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REVIEW ARTICLE

PEOPLES BIODIVERSITY REGISTERS (PBRS) – A BIODIVERSITY IMPACT ASSESSMENT TOOL FOR SUSTAINABILITY OF BIOLOGICAL RESOURCES

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ABSTRACT

People's Biodiversity Register (PBR) is a document which contain comprehensive information on availability, knowledge of local biological resources their medicinal uses, traditional knowledge, geographical coverage, sustainable management of resources, quantification of the resources and serves as an impact assessment tool for developmental activities. PBRs are maintained and prepared in consultation with local people constituted by Biodiversity Management Committees (BMC) at local bodies such as village Panchayats, Taluk's, Distrricts / Zilla's, Corporation / Municipalitites. BMC and local support group (LSG) are the custodians of PBRs. Biological Diversity Act (2002) and Rules (2004) establishes Biodiversity Management Committees (BMC) in all local bodies throughout the country for the preparation of People's Biodiversity Registers (PBR). Preparation of PBRs is a scientific activity and serves as a key tool to monitor, document and facilitates knowledge-based management of agriculture, livestock, fish, forests, public health to enhance the quality of life of community members. Documentation should also help prevent loss of grass-root knowledge associated with biodiversity, secure recognition for such knowledge and add value to it for conservation of Biodiversity and related Indigenous traditional knowledge. The total number of PBRs Documented in different states till 17.07.2017 by National Biodiversity Authority is Karnataka with highest number 1970, Gujarat with 957, Madhya Pradesh of 890, Kerala with 854, Tripura with 279 and Andhra Pradesh with only 25. Hence, PBRs should be used as a base to set a standard for Bio-prospecting and there is a need for increasing the number of PBRs at gram Panchay at levels for conservation of Biological resources.

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INTRODUCTION

India is a land of rich biological and cultural diversity, one of the mega biodiverse countries of the world and home of a large number of tribal groups, pursuing different kinds of nature based livelihoods. In addition, a large number of farming and fishing communities, nomadic groups possess traditional knowledge of varying degrees. The development of modern science and technologies notably biotechnology and information technologies have increased the value of biodiversity and associated knowledge including Traditional Knowledge (TK). The sustainability of biodiversity depends on the diversity of animals and plant forms in it but due to anthropogenic effects many species have already lost and many are on brim of extinction. If this continuous the life on earth may lead to an end. Development policies must widen people's options for earning a sustainable livelihood, particularly for resource-poor households and in areas under ecological stress. In a hilly area, for instance, economic self-interest and ecology can be combined by helping farmers shift from grain to tree crops by providing them with advice, equipment, and marketing assistance. Programmes to protect the incomes of farmers, fishermen, and foresters against short-term price declines may decrease their need to overexploit resources. The conservation of agricultural resources is an urgent task because in many parts of the world cultivation has already been extended to marginal lands, and fishery and forestry resources have been overexploited. These resources must be conserved and enhanced to meet the needs of growing populations. Land use in agriculture and forestry must be based on a scientific assessment of land capacity, and the annual depletion of topsoil, fish stock, or forest resources must not exceed the rate of regeneration. The first step towards conservation is sustainable utilization of biological resources and its documentation. Biological Diversity Act, 2002 as notified by Government of India proposes to conserve Biodiversity at the village level by access and benefit sharing through sustainable utilization of bio-resources. The act needs

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a variety of information for its proper implementation with the aim to conserve heritage sites at a local and global level in the context of socio-economic forces and tenurial arrangements for specific sites. The knowledge of local people mainly in oral form needs to be documented, which is taken up by Biodiversity Management Committees at the local level.

Biodiversity Management Committee (BMC)

Biological Diversity rules, 2004 states that every local body shall constitute Biodiversity Management Committee (BMC) within its area of jurisdiction. The National Biodiversity Authority (NBA) shall provide guidance and technical support to the BMC for preparing, maintaining and validating People's Biodiversity Register. State Biodiversity Board (SBB) or Authority advises BMC for granting approval, to maintain data about the local vaids and practitioners using the biological resources. The Authority shall take steps to specify the form of the PBRs, and the particulars it shall contain and the format for electronic database. SBB would provide necessary training to the Technical Support Group (TSG) of the district and enable smooth functioning and aid in networking for creation and maintenance of People's Biodiversity Registers (PBRs).The concept of PBR is pioneered by Foundation for Revitalization of Local Health Traditions (FRLHT) during 1995 to record the rapidly eroding folk knowledge of medicinal uses of plants (Gadgil, 1996).

