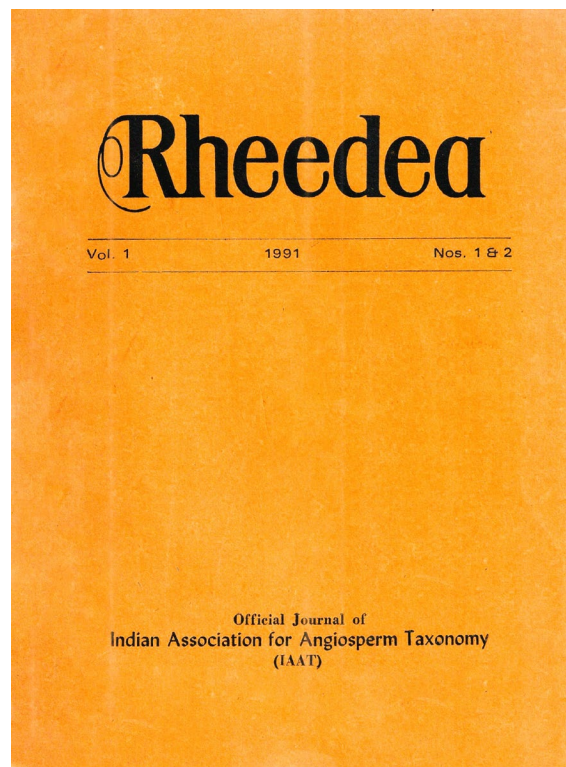




Mangroves of Orissa and aspects of their conservation

Choudhury B.P., Biswal A.K. & H.N. Subudhi



How to cite:

Choudhury B.P., Biswal A.K. & H.N. Subudhi 1991. Mangroves of Orissa and aspects of their conservation. *Rheedeia* 1(1&2): 62–67.

<https://dx.doi.org/10.22244/rheedeia.1991.01.01&02.11>

Published in print: 15.12.1991

Published Online: 01.01.2022

Mangroves of Orissa and aspects of their conservation

B. P. Choudhury, A. K. Biswal and H. N. Subudhi

P. G. Department of Botany, Biosystematic Laboratory,
Utkal University, Bhubaneswar-751 004

Abstract

Orissa had a rich mangrove forest in the remote past. However, as in other states of India, this has been devastated largely due to biotic interference. Naturally, there is a considerable amount of shrinkage in the mangrove vegetation of Orissa due to habitat destruction especially at Paradeep-Hukitola, Devi, Jambu estuaries etc. The mangrove forests at these places have degraded to scrub jungle and at places they have totally disappeared. In contrast to these regions, Bhitarkanika sustains luxuriant mangroves. This is due to adequate protection given to this plant community since this terrain has been declared as a sanctuary in 1975. General information about mangroves and their distributional pattern have been highlighted. Conservation of some taxa whose population exhibit considerable degree of shrinkage has also been suggested.

Introduction

Orissa is endowed with various types of natural resources of which vegetable wealth is one. Champion and Seth (1968) have identified as many as 32 vegetational types occurring within the geographical boundaries of Orissa. Of these, littoral and tidal swamp forest occur in the estuarian regions of the rivers like Mahanadi, Brahmani, Baitarani, Devi, Burabalanga, Jambu etc. (Fig. No.1). According to remote sensing survey report conducted in 1984 the mangrove forest spreads over an area of 214.58 Sq. kms. (Samal & Patnaik, 1989). Of this, Mahanadi delta sustains 120 sq. kms. of mangrove forest cover as indicated in the status report: "Mangroves in India" (Anonymous, 1987). It is true that there is a considerable amount of depletion of this plant community mainly due to habitat destruction human settlement,

