

Ecological Pattern And Diversity Of Foot Hill Vegetation At Gar-Panchakot Hill In Purulia District Of West Bengal, India

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Abstract- The paper presents vegetation pattern of Gar-Panchakot Hill, commonly called Panchet in Purulia District of West Bengal, India. It actually broadcasts pattern and diversity of vegetation in plantation site near foot hill managed by Forest Department, natural sites and degraded land including base of the hills with small patches of agricultural land. Wetlands are excluded in this discussion though a small pocket of water bodies is included as it is associated with foot hills, and retention of water which is very less volume during dry summer. It reflects not only the diversity and structure of succession vegetation but also reflects the suggestions to conserve the vegetation for ecological sustenance of life. Lastly it aims to fetch a pail of interest to overcome the problem and to conserve the medicinal plant resources for common people to conserve in in-situ platform if possible ex-situ nearby. Four stages discussion along with some measures are jot down to conclude the problems and to initiate the projects in a micro or macro level basis through different sectors for all round development of the societies' need during the present position.

Keywords- Gar-Panchakot Hills, Purulia, Vegetation pattern, diversity, Medicinal Plants, conservation.

I. INTRODUCTION

Gar-Panchakot hill falls under Purulia District. The district has gently undulated topography with occasional hillocks and hard rocks (Ghosh, 2016). Gar-panchakot hill is a popular among tourists but most of the people are familiar with the hill which is situated in lateritic Purulia district of southwest Bengal of West Bengal. It is nearer to Ramkanali railway station which is situated in between Adra and Asansol railway station. It is nearer to Damodar River and separated two states West Bengal and Jharkhand. The Panchet Dam is famous which is nearer to the hill Gar-Panchakot. The district has gently undulated topography with occasional hillocks of hard rocks. These are residual hill bearing testimony to the high plateau of ancient times which has been eroded down and

form the present land form. Highlands of Purulia are actually the remnants of the spurs projecting from the Ranchi plateau to the west and functioning as water shed of Subarnarekha-Kansai-Damodar group of rivers. Gar-Panchakot (560m), Ajodhya (580m), Baghmundi (377m), Gorgaburu (677m), Karma (663m) are the main hills of the district. Upper parts of the hills show a mixed type of vegetation like *sal* (*Shorea robusta*), *kul* (*Zizyphus jujuba*), *chiar* (*Bauhinia vahlii*), *piyal* (*Buchanania lanzan*) etc. In the lower region mostly the species like *sal* with other plants like *parasi* (*Cleistanthus collinus*), *bhurru* (*Gardenia gummifera*), *galgali* (*Cochlospermum religiosum*), *sidha* (*Lagerstroemia parviflora*), *kusum* (*Schleichera oleosa*) etc. are found (Das, 2006). Dhara of Gar-Panchakot was taken to study the medicinal plants including vegetation structure in lateritic southwest Bengal.

II. STUDY AREA

Study area includes the places like Shyampur and Cholaberia including foot hills of Gar-Panchakot at Dhara of Purulia District. It is nearer to Ramkanali Railway station and very close to Gobak bus stand towards Dishergarh to Adra in Purulia. It is fall under Raghunathpur forest Range of Purulia. Foot hills and lower tract of the study area was taken in to account.

III. MATERIALS AND METHODS

Seasonal visit in the area was conducted in a team with different experts from different organization. Plant materials were collected from different places since June 2012 along with the sites of shyampur where so many local resource persons accompany the team. During collection all specimens were properly tagged and demarcated with collection number with date to identify the selected medicinal medicinal plants for mycorrhizal study including study of foot hill vegetation. For detailed study sections of the twigs along with the flowers and fruits were collected and were tested under stereo

microscope. Following intensity of infection primary and secondary hosts of *Cassytha* and *Cuscuta*, attention were paid and focuses were pointed for the intensity of infectivity on hosts. Populations of host plants were also studied to know the ecological status of hosts. Normally three kinds of status have been made after critical field study and laboratory examination. These are abundant (more than 80% frequency), less abundant (less than 80% but more than 10%) and least abundant (less than 10%). The number of medicinal plants were studied in each site was determined in a quart size 1m x 1m for herbs, 5m x 5m for shrubs and 10 m x 10 m for tree species. Study sites were divided into some microclimate namely shrubberies, as degraded and natural forest. Each site has been marked for a single species. Plant species were identified; ecological condition and status were made as per the standard literature (Wheater et al. 2011). Literature used for various purposes which are mentioned in references (1-7). Herbarium specimens were housed in College herbarium section for further study.

