

## PEOPLE'S BIODIVERSITY REGISTERS: LESSONS LEARNT

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**Abstract.** People's Biodiversity Registers (PBR) document folk knowledge of status, uses, history, ongoing changes and forces driving changes in biodiversity resources, gainers and losers in these processes and people's perceptions of how these resources should be managed. A number of PBRs have been prepared in different parts of India beginning 1995 through initiatives of NGOs and educational institutions working with local communities and village councils. These attempts have been motivated by a desire to promote decentralised systems of management of natural resources and to create the basis for equitable sharing of benefits of commercial utilisation of folk knowledge of uses of biodiversity. The documents bring together important locality specific information on biodiversity resources and ecological processes affecting them. They lead to recognition of conservation oriented local practices such as protection of sacred groves. They help mobilise local communities to prudently manage local biodiversity resources in ways that would promote social justice. It is however important to recognise that not all folk knowledge may be valid, nor all folk practices wise, and to create systems of careful assessment of the material. There are many encouraging signs globally, as well as within India, such as the coming in force of the Convention on Biological Diversity, forces promoting decentralised democratic systems of governance and institutions of co-management of natural resources which suggest that programmes like PBR will have an important role to play in promoting conservation, sustainable use and equitable sharing of benefits of biodiversity resources in the coming decades.

**Key words:** biodiversity, information system, folk knowledge, participatory appraisal, benefit sharing, CBD, co-management, PBR.

**Abbreviations:** CBD - Convention on Biological Diversity; NGO - Non-Governmental Organisation; PBR - People's Biodiversity Registers; SPWD - Society for Promotion of Wasteland Development; TBGRI - Tropical Botanical Garden and Research Institute; UNEP - United Nations Environment Programme.

### 1. Introduction

The People's Biodiversity Register (PBR) programme is an attempt to record people's knowledge and perceptions of the status, uses, history, ongoing changes and forces driving these changes in the biological diversity resources of their own localities. It also aims to document people's perspectives on who the gainers and losers are of ongoing changes in the ecological setting and utilisation of biodiversity resources, and how they feel



the resources ought to be managed (Gadgil *et al.*, 2000). The endeavour acknowledges that different stakeholders from local communities, as well as outsiders may have divergent understanding and perspectives on these issues and attempts to record these. It is hoped that the information thus recorded would eventually become a part of a broader biodiversity information system. Such an information system could serve to (a) support a decentralised system of management of natural resources, as well as (b) help organise equitable sharing of benefits flowing from commercial utilisation of biodiversity resources and knowledge of their uses (Dhar and Chaturvedi, 1998; Gadgil and Rao, 1998). PBRs are expected to become an element of an ongoing effort at monitoring of biodiversity resources and to be updated at regular intervals. The process of compilation of PBRs is expected to enhance the public awareness of significance of conservation, sustainable use and equitable sharing of benefits of biodiversity and to catalyse grass-roots action.

## 2. Motivation

A number of groups from the NGO sector as well as the academic community have been involved in preparation of PBRs in different parts of India since 1995. The primary motivation behind the pioneering attempts initiated in early 1995 by the Foundation for Revitalisation of Local Health Traditions, Bangalore was to record the rapidly eroding folk knowledge of medicinal uses of plants (Gadgil, 1996). Two other NGOs, Navadhanya of New Delhi and Deccan Development Society of Hyderabad have focussed on recording the occurrence and management practices of land races of cultivated crops to support their on-farm conservation, as well as promotion of farmers' rights. Kerala Sastra Sahitya Parishat, a leading People's Science Movement from Thiruvananthapuram has been involved in local level mapping of natural resources to support decentralised systems of resource management since 1991. They have prepared PBRs covering all 85 village councils of the district Ernakulam over 1998-99 as an element of the people's planning movement in the Kerala state (Ernakulam District Biodiversity Committee, 1999). M.S. Swaminathan Research Foundation of Chennai has prepared PBRs in Wynaad district of Kerala and Paschim Banga Vigyan Manch of Kolkata in Hoogly district of West Bengal with a similar motivation.