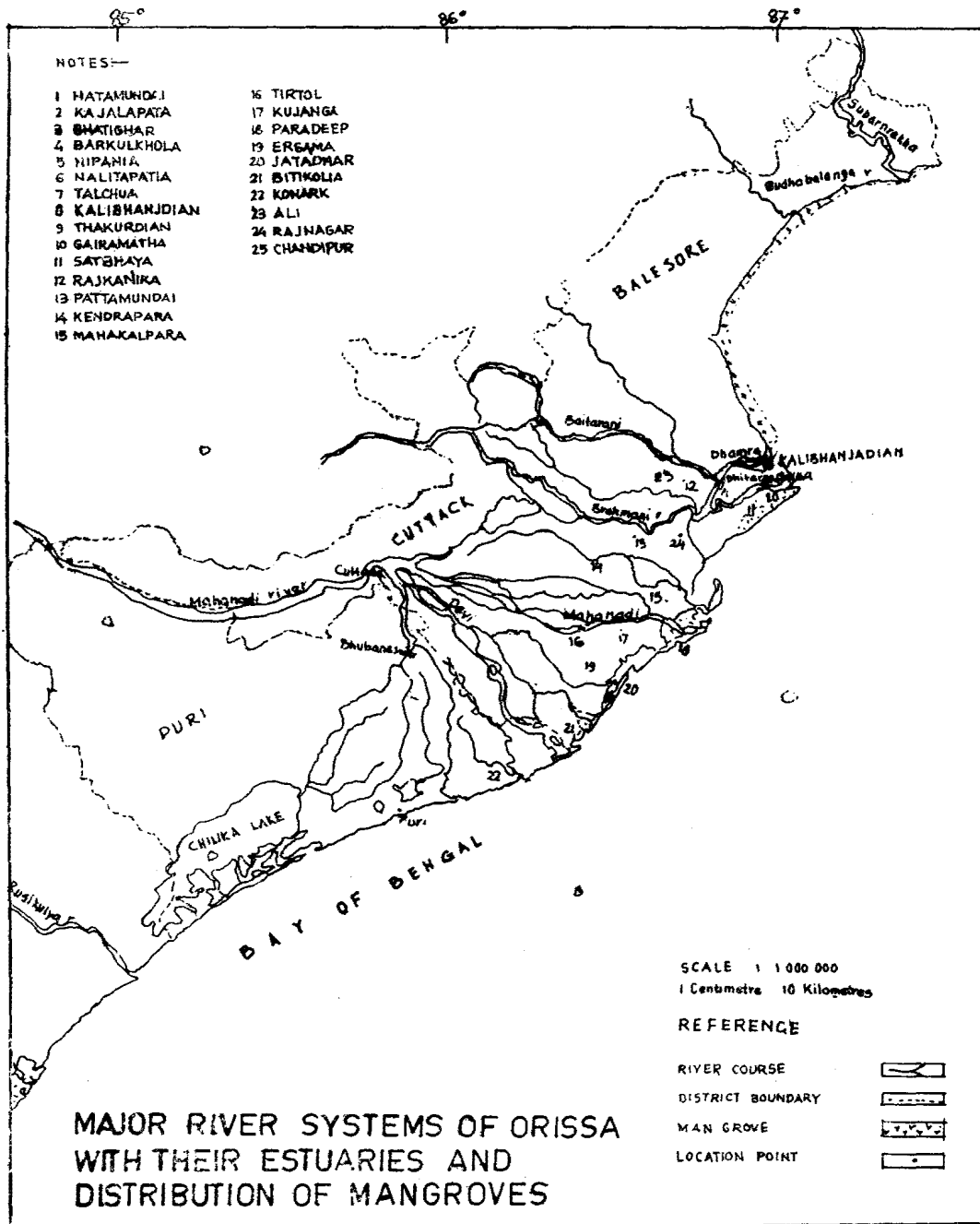
spread of urbanisation, paddy cultivation, prawn culture, over exploitation of trees and shrubby elements for timber, fuel, other forest products and clearing of forest area for establishment of port and factories. As a matter of fact, the mangrove forests at Paradeep-Hukitola complex, Jambu, Kujanga, Ersama Devi estuaries and those in the fringes of Chilka lake are highly degraded and are on the verge of disappearance.

Review of earlier work

Haines (1921 - 1925) has provided some general information pertaining to the coastal tract vegetation in the introductory part of his Flora. He has given an account of 45 mangrove taxa (including their associates) from Mahanadi delta under 39 genera belonging to 29 families. Of these, 29 species have been recorded from the tidal forests of Mahanadi delta

and a few from Chandipur coast (Balsore district) and the fringes of Chilka lake (Puri and Ganjam districts).

