

Proceedings of the State-level Consultation

on

Biodiversity Conservation & Bioresource Governance

The 73rd amendment in the Indian Constitution provides for transfer of certain power to the PRIs whereas the 74th amendment has a similar provision for urban local bodies(ULBs). However, the states have actually transferred only a part of these powers so far. Accordingly, the PRIs now have some control over the local programmes of agriculture-, fishery-, and animal resource development departments.

The Biodiversity Act, 2002 added a new dimension to this decentralization process. It provided for a role of PRIs and ULBs in the biodiversity conservation & management at local level. These institutions are supposed to have a BMC(Biodiversity Management Committee) at their own level which in turn is required to prepare the local biodiversity register.

However, this provision in the Biodiversity Act can be implemented at the state level after the notification of State Biodiversity Rules. Accordingly, in some states like MP and Andhra Pradesh the state Rules have been notified and BMCs have been formed. In Odisha, the draft Biodiversity Rule was but recently notified for public comments, and it is yet to be finally notified. Hence, BMCs are yet to be formed in Odisha.

A study commissioned by RCDC has suggested that among the 4 states of MP, Chhatisgarh, Jharkhand, and Andhra Pradesh some remarkable activism is seen in Andhra Pradesh. For instance, the first receipt of fees of Rs.10,000/- for access of biological material (*Indian Senega Glinus oppositifolius* Linn) by Bio-India Biological (BIB) Corporation, Nacharam, Hyderabad is a remarkable achievement. In this process the BMC of Gavinivaripalem in Prakasham district of Andhra Pradesh, alongwith other 5 BMCs is involved. Similarly, BMC Mahanandi has resolved to charge an accession fee of Rs. 300 lakhs on multinational seed company (Monsanto) for alleged Biopiracy of the bacteria, *Bacillus thurengiensis* (BT cotton).

In other states some PBR(people's biodiversity registers) have been prepared under BMCs(in Odisha, it has been prepared sporadically through some NGOs), but the real dynamism at PRI/ULB level regarding biodiversity conservation is yet to be seen except but few cases.

Earlier, natural resource governance/management was a broad concept; and PRIs do not normally bother for GM crops/animals, etc.. However, both PRIs & ULBs are now required to take care that development of agriculture, animal resource, fishery, etc. should not be at the cost of local biodiversity. On the other hand, Agricultural & allied research institutions/departments should also see to it that promotion or propagation of a new or advanced species/variety by them must not threaten the local biodiversity in any way.

RCDC, which is pursuing a bioresource governance programme in some parts of the KBK districts of Odisha, organized a state-level consultation on 29th December 2010 at Hotel New Marrion to discuss these issues with an objective to develop bioresources without threatening the

biodiversity. More than 100 participants from various parts of the state attended this consultation.

The inaugural session was chaired by Dr.S.N.Patro, Working President of Orissa Environmental Society. Bikash Rath of RCDC welcomed the participants and shared in brief the objectives of this programme. He said that bioresource governance, unlike natural resource governance, may incorporate some unnatural elements(like genetically modified organisms) and requires a more sensible approach since living organisms have low tolerance limit that abiotic resources. However, with the responsibility of biodiversity conservation, the bioresource governance has to exercise some control in its activities/approaches(like, going for GM varieties).

Dr.S.N.Patro described in his address how the sequence of events starting from 1992 Convention of Biodiversity to the 2006 National Environment Policy finally led to the protection of intellectual property rights, and facilitated conservation as well as equitable distribution of benefits accrued from bioresources. He said, 50 years ago it took 90 years for extinction of a species whereas now every hour three species get extinct. Citing the



Dr. S.N.Patro

example of Royal Bengal Tiger, he said in 1901 India had a human population of 32 crore as against the tiger population of about 40,000, but 110 years later the human population increased to 130 crores while the tiger population decreased to only 1400. He stressed on the fact that forest is a rich habitat of biodiversity which a plantation can't replace, and now that bioresources are under extreme pressure and so many species are already extinct, we need to take urgent measures so that these resources can be properly conserved. Avoid, Adopt, Endure, and Resilience- these are the four principles that help conserve the bioresources, he said. His presentation displayed the list of endangered & vulnerable plants in the state(annexure-1).