IV. RESULTS AND DISCUSSION

In the present study total 16 medicinal plant species was found near the foothill of Gar-Panchakot area (Table 1). Here 6 species is considered as high altitude species where as all species are available in low altitude of foothills (plus sign denotes presence of species). A total 93 species recorded from natural forest and degraded land of the Dhara area of Panchet (Table 2). Out of 93 species recorded, 82 species found in natural forest and 88 species found in degraded land of the same area. All species are mycorrhizal except one species that is *Argemone maxican* which is found during winter to summer in the degraded land. The unique vegetation of the said area is diminishing due to penetration of people and introduced artificial cementing materials. Land degradation is going on which causing serious threat on (1) Vegetation, (2) on species, (3) on ecosystem and ultimately on (4) society. The gradual habitat loss and species loss locally should be prevented to save the ecosystem pristine.

Table 1 Medicinal Plant species available in Plantation Stand near foot hill of Gar-Panchakot hill, Purulia, West Bengal, India

Sl. No.	Name	Family	High altitude	Low altitude
1.	<i>Abrus precatorius</i>	Fabaceae	+	+
2.	<i>Ailanthus excels</i>	Simaroubiaceae	-	+
3.	<i>Anthocephalus cadamba</i>	Rubiaceae	-	+
4.	<i>Azadirachta indica</i>	Meliaceae	+	+
5.	<i>Bombax ceiba</i>	Malvaceae	+	+
6.	<i>Butea monosperma</i>	Fabaceae	-	+
7.	<i>Capparis spinosa</i>	Capparidaceae	+	+
8.	<i>Carissa spinarum</i>	Apocynaceae	+	+
9.	<i>Cassia siamea</i>	Caesalpinaceae	-	+
10.	<i>Leucaena leucocephala</i>	Mimosaceae	-	+
11.	<i>Melia azaderachth</i>	Meliaceae	-	+
12.	<i>Murraya exotica</i>	Rutaceae	-	+
13.	<i>Murrayya koegnii</i>	Rutaceae	-	+
14.	<i>Pongamia pinnata</i>	Fabaceae	-	+
15.	<i>Sesbania grandiflora</i>	Fabaceae	-	+
16.	<i>Simaruba sp.</i>	Rubiaceae	+	+

Table 2 Plant species available in natural forest and degraded land near foot hills of Gar-Panchakot hill, Purulia, West Bengal, India

Sl. No.	Name	Family	Natural Forest	Degraded Land
1.	<i>Abrus precatorius</i>	Fabaceae	+	+
2.	<i>Acacia nilotica</i>	Mimosaceae	+	+
3.	<i>Aegle marmelos</i>	Rutaceae	+	+
4.	<i>Alangium salvifolium</i>	Alangiaceae	+	+
5.	<i>Albizzia indica</i>	Mimosaceae	+	+

