



NTFP-EP

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Give youth a chance

Every time I visit an adivasi village and hold a meeting about wild foods, or the state of the forest in their surroundings, the discussions and the overall mood take some clear trends. Yes, we had many more food plants that we harvested and consumed then; the fish were more diverse and abundant in those days; the forest was more dense, and people brought back meat whenever they went out. Nowadays the youth don't even know how to recognize the different food plants. They hardly know how to make a good fish-trap. And the forest itself has retreated so far from the village, one has to walk miles even for firewood!!

When I visit a friend in any city it doesn't require much effort to take the discussion on a similar negative path. Most urban set-ups are quite easy to be skeptical about. Bad infrastructure in the cities (Benguluru or Mumbai during the monsoon), traffic snarls, high rents for appartments which the youth can ill-afford, pollution on all fronts (air, water, food, sound), the corruption and the unemployment, and the difficulties of finding a satisfying job. If all this doesn't work we always have climate change, which we can't escape. And, of course, things were far better in the past, but its all screwed up beyond repair now.....

It time to refrain from such negative talk, from such a mood, even from such thoughts. Especially when we are among the youth in our homes or elsewhere. Because they *know* the mess we have led them into, with several decades – and continuing – of our business as usual lifestyles, with few of us stepping out of the system, or even questioning it. India has an average age of about 29 but most of it's elected leaders are between 60-70 years old, and most leaders stay around as long as they can, seldom making way for the younger generation. The advantage with older leaders is experience: they will be better at handling a crisis, but they are less likely to innovate. The youth are known for their fresh take on the new challenges facing us, unhindered by the baggage of old ideas and habits. Many of the problems confronting us today – pandemics, climate change, old models of economic growth – require such an approach, and with more youth at the helm we, as a race, may still have a chance to get out of the deadends we have steered ourselves into.

Though not actively involved in politics the youth are not apolitical. The Arab Spring, the gathering in Delhi in support of Anna Hazare's anti-corruption movement, Climate Change protests across the world, various candle light vigils for women's rights, etc., are some of the issues the youth have come together for. These issues call for structural change and threaten regimes and economic structures, perhaps reasons why they are derailed by governments, or simply compromised. To get some real answers to the problems that humanity faces today the youth have to be given more space within the political structures, not only to voice their ideas and worries but also to implement potential solutions. They might struggle or even fail, initially, but it is also likely that they show us a way to avoid the crisis we collectively face.

It's better than sleep-walking to our doom!

Madhu Ramnath

Fruit flies: a common agricultural problem between Mexico and India

Diana Pérez-Staples

Have you ever peeled a mango only to find a wriggling worm inside of it? And if so, wondered where did it come from? Did the worm crawl inside the fruit after it fell on the ground? No, in fact the worm came into existence because a female fruit fly deposited its eggs in the fruit and from there it developed into a worm, which then jumped out of the fruit and buried itself in the ground, formed a cocoon much like a small butterfly, and then became an adult fly. Aha you say! indeed I saw some small flies around my bananas this morning. No, not those fruit flies. Even though everyone calls those small pesky but very famous flies, *fruit flies*, they are not the *real* fruit flies. Their scientific name is *Drosophila melanogaster*, and they are in fact the vinegar fruit flies. The mango fruit fly and many other agricultural pests are the *true* fruit flies. They are also sometimes called the pictured wing fruit flies from the Tephritid family. They are about the size of a common house fly and there are thousands of species distributed throughout the world. Some of these flies are terrible agricultural pests, especially those from the genus *Ceratitis*, *Bactrocera*, *Anastrepha* and *Rhagoletis*. They infest a wide range of commercial fruits and vegetables, even beloved chilies are not safe! Most tephritid fruit flies are not pests and some could even be used to control weeds such as *Dacus persicus*, commonly found around Callotropis plants in many Indian towns (Figure 1).



Pests of economic importance

For India, pests such as the oriental fruit fly *Bactrocera dorsalis*, the peach fruit fly *Bactrocera zonata* and the melon fruit fly *Zeugodacus cucurbitae* are headaches for fruit and vegetable farmers. They infest vegetables such as mangoes, okra, cucurbits, peaches, sapodilla, guavas, bottle guard, pomegranate, just to name a few hosts. For Mexico, species such as the Mexican fruit fly *Anastrepha ludens* (Figure 2), the sapodilla fruit fly *Anastrepha serpentina*, the guava fruit fly *Anastrepha striata* and the West Indies fruit fly *Anastrepha obliqua* are problematic. They infest many of our favorite fruits: mangoes, certain citrus, chikoo, guavas etc. There are many more species of fruit flies that are found in non-timber products, fruits in the forest that are not of commercial use but are eaten by birds or mammals. Surely there are many more species that need to be discovered.



Figure 2. Female Mexican fruit fly, *Anastrepha ludens*, laying eggs in a fruit. Photo credit: Andres Díaz Cervantes.

Methods of control

Fortunately, there are various methods of control against these pesky flies. The most widely used throughout southeast Asia is traps with specific very powerful synthetic lures called methyl eugenol or cue lure. These lure are based on plant scents that the flies are attracted to. However, one caveat of this approach is that it attracts only males, whereas it is the females that are infesting the fruit. Considerable efforts are being made, for example by Dr. Kamala Jayanthi at the Indian Institute of Horticultural Research, to find a female lure. That will surely be a great asset to target these pests. In Mexico, the lures that are used in traps are liquid protein, and fortunately both males and females are attracted to protein-based lures.

What can a small farmer do to protect his fruit or someone that has a few trees in their house? First start by burying the infested fruit and throwing some limestone on top. Or you can place the infested fruit inside a bag in the sun so that all worms die. Second you can spray the fruit if it is still green with a mixture of Neem, or bag each fruit. Alternatively, a good method is to make your own bait station. For this you need a small plastic bottle with a lid, then make about three small holes in the top part, approximately the size of a coin. In the bottom of the bottle place a water mixture with jaggery and banana or fresh fruit pulp, then hang the bottle from the fruit tree (Figure 3). The flies will fly in and drown in the mixture.



Figure 3. Simple bait station for flies. Photo credit: Christian Rodríguez.

Sterile Insect Technique

On a larger scale, as part of what is called area-wide management programs there is a very ingenious type of birth control that is called the Sterile Insect Technique (SIT). SIT consists in the mass-rearing of insects in huge factories, sterilization through gamma rays or X rays and then release of the sterile adults in affected areas. The males then mate with the females rendering them infertile. One common misconception of SIT is that flies are radioactive, they are not, they are just sterile. SIT does not introduce foreign genetic material into the population, targets only the pest, does not harm other beneficial insects such as bees and reduces the use of toxic insecticides commonly used against pests.