Inaugurating the event jointly with Sri Purnachandra

Sahu(representing forest protecting communities),Dr. S.N. Patro (representing the scientists), Sri Chakradhara Pruseth(representing the PRI members), and Smt. Kunti Kisku(representing women), **Sri Aravind Behera, IAS, chairman, State Biodiversity Board, Odisha and Principal Secretary, Environment & Forest Department, Odisha** said that we need urgent action to conserve our biodiversity since it is too late. Unless the PRIs and ULBs understand this and their development activities do not comply with biodiversity conservation, then it would lead to



Sri Aravind Behera, IAS delivering his inaugural address

various problems, he said. Citing the example of some initiatives already taken by the Environment & Forest Department in Odisha, he mentioned the establishment of Wetlands Authority which would look after the conservation of wetlands in the state. Moreover, he himself has advised the Biodiversity Board to prepare a checklist of Do's & Don'ts that could help the PRIs/ULBs understand which activities would not be in conformity with biodiversity conservation, and hence should be avoided. The House was delightfully touched when Sri Behera said that he felt this programme as his own(departmental), and had come to express his gratitude for such an initiative.

Sri Behera further said that whereas the government has resources, its capacity is limited which is why without cooperation of civil society government programs can't be fully successful. The State Biodiversity Board has been constituted, but much of the work is yet to be accomplished. Mere notification for BMCs will not be enough, and we need to make them aware of their responsibilities, he said. There are 314 Blocks in the state with about 6000 GPs, and through GP-level BMCs it would be easier to influence biodiversity conservation activities at grassroots level, he expressed hope.

He opined that while we need to increase production through another green resolution, this should be in conformity with biodiversity conservation. We shall have to bring back the extinct species like vultures, he said.

Sri Bikash Rath thanked Sri Behera for sparing some time for this programme despite his busy schedule, and called for immediate initiatives so as to make the State Biodiversity Board effective in safeguarding the interest of the state & its people. He took this opportunity to draw the attention of Sri Behera regarding how the pro-people JFM resolution of 1996 remains unimplemented yet, and also how the pioneering community forestry initiatives have been ignored in the state although countries like Bulgaria and Nepal have made specific legal provisions so as to secure the tenurial rights of community forestry groups because of their valuable contribution in conserving the environment. He urged the Forest Department of Odisha to revise the 2008 JFM policy so as to give ownership rights to the communities in the forests they protect.

The thematic session began with a presentation by Dr.R.K.Rath, Dean, College of Fishery(OUAT), Rangeilunda. He mentioned that there are about 2200 varieties of fish in India, and geo-climatic variations affect the habitat conditions which is why the species found in the Himalayan region differ from those of the plains, and seas. High rate of catching and adverse impact on habitat has led to significant reduction in the population of some varieties like *hilsa* and *chittal*. On the other hand, introduction of common carp(*Cyprinus carpio*) species in the waters of Dal lake in Kashmir and Loktak lake in Manipur led to significant loss in the population of the local varieties(*Schizothorax* in case of Dal lake and *Osteobrama belangeri* in case of Loktak lake) there because the common carps grow faster and are able to dominate the local variety, he explained.



Dr.R.K.Rath

He clarified that **genetic upgradation, that takes place between the same species, is different from genetic contamination that takes place between different species. It is this genetic**

upgradation or selective breeding that is required for fishery development which does not pose a threat to biodiversity. If exotic species are to be cultured, then that should be in confined water and not in natural flows because in case of latter the risk of contamination would be higher.

Replying to a query as to how exotic fishes are being introduced into culture fishery in parts of Odisha, and what is the risk in that, Dr. Rath said that Silver carp, Grass carp, and Common carp have been introduced in certain cases which work as complimentary to the indigenous varieties, but since there is little chance of inbreeding between them in confined water, hence they are not supposed to be risky though the chance of inbreeding can't be totally denied in the long run. He further said that there are 18 exotic fish varieties in India, and not all exotic varieties are entertained. Like, the Thai *magur* has been banned because of its voracious & carnivorous tendencies.

