrate from Siberia, Russia, to India. Two falcons who were geo-tagged at Manipur's Tamenglong district in 2019, have successfully returned to the state this year

of the species in the endangered list. With the introduction of mitochondrial DNA barcoding technique in India, the DNA barcode library is being prepared that will help scientists, researchers and conservation managers in easy identification of the species, including morphologically-cryptic ones. DNA-based phylogenetic studies provide better clarity among the relationship between the sister species, which is crucial for understanding the species and

interspecies when it comes to relocating them from their habitat to new areas or their reintroduction to their native abode.

The array of methods and tools being used today in Indian forests to protect wild animals prove that the field of conservation and ecology advances, with the advent of technology, has matured as a discipline over the last few years in the country. These measures supported by positive policy changes by the government are helping shape India's conservation strategies for the new millennium.



Chairman of the Mhadei Research Center, Goa, Nirmal Ulhas Kulkarni is a herpetologist, field ecologist, conservationist and wildlife photographer. He is also one of the longest serving members of the State Wildlife Advisory Board of Goa.



# Farm support

Be it the moringa leaf or lemongrass, cultivation of native crops with high commercial demand is helping India's farming sector become self-reliant. We delve into a few power-crops to understand their health benefits and financial viability

BY DR MOHIT SHARMA

India is blessed with the heritage of varied agro-climatic conditions, which offer enormous varieties of agricultural and horticultural products. As the agrarian economy of the country evolved, India has seen transformation from being

a food deficit country to a food exporting nation. In the current scenario of the Covid-19 global pandemic, the importance of being self-sufficient in food production has increased manifold and so has the demand for nutritional crops. India's Prime Minister Narendra

Kewda (*Pandanus odorifer*), commonly called screw pine, is a shrub that largely grows in Odisha's Ganjam district. It bears fruits that are cooked and its inflorescences are used to extract perfume



Modi has given a new vision of making India *aatmanirbhar* or self-reliant and self-sustainable in agriculture. While there are several measures being taken to achieve this goal, one of the most important is the promotion of local farm products with a wider platform and market facilitation. The smaller farmers involved in the cultivation of local cash crops require to be supported and trained in quality and marketing. Recognising the need of the hour, the government is making the branding and marketing of India's local farm products more aggressive and is also offering farmers support in this direction. The following are a few examples of such popular local cash-crops or super-crops.

#### KEWDA (KEWRA) FLOWER

One of the first in the super-crop list is the fragrant kewda flower from Odisha's Ganjam district. Locally

known as Kia flower, the kewda plant is a shrub that grows wildly in coastal areas and is also cultivated by small sections of farmers in the region. Its extracts - the kewda oil and the kewda hydrosol or Kewda water (steam distilled from the



Kewda water/essence is used to add piquancy to several Indian sweet treats. **(Top and left)** *Phirni*, a pudding made with ground rice, milk and sugar, is flavoured with kewda essence; The popular east Indian sweet *cham cham* is often flavoured with a drop of kewda essence for texture

Local cash crops can mitigate the uncertainties of the agriculture sector as most of them grow in areas where staples like rice and wheat can't be cultivated

### The context of making India *aatmanirbhar* or self-reliant and self-sustainable in agriculture has been the focus of India's Prime Minister Narendra Modi



fragrant flowers) have several health benefits. Kewda oil is used as an Ayurvedic medicine, while the hydrosol is used to add flavour to food and also as a base for perfumes. It is registered under the Geographical Indication Act by the Government of India.

Currently, around 200 villages are linked with this industry through 140 traditional distillation units and generate an annual turnover of USD 10 million. Kewda *ruh* (perfume) and its products are in huge demand in Middle Eastern countries. However, frequent natural calamities like cyclones that hit this region have been affecting the livelihood of kewda farmers and the state and the Central governments have been providing financial aid to the growers to help them tide over these challenges. Local NGOs are also being encouraged to upgrade the technologies being used by the distillation units.