Another positive point of SIT is that it can be used in combination with other environmentally friendly

techniques such as biological control. SIT is now used worldwide, in all the continents except Antarctica. The largest production plant of Medflies is currently in Guatemala. This plant has the capacity to produce 3,000 million flies per week!

Successful stories of SIT implementation

There are some magnificent examples where SIT has been successfully applied. Some of these examples are the eradication of the screwworm fly in Libya, and all of North America, including Mexico, Central America until Panama. The screwworm fly is major parasitic pest of all warm-blooded animals, including humans. A permanent barrier of sterile insects is currently maintained over eastern Panama to protect these pest free areas. Another example is in the tsetse flies, which can transmit sleeping sickness, this insect has been eradicated from Zanzibar, in Tanzania. Using SIT, the pink bollworm, which is a pest in cotton farming, has been eradicated in Southern USA and NW Mexico. Another example is the melon fly, which is one of the worst pests in vegetables throughout various regions in Asia and this has been eradicated in southern Japan.

Another successful example is the eradication of the painted apple moth in New Zealand. Also, the Mediterranean fruit fly, or Medfly, which is a fly species that attacks hundreds of different fresh fruits or vegetables, has been successfully eradicated from California and Chile. SIT has been also used against the Queensland fruit fly, which has been eradicated in South Australia and Tasmania. SIT was also used to eradicate the Cactus moth in Yucatán, Mexico. The establishment of this moth would have been devastating to prickly pear producers.

These are just a few examples of successful SIT implementation for eradication, but SIT can be used to can be used to suppress, eradicate, contain or prevent the establishment of pests, so there are many other successful examples of SIT being used for these means. However, the most recent and wonderful example, I think, of how this technique works is how the Medfly was eradicated from the Dominican Republic after it invaded that country. exports of fruits and vegetables, the Dominican Republic lost more than 40 million USD just in that year. The government, together with international agencies such as OIRSA, FAO, IAEA and USDA implemented SIT and in just two years they eradicated the pest. It's a technique that when used as part of an area wide management program deserves some more attention given its green credentials. This terrible agricultural pest was first

reported in 2015, and as a result of the ban implemented on

What about India?

In India some efforts were made in the 1970s to implement SIT against mosquitoes, which had disastrous results, mostly due to lack of efforts to educate the public and major misunderstandings between the Government of India and international bodies such as the World Health Organization. A full account of these efforts can be found in a letter to the prestigious journal *Nature*, entitled “Oh, New Delhi; oh, Geneva” (vol 256, July 31, 1975). Fortunately, there are now efforts to bring back this green technology to India, which will be exciting to see.

Mating is the key to SIT

Once a sterile insect is released into an affected area, either through a plane or by ground release (Figure 4), the males need to survive, and find a female to mate with. This is one of the most important parts of SIT. If the sterile male quickly dies or fails to find and then successfully court a female, then all efforts to mass-rear this insect will have been in vain. Some of the insects that SIT controls have very complex courting behaviors. For example, male Medflies aggregate under leaves, they start “calling”, that is emitting a type of perfume that is called a pheromone and moving their wings quickly, sometimes dancing around and around. This attracts the wild females which will then decide with which male to mate with. Thus, sterile males have to outcompete wild males. Since females can be very choosy, it is important that sterile males are as competitive as wild males, or that enough sterile males are released so that wild females will be much more likely to find and mate with a sterile male than a wild male (Figure 5).



Figure 4. Ground release of flies in an apple orchard, Okanagan valley, British Columbia Canada. Photo credit: Diana Pérez-Staples.



Figure 5. *Bactrocera* fruit flies mating. Photo credit: Ajay Narendra.

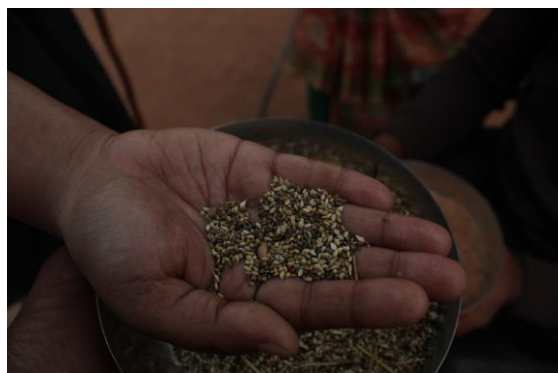
After they mate, sterile males will transfer sterile sperm in their ejaculate to females, but also many other complex biochemical substances such as proteins that are produced in the male accessory glands. These substances together with sperm have some interesting effects on females, for example they can reduce her willingness to remate with another male, they can increase her egg production, or appetite, or change her olfactory behavior, so that they stop responding to male pheromones and instead look for fruit to lay their eggs in. These substances, called seminal fluid proteins, are currently the focus of many research studies with exciting prospects for future pest control when integrated with SIT.

So, next time you are about to eat your favorite type of mango, think about how lucky you are that you can eat it without sharing it with a fruit fly maggot.

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Reviving Millets in Rajasthan.

Sai Anurag Nandagiri, Kalu Lal Bhagora and Radha Bai.



India is the largest producer of most millets in the world. Millets mature quickly, which is an advantage in rain-fed areas, and they require fewer inputs than mainstream cereals. In addition, millets provide ecological, nutritional, and social benefits in addition to these agronomic advantages. Despite these benefits, and even though the overall millet output in India has increased in recent decades from 7.7 million tonnes in 1961 to 10.7 million tonnes in 2012, the land area dedicated to minor millets has decreased.

Arid to semi-arid conditions prevail in Udaipur and other districts in south Rajasthan. The nature of the monsoon and the geography have combined to make millets an integral part of agriculture, and hence they are crucial to the diets of the people here. Millets' low requirement of land preparation and water availability make them compatible with natural farming techniques; they have therefore been a good crop to introduce into a sustainable agriculture transition.

Since the Green Revolution began, farmers of Jhadol have adopted chemically intensive farm practices. They replaced traditional crop diversity (growing

several crops together) with fast-growing commercial monocrops; this change affected land and water resources adversely in the region, and led to stunted growth. Farmers are now confronted with increased climate and weather variations that result in crop loss. Millet enhancement, on the other hand, gives a better chance for increased production.

