

FIELD FORESTER

VOICES FROM THE FIELD

VOLUME 1 • ISSUE 2

DECEMBER 2015



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Ministry of Environment, Forests and Climate Change

Government of India



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From the Chief Editor's Desk

The long felt need for a quality popular electronic journal in the area of field forestry is addressed through this humble initiative of the Directorate of Forest Education, Ministry of Environment Forests and Climate Change. The idea of such a publication arose during this year when the Directorate of Forest Education acutely sensed the absence of a set of good field forestry practices or well profiled role models in forestry sector or successful field stories which could be used for training purposes. The Ministry of Environment Forest and Climate Change had been highly supportive of the initiative.

The contributions towards the publication are aimed from two primary sources; from practicing foresters and officer trainees in various training institutions. The response to the first issue had been overwhelming especially from the officer trainees of the constituent institutions of the Directorate of Forest Education. State Forest Service (SFS) Officer Trainees and Forest Ranger Officer Trainees have both contributed liberally to this publication, through case studies conducted during the course of their induction training.

Articles on themes such as Eco-development, Wildlife conservation, Joint Forest Management, habitat ecology and a few inspiring success stories in wildlife and landscape restoration have been selected and brought to focus during the course of this publication.

There is a need to have stories from the field to satisfy the mandate of this initiative. The field experiences have to be shared with the younger community of foresters to enable cross learning and ensure replication of good practices across the country. Forest officers working in the field are encouraged to contribute their success stories and good practices and spotlight our multifaceted activities, highlight the good works and feature personalities and topics of general interests. We have to be more visible to the public eye. The Field Forester will enable the forest department and the public to be more aware and to have a better understanding of our comprehensive programmes and services.

I congratulate the Editorial Team for their hard work and enterprise in producing the inaugural issue of our electronic journal.



MP Singh

FORESTRY / TAMIL NADU

AN INNOVATIVE APPROACH TO GROW TALLER AND LESS BRANCHY TEAK TREES

Establishing windbreaks of casuarina on either side of teak trees row in boundary planting helps prevent stunted growth of teak and impacts on the branching pattern of teak by minimizing the desiccating effect of strong wind on terminal shoot growth.

C. BUVANESWARAN¹, P. MASILAMANI²
AND S.SENTHILKUMAR¹

Teach (*Tectona grandis* L. f.) trees when planted in boundaries or in farm bunds as a row planting often suffer stunted height growth and develop heavy branchiness on the apical region of the main stem. This stunted growth of teak has also been recorded in block plantations of teak grown in windy localities and on upper hill slopes exposed to strong wind forces. Research literature also indicates that teak is a light demanding species and thus tends to modify its crown characteristics to enable capturing of greater amount of sunlight. Therefore, when teak is grown on bunds or in boundaries of farmland, it produces profuse branches and in turn growth in height is limited and stem form is also bent and not straight. It has also been reported that strong wind is a deleterious factor for growth of teak. This stunted growth of teak is also

recorded in block plantations of teak grown in upper hill slopes exposed to strong wind forces. On the other hand, there are now fast growing branchy varieties (clones) in Casuarina which have been developed for windbreak agroforestry system. Taking into account these two facts, an innovative hypothetical model for cultivating teak in windbreak agroforestry system has been conceived. In this model, it is proposed that teak will be grown in the middle row of windbreak and on either side of the teak rows, branchy varieties (clones) in *Casuarina* will be planted to provide protection from desiccating wind and produce competition for light to teak. This competition will benefit teak for growing tall without much production of side branches. As described earlier, the expected benefits from this proposed Teak + *Casuarina* based windbreak agroforestry system is that it will produce teak with less branches.

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The Study

Casuarina equisetifolia X *Casuarina junghuhniana* hybrid clone was used to create windbreaks. The potential of this hybrid clone as a good species to be used for shelterbelt system in coastal tracts of Tamil Nadu has been established by State Forest Department. However, the potential of this clone for the use in windbreaks has not been fully explored for use in farmlands as windbreaks. Further, its branchy nature and fast growth were the criteria to select this hybrid clone for this study. This present attempt was made to use this hybrid clone in windbreak agroforestry system to study its effect on the growth and branching pattern of teak in the bund planting system.

In the study, 1.63 acres of agricultural fallow land was selected in Puthanampatti village, Musiri Taluk, Tiruchirappalli district of Tamil Nadu, India. The altitude here is 88 meters above mean sea level. Mean annual rainfall is 566 mm. Average minimum temperature ranges from 5°C to 16°C and average maximum temperature ranges from 8°C to 23°C.

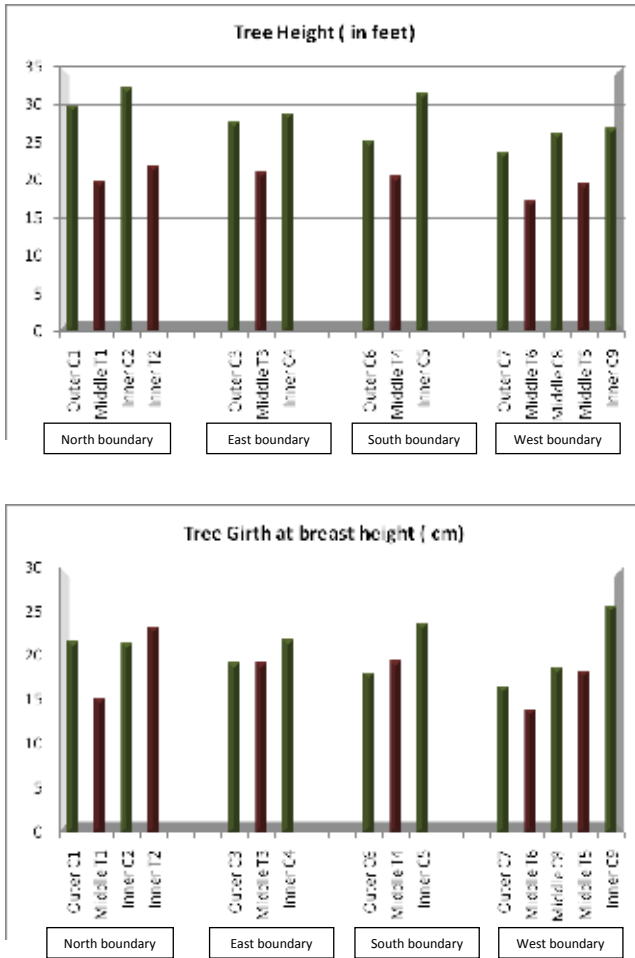
After land preparation by ploughing, three parallel channels at distance of 1 m were created all along the boundary. In the outer two channels, *Casuarina equisetifolia* X *Casuarina junghuhniana* hybrid clone were planted at 1 m spacing. In the middle channel, teak seedlings were planted at 2 m intervals. The planting was done during October 2011. Tree rows were irrigated during the first year at least once in a week. In the subsequent years, no separate irrigation was done for tree rows. The

trees benefited from the management practices followed for the agricultural crop inside the windbreak boundaries. Periodic cultural operations like weeding and soil working around trees were carried out twice a year.

Inside the field, two raised farm bunds were made running across the field, one bund from east to west and another bund from north to south. On either side of these farm bunds, 78 seedlings of *Moringa* (var. PKM1) were planted and interval between *Moringa* plants was 2 m. Inside the four blocks of the field, 90 coconut palm seedlings (var. tall x dwarf hybrid) were planted at a spacing of 7.62 m x 7.62 m. The interspaces between young coconut plants were used for cultivating various agricultural crops up to three years period. The intercrops grown were chilly (var. K2), tapioca (local variety), green gram (var. CO6), black gram (var. VBN4), onion (var. CO4), and pumpkin (var. CO1). The schematic diagram of the field is given in Figure 1.

Girth at breast height and total height of teak and *Casuarina* hybrid clone were measured row-wise in all the four directions of the boundary. Figure 2 presents mean height (feet) and girth (cm) of teak in boundary planting. Teak registered a mean height of 14.7 ± 0.97 feet (4.5 ± 0.3 m) and a mean girth of 13.8 ± 1.01 cm at the age of two years. At three years age, height and girth of teak in the boundary planting was 19.97 ± 0.64 feet (6.07 ± 0.19 m) and 20.7 ± 0.96 cm respectively. Thus, mean annual increment in height growth of teak was 2.02 m per year during the course of the study. Earlier studies on assessing

Figure 2: Growth of Casuarina and teak in inner, outer and middle rows in different directions of farm boundaries in Puthinampatty village in Trichy district of Tamil Nadu (Age of trees: 3 years)



favour growth in height of teak in bund planting system.

In the study, mean annual increment in girth was 6.9 cm per year (Figure 2). This increment falls within the range reported in earlier studies for teak in bund planting in a single row without

any windbreaks, wherein mean annual increments in girth was to the tune of 5.22, 5.26 and 7.25 cm per year at the age of 5, 9 and 12 years respectively. Slightly higher mean annual increment in girth (8.67 cm) for teak in boundary plantation on wheat fields has also

been reported.

While comparing growth of teak and growth of adjoining *Casuarina* rows in four directions of the farm boundary, it was observed that both girth and height growth of teak corresponded to the girth and height growth of *Casuarina* in adjoining rows as depicted in Figure 2. It clearly indicates that teak height growth is determined by height of protective barriers, particularly in windy localities, irrespective of edaphic and other management factors.

Conclusion

This new approach of growing teak trees along with *Casuarina* windbreaks favours better growth of height in teak, particularly in bund planting system and in windy localities. Self pruning of branches in teak tree in the mid of *Casuarina* windbreaks helps to produce clean boles of teak without knots which will fetch a good price. Further research on mixed planting of teak and *Casuarina* in large scale block plantations will pave a way for enhancing quantitative and qualitative production of teak wood in the country.

Plate 1: **Growth of teak in the middle row (Age: 3 years) with windbreaks of *Casuarina* in Puthinampatty village, Trichy district of Tamil Nadu**



Plate 2: **Growth of teak in the middle row (Age: 2 years) with windbreaks of Casuarina in Puthinampatty village, Trichy district of Tamil Nadu**



then functioned as trainers for transfer of technology to other villagers by motivation and regular contacts.

With the implementation of this new technique of sustainable harvesting of gum by ethofone injection, the gum yield from villages selected in Karzana range got a tremendous boost (Table 1).

With activation of JFM in these villages the migration of people for employment to other places has now stopped. With the practice of scientific method of gum extraction, the quality of the gum improved as

well as quantity. With the use of this technique the injuries caused to tree are also prevented, as small injections are inserted the life of tree has also improved. The problems of setting of fire, encroachment and illicit felling came down. The people also got more aware of the benefits of the trees. The quantity of gum collected on an average is about 50 kg per person and each kg fetches Rs. 250 in the market. It has thus helped improve the income of the tribal communities.

Village	Beneficiaries	JFMC	Yield(kg)	Amount Received
Devzari	28	Devzari	448	112000
Ghodachapar	19	Melane	295	73750
Jirayapada	36	Melane	628	157000
Karzane	38	Karzane	698	174500
Melane	50	Melane	1068	267000
Golapada	55	Melane	1626	406500
Barmali	132	Barmali	1302	325500
Devziri	10	Devziri	68	17000

AHMEDNAGAR, MAHARASHTRA

Leopard: Menace of over-population

With breeding of leopards and harvest of sugarcane coinciding, the man-animal conflict is increasing in the western part of Maharashtra

VISHAL K BORHADE

Ahmednagar district is a dry region, located at the foot of the Sahyadri Ranges of Western Ghats in Maharashtra. Though the area is dry, it wears a lush green cover due to enhanced irrigation facilities. The people in the region are hard-working and are employed through the year as livelihood opportunities are generated by cooperatives in the area. The farmers here cultivate sugarcane. India's first cooperative sugar mill was started here six decades ago. As the cooperatives expanded the areas of agriculture, it led to a loss in the forested areas. This disturbed the habitat of wild animals and gave rise to the menace of leopard attacks on villagers and their cattle.