#### LEMONGRASS

Due to the current pandemic, the market potential for medicinal plants has been continuously increasing.

A pumpkin dish prepared with lemongrass and coconut milk. Varieties of this recipe are popular throughout India and Southeast Asia





Lemongrass can be easily grown at home in wide (minimum 14 inches) pots. In smaller pots, the roots are likely to break out

The lemongrass oil, distilled from leaves and flowering tops of the plant, has a high percentage of citral, which has germicidal, medicinal and flavouring properties. Of all the medicinal plants cultivated in India, lemongrass is one of the most popular ones and the country is the largest producer of lemongrass. About 80 per cent of the produce is being exported to western Europe, USA and Japan. Lemongrass was introduced in India about a century ago and is today commercially cultivated in several states, including those along the Western Ghats like Karnataka and Tamil Nadu; Bihar, and the foothills of Arunachal Pradesh and Sikkim. Within the country, the crop is grown in around 3,000 ha of area, and the annual production ranges between 300 to 350 t per annum. As the income generation from the production of lemongrass is comparatively

high, and the cultivation is easy, the government is trying to rope in more farmers to cultivate it commercially. For example, in Bihar, district administrations are aggressively encouraging farmers to grow lemongrass on cultivable land. Some district administrations are linking farmers to firms that aid the latter financially to grow the crop,



Lemongrass oil is an integral ingredient of Ayurvedic medicine and aromatherapy. Its health benefits include the ability to reduce stress, headache and insomnia, uplift moods and stimulate the production of the happy hormone, serotonin



Millets, local to India, have a long list of health benefits. They are nutrient-rich, have a high fibre content, and a low glycaemic index — making them ideal to fight obesity and diabetes. They are also gluten-free. Ragi or finger millet is full of calcium; jowar has potassium and phosphorus, the foxtail (*kangni* or *kakum*) millet is high in fibre, while *kodo* millet is rich in iron. The most popular millet in India is bajra or pearl millet, which is rich in magnesium and potassium, which keep the heart healthy. Today, with the urban focus shifting to healthy food options, the simple Indian millet has become a superfood and hence, a profitable crop for farmers.



Indian aloe vera or *ghritkumari* is a plant with great commercial potential and health benefits. This hardy plant is easy to grow and has a high yield, and growing demand. In 2017, the revenue generation from Indian aloe vera market was around USD 23.72 million and this is projected to grow at a CAGR of 10.02 per cent (in value terms) till 2023. In India, it is mainly grown in Rajasthan, Andhra Pradesh, Gujarat, Maharashtra and Tamil Nadu. As incidences of low rains, decreasing ground water levels and soil degradation make large tracts of land unproductive for grain or legume crops, farmers are being encouraged to shift to aloe vera farming.

and then buy back the product directly from the field, freeing the farmers from the worry of selling their produce.

### MORINGA

Other than economic support, indigenous crops are often a source of nutrition for farmers and their families. An apt example is the traditional moringa or drumstick tree (*saijan* in Hindi), which is native to India and well known for its nutritional properties, wide adaptability and ease of cultivation. In a recent speech on making the country's farming sector self-sufficient, PM Modi stressed on the health benefits of this tree. Each part of the moringa tree is useful, and considered a healing herb in Ayurvedic medicine.

The oil and the powdered leaf are major moringa products India exports to countries like USA and Japan, and to western Europe. The global demand for moringa is about USD 5.5 billion and it is estimated to grow to about USD 10 billion by 2025, and India is a market leader, meeting more than 80 per cent of the plant's demand worldwide. As demand for moringa grows across the country and world, more farmers are cultivating it. In Maharashtra's Sangli, Solapur, Nashik, Pune, and Yavatmal, farmers hail this cash-crop that has helped them enhance their livelihoods by catering to growing urban demands.