## 3. Materials and Methods

The most systematic attempt at preparation of PBRs was undertaken by a network co-ordinated through the Indian Institute of Science, Bangalore as a part of the Biodiversity Conservation Prioritisation Programme sponsored

by World Wide Fund for Nature (India) over 1996-98 (Srishti Jigyasa Parivar, 2000). This programme was initiated through a workshop held at the Indian Institute of Science, Bangalore in March 1996 involving potential collaborators from the states of Himachal Pradesh, Rajasthan, Bihar, Assam, Orissa, Karnataka, Maharashtra and the Union Territory of Andaman and Nicobar Islands. These eight regions had been selected to represent the varied ecological and social regimes of the subcontinent. The discussions at this workshop permitted a crystallisation of the methodology and drafting of a methodology manual. There followed a series of further training programmes and workshops that facilitated the field work spread over fifty two sites throughout the subcontinent employing a common methodology. The individual study sites were so selected as to represent the entire spectrum of ecological and social regimes within the state. The fifty two study localities covered the entire spectrum of bioclimatic zones of the country (Gadgil and Meher-Homji, 1990): tropical wet (18), tropical moist (16), tropical dry (6), tropical semi-arid (4), subtropical (4), temperate (3) and alpine (1). They also covered a whole range of ecosystem types: forest (30), pastures (8), wetlands (14), degraded forests (3), agriculture (33), horticulture (8) and desertic (3). Sixteen of the studies pertained to protected areas, comprising six national parks and ten wildlife sanctuaries, three of these were Tiger Reserves and two were Bird Sanctuaries. This was followed by selection of field investigators from amongst college or University level science teachers or workers of rural development or environment oriented NGO's. Many of these belonged to localities from or close to study sites, with considerable previous familiarity with the study sites. The field investigating teams worked closely with, and often included some of the local residents. Of the fifty two Principal Investigators of the programme fourteen were college teachers, two University teachers, two school teachers. There were four government officials, thirteen NGO workers and six individuals engaged in development activities on their own. The entire programme engaged 350 researchers from all these sectors and 200 assistants from village communities. As many as 1000 villagers had extensive involvement in the programme as local knowledgeable individuals.

The methodology of field investigations included the following components: building of rapport with local people, clarifying project rationale and obtaining their approval for the joint studies, identification of different biodiversity user groups, identification of individuals knowledgeable in different aspects of distribution and uses of biodiversity, individual as well as group interviews with members representing different user groups as also knowledgeable individuals, mapping of the landscape of the study site, field visits to representative elements of this landscape along with some user groups members and knowledgeable individuals, discussions with the entire village assembly, and discussions with outsiders affecting the resource use at study site such as nomadic shepherds or artisans, traders and government officials. The information so generated was then synthesised into a PBR

document by the Principal Investigators in charge of the particular sites. These documents were in local languages, several of these were also translated in English. The documents were presented to the village communities and lodged in the village council offices and schools and colleges. In several cases these were discussed at district and state level meetings as well. A summary of the main points emerging from these PBRs was published as a review in a widely circulated Annual Survey of Environment published by Hindu, a leading English language daily (Srishti Jigyasa Pariwar, 1998).

#### 4. Positive Outcomes

##### 4.1. ECONOMIC RESOURCES

The PBR exercise is still in an early experimental phase, yet it is clear that it is of value in several contexts. It can help the local community become aware of specific resources of value being harvested from their locality. Thus in village Kigga in Chikmagalur district of Karnataka state, the process of documentation drew people's attention to the fact that large quantities of mosses were being collected and exported to urban centres. As a consequence they became motivated to find out the prices prevailing in the urban markets and organise themselves to regulate the harvests and ensure better returns for themselves. In village Mala of Udupi district in Karnataka, the villagers had not realised that the total value of non-timber forest produce being collected annually from their village was around half-a-million rupees. Realisation of this large volume has triggered an interest in sustainable use through mechanisms such as the establishment of a Joint Forest Management Committee.

##### 4.2. ECOLOGICAL PROCESSES

Such a documentation could bring out very useful understanding of ecological processes, as had happened in an earlier investigation of use of bamboo resources. Bamboo is used both for rural handicrafts and as a raw material for paper production. While harvesting bamboo, the rural artisans left intact the cover produced by a tangle of thorny branches at the base. On the other hand, the paper industry cleared this thorny cover during the harvesting operation. The artisans were aware that the latter practice was undesirable as it exposed the young shoots to grazing thereby adversely affecting the growth of the bamboo clump, a claim sustained by the experimental evidence collected by a group of scientists from the Indian Institute of Science (Gadgil and Prasad, 1981). It is likely that other such interpretations of ecological processes by local people may turn out to be of value in deciding upon resource management practices. For example, villagers from

Teligram in Hoogly district of West Bengal contend that fertilisation of fish ponds by poultry waste is responsible for the outbreak of diseases amongst domesticated ducks.

