



Dominant medicinal plants of KBK districts of Odisha with special reference to the strategy of their conservation

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ABSTRACT

The KBK region of Odisha, comprising of erstwhile Koraput, Bolangir and Kalahandi districts, are considered to be the poorest and most backward region of the country. It's scanty population over an area of 30.60% landmass of the State, dominated by mostly tribals has attracted the attention of Government of India to declare it as a special region, which needs to be elevated in all developmental aspects. The present paper depicts as to how those poor, illiterate and ignorant tribal people make best use of plants available around them and take care of their health and day to day medical needs even without the help of a qualified medical professional. Since the over use of the plants has become a threat for the long term sustainability of those medicinal plants found in the wild, some strategy has been adopted for their conservation.

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1. Introduction

The KBK region comprising of undivided Koraput (i.e. Koraput, Nawarangpur, Malkangiri and Rayagada), undivided Bolangir (i.e. Subarnapur and Bolangir) and undivided Kalahandi (i.e., Kalahandi and Nuapada) districts is the poorest and most backward region of the country; 89.95 % people of this region still live in villages. The KBK districts account for 19.80% population over 30.60% geographical area of the state. Tribal communities comprising 38.41% of the population dominate this region which include six primitive tribal groups i.e. Bondas, Didayi, Lanjia Saora, Dangria, Kandha, Kutia Kondha and Chuktia Bhunjia. In addition, 16.25% population belong to the scheduled caste (SC) communities as per 2011 census. (Mohanty, 2011).

Because of its very adverse socio-economic and human development indicators, the KBK region has for some time past been attracting the attention of Government of India, National Human Rights Commission (NHRC) and the State Government. The need for long term measures for speedy development of livelihood support has been articulated in early 1990s.

As per the estimates of the 55th round of NSS survey conducted in 1990-2000, (Anonymous, 2006) by Planning & Co-ordination Deptt. Government of Odisha, the incidence of rural poverty in this region is as high as 87.14%. The multifaceted deprivation and backwardness of this region are the result of deep-rooted factors or processes that have emanated from a complex mix of geographical, economic and social factors. The region in general, and undivided Koraput and Kalahandi districts in particular are almost at the bottom of the list of 250 backward districts identified under Backward Regions Grant Fund (BRGF) of India.

The old Koraput and Kalahandi districts and portions of Bolangir districts are mainly hilly. Severe droughts and floods also often visit this region and some areas in quick succession. While many factors like tribal backwardness, hill area backwardness and backwardness due to severe natural calamities haunt this region, many other multifaceted factors are also encountered. All these factors combine to force the local inhabitants to depend more and more on forest and natural resources for eking out their livelihood. Intensive use of forests for sustenance coupled with other anthropogenic factors, continuously lead to forest degradation. In fact, it is observed during the course of

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work, that all eight KBK districts are ecologically disturbed and more than 50% of forests of these districts are degraded, which aggravates the problem of poverty in this region.

2. Materials and methods

The plants were collected from different districts under KBK and conserved in the Silviculture research centre, Ghatikia. The medicinal plants were identified with the help of flora (Saxena and Brahmam, 1994) and available literature. The significance of the plants were noted accordingly and the field note books were also maintained in the centre. Photographs were taken with the help of digital canon Kodak 4.0 mega pixes. 35 mm and the photographs were processed in commercial photographic studios. Strategies for conservation were adopted through conventional methods under in situ condition. Important plants under dried condition were stored in the herbarium.

3. Results and discussion

The KBK districts have been historically rich in forest resources. Though the people have been using these forests very intensively and eking out their livelihood from this source, forests of this region have not received adequate investments and management inputs over the time. Intensive use of forests for sustenance coupled with lack of insufficient investments and managerial inputs are, thus, continuously leading to forest degradation and denudation. Although little more than one fourth (12,957 sq km.) of the geographical area (47,016 sq.m.) of this region is recorded as forests which comes to 27.55%, only 12.45 % (5855 sq km.) is actually dense forest (i.e., with crown density over 40%). It

has been further ascertained that 9% (4,332 sq.km) forest area is completely devoid of vegetal cover. Another 15.1% (7,102 sq. km) forests are open having crown density more than 10% but less than 40%(Table I).