Dr.Damodar Satapathy, who was a member of the Committee formed to prepare Biodiversity Action Plan, had some critical observations on fishery activities in India/Odisha. He said that our fishery activities are rarely positive(like, brood stock development through selective breeding up to F₁,F₂&F₃¹ generations of offspring), sometimes neutral(like, modernization of existing fishery harbors and fish-landing centres), and usually negative so far their conformity with biodiversity conservation is concerned. The bold approaches for development often tend to ignore the sensitive/finer aspects, and hence shrimp farming is causing pollution, enrichment of reservoirs through supplementary stocking and auto-



Dr. Damodar Satapathy

stocking(inbreeding) is causing genetic erosion, and removal of weeds & carnivore fish while developing swamps & water-logged areas is causing loss of micro-habitat as well as loss of local species. Optimization of production, and not maximization should be our objective. He further said that fishes by nature are territorial, and hence that species is suitable for farming/culture which is found naturally in large quantities in a particular area.

The expert panel on animal resource development was represented by Dr. P.K.Rao, Professor & Head, Department of Animal Biology & Genetics, College of Veterinary Sciences & Animal Husbandry, OUAT, Bhubaneswar and Dr.R.C.Mohanty, a research scholar in the same department. Dr. Mohanty first cited an interesting example of how the elements of a particular ecosystem are interlinked. There is a special variety of buffalo in the Chilika area which can eat underwater vegetation in the lake. Whereas only cow's milk is used in the temple of Lord Jagannath, curd prepared from this buffalo's milk is also offered to the Lord since legend has it that during Kanchi war Lord Jagannath and Lord Balabhadra drank this curd from the hands of Manika gauduni, a village woman of Manika



Dr. R.C.Mohanty

¹ Refers to first, second, and third generations of breeding of a particular species so as to monitor the hereditary changes(if any, like changes in disease resistance capacity).

Patana near Chilika. This curd is specially prepared in bamboo baskets, and is very thick which helps it come out in slices. When a herd of this buffalo swims in the lake to reach another island, their dung dropped in the lake water becomes a good source of nutrients for the shrimps.

Some special breeds like the Hassili cock of Mayurbhanj are important elements of veterinary biodiversity. To preserve their distinct identity, artificial insemination is not permissible in such recognized breeds. So far in Odisha only few indigenous breeds have been registered. These are as under:

1. Cows: Binjharapuri, Motu, Ghumusari, and Khariari
2. Buffalo: Chilika buffalo

Attempts are being made to register also the Kalahandi buffalo, but breed recognition is a complex process and takes a lot of time, Dr.Mohanty said in response to a query by Bikash Rath as to what is being done to preserve these breeds.

Eminent rice expert and former Joint Director of Central Rice Research Institute, Cuttack Dr. Jafran Keshari Roy said that whereas biodiversity is species diversity, genetic diversity within a



Dr.J.K.Roy

single species/crop can also be seen. Rice is a good example of rich genetic diversity among the crops. There are about 80,000 varieties of rice cultivated in the world. Odisha's Jeypur tract is the second centre of origin of rice. These centres of origin have the maximum diversity.

Odisha had about 20000 indigenous varieties of rice cultivated, but now it has been reduced to 5000/6000 or less. This is because high yielding varieties are increasingly becoming adopted by farmers. Out of the total paddy area of 44 lakh hectares in the state, only about 11 lakh hectares are under local varieties. Local

varieties are usually confined to upland areas, or unfavourable low lands/unirrigated areas. However, local varieties have certain distinguished/remarkable advantages. For instance, general rice contains only 4 ppm iron whereas rice from *balunga dhana*² contains as high as 24 ppm iron. It is for this reason that in China & Japan, the iron-rich variety is mixed in 5% proportion with general rice.

