

sive epidemics often occur in these regions after excessive rains causing poor health and food insecurity in the region which already suffers from guinea worm disease and deficiency in food supply. Access to frequently updated rainfall information should become one of the essential elements for the development of integrated malaria early warning systems for the desert region.

1. Akhtar, R., *Ann. Nat. Assoc. Geogr., India*, 2003, pp. 1–16.

2. Kovats, R. S., *Bull. World Health Organ.*, 2000, **78**, 1127–1135.
3. Akhtar, R., *Glob. Environ. Res.*, 2007, **11**, 51–57.
4. Kumar, J. S., *Lancet*, 1998, **351**, 1869.
5. Sharma, I. D., *Nature*, 1995, **373**, 279; also see Bouma, M. J. and Vander Kaay, H. J., *Lancet*, 1995, **344**, 1638.
6. Goudie, A., *Environmental Change*, Clarendon Press, Oxford, 1983, p. 156.
7. Parthasarathy, B., Sontakke, N. A., Munot, A. A. and Kothawale, D. R., *J. Climatol.*, 1987, **7**, 57–70.
8. Akhtar, R. and McMichael, A. J., *Lancet*, 1996, **348**, 1457–1458.

9. Anti-malaria steps are inadequate, *Hindustan Times*, 30 October 1994.
10. Tyagi, B. K., Choudhary, R. C. and Yadav, S. P., *Lancet*, 1995, **346**, 634–35.
11. Hahir, P., *Malaria in India*, Humphrey Milford, Oxford University Press, London, 1927, p. 28.
12. Govt will import rice, *Hindustan Times*, 19 November 2009.

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The Biological Diversity Act 2002 – governing conservation and development in India

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The Biological Diversity Act 2002 is a landmark in the environment and development field. It is a very comprehensive approach being taken for the first time towards the conservation of earth's biodiversity and sustainable use of its biological resources. The Convention on Biological Diversity was negotiated and signed by the nations at UNCED Earth Summit at Rio de Janeiro in Brazil in June 1992. India is one of the 175 countries party to this convention. The main objectives of the convention are conservation of biological diversity, sustainable use of components of biodiversity, fair and equitable sharing of benefits arising out of the utilization of genetic resources. The National Biodiversity Act 2002 has 12 chapters, 65 sections and many sub-sections pertaining to balancing conservation and development.

Biodiversity means variability among living organisms from all sources including inter alia terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are a part; which includes diversity within species, between species and of ecosystems¹. Indian subcontinent forms part of the 25-mega diversity hotspots of the world, occupying only 2.5% of the land area and accounting for 7.8% of the globally recorded species². India is party to the United Nations Convention on Biological Diversity signed at Rio de Janeiro on 5 June 1992. The convention reaffirms the sovereign rights of the states over their biological resources, and also expects the parties to facilitate access to genetic resources by other parties subject to national legislation. At national level, biodiversity is a multidimensional subject and the stakeholders in biological diversity conservation policy include the

Central Government, State Government, Institutions of local Self-Governing organizations, industry, etc.

Recognizing the urgent need for developing human resources, capabilities and public policy, in order to take an active part in the new economy associated with the use of bioresources, 17 biodiversity rich countries have formed a group known as 'Like Minded Mega-diverse Countries'.

The value added Act for biodiversity conservation bears policy guidelines that balance biodiversity conservation and sustainable development and warrant self-governance of bioresource utilization. In this article, the advantages and disadvantages of the National Biodiversity Act 2002 (ref. 3) have been elucidated along with the do's and the don'ts as per the Act for public awareness amongst all cross-sections of the society.

The advantages

- The convention reaffirms the sovereign rights of the states over their biological resources.
- It aims at conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of utilization of genetic resources.
- The Act provisions good institutional set-up comprising Chairperson, members, ex-officials, etc.
- Expenses of National Biodiversity Authority (NBA) including salaries, allowances, pension, etc. to be defrayed out of the consolidated fund of India.
- There is an establishment of State Biodiversity Board (SBB) to advise State Governments on issuing guidelines and granting of approvals.
- Under this Act, the State Government in consultation with the local bodies

may notify in the *Official Gazette*, the areas of biodiversity importance as 'biodiversity heritage sites'.

- The convention has specific provision to notify any species which is on the verge of extinction or likely to become extinct in the near future.
- It respects and protects knowledge of local communities related to biodiversity.
- It aims at protecting India's rich biodiversity and associated knowledge against their use by foreign individuals and organizations without sharing benefits arising out of such use and checking biopiracy.
- With the interests of the local people and for research activities by Indian citizens within the country, free access to bioresources has been given to the traditional physicians (e.g. the vaidas and the haqims) provided the resources will be utilized for any purpose other than commercial use as well.

Drawbacks

- There are no specific provisions for combating the pressing problems of shifting cultivation, habitat destruction, fragmentation, rehabilitation of degraded ecosystems and so on.
- There is no detailed provision to address the rights and concessions of the scheduled tribes and other traditional forest dwellers.
- No guideline has been made for involvement of women in achieving national objectives and goals.

Do's

- Any person who is not a citizen of India and a non-resident citizen of India shall be required to take prior

approval of the NBA in order to have access to biodiversity.

- Prior intimation has to be given to the SBB by a citizen of India or a corporate body, association or organization, registered in India for obtaining biological resources for certain purposes.
- All orders and decisions of NBA shall be authenticated by the signature of the Chairperson or any person authorized by the Authority on his behalf.
- It is the duty of the NBA to regulate activities by the provisions of this Act, issue guidelines for access to biological resources for fair and equitable benefit sharing.
- Central Government shall develop strategies, plans, programmes for conservation, promotion and sustainable use of biological diversity.
- The Act governs benefit sharing and access by a 3-tier system of NBA, SBB and Biodiversity Management Committees (BMCs).
- The mandate of the BMC is conservation, sustainable use and documentation of biodiversity. NBA and SBA would consult the BMCs on matters related to use of bioresources and associated knowledge within their jurisdiction.
- It is the duty of BMCs to prepare People's Biodiversity Register (PBR) in consultation, active support and cooperation of local people which will contain comprehensive information on the availability and other traditional knowledge associated with them.

Don'ts

- Although permits are given for research, no person shall obtain any biological resource occurring in India or any knowledge associated with it, without prior approval of the NBA for commercial activities.

- No person without previous approval of NBA shall transfer the results of any research related to any biological resource to any person who is not a citizen of India or to any non-resident citizen of India. The transfer does not include publication of any research paper or dissemination of knowledge in any seminar or workshop, if such publication is as per the guidelines issued by the Central Government.
- Intellectual property rights are not to be applied in or outside India for any invention based on any research or information on biological resources obtained from India.
- The Act imposes restrictions on access to resources which are (i) endangered taxa, (ii) endemic and rare taxa, (iii) likely to have adverse effects on the livelihood of the local people, (iv) causing genetic erosion and (v) having purposes contrary to national interests and other related international agreements to which India is a party.

1. Ramakrishnan, P. S. *et al.*, *Mountain Biodiversity, Land Use Dynamics, and Traditional Ecological Knowledge*, UNESCO and Oxford & IBH, New Delhi, 2000, p. 353.
2. Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A. B. and Kent, J., *Nature*, 2000, **403**, 853–858.
3. The Biological Diversity Act 2002, No. 18 of 2003, Ministry of Law and Justice, Govt of India.

ACKNOWLEDGEMENT. We thank UNESCO, New Delhi for financial support.

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