Therefore, it is evident that Haines (*J. c.*) could not botanize the estuarian flora of Bhrahmani, Baitarani, Devi,



Burabalanga, Jambu etc. although these terrains harboured very rich and luxuriant mangrove forest. Thereafter, the mangroves of Orissa remained untouched till 1950.

Mooney (1950), made a short trip to Mahanadi delta during the first week of June 1949 while his treatise was in press, and collected *c.* 12 mangroves and their associates of which as many as 10 proved to be new reports for the State of Orissa. Later Rao *et al.* (1970), Banerjee and Das (1972) and Rao and Sastry (1974) made some ecological studies on the mangroves and their associates in the estuarine complex between Devi and Dhamra rivers.

Present study

Realising the incompleteness of information pertinent to the mangroves of Orissa and their rapid depletion at an alarming rate, a survey programme was launched under the auspices of P. G. Department of Botany, Utkal University, Bhubaneswar since 1980. Through this programme the mangrove flora at Bhitarkanika (Choudhury, 1984, 1986, 1987, 1990a and 1990b), (Patnaik & Choudhury, 1989), Paradeep - Hukitola complex have been extensively studied. Preliminary survey works have also been done in the estuaries of Devi and Jambu rivers and fringes of Chilka lake. Floristic studies at other mangrove areas are now in progress.

Observation

At present the estuary of Devi river is almost devoid of typical mangrove elements. This is mainly due to habitat destruction connected with human settlement and paddy cultivation. Moreover, the ecological conditions have been changed due to formation of sand bars

which have considerably checked inundation. Only patches of *Acanthus ilicifolius*, *Tamarix troupii*, *Excoecaria agallocha* etc. are found in denuded condition.

Similarly, typical mangroves have disappeared from the fringes of the Chilka lake and its adjoining regions. Only mangrove associates and transitory taxa like *Aegiceras corniculatum*, *Azima tetracantha*, *Salvadora persica*, *Cressa cretica* etc. are found at places. However, species like *Clerodendrum inerme*, *Excoecaria agallocha* etc. as reported by Narayanswami and Carter (1922) could not be traced during the present survey work. Probably these have been totally destroyed by human interference.

Before the establishment of Paradeep port (1962) and Paradeep phosphate factory (1982) Madhuban, Ghanagolia, and Atharbanki area sustained a large number of mangrove taxa such as *Sonneratia apetala*, *Heritiera fomes*, *Excoecaria agallocha*, *Avicennia officinalis*, *A. alba*, *Hibiscus tiliaceus* etc. These tree species, along with other shrubby mangrove elements like *Kandelia candel*, *Merope angulata*, *Acanthus ilicifolius*, *Tamarix troupii*, *Caesalpinia nuga* etc. constitute dense forest cover and all enjoy regular inundation through a network of creeks and channels. But these have been cleared for establishment of port and factory. Consequent silting has resulted in sandbanks, preventing inundation and the destruction of mangroves. At present, on the way to Nehru Banglow (Paradeep port Guest House) from Ghanagolia, isolated patches of *Acanthus ilicifolius*, *Tamarix troupii*, *Phoenix paludosa*, *Myriostachya wightiana*, *Dalbergia spinosa* etc. are met with in muddy depressions and along the fringes of defunct creeks and channels. Herbaceous taxa like *Suaeda maritima*,

Sesuvium portulacastrum, *Tylophora tenuissima* etc. constitute the ground flora.