Instead of focusing on mainstays like rice and wheat, which yield less than 1% of the agricultural production and is declining, focusing more research on healthy cereals like millets would be a very strategic decision. The benefits in terms of reduced water requirements, climate change adaptability, marginal soils, and social impact in terms of increased self-reliance of local residents and more resilient and accessible food systems are added incentives.

Seva Mandir sees an opportunity in millet cultivation to reverse the adverse socio-economic and ecological effects of the Green Revolution. Such an effort would facilitate farmer status and empowerment, increase incomes (especially for women), improve conservation and environment and, ultimately lead to better food and nutrition security.

Sewa Mandir's agricultural intervention covers about 80 villages in Jhadol, with between 1200 and 1300 families actively involved in soil and water conservation activities. Most of these farmer families are in the low to medium income category and are, essentially, subsistence farmers.

Seva Mandir began its intervention in millet cultivation in 2019 in the Panarwa zone. There are 10 village clusters totalling 23 villages. Here, 6 indigenous minor millet varieties have been identified through interactions with the people, and the seeds were acquired. Some of these seeds were collected from the older men and widowed women who cultivated these crops as their staple.

In the Phalasiya zone of Jhadol Dhala village all the millet varieties have been cultivated since 2019. Kalu-ji, the GVC Adhyaksh in Dhala, began reaching out to farmers to acquire the seeds of indigenous millet varieties, including Finger millet (Maal), Brown-top millet (Kuri), Barnyard Millet (Batti), Kodo millet (Kodra), and the Grain of Amaranth (Samlai). The seeds were obtained from 9 different farmers in Dhala. Some of these farmers were already growing millets on a small scale; some millets, like the Brown-top millet and Barnyard millet were found from widowed elders who had it stored away in small earthen pots.



With the efforts of Kalu-ji, the distribution of these seeds began on 10th July, 2021, among 118 farmers. Some 18 other farmers, who were already cultivating these, also joined the intervention. The farmers were happy with the seeds and this led to an increase in the total number millet cultivators (114) for the next stage of the intervention; in this phase Proso Millet (Cheena) was also introduced..

A parallel pilot project to gauge initial millet adoption and cultivation experience was also done in 2021 in the Bhesana and Kherad villages of the Bhesana Cluster with 20 farmers. During

discussions with the farmers, it was seen that the farmers were initially skeptical about the



intervention but the ease of cultivation, and the eventual harvest (an increase from 95 kg to 6-7 quintals) made them change their attitudes towards minor millets.

The elders, the women and the younger generation of farmers were the important pillars of the project. During the first months the focus was on the elders, getting to know how they felt about millet cultivation. The elders conveyed a sense of faith in the project, through the health and strength of their own being. In the discussions that were held, they made sure to mention that the food that they ate included a variety of millets.

“It requires minimal effort to cultivate these millets. Maal, for example, which was harvested recently, is raised in nurseries for a month and then replanted in the field. The land doesn't have to be tilled much, especially on the slopes, as it prevents water-logging.”

Ratan Singh Ji (103 year old farmer in Birothi Village)

Each of these villages had a key resource person who worked in association with Seva Mandir. The intervention was a combined effort of the local farmers and the field workers from Seva Mandir. Like the elders, the resource persons received an exposure that gave them insight into various sustainable agricultural practices.

“In the old days, our ancestors used to clear a small portion of land in the forest, set fire to the debris and sow the seeds. These crops do not need a lot of fertilizers and water to mature.”

- Ram Singh
(Son of Ratan Singh, Birothi Village)



Many older women in the villages, especially single women, cultivated these millets. Such women became an important part of this project; they knew the process of cultivating millets and also that of including these crops in their diets.

“We started growing wheat and maize only in the recent years, nobody is buying these millets (Chota Anaj) anymore in the mandi. If we get the right buyers and seeds are provided, we would of course include it in our cultivation.”

Wife of Basantlal Ji (GVC [19] President, Kot Village)



Connecting with women in the identified villages through SHG meetings, which included discussions about nutritional benefits of the crop, helped gauge the readiness of the community towards millet adoption in a much more holistic way.

“The farmers want to do Maal and Samlai for the coming season. Cheena needs more water retention and Dharwan requires a different kind of land. Besides, people are enjoying the rotis made with Maal; Cheena rotis don’t taste as good.”

Leela Bai (Krishi Paraworker, Dharwan Village)

During the time of the pilot, Cheena (Proso millet) was the crop that could be cultivated in the season. Although Proso millet was not readily accepted in Dharwan and Lathuni due to the topography. Despite its unfavorable taste it had a higher nutritional value which could be leveraged for market linkages.



“I had heard about various millet when I was 12, this was 30 years ago. We used to cook them at home and consume them in the form of roti's or boiled as rice. The millets we had then were various, Kuri, Batti, Samlai, Cheena, Maal, Kodra, etc.”

- Leela Bai

(Krishi Paraworker, Dharawan Village)

The traditional recipes with millets include *Khichdi* and *Rabri*, which are highly nutritious but have a short shelf life. Value addition to these millets is not done in the community. A demonstration to cook unleavened bread from Finger millet was done to provide some knowledge into processing the grain.

The intervention with millets has now increased to include 400 farmers in Jhadol Block. There is a growing interest in their cultivation due to the potential market value of the processed grain as well as the products derived from them. With the plan of bringing millets back into local diets, Balwadis too may include millet based recipes for children as a way to tackle malnutrition. In the next phase one envisages a formal large scale framework for market access with 1000 farmers, with aggregation centers, and spaces for processing, grading and packing.

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Are forests net sources or sinks of carbon?

Mridula Chari

As mentioned in the last issue of *Leaf Litter*, the Central government is pushing for afforestation and reforestation across the country, through indirect tax benefits to states, known as ecological fiscal transfers. These transfers, routed through the Finance Commission, will incentivise states to fulfil targets mentioned in India's forest policy and in the Green India Mission, which aims to sequester carbon.

But before states undertake plantations with the aim of carbon sequestration in mind, do they know how much carbon forests actually sequester?

Conventional understanding suggests that all trees are net absorbers of carbon due to the natural process of photosynthesis. However, a recently published set of research articles in *Current Science* suggests that this is more complicated than it seems.

