

Probable Agricultural Biodiversity Heritage Sites in India: XVI. The Koraput Region

Anurudh K Singh

2924, Sector 23, Gurgaon 122017, Haryana, India
(email: anurudhsingh@gmail.com)

Abstract

The Koraput region of the Eastern Ghats of India is a unique area of topographical and ecological diversity with great variation in altitude (80–1,500 m). It is predominantly inhabited by some of the most primitive tribes of diverse origin, who are mostly involved in agriculture-related activities. The archeological evidences and available agrobiodiversity, including the ancestral species and the intermediate forms of some of the important crop species suggest that the interaction of the early tribes with the landscape and the biodiversity has resulted in the domestication of several species, including some of the most important crops, like rice and pigeonpea, breeds of some cattle, and the introduction of a few species. The cultivation of domesticated species under diverse ecological conditions evolved various production systems suited to the diverse ecologies and a reservoir of genetic diversity in the form of landraces and farmers' varieties. Together the local tribes have conserved diverse cultural and cultivation practices, and a large number of landraces and farmers' varieties, making significant contributions towards global agriculture. Recently, the Food and Agriculture Organization of the United Nations (FAO), in recognition of these significant contributions facilitating the livelihood of humanity have recognized the region as one of the sites of the Globally Important Agricultural Heritage Systems. The present article enumerates some of these contributions to justify the world recognition, and proposes the region as another Indian national agricultural biodiversity heritage site.

The Koraput region situated in the Eastern Ghats with great variation in the altitudes is a land of topographical and ecological diversity. It is inhabited by some of the most ancient tribes, including the tribes of Austro-Asiatic origin, and is an agriculturally important region that has contributed to early agriculture in India. It is the abode of ancient tribal

communities and primitive agriculture, involving over 76 per cent of the people in diverse agriculture-related activities. The geographical and ecological diversity has allowed the prevalence of all forms of evolving agriculture in the region, starting from hunter-gatherers' practices to settled agriculture as per the demands of the landscape and situations. It is a unique

area, where interaction of the primitive tribes with rich plant biodiversity has resulted in the domestication of several crops, like rice and pigeonpea, whereas the confluence of the tribes has preserved diverse culture and a large amount of genetic diversity in the traditional crops in the form of landraces and wild relatives, including intermediate forms. Cultivation under diverse geographical and ecological conditions has also resulted in the evolution of diverse production systems, suited to various ecological situations on the one hand, and in the evolution of reservoir of genetic diversity on the other, in important crops like rice in the plateau region, and in minor millets, pulses, horticulture crops and medicinal plants in the hilly regions, providing unique opportunities to the local communities to select and conserve a large number of landraces/farmers' varieties. Evidences for evolution and use of wild *Oryza* species as food, and the genetic diversity in cultivated *O. sativa* L., has led biosystematists, geneticists, conservationists, and rice researchers to conclude that the Jeypore/Koraput Tract is one of the centers of origin and genetic diversity of rice. Similarly, archeological evidences and presence of ancestral wild relatives of pigeonpea suggest its possible early domestication and use in the region. For these reasons, the Food and Agriculture Organization of the United Nations (FAO) has recently declared the region as a site of Globally Important Agricultural Heritage Systems, in recognition of the service of the communities of Koraput in ensuring food security (www.fao.org/nr/giahs 2012). Corroborating this step, the present article, based on the indices illustrated by

Singh and Varaprasad (2008) discusses the contributions of the region in some detail, proposing the region to be another Indian national agricultural biodiversity heritage site.

Location and extent

Before 1936, Koraput was a part of the Madras Presidency as a subdivision of the Visakhapatnam district (Senior White, 1937). The present administrative Koraput district is situated between 20°3' and 17°50' North latitude, and 81°27' and 84°1' East longitude. But geographically, the region is a contiguous area, including the southwestern parts of Odisha (which are one-fifth of the state), parts of northeastern Andhra Pradesh (Srikakulam, Vizianagaram, Visakhapatnam in the Eastern Ghats), and eastern Madhya Pradesh. In the north, it is bound by the Kalahandi and Phulbani districts of Odisha, and the Raipur district of Chhattisgarh; in the east by the Ganjam district of Odisha, and in the south by the East Godavari and Khammam districts of Andhra Pradesh; and in the west by the Bastar district of Chhattisgarh. Physiographically, it is the northern part of the Eastern Ghats, which includes the districts of Koraput, Phulbani, and Kalahandi towards west and southwest of the table land; the hills of the Eastern Ghats lying to the northwest of Rajahmundry and Visakhapatnam, which rise almost abruptly from sea level to heights of about 900 to 1,200 m; the famous Jeypore hills of Koraput forms the northern-most part of these hill ranges in continuation with those in the adjoining districts of Andhra Pradesh (Visakhapatnam and East Godavari) and Madhya Pradesh (Bastar district). Thus

the region includes parts of the districts of Bolangir, Kalahandi, Phulbani, Gajapati and whole of Rayagada, Nabrangpur, Koraput, Malkangiri of Odisha, and parts of the districts of northeastern Andhra Pradesh, i.e., Srikakulam, Vizianagaram, and Visakhapatnam (Fig. 1).