However, the tract from Ghangolia to Hukitola harbours quite a good number of mangroves along the banks of the river Mahanadi and its ramifying creeks. Of course, their past luxuriance and density no longer exist. In fact the mangrove forest of yore has degraded to mere scrub jungle due to human interferences. A few tree species like *Avicennia officinalis* and *Sonneratia apetala* are still found near Batigher. The large trees in these denuded forests indicate the existence of mangrove forest here, similar to that of Bhitarkanika, in remote past. Shrubby taxa like *Kandelia candel*, *Clerodendrum inerme*, *Lumnitzera racemosa*, *Phoenix paludosa*, *Brownlowia tersa*, *Excoecaria agallocha* etc. are found in abundance along the river bank and its creeks. Away from the water bodies, usually *Merope angulata*, *Salvadora persica* etc. are met with occasionally. *Rhizophora mucronata*, *Aegialitis rotundifolia* are conspicuous towards the Hukitola island, where salinity is comparatively high. *Acanthus ilicifolius*, *Myriostachya wightiana*. *Phoenix paludosa* etc. are very common along the creeks. Common climbers/twiners are *Derris trifoliata*, *D. scandens*, *Ipomoea macrantha*, *Finlaysonia obovata* etc. Among the herbaceous elements *Suaeda maritima* *S. nudiflora* and *Sesuvium portulacastrum* are commonly found in mud flat. Incidentally, *Xylocarpus granatum*, *Ceriops decandra*, *Bruguiera cylindrica*, *Heritiera littoralis* and *Bruguiera parviflora* reported by Rao & Sastry (1974) have vanished from this estuarine region.

Jambu estuary as well as Jambu island also harbour some mangrove elements like those of Paradeap-Hukitola area but species diversity and composition are

rather poor. Notable elements are *Rhizophora apiculata*, *Aegiceras corniculatum*, *Kandelia candel*, *Dalbergia spinosa*, *Heritiera fomes* *Phoenix paludosa* etc. The climbers, twiners and herbaceous taxa occurring here are almost similar to those of Hukitola- Ghanagolia terrain.

Bhitarkanika wild life sanctuary in the Cuttack district is situated between 20°4' and 20°8' N. latitude and 86°45' and 87°5' E longitude and bordered by the river Brahmani, Baitarani, Dhamra, (confluence of the river Brahmani and Baitarani) and 35 km. long stretch of sea shore. It covers an area of 650 sq. kms. (Anonymuos, 1986) of which, about 380 sq. kms. is under forest cover. However, the Bhitarkanika core area spreads over an approximate area of 141.44 sq. kms.

At Bhitarkanika the major mangrove forest constitutes a two storey system. The ground flora is rather poor in respect of species compositions. The tree species like *Sonneratia apetala*, *Avicennia officinalis*, *Heritiera fomes*, *Excoecaria agallocha* etc. are luxuriant and gregarious, while other species like *Xylocarpus granatum*, *Cerbera manghas*, *Heritiera littoralis*, *Cynometra iripa*, *Crinum defixum*, *Sapium indicum*, *Ipomoea campanulata*, *Sonneratia caseolaris* are mostly concentrated in Khola creek, where salinity is comparatively less. These species are not found in other mangrove forests of Orissa. Interestingly, *Excoecaria agallocha* and *Phoenix paludosa* are found almost in pure strands near Dangmal forest rest house which extends towards Nalitapatia village. Sometimes *Excoecaria agallocha* is associated with patches of *Heritiera fomes*. The shrubby taxa like *Kandelia candel*, *Brownlowia tersa*, *Aegiceras corniculatum*, *Dalbergia spinosa*, *Cynometra iripa*, *Lumnitzera racemosa*, *Clero-*

dendrum inerme, *Caesalpinia nuga* constitute the second storey of the forest. *Salicornia brachiata*, *Suaeda nudiflora*, *S. maritima*, *Acrosticum aureum*, *Sesuvium portulacastrum* etc. are the major elements of the ground flora. The mudflats close to the creeks and river banks are usually studded with pneumatophores and at places with stretches of *Cyperus malaccensis* and *Myriostachya wightiana*. Similarly, *Rhizophora mucronata* and *Aegialitis rotundifolia* community become gregarious towards Gahirmatha region while *Excoecaria agallocha* and *Heritiera fomes* association declines as the salinity of the water increases. In the mesophytic region mostly *Flagellaria indica*, *Bruguiera gymnorrhiza*, *Merope angulata* etc. are found in abundance.

The common climbers are *Derris trifoliata*, *D. scandens*, *Mucuna gignatea*, *Finlaysonia obovata*, *Pentatrodia capensis*, etc. Interestingly, *Acanthus volubilis* and *Cerbera manghas* are found only in Bhitarkanika and their population exhibits a tangible degree of shrinkage. The epiphytes like *Hoya parasitica*, *Drynaria quercifolia* are rarely met with. *Heritiera kanikensis* has been identified as a rare element by Majumdar and Banerjee (1985). It is interesting to note that while three species of *Heritiera* occur abundantly in Bhitarkanika, they gradually decline towards Sundarban of west Bengal (Mukherjee & Mukherjee, 1978). On the other hand, *Nypa fruticans* which is commonly found in Sundarban is absent from mangrove forests of Orissa.