The south-west part of the district is somewhat flat as compared to the northern part, which provides the terrain for leopards to breed and hide. The flat southern area has grasslands which provide home to the leopard's prey base. But, to reach there, the leopards have to pass through sugarcane farms. As they could get easy food in terms of cattle, goats and dogs and ample water to drink, which is never deficient in harsh days of summer, encouraged

them in due course of time to stay and settle in sugarcane fields. The leopard population also increased and this led to an increase in the number of cattle kills and attacks on villagers.

Further, the season of giving birth to cubs and the season of harvesting of the sugarcane crop – June to October – coincides. The leopards prefer moist and cool places among tall rows of sugarcane. During the harvesting of the sugarcane crop, the birthplace, and thereby leopard cubs, are often discovered by villagers and farm workers. During day, when the mother leopard goes out for the search of prey, these cubs are handed over to the local forest office. The absence of cubs provokes the mother to attack people in nearby areas. Numerous such cases of attacks by leopards are filed particularly during the harvest every year. This has become an area of major concern for the forest department. The forest department staff have to shift the cubs temporarily during the day, but, after sunset, they have to relocate them to the same farm from where they were rescued. This has now become a routine practice.

Incidents of attacks on people by leopards and the rescue of leopards

from villages has become very common her. Leopards that enter a village are rescued by the forest department and again released in their natural habitat. It is mandatory for the forest department to release the leopards in their natural habitat within 24 hours of their capture. The Ahmednagar forest division generally releases them in the dense forest area of Western Ghats, which is approximately 100 km away. The areas where they are released are at the periphery of Junnar Tehsil of Pune District. This has led to a repeat of the cycle of leopard attacks in this region too and the man-animal conflict is very common.

The issue of leopard ecology, when they live in agricultural landscapes, has been studied in detail by Vidya Athreya. Her study reveals that the leopard once released into a different area, travels back to its original habitat. This theory proves that all the efforts taken by the forest department are temporary in nature, neither ending nor controlling the menace. I understood this when I got the charge of Range Forest Officer of the Rahuri Range of Ahmednagar Forest Division, during my on-the-job training. From the first day of my charge, I encountered many cases of sighting of leopards, its cubs and cattle kill by leopards. Half of the energy of the staff of Rahuri Range was being wasted in the rescue and release of leopards. This is now one of the major problems in Western Maharashtra as the area is deprived of forested areas and the adjoining plain lands are sugarcane fields. Being a forester, I started to think of a solution to resolve this issue.

The key problem is the uncontrolled population of leopards. The Western Ghats in Maharashtra today do not have tigers due to many reasons, including, among others, habitat destruction, decreased prey base and reduction in forest area. On the contrary, the leopard, being very adaptive in nature, has moulded itself very well to existing conditions. The leopard here is at the apex of the food chain. Its adaptive nature has led to an increase in its population, but not in their prey base. The decreasing forest cover and degraded grasslands cannot support a large herbivore population. This has resulted in leopards roaming near villages in search of soft targets like cattle and dogs. This has also resulted in frequent attacks on small children and elderly people in the villages, even during the day. These incidences have soured the relations between the people and the forest department.

The view of the forest department is that people should accept the presence of wild animals and should take all necessary precautions. I too agree with this. However, these are just temporary measures. Also, taking necessary precautions imposes restrictions on the people and impacts their livelihoods. People have to go and tend to their farms; they can't stop their day-to-day activities.

Some of the permanent solutions could include prioritising the need for increasing forest cover and its quality, upgrading and expanding of grasslands and the creation of corridors for the easy movement of leopards from the northern part of Range towards the

southern part, where the prey base is ample. Another simple, but difficult to execute, option would be to control the leopard population based on the carrying capacity of the area. This could be achieved by sterilisation of the male and female leopards. However, leopard falls in the First Schedule of wildlife animals and any such decision will be a difficult one. However, it has precedence. In Shimla, sterilisations were carried out to check the menace of

macaques. It might just be the need of the hour to prevent the escalation in the conflict between humans and leopards in this area. This, of course, would require necessary amendments in the forest laws, especially in the Wildlife Protection Act (1972). These two options – increasing forest cover and controlling over-population of leopards – can certainly provide a permanent solution to this major problem in Western Maharashtra.

WILDLIFE

An encounter with Leopard rescue operation

The successful translocation of leopard from human habitat to its natural habitat without any undue incidence is itself a matter of pride

MAKRAND GUJAR¹ & U.G. VAVARE²

A few decades ago, Nashik city was just a small area surrounded by rich forest. But due to rapid urbanisation and rise in population, the city has been expanding by leaps and bounds. Areas hither to not traditionally considered part of the city have now become integral parts of it. Due to the expansion of the city, there has been a rise in man-animal conflict, especially with leopards.

This narrative is of an incident I witnessed during my OJT at West Nashik Division of Maharashtra. Upnagar is a suburb originally situated towards the west of Nashik city. It had many government establishments like the Artillery Training Centre and the India Security Press along with dense vegetation on one side. The sighting of wildlife was uncommon and restricted only to the people living in the nearby government colonies. But due to rapid industrialisation and population growth, Upnagar has now become the centre of the city and leopard sightings have increased, especially early morning, at places like Ashwini

Housing Society, DhobhiMala, Bhuvani Basti, etc.

On August 20, 2015, around 8.30 am in the morning, a distress call came from the police control room about a leopard sighting at a bungalow in Ashwini Housing Society on the Jai Bhavani road. After verification of the information, the wildlife rescue team was immediately called into operation. Meanwhile, the local forest staff went to the spot and did a recce of the situation. They immediately informed their superiors about the situation and were monitoring the movement of the leopard. The locality is densely populated, and includes a school and adjoins the Nashik-Pune highway. It was essential that the leopard be captured at the earliest given the circumstances.

In no time the news had spread and soon there was a huge crowd of people, school children and vehicles. The leopard was showing anxiety signs and it had roared many times, which created panic in the public and it was getting difficult to handle the crowd. The police officer present on the spot called for additional force to

¹ACF (OT), ²ACF, West Nashik Division (M.S), Maharashtra

control the mob and the entire area was cleared. Traffic was also closed between Upnagar and Jai Bhavani road, which brought the situation under control.

The wildlife rescue team arrived at the spot with all its equipment. The rescue team discussed the last sighting of the leopard with the house owner. Then V.D. Kamble, RFO, Prashant Khairnar, RFO(T) and S.P. Thorat, Forest Guard, went for closer inspection of the area from the terrace of a nearby house. Based on the inputs and minute sounds being made by the leopard, they were able to track it under the gap between a washing stone and the wall of the compound wall. The leopard had hidden itself in very small place. The distance between the terrace and the leopard was approximately 30-40 feet. The hindrance posed by vegetation, the compound wall and the fence made it impossible to undertake a tranquilising operation. However, after discussion, it seemed there was no other option to capture the animal.

In the meantime, the other members of the rescue team erected barricades around the bungalow to prevent the leopard from running here and there if it got aggressive during the tranquilization procedure. All other members were ready with protective gears like helmet, fibre board and sticks. A cage was also arranged for the translocation.

During discussion, it was decided to tranquilise the leopard from the servant quarter of the adjacent bungalow and arrangements were made for it. The back door of the servant quarter was opened

after some effort as it was not in use for a long time. Some of the members went to the terrace to monitor the movement of the leopard and gave information about its behaviour to the tranquilising team. The tranquilisation expert, S.P. Thorat, prepared three doses for the injection. In the meantime, the iron door of quarter was opened and through it, the leopard was clearly visible. The distance between Thorat and leopard was approximately 8-10 feet. Hence, it was decided to use the blow pipe for darting the animal. Thorat took permission from the RFO for darting the animal and after getting a positive nod, he blew the dart targeting the left thigh of the animal. The darting was successful with great accuracy in the first attempt itself and was confirmed by the members on the terrace. The leopard felt the injection, it roared and tried to take a big leap. As the dart hit the correct spot, it was unable to jump and sat instantly due to the impact of the chemicals. The tranquilisation was done at 10.15 am and around 10.30 am, members of the rescue team went near the leopard and pointed the snare towards it. There was no response from the leopard, confirming that it was unconscious.

After getting information about successful tranquilization, the forest staff, police and people led a sigh of relief and directions were given by U.G. Vavare, ACF, for further actions to transport the animal safely. Preliminary inspection revealed that the leopard was a male of approximately 1.5-2 years old, without any visible injuries. The animal was lifted immediately on

the stretcher and kept in the cage. It was transported to the Central Nursery for observation before release. The leopard came to consciousness at around 1 pm and was provided with food. Around 3 pm, the veterinary doctor checked the leopard and gave its approval for the release. The leopard was released at night in its natural habitat.

The successful translocation of leopard from human habitat to its natural habitat without any undue

incidence is itself a matter of pride. The efforts taken by all members of the rescue team and West Nashik forest division are laudable. Though such incidence of animal wanderings in the city area should not happened but it is becoming a reality due to the alarming decrease in forest cover. Hence, we must be ready to tackle such incidents. This incident opened my eyes to some of the challenges that lie ahead in my service.

JOINT FOREST MANAGEMENT

Managing the Forest as the Homestead – the Saga of Baripada

Starting with regeneration of the forest cover, the JFMC's work has expanded to include health, education, watershed development, farming, renewable energy, self-employment, and empowerment of women.

HEMANT YASHWANT SHEWALE

Baripada village was at some point blessed with a rich forest cover that extended to 445 hectares located in Sakri blocks of Dhule district, Maharashtra. However, in the 1980s, the local community was facing several problems. Illegal cutting of teak and removal of some other plants, mainly by outsiders, had begun to assume serious proportions. The hill near the village that had always been draped in green was turning into a barren, arid sand pile. This was worrisome for the villagers, who depended on the forests for their daily lives and livelihood. Besides drinking water, they also faced scarcity of firewood, fodder and other non-timber forest products (NTFPs). Agricultural productivity declined, poverty and unemployment increased leading to largescale distress migration involving as much as 70 per cent of the population. In the absence of other livelihood options, women had turned to liquor production as a source of secondary income. Liquor consumption led to social disquiet in the village.

The turnaround happened in 1991 when a group of youths led by Chaitram Pawar planted 3,000 eucalyptus saplings in the village commons, using their own money. Initially other villagers ridiculed them but when they saw the plants growing well, ridicule turned to respect. People were now receptive to ideas on conservation. Pawar mobilised the village community and urged them to act. He pointed out that if deforestation continued, their access to dry wood, fruits and other minor forest produce would get affected. His efforts were supported by the forest department and a local NGO called Vanvasi Kalyan Ashram. After repeated meetings involving all the villagers in 1993, it was decided to protect 445 hectares of the forest adjacent to Baripada. A Joint Forest Management Committee (JFMC) was formed in the same year.

All decisions are taken in the JFMC meetings and each member needs to be present for the meeting. In an interesting form of participatory management, the committee gives the responsibility of implementing certain decisions to

the person/people who are deemed as potential troublemakers. The decisions are then recorded in the meeting register and are declared as JFMC rules, which are then communicated to surrounding villages by public announcement in weekly *haats*. The JFMC has formulated several rules for protection of the forest and sustainable use of forest resources by the members. There are strict penalties for breaking the rules like a fine of Rs 1,001 for timber hauled by bullock carts and Rs 1,500 for cutting a green or living tree. Also, each family is required to contribute voluntary labour (*shramdan*) for all the conservation works.

Two elderly people from the village are appointed as watchmen. They are responsible for reporting any theft or rule breaking. Every family in the village contributes Rs 3 per month or grain equivalent to that amount towards the wages for the two watchmen. Each watchman receives Rs. 100 per month and the remaining amount is used by JFMC for social work.

