

Vegetation study at Rakhalmara forest in Kapgari Beat of West Bengal

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Abstract

Forest plays a crucial role in improving ecosystem services. Ecosystem role is primary under which each entity work separately. This is accompanied by a large number of micro-ecosystem with enormous energy flow which supports all living components to grow, regulate their interactions even change the structure of vegetation form one form to another form. Vegetation of forest also plays a significant role to improve the quality of the environment. The use of minerals and their constitute components in any part of the ecosystem is important. Therefore, in this study general information on vegetation components, its status and ecosystem services have been placed. Study also reflects the forest elements managed by forest department as well as by local people to make healthy vegetation at Rakhalmara village under Kapgari beat of Jhargram forest division. *Sal* (*Shorea robusta*) is the main element in the forest though in degraded areas main components are *mahul* (*Madhuca indica*) and *jam* (*Syzygium cumini*). The paper reflects on the vegetation of Rakhalmara with its status and management in a long term basis.

Forests of the lateritic southwest Bengal is dry deciduous *sal* dominated type. Here due to dry spell of summer, many forest components shed off their leaves and barks even they look broom-like structures after winter. Two to three months heavy summer make the forest vegetation dry and successive forest fire causes heavy damage in this area.

Forest Protection Committees (FPCs) are trying to make repair it natural. Feeling, looping, climber cutting, thinning, weeding, mulching, pruning are the normal practice of the forest department to get healthy stock even healthy non-timber forest produces (NTFPs) round the year. In the forest of southwest Bengal, plant cover shows multi-storied tree species found

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in a natural way. It is very dense area due to change of vegetation and competition of species or its elements too. This may be heterogeneity of indigenous as well as foreign plant elements and their composition and even their interactions at the same time under various micro-climatic conditions. In the community, many types of plant species occupy their own position due to various ecological factors. The interactions and high influence of physic-chemical parameters imposed on growth and behaviour of many species at a glance. So many herbs, shrubs, trees and climbers with a good number of lower group of plants available here. These are mosses, lichens, ferns and fern allies found in a forest area with potential interactive behaviour. Due to dry spell of summer no aquatic vegetation has been found inside the forest. Temperature, humidity, rainfall and topographical variations change the growth behaviour and species dominance time to time. The overall uniqueness makes the entire ecosystem diverse and heterogeneous. Species variation is a general phenomenon due to change of edaphic as well as other topographic factors. So, the variety including variability of species constitutes the diversity of biological entities under the major group landscape diversity. No ecosystem is entirely static but it is fluctuating due to change of imposed factors time to time on space with seasons. Cox *et al.*⁹ supported the arguments and established imposed factor based dynamic ecosystem activity. The change of ecosystem and the process of development in such situation make a succession with special kind. According to He and Hubbell¹⁷ the changes of composition take places overtime are relatively predictable, especially in general terms. So, scientists argued that successions affect species diversity

because of its tuned environment after a repeated hammering on a same space after a repeated pressure by factors like soil, temperature, light and temperature. Biotic and microbial composition is also another factor that changes the system in a time scale basis. Therefore, in any succession, the overall changes make the ecosystem fit in connection with the altered system. So, researchers argued higher biomass in the species level is a possible cause of the high species diversity at the low altitudes because it offers greater spatial heterogeneity and more opportunities for small organisms to find home. Similarly, in succession it increases biomass and architectural complexity in the vegetation lead to higher species diversity. Under such varied situation, many species found in an ecosystem and their parts develop versatile products that are used by us. We use these items as resource for many purposes. Food, fodder, fibre, flosses, resins, gums, twigs, green leaves, dry leaves, medicines, edible fruits, mushrooms are the resources of forest round the year. But productivity is independent due to variations of imposed factors on it. The use and pattern of use of the forest produce materials are different from site to site. Wildlife and their interactions in a forest are also different which is determined by a large number of factors. The interactions of wildlife and their positive affect in a forest are not recorded fully but unrevealed scenario is under study everywhere. Due to repeated change of climate the structure of the vegetation alters and that affects their flora and fauna and even the effect affects on the people and environment. So, local scale vegetation and their interaction study are essential to manage the forest and people in a kith and keen relationship basis. Remembering the theme is mind, a village forest Rakhalmara

under Kapgari forest beat has been taken in to account to know the structure of vegetation. It would help foresters to manage the forest in a regional basis during climate change condition.

Area under Study :

In this research forest of Rakhalmara under Jamboni Community Development Block (CDB) was taken. It lies between 86.89° E and 22.51° N. Forest is aside the village (code 340234) and the village is mainly dominated by marginalised people. Small patch of land and landmasses are under cultivation practice and most of the people are farmers. According to census 2011 total population of the village is 261. Number of female are more than male and all are engaged in agriculture followed by work in forest or under forest department in various projects. Sal dominated natural forest, degrade stand with scattered trees and low lying cultivable lands are the common land forms.