This surprising study, led by retired IITM scientist Supriyo Chakraborty as a part of a larger Metflux India project, shows that the Kaziranga forest in Assam is a net emitter of carbon, largely due to decomposing soil organic matter from deposits left by the Brahmaputra river. The study was conducted over 2016 to 2018. The researchers collected eddy covariance (a micrometeorological method to observe the exchanges of gas, energy and momentum between ecosystems and the atmosphere) data from a flux tower established in the Kaziranga forest, which measured the net carbon emissions and uptake over the period of a year. It found that over the course of a year, the Kaziranga ecosystem released more carbon than it absorbed from the atmosphere. These are relatively small variations and not comparable to, say, emissions from thermal power plants. Even so, it

upends the understanding of forests as net carbon sinks.

Meanwhile, another study that collected data from a similar flux tower in a teak plantation in Betul in Madhya Pradesh found that that plantation was a net carbon sink and absorbed more carbon than it released. The problem lies in studying the phenotype of individual species versus entire forest regions. Climate change scientists need to instead research the carbon sequestration potential of entire forest ecosystems, not just of individual species of trees, the studies suggest.

Worldwide pattern

Across the world, researchers are beginning to understand that forests in tropical regions might be transforming into net carbon sources, instead of net carbon sinks, due to the effects of climate change.

Globally, politicians have suggested that carbon credits are the answer to high carbon emissions by industries across the world. In this view, polluting countries and industries can purchase credits to offset the carbon that they emit. These credits often represent mass reforestation and afforestation efforts, particularly in the Global South.

But it is extremely limited to view forests merely as a means to sequester carbon. For instance, a 2021 study in *Nature* shows that due to deforestation and other human activities, the Brazilian Amazon is now a net emitter of carbon annually. This view does not account for the numerous ecological, biological and social benefits of the Amazon forest and instead should be a comment on destructive activities such as industrial-scale logging.

In the case of India, these studies might lead one to conclude that teak plantations are “better” than the natural ecosystem of the Kaziranga forest. However, these same plantations do not support rich and varied biodiversity that old growth forests do. These studies also cannot be generalised to larger ecosystems. Scientists have not yet studied the carbon sequestration potential of mixed forests in central India, which would provide a more apt comparison point to Kaziranga.

In the push to implement the Green India Mission and to open up the carbon market to international players, it is vital that India should take a more nuanced view of the role of forest ecosystems and collect more localised data from sites across the country.

Mridula Chari is an independent researcher and journalist.

Indigenous peoples dignity and livelihoods: working with the law

Pravat Kumar Misra

Balanced growth and economic development are the ultimate aim of every country, and Strategic Plans (5-year plans as in the case of India) are designed accordingly. Even after 25 years of Independence, and the successful completion of four five year and three annual plans, policy makers realized that the Scheduled Tribes are still way behind in the mainstream development process. In addition, progressive and protective legislation, like the Forest Rights Act (FRA), the Panchayat Extension for Scheduled Areas Act (PESA), along with many Central and State schemes and programmes, designed for the overall development of the economy, hardly impacted the tribal peoples' status. Nor did the benefit of welfare schemes percolate towards the development of the tribal population in a significant manner.

In order to solve the problems facing tribal development the Tribal Sub-Plan was initiated during the Fifth Five Year Plan; the Panchayat Extension to Scheduled Areas Act, 1996, and the Scheduled Tribes and Other Traditional Forest Dwellers Forest Rights Act, 2006, followed. India as a whole has a tribal population of 8.6%, whereas Odisha has a population of 22.85%. The tribal development effort was revamped and invigorated to fulfil the constitutional mandates of ensuring better quality of life for these peoples. However, even after 40 years the Human Development Indices (HDI) of tribal peoples are the lowest in Odisha.



The basic objective of Tribal Sub-Plan, the PESA and the FRA is to empower the tribal people through accessing and exercising their rights over the natural resources, thereby strengthening their livelihoods. The Tribal Sub-Plan is meant to channelise the flow of outlays and benefits from the general sectors in the Central Ministries/Departments for the development of Scheduled Castes and Scheduled Tribes, in proportion to their population and in physical and financial terms. The PESA is to strengthen self-governance and the FRA recognizes tribal rights over the forest and its resources. Overall, livelihoods are central and key to all the three acts and provisions. However, we observe that the Ministries/Departments have not earmarked adequate funds for TSP in proportion to the tribal population; neither is the implementation of the PESA taken seriously and attempts are being made to dilute the FRA. In order to overcome these policy and operational challenges the Gramsabha has to play the pivotal role.

Role of Gramsabha:

The empowerment of the Gramsabha, the Gramsabha Sashaktikaran, is the first step in bringing Tribal Self Rule to PESA areas, and to exercise control over the natural resources for sustainable livelihoods. The Gramsabha, or village assembly, has to take decisions with regard to the protection, conservation and management of the natural resources. The Forest Rights Committees and other village institutions functioning within the village have to intimate and take approval from the Gramsabha with regard to their plans and programmes. The Gramsabha has to develop the CFR Management plan and may issue Transit Permits for the NTFPs that need to be transported within and outside the village boundary. Since the

Gramsabha is the basic unit consisting of the village community it is the legally competent authority. The functionaries and the village community should be aware of their roles and assert their rights for their socioeconomic development. Besides this the Gramsabha has the right to monitor all the government supported development activities. In case of land acquisition or establishment of any projects, the Free and Prior Informed Consent (FPIC) of the Gramsabha is obligatory. Above all, the Gramsabha may request the help of all line departments to extend support for livelihoods promotion.



Challenges facing tribal peoples

- **Land Alienation:** land acquisition by state agencies, by non-tribal people, or by non-tribal people marrying tribal women, leasing of tribal lands for contract farming, especially to cultivate lemongrass and maize; other forms of land alienation include land mortgaging, illegal leasing, and forceful acquisition of common property resources in PESA areas;
- **Habitat Rights of PTGs,** claiming Forest Rights within Protected Areas, the rights of the displaced communities, the conversion of forest villages into revenue villages, the lack of CFR management plans and programmes; the depletion of forest resources in most tribal areas affects livelihoods, as also the improper implementation of convergence programmes;
- **Massive diversion of TSP funds** for salaries, matching grants for centrally sponsored schemes, construction activities in non-TSP areas, and office expenses that do not directly benefit the tribal people is a violation of the guidelines of the Planning Commission;

- The sale of intoxicants by outsiders in PESA areas through government-run wine shops is a major cause of conflict and crimes, poverty and household discord in such areas;
- The lack of proper infrastructure and institutions for tribal development such as schools, Community Health Centres, irrigation facilities, drinking water, vocational training centres, etc., has resulted in low Human Development Index in the area;
- Exploitation by Sahukars, Contractors, Police, Forest guards, Micro-Finance Companies, even traditional community leaders, and their nexus to control the local market, agricultural and forest resources, are responsible for making poverty a permanent phenomenon in the area;
- The lack of political will, an improper governance system, the apathetic attitude of the government in dealing with tribal issues and concerns are the major factor fuelling naxalism, the conversion to Christianity, and precipitating divides within the tribal community;
- The improper implementation of government programmes (micro-projects, OTELP, MGNREGS, and Social Security Schemes) and lack of community participation in these programmes together causes them to fall short of their objectives;
- Migration, displacement, the loss of traditional food habits and culture, and the introduction of modern agriculture (hybrid seeds, fertilizers, pesticides) have made tribal people dependent on the market and prone to exploitation.