Biodiversity outcomes: In 2004, a biodiversity register was created. The exercise is now repeated twice every three years. It registered 342 species of plants, natural forest vegetables, medicinal plants, fruits and flowers, birds and animals. Both floral and faunal biodiversity have improved since the conservation efforts began. Creepers and grasses that had all but been lost to grazing and fire have now made a comeback. At least 25-35 per cent of the plants have regenerated on their own. Certain species not seen earlier like *Caesalpinia crista*, *Acasia*

Notable changes in Baripada (1992-2014)

Issue	1992	2014
Chlorination of water	0	100 % in monsoon season
Alcoholism	90 %	10 %
Smoking	90 %	0 % from young generation
Vasectomy	4 %	50 %
Construction of latrines	0	14 Families
Change in Food habits	Roti, Dal, Rice & occasionally green vegetables	In addition Non-veg food, ghee & oil

catechu, *keli*, *godghot* and *yelangi* are also seen now. Endangered species like *Plumbago zelanica*, *Polyalthia longifolia*, *Curcuma oblonga*, *Gloriosa suporba* have increased in number. There are around 48 species of birds of which at least 4-5 are new. Peacocks that were not seen earlier are now abundant. There are 20 different species of animals in forest including leopards which are seen more frequently. The increase in the numbers of wild pigs has been remarkable. Importantly, ground water availability has increased up to 10 metres. The availability of grass/pasture has increased significantly. The construction of continuous contour trench (CCT) and farm levelling have prevented soil erosion.

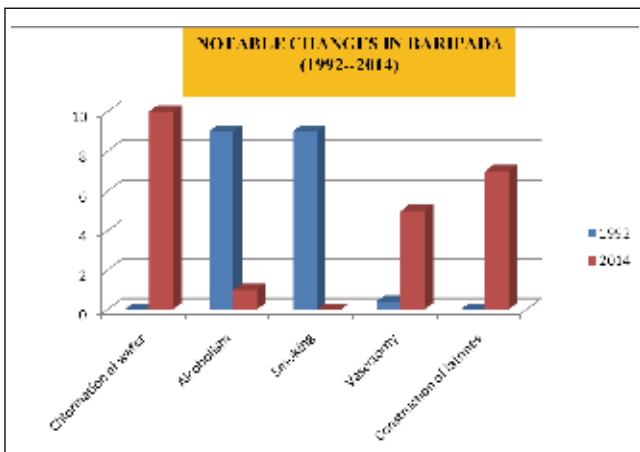
Improved well-being: Agriculture productivity has improved on account of improved water availability and improved soil moisture. Villagers are

growing a larger variety of crops than just paddy and black gram. Onion has become an important cash crop. Productivity of paddy, a staple crop in *Kharif* has increased 10 times since 1992 to 60 quintal per hectare while productivity of wheat, an irrigated *rabi* crop has increased by 50 per cent to 17 quintals per hectare.

Villagers have set up small businesses which were non-existent in 1992. Around 40 families are engaged in jaggery production. People have started bee farming and collection of lac (resin) from trees. The increased fodder production has brought about a tremendous change: Rs 200,000 worth of milk was sold by the villagers in 2014.

Food habits have changed with higher consumption seen now of green vegetables, pulses, animal proteins and ghee. Construction and use of latrines has increased. Distress migration and incidence of malnourishment has reduced significantly.

Starting with regeneration of the forest cover, the JFMC's work later expanded to include health, education, watershed development, farming, renewable energy, self-employment, and empowerment of women. Baripada village presents an impressive example of community based conservation. Initiated by a local youth with the support of the forest department and a local NGO, the conservation efforts helped in maintaining the receding forest line caused due to indiscriminate tree cutting or deforestation. The community's efforts not only cleared the way for other development activities, but also won accolades at national and international levels. The village community won the award in a competition on "Local Knowledge and Innovation of the Rural Poor" in the Asian region, organised by the International Fund for Agricultural Development, Rome, and SRISTI in 2003.



KODAIKANAL WILDLIFE SANCTUARY, TAMIL NADU

The restoration of pristine ecosystem

To check the menace of wattle on Mathikettan shola, the forest department has cleared wattle in 25 ha on an experimental basis during 2013-14

D RAMESHWARAN

Shola, derived from the Tamil word 'sholai', is located in the valleys and folds of the mountains so as to get themselves insulated from the frost. Sholas begin at the ranges from 1600-1800m in the Palani hills of Western Ghats in Tamil Nadu. The higher end of the range would constitute the more typical shola and this continues as the forest ascends to some 2500m. At this altitude, the trees are generally stunted with canopy formation never above 15m. The crowns, often supported by trunks of massive girth, are many branched, forming a very dense canopy and providing a moist, cool and shady interior that supports a rich micro flora of herbs, shrubs, ferns, mosses and epiphytes. Sholas are associated with extensive grasslands and together the two are considered as a single composite ecosystem.

Sholas are considered 'living fossils' for their sheer antiquity and virtual non-regeneration. Several prominent sholas are found in Kodaikanal Wildlife Sanctuary. But Mathikettan shola is one of the best in Kodaikanal Wild life Sanctuary of Tamil Nadu. It is spread in an area of 115.20 ha, in Amphill

Down Reserve Forest of Berijam range. The name, Mathikettan Shola, itself is curious as roughly translated from Tamil it means "Shola where one loses oneself". This shola plays a major role as primary watershed of Periyakulam town and Vaigai river basin and also as a shelter for leopards, wild dogs, elephants, sambar deer, Indian gaur, Nilgiri langur, etc. Numerous species of birds and butterflies are also found here. Flora of Mathikettan shola is one of the most valuable treasures of food chain, Endemism, in addition to being the terminal refuge for endangered species of *Syzygium* and *Elaeocarpus* species.

Nowadays, Mathikettan shoal, with its varied climatic and ecological conditions, has a large variety of species, some of which are indigenous and some exotic. These exotic species have been introduced from time-to-time and which have now become naturalised, such as *Acacia mearnsii*, *Acacia decurrense*, *Acacia dealbata*, *Eucalyptus globulus*, *Eucalyptus elata*, *Eucalyptus citriodora*, *Pinus patula*, *Pinus radiata*, *Pinus insularis*, *Alnus nephalensis* and a number of other miscellaneous species which suppressed the native vegetation. The current rate of development and



Shola ecosystem in Kodaikanal Wildlife Sanctuary

tourism too are playing an important role in the loss of plant bio-diversity.

The peripheral and open area of Mathikettan shola is completely encroached by wattle (*Acacia mearnsii*) and this has become a serious problem for the food chain, biodiversity and water. Wattle secretes some organic compounds which alter the soil pH and damage soil microbes and nutrients, affecting the growth of native vegetation and causing biodiversity imbalance. Also, wattle produce lot of pods through the year, hence the new seedlings continuously emerge and no one can stop the vigorous growth of wattle. As a result, fauna and flora of Mathikettan shola is decreasing periodically.

The forest department, therefore, has carried out clearing of wattle on an experimental basis in 25 ha of Kodaikanal Forest Division, under the Tamil Nadu Biodiversity Conservation and Greening Project (TBGP), during

the year 2013-14. Only those areas where the shola regeneration had been observed were taken up for clearing and restoration under the above scheme.

Under this scheme, wattle trees were felled. But, before felling, all trees in the identified areas were enumerated and their dimensions recorded. The side branches of the trees were removed and then the main tree was cut in steps, starting top down, in order to avoid damage to the regenerating shola saplings by the falling logs. The cut material were later stacked at site for quantity assessment for disposal as well as to allow the wild animals to move freely. The side branches, lops and tops and thin wattle saplings were collected and burnt to clear congestion and avoid fire hazard. In the subsequent year, all new wattle recruits and emergent secondary weeds were manually uprooted after rains. It is proposed to carry out this manual uprooting operation for at least four more years to

ensure that grass and shola species are established firmly in the area.

During my field visit to Mathikettan shola, I made a detailed study with the help of forest staff about the effectiveness of the above methodology. We observed that many native grass species were emerging in the wattle removed areas. As a result, wild animals like elephants, sambar deer and around 20 to 30 Indian gaurs were revisiting the area and there was also evidence of presence of tigers. Latest wildlife census is also supporting the presence

of tiger, based on its feeding behaviour and pugmarks. Following the success of this methodology, the same was included in the Draft Management Plan for Kodaikanal Wildlife Sanctuary and the proposal was also sent to the government for approval of largescale removal of wattle. Once the government approves the proposal, it will help to allow shola and grassland ecosystem to function as the life supporting system for wildlife and for the well-being of mankind in the near future.

MAWPHLANG SACRED GROVE, MEGHALAYA

Sacred groves

There is an urgent need to apply forest management strategies to preserve the sacred groves in the country

PRADIP EKNATH PATIL

Our East India tour started on September 11, 2014. The programme was to visit different forests of East India and study the aspects of forestry management. As per the scheduled programme, we – a batch of 39 officer trainee from SFS batch 2014-16 CASFOS, Dehradun – visited number of well-known and better managed forest areas like Bhitarkanika National Park, Sundarban Tiger Reserve, Himalayan Zoological Park, Kaziranga National Park and Eagle Nest Wildlife Sanctuary. But the place that impacted me the most was the Mawphlang Sacred Grove.

One of the most remarkable features of the Khasi Hills is its sacred forests. Early in the morning, on September 30, we visited the famous Mawphlang Sacred Grove there. It was just 25 km away from Shillong, the capital city of Meghalaya, and it was an hour-long journey. Two villagers, who were local community representatives, welcomed us and took us to the sacred grove. The forest, in 75 ha, was community owned and protected by them since last 500-600 years. Such a long history of forest protection surprised us. After

discussions with the local people, we came to know that in that forest you cannot cut any trees or branches. “If someone did so, illness and misfortune will befall on him or her.”

About 400 plant species and large number of wild animals are present in the Mawphlang Sacred Grove, indicating its richness in biodiversity. One can easily observe the ground well covered with a thick cushion of humus accumulated over a long period. It has survived for many hundred years and today acts as a reservoir of biodiversity, harbouring many plants and animal species as a patch of relatively undisturbed forest. The great efforts taken by local people of this area are appreciable. Such sacred groves are preserved by natives in North-East India since centuries as a part of their religious beliefs. Sacred grove gives the message of control over greed of humans and protection of forest for the well-being of all.

We, the foresters, need to have such spiritual attachment with our forest. The presence of human beings on our planet has become possible only because of trees. Each person should take a lesson from such communities and their tradition to save nature.

SFS 2014-16, CASFOS Dehradun

In India, sacred groves are found all over the country, especially in the regions inhabited by indigenous people. Although there has been no comprehensive surveys carried out in the country, approximately 13,720 sacred groves have been documented. Such groves are commonly found in the Western Ghats in the states of Maharashtra, Kerala, Karnataka and Tamil Nadu. In North-East India, most of the sacred groves have been recorded from Arunachal Pradesh, Meghalaya and Manipur.

After our visit to the Mawphlang Sacred Grove, we had a discussion on the management of forest in the grove. Is there any need to intervene in the management of sacred groves? This is debatable. Most of us suggested keeping the forest undisturbed as forest

can take its own care. But, when I read in the newspaper about the decline in the health of sacred groves of in the Western Ghats, in Maharashtra, I was surprised. Why it is happening? Why, without touching the forest, its health declines. Yes, it is true that nature takes its own care, but our intervention to protect the forest is the need of time. If we divide threats to forest in terms of 'threats from outside' and 'threats from inside', the most serious ones are from outside. To overcome it, we need to modify our management strategies. This is the reason for the need to intervene in the management of sacred groves. Detailed study and its implementation can definitely save the decline of sacred groves of our country. Sacred groves have a long history and we have to take steps to keep these treasures.

