



Studies on Natural Resources and their Significance Around Arpa River Basin in Chhattisgarh

S. J. A. Bhat and S. Maqbool Geelani*

Department of Forestry, Wildlife and Environmental Sciences, Guru Ghasidas Viswavidyalya, Bilaspur, C.G., India

*Division of Environmental Sciences, S. K. University of Agricultural Sciences & Technology-Kashmir, Srinagar-193 201 Jammu & Kashmir, India

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ABSTRACT

Chhattisgarh State is mostly dominated by tribal and backward people. The state has rich endowment of natural resources in terms of minerals, forests and water bodies. The state has a forest cover of around 44%, which represents diverse tropical flora and fauna. Mahanadi, Shivnath, Son, Arpa, Kharoun, Hasdeo and Indrawati are the main rivers. The main forest types that are classified on the basis of species composition include Sal forest, being the dominant species distributed throughout western and eastern Belghana. However, the teak forest are found throughout the Khondri range while the mixed forests are distributed in the southern Belghana where the species of bamboo, sal, muhua, bija, sisso etc. are prominent. The third important resource in aforementioned region is soil and the geology of watershed that determines the infiltration of water, percolation of water, and controls the runoff and soil erosion of the area. The most widely distributed soil types of the area are loamy sand, loam, clayey loam and clay. The black cotton soil and lateritic or red soil are widely dominating in parts of study area. It was inferred from the study that Arpa river basin is very rich in natural resources, which need their systematic management without overexploiting them so that socioeconomic standards of this tribal area can be uplifted in a productive manner.

INTRODUCTION

As-per provisions of the Madhya Pradesh Reorganization Act, 2000, a new state of Chhattisgarh was born on 1st November 2001. The sixteen districts of erstwhile Madhya Pradesh spread over an area of 1.35 lakh sq. km constituted the new-state. The state has rich endowment of natural resources in terms of minerals, forests and water bodies (Joy et al. 2005). The state has a forest cover of around 44%, which represents diverse tropical flora and fauna. Mahanadi, Shivnath, Son, Arpa, Kharoun, Hasdeo and Indrawati are the main rivers of the state. With the population of slightly over twenty million people, Chhattisgarh has got high proportion of scheduled castes (SC) and scheduled tribes (ST), comprising 44.7%, consisting of 32.4% of STs and 12.3% of SCs (Agarwal & Narain 2002).

The State has around 20,000 villages of which 9,500 villages are adjacent forests, which have more than half of the population belonging to tribal groups. Gonds form the largest proportion (55%) of the tribal population. The tribal and other backward classes are concentrated in the hilly parts of southern and northern districts where the hillocks are covered with forests. The present study was an attempt to explore the natural resources around the Arpa river basin that

can be exploited for uplifting the socioeconomic levels of the resource poor people of the region.

MATERIALS AND METHODS

An integrated survey was used to explore the natural resources in the Arpa river basin of Chhattisgarh through the collection of primary and secondary data. The primary data were collected through the eye views and interviewing with villagers representing different sections of the society, which are settled on/and around the banks of Arpa river in district Bilaspur. However, the secondary data were collected from the wide network including, agriculture, revenue, forest and irrigation departments of the state, especially at tehsil and district levels. Both the data were used to meet the objectives of the study.

RESULTS AND DISCUSSION

The State of Chhattisgarh is located between the northern latitude of 17°52' and 24° and east longitude of 78°58' and 84°28' spreading over an area of 136194 sq. kms consisting of 16 districts and 146 developmental blocks. Chhattisgarh is known as the 'Rice bowl' of Central India. The population of the state is 20.80 million with the density of

population as 154 persons per sq.km (Anonymous 2001). Physiographically, the state of Chhattisgarh can be divided into 3 distinct zones viz., Bastar, Dantewada and Kanker mostly covered with forests (Gupta 1995). The hills forming the plateaus achieve heights between 700 and 800m above MSL. Chhattisgarh plains represent mature pediplain and are characterized by a gently undulating and flat terrain. The fringe area is distinguished by high mounds or hillocks rising to altitude of 700 m. Northern hill covers (400 m) include parts of Surguja, Koriya, Korba, Bilaspur, Jashpur and Raigarh districts.