### THE WAY FORWARD

Local cash crops can mitigate the



**Top:** A delicacy prepared with fried moringa leaves and grated coconut; **Right:** Full-grown moringas, also called drumsticks, are used in Indian recipes





**Top:** Drumsticks feature in several dishes across the country. It helps in streamlining blood circulation, purifying blood and also acts as an antibiotic agent;  
**Above:** A drumstick dish prepared with poppy seeds

uncertainties of the agriculture sector as most of them grow in areas where staples like rice and wheat can't be cultivated. These local plants are well-suited to adverse climate changes. They are drought tolerant and, therefore, can be grown in arid and semi-arid tracts under low rainfall conditions. However, the small farmers need institutional support

to market their products. In such scenarios, schemes floated by the Central and state governments prove very effective. Programmes like One District One Product being promoted in the state of Uttar Pradesh and Geographical Indications (GI) certificate have helped small and marginal farmers. PM Modi's clarion call of 'Vocal for Local' is also encouraging farmers and consumers alike to shift to local crops, which is an immensely effective step towards making India's farming sector *aatmanirbhar*!



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# PURE sweetness

From traditional winter treats to summer drinks - jaggery finds its place in a wide array of Indian recipes. This unadulterated sweetener comes with its own set of health and wellness benefits too

BY GITA HARI



An apt substitute for refined sugar, jaggery adds flavour to sweet treats, promotes overall wellness and treats common ailments



Come winter and *gur* or jaggery comes into focus in Indian kitchens, finding its way into numerous recipes. Be it *gur ki roti* (jaggery-filled flatbread), *gur ka halwa* (semolina dessert cooked with jaggery), *khatti meethi phaliyan* (a Gujarati specialty of stir fried beans tossed in tamarind, spicy coconut shavings and jaggery) or *patishapta* (a Bengali delicacy where thin crepes are stuffed with coconut and jaggery filling), jaggery-based delicacies become common in Indian households. High in iron and vitamin C, jaggery is not only a healthier alternative to refined sugar but is also used in traditional home remedies for common ailments.

Derived from the same source but vastly different in look and taste – both refined sugar and jaggery belong to the sugarcane family but while the former gets a glorified appearance, the latter is considered to be its unassuming cousin. According to an article published in the October 2020 issue of *Journal of the American Dietetic Association*, added sugar is one of the major reasons for obesity and related health disorders as it contains empty calories (ones devoid of vitamins or minerals) and plain sucrose.

“Jaggery is packed with minerals and vitamins, and also contains iron, magnesium and potassium. The easiest remedy for stomach disorders, constipation and cough, this

**Jaggery is loaded with antioxidants and such minerals as zinc and selenium, which boost resistance against infections**



**Top:** Prepared on festive occasions, South India's nei appams are rice-based sweet pancakes prepared using *ghee* (clarified butter); **Bottom:** Modak, a Maharashtrian specialty, is prepared by steaming a rice flour pocket stuffed with a mixture of coconut shavings and jaggery



**Top:** A favourite during winter, *chikki* is a sweet treat prepared with jaggery and a variety of dry fruits, including peanuts, almonds, cashew nuts and pistachios

**Bottom:** *Chikkis* can also be prepared with amaranth or *rajgira* seeds. Amaranth, a superfood, is rich in fibre and helps lower blood glucose levels



unrefined sugar helps relieve gullet and lung contagions too,” says Pranati Bollapragada, head of nutrition and dietetics at Dharana at Shillim, a wellness retreat in Pune.

### HEALTH BENEFITS

Jaggery has been traditionally used in the treatment of cold and flu-like symptoms since ages, and consuming it during colder months helps in generating heat in the body. Jaggery

contains approximately four calories per gm. And burning calories from food produces heat, which dilates the blood vessels and provides warmth to the body. A reason why jaggery becomes a quintessential kitchen ingredient during winter.