SATARA BHOSLE, MAHARASHTRA

The JFMC success story

A small village in Chandrapur District has joined hands with the forest department to set an example on joint forest management

NITESH S DEOGADE

The village Satara Bhosle, situated in Chandrapur District of Maharashtra, comes under Ballarshah range of central Chanda forest division in Chandrapur Circle. The village is 36 kms from Manora and under Pombhurna Taluka. It is a 100 per cent tribal village and most of the people belong to the Scheduled Tribe. The village has 71 families and a population of 310. Among them, 92 are male, 101 are female and 117 are children. Further, the number of literates is 143 and illiterates, 167. It means, the percentage of literacy is 46 per cent.

The total area of the village is 153.40 ha, out of which 148.48 ha is agricultural land. Of the remaining 4.92 ha, 2.96 ha is village land and 1.92 ha is protected forest. The headquarters of the forest guards is 2 km away and situated in the village Satara Komti.

Starting of Scheme

On October 25, 1998, Mr DV Zade, Forester, conducted a meeting of villagers of Satara Bhosale and explained the importance of Joint Forest Management as well as encouraged

them to establish the JFMC (Joint Forest Management Committee). After much persuasion and follow-up by the forester, the villagers established JFMC and elected the executive body on November 6, 1998. In the 11-member executive body, there is one chairman, one vice-chairman, four male members and three female members. Besides this, a forester is member-secretary and gram sevak of the gram panchayat is the member of the executive body.

The area of compartment number 441 is 323.750 ha, out of which 100 ha is handed over to the JFMC for protection purposes. The villagers decided to start the work of plantation in the rainy season of 1999. As preparation, in March 1999, the villagers dug 12,000 pits. The rate of pit digging was Rs 3.02 per pit, but the villagers gave this work to JFMC at the rate of Rs 1 per pit and on April 18, 1999, JFMC opened the account in bank and deposited Rs 12,000. From voluntary work time to time they deposited money in the bank account. From 1999, the JFMC conducted various projects like cement nala bund, loose boulder structure, Gabian structure, vermi-compost, children's park, DhanyakoshYojana, etc.

This committee was registered on June 4, 2000, under to the Maharashtra Society Registration Act 1860. The registration number of this JFMC is Maharashtra/167/2000. Since 2005-06, the concerned village is included in the Forest Development Committee, Central Chanda Division, Chandrapur.

Conducted Project from 1999

Plantation: Plantation work was done in 1999 on 30 ha, in 2000 on 30 ha and in 2006, through Forest Development Committee, on 36 ha. Presently, the plantation is very successful.

Soil moisture conservation: Four cement nala bunds, 34 loose boulder structures as well as 9 loose boulder bunds were built in the wildlife week of 2010. Because of this work, soil erosion decreased visibly and according to the farmers, water level of their farm wells increased.

Vermi-compost production: Villagers used vermi-compost for organic farming and collected Rs 10,000 by selling surplus vermi-compost.

Investment: In the saving account of JFMC, balance amount is Rs 81,405. On November 30, 2004, they deposited Rs 63,375 as fixed deposit. After addition of interest, the total amount of fixed deposit on November 30, 2009, is Rs 78,620. Again, they put the same amount in fixed deposit.

Self Help Group: In the village, seven women SHG and one men SHG is working. They took Rs 40,000 as debt and invested in various shares.

Water holes: The villagers constructed one water hole in the nearby forest which retains water throughout

the year and is very useful for wildlife. For such a wonderful work, they were awarded the first prize on district level of Rs 51,000. From this amount, they deepened water holes in the vicinity of the forest area through voluntary work.

Others: In the village, prohibition of grazing and illicit cutting, drinking of alcohol and the work of cleaning the village is still going on. Through voluntary work, they completed road construction. They have also established in the village a children park, library, etc.

Work done under the guidance the forest department

The JFMC has conducted various schemes in the village by collaborating with various government departments.

- a) The Project Office distributed solar lamps and smokeless *chulhas* to 63 beneficiaries.
- b) Established Chilly Grinder Machine on 100 per cent subsidy.
- c) From the Fishery department, fishing nets worth Rs10,000 were distributed.
- d) Fishing in the village area is not auctioned to other people. They do fishing on their own by using JFM funds. Through this work, they are getting employment worth Rs 60,000 per year.
- e) Distribution of free bicycles to schoolchildren.
- f) Beside this, JFMC is helping in making roads in village, and on water holes, grinding machines, ration facilities, library, etc.
- g) Through the National Samvikas

Scheme, villagers have constructed a storehouse for seed grain.

h) Through the scheme of JALSWARAJ, the work of water supply is going on.

Social Attachment: On December 9, 1999, they sent 400 kg grass to Orissa to help the storm-affected people.

Protection Work: In groups of 8-9, villagers regularly patrol the forest area. So, it is possible to control illicit cutting and illicit grazing. Every year, they make fire-line in and around the forest area and this has decreased the chances of forest fire.

Condition of forest area handed

over to JFMC: On February 26, 2009, they made two plots of 20x20 m and counted the trees and found in good condition as compared to the past.

Conclusion

The concerned area is thus protected by the JFMC. So, the chances of forest fire are rare now. Also, because of controlled grazing, natural regeneration is good. In 2009-10, the village was awarded through the Sant Tukaram Van Gram Scheme. At the district level, the village was selected for the first prize of Rs 51,000 and at the State level, the second prize of Rs 5,00,000.

CHHATTISGARH

Success story of Hazra Falls

With the help of JFMC, this naxal-impacted region has turned the corner and many tourists are visiting the place

NITIN C GONDANE

The Hazra Fall is renowned for its beauty and is a valuable source for local irrigation, thereby managing the balance between recreational and commercial uses. The fall is located in beautiful sylvan setting that straddles the border between Maharashtra and Chhattisgarh, more specifically between Salekasa and Dongargarh. Hazra Fall is source of inspiration for explorers, travellers, filmmakers, residents, villagers, birdwatchers, conservationists, etc. The forest department, Gondia division, has started development of the fall and its surrounding and bringing the fall to the attention of people. During the last three years, tourism became popular due to the efforts of the Gondia forest division. With increase in railroad traffic, fall has drawn attention

of many tourists and explorers.

The area is dominated by the tribal community of 'Gonds'. There is no other source of employment here other than farming, which is totally based on monsoon rains. Till three years ago, there was hardly any tourism in the region and due to lack of attention the fall was suffering from blockage and was under the threat of extinction because of inaccessibility and poor conservation efforts. The local community was facing many problems in meeting their daily needs because of lack of employment opportunities and poor industrialization. Also, nature's fury had put the farming community under debt, forcing them towards naxalism.

After understanding these problems, Gondia forest department started developing Hazra fall as a



tourist place, keeping a dual view in mind – conservation and solving the unemployment problem of villagers thereby reducing the influence of naxals in the area. To achieve this, there was a need to gather the people on a single platform. Hence, the work began with the formation of a Joint Forest Management Committee (JFMC) of villagers and the department started to run many schemes through JFMC.

The members of the committee were selected from people from the village Navatola. The first major task was construction of a road and it was done with the efforts of villagers through 'shramdan'. Following this, cleaning and beautification work, creation of tourist facilities, recreation and promotion was done with the combine efforts of the JFMC and the Gondia Forest Division. For better management, the department trained youngsters of the committee in different fields like water sports, mountaineering, hospitality, crowd handling, etc. The outcome of the project is that people started visiting Hazra Fall. Nearly 200-300 tourists visit the fall on a week day while on Saturday and Sundays the number rises to nearly 600-700. They enjoy and praise the efforts made by the Gondia division in the development and promotion of the fall.

The major outcomes of the project include:

- 1) People started earning Rs 5,000-6,000 per month.
- 2) JFMC started getting good revenue from tourism of Hazra Fall.
- 3) 50 per cent revenue is spent on the development of the village.
- 4) 50 per cent revenue is spent on the salary of JFMC workers.
- 5) It started attracting attention of tourists from all over Maharashtra.
- 6) Many organisations came forward and started contributing for development by providing monetary and other help.
- 7) Many people joined hands to provide and share technologies for further improvements.

Future Prospects

- 1) Setting up of a zip-line for the bird's eye-view of the Hazra Fall.
- 2) Setting up of a cafeteria for tourists.
- 3) Creation of a souvenir shop.
- 4) Providing a trekking route and camping facility for interested tourists.
- 5) Promotion of locally available food.
- 6) Promotion of tribal culture.
- 7) Providing life cover to all JFMC members and also providing area insurance for tourists.

After the necessary development, the tourism department is planning to fully handover Hazra Fall to the JFMC so that they can start earning more revenue through it.

JOINT FOREST MANAGEMENT

Case study on Vachathi incident

*It is important to involve local people in the process of forest conservation.
And this is only possible when their basic needs are met*

PRIYADARSHINI V

The article is based on a village, Vachathi, dominated by under-developed section of the society. The main aim of this article is to understand the importance of development of forest fringe village and importance of coordination between the forest and line departments against a forest crime. The incident focuses on how a forest crime may turn into a communal clash and later on into an “Atrocities Act” if there is no proper coordination between the judiciary and executive and also if no rapport exists between the common people and bureaucrats.

Background of the case

Vachathi is a village located in Harur Taluk, Dharmapuri district, Tamil Nadu. The people in the village are so poor that they depend upon the forest for their basic needs. There was hardly any development activities undertaken and hence most of the people were involved in any activity (like poaching and smuggling) that fetches money to them.

A day before the fateful day (June 20, 1992), forest officials were informed that some of the people in

that particular village were actively involved in smuggling of sandalwood procured illegally from Chitteri hill region. During that time, the problem of sandalwood smuggling had become a menace to the forest department and also a cause of concern for the Government of Tamil Nadu. Based on the information received, few of the forest staffs went to the village for interrogation in the pretext of nabbing the offenders. The villagers, who were mostly tribals and Dalits, got aware of the motives and resisted them from entering into their hamlet. The staff looking for the smugglers were assaulted by the villagers. One of the injured staff member informed the incident to the authority concerned (DFO). A high level meeting was organised among the administrators of the district and hence a Special Squad, comprising of personnel from the forest department (155), police (108) and revenue (6), was formed to tackle the anti-social elements. The special force raided the entire village and seized sandalwood logs kept hidden in their houses. The raid continued for two days. During the operation, the property of the villagers was damaged, valuables were looted and those who resisted the raid

operation were thrashed and assaulted.

After the incident, the villagers gathered at a common place and discussed their losses. They approached the local police to lodge a complaint against the raid. Since the raid was conducted with due instructions from the high level committee, the complaint was not accepted. Annoyed by the response, the villagers, along with the help of local supporters, lodged a complaint against the misuse of power. Subsequently, writ was filed in High court as well as in the Supreme Court. At this point of time, the "Forest offence" turned to the case of "crime against SC & ST atrocities Act".

The case was investigated by CBI and the trial was held at Dharmapuri Principal District Court. After the prolonged trial, all the 269 accused involved in the special operation (including top administrators of the concerned departments) were found guilty and sentenced on September 29, 2011. Of the 269 accused, 54 died during the trial. Of the remaining 215, 126 belonged to forest department, 84 were policemen and five were revenue officials.

Learnings from the incident

The incident is an eye opener for every administrator, irrespective of the department. The incident clearly shows that the neglect of any section of the society will lead the people towards illegal activities, which ultimately put any administration in trouble.

The incident would not have occurred if the people of the village have had a better socio-economic status, not

deprived of any development measures; was aware of their natural resources and their responsibility in preserving and conserving it; and, essentially had a good relationship with the government officials. The failure of all these might have resulted in forest crime – illegal smuggling of sandalwood – which later led to this incident, which is a black mark in the history of the management of that area.