The main rivers that flow in the State of Chhattisgarh are Mahanadi and its tributaries like Shiv-nath, Hasdeo, Mand, Arpa etc., which drain part of Raipur, Durg, Rajnandgaon, Bilaspur, Raigarh and Sarguja districts. The river Indravati - a tributary of Godavari drains the districts of Baster and Dantewada. Most of the rivers are perennial in nature. Generally, the drainage patterns are of dendritic, parallel, angular and radial types (Anonymous 2008). The State experiences a subtropical monsoon climate. The southwest monsoon starts from second week of June and continues till middle of September. The normal annual rainfall is about 1300mm. The vagaries of monsoon and uneven distribution of rainfall causes severe drought conditions. Chhattisgarh has rich biodiversity because of favourable climatic conditions and has 44% of the geographical area under forests. The state has ample resources including; land, water, forest, animals and human. All types of resources are available for all the activities embedded in the project to provide a better living environment and livelihood opportunities to the residents of various districts. The following resource inventory is the result of discussions in meetings to plan this project and data collected from secondary resources.

Water: Chhattisgarh abounds in water-bodies, rivers and streams, lakes, and tanks. Through systems and practices evolved over hundreds of years people have learned to conserve water and use it judiciously and equitably (Pant et al. 2003). A combination of wisdom, intuition and experience has enabled the people to tide over the situation of adversity. The cultural heritage and living pattern in Chhattisgarh are associated with tanks and small water-bodies called bries. In religious celebrations, there are many instances when small tanks are made at the home and worshipped. In local songs (Lok Geet) there are instances, which indicate that 700 tanks were constructed by Raja Buland of Sarguja and 126 tanks were constructed at Ratanpur of Bilaspur District. In Janjgir-Chapa district there are 36 earthen forts surrounded by water channels, which are not for the defence but for the water storage. For maintaining the cleanliness around the tanks there are persons from the villages who attempt to do it daily. They used to go to tank in the morning and before taking

bath, clean the Ghats daily for general use. There are traditions that during rains on Hareli- festival several articles used for worship are immersed in tanks. Equivalent silt is taken out to compensate and maintain the depth of the tank. Many of the important cities and towns of Chhattisgarh are situated on the banks of rivers viz., Arpa, Mahanadi, Narmada, Godavari, Shivnath, Hansdeo, Indravati, Pairi, Kharoon, Maniyari Jonk, etc. The River Kole flows by the capital city of Raipur. Bilaspur is situated in the river bank of Arpa, Taalagaon on the bank of Maniyari river and Jagdalpur on the banks of Indravati river. Rajim, an important pilgrimage lies by the confluence of three rivers, namely, Mahanadi, Pairi and Sondhul. The renowned Danteshwari temple at Dantewada is situated on the confluence of Shankini and Dankini rivers. Thus, the rivers of Chhattisgarh are important from the social, economic, religious, and even political point of view to the state. Arpa river watershed is the base of Bilaspur. But in the present condition Arpa river is totally dry except during rainy season. Arpa river is a main tributary of Mahanadi, which is known as the perennial source of irrigation in the state of Chhattisgarh (Farrington et al. 1999). Making the lands of the state fertile from a very long time, Mahanadi interests the various districts of Chhattisgarh. Bilaspur district is a flourishing place which is blessed with an abundance of natural treasures. For example, there are vast stretches of fertile fields that are used for growing a number of high quality crops. Every year Bilaspur contributes considerably towards the state's total crop production. The reason behind such a commendable farm production is the Arpa river. The River Arpa is regarded as the very core of the economic sustenance of Bilaspur. Round the year Arpa river goes on making the agricultural lands of Bilaspur more fertile (Sahoo et al. 2003). Apart from its economic viability, Arpa river with its scenic beauty and perennial nature attracts a huge number of tourists. People from every corner of India and sometimes from outside the country too, flock to the banks of Arpa river in Chhattisgarh to enjoy the calm ambiance. In a way, Arpa river also provides a major boost to the tourism industry of Bilaspur district. Arpa river is one of the vital strong holds of Bilaspur district in Chhattisgarh.