According to a study published in the *International Journal of Current Research* in 2018, jaggery works wonders for overall well-being too. It not only aids in the secretion of endorphins or happy hormones but is also effective in providing relief from abdominal spasms. When taken in moderation on a regular basis, jaggery also acts as a natural blood purifier and helps cleanse the liver by flushing out harmful toxins from the body.

Jaggery is loaded with antioxidants and such minerals as zinc and selenium, which boost resistance against infections. It also helps increase the blood's haemoglobin count. Iron and folate present in



jaggery ensure that the normal level of red blood cells is maintained in the body, thereby preventing anaemia.

A rich source of potassium - a mineral that maintains electrolyte balance in the body, helps build muscles and boosts metabolism - jaggery is favoured by fitness enthusiasts and those aiming to lose weight. Being a complex carbohydrate, jaggery keeps the body active for a longer period of time as compared to refined sugar, which is a simple carbohydrate and is absorbed immediately by the blood.

But just like any good thing, it should be consumed in moderation.

## MAKING OF JAGGERY

Sugarcane is a major source for jaggery, which can also be derived from date palm sap (called *nolen gur* in liquid form and *patali gur* in solid form) and coconut sap as well. The non-industrial, natural method consists of the sap or juice being collected, boiled and cooled. The quality, however, depends on factors like the variety of sugarcane, the cultivation standards followed, the composts used, the stage of fruitage and the process of sap removal, among others. The traditional and organic method is as meticulous as it is sustainable – sugarcane juice is extracted, poured into a large metal vessel and boiled while stirring continuously to avoid lump formation. The liquid is stirred till it forms a thick powdery element. The end product is brown in colour, less salty and an ideal substitute for sugar.



Jaggery is also used to make the South Indian cooler *panakam*. According to ancient science, this drink was used as an oral rehydration solution (ORS) as jaggery, in its purest form, is loaded with electrolytes, which helps regulate the balance of fluids in the body

## Purity Check

1. Do taste a piece of jaggery. It should not taste even slightly salty. If it does, this may indicate a high concentration of mineral salts. The salty taste can also tell you if the *gur* is fresh - the older it is, the saltier it gets.
2. If there is any bitterness in the product, it means that it has gone through the process of caramelisation during the boiling process.
3. Check for any crystals on the jaggery. Presence of crystals indicates that the jaggery may have gone through other processes to make it sweeter.
4. The colour of the jaggery also plays an important role in identifying purity. Ideally, the colour of the jaggery should be dark brown. The yellowish colour in *gur* may indicate chemical treatment.
5. Prefer buying hard jaggery; this ensures that there are no additives added while boiling the sugarcane juice.
6. Most vendors add chalk powder in jaggery. In order to check for its presence, take a transparent bowl of water and dissolve a piece of jaggery in it. You will see the powder settling at the bottom.
7. Often, artificial colour is used to give jaggery the right hue. Take half a teaspoon of jaggery and add six ml of alcohol and mix well. Add 20 drops of concentrated hydrochloric acid. If the jaggery turns pink then it means artificial colours have been added.

Source: [food.ndtv.com](http://food.ndtv.com)

### KNOW YOUR VARIETIES

Sugarcane jaggery is the most commonly consumed. The smooth-textured palm variety is sweeter and more nutritious as it is loaded with nutrients and fibre that not only stimulates digestion but also helps in providing relief to migraines and headaches. But the sweetest of all is the one with a crystallised texture made from unprocessed and fresh extracts of coconut sap. This sugar substitute is used in many traditional recipes of South India. “Jaggery is also consumed as a summer cooler. The palm sap is known for its cooling effects,” informs Dinesh Mhatre, executive chef, Hilton Mumbai International Airport. Take the *panakam* for example. Called *panaka* in Kannada, it is a digestive beverage prepared with jaggery and ginger and is had as a refreshment. Sweet treats like *payasam* (rice pudding), *nei appam* (a South Indian delicacy made with rice flour, jaggery and clarified



butter), *suhiyan* (a popular evening snack in South India cooked with green gram, flour and jaggery) and *modak* (also called *ukdiche modak*, it is a Maharashtrian rice flour dumpling stuffed with coconut and jaggery) are prepared with different varieties of jaggery and savoured across India.