While dealing with the forest offence, consultation with legal experts may be more helpful. A proper analysis about the nature and the extent of the offence and also about the offenders has to be done. Before making any decisions, the possible outcomes of the decision have to be discussed thoroughly. When there is a strong reason for organising a joint operation, the plan of action, right from selection of staff (inclusion of female staff and representatives of all community) to execution of operation, has to be formulated systematically and cautiously. Clear instructions regarding the approach and use of power has to be provided for all the staff engaged in such operations. The execution of the plan should be more transparent and properly recorded.

From the judgement of the Vachathi case, it was clear that sanction of prosecution (Section 197 of CrPC) from the concerned authority is essential and mandatory for investigating any government servants. But in this case, the complaint was lodged as 'police excesses' and hence prosecution sanction was not obtained by the CBI. Since this case is sensitive, CrPC Section 164 was applied on all the

accused, some who had not even participated in the incident but were convicted.

Suggestions to avoid similar incidents

After this incident, the responsibility of these departments has been increased. The forest department has to take steps to create awareness among the people (especially among those living at forest fringes and also those in places situated around highly valuable species, both flora and fauna). Special camps have to be conducted periodically to educate them about the existence and significance of forests and forest products, Forest Act and Rules, Forest Rights Act, etc.

Conservation and protection of

forests can be done better only with the involvement of local people. The support of local people can be expected only when they are socially, economically and ecologically empowered. Once their basic needs are fulfilled, the over-exploitation of natural resources can be controlled. The employment opportunity in the forest department viz., in plantation works, as protection squads, as eco-tourism guides, etc., can change the forest offender into a guardian of forest. Participatory approach – involving local people along with the forest and line departments – can be effective in protecting and managing the natural resources. It also develops a good rapport between the people and administrators, which is very essential for good administration.

FORESTRY

Forest Food Festival: A successful example of biodiversity conservation

Forest Food Festival in Rourkela went a long way in improving livelihoods of the forest-dependent community by bettering forest health

VINOD KUMAR

Forests are intrinsically linked to tribal livelihoods and tribal heritage. The lifestyles in tribal hamlets of Odisha are synonymous with nature friendliness. Since time immemorial, the culinary habits of tribal populations have been heavily inspired from nature and are largely based on forest species. In today's context, with the fast depleting natural resources and growing population, there is a tremendous awareness on forest conservation. The focus of forest conservation has been refreshingly on biological diversity in recent times. Biological Diversity Act, 2002 had been a huge fillip in this direction; the preamble of which enunciates "An Act to provide for conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto".

Biodiversity links forest conservation to tribal livelihoods in a big way. Foods from forests play an important role in meeting food and nutritional security, very strongly during off - seasons and

drought years. Forest food cuisines form a part of the rich tribal heritage, being ingredients of the traditions, celebrations and festivals. Thus, conservation strategies can utilise this opportunity by focussing on forest cuisines and highlighting the role of biodiversity thereby benefitting communities, traditional knowledge as well as biodiversity conservation. Forest Food Festival is an innovative concept practiced in Maharashtra and was proposed in Odisha as part of the initiatives of Odisha Forestry Sector Development Project (OFSDP) with intent that it will 'inter alia' provide an insight into species of relevance for food security, and that traditional knowledge is being respected and getting documented.

Odisha Forestry Sector Development Project (OFSDP) is a project launched by Odisha state government with the support from Japan International Cooperation Agency (JICA). The major objective of the project is to restore degraded forests and improve the income level of villagers by promoting sustainable forest management, JFM and community/tribal development.

Conserving the biodiversity and improving livelihood of the people is one of the major thrusts of the project.

When forest protection is good and forest has improved, it is also a time to make assessment of its food value. Forest Food Festival would aim to improve livelihoods of forest dependent community by improving forest health. Participatory community collectively stand to gain from the decision to host the event.

Actions on these lines elsewhere in Maharashtra and Odisha have influenced community with introduction of under planting in their forests being protected. This has been experienced with JFM bodies in Rourkela Division in implementing Odisha Forestry Sector Development Project during revisit to micro plans and species to be included therein considered by the VSS community.

Perception of stake holders before initiative – threat to food security

Most tribal village women regularly collect roots, shoot, flower, leaf parts of tree/herb/shrub from forest in different seasons, as a part of their culture and traditions for sustenance /subsistence. For many a tribal community, tubers were the staple diet but with easy availability of cereals like wheat, rice, etc such crops are being over looked / neglected. On the other hand administration through its public distribution system, is making available food grain at subsidized rates. With so called modernisation, factory products like biscuits/ fried things / noodles, etc., (which is actually

a junk food) are reaching village markets in attractive packages; some of the items are marketed aggressively and as a result, local products are pushed into background, or maybe even get pushed out of competitive market. Even cultivation of local food items, may become unattractive from economical angle.

Sometime, the modern or affluent segment of the society that is, at times considered to be role model by local youth, look down upon local products as unhygienic and ridicule it. Even media at times perceives local food like tubers or tree seeds as ‘distress food’ but in case of unforeseen circumstances, it is only such easily available hardy crop; let us not consign them to oblivion. If such trend continues, even whole some / nutritive items, may be lost sight of and be forgotten. Such a loss will not be in the interest of preserving relevant biodiversity as well. Corrective steps thus need be taken and forest food festival is one such novel approach.

The Forest Food Festival

Participation of local women who make fresh collection of items from the forest and prepare tantalizing food items would be required. Village seniors / expert in the field of nutrition/‘ayurved practitioner’ can taste the food and select items based on number of parameters like plant species used & its seasonality, method of cooking, spices used, hygiene, etc.

The selected participants would have a chance to test new idea and show case newly acquired skills; to produce some exquisite, nutritious food items that might not appeal to

palate but are also recognized by even medical practitioners /nutritionists, as nutritious food. Common perception about forest that it is an assemblage of tree species that provide primarily wood for construction, fire wood for the hearth and some non timber forest resources, could be augmented with strength of food products also. A city based person hardly realizes the range of food products along with timber and services that this forest eco system provides to all the living creatures.

The purpose of the food festival is further to preserve and develop the traditional knowledge on 'wise-use' of forest resources handed down by the ancestors. It can also highlight and popularize such items and bring recognition to tribal forest based foods and food practices by members of the indigenous communities. Festival can initiate change in mindset, many surprises that so many items are being prepared and many new items can be prepared from the forest species / these items can support their food security and well being /this can be a platform for the village for convergence with other line department. The species used as forest food is presented as three boxes separately for fruits, leaves and flowers.

The experience from Maharashtra and Odisha

UNDP and Government of India in 2014 awarded Baripada village of Dhule District, in Maharashtra, under Community stewardship in Biodiversity conservation category. To encourage them further, the initiative was facilitated

by Honorable Union Minister of State (IC), Environment, Forest and Climate Change Shri Prakash Javadekar in a state level function organised in Pune.

In October 2013, 34 VSS from tribal community villages of Banki Forest Range of Rourkela in Odisha first time organised Forest Food Festival to show case their newly awakened understanding of forests as a food basket to their own brethren in rest of Banki. They felt "If this concept is followed to its logical end, it will ease food scarcity that ever looms large."

Learning from exercise and way forward

- a) It accords recognition to role of women in understanding food resources and its conservation.
- b) It also accords recognition to forests as source of food – this concept need be extended to eco-development committees / Joint Forest Management Committees/ Van Panchayat / Biodiversity Management Committees.
- c) Such events will promote local food items as food security and in turn will promote retention / planting of these plant species, in forest assigned to Committees or protected by communities.
- d) This will, incidentally, promote biodiversity conservation
- e) Thought process need be extended to other areas so that the forest species that are sources of food items are cultivated in nurseries / planted and utilised by the people.
- f) As it will spread message that forest foods are very nutritious and

organic (and are better than junk food) such events can be linked to eco-tourism.

- g) This programme will encourage the villagers to conserve, sustainably harvest and utilise such species.
- h) One-time effort will not suffice and thus be repeated every year in different places and different seasons to cover whole range of species
- i) Learning be integrated into micro plans / its revision as a component

of ANR under-planting in a systematic manner and executed by SHG/ BMC members.

- j) Such efforts are precursors to adoption of institutional frame work expected under the Biodiversity Act 2002 and rules made under by the state government.

Acknowledgement

OFSDP actions and learning for sharing thereof is duly acknowledged.

Box 1: Forest plant foods: Fruits

Plant Name	Scientific Name	Habit	Season of availability
Anzeer	<i>Ficus carica</i> Linn.	Tree	Rainy
Amuta	<i>Antidesma ghaesembilla</i> Gaertn.	Tree	Winter
Badru	<i>Oxal scandens</i> Roxb.	Shrub	Rainy
Gururu / Ghunti	<i>Gardenia gummifera</i> Linn. f.	Tree	Rainy
Baincha Kuri	<i>Flacourtia jangomas</i> Raeusch.	Tree	Spring
Bankundri	<i>Melothria heterophylla</i> (Lour.) Cogn.	Herb	Rainy
Ban karaila	<i>Momordica dioica</i> Roxb. ex Willd	Herb	Rainy
Bhawarkuri	<i>Cordia macleodii</i> Hook. f.Thomas.	Tree	Summer
Benchi	<i>Casearia graveolens</i> Dalz.	Tree	Summer
Bhadoo	<i>Vitex glabrata</i> R. Br.	Tree	Summer
Lawa	<i>Ficus glomerata</i> Roxb.	Tree	Rainy
Joraikuli	<i>Erycibe paniculata</i> Roxb.	Shrub	Summer
Dhamna	<i>Grewia subinaeqnalis</i> DC.	Tree	Summer
Terrel	<i>Diospyros melanoxylon</i> Roxb.	Tree	Summer
Kadiweer	<i>Garuga pinnata</i> Roxb.	Tree	Rainy
Kukrakari	<i>Gelonium multiflorum</i> Juss.	Tree	Spring
Karmata	<i>Dillenia aurea</i> Sm.	Tree	Summer
Korkotta	<i>Dillenia indica</i> Linn.	Tree	Winter
Kashiphal	<i>Bridelia retusa</i> Spreng.	Tree	Summer
Kongat	<i>Dregea sp.</i>	Herb	Winter
Kowa/Sarbara	<i>Garcinia cowa</i> Roxb.	Tree	Rainy
Nanunia	<i>Embllica robusta</i>	Tree	Winter
Oserwa	<i>Capparis zeylanica</i> Linn.	Tree	Rainy

Char / tarop	<i>Buchanania lanzan</i> Spreng.	Tree	Summer
Pinder	<i>Randia uliginosa</i> DC.	Tree	Winter
Puinjamala	<i>Syzygium cerasoideum</i> (Roxb.) Raizada	Tree	Summer
Pakare	<i>Ficus lucescens</i> Blume	Tree	Rainy
Rai	<i>Dillenia pentagyna</i> Roxb.	Tree	Summer
Soso	<i>Semecarpus anacardium</i> Linn. f.	Tree	Spring
Thedu	<i>Ficus hispida</i> Linn. f.	Tree	Winter