Conservational aspects of mangrove:

At present one can observe the luxuriance and high concentration of mangrove taxa and their associates at Bhitarkanika as compared to those at other mangrove swamps of Orissa.

Prior to 1975 the mangroves of Bhitarkanika were subjected to high degree of biotic interference when this was under the control of Kanika Raja. Due to indiscriminate cutting of woody elements for fuel and timber and over exploitation of economically important mangrove taxa the overall equilibrium of the ecosystem has been highly disturbed. Realising the need of conservation of this vulnerable ecosystem and to conserve the threatened life forms therein the Government of Orissa declared the forest land as Bhitarkanika wildlife sanctuary in 1975 and more recently (1988) as a National Park.

As stated earlier the mangroves of Paradeep-Hukitola complex is in highly denuded state, and is in need of adequate protection, through legislation and other means.

Finally, special steps should be taken to conserve some mangrove species and their associates like *Cerbera manghas*, *Ipomoea macrantha*, *I. campanulata*, *Acanthus volubilis*, *Heritiera kanikensis*, *Xylocarpus granatum* which exhibit restricted distribution.

Realising the high degree of socio-economic importance of the mangroves, their vulnerability and ecological importance Government of India in their Ministry of environment and forestry have set up a National level mangrove committee for proper management, rehabilitation and conservation of mangrove elements in India comprising of Forest officers, scientists, administrators and researchers. Similar type of committees have also been constituted at the state level to evolve strategies for management and conservation of mangroves. It is therefore, expected that Government of Orissa will take necessary steps to restore the rich heritage of mangrove vegetation.

dendrum inerme, *Caesalpinia nuga* constitute the second storey of the forest. *Salicornia brachiata*, *Suaeda nudiflora*, *S. maritima*, *Acrosticum aureum*, *Sesuvium portulacastrum* etc. are the major elements of the ground flora. The mudflats close to the creeks and river banks are usually studded with pneumatophores and at places with stretches of *Cyperus malaccensis* and *Myriostachya wightiana*. Similarly, *Rhizophora mucronata* and *Aegialitis rotundifolia* community become gregarious towards Gahirmatha region while *Excoecaria agallocha* and *Heritiera fomes* association declines as the salinity of the water increases. In the mesophytic region mostly *Flagellaria indica*, *Bruguiera gymnorrhiza*, *Merope angulata* etc. are found in abundance.

The common climbers are *Derris trifoliata*, *D. scandens*, *Mucuna gignatea*, *Finlaysonia obovata*, *Pentatrodia capensis*, etc. Interestingly, *Acanthus volubilis* and *Cerbera manghas* are found only in Bhitarkanika and their population exhibits a tangible degree of shrinkage. The epiphytes like *Hoya parasitica*, *Drynaria quercifolia* are rarely met with. *Heritiera kanikensis* has been identified as a rare element by Majumdar and Banerjee (1985). It is interesting to note that while three species of *Heritiera* occur abundantly in Bhitarkanika, they gradually decline towards Sundarban of west Bengal (Mukherjee & Mukherjee, 1978). On the other hand, *Nypa fruticans* which is commonly found in Sundarban is absent from mangrove forests of Orissa.

Conservational aspects of mangrove:

At present one can observe the luxuriance and high concentration of mangrove taxa and their associates at Bhitarkanika as compared to those at other mangrove swamps of Orissa.

Prior to 1975 the mangroves of Bhitarkanika were subjected to high degree of biotic interference when this was under the control of Kanika Raja. Due to indiscriminate cutting of woody elements for fuel and timber and over exploitation of economically important mangrove taxa the overall equilibrium of the ecosystem has been highly disturbed. Realising the need of conservation of this vulnerable ecosystem and to conserve the threatened life forms therein the Government of Orissa declared the forest land as Bhitarkanika wildlife sanctuary in 1975 and more recently (1988) as a National Park.