### MODERN VARIATIONS

With an increasing number of chefs across the country turning to

**Top:** A speciality of east India, *narkel naru* (coconut balls) are prepared with jaggery.

These bite-sized delicacies are also used as *prashad* (religious offerings) during pujas;

**Right:** *Puran poli* is a savoury Indian flatbread where wheat flour flatbreads or *poli* is stuffed with a mixture of *chana dal* or split Bengal gram and jaggery, and cooked in *ghee*





**Right:** The popular South Indian dessert *payasam* is traditionally cooked with split *moong daal* or green gram and jaggery, and garnished with dry fruits; **Bottom:** A favourite snack in South India, especially Kerala, *sukhiyan* or *suhiyan* is prepared by deep-frying small balls made from a mixture of green gram, jaggery and grated coconut



seasonal produce for recipes, jaggery has found a new expression. Take for example Kolkata-based chef Joymalya Banerjee's contemporary *nolen gurer* madeleines (bite-sized sponge cakes coated with jaggery) and his prawn and crab meat dumplings that are stewed in spicy *nolen gur* reduction. New Delhi-based chef, Sabyasachi Gorai points out, "I have done away with refined sugar in my kitchen. Jaggery is my go-to sweetener for

most of my recipes as it adds both flavour and nutrition to my dish."

Jaggery is more than just a natural sweetener. It is a superfood in the true sense. Be it adding flavour to sweets, promoting wellness or treating ailments – its uses and benefits are unmatched. Snehal More, dietician at Mumbai's Bhatia Hospital, adds, "It protects vital body organs by insulating them and maintains warmth of the body. Date palm jaggery triggers digestive enzymes and improves gut health." As the country recuperates from the Covid-19 pandemic, this superfood can serve as a godsend in the winter months.



An expert on indigenous Indian cuisine, Gita Hari curates healthy Sattvik cuisine for premium hotels. Her recipes have been featured in the health columns of leading newspapers. The recipient of Women Achievers' Awards, Hari has conceptualised, scripted and hosted shows on television and the digital platforms as well.



# INDIA'S VIBRANT autumn

Navratri, Durga Puja, Dussehra, Chhat Puja, Milad-un-Nabi and Diwali light up festive fervour across the country. Here are a few glimpses

A girl in a traditional *garba* costume in Mumbai. *Garba* is a form of Indian dance native to Gujarat and performed mostly during the festival of Navratri



**Top:** Kali Puja (November 14, this year) is dedicated to the worship of Goddess Kali. It is celebrated largely in West Bengal, Odisha and Bihar. This festival is also known as Shyama Puja and Mahanisha Puja; **Bottom:** Durga Puja (October 23-26, this year) is celebrated with great pomp and joy across the country with the grandest festivities happening in West Bengal. One of the characteristic features of Durga Puja is the performances by *dhakis* (drummers) who decorate their drums with feathers





## SNAPSHOTS



On *dashami*, the last day of Durga Puja, women engage in a play of vermilion (*sindoor khela*). In this ritual, women apply vermilion powder to Maa Durga before applying it on each other



A scene from a *Ramleela* (Ram Leela) performance held in Ghaziabad, Uttar Pradesh, on Dussehra in 2019. *Ramleela* re-enacts the story of the Hindu epic *Ramayana*, where Lord Rama defeats Ravana, symbolising the victory of good over evil. *Ramleela* was inscribed on the Representative List of the Intangible Cultural Heritage of Humanity of UNESCO in 2008



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Durga Puja (October 23-26, this year) is celebrated with great pomp and joy across the country with the grandest festivities happening in West Bengal