What should be done?

In spite of these issues and challenges, the opportunities for tribal development at individual, family, institutional and, above all, at the village level is visible. The Odisha Scheduled Area Transfer of Immovable Property resolution of 1956, the PESA Act 1996, the FRA 2006 are some of the legislations that have proved helpful. As far as funds are concerned, the Article 275(1) (The consolidated Fund of India) has adequate resources for tribal development. A coordinated effort among all the

concerned departments engaged with tribal development would do wonders.

Odisha has done a commendable job in recognizing and granting 4,50,000 Individual Forest Rights titles. However, the state is far behind on the Community Rights front. Recognition of the Community Rights and Community Forest Resource Rights under the framework of FRA should be expedited. This will strengthen the livelihoods option of the forest communities and help in a substantial reduction of poverty and un-employment; the convergence of government schemes and programmes will further help in this regard. The creation of productive assets in favour of Scheduled Tribes to sustain growth likely to accrue through development efforts needs to be harnessed. Efforts should be made by the Human Resource Development of the Scheduled Tribes by providing adequate educational and health services, and a transparent social audit through community monitoring.

Common Property Resources are very vital for the sustenance of the tribal people in Scheduled Areas. Such areas need protection from encroachment, especially by non-tribals and other vested interest groups. The Grampanchayat has the power to pass resolutions to reclaim any encroached lands; such areas can be cultivated by the poor people for their livelihood purposes, both individually or collectively.

NTFPs are a major livelihood resource for the tribal people. The FRA provides ownership rights over NTFPs to the community and the government has declared a Minimum Support Price (MSP) for 10 NTFPs, providing the tribal communities with an assured price through procurement agencies. However, the people must be oriented properly to maintain the FAQ so that TDCC can purchase and sell these goods effectively. NTFP Cooperatives can play a vital role in this field.

For the implementation of FRA, the expenditure incurred by the state government in Scheduled Areas is channelized through the Integrated Tribal Development Agencies (ITDAs), and in non-tribal areas through the District Rural Development Agencies (DRDAs). In Odisha, the government has spent very little of the budget, with little clarity about how the three departments that are involved declare

their expenses. It would have been better if the allocation is done from the TSP fund for the implementation of the FRA. In addition, the TSP funds are non-divertible and do not have a time-line, with the clear objective of bridging the gap in socio-economic development of the STs within a specified period. Unfortunately, the money earmarked for tribal development is spent in ways that make a mockery of the above objectives. Some of the major policy and operational issues in Odisha are:

- The TSP funds are diverted for other purposes, especially infrastructure development activities in non-TSP areas;
- Less than the TSP budget in the annual plans in proportion to the tribal population, thus violating the guideline;
- The government has no fixed or periodical survey with regard to the socioeconomic status of the tribal people in TSP areas; there is no perspective, no vision document that explains long term goals and outcomes;
- The Scheduled Caste and Schedule Tribe development department is spending less than what is ear-marked for various development purposes.

The TSP funds are allocated from the Consolidated Fund of India (Article 275(I)) which is a central sector scheme; this financial assistance is provided to the states through the nodal Ministry of Tribal Affairs. All revenues received, loans raised and funds received by the government in repayment of loans are credited to the Consolidated Fund of India and hence the communities and civil societies have a role to monitor it.

The major tribal friendly Acts (PESA and FRA) and their implementation and the expenses incurred by the institutions and departments may supplement and complement the TSP funds, programmes and schemes.

Recommendations:

- New guidelines should be developed taking account of the past experiences to guide the formulation of the next 12th five year TSP;
- The TSP programmes/schemes should be made transparent, with regular monitoring;

- Only schemes with direct benefit to individuals/families of tribal people should be included under the TSP;
- Priority should be given to basic services like primary education, health, drinking water, nutrition, rural housing, rural electrification and rural link roads;
- Wage components of rural employment schemes should not be included under the TSP;
- Schemes to develop agriculture and allied activities like animal husbandry, dairy development, vocational training, etc. that provide a source of livelihood to the ST population should be included;
- Innovative projects that draw upon institutional finance to supplement plan allocations may be drawn up.

The tribal legislatures, TAC members, Zilla Prishad and Panchayat Samiti members, along with the tribal community leaders, should proactively assert their rights. State governments should generate awareness among the general public about the schemes to be implemented/being implemented for the development of tribal people by their different departments through electronic and printed media. According to PM Narendra Modi, we should believe in more governance and less government, implying that people should come forward to own, and manage their affairs with the support of the government for better livelihoods and restoration of food security.

Pravat Kumar Mishra is an independent researcher in Bhubaneswar.

Shiratoki Collective Natural Farming

Kishore Moghe.

A unique model of collective natural farming by the Kolam Tribal community in Shiratoki village of Zari Jamni Block of Yavatmal district, Maharashtra.



Shiratoki Collective Natural Farming Initiative

30 farmers came together and pooled their total of 150 acres to carry out a collective natural farming initiative. All the farmers are from the Kolam tribal community and they decided to do the farming collectively.

The Gramin Samasya Mukti Trust (GSMT), founded by Dr. Kishor Moghe and his friends in early 1990s, to work with tribal and marginalized communities in Yavatmal district, has been engaged in the Blocks of Kelapur, Ralegaon, Maregaon, Ghatanji, Wani, and Zari Jamni. In Shiratoki, a small tribal hamlet of Bhimnala village of Zari Jamani, the effort has been on strengthening the Gramsabha, the pivot of development.

The GSMT facilitated the formation of the Gramsabha Mahasangh with Vasant Kumare as the President. This soft spoken Kolam community leader is from Shiratoki and when Dr Moghe spoke to him about the collective farming initiative, he said: “Let’s do it”.