UN Convention on Biological Diversity (CBD)

CBD came into force on December 29, 1993 to ensure the biodiversity conservation, sustainable use of its components, and the fair and equitable sharing of benefits arising out of the utilisation of genetic resources. Article 15 of the CBD provides the authority to determine access to genetic resources rests with the National Governments having sovereign rights over their natural resources and is subject to national legislation. Such mutual access is required between contracting parties and the party providing the resource. Government of India has established an autonomous society called the National Innovation Foundation (NIF) to safeguard, reward and add value to traditional knowledge as well as grass-root innovations in the informal sector. NIF maintains a repository of the information in National Register (NR), which organize People's Knowledge Database (PKD) collected through PBRs with public. PKD and NR form part of a distributed Biodiversity Information System (BIS) that would incorporate other relevant scientific, technical, IPR and market related information and serve as the knowledge base for NBA, SBBs and BMCs. NIF would facilitate linking of local with national and global scale processes of knowledge management. It would also bridge the gap between informal folk knowledge and formal scientific knowledge systems (Gokhale *et al*., 2005).

Biodiversity Information System (BIS)

Documentation of knowledge associated with biodiversity is clearly pertinent to Biological Diversity Act, 2002 of India and also of CBD for equitable sharing of benefits with knowledge holders. The Act proposes to have heritage sites to be selected for conservation management and purposes for which there is a need to have an information base. The threatened species also require information for the purpose of preservation and rehabilitation as mentioned in the Act. It is necessary to have information on globally held patents, inventory of biological resource of Indian origin and issues related to intellectual property rights of the local people. The reliable and most novel and significant information on the status and dynamics of the natural medicinal plant population have to be developed at the national level. There is a great dearth of information on biodiversity of India even though India has a long history of taxonomic studies. The information should envisage on present status, on-going processes, historical trends, uses, conservation traditions, with non-scientists, embodied in oral traditions of species, genes and ecosystems. Information system is an important prerequisite for the validation of informal knowledge of the local people.

Validation of documentation

The process requires rapid methodologies to test these perceptions so as to use those for management purposes. Some of the immediate validation tools could be –

a) Maps prepared for specific themes by superimposing the perceptions of peoples on existing village map or toposheets e.g. increase in the mining area or spread of cattle disease in the region over the period etc.
b) Cross checking with available beneficiaries of medicines or any other skill in field.
c) Known information to the data collector based on secondary literature.
d) Knowledge being practiced by the data collector e.g. edibility of fruits, recipe for specific tuber, etc.
e) Data collector as witness of certain event, e.g. rituals in sacred groves.

PBR Process

The PBR is a participatory process requiring intensive and extensive consultation with the people. The objectives and purpose is to be explained in a group meeting in the presence of all sections of people in the Panchayats, members of the BMC, students, knowledgeable individuals and all those interested in the effort. Documentation includes photographs (including digital images), drawings, audio and video recordings and other records like printed material.

The process in PBR preparation includes the following steps:

a. Formation of BMC
b. Sensitization of the public about the study, survey and possible management
c. Training of members in identification and collection of data on biological resources and traditional knowledge.
d. Collection of data, Data collections includes review of literature on the natural resources of the districts, Participatory Rural Appraisal (PRAs) at village level, house hold interviews, individual interviews with village leaders and knowledgeable individuals, house hold interviews, individual interviews with village leaders and knowledgeable individuals, households heads, key actors of the Panchayat raj institutions and NGOs and direct field observations.
e. Analysis and validation of data in consultation with technical support group and BMC.
f. Preparation of PBR
g. Computerization of information and resources.

h. PBR includes ten modules like peoplescape, landscape, mindscape, lifescape, world in flux, utilisation, nurturing, lifestyle and choices.

PBR programme was launched with a workshop held on Western Ghats Biodiversity Network initiated by the centre for Ecological Sciences (CES) at Indian Institute of Sciences, Bangalore and Medicinal Plant Conservation project of FRLHT on1995. PBR is reported at 24 sites from 10 states of India. It is an authentic document which contain comprehensive information on availability, knowledge of local biological resources their medicinal uses, traditional knowledge, geographical coverage, sustainable management of resources, quantification of the resources and serves as an impact assessment tool for developmental activities. From the year 1995 a number of PBRs are prepared with the initiatives taken by NGOs sector and educational institutions working along with local and village people. PBR records people's knowledge and on-going changes in biodiversity of the area and serves as a baseline database for future management strategies; it can be used as a handbook for assessing locally significant elements of biodiversity as part of formal and non-formal education (Laladhas *et al*., 2013). Dr.M.S.Swaminathan urged upon scientific community to make PBR a reality in 6,00,000 villages of India. The people's contribution to conserving biodiversity is equated with emphasized on the need to conserve Agro-biodiversity, launch on farm conservation and need for conservation of literacy amongst 40% of 1 billion Indian Population, comprising youth. PBR may provide insight into sacred groves and sacred ponds and on the pattern of biodiversity in the culturally diverse society of 40,000 endogamous groups in India. Tribal taxonomy may actually lead to value added taxonomy. Stressing ever increasing knowledge on Indian Biodiversity with 396 mammals, 1200 Birds, 484 Reptilia, 228 Amphibia the potential use of modern statistical tools estimation was emphasised (Gore, 1997).