Box 2: Forest plant foods: Leaves

Plant Name	Scientific Name	Habit	Season of availability
Ban Kundri	<i>Melothria heterophylla</i> (Lour.) Cogn.	Herb	Rainy
Bathua	<i>Chenopodium album</i> Linn.	Herb	Rainy
Ban-Poi	<i>Basella alba</i> Linn.	Herb	Rainy
Chakor	<i>Cassia tora</i> Linn.	Herb	Rainy
Daliara/ Balbalia	<i>Portulaca oleracea</i> Linn.	Herb	Rainy
Bilikhuji/ Chamani	<i>Cleome isosandra</i> Linn.	Herb	Rainy
Marshi sag	<i>Amaranthus viridis</i> Linn.	Herb	Rainy
Kansaree	<i>Commelina benghalensis</i> Linn.	Herb	Rainy
Katai	<i>Menya laxiflora</i> Robyns.	Shrub	Winter
Kankodo	<i>Momordica dioica</i> Roxb.ex Willd.	Herb	Rainy
Kointho/ Pitta	<i>Leucas cephalotes</i> Spreng	Herb	Rainy
Sing aa / Kurul	<i>Bauhinia purpurea</i> Linn.	Tree	Summer
Kachoa	<i>Trianthema portulacastrum</i> Linn.	Herb	Rainy
Kalmi	<i>Ipomoea aquatica</i> Forck.	Herb	Whole year
Koilkhara	<i>Asteracantha longifolia</i> Nees.	Herb	Rainy
Lahenga /Sirgitti	<i>Celosia argentea</i> Linn.	Herb	Rainy
Lapung	<i>Aerva lanata</i> Juss. Ex Schult.	Herb	Rainy
Madranga	<i>Alternanthera amoena</i> (Lemaire) Voss.	Herb	Rainy
Marmuri	<i>Antidesma diandrum</i> Heyne ex Roth	Tree	Rainy
Pimpari	<i>Polygonum plebeium</i> R. Br.	Herb	Rainy
Purni	<i>Trianthema decandra</i> Linn.	Herb	Rainy
Sunsunia	<i>Marsieia minuta</i> Linn.	Herb	Rainy
Siramo	<i>Gynandropsis gynandra</i> (Linn.) Briq.	Herb	Rainy
Mansaru	<i>Colocasia sp.</i>	Herb	Rainy
Suni ara	<i>Portulaca quadrifida</i> Linn.	Herb	Rainy
Zanumare	<i>Amaranthus spinosus</i> Linn.	Herb	Rainy

Box 3: Forest plant foods: Flowers

Plant Name	Scientific Name	Habit	Season of availability
Agasti phool	<i>Sesbania grandiflora</i> Pers.	Tree	Winter
Jerhul / Hutar	<i>Indigofera pulchella</i> Roxb. in part	Tree	Spring
Hupu	<i>Cochlospermum religiosum</i> (Linn.) Alstm	Tree	Summer
Kujri	<i>Celastrus paniculatus</i> Willd.	Herb	Summer
Kongat	<i>Dregea</i> sp.	Herb	Rainy
Kurchi	<i>Holarrhena antidysenterica</i> (Linn.) Wall.	Tree	Summer
Mahua	<i>Madhuca indica</i> J.F.Gmel.	Tree	Summer
Pinder	<i>Randia uliginosa</i> DC.	Tree	Rainy
Phutkuli	<i>Phyllochlamys taxoides</i> Koorders	Tree	Summer
Sahar baha	<i>Dillenia pentagyna</i> Roxb.	Tree	Rainy
Sahada Baha	<i>Streblus asper</i> Lour.	Tree	Summer
Tentuli	<i>Tamarindus indica</i> Linn.	Tree	Winter

JOINT FOREST MANAGEMENT

Wildlife Protection outside Protected Areas: A success story

Two villages of Maharashtra and the forest department have shown that nothing is impossible if there is a will to work and interests of everybody are kept in mind

RAJAN TALMALE

As per Wildlife Protection Act, National Parks and Wildlife Sanctuaries are managed and controlled to provide an assured habitat. These Protected Areas are the exclusive areas for the brooding and breeding of wild animals. There is a specific management strategy for the management of their habitat. But the boundaries of a Protected Area cannot restrict the wild animals from roaming. For example, an individual Tiger needs a territory of approximately 20 to 25 square km. Increase in their population will decrease per head area of tiger. Protection, conservation and management of wildlife out of the purview of such protected areas is successfully attempted in territorial areas of Nagpur Forest Division.

The story starts on February 7, 2012. A pregnant tigress of age 4-5 years was rescued from a dry well in a farmland, near village Kathlabodi of Kondhali Range by the Nagpur Forest Division with the help of a young wildlife activist Mr Kundan Hate. During the rescue, she was tranquilised and this

resulted in 'self-abortion' of her three well developed foetuses. It was a new experience for the team that the trauma during the rescue made her body unfit to carry out pregnancy. After complete recovery, it was decided to release the tigress in her habitat. With the permission of PCCF, she was released in Compartment no. 11 of Reserved Forest of Kalmeshwar Range on February 14, 2012. After release, she was monitored with camera traps only, as the department didn't have any other high-tech gadgets like Radio Caller; nor was it needed before.

The turning point is that, in 2013 once again, she gave evidences of her presence with three cubs in camera traps near village Nimji in Kalmeshwar Range. That tract was with a narrow prey base, comprised mainly of blue bulls and wild boar. Later her cubs were seen separated from her in the summer of 2014. Then the thinking started for the need of their protection from adjoining villages, need of increasing prey base; need of water in summer days as the tract is dry, rocky and degraded due to human activities. At six km, there is National Highway 6, as well as logistic

park, godowns, warehouses and some factories within three-km distance. All these were putting their habitat under threat. Those days, newspapers were describing the news of tiger poaching and trafficking by Baheliya gangs. All these made their protection a challenge for the department.

Forest department accepted this and made a strategy; the area where she was sighted was closed for public, patrolling was increased and monitoring was intensified with increased number of camera traps. Each and every precaution was taken for restricting the coverage by media with an intention to prevent havoc in public. Everything was going on secretly. These were all the short-term measures. The long-term measures were intended to increase the prey base, ensuring water availability for whole year; and people's participation was the only key towards the success and fund management.

Mr Kundan Hate coordinated between the higher officials and the ground staff for the funds diversion and allocation; and the most important, winning the good faith of villagers. The local JFM Committees of Nimji and Ladhai actively participated by performing a large number of soil and moisture conservation activities like CCT, LBS, Gabion structures, water holes for drinking of wild animals, sowing grass seeds on TCM and other structures, desilting of natural water sources, etc. The villagers were largely dependent on this forest for grazing of their cattle. The cattle used to drink water at Vena reservoir which is near to these villages and do grazing in this

forest area. Grazing and illicit felling made the area degraded and the eroded soil started silting the reservoir.

As a substitute for grazing, compartment no. 6 of 191.42 ha was allotted to the JFMC of Nimji. This area was used for fodder production. Only members of the JFMC were allowed to enter and collect. The fodder was sold by the committee at nominal price and, thus, stall feeding was started by cattle bearers. The revenue from fodder was used to pay the wages of collection and carriage of fodder. Another need of the villagers was fuelwood which they used to satisfy from their 'Nistar' claims. Initially the needy villagers were allowed to enter the forest only with forest personnel. Later, as the funds came, slowly families were distributed LPG connections. Thus grazing and felling was completely phased out. The area of concern was not allotted for Tendu collection. Plantation programmes were taken in 2011 and 2012 and 125,000 seedlings were prepared in nursery under MGNREGA. In 2012 and 2013, Nimji achieved award under 'Sant Tukaram Van Gram Yojna'. Funds from the award were used for purchase of utensils and other appliances to start a catering business in order to strengthen the SHGs of village women. Some farmers and landless labourers were provided with hybrid milching animals.

All these endeavours resulted in lush green area with ample availability of water in harsh days of summer; and goodwill of people towards the protection of the tigress and her cubs and conservation of habitat. In 2014-15,

JFMC of Nimji achieved 'First' position in 'Sant Tukaram Van Gram Yojna' on the state level as it complied with all 17 conditions of works to be completed. Till date, there is not a single case of man-animal conflict. Rarely some cases of cattle kill happen, but villagers are never seen aggressive as they get the compensation with fast transaction. People believe that the carnivore kills their cattle only when it needs a change in taste. An ideal relationship is developed among the wild animals and the villagers. All this attracted the villagers of other villages and now they have started active participation in JFM. The villagers and the department staff report some wild animals like leopard, caracal, mouse-deer, hyena and rattle, which were never recorded there before. Number of herds of sambhar, spotted deer, wild boar, bluebull, wild dogs, fox and wild cat, etc., can be sighted now. The improved grasslands have attracted many animals and improved the biodiversity of this area. The wildlife from adjoining Melghat and Pench Tiger Reserve and Bor Wildlife Sanctuary may have settled here. Though the area is having some detonator manufacturing plants, countering their loud sounds of testing, the top predator is living here and other wild animals are flourishing; this is nothing but a miracle.

The supreme result of all these efforts recently resulted in sighting the same tigress with her 2-3 month old three healthy cubs again in camera traps. Their presence is a solid proof of success of the teamwork. The higher officials, when reported with this

scene by a wildlife activist (now he is Honorary Wildlife Warden of Nagpur District) and the ground staff, they are now working with preparation of Special Wildlife Management Plan, aiming at their Protection and Conservation, ensuring sustained prey base and habitat management; forest protection, wildlife management and controlling man-animal conflict etc. Anticipating the increase in wildlife population, some activities proposed in that plan are – meadows development programme, habitat and water source development works, infrastructure development for protection including protection huts, residential amenities for staff, road repairing, checkpoints, purchase of patrolling vehicles, research projects for wild animals like rattle, caracal, etc., purchase of high-tech gadgets for monitoring, construction of parapet walls on irrigation wells in nearby farmlands, study on habitat and corridor development with the help of WII, fire protection works, rapid response team for rescue, relief and rehabilitation, soil and moisture conservation programmes including de-silting of natural water resources, funds for intelligence and public propaganda, etc.

The key to success here might be that for the protection of wildlife, the rights and privileges of the local people were not abolished unlike Pas, and the department succeeded to preach that their interests are more in protection and conservation of nature. Also, the protection and conservation of the tigress and her cubs was given priority.

The story has given rise to some

questions –whether exclusive protected areas like NP and Sanctuaries are needed to expand in terms of numbers or area? Why NGOs do not identify and concentrate on potential territorial forest areas, instead of dumping funds in PAs only? What is the solution or preparedness for the management of spill-over population from PAs as there is restriction to expand their areas? Is there any middle solution for satisfaction of tiny needs of local human population with nature conservation, hand-in-hand?

We cannot declare the whole land-

scape as a PA. In future, the need will arise for the management and control of spillover population of wild animals from PAs. Although PAs facilitate them to live natural life, their increasing population cannot be nourished there. PA has not proved to be the solution to the increased man-animal conflict. This story highlights the need to improve relationship between people and forest department; how man and animal can live together without any conflict; and, the need to concentrate on Territorial Forest Areas for the protection and conservation of wildlife.

JOINT FOREST MANAGEMENT

Thoseghar reaching the heights

JFM has changed the way the people look at forests; it has become a major source of revenue for the panchayat and employment for youth

DR. RAJENDRA PUNDALIK NALE

Thoseghar is a small village situated in the Western Ghats in Maharashtra state. Falling in the jurisdiction of the Satara Forest Division, it is blessed with beautiful landscapes enriched with semi-evergreen forests, rich biodiversity, landforms, plateaus and waterfalls with perennial streams.

The village has a population of 1,216 with 766.49 hectares of forest area. Most

of the population is involved in the agriculture business and is dependent on the adjoining forests for their daily needs like fuelwood. In the valley of the Kalganga River, water falls from a height of 350 metres, making it India's fourth highest waterfall. This magnificent waterfall creates tremendous scope for ecotourism; an added advantage is provided by the beautiful plateaus in adjoining areas.

In 2004, the Joint Forest Management



Officer Trainee, SFS-2014-16 batch

Committee (JFMC) was created in Thoseghar by the Forest Department with the intention to reduce pressure on the forest and manage the forest in cooperation with the local villagers. In the early days, there were doubts about the intention of the forest department considering past systems of forest management and administration. These doubts cleared with time given the continuous efforts and communication of the Forest Department and villagers; and a new era of joint forest management started.

The JFMC was formed involving the local panchayat leaders, villagers and forest staff. First, a mechanism was set in place to manage ecotourism facilities. Facilities like ticketing, parking fees, garden management, tourist management, forest enrichment, Nature Information Centre etc., were handed over to the JFMC for management. Nearly 20-25 villagers were employed, either on continuous or seasonal basis, to take care of all routine works through the JFMC.

Revenue generated through this activity and its systematic use under the guidance of forest officials earned

recognition, prestige and honour to the village.