Since then the GSMT have held a number of meetings. After the first meeting, Covid arrived and the idea was put on a back burner for some time. Again, towards the end of 2020 and beginning of 2021, the GSMT held a number of meetings with the community to answer their queries. All the while Vasant Kumare stood firm as a rock in his decision. The GSMT pursued the matter and Shri Hemant Singh Chouhan, the eminent natural farming expert, also chipped in.

So what does Shiratoki Community Natural Farming entail?

In Shiratoki this has meant that:

- 30 Kolam (ST/PVTG) farmers have pooled their land together for the collective farming of 150 acres;
- For the next ten years, these 30 families will not withdraw their land from the common pool;
- A farmer producer company has been formed to manage the farm and other related functions and accordingly, a Producer Company is functioning in this village;
- The farm design is based on the contour mapping and CCTs, the compartment bunding work is completed for soil and water conservation;
- A series of water bodies (7 big farm ponds, 7 open wells and 18 recharge pits) have been constructed across the farmland;
- Water is used and recycled through a combination of technologies;
- An Agricultural implement bank has been established in the village; this has a tractor, a mini tractor, rotavator, a cultivator and various other tools. These tools are mobilized through the Manav Vikas Mission

Department;

- A combination of crops including cereals, millets, vegetables, grass, horticulture, fodder trees, and a bamboo plantation of 10000 saplings have been sown in the land. The farmers have used non-GM seeds and other traditional seeds mobilized through local farmers;

- Cattle, poultry, goat rearing, etc., will be promoted as supplementary activities. All the produce will be stored in a warehouse, aggregated and processed before getting sold. Two members from each family will get two hundred days of assured wage employment. The company will use the profits of the sales to improve education, health care and sanitation in the village;

- No chemicals will be used on the farmland; no chemical fertilizers, no chemical pesticides.

We have never heard of such a model being implemented anywhere and this is therefore a challenge as well as a learning experience for tribal smallholders and therefore we very much hope that the farmers as well as the other inhabitants look forward to the results!!

Kishore Moghe is with the GSMT, Maharashtra

Fort Canning Park

Satheesh Muthu Gopal

On a cloudy evening, I saw an old woman speaking to a little tree in Fort Canning Park in Singapore. The information board in front of the tree drew my attention, and I began to read it. The lady turned to me and said: "I often come here and speak to this tree. In this place we had a huge Flame of the Forest tree. When it bloomed the entire area was beautiful. But the tree died in 2020. I used to talk to the tree. As it's no more, nowadays I'm talking to the offspring". She showed me some old photographs of the tree and she moved away.



The Flame of the Forest is native to Madagascar and this particular tree was endorsed as a heritage tree in Singapore. The government of Singapore declares some of the trees as "heritage trees", based on their girth as well as the botanical, social and cultural values. There are heritage trees over a hundred years old, and few of them are native to Singapore. Fort Canning is one of the places to find such heritage trees.

Fort Canning Park is a small hill surrounded by the sky scrapers to the south of Singapore city. One who enters the park can feel the ambience of the rainforest in a few minutes. Though the hill is well known for its natural aspect, it has a historical value too. This hill was the centre of the kingdom of Temasek in the 14th century and it became the centre for administration during the British period.

This park was constructed with a fort during the 1850s. When the rebellion broke out in 1857 in India, the Governor General of British territories in India, under the East India Company, was Lord Charles

John Canning. In 1958, the East India Company was dissolved and all the British territories, including Singapore, came directly under the British Crown. Lord Charles John Canning was appointed as the first Viceroy of India in 1958. Hence the British Government decided to name the park in Singapore 'Fort Canning'. Today there are hundreds of trees in the park that provide a good habitat for many bird species. To strengthen the spice trade, the British brought cocoa trees to Singapore. I saw a pair of Plainain Squirrels feeding on the fruit of the trees.



The Kapok Tree (*Ceiba pentandra*), native to tropical America, is one of the heritage trees in Fort Canning. The Malay word 'kapok' refers to the white fibre in which the seed is embedded. Old trees have large buttresses and the stem is usually covered with stout conical prickles. Another heritage tree well known by appearance is the Rain Tree (*Samanea saman*), also introduced to Singapore from the tropical Americas. The Rain Tree is called "Pukul Lima" in Malay, meaning 5 o'clock; the leaflets tend to fold up around that time in the evening. Similarly, the Indian Pitta (*Pitta brachyura*) is called "Arumanik kuruvi", meaning 6 o'clock bird in Tamil, as it calls around that time in the evening. These names surprised me as they referred to phenomena in other languages.



The Red Jungle fowl (*Gallus gallus*) is one of the common bird species and is found all around the park. They freely roam about, thanks to the local people who don't pose them any threat, and is a fine example of wildlife coexisting with humans. Similarly, the Asian Water Monitor (*Varanus salvator*) and the Clouded Monitors (*Varanus nebulosus*) are commonly seen in Singapore. I saw an Asian Water Monitor Lizard on a ficus tree. Unlike in urban areas, the Banyan (*Ficus benghalensis*) trees in this park are well protected, with the aerial roots touching the ground and forming strong woody props. Resident birds, like the Yellow-vented Bulbul (*Pycnonotus goiavier*), the Javan Myna (*Acridotheres javanicus*), and the Black-naped Oriole (*Oriolus chinensis*) are commonly seen in this tree.



The American tropics contributed two more heritage trees to the Park, the "Madras Thorn" (*Pithecellobium dulce*) and the "Earpod Tree" (*Enterolobium cyclocarpum*). The Pinkish pods of "Madras Thorn" are familiar to many Indians, who consume the sweet pulp during the season. The "Earpod Tree" also produces ear-shaped pods with a

sweet pulp, but this is mostly eaten by the wild animals and cattle.



During a walk I once saw a pair of Collared kingfishers (*Todiramphus chloris*) feeding their chicks nesting in an arboreal hole. Unlike most Kingfishers, the Collared kingfisher uses the holes in trees for nesting. They are commonly found in the coastal area of Southeast Asia. I also saw an Oriental Pied Hornbill (*Anthracoceros albirostris*) which also uses the holes for nesting. They coexist well in the urban area and it was really surprising to see them perching in high-rise buildings around the Fort Canning Park. The Park has a mural wall recreated in 14th-century Javanese style. This wall shows the socio-cultural significance of water from the 14th Century to the 19th Century. The hornbill was also depicted, beautifully carved on the wall, showing the historical and natural importance of the bird.