Landscape

The region is highly undulating, covered with many hills and forests, which are criss-crossed with numerous perennial and seasonal streams and channels. Topographically the region is represented by highland plateau and hill ranges of

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the Eastern Ghats with vast diversity in the altitudes, making it a land of typical topographical and ecological diversity (Fig. 2). The altitude in the area ranges



Figure 1. Location and extent of the Koraput region, marked by dotted and solid lines.



Figure 2. The undulating landscape of the Koraput region (Source: www.computerlearningorg.blogspot.com).

between 150 and 1,500 m above mean sea level (msl), with the Koraput plateau having mean elevations of 900, 750, 600, 300 and 120 m above msl lying on a section of the Eastern Ghats. The whole tract appears divided into four distinct divisions, each of which is separated by natural barriers in their respective limits: (i) the Rayagada Division consisting of two fertile valleys of the Nagavali and the Vansadhara, slopes rising from a height of 400 m above msl near Ambadala, and going down to 80 m above msl at Gunupur. This zone contains thick forest tracts with timber wealth and rich lands; (ii) the Koraput Division extending from Kasipur to the borders of the Visakhapatnam plains of Andhra Pradesh, known as the plateau of 900 m above msl. The plateau is slightly tilted to the west, and its eastern edge is boldly marked by a line of high hills. The highest peak of the division (region), Deomli (1,650 m), is situated in this plateau. In the west, it descends to the 600 m plateau towards Jeypore. The area of this plateau consists of undulating table land scattered with numerous small to large hills; (iii) the Jeypore zone or the

Nabarangpur Division, extending into Bastar in the west, is a plateau of 600 m above msl, with a pocket known as the Pannabeda Mutha in the extreme northeast of Nabarangpur, which is some 150 m above msl, and is the lowest level compared to the rest of the plateau. This area forms the principal granary of the region. There are numerous villages with wide tracts of paddy cultivation. In Umerkote, to the north of Nabarangpur, the area is equally rich, where cultivation has been greatly extended. Throughout this plateau, there is a fine growth of *sal* and other timbers; and (iv) the parts of the Malkangiri area forming the fourth natural division consisting of a tract between the ghats of 900 m above msl plateau, where the valley of Machkund lies. It is separated from the Jeypore zone by high hills in the north. To the east lie the mountain ranges in continuation of the eastern side of the Koraput Division. The most important of these are Bonda hills inhabited by 'Bonds', one of the most primitive Austric tribes of India. The rest of the region is a comparatively flat plain, declining from an elevation of about 245 m above msl near Govindapalli in the north, to under 120 m above msl in the extreme south.

The region is drained by five major rivers. These are: *Vansadhara* (arising from near

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Bism, Cuttack) and *Nagavalli* (arising from the Kalahandi district of Odisha) flowing eastwards through coastal plains directly into the Bay of Bengal; *Kolab* and *Machkund* draining westwards into the basin of mighty Godavari; and the river *Tell*, which rises north of Umerkote, flows into the Kalahandi and joins the Mahanadi.

The soilscape of the region is represented by four varieties of soil: *Red laterite soil*, most common to the region, particularly the Koraput/Jeypore track; *Black soil* found in Malkangiri and parts of Jeypore, rich in organic matter and more fertile; *Alluvial soil* found on either side of the Indravati river in Jeypore and on either side of *Vansadhara* in the Rayagada Division, rich in organic matter and fertility; and the *sandy soil* found in parts of Rayagada and Koraput.