Dr. Roy said that whereas the growth rate of other sectors are relatively high, that of agriculture sector is only 2% though the 7th Plan target is 4%. Therefore new technologies are being introduced to accelerate the growth, but this has threatened the biodiversity. Piracy has added to the trouble. Whereas genetic upgradation is to be done on exchange basis recognizing the original suppliers, piracy doesn't recognize the original suppliers who are deprived of the benefit of profit sharing. Dr. Roy said that many of Odisha's indigenous varieties have been supplied to Philippines(International Rice Research Institute) without recognizing the original source. The concept of **farmers' participatory breeding** therefore essentially stresses on the fact that the original supplier(farmer) of the indigenous variety must get the benefit of profit sharing.

² Paddy growing on its own without cultivation. Its presence in the field threatens paddy cultivation, and hence farmers uproot it. Interestingly, the seers(*rishis*) of ancient India used to eat this balunga rice and hence it is also called *rishi dhana*. (Source: Purnachandra Bhashakosha)

Odisha's *dhalaputia* rice variety is flood resistant. Through pure line selection, using its flood-resistance gene, Sub-1 lines have been developed at IRRI, Philippines, said Dr. Roy.

He expressed concern about the indigenous farmers losing their self-reliance in seed production. Local farmers are fast adopting hybrid varieties, but these do not yield seed and hence the farmer has to depend on the company to procure the same. This is how MNCs are capturing the seed industry, making the agricultural occupation more & more dependent on them. Explaining the difference between a grain and a seed, Dr. Roy said that while a grain may or may not be viable (for germination), a seed must have this viability. Replying to a query on certified seed, he clarified that the nucleus breed is the purest form of seed followed by the breeder seed which also is 100% pure, but foundation seed is 98% pure whereas certified seed is 95% pure (purity here implying to the capacity of germination).

He then spoke on the terminator gene. High yield variety was followed by further developed genetically-modified (GM) variety, which in turn was followed by the development of varieties having terminator genes. Terminator genes totally eliminate the scope of production of seeds though there would be flowers & fruits. Such a gene was tried in cotton in the US, but the experiment was stopped because of its high controversy.

Referring to BT brinjal, he said that it was not a genetic exchange between two varieties of brinjal; rather the gene extracted from the BT bacteria was inserted into brinjal which is why it became a matter of concern³.

Dr. Roy also referred to the medicinal varieties of rice⁴. He further mentioned the indigenous *kalamulia dhana* that is used to remove wild rice with non-pigmented base from the field even at early stage of the crop. Wild rices are big problems particularly in tribal areas, and experts like Dr. Roy recommend use of *kalamulia* rice varieties as a solution to this problem

The final presentation was made by Sri Biswanath Hota, retired forest officer and an expert on medicinal plants. He demonstrated many species of threatened medicinal plants in the state, and explained on *in situ* and *ex situ* conservation approaches. Showing the list of 10 hot spots of medicinal plants in the state (vide annexure-2), he said that out of the 41 varieties of threatened medicinal plants in Odisha 14 varieties have been endangered because of the unsustainable extraction of their bark. Of them the Ashoka tree, which is critically endangered, is found in maximum concentration in the Duanali-Barbara forest area. *Lodha (Symlocos*



Sri B.N.Hota

racemosa) is also critically endangered.

³ In January 2011 findings of a study suggested that BT brinjal can damage liver, and hit immunity (<http://indiatoday.intoday.in/site/Story/126821/mail-today-stories/bt-brinjal-can-damage-liver-&-hit-immunity-of-a-human-being..html>).

⁴ Rice varieties like Alcha, Karnhi (local varieties of Madhya Pradesh) are used for cure of some child diseases. Deep-red rices (mainly grown in deep water rice areas) have high iron content and used at the time of pregnancy. (Source: Dr. J.K.Roy)

The preferable variety of rasna(*Blepharispermum subsessile*, an endangered species) is found in Amarkot & Gurudangar forest areas of Khariar. Bidanga(whose substitute baibidang is relatively more available) is found in Shimilipal and Karlapat forests.