6.	<i>Albizzia lebbeck</i>	Mimosaceae	+	+
7.	<i>Argemone maxicana</i>	Papaveraceae	-	+
8.	<i>Aristolochia indica</i>	Aristolochiaceae	+	+
9.	<i>Bambusa arundinacea</i>	Poaceae	+	-
10.	<i>Blumea lacera</i>	Asteraceae	+	+
11.	<i>Borassus flabellifer</i>	Arecaceae	-	+
12.	<i>Buchanania lanzan</i>	Anacardiaceae	+	+
13.	<i>Butea frondosa</i>	Fabaceae	+	+
14.	<i>Butea superb</i>	Fabaceae	+	+
15.	<i>Caesalpinia sappan</i>	Caesalpiniaceae	-	+
16.	<i>Calotropis gigantean</i>	Asclepiadiaceae	+	+
17.	<i>Calotropis procera</i>	Asclepiadaceae	+	+
18.	<i>Canscora indica</i>	Gentianaceae	+	+
19.	<i>Carissa spinarum</i>	Apocynaceae	+	+
20.	<i>Carya arborea</i>	Lecythidaceae	+	+
21.	<i>Cassia occidentalis</i>	Caesalpiniaceae	+	+
22.	<i>Cassia tora</i>	Caesalpiniaceae	+	+
23.	<i>Cassytha filiformis</i>	Lauraceae	+	+
24.	<i>Catharanthus pusillus</i>	Apocynaceae	-	+
25.	<i>Cleistanthus collinus</i>	Euphorbiaceae	+	+
26.	<i>Cocculus hirsutus</i>	Menispermaceae	+	+
27.	<i>Commelina oblique</i>	Commelinaceae	+	+
28.	<i>Coutleya spicata</i>	Zingiberaceae	+	-
29.	<i>Creteva nervosa</i>	Capparidaceae	+	+
30.	<i>Crotalaria palida</i>	Fabaceae	+	+
31.	<i>Croton bonplandianum</i>	Euphorbiaceae	+	+
32.	<i>Canscora decussate</i>	Gentianaceae	+	+
33.	<i>Cuscuta reflexa</i>	Convolvulaceae	+	+
34.	<i>Cyanoglotis axillaris</i>	Boraginaceae	-	+
35.	<i>Daemia extensa</i>	Asclepiadaceae	+	+
36.	<i>Dalbergia latifolia</i>	Fabaceae	+	+
37.	<i>Dendrothoae falcate</i>	Loranthaceae	+	+
38.	<i>Dioscorea floribunda</i>	Dioscoreaceae	+	+
39.	<i>Dioscorea pentaphylla</i>	Dioscoreaceae	+	+
40.	<i>Dioscorea triphylla</i>	Dioscoreaceae	+	+
41.	<i>Diospyros embryopteris</i>	Ebenaceae	+	+
42.	<i>Diospyros melanoxyton</i>	Ebenaceae	+	+
43.	<i>Diospyros sylvatica</i>	Ebenaceae	+	+
44.	<i>Drosera burmanii</i>	Droseraceae	-	+
45.	<i>Erythrea roxburghii</i>	Leguminosae	+	+
46.	<i>Flacourtia indica</i>	Flacourtiaceae	+	+
47.	<i>Flacourtia ramontchii</i>	Flacourtiaceae	+	+
48.	<i>Gardenia gummifera</i>	Rubiaceae	+	+
49.	<i>Gelonium multiflorum</i>	Euphorbiaceae	+	+
50.	<i>Glochidion lanceolarium</i>	Euphorbiaceae	+	-
51.	<i>Gnephalium luteo-album</i>	Asteraceae	+	+
52.	<i>Grangea madarapatna</i>	Asteraceae	+	+
53.	<i>Helicteris isora</i>	Sterculiaceae	+	-
54.	<i>Heliotropium indicum</i>	Boraginaceae	-	+
55.	<i>Hewitia bicolor</i>	Convolvulaceae	+	+

56.	<i>Ichnocarpus frutescens</i>	Apocynaceae	+	+
57.	<i>Ipomoea hastat</i>	Convolvulaceae	+	+
58.	<i>Jatropha gossypifolia</i>	Euphorbiaceae	+	+
59.	<i>Launea asplanifolia</i>	Asteraceae	+	+
60.	<i>Macardonia procumbens</i>	Scrophulariaceae	+	+
61.	<i>Madhuca indica</i>	Sapotaceae	+	+
62.	<i>Meyna laxiflora</i>	Rubiaceae	+	+
63.	<i>Mimosa pudica</i>	Mimosaceae	-	+
64.	<i>Mimosa rubricaulis</i>	Mimosaceae	+	+
65.	<i>Mucuna pruriens</i>	Leguminosae	+	+
66.	<i>Nicotiana plumbaginifolia</i>	Solanaceae	-	+
67.	<i>Nyctanthus arbor-tristis</i>	Oleaceae	+	+
68.	<i>Nymphaea stellata</i>	Nymphaeaceae	+	+
69.	<i>Nymphoides indica</i>	Nymphaeaceae	+	+
70.	<i>Olox scandens</i>	Olacaceae	+	+
71.	<i>Phoenix sylvestris</i>	Arecaceae	+	+
72.	<i>Polyalthia cerasoides</i>	Annonaceae	+	+
73.	<i>Polygala crotalariodes</i>	Polygalaceae	+	+
74.	<i>Premna herbacea</i>	Verbenaceae	+	+
75.	<i>Samania saman</i>	Mimosaceae	+	+
76.	<i>Scirpus articulatus</i>	Cyperaceae	+	+
77.	<i>Solanum sisymbriifolium</i>	Solanaceae	+	+
78.	<i>Solanum xanthocarpum</i>	Solanaceae	+	+
79.	<i>Sphaeranthus indicus</i>	Asteraceae	-	+
80.	<i>Sterculia foetida</i>	Sterculiaceae	+	+
81.	<i>Tamarindus indica</i>	Caesalpiniaceae	+	+
82.	<i>Tephrosia perpurea</i>	Fabaceae	+	+
83.	<i>Teramnus labialis</i>	Fabaceae	+	+
84.	<i>Thespesia lampas</i>	Malvaceae	+	-
85.	<i>Tiliacora racemosa</i>	Menispermaceae	-	+
86.	<i>Utricularia indica</i>	Lentibulariaceae	+	+
87.	<i>Ventilago denticulate</i>	Rhamnaceae	+	+
88.	<i>Viscum orientale</i>	Loranthaceae	+	+
89.	<i>Woodfordia fruticosa</i>	Lythraceae	+	+
90.	<i>Wrightia tomentosa</i>	Apocynaceae	+	+
91.	<i>Zizyphus jujube</i>	Rhamnaceae	+	+
92.	<i>Zizyphus oenoplea</i>	Rhamnaceae	+	+
93.	<i>Zizyphus rugosa</i>	Rhamnaceae	+	+