Revenue Generated

Year	Revenue Generated (in Rs)
2013-14	14,70,000
2014-15	15,29,000

This revenue is used for making payments to staff and for enriching the forest by plantations, protection activity, etc.

The JFMC is actively participating in forest protection. Various initiatives have been undertaken with the guidance of Forest Department and include:

1. Rapid Fire Response Team – JFMC has been created with the view to assist forest department to prevent and control forest fire with the help of team of villagers. Now the committee is thinking to give modern equipment’s to manage fire.
2. LPG gas connections and bulk water heaters - JFMC and Maharashtra Forest Department has supplied 151 LPG connections and six heaters on 50 per cent subsidy basis to villagers to reduce the dependency of the villagers for fuel wood.





3. Grazing is now managed by the forest dependent along with JFMC. It takes care that the grazing will not become a problem in forest areas.
4. Persons involved in forest offences are intimidated and restrained by Thoseghar villagers from committing forest offences like illicit felling, hunting, etc.
5. Tourists are managed in systematic way, hence preventing problems created by tourism like pollution, damage to forests, etc.

On a visit to Thoseghar, one can notice the following changes in the way the ecotourism site is managed.

- Clean premises, information boards about dos and don'ts to tourists can be seen in the ecotourism facility and forest area.
- Continuous audio broadcast stressing importance of forests and guiding tourists.
- Continuous monitoring of the entry

gate with the help of CCTVs.

- Electronic ticketing machine for bringing transparency in the accounts.
- Proper parking facility to avoid road blockade.

Thoseghar JFMC President Shankarrao Chavansays, "This joint forest management with the help of the forest department has changed the way we look at forests. It has become a major source of revenue for the panchayat and employment for unemployed youth. Previously, the forest was perceived as of no use but now this view has changed and now all villagers are also actively participating in conserving and managing forests."

Local villagers are also happy with the initiative and some of them cautioned about the need for transparency as huge amounts of money are involved.

Seriousness and need of JFM can be seen through the creation of the

Contingency Fund. The JFMC has created a contingency fund of Rs 2 lakh to be used in case of any emergency or to fulfill needs of funding in case of less tourism in a particular season, or due to reasons of less rain, and so on.

While the success of joint forest

management is being debated elsewhere, in Thoseghar it is working successfully. We need to take notice of one thing, where there is potential of sustained income from forest resources, the chances of joint forest management becoming successful are very high.

WILDLIFE

Hidden Trade in Madurai

Several recent instances have prompted the DFO to set up a voluntary organisation called 'Friends of Forest Madurai' to gather information on wildlife trade.

M.G. GANESAN

Madurai may have several things to be proud about, but it has the dubious distinction of being a major transit point for trade in both wildlife and marine life. The city has no major forest area close by nor can it boast of any aquarium of repute. But it is the 'routing centre' for rare species, say wildlife and police authorities. In August 2015, in a joint operation, forest officials seized five turtle carapace and 10 pairs of Rose Ringed parakeets trapped in the wild and brought to the Sunday market for sale. The forest officers got wind of the illegal transaction, swooped in and rounded up the offenders, who were charged with violating the Wildlife Protection Act. Wildlife authorities say they enjoy a good rapport with the Customs and Airport authorities. Besides they have their own informers. Similarly, they get ground level information on the sale of live birds trapped in the wild. They also conduct surprise checks at private handicrafts shops, pet shops, ayurvedic medicine shops, industry and restaurant whenever they get information about sale of meat, birds and artifacts made of animal parts.

The DFO set up a voluntary organization called 'Friends of Forest Madurai' to gather information on wildlife trade, rescue of wild animals, hoarding, meat sales, sales of artifacts made from wild animal parts. The officer says that only in a recent case where the Tiruppur district smuggler was detained and a tiger nail seized, did the forest officers work systematically and executed a plan. Though they knew they were on to something 'big', they were simply unaware what the prize catch could be. They had set up an informant to obtain details about hare meat, but ended up busting a racket involving tiger nail.

Also, forest officials in Madurai seized 400 pangolin scales from 37-year-old Narikorava, at Karuppayurani, Madurai on August 11, 2015. The scales were about to be sold off. TRAFFIC, the wildlife crime control wing of the World Wide Fund for Nature - India (WWF-I) field operatives helped the officials to nab the offender. The operatives said the scales were sold between Rs 10,000 and Rs 30,000 depending upon the seller. The scales were believed to have medicinal properties that could cure piles and rheumatism. In Tamil Nadu, people burn the scales and the

ashes from the burnt scales are used as medicines. In China, too, these scales are used in traditional medicine; people also make rings out of the scales and wear them on their fingers.

We learnt that pangolins are killed in a very cruel manner. Being very shy animals, the pangolins coil their body into a ball-like shape when they feel threatened. As they are docile animals, they never attack when they are caught. So the poachers easily trap them and pack them in gunny bags. The Explaining about the cruel method in which the pangolins are killed and

The live animals are then put in boiling water and once they are dead, the scales are removed and the flesh is eaten by tribals living across the state. The forest officials laid a trap and arrested a person who came forward to sell 400 scales for a price of Rs 25,000. Pangolins are categorized under Schedule I of the Wildlife Protection Act and those who indulge in poaching of this species may get three years of imprisonment with a minimum fine of Rs 25,000. The culprit has been produced before the judicial magistrate two in Madurai and remanded in judicial custody. TRAFFIC field operatives said there is a great demand for the scales in China and other Southeast Asian nations. They are also investigating the country medicine practitioners (Nattuvaidyars), who placed a demand for these animals. The Nattuvaidyars cheat the public by claiming the smoke from pangolin scales help in relieving piles, thereby creating an illegal trade for these wildlife items.

In another case, a 40-year-old wom-

an was arrested by forest officials for trading wildlife products at the Sunday market area on Tamil Sangam Road on September 9, 2015. Officials seized five green turtle carapaces, broken carapaces pieces and 52 pangolin scales. The women, who hails from Nagamalai Pudukottai situated on the city outskirts, has been arrested under the Wildlife Protection Act. Forest officials suspect that she may be a key player in the wildlife trade in the city. She has been remanded to judicial custody. Throughout the questioning, she maintained that she collected the items from nearby forest areas. But stumbling on green turtle carapaces in Madurai forest areas is impossible and spotting a pangolin is difficult in the region.

In another incident, on the night of September 29, 2015, a Sivaganga district smuggler who tried to smuggle star tortoises at Madurai International Airport was detained with the help of custom staffs. They seized 247 star tortoises which were being smuggled from Kerala via Madurai to Kuala Lumpur. The customs officials at the airport after a check on his cabin baggage revealed that he was illegally taking the tortoises to Kuala Lumpur via flight to Sri Lanka from the city. The consignment was estimated to be worth over Rs 60 lakh. The species are extremely popular among overseas exotic pet traders and many people in South East Asian countries preferred to have them as pets. These star tortoises are primarily found in dry and deciduous forests and can survive for up to 3 days without food or water while being transported. In Madurai,

they can be found in forest areas in Vikramangalam and Sirumalai. The forest authorities found that this was probably one of the first instances of star tortoises being smuggled and seized at Madurai Airport.

From the investigation, we came to know that the smugglers are involved in several crimes such as ketamine smuggling, pet animal trade, animal part trade, endangered animal trade simultaneously, catering to the demand in India and the South East Asian countries. Though officials agree that Madurai is nothing more than a transit point, they do not rule out the possibility of Madurai emerging as a base for illegal trade in wildlife. The DFO has cracked the whip on wildlife poachers in the district and earned the title, the Jungle Man of Madurai. Many local nature lovers, environmentalists and wildlife enthusiasts say that he is probably the first DFO who fined two private mahouts in the city for making their elephants beg in crowded places.

There are also habitual offenders who hunt wild boar and black napped hares. In the last six months or so, the forest department has confiscated wildlife trophies such as peafowl legs and porcupine quills from poachers. Madurai area has little forest in

comparison to other districts and the wildlife here comprises mainly of smaller mammals. These too need to be conserved, as small mammals play a crucial role in the food chain and ecological balance. The forest department should get closer to the public to sensitise the people towards nature and wildlife.

As part of the outreach activities, a Facebook page 'Madurai Forest Division' has been started, which acts a platform for wildlife lovers in the city to come together. To improve people's connection to forests and environment, more awareness campaigns are being conducted. Forest officials cite the example of one such safe rescue of snakes.

Through the voluntary organization, social media and campaigns, a network of wildlife volunteers has been built across the district. The plan is to further strengthen this team so that people in different places can provide fast and reliable information on wildlife offences. In addition, the display of banned items at major air and seaports, involving the people living on the forest fringes and coastal fishermen for protecting the natural resources can also help reduce the illegal trade in marine and wildlife.

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Hiware Bazar, a success story

The Hiware Bazar experience stands out, not only in terms of equity outcome, but also in terms of improvement in livelihoods and the impact on sustainability

GEETA PAWAR

Every few years, villages in central Maharashtra, like those in other drought-prone regions across the country, face crippling water scarcity that threatens lives and livelihoods and fuels migration. Despite decades of drought-relief programmes, there has been little change over the years. Hiware Bazar lies in the drought-prone Ahmednagar district. It is in the nagar 'taluka' of Ahmadnagar district in western Maharashtra and is 28 kms from Ahmadnagar city. Hiware Bazar lies across 977 hectares (ha) at the foothills of the Sahyadris. Of the total geographical area of the village of 976.84 ha, 795.23 ha is cultivable. The village receives only 300-400 millimetres (mm) of rainfall a year.

Over time, with steady degradation of their forest land, there was severe water paucity for drinking and irrigation purposes. This led to very low productivity owing to dependence on rainwater. Only on half-an-acre of land could water-intensive crops grow. Hard rock makes up 80 per cent of the land. Indiscriminate grazing had eroded the green cover. People migrated in hordes due to constant crop failures

and drought. By the early 1980s, almost 50 per cent of the village population had drifted out of the village. During 1989-90, less than 12 per cent of the cultivable land was under cultivation. The village's wells used to have water only during the rainy season.

In 1990, Popatrao Pawar, after completing his M.Com in Pune, was persuaded to return to his village. He was elected sarpanch and gave up a potential career in the city. Under his leadership the village drew up a plan based on priorities set by villagers themselves – with top priorities on safe drinking water, irrigation water, employment, education and health. The village used funds from government schemes and launched a programme to regenerate its natural resources. In 1972, percolation tank was constructed under drought relief work. In 1982, under similar circumstances, it was repaired. In 1995, the Adarsh Gaon Yojana was launched. In keeping with the requirements of AGY, resolutions were collectively adopted in the gram sabha to start working on the 'pancha-sutri', or five principles – restrictions on free grazing, ban on tree felling, ban on alcohol, adoption of family planning and voluntary labour. An

NGO called Yashwant Agricultural, Rural and Watershed Development Agency was set up by Popatrao Pawar in 1993 and the scheme began to be implemented from 1994. An important feature of the Hiware Bazar case is that the implementing agency was not an external NGO, but a village-level organisation that worked closely with the gram panchayat.

A Watershed Development Programme is essentially designed to increase the moisture content in the soil, thereby leading to an increase in productivity. The village was divided into three micro-watersheds, the first with an area of 612.14 ha, the second with an area of 123.4 ha and the third with an area of 241.3 ha. Total geographical area of the village is 976 ha and it is divided into three micro watersheds. Of this, 70 ha is forestland, developed while working in close cooperation with the forest department. Presently, its entire management is village's responsibility. The department even does not have their guard to protect the reserves. This relationship between the department and the villages was painfully developed. In 1992, the forest department rejected the request of the villagers, as the villagers, due to free grazing, ruined the department's earlier works. However, the villager's persistence made the department reconsider in 1994, bringing joint forest management (JFM) programme to the village and the results are evidently visible to everyone. Under JFM and Enhanced Geothermal Systems (EGS), water and soil conservation works were taken up in the upper reaches.