Regular and periodical survey for consecutive three years (July 2018 to 2021) in the study area of forests was conducted in 5 study sites in forest. Degraded land, natural forest and in village boundary was taken for study. Marked plot for herbs was taken in 1 x 1 m² for shrubs it was taken as 5 x 5 m² and for tree species¹⁰ it was 10 x 10m². Status study was made as per the work done by Godoy and Bowa¹⁵. Identification of NTFPs was done following Mishra *et al.*²⁵. Species identification was confirmed using standard literature²⁸. The study was conducted for consecutive three years as per the plan discussed with some foresters. Field trips were

arranged to cover all the study sites in 3 seasons namely winter, summer and monsoon. Data on the ethno-botanical values of plants were collected through cross interviews on local people then matched with literature published time to time¹⁻³⁹. Local and common names including usable plant parts and photographs were taken to verify the authenticity of species and to make record data. Identification of species was done with the help of available literature. Herbarium specimens were prepared and preserved in museum of Govt. General Degree College Lalgah, Jhargram, W.B.

Present study reports Heterogeneity of forest of Rakhalmara. This forest is sal dominated though other species like *Syzygium cumini*, *Semecarpus anacardium*, *Madhuca indica*, *Buchanania lanzan*, *Cassia fistula*, *Diospyros melanoxylon*, *Careya arborea* and *Anogeissus latifolia*. Shrubby species found here are *Combretum decandrum*, *Ventilago denticulata*, *Cissus adnata*, *Agave* sp., *Vitis pedata*, *Symplocos racemosa* and *Ichnocarpus frutescens*. Herbaceous plants like *Aristolochia indica*, *Hemidesmus indicus*, *Blumea lacera*, *Curculigo orchioides*, *Elephantopus scaber*, *Ionidium suffruticosum*, *Vernonia anthelmintica*, *V. cinerea*, *Ageratum conyzoides*, *Smilax zeylanica* and *Ageratum houstonianum*. Some of the photographs are mentioned in photo plate 1 (Fig. 1-6) indicate the composition of the vegetation. A large number of mushrooms and ferns are found in ground though during in winter and in summer these are obscure. During late winter sal shows flowering vegetation and looks beautiful with fragrant flowers. Green leaves, sal plates, resins, sal twigs are important except poles and

boles or tree form of wood. *Diospyros melanoxylon* leaves are used as fumicatories and widely used as *bidi* leaves with high economic demand. Mushrooms in late monsoon grow in ground and used by local people for edible purpose. In monsoon forest looks like lush green and many valuable items available there. Many medicinal plants, fruits, seeds, flosses, resins, red ant and tussar are the products rather than wood. The significant role of Joint Forest Management Committees (JFMC) are immense and members of the committee are involved to make the eco-system sustainable even they serve as regulator to manage the phto and zoo diversity in the said area. In this article various types of plant based items have been presented viz. whole plant, roots, barks, flowers, fruits, seeds and resins. Anthills are available inside the forest. Termites found in forest and during winter they decompose dead barks over the trees. As termites is a main decomposer in the forest so useless leaf and twig litter are used by her own agent *i.e.* termite. Result found similarly for active pine forest ecosystem in the South Eastern United state regions³⁷. It is food for many woodpeckers and wryneck birds. India is rich in bio-diversity as its geographical location is distinct. Its floral and faunal elements are so rich and distributed in various nature reserves and in forests of different eco-habitats. In West Bengal, it is unique from hills to plains. Rakhalmara is such kind of diverse eco-habitat covers many more from phyto to zoo-diversity ground. Here many important plants are found in different co-habitats in forest that are truly a source of economic development.

Result revealed that the area is high and diverse habitats for many valuable plant

as well as animal species. Asian elephant is the most endangered species that are found in the forest of the Rakhalmara under Jamboni block because it is adjacent to Jharkhand and corridor of elephants from Dalma Range. Other animals like Jackal, fox, monkey and mouse are common. Venomous snakes are also recorded from the forest. In degraded land *Madhuca indica* are common. Big sized trees are used to collect flowers- an ingredient of local liquor. *Terminalia arjuna* bark, *T. chebula* fruit, *T. bellerica* fruits are found from the forest. It is source of *bidi* leaves which is available from small shrubby plants of *Diospyros melanoxylon*. Twigs of *Combretum decandrum* is used to prepare basket. Some grasses are used to prepare brooms. *Phoenix acaulis* – a small palm of forest used to prepare broom. In local market, many fruits like *Flacourtia* sp., *Syzygium* sp., *Diospyros* sp., are available which are economically important. Agave used as natural fence to protect soil and stop soil erosion. Some medicinal herbs are common that yield good biomass which is used to make local formulation to cure ailments. Red ant and its eggs are marketed with high demand as medicinal purpose. Due to heavy stress on forest the young seedlings and their establishment is not properly established. So, they fail to regenerate. Regeneration study on each important forest plant is urgent issue to know the demand based use. Main purpose of this study is therefore to develop local *ex-situ* plant garden or nursery by local people for sustainable resource management and to develop local economy. Our duty is to encourage them for betterment of the society in near future. Forest department and local government should promote them to do work along with different projects. Research and extension should be incorporated to know the status

which could flow the resource as a managerial way for better management of the resource as suggested by researchers time to time². Therefore, continuous research and extension should be made on soil, ecosystem, flora, fauna and people in a balanced way. This could help us to know more about the role of forest and its environment even their impact on society in a long term basis.

Photo Plate 1 (Fig. 1 to 5)



Fig. 1 *Aristolochia indica*; Fig. 2 *Agave* sp. planted to check soil erosion; Fig. 3 Author measuring GBH of tree.



Fig. 4 Measuring GBH of *Syzygium cumini* ;
Fig. 5 Measuring GBH of *Madhuca indica*;
Fig. 6 A mature tree

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