V. CONCLUSION

Gar-panchkot revealed 125 herbaceous species, 31 shrubby species as well as 50 tree species as a whole under hill conservation area (Anonymous, 2010, pp.123-126.) But the present revealed that Dhara area boosts 93 medicinal plant species which have been recorded as per study. Targeted species found here are ***Aristolochia indica* L.**, ***Asparagus racemosus* Willd.**, ***Litsea glutinosa* (Lour.) C.B.Robinson**, ***Morinda citrifolia***, ***Desmodium gangeticum* (L.) DC.**,

***Gloriosa superba* L.**, ***Gymnema sylvestre* R.Br.**, ***Mucuna pruriens* (L.) DC.**, ***Ophioglossum* spp.**, whereas, flagship

species found here is ***Pterocarpus marsupium* Roxb.**, The present area also have threatened species which need conservation as a whole. Hope that more persons will take that opportunity to make the ecosystem eco-friendly to conserve the species.

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Photo Plate -1





vegetable; **Fig. 14** First author taking data from local people at Dhara, Purulia; note that a small movable tea shop run through the use of modern supportive technique *i.e.* by LPG gas stove.

Legend of Figure: **Fig. 1** *Acacia nilotica* and *Abrus precatorius* (Fruits showing red beaded structures); **Fig. 2** A team of research workers after study at Dhara area and in front of Gar-Panchakot Hill, Purulia, West Bengal during winter 2015; **Fig. 3** *Daemia extensa* –A climber on *Acacia* sp. showing dehiscence of seeds by parachute mechanism through commas; **Fig. 4** Cattle are taking rest after grazing near foothill of Gar-Panchakot, Purulia; **Fig. 5** Plantation stand near foothill of Gar-Panchakot hills, Purulia, in front of which is degraded land; **Fig. 6** Settlement of manmade environment, the pioneer of environmental degradation near hill Gar-Panchakot, Purulia; **Fig. 7** Establishing building and settlement of tourism is the pioneer of land degradation and loss of habitats causing destruction of plants and threats on forest and nearby environment, also local people; **Fig. 8** Initiation of Bungalow to develop tourism near natural vegetation is the initiation of eco-degradation for long term basis environmental pollution and potential degradation in ecosystem; **Fig. 9** Bio-degradable leaf bowl made by *Butea frondosa* leaf in Foothill villages of Gar-Panchakot; **Fig. 10** Sal twig (*Shorea robusta*) used as tooth brush and as a marketed NTFP to develop local economy; **Fig. 11** Jhurkund brooms made by *Andropogon sorghum* (Poaceae)-A plant used as local NTFP with high market demand; **Fig. 12** Local people carrying plough at Shyampur Village of Purulia to tillage agricultural land; **Fig. 13** Local people carrying fuel wood from hill forest along with some plant twigs as