As stated earlier the mangroves of Paradeep-Hukitola complex is in highly denuded state, and is in need of adequate protection, through legislation and other means.

Finally, special steps should be taken to conserve some mangrove species and their associates like *Cerbera manghas*, *Ipomoea macrantha*, *I. campanulata*, *Acanthus volubilis*, *Heritiera kanikensis*, *Xylocarpus granatum* which exhibit restricted distribution.

Realising the high degree of socio-economic importance of the mangroves, their vulnerability and ecological importance Government of India in their Ministry of environment and forestry have set up a National level mangrove committee for proper management, rehabilitation and conservation of mangrove elements in India comprising of Forest officers, scientists, administrators and researchers. Similar type of committees have also been constituted at the state level to evolve strategies for management and conservation of mangroves. It is therefore, expected that Government of Orissa will take necessary steps to restore the rich heritage of mangrove vegetation.

Acknowledgements

The authors are thankful to the Professor and Head, Post-Graduate Department of Botany, Utkal University for his interest in this piece of work, and to the wildlife conservation authorities and DFO, Chandbali for help during the floristic survey.

Literature cited

- Anonymous, 1986. *wild life of Orissa*. Government of Orissa, Forest Department.
- Anonymous, 1987. *Mangroves of India-Status report*. Government of India, Ministry of Env. & Forests, New Delhi.
- Banerjee, L. K. and G. C. Das 1972. New distributional records from Orissa coast. *Bull. Bot. Surv. India* 14 (1-4) : 184-186.
- Champion, H. G. and S. K. Seth 1968. *A revised survey of the forest types of India*. New Delhi.
- Choudhury, B. P. 1984. A glimpse into the vegetation of Bhitarkanika wildlife sanctuary in the State of Orissa- *Indian Bot. Repr.* 3(2): 121-124.
- Choudhury, B. P. 1986. Nomenclature and distribution of some mangrove elements in the Bhitarkanika wild life sanctuary. *News letter Nature and wild-life cons. Soc.* 4 (1 & 2) : 58-60.
- Choudhury, B. P. 1987. Socio-economic aspect of Bhitarkanika wildlife sanctuary in the state of Orissa. *Orissa Review*, 43(9) : 45-47.
- Choudhury, B. P. 1990a. Bhitarkanika : mangrove swamps. *J. Env. Sci.* 3 (1): 1-16.
- Choudhury, B. P. 1990b. The unique mangrove forest of Bhitarkanika in the state of Orissa. *Orissa Review* 46(9): 34-39.
- Haines, H. H. 1921-1925. *The Botany of Bihar and Orissa*, 6 parts. London.
- Majumdar, N. C. and L. K. Banerjee 1985, new species of *Heritiera* Dryand (Sterculiaceae) from Orissa. *Bull. Bot. Surv. India* 27 (1-4) : 150-151.
- Mooney, H. F. 1950. *Supplement of the Botany of Bihar and Orissa* Catholic Press, Ranchi.
- Mukherjee, B. B. and J. Mukherjee 1978. Mangroves of Sundarbans. *Phytomorphology* 28(2): 192.
- Narayanswami, V. and H. G. Carter 1922. Systematic list of the plants of Barkuda. *Mem. Asiat. Soc. Beng.* 7(4) : 289-319.
- Patnaik, S. N. and B. P. Choudhury 1989. *Present status and future development of mangrove vegetation in Bhitarkanika in INDO-US workshop on wetlands, mangroves and Biosphere reserve* Govt. of India, Ministry of Env. & Forests, New Delhi. 89-95.
- Rao, T. A. L. K. Banerjee and A. K. Mukherjee 1970. Some interesting plant records from the Orissa Coast. *J. Bombay Nat. Hist. Soc.* 66 : 659-660.
- Rao, T. A. and R. K. Sastry 1974. An ecological approach towards classification of coastal vegetation of India II. Estuarine border vegetation. *Indian Forester* 100: 438-452.
- Samal, R. C. and J. M. Patnaik 1989. *Management strategies for Bhitarkanika mangrove forest in INDO-US workshop on wetlands, mangroves and Biosphere reserve*: Government of India, Ministry of Env. and Forests, New Delhi. 96-99.