3.1. Flora and Vegetation of KBK District

Miscellaneous forests of a moist type dominate the tract of 900 meter Koraput plateau which tends towards semievergreen in the valleys even at low altitudes. Most of the high elevation forests, in this area has been lost under shifting cultivation. The prevailing type of vegetation in the Jeypore plateau is sal, which occupies the greater part of the forest area where it sometimes forms almost pure crops. The general panorama of the lower plains of Malkangiri is that of dry miscellaneous forests intensively associated with bamboos.

Deomali hill of erstwhile Koraput district with 1,667 mt. in height is the tallest hill of the state. The hills are inhabited by a number of tribals but Kandha and Savara communities are numerically rich. In the absence of modern medical facilities in these remote areas, they have been using the plants for treatment of various diseases.

The forests of Bolangir district are situated within the dry deciduous zone of Indian vegetation and are of xerophilous nature. According to the revised classification in the forest types of India by Champion and Seth, the forests of Bolangir division can be classified into two major subgroups i.e. Northern tropical dry deciduous forests 5B and Southern tropical dry deciduous forests 5A. (Champion and Seth, 1968) Gandhamardan hills of 'Ramayana epic frame

Table 1
Areas of the districts of KBK showing different types of forest coverage

Name of Erstwhile district	Name of the district after reorganization	Geographical area (km ²)	Forest area coverage (km ²)			Total forest area (km ²)	Forest area (%)
			Very dense forest (>70%)	Moderate dense forest (40 to 70%)	Open forest (10 to 40%)		
Koraput	Koraput	8807	104	718	872	1694	19.23
Koraput	Rayagada	7073	456	891	1769	3116	44.05
Koraput	Malkangiri	5791	157	703	1326	2186	37.74
Koraput	Nawarangpur	5291	188	462	485	1135	21.45
Bolangir	Bolangir	6575	72	222	640	934	14.20
Bolangir	Sonepur	2337	3	200	121	324	13.86
Kalahandi	Kalahandi	7290	370	743	1218	2331	31.97
Kalahandi	Nuapada	3852	85	481	671	1237	32.11
	Total	47016	1435	4420	7102	12957	27.55

Source: Anonymous (2011), Forest Survey of India, Govt. of India.

forms a natural boundary to the north western side of the district. This range consists of several hills, the highest among them being Gandhamardan of 1020 mt. Gandhamardan makes a name in the indigenous medication map of India. Everybody residing in this region uses plants for one element or the other.

The erstwhile district of Kalahandi occupies the south-western portion of Odisha and is situated between 19^o3' and 21^o.5' N. latitude and 82^o.20' - 82^o.47' E longitude. The principal hill range of the district belong to Eastern Ghats. It covers almost the entire eastern and southern parts of the district. The flora of ravines and valleys in the district is mostly evergreen and where the few small patches and reserve forests occur the crop inside is that of pure sal, where as the adjacent hill sides are covered with grass and mixed forest. Sunabeda plateau of erstwhile Kalahandi district and presently in Nuapada district is famous for its natural beauty endowed with dense forest and a rich depository of medicinal plants. More than 50% plants available in the plateau used for health care of the ethnic people living in and around the locality.

3.2. User Groups and what they use from forest

In Odisha there are 62 tribal communities recognized by Govt. of Odisha. Amongst them the state has the distinction of 13 primitive tribal groups which is highest in the country; out of which 6 primitive groups are found in KBK district only. They are Bonda and Didayi of Malkangiri district, Lanjia Saora and Dangria Kondha from Rayagada district, Kutia Kondha of Kalahandi district and Bhunjia tribes belonging to Nuapada district (Mohanti, 2007). Beside these six primitive tribal groups, other tribal communities found in the district are, Bhattada, Banjara, Gond, Munda, Paraja, Saora, Mirdha, Lodha.

During the investigation, it was observed that the tribal communities, as usual, are mostly dependant on forest and forest products for their sustenance and livelihood. Further, it is established from their day to day life style, that they are mainly centered around shifting cultivation and collection of non-timber forest products including medicinal plants. On our further investigation, the herbal drugs, they use, are mostly procured from the wild. The observation was strengthened by the report of Task Force, Ministry of Environment and Forest, Government of India, (Anonymous, 2000), that almost 90% of plants used in Indian system of medicine like Ayurved, Unani and Siddha are collected from forest and wastelands. They utilized plant parts like root, root bark, tuber, stem bark, fruits, flowers, leaves and some times the whole plants for medicinal purposes. As such, it is nothing but natural that procurement

of those raw materials is not sustainable as it causes loss of biodiversity leading to depletion of medicinal plant species, as well as forest cover, which are of greater concern to look for conservation of those species.