Satheesh Muthu Gopal is a wildlife enthusiast and a member of the PHCC.

On Nature Based Solutions & Gender Just Climate Solutions.

Snehlata Nath

Nature-based solutions to climate change, sometimes called “natural climate solutions,” involve conserving, restoring, or better managing ecosystems to remove carbon dioxide (CO₂) from the atmosphere. Examples include allowing forests to regrow, restoring coastal wetlands, and switching to restorative agricultural practices, such as cover crop rotation, that support healthy soils.

These ecosystems reduce climate change by capturing CO₂ from the air and sequestering it in plants, soils, and they provide a wide range of other important benefits, such as cleaner air and water, economic benefits, and increased biodiversity. These solutions can be for both natural and human landscapes. Taking them in turn, we have:

Natural Landscapes

- Forestry practices include planting new forests, allowing forests to regrow naturally where they have been cut down, improved forest management, fire prevention, etc.;
- Wetland-related practices focus on conserving and restoring peatlands and coastal wetlands, such as mangroves, salt marshes;
- Ocean-based practices include restoring seagrass meadows or growing kelp or shellfish to restore or expand marine ecosystems.

Human Scapes

- Restorative agriculture ranges from practices that build soil carbon, such as no-till agriculture and crop rotation;
- Agroforestry/Analog Forestry in farms;
- Grazing lands and improved livestock management;
- Green Cities.

The International Union for the Conservation of Nature (IUCN) and other institutions have worked on the Global Mitigation Potential by 2050. This is as follows:

- Prevent tropical forests degradation – 58-65%;
- Cropland and Agroforestry – 22-28%;
- Peatlands – 9-11%;
- Coastal wetlands, salt marshes and sea grass – 3-4%.

In an interesting study, the Kerala and Karnataka coast has been identified with peatlands in both offshore and on shore areas. The conservation of these is important for mitigation, as they constantly face a threat from ports and tourism infrastructure.



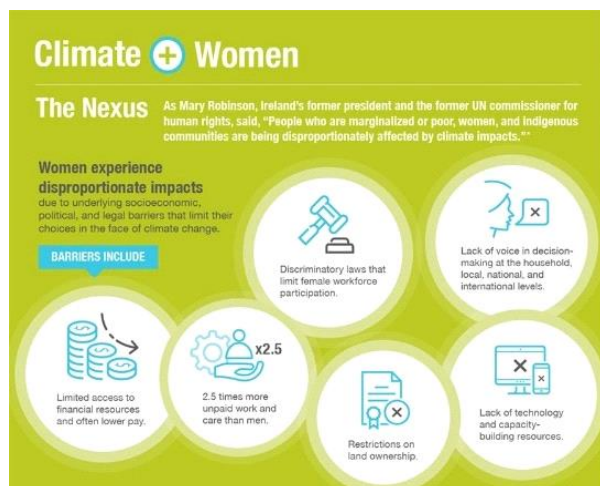
Other sectors with mitigation potential are:

- Waste management;
- Health & Education;
- Disaster risk management
- Financial stability;
- Insurance tools.

NBCS - Overall goal of building autonomy & resilience in both people and nature. Due to the differing gender roles, status and societal norms, women face the brunt of climate change more than men. In particular, in the impacts of climate change, women are both actors and victims. A look at the statistics shows that:

- Globally, women are responsible for 70% of water related chores;
- In India, 65% of the agriculture workforce is of women;
- Among forest gatherers, mostly women gather NTFPs, medicinal plants and firewood;
- 30% of the women in Asia use the forest for subsistence;
- Climate-related extreme events impact women as primary care givers;
- Relocation and migration increases the burden on women.

Given this, we must have Gender Just Climate Solutions, which will address the specific situation of women everywhere. These solutions usually have women as the main actors, fighting for justice, empowerment and equality. These could be actions taken by women, their collectives and youth groups to address climate change, increase adaptability, grassroots climate action that promotes gender equality and women empowerment. It may also be promoting more decision making and governance roles for women in various social groups/forums.



For many in the development sector, some of the relevant themes are:

* Women & Agriculture - Food gardens and food exchanges; native seeds and exchanges; cultivation of medicinal plants; agroforestry; soil and water conservation;

- Women & Water - spring, pond, well, river, wetland restoration and protection initiatives;
- Women & Forests - restoration of biodiversity & sustainable use of NTFPs; protection of grasslands, mangroves, nurseries and restoration;
- Women & Energy - improved cook-stoves, use of renewable energy, reducing fossil fuel use, and
- Women & Climate Information and Advocacy - secure access to communication, Information dissemination, amplifying voices, community radio and manuals, collective spaces for solidarity and capacity building.

With these concepts and issues coming to the forefront, it is important that NGO partners also learn to frame their work in climate change, climate justice and gender empowerment ways. NGO-partners must support women led initiatives, youth and women leadership amongst communities; and work in these new areas that address climate change, for example in energy, waste management and restoration.

This article is an adapted version of a ppt used in a training session

Snehlata Nath works at Keystone Foundation in Kotagiri, Tamil Nadu

The New and The Old come to an Agreement

Tariq Sayed Hassen

In the early hours of the morning, having driven through the night with two of my friends, I was flirting with the mental state of delirium when I caught my first glimpse of the 'Arc de Triomphe'. At first, I was under the impression that it was the lack of sleep that made this monument look so grand. Despite my familiarity with the concept of depth perception, having been accustomed to it since birth, I was still caught off guard by how unfathomably large the structure grew as we got closer to it. Unlike my friends who were sitting at the front of the car and kept busy navigating towards our accommodation, I found myself transfixed by the sight before me. My state of wonder lasted only a few seconds before we emerged onto the roundabout which had an unreasonable number of exits. From above it must have looked like a dart board with the Arc de Triomphe lying at its very centre. The clock on the dashboard spoke 4 AM, but the crowds of people outside yelled 4 PM. Such was my introduction to the capital of France; This was Paris.

I would only be doing two days in this city and so I made a mental note to myself to soak in as much of Paris as I could. After our arrival, my friends and I were at the point of the night, or should I say morning, where the urge to sleep had faded and been replaced by a mild frenzy. Incidentally, we found ourselves doing what anyone else in our position would have done. We went out for crepes. It was a short walk from my friend's house to the crepe stall but that didn't

stop us from coming across our fair share of interesting characters. On the cobbled streets were different groups of people sat on the ground engrossed in their own slurry conversations following yet another Saturday night out. One such group stopped us, announcing themselves to be the 'crepe police' before giggling themselves back into their shenanigans. Having had a teaser of what the upcoming two days would be like and inaugurated our arrival with crepes, we decided to get some rest before setting out bright and early at noon.