Suggesting the ways of conserving and sustainably extracting the medicinal plants, Sri Hota said that Ashok being Odisha's state flower, we need to plant this tree in each house. We should pluck only mature leaves of gudmari since only these are medicinally suitable. He referred to the findings of studies done at Tropical Forest Research Institute, and said that satabari can regenerate itself if we leave atleast 6 of its roots, and bark should not be extracted from a tree till it attains a girth of 90 cm.

Many of the participants, especially ladies took special interest in Sri Hota's presentation and asked him various questions. One of the narrations of Sri Hota in fact answered a question asked during some earlier presentation, i.e. why is araguna plant(which is being unsustainably extracted, as reported from Nayagarh district) used. He said that grains resembling that of sago are produced from the processing of the trunk of this plant(*Cycas circinalis*)⁵.

The programme ended with a vote of thanks from Bikash Rath.

⁵ The sago palm(*Metroxylon sagu*)'s trunk is processed to yield a starch that is converted into granular form known as sago. What is produced from a completely unrelated species, *Cycas circinalis* seems to be a substitute for the same, for adulteration purpose. The Cycad tree has poisonous properties, and hence sago substitutes produced from *Cycas circinalis* and *Cycas revoluta*(<http://en.wikipedia.org/wiki/Sago>; http://en.wikipedia.org/wiki/Cycas_revoluta) should be prepared after proper processing to remove the toxicity. It may be mentioned here that the primary use of *Cycas circinalis* has been for ornamental purpose, and its leaves are used for decoration.

Annexure-1

List of endangered & vulnerable plant species

(as presented by Dr. S.N.Patro)

Endangered plants

¹Herb, ²Shrub, ³Climber, ⁴Tree

- *Gloriosa superba* (Ognisikha/ Dasahara Phula/ Pancha Angulia)¹
- *Blepharispermum subsessile* (Rasna-Jhadi)²
- *Rauwolfia serpentina* (Patala Garuda/ Sarpagandha)²
- *Uraria picta* (Ishwarajata)²
- *Mucuna gigantea* (Ghoda Baidanga)³
- *Piper longum* (Pippali)³
- *Cordia macleodii* (Baurlo/ Boralo/ Ghanti/ Boet)⁴
- *Oroxylum indicum* (Phe nphana/ Bhalu-sakti)⁴
- *Pterocarpus marsupium* (Piasal/ Bija)⁴
- *Stereospermum chelonoides* (Pamphunia/ Parudi/ Patuli/ Padal)⁴
- *Xylocarpus granatum* (Sisumar/ Susamber)

Vulnerable plants

Herbs¹; Shrubs & Stragglers²; Climbers & Lianes³

- *Hedychium coronarium* (Rama Kedar)¹
- *Thalictrum foliolosum* (Bharda)¹
- *Caesalpinia digyna* (Gilo/ Tari)²
- *Embelia tsjeriam-cottam* (Baibedang/ Nuninunika/ Nununia)²
- *Gardenia gummifera* (Gurudu/ Bhuronkuli)²
- *Celastrus paniculata* (Pengu/ Pengumal/ Katta Pengu)³
- *Embelia ribes* (Baibedanga)³
- *Gnetum ula* (Lolari/ Galio/ Mirig-lendi/ Ludijango)³
- *Operculina turpethum* (Dudholomo)³
- *Paederia foetida* (Prasaruni/ Gandhali)³
- *Pueraria tuberosa* (Bhui-kakharu Patal kumra)³
- *Scindapsus officinalis* (Gajapipali Girudhuni)³
- *Stemona tuberosa* (Koelakand/ Kelya kanda)

Annexure-2

List of medicinal plant hotspots in Odisha

(as presented by Sri Biswanath Hota)

| FOREST | DISTRICT |
|------------------------|--------------------|
| Similipal | Mayurbhanj |
| Gandhamardan | Bargarh & Bolangir |
| Malyagiri | Angul |
| Mahendragiri | Gajapati |
| Niyamgiri | Kalahandi |
| Barbara-Dhuanali | Khurdha |
| Bhitarkanika | Kendrapada |
| Kothagada | Kandhamal |
| Gurudangar & Patdharha | Nuapada |
| Kapilash | Dhenkanal |