#### 4.3. CONSERVATION PRACTICES

The PBR process also helps to record and promote an assessment of possible value of a variety of conservation oriented traditional resource use practices (Gadgil and Berkes, 1991; Gadgil *et al.*, 1993). These include, for example, protection to entire biological communities as sacred groves or river stretches, or protection to certain life history stages such as birds breeding at a heronary or fishes migrating upstream to spawn during the rainy season. It is only recently that Resource Management Agencies are beginning to accept the possible value of such practices, earlier discarded as superstitions of no practical value, and their proper documentation through the PBR process would be an important step in their rehabilitation where appropriate (Gokhale *et al.*, 1998). For example, the PBR of Mala village of Karnataka has documented the existence of as many as 400 sacred groves in an area of about 50 km<sup>2</sup>. While they have greatly shrunk in area, from an earlier coverage of about ten per cent of land surface, they today harbour almost all the dipterocarp trees surviving in the locality. Elsewhere such sacred groves have been shown to play a significant role as fire breaks to prevent the spread of fires set during the slash-and-burn cultivation (Gadgil *et al.*, 1997).

#### 4.4. SOCIAL MOBILISATION

The PBR process can play a valuable role in social mobilisation. The village Nanj of Mandi district in Himachal Pradesh was an active participant in the literacy movement during 1992-93 and the people were exposed to a variety of issues relating to natural resource management. As a consequence, a heavily degraded patch of forest was enclosed by consensus. The regeneration in this patch has been extremely promising. During the literacy campaign, a blackboard had been painted on a wall at a public place in the village for open classes and dissemination of information. Subsequently, it had fallen into disuse. It was revived again during the PBR documentation to display the gist of information collected, leading to public debates on the issues raised by the information and in turn to conservation actions.

One such debate centered around the species Kambal (*Rhus wallichii*, Hook. f.); a multipurpose tree species found up to the mid-Himalayas, considered to be a good source of fuelwood and green manure. It was pointed out on the blackboard that due to excessive pressure of both fuelwood and manure collection, Kambal had been reduced to a bush in the forest, leading to declining availability of both fuelwood and manure. After many days of discussion in front of the blackboard, it was decided that leaf manure for ginger was a higher priority. As other fuelwood species were available in the

forest, the extraction of Kambal was agreed to be restricted to leaves for green manure, with bushes pruned in such a way that one or two shoots would be permitted to grow. At the same time, a few progressive farmers decided to experiment with agricultural crop residues as a substitute for Kambal leaves for manure. Over one year, they demonstrated that there was no difference in the yields from the two kinds of manure and subsequently more farmers turned to crop residues as this meant lower labour inputs. As a consequence, Kambal is now flourishing in the forest and due to careful pruning and good rootstock, will grow back to trees in a few years time.

Similarly, the PBR exercise in Telegram village in Hoogly district of West Bengal has highlighted the near total destruction of indigenous fish diversity in this region rich in fish ponds and streams, to make way for culture of exotic carps. Such commercialisation has also reduced the access of the poorer families to fish they used to be allowed to harvest on their own. As a fall-out of the PBR exercise the village council chairman is proposing a project wherein the village would lease out a few ponds with substantial subsidies to poor families on the condition that they stock these with indigenous fish communities.

#### 4.5. BENEFIT SHARING

PBR documentation could potentially serve as a basis for equitable sharing of benefits from commercial application of folk knowledge of uses (Dutfield, 1999). A well known Indian case of such benefit sharing involves the development of a stamina-enhancing product from the plant *Trichopus zeylanicus* by scientists at the Tropical Botanical Garden and Research Institute (TBGRI) at Thiruvananthapuram in Kerala on basis of information received from members of the Kani tribe. The know-how relating to this product has been passed on to a pharmaceutical company with the TBGRI sharing half the amount of the royalty received with a trust set up to benefit the Kani tribal community. In this case there was much debate as to who the recipients of the benefit should be. Careful PBR type documentation could be of considerable value in resolving such issues. At the moment however the PBR exercises have not taken up the recording of such novel knowledge of uses, since the PBR documents do not as yet enjoy any legal status. The uses thus far recorded pertain to those that are already common knowledge.