Agroclimate

The climate of the region varies in different physiographic regions due to differences in altitude, rainfall, and temperature. The general climate of the region is characterized by hot summers (March to mid-June), heavy rainy season (mid-June to September), and cool winters (October to February). The monsoon sets in around the middle of June (or sometimes late May) and continues till September (sometimes

up to October). Nearly 80 per cent of the rainfall is received from the southwest monsoon, coming from the Arabian Sea. During the monsoon, the wind direction is from west or southwest. The distribution of rainfall is more on the windward side (western side of the hills). Thus, the rainfall in Jeypore and Malkangiri zones is heavier than in Rayagada. It is nearly the same in Jeypore and Malkangiri zones. The Rayagada zone being on the leeward side, receives minimum rainfall. The numbers of rainy days are higher in Jeypore compared to Koraput. During June to September, the rainy days are about 15 days or more. The annual average rainfall in the district was 1,522 mm, which covers around 80 per cent of potential evapotranspiration (PET). The dry spell falls between November and May, extending the length of moisture availability (growing period) from 150 to 180 days. However, there has been a declining rainfall trend from the middle of the present century. This is probably due to the gross ecological changes brought about by gradual deforestation for slash and burn cultivation. Temperature also shows seasonal variations in four geographical divisions. Generally, it is hot between March to May, and decreases in June with the onset of rains. November to February is the coolest part of the year. The Koraput Division is the coolest (6.5°C in December and 35.4°C in May), Jeypore is intermediate, and Rayagada and Malkangiri are the hottest (43.7°C and 42.9°C respectively). The data on relative humidity shows that the climate in Koraput is comparatively more pleasant throughout the year than in the Malkangiri zone.

Floristic diversity

The Koraput region has been reported to be a reservoir of floristic diversity with around 2,500 species of flowering plants with endemism of around four per cent, represented by about 79 angiosperm and one gymnosperm species (with Fabaceae and Acanthaceae as the dominant families). The book by Misra *et al.* (2009), “*Phytodiversity and Useful Plants of Eastern Ghats of Orissa with Special Reference to the Koraput Region*”, describes about 582 plants of 324 genera and 100 families, whereas a survey of hill forests of south Odisha recorded 947 species of Angiosperm (Mohapatra *et al.*, 2009).

Forests of the region are mainly of the tropical deciduous type and can be broadly classified into two major groups, the **Moist Tropical Forests**, and the **Dry Tropical Forests**. As per Champion and Seth’s (1968) revised classification, they can be classified into different types and sub-types. In the **Moist Tropical Forests**, the dominant elements are the **tropical semi-evergreen forests** with *Dalbergia latifolia* Roxb., *Dillenia pentagyna* Roxb., *Firmiana colorata* Roxb., *Macaranga peltata* (Roxb.) Mueller., *Mesua ferrea* L., *Syzygium cuminii* (L.) Skeels, *Terminalia alata* Herb. Madr. ex Wall, etc., and the **tropical moist deciduous forests** associated with canopy trees of *sal* (*Shorea robusta* C.F. Gaertn.), *Callicarpa arborea* Roxb., *Diospyros*

melanoxylon Roxb., *Haldina cordifolia* (Roxb.) Ridsdale [syn. *Adina cordifolia* (Roxb.) Bra], *Pterocarpus marsupium* Roxb., *Terminalia tomentosa* Wight & Arn., *Toona ciliata* M.Roem., etc.

In the **Dry Tropical Forests**, the tropical dry deciduous forests have the dominant species: *Anogeissus latifolia* (Roxb.) Bedd, *Buchanania lanzan* Spreng., *Boswellia serrata* Roxb. (syn. *B. glabra* Roxb.), *Diospyros melanoxylon*, *Sterculia urens* Roxb., *Shorea robusta*; the **Southern Dry Mixed Deciduous Forest** has the characteristic tree *Anogeissus latifolia* and the associate *Terminalia tomentosa*. *Diospyros tomentosa* Roxb. is also common, *Boswellia serrata* and *Lagerstroemia parviflora* Roxb. are very widespread and conspicuous, bamboo and grass are conspicuous till it is grazed or burnt in a forest fire, while climbers are few, like *Bauhinia vahlii* Wight & Arn. This type is especially prevalent in the drier localities; the **Dry Peninsular Sal Forests**; **Northern Dry Mixed Deciduous Forest** has widespread *Anogeissus latifolia* and *Buchanania lanzan*, *Sterculia urens*, *Bauhinia* L. spp., poorly grown *Terminalia tomentosa* and *Nyctanthes arbor-tristis* L. in many tracks; the **Dry Deciduous Scrub Forest** with shrubs; **Dry Deciduous Savannah Forests** are open with original forests being lost and the trees stand apart singly or in small groups in more or less heavy grass; and **Dry Bamboo Brakes** with *Anogeissus* Wall., *Butea monosperma*, bamboo, *Boswellia serrata*, etc., capable of forming more or less pure stands. Dry Bamboo, Brakes in such forests are encountered in the Narayanpatna Range

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