*Ramleela* performances are held during Navratri or nine nights. On the last day, which coincides with Dussehra, life-size effigies of Ravana, Meghnath and Kumbhakarana are burned in an enactment. Here, actors dressed as Lord Rama and Lord Lakshmana aim an arrow towards an effigy of Ravana as they take a part in a *Ramleela* procession in Amritsar, Punjab



## SNAPSHOTS

**Top:** Milad-un-Nabi celebrates the birth of Prophet Muhammed. Also known as Id-e-Milad, it is one of the major festivals of the Islamic festival calendar;

**Bottom:** On Dussehra, it is said that all the *devatas* (gods) of Kullu, Himachal Pradesh, come out and proceed with their band of musicians towards the temple of Raghunathji (Lord Rama)







**Top:** Diwali (November 14, this year) marks the victory of light over darkness. Here, people gather with oil lamps on the banks of River Sarayu in Ayodhya, Uttar Pradesh in 2019

**Bottom:** On Diwali, people light *diyas* (earthen lamps) and exchange gifts, sweets and festive wishes



The five-day festivities of Diwali concludes with *bhaai dooj*, where sisters apply *tika* (dot) on their brothers' forehead for their well being



A traditional *bhai dooj thali* (platter) with sweets, conch shell, wheat grains, darbha grass, flowers and *diya*. On *bhai dooj* (November 16, this year), celebrated across the country in regional variations, sisters apply *tika* (dot) on their brothers' forehead for the latter's well being





**Above:** One of the major festivals of India, Chhat Puja (in November this year) is celebrated in most parts of Bihar and Uttar Pradesh. This auspicious festival day is observed by fastings and offering prayers to the Sun God

**Bottom:** Women offering prayers with bananas during Chhat Puja



# INDIAN IMPRESSIONS

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## ENGINEERING MARVEL

The iconic 100-year-old Pamban Bridge that connects Rameshwaram and Dhanushkodi (located off the Tamil Nadu mainland) to the rest of the state will soon be replaced by a new one. The 2.07-km-long New Pamban Bridge is being built at a cost of INR 280 crore and is scheduled for completion by December 2021. This new bridge will be the country's first vertical lift railway sea bridge that will allow ships to pass beneath it. It is expected to boost tourism, especially religious tourism as every year, hundreds of devotees flock to the revered Rameshwaram temple.

## INNOVATIVE MINDS

- In an attempt to aid the visually-impaired identify old and new currency notes, students from Ahmedabad's National Institute of design – Mani Teja Lingala and Mrudul Chilmulwar – have designed a pocket-sized sheet named Drishti. This handy template has a ridge and steps for note identification instead of braille.
- Ashok Chakradhari, a potter from Bastar (Chhattisgarh) district's Kondagaon village, has modelled a traditional *diya* (earthen lamp) that can burn for at least 24 hours. It is made of three parts – a lamp, a dome-like structure that acts as an oil reservoir and a tube-like structure to hold the reservoir over the lamp's base.



**L to R:** The magic lamp that can burn for at least 24 hours; The handy template Drishti helps the visually-impaired identify both old and new currency notes

Image: betterindia.com



Rushikonda beach in Andhra Pradesh was one of the eight Indian beaches to receive the Blue Flag Certification

## BLUE REVOLUTION

India has become the first country in the world to receive the Blue Flag Certification for eight beaches in a single attempt. The award is given to the safest, cleanest and environment-friendly beaches of the world. Spread across five states and two union territories, the beaches that were honoured with this certification, which is awarded by an International Jury comprising members of United Nations Environment Programme, UN World Tourism Organization, Foundation for Environmental Education and International Union for Conservation of Nature, include Ghoghla (Diu), Shivrajpur (Dwarka-Gujarat), Kasarkod and Padubidri (Karnataka), Kappad (Kerala), Rushikonda (Andhra Pradesh), Radhanagar (Andaman & Nicobar Islands), and Golden Beach (Puri, Odisha).





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