### 5. Validation

There are thus many positive experiences of the value of the PBR documentation. However, it is clear that the information thus being recorded must be assessed in terms of factual validity and cross-checked against other scientific evidence. The villagers of Mala (Udupi district, Karnataka), for instance, report having seen a snake of the size of a king cobra with a crest

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shaped like a cock's comb. They also report the use of some herbs as an antidote against poisonous snake-bites. The traditional resource use practices of one of the communities in this village include semi-annual communal hunts during which all the larger mammals that they come across are killed. It is evidently desirable that such claims of knowledge and consequences of practices are carefully assessed.

## 6. Barriers

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Ethnobiology has a long tradition of recording folk uses of biological material to serve as a possible starting point for development of new commercial products (Martin, 1995). Such documentation is not concerned with careful recording of contributions of particular individuals or communities, nor with any sharing of benefits with them. These, on the other hand, are significant concerns of PBR exercise. At the same time, PBR exercises focus on people's perceptions of ecological processes, ecological changes, forces driving ecological changes, gainers and losers of uses of living resources and management options. These issues may be addressed, albeit to a limited extent in exercises such as participatory rural appraisals that are aimed at supporting decentralised participatory systems of resource management (Chambers, 1983). PBR thus emphasises documentation as a tool to empower people outside the scientific, administrative and political mainstream (Sharma, 1997).

It is therefore to be expected that the PBR experiment will be opposed by some of the beneficiaries of the current system. In one of Indian states, for instance, a senior bureaucrat blocked the acceptance of a major grant to initiate the preparation of PBRs on a large scale on grounds that this would come in the way of state's implementation of development programmes. Some leading scientists have also objected to any recording of folk knowledge, even when accompanied by measures to validate such information. There have been other sources of opposition to the PBR experiment as well. These include a fear that recording of folk knowledge of uses may be appropriated by commercial interests without a just sharing of benefits; and that recording of information on occurrence of biological resources would lead to an overexploitation of these resources by commercial interests. Both these apprehensions have a genuine basis, and need to be addressed by putting in place proper mechanisms for benefit sharing and for ensuring sustainable resource harvests. The third strand of opposition comes from groups that distrust modern science and technology. They correctly view PBR as part of the modern scientific tradition of systematic documentation and subsequent validation which may lead to further technological developments. Some believers in a romantic pastoral society such as the well known Indian environmental activist, Sundarlal Bahuguna, may therefore be uneasy with such experiments. Others consider

modern science as just another knowledge system on par with any of folk knowledge systems and are therefore uneasy with scientific scepticism and the demand to scrutinise and validate folk knowledge and perceptions.

## 7. Supportive Developments

While there exist such barriers to further development of PBRs as a tool of value in many contexts, there are a number of supportive developments, at a global as well as a national scale. At the global scale, the Convention on Biological Diversity, especially article 8 (j) recognises the value of folk knowledge and practices and calls for activities which would include many elements of the PBR exercise (UNEP, 1992). The global science community is also moving towards according due recognition to folk knowledge and wisdom as evident in the discussions at the World Conference on Science at Budapest in June 1999 (Gadgil, 2000).

At the national level, the Government of India has tabled before the Parliament in the Monsoon 2000 session a Biological Diversity Bill which provides for a National Biodiversity Authority, state level Biodiversity Boards and local level Biodiversity Management Committees (Anon., 1998). The local level Biodiversity Management Committees would be responsible for local level chronicling of biodiversity. Obviously, these chronicles would include many elements of PBRs. Simultaneously, India is moving towards decentralisation of governance and of management of natural resources. It is committed to devolution of considerable powers to village and district councils. This devolution has progressed furthest in the state of Kerala where each village council is expected to prepare a village development report. Several elements of such a village development report are integral to PBRs and in fact many village councils in Kerala are actively preparing PBRs (Ernakulam District Biodiversity Committee, 1999). Similarly many villages in India are now involved in managing local forest resources through joint committees involving village communities and forest department (Saxena, 1999; SPWD, 1992). The management plans prepared for such programmes of co-management have many elements in common with PBRs (Karnataka Forest Department, 2001; National Wasteland Development Board, 1990).

## 8. Conclusions

There are then a number of supportive developments, globally and within India which suggest that exercises of systematic, periodic documentation of people's knowledge and perceptions of biological diversity and its management such as PBRs may become significant elements of the world-wide attempts at conservation, sustainable use and equitable sharing of



benefits of biodiversity. It is possible to organise such documentation as a co-operative endeavour of teachers, students, NGO workers and community members. A supportive system needs to be set up to scrutinise and validate the information recorded in these documents and to incorporate it in a comprehensive biodiversity information system to support prudent management and to sustain claims in relation to intellectual property rights.