Under this programme, about 52 earthen bunds, two percolation tanks, 33 loose stone bunds were constructed. About nine check dams have also been constructed in a series on the downstream nallah. The principal watershed works constructed include continuous contour trenching and tree plantation (on forest, private and panchayat land), contour bunding, nala bunding, percolation tanks and five storage bandharas. In a span of four years, most of the work under AGY was completed.

In Hiware Bazar, when the watershed work began and trees were planted as a first step, the question of cutting of trees was brought up. A resolution was passed in the gram sabha to ban cutting of trees or even branches of trees from the commons. People could, however, cut branches of trees from their own fields. Two positive aspects of the ban on tree cutting in Hiware Bazar are worth noting. These restrictions were imposed uniformly for all uses (fuel and non-fuel), and indigenous varieties of trees (such as babul, tamarind and bamboo) were chosen because they were more suitable to local climatic conditions and likely to survive longer. The revenue from these trees (as well as other product of the commons) goes to the gram panchayat.

The main focus was on the creation of EGS, constituting Continuous Contour Trenches (CCT) and Earthen Bunds. The construction of CCTs and Bunds has been completed by the villagers themselves, through the process shramdaan. Three watersheds were built at a cost of Rs 42 lakh spent by

the government; 17 lakh was provided as shramdaan. With shramdaan, the panchayat built 40,000 contour trenches around the hills to conserve rainwater and recharge groundwater.

Alongwith the contour building, they planted 45,000 trees on a 30-hectare area of government land. Preference was given to species like bitter neem, kashid, babul and shisham. The villagers made special efforts to protect and nurse more than 70 per cent of the planted trees. In appreciation of their efforts, the department provided 36,000 new saplings in 1993-94. The villagers saved the remuneration earned and used it for improvement of the watershed. In 1994, the residents, alongwith the Gram Sabha (village council), approached 12 different agencies to implement watershed works under the state's EGS. The village prepared its own five-year plan for 1995-2000 that emphasised local ecological regeneration. Implementation of the five-year plan then became the objective of the EGS, which was otherwise a wage employment programme. This was to ensure that all departments implementing projects in the village would have a common and integrated work plan.

In the years 1997 and 1998, additional 206 ha were brought under afforestation. By 1999, the village had grown 600,000 trees by adopting the technique of 'Continuous Contour Trenching' (CCT) by using contour markers and digging contour pits 2 square feet Square and 1 foot deep. This was supported by the already dug pits which conserved soil and water. One running metre of the

pits stored 1,000-litres of water. There were about 1,500 running metre pits within one-hectare land and, therefore, one hectare stored 1,500,000 litres of water. The total geographical area of the village is 976.44 ha, out of which 150 ha land is under social forestry. Therefore, the entire forest area under CCT could conserve about 225,000 cubic metres of water (150 ha x 15 lakh litres of water).

The villagers implemented a drip irrigation system to conserve water and soil, and to increase the food production. They avoided crops like sugarcane and bananas, which require a high use of water.

Due to watershed development measures, the groundwater table rose and irrigated area increased. Farmers, previously able to cultivate only in the *kharif* season and grow bajra in *rabi*, could now grow in more seasons and switch from the traditional jowar and bajra to cash crops such as onion, potato, tomato and horticulture. As area under cultivation and cropping intensity increased and the cropping pattern changed, incomes rose sharply. With more assured irrigation and therefore lower risk, farmers began to invest more in their land, such as by building additional water storage structures. Some families that had migrated returned to the village. Many farmers used their increased agricultural earnings or took loans to buy cattle. The re-vegetation programme, as part of watershed development, has increased availability of good quality grass, which has, in turn, contributed to increased milk yield. The grass harvest increased from 100 tonnes in 2000 to 6,000 tonnes

in 2004, and the milk production rose from 150 litres a day in the mid-1990s to 4,000 in 2010. Today dairying is an important mainstay of their economy. The village is now among the top income villages in India.

The fruition of the watershed development programme has aided immensely in agriculture and in providing drinking water. It has also been instrumental in the conservation of both water and soil. Both the quality of the technical watershed works and the resulting positive socio-economic changes have now been widely acknowledged in government and NGO circles as well as in popular media. What is most striking about Hiware Bazar's growth is that most families gained from it, either directly or indirectly. Today the village has only three BPL families. Moreover, a commitment to sustainability helps ensure that benefits secured are not lost. Prudent water management, coupled with crop planning, guarantees drinking water year round, and agriculture and dairying are maintained as far as possible, even in low rainfall years.

Equity will be on one particular dimension of these changes. More specifically, I consider the distribution of the benefits and costs of the watershed development project across different land-holding classes. The reason for focusing on this particular dimension of equity is the linkage between access to land and access to water, which means that the benefits of any water intervention, such as watershed development, end up being distributed in proportion to landholding, or

sometimes even disproportionately in favour of larger farmers. I consider below what the experience in Hiware Bazar has been in the context of various rules adopted in the course of the project, the two major effects of watershed development – increased availability of irrigation water and increased employment opportunities – as well as the watershed-plus measures. The aim of the exercise is not so much to label the project as “successful” or “unsuccessful” from the point of view of a specific version of equity, but rather to learn from both its positive and negative aspects.

Apart from the *pancha-sutri*, the other set of rules adopted in Hiware Bazar were related to water. Rules related to water could either deal with distribution of water or with use of water. The rules about distribution of water can be further classified into two kinds: (a) rules that determine the particular set of people who will get access to water; and (b) rules that determine how water will be distributed within this set of beneficiaries, i.e., allocation rules. If 100 litres of groundwater is available, 80 litres are used and 20 litres are kept as buffer stock. The water is recharged during July. Additional water led to higher productivity and also enabled cultivation of cash crops, such as onions and potatoes.

How equitable the above practice should be considered, is open to debate. Given that the link between access to land and access to water (as well as the underlying distribution of land) is considered inevitable by most people (not just in Hiware Bazar but elsewhere

too), the fact that water distribution follows land distribution could be considered equitable, especially if the larger land-holders do not get a share of water that is greater in proportion to their landholding. However, one could also raise the broader question of whether public resources (such as state funds for watershed development) should be used for the development of a private resource (such as groundwater) without making any attempt to change the structure of rights over groundwater, especially when access to water is important not just for improved livelihoods but also for greater social and political power. In the Hiware Bazar case, there was at least some attempt to compensate those whose benefits from watershed development were limited. But, in cases where there are no such attempts, the above water distribution rules could end up re-enforcing existing land-based inequities.

Equity concerns in any single project are influenced by a number of factors such as the differing conceptualisations of equity by various agents involved, limits to the number of radical concerns that can be taken up any one time, macro-level factors such as government policies and laws on relevant subjects, and the nature of the development process that people are interested in setting in motion. Similarly, the equity potential of government schemes for wells is limited by the requirement that beneficiaries should have a minimum landholding of three acres; while the logic behind this is that without a certain level of landholding, the water in the well would not be optimally

used, the result is that marginal farmers find it difficult to avail of the schemes. But given the constraints within which any project functions, the Hiware Bazar experience stands out, not only in terms of its equity outcome, but also in terms of improvement in livelihoods and the impact on sustainability. The measures to attenuate the negative impact of the ban on grazing, the rules about use of water and the careful targeting of watershed-plus measures have been particularly critical. An important lesson that one can, therefore, be drawn from Hiware Bazar is that some of the inequities considered 'inherent' to watershed development projects can be partially remedied by local-level initiative, and it is important to think about ways in which this experience can be used to improve the equity outcome in other watershed development projects.

Hiware Bazar's success has hinged on the involvement of the entire community who collectively decide their development priorities, contribute labour, and manage their natural resources by regulating and enforcing norms. Most community decisions are taken at GS meetings. Involvement did not come overnight. Education has been an important medium to raise awareness of key issues. Participation by all members has created a strong sense of ownership. Schoolchildren read rain gauges and measure groundwater levels. Women collect and manage a monthly water tax on individual connections. Decisions on water budgeting, crop planning and

maintenance of water structures are taken in the GS. In addition, there are village committees to monitor forest conservation, wildlife protection and cleanliness.

To institutionalise sharing of water, the village introduced a practice of water budgeting. Using a 'waterbank' principle, the budget ensures that the village does not draw more water than it stores in a year, and a small amount is kept in reserve. Depending on rainfall in that year, available water is allocated amongst various uses, with first priority for drinking water for humans at 50 litres per capita per day (lpcd) and cattle (30 lpcd). Here, water for drinking purposes (of humans and animals) and for other daily uses gets top priority. After budgeting for drinking water, 70 per cent is set aside for irrigation. The remaining 30 per cent is kept for future use by allowing it to percolate and recharge groundwater. Taking this broad framework for water use, a yearly audit is carried out to assess water availability and adjust use accordingly.

Since 2002, Hiware Bazar has been doing an annual budgeting of water assisted by the Ahmednagar district's groundwater department. Every year the village measures the total amount of water available in the village, estimates the uses and then prescribes the agricultural cropping to be taken up. All this is done through the instrument of Gram Sabha, whose decisions are binding for the residents of the village.

The cropping pattern is undergoing a change in favour of cash crops but with high productivity and availability of water, food crops produced in the village also suffice. Many families now buy foodgrains from the market. Food security will not be an issue for the village for a long time to come.

Through the five years of water budgeting, the village has been able to identify its average water availability. It is estimated that with 400 mm of rainfall, a small amount, the village of Hiware Bazar will have sufficient water throughout the year. Because the village has an average shortfall of 50 to 80 million litres, the Gram Sabha has banned drilling of borewells for irrigation. The audit process begins with the monitoring of the groundwater level of the six observation wells identified in the village, alongwith the amount of total rainfall received measured by the village's 3 rain gauges. The cumulative sum of rainfall and groundwater is the total water available to the village after monsoons.

The village has also won numerous awards, such as the National Productivity Award in Dryland Farming in 1997-98. The initiatives greatly improved the socio-economic conditions in the village and the village was declared as an "Ideal Village" by the Government of Maharashtra. At the "National Groundwater Congress" in New Delhi on September 11, 2007, the village received the "National Water Award" by the Government of India.

Note: Articles may be sent at the following email ID:
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Evaluation and Review System

There will be two layers of review of the contributions; Faculty and the Directorate review. Evaluation and review at the faculty level in the training institutes/academies will be undertaken under the guidance of Director/Principal/Head of the institutions. Even very specialized and technical topics shall be presented in simplified format so that frontline staff and forest community are able to appreciate and understand the topics. Articles shall be written in a popular style, easily understandable and in simple English.

However depending on the response to this programme, arrangements can be made for translation of the magazine into the vernacular. A short note about the contributor and the reviewer shall accompany the article. The note shall contain name, age, postal and e-mail address, academic accomplishments, and important assignments held. The evaluation would be done on following criteria:

- a. **Style:** The article should be interesting and informative. The introduction should draw the reader in and convince them that the remainder is worth reading. The remaining should be written in a lively and concise style, and should leave the reader convinced of the importance of the topic.
- b. **Structure:** The article should be within 1000 words, and formatted in 1.5 line spacing in Times New Roman 12 point font.
- c. **Organization:**
 - Instead of an abstract the article will give information on the location, the period when the field work was carried out
 - Integration - the article organized in a coherent form and all ideas are clearly leading to a single main argument.

The review at the Directorate level will be done through an editorial board constituted by the DFE, which will be responsible for the content, design and review of the journal articles. The editorial board shall consist of expert/experts constituted by DFE and reconstituted every year, which would screen contributions and recommend their publication. Articles previously published elsewhere, or simultaneously sent for publication elsewhere, may be accepted with modifications. Article submitted shall carry a declaration that the article is original. The Editor would reserve the right to reject articles without assigning any reason and articles not found suitable will be sent back.



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