3.3. Conservation Strategy

At present, 90% collection of medicinal plants is from the wild i.e.; from common property resources, where access appears to be neither restricted nor regulated. Since 70% of plants collection involves destructive harvesting, many plants are endangered or vulnerable or threatened. In this context harvesting patterns include the parts of the plants used for medicinal purposes, how it is harvested, timing and frequency of harvest, proportion of target material harvested per plant, per season, the geographic concentration or dispersion of the harvest and the methods used to access the harvest area. In fact, harvesting of medicinal plants is a complex issue requiring analysis of multiple dimensions including social and ecological aspects. In view of this sustainable harvesting and management of medicinal plant resources are not possible without promoting participatory local institutions that can oversee, monitor and enforce regulations so as to derive continuous benefit from these resources. (Patnaik, 2005).

Conservation of threatened and endangered germplasm in general and medicinal plants in particular need special attention keeping in view the degradation and denudation of the existing biodiversity. Although the plants are protected in its own way in the in-situ condition, the continuous interference of human population as well as other biotic interference has appeared as a threat to protect those plants. The ethno-pharmacological informations which are widely used in traditional medicine are quite threatening and the plants are vulnerable for extinction. During the present study, although much work could not be taken to conserve the plant under invitro condition like tissue culture and cryo preservation etc. attempts have been taken for storage of seeds and to maintain its viability. All the possible strategies for in-situ and ex-situ conservation has been attempted, for furtherance of the conservation.

3.4. Some Important medicinal plant species found in KBK districts and their uses

(mentioning "F" as name of the family and "L" as local /vernacular name of the plant).

1. *Achyranthes aspera* L. (F:Amaranthaceae; L:Apamarang)

Found in 'Mudulipada' locality of Malkangiri district. Water extract (20-30 ml) of root is given internally to

- hasten delivery during labour pains. Dried powdered root (6g) is given with water in epileptic condition to regain consciousness.
2. *Adhatoda vasica* Nees. (F: Acanthaceae; L: Basanga)
Found in Manbhang locality of Gandhamardan Hills. All the five constituents of the tree i.e. root trunk, leave, flower and fruit is boiled in water. The quath mixed with honey is taken for relief from cold, cough and asthma.
 3. *Andrographis paniculata* (Burm.f.) Wall.ex. Nees. (F:Acanthaceae; L:Bhuinnim)
Found in Manbhang locality of Gandhamardan hills and Mudulipada area of Malkangiri district. It is a bitter tonic useful for curing malaria fever, worms, dysentery etc. Decoction of 10-12 leaves (250 ml) is given once daily to check diarrhoea.
 4. *Asparagus racemosus* Willd. (F:Liliaceae; L:Shatabari)
Found in Mudulipada, Dantipada area of Malkangiri district. Roasted root is given with cow's milk twice a day in post-delivery complaints, like abdominal pain and body ache.
 5. *Barringtonia acutangula* Gaertn. (F:Barringtoniaceae; L:Hinjala)
Found in Khuripani and Beherapani area of Gandhamardan hills. Powdered seed with little water is taken internally on empty stomach at 3 hours interval for severe colic pain caused due to liver trouble. Leaf juice 3 ml with honey 3 ml taken to treat amoebic dysentery.
 6. *Bauhinia vahlii* Wight & Arn. (F:Caesalpiniaceae; L:Siali leaf)
Found in Chaldhar and Bhitarkhol of Gandhamardan hills and also in Sunabeda plateau of Nuapada district. The decoction of seeds is given twice daily as tonic to children, taken at night as an aphrodisiac. Leaves are used as contraceptive.
 7. *Bridelia retusa* (L.) Spreng. (F:Euphorbiaceae; L:Kasi)
Found in Sunabeda plateau of Nuapada district and Mudulipada area of Malkangiri district. Stembark powder given with water to give relief to abdominal pain.
 8. *Bryonopsis laciniosa* L. (F:Cacurbitaceae; L:Shivalingi)
Found in common thickets of Batipathar area of Gandhamardan hills. The seed powder with a spoon of honey is taken twice daily to ensure conception and prevent miscarriage.
 9. *Bryophyllum pinnatum* (Lam.) Oken.(F:Crassulaceae; L:Amarpoi)
Found in Bainsapada area of Malkangiri district. Leaf paste is applied over stomach to relieve abdominal pain.
 10. *Buchanania lanzan* Spreng. (F:Anacardiaceae ; L:Char)
Found in Harisankar, Kapildhar area of Gandhamardan hills. The oil extracted from the kennels mixed with the fruit paste of Sahaj (*Terminalia alata*) is applied externally to get relief from muscular pains, rheumatism, glandular swelling of the neck.
 11. *Butea monosperma* (Lam.) Taub. (F:Fabaceae ; L:Palas)
Found in Sunabeda plateau of Nuapada district and Harisankar, Nandapara locality of Gandhamardan hills in Bolangir district.
Seed ash (2 gm) with cold water given once a day for 3 days after menstruation to prevent pregnancy. The red coloured gum, called Bengal Kino are obtained from tree and is valuable for treatment of diarrhoea.
 12. *Capparis zeylanica* L. (F:Capparaceae ; L:Asadhua)
Available in Mahadevjharan and Dukura area of Gandhamardan hills. Root extract cures syphilitic disease. The leaf extract is prescribed for external application on swelling, rheumatism and boils.
 13. *Cassia histula* L. (F:Caesalpiniaceae ; L:Chakunda)
Available in Mudulipada area of Malkangiri district. Seeds are given as animal feed to check epidemic disease among fowls.
 14. *Centella asiatica* (L.) Urb. (F:Apiaceae; L:Thalkudi)
Found in Sileiguda area of Malkangiri district. Quite common in Gandhamardan hills.
Leaf is eaten as vegetable as a tonic. The leaves or the entire plant parts are boiled in water and this decoction is given for treatment of leprosy.
 15. *Curculigo orchioides* Gaertn. (F:Liliaceae; L: Talmuli)
Found in Kisanipoda area of Malkangiri district. Paste of rhizomes is bandaged in whitlow.
 16. *Datura fastuosa* L. (F:Solanaceae; L: Kaladudura)
Found in Khemaguru area of Malkangiri district Seeds with carum, cardamom, clove and ginger in equal