Cut to the Eiffel Tower. What they don't tell you about visiting public monuments is that you don't get a say in when you get to lay eyes on it. It chooses when it wants to see you, not the other way around. The moment you set you out for the day, you must be prepared to have the Eiffel Tower pounce into your line of vision. I'd always thought that if I were to ever see the Eiffel Tower, the Great Pyramids, the Colosseum or any other Wonder of the Earth that it would be on my terms. I had this image in my mind that for each of these, I would emerge from behind an obstacle of some sort, and the monuments would simply be there, standing large and tall, completely visible from top to bottom. I can now confidently say that was not the case. Unlike the Arc de Triomphe, I only noticed the Eiffel Tower in the corner of my eye as I stepped out of a grocery store. It was such a mundane moment for what I had hoped to be an awe-inspiring one. There it stood in the distance, sandwiched between a residential building and a boulevard lined with trees. It was beautiful but I was mad at myself for not having anticipated that moment, for not having been in the state of mind to appreciate it; for having been caught off guard. That was also when I realised that the Eiffel Tower did not care.

It was there to be seen, whether I was ready for it or not.



As we inched closer to the metal giant, I noticed that depending on the surrounding environment, the Eiffel tower moulded itself to fit the scenery accordingly. Along the boulevards it looked like a mighty fortress looming in the background, whereas in the backdrop of graffitied walls, it took the form of a rebellious art piece. In the pictures taken by other tourists, it played the role of a supporting character that would garner more likes on an Instagram post. Amidst other buildings, it stuck out like a sore thumb, as though it were the fossilised remains of a rocket. It occurred to me that although the Eiffel tower was but a single structure, it had many faces, all of which played a role in its overall presence.

I naively thought that I had finally had my fill of massive structures in Paris and that I would no longer be caught by surprise when it came to public monuments. That was when we stumbled across the Pantheon. It comes as a bit of a shock when one initially sets out for ramen but stumbles upon a 300 year old stone and marble building. This time however I was struck by an emotion other than awe. I found the scene standing before

me to be quite amusing and humorous. In front of me lay an establishment steeped in history with steps that led up to the entrance surrounding it. As to be expected, the square was filled with people, but what was unexpected was that everyone's backs were turned to the Pantheon. The midday sun was beating down on us and so people felt the need to sit and take a break or a breather. I found it incredibly entertaining to people-watch at this location. Firstly they would come in groups, pairs, or alone, then they would pull out their phones or cameras and have their pictures taken, before wobbling off to the shade and forgetting that the Pantheon was ever even there.

All of this to say that what has stuck with me since my time in Paris has been seeing the reconciliation between the people of the present with the world of the past. I saw thousands of phone cameras pointed in the direction of the Pantheon. I witnessed the Eiffel Tower shimmer with dazzling lights as the clocks signal a new hour. I was a part of the seemingly endless traffic that surrounds the Arc de Triomphe. The developments and advances of today add new lenses to the way we perceive the constructs of yesterday. Though the structures themselves have remained the same, the world around them has evolved. Yet they stand tall and watchful, bearing witness to the world that is moving on without them. As stone guardians that have supervised the city across different ages, I wonder what stories they would tell if they could speak.

Tariq Sayed Hassen is a graduate in media studies and current freelance writer

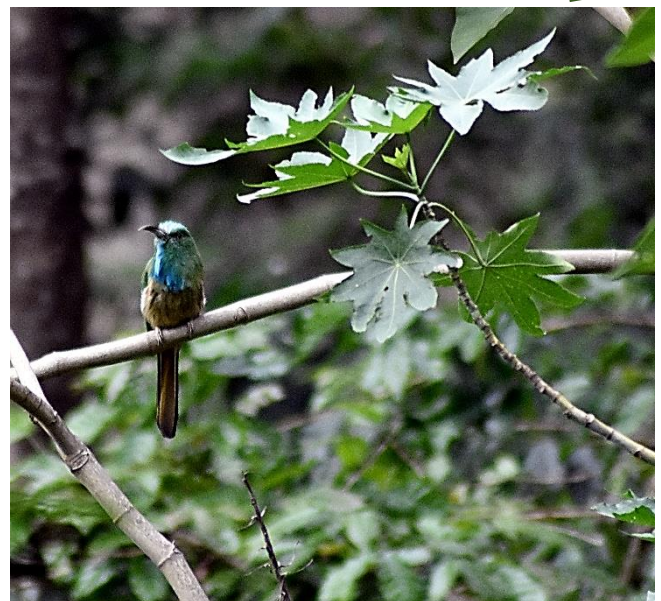
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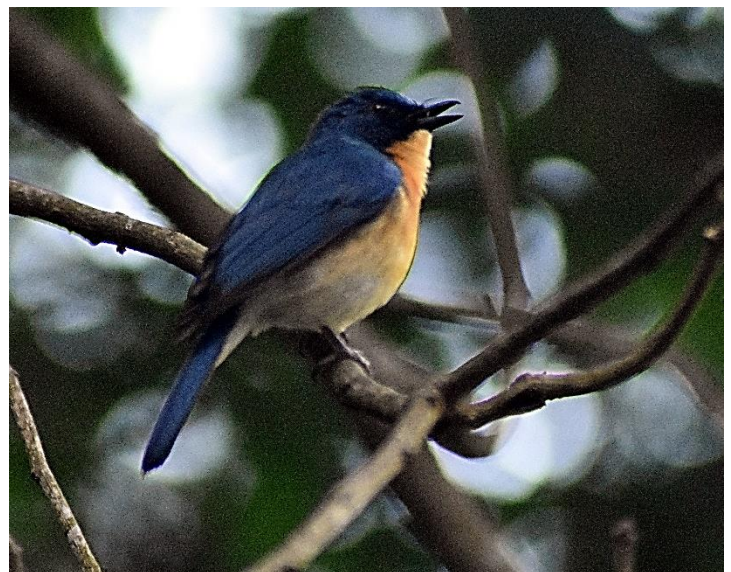
Scarlet Minivet
(*Pericrocotus flammeus*)



Blue-Beaded Bee-Eater
(*Nyctyornis athertoni*)



Common Hill-Myna
(*Gracula religiosa*)



Tickell's Blue-Flycatcher
(*Cyornis tickelliae*)



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