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### References

- Anonymous (1998) *The Draft Indian Biological Diversity Act*, Ministry of Environment and Forests, Government of India, New Delhi.
- Chambers, R. (1983) *Rural Development: Putting the Last First*, Longman, London.
- Dhar, B., and Chaturvedi, S. (1998) *Implications of the Regime of Intellectual Property Protection for Biodiversity. A Developing Country Perspective*, RISNOPC, New Delhi.
- Dutfield, G. (1999) *Intellectual Property Rights and Plant Genetic Resources with Particular Reference to Seeds and Plant Varieties*, IUCN, Gland.
- Ernakulam District Biodiversity Committee (1999) *Ernakulam District People's Biodiversity Register*, Ernakulam.
- Gadgil, M. (1996) Peoples biodiversity register: a record of India's wealth, *Amruth Spl. Suppl.*, 1-16.
- Gadgil, M. (2000) Forging an alliance between formal and folk ecological knowledge, in *World Conference on Science. Science for the Twenty first Century - A New Commitment*, UNESCO, Paris, pp. 94-97.
- Gadgil, M., and Berkes, F. (1991) Traditional resource management systems, *Resource Management and Optimisation* 18 (3-4), 27-141.
- Gadgil, M., Berkes, F., and Folke, C. (1993) Indigenous knowledge for biodiversity conservation, *Ambio* 22, 151-156.
- Gadgil, M., Hemam, N.S., and Reddy, B.M. (1997) People, refugia and resilience, in C. Folke and F. Berkes (eds), *Linking Social and Ecological System*, Cambridge University Press, Cambridge, pp. 30-47.
- Gadgil, M., and Meher-Homji, V.M. (1990) Ecological diversity, in J.C. Daniel and J.S. Serrao (eds), *Conservation in Developing Countries. Problems and Prospects*, Proceedings of the Centenary Seminar of the Bombay Natural History Society, Bombay Natural History Society and Oxford University Press, Bombay, pp. 175-198.
- Gadgil, M., and Prasad, S.N. (1981) *Conservation of Bamboo Resources of Karnataka*, Karnataka State Council for Science and Technology, Bangalore.
- Gadgil, M., and Rao, P.R.S. (1998) *Nurturing Biodiversity: An Indian Agenda*, Centre for Environmental Education, Ahmedabad.
- Gadgil, M., Rao, P.R.S., Utkarsh, G., Chhatre, A., and members of the People's Biodiversity Initiative (2000) New Meanings for Old Knowledge: The People's Biodiversity Registers Programme, *Ecological Applications* 10 (5), 1307-1317.

- Gokhale, Y., Velankar, R., Chandran, M.D.S., and Gadgil, M. (1998) Sacred woods, grasslands and waterbodies as self-organised systems of conservation, in P.S. Ramakrishnan, K.G. Saxena and U.M. Chandrashekara (eds), *Conserving the Sacred for Biodiversity Management*, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, pp. 366-396.
- Karnataka Forest Department (2001) *Forest Management Planning Handbook*, Karnataka Forest Department, Bangalore.
- Martin, G.J. (1995) *Ethnobotany: A Method's Manual*, Chapman and Hall, London.
- National Wastelands Development Board (1990) *Guidelines for Microplanning*, NWDB, New Delhi.
- Saxena, N.C. (1999) *The Saga of Participatory Forest Management in India*, Centre for International Forestry Research, Bogor.
- Sharma, B.D. (1997) *Tide Turned: The Making of Self Rule in the First Central Law in the Wake of Bhuria Committee Report*, Sahayog Pustak Parivar, New Delhi.
- SPWD - Society for Promotion of Wasteland Development (1992) *Joint Forest Management Field Methods Manual*, Vols 1 and 2, New Delhi.
- Srishti Jigyasa Pariwar (1998) Let the people speak, *The Hindu Survey of Environment '98*, 101-137.
- Srishti Jigyasa Pariwar (2000) Conserving India's biodiversity: let people speak, in S. Singh, A.R.K. Sastry, R. Mehta and V. Uppal (eds), *Setting Biodiversity Conservation Priorities for India*, Summary of the Findings and Conclusions of the Biodiversity Conservation Prioritisation Project, Vol. II. World Wide Fund for Nature - India, New Delhi, pp. 583-600.
- UNEP - United Nations Environment Programme (1992) *Convention on Biological Diversity*, United Nations Environment Programme, Nairobi, Kenya.

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