- quantities made into powder and 250 mg given twice a day in joint pain.
17. *Dioscorea bulbifera* L. (F: Dioscoreaceae; L:Pita Alu)
Found in Mahadev-jharan locality of Gandhamardan hills. Tubers are edible and nutritious. Eaten in times of famine after boiling and much preparation.
 18. *Diospyros melanoxylon* Roxb. (F:Ebenaceae; L:Kendu)
Found in Sunabeda plateau of Nuapada district and Bardaguda area of Malkangiri district. Tender leaf juice taken orally and unripe fruit is eaten for relief from nagging cough.
 19. *Emblica officinalis* Gaertn. (F: Euphorbiaceae ; L: Anla)
Found in all the KBK district, specifically in Sunabeda plateau, Gandhamardan hill and Mudulipada area of Malkangiri district. Dried fruit with fruit of Beleric myrobolan made into powder, mixed in equal quantity, given three times a day to check cold. Fruit is eaten raw, as a supplement for Vitamin C.
 20. *Erythrina resupinata* Roxb. (F:Fabaceae ; L:Badokanda)
Found in Nrusingnath area of Bolangir district. Root powder (10gm) is prescribed for rheumatism. Root (10 gm) grounded with 1 gm each of 'pipli' (*Piper longum* L.), clove, ginger, black pepper, kalazira and chilies given orally for treatment of leprosy.
 21. *Erythrina variegata* L. (F:Fabaceae; L: Rinki)
Found in Mudulipada area of Malkangiri district. Twig is used as tooth brush to reduce toothache.
 22. *Ficus hispida* L.f. (F:Moraceae ; L:Pani Dimri)
Found in Bondapoda area of Malkangiri district. Latex is diluted and given internally to check diarrhoea in children.
 23. *Flemingia chhapar* Buch. – Ham. ex. Benth. (F:Zingiberaceae ; L:Banhaldi)
Found in Guptijharan area of Gandhamardan hills. 1-2 drops of juice extracted from fresh seeds are applied on eyes to get relief from cataract and related eye troubles.
 24. *Helicteres isora* L. (F:Sterculiaceae ; L:Modimodika)
Found very commonly in Balipathar area of Gandhamardan hills and also in Mudulipada area of Malkangiri district. The paste made from the fruit is applied externally on the stomach to get relief from flatulence.
 25. *Hemidesmus indicus* (L.) R.Br. (F:Periplocaceae ; L:Ananta mula)
Found in Khandijharan area of Gandhamardan hills. Also in Mudulipada area of Malkangiri district. Ten gm. of powdered root mixed with 3 gm. of stem bark of Jamun (*Syzygium cumini*) is given with water in empty stomach, within 3 days of delivery to increase lactation. Powdered flowers are given for cold, cough and asthma.
 26. *Heterostemma tanjorensis* Wight & Arn. (F:Asclepiadaceae ; L: Badobhulan)
Found in Harisankar area of Bolangir district. As a witch craft paste applied in forehead to drive away impacts of evil spirit.
 27. *Holarrhena antidysenterica* Wall. (F:Apocynaceae; L: Kurei).
Found in Mudulipada area of Malkangiri district and Batipathara, Harisankar area of Gandhamardan hills. Fresh root juice is given internally on empty stomach for deworming in children. The dried bark of the plant constitutes the drug 'Kuruchi'. The chief use of this drug is in curing amoebic dysentery.
 28. *Ipomea batatas* L. (F:Convolvulaceae; L:Kandamula)
Found in Bondopada area of Malkangiri district. Leaf juice is applied locally in snakebite.
 29. *Madhuka indica* Gmel. (F:Sapotaceae; L:Mahula)
Found in Sileiguda locality of Malkangiri district. Decoction of bark is used in stomachache.
 30. *Mallotus philippinensis* (Lam.) Muell –Arg. (F:Euphorbiaceae ; L:Sindurgundi)
Found in Dantipada locality of Malkangiri district. Fresh leaf juice is given internally in dysmenorrhoea.
 31. *Mangifera indica* L. (F:Anacardiaceae; L:Amba)
Found in Khemaguru and Dantipada area of Malkangiri district. Powdered stem bark is given with jaggery once a day in abdominal pain. Bark juice is given to check diarrhoea.
 32. *Martynia annua* (L.) (F:Martyniaceae; L:Baghanakhi)
Found in Paikamal locality of Gandhamardan hills in Bolangir district.