Preparation of Peoples Biodiversity Register
www.ctrdresearch.org/photo_gallery.php

When PBR documentation is completed, copies of each PBR will be held locally by Panchayats (local level elected councils), by educational institutions, and by proposed district level "biodiversity cells" that will serve as repositories of computerized collections of the PBRs produced within the district (Ghate and Utkarsh, 1997). With the advice and support of these cells, which would comprise representatives of all stakeholders, the validity of the information in each PBR will be checked and the PBRs will be periodically updated. The total number of PBRs Documented in India are 5466 in 29 different states till 17.07.2017 by National Biodiversity Authority is Karnataka with highest number 1970, Gujarat 957, Madhya Pradesh 890, Kerala with 854, Tripura 279 and Andhra Pradesh with 25. Hence, PBRs should be maintained as a base to set a standard for Bio-prospecting and there is a need for increasing the number of PBRs at gram Panchayat levels for conservation of Biological resources (Ghosh, 2007).

PBR objectives

- The objective is to document the information present with practical ecologists, people who deal with living resources as a part of their daily subsistence activities as grazers, fisher folk, basket weavers, hunters, tribal healers, honey gatherers and sophisticated practitioners like Ayurveda.
- Status of biodiversity resources such as populations of medicinal plants, cultivars of fruit trees or freshwater fishes.
- Various factors such as harvests from natural populations, changes in agricultural practices or discharge of industrial effluents, affecting the biodiversity resources.
- Local communities/individuals in sustainable use and conservation of biodiversity resources, such as systems of regulated grazing on pastures, maintenance of plant varieties and protection of fauna species (Om Prakash *et al*., 2014).

Specific roles by the following agencies for preparing PBR

Villagers: Try to acquire some knowledge of the medicinal plants available in their locality, and try to protect them, prevent smuggling, cutting, and destroying the medicinal plants.

Forest Department: Prevent smuggling, theft of some of the trees like sandal, teak, neem etc. Establish nurseries, distribute seedlings and plants at a low cost and encourage farmers to grow economically valuable trees like sandal, teak, mango, silver oak by giving protection to them.

Joint Village Forestry Committee: A committee involving both forest department, and village members should be formed, and it should identify empty lands nearby village where nothing has been grown, and in those lands try to cultivate medicinal plants.

Agricultural department: Establish research centers, nurseries, and medicinal plant gardens where information regarding cultivation of medicinal plants will be available, and medicinal plants will be supplied at nominal cost to the people. Establish a center where people can sell their products for a reasonable price.

Non-Government Organizations (NGOs): Education and awareness creation regarding medicinal plants through posters, street plays, skills etc.

Agencies preparing Ayurvedic medicines: Visit the locality on fixed days and purchase the medicinal plants. Encourage people who grow medicinal plants on an extensive scale by giving some incentives, such as loan, and subsidy.

Gram Panchayat: Pass a resolution that people should take permission and clearance from Gram Panchayat when collecting medicinal plants and also when cutting trees like *Neem,Pongamia* etc.

Taluk Panchayat: Monitor the activities of Gram Panchayat and also help out interested people in maintaining and conserving medicinal plants.

District Panchayat: Organize workshops for NGO's, Govt. officials, officers, teachers regarding the traditional uses and importance of medicinal plants and encourage them to continue those elements of the culture and tradition that are practical.

A medicinal plants conservation agency: Should be formed, with sub-units in schools etc. This agency should monitor village level action plans prepared by the villagers (Gadgil online).

Conclusion

The PBR exercise will be an innovative enterprise bringing together knowledge of the local people with scientific knowledge. The technical inputs may be derived opportunistically from a variety of sources such as Regional Stations of Agricultural Universities, Krishi Vigyan Kendras, Farm Clinics, Universities and colleges, research institutes like Central Institute of Medicinal and Aromatic Plants, NGOs like the FRLHT and so on. PBR exercises may be initiated on the basis of technical knowledge accessed by local High School teachers coupled to the knowledge of local community members. Simultaneously, efforts should be organized at the state and national levels to develop

[a] Resource material
[b] Training modules
[c] A network of experts and technical institutions to support PBR activities everywhere
[d] A database designed to organize the locally collected PBR information and link it to a broader networked Biodiversity Information System. And it will be a Biodiversity impact assessment tool for Sustainability of Biological resources.

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