The oil extracted from the seed is applied locally to itches, scabies and wounds. Flower paste is also applied locally to prevent skin infection.

33. *Mimosa pudica* L. (F:Mimosaceae ; L: Lajkuli)

Found in Dantipada,, Mudulipada locality of Malkangiri district. Leaf paste is used externally in snakebite. Root powdered with water and liquid paste taken twice a day to prevent diarrhoea.

34. *Mucuna nigricans* (Lour.) Steudel, (F:Fabaceae; L:Baidanka)

Found in Panchupandav ghat of Harisankar locality in Gandhamardan hills. The seed paste is used as a local application for the treatment of ulcers of genital organ of both sexes.

35. *Nyctanthes arbortristis* L. (F:Oleaceae; L:Gangasiuli)

Found in Mudulipada locality of Malkangiri district. One tea spoonful leaf decoction is given with honey twice a day for 3 days in intermittent fever.

36. *Sida rhombifolia* L. (F:Malvaceae; L:Bajramuli)

Found in Khemagura area of Malkangiri district and also found in Sunabeda plateau of Nuapada district. Crushed leaves are applied on cuts and wounds. Used as toothbrush in Sunabeda plateau area by Chuktia Bhunjia tribe

37. *Smilax zeylanica* (L.); (F: Smilacaceae; L: Mumbarai)

Found in Mudulipada area of Malkangiri district. Twigs are used as tooth brush for dental care. Leaves are used as plates for serving food.

38. *Sterculia urens* Roxb. (F:Sterculiaceae ; L:Genduli)

Found in Bondapada locality of Malkangiri district. Gum is given with sugar candy for remedy from Diarrhoea & Dyspepsia.

39. *Strychnos nox-vomica* L. (F:Longaniaceae ; L:Kochila)

Found in Koraput district. Tree bark mixed with Neem bark given orally for prevention of dysentery.

40. *Woodfordia frutucosa* (L.) Kurz. (F:lythraceae ; L:Dhatki)

Found in Khemaguree and Mudulipada area of Koraput district. Also found in Panchapandav ghat and Khandijharan of Gandhamardan hills. Bark is added to the brew to enhance the intoxicating properties of country liquor. Sweet flower juice is sucked by children. Intake of the decoction of the bark is prescribed to treat impotency of man and decoction of root is used for curing ulcers and boils.

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