Forests: Forty four percent of the state is covered with the forests. People of Chhattisgarh have symbiotic relationship with the forests. The economy, culture, tradition and livelihood are all inextricably linked to the forests. In several tribal districts of the state sacred groves - tracts of virgin forests - or vestiges of an ancient practice in which people protected a forest to avoid the wrath of its resident god. These groves are unique example of ecological understanding and management (Ramakrishna & Osman 2004). The villagers here recall how their ancestors forbade them to cut the trees in the grove. Sacred groves range in size from a few trees to

Table 1: Forest types on the basis of species composition.

S.NO	Forest type	Distribution
1.	Sal forest	Western and eastern Belghana
2.	Teak forest	Khondri
3.	Mixed forest	Southern Belghana
4.	Bamboo forest	Buloda village

dense forests of hundreds of hectares. The guiding principle behind all these people's forests is the supremacy and control of the community, not only over the forests and the environment, but also over the individual. The community designates a forest area as protected and to enforce the protection, declares it sacred, usually by dedicating it to a deity (Gupta 1995). In such groves, all forms of vegetation, including shrubs and climbers, belong to the deity. Grazing and hunting are prohibited and only the removal of dead wood is allowed. Sacred groves reflect what ecologists call social fencing. Sociologists say that in the absence of written laws, religion played an important role in enforcing social norms and codes.

Table 1 shows the forest types that are classified on the basis of species composition. In Sal forest, the dominant species are Sal distributed throughout western and eastern Belghana. The teak forests are found throughout the Khondri. The mixed forests are distributed in the southern Belghana where the species of bamboo, sal, muhua, bija, sisso, etc. are found. The bamboo forests are distributed throughout the Buloda village where the dense vegetation of bamboo is seen.

The soil/land: The soil and the geology of watershed determines the infiltration and percolation of water, and controls the runoff and soil erosion of the area. Soils are the dimensional body which develop naturally by the action of natural forces. It is derived by the rocks through the process of weathering. There are different varieties of soil formulates depending upon the parent materials (ADRC 1989). Prime among these are red soil, black soil, deep soil, shallow soil, coarse textural, fine textural, sandy and loamy etc. The information about the major soil groups existing in the watershed area has been recorded on the basis of their hydrologic grouping, and physical and chemical properties of the soil. The most widely distributed soil types of the area are loamy sand, loam, clayey loam and clay. The black cotton soil and lateritic or red soil are widely dominating in parts of the study area.

Distribution of soils in Chhattisgarh: The soils of the region are deficient in important mineral nutrients like calcium and magnesium, nitrogen, phosphorus, lime and potash, which are concentrated in the lower parts of the soil layer. However, the tropical red and yellow soils or the red sandy soils of the region possess texture suitable for growing rice and millet crops. The soils of the Chhattisgarh plain

are considered its principal natural resource, and are the mainstay of the predominantly agricultural population of the region. We have derived data for the other districts from our maps. For the state as a whole, the predominant soil type is red and yellow loamy soil (ADRC 1989). The percolation/water retention capacity, as well as the productive capacity of different soils, varies. The following major types of soils are found in Chhattisgarh:

Kanhar (clayey): A low-lying deep bluish black soil with high moisture retention capacity. It is well suited for rabi crops, particularly wheat.

Matasi (sandy loamy): This is a yellow sandy soil, with an admixture of clay. It has limited moisture retention capacity. Though used for paddy, it is ideal for short duration maize and deep-rooted pulses. It is found in better-drained areas and at relatively higher altitudes.

Dorsa (clay-loam): This type of soil is intermediate in terms of soil moisture retention between kanhar and matasi. This is best described as loamy, and has a colour between brown and yellow. This is more or less an all-purpose soil, and is suitable for paddy.

Bhata (laterite): This soil is a coarse-textured, red sandy-gravelly soil, found on upland tops. It is deficient in minerals and other productivity enhancing nutrients, and is often suitable only for coarse millets. It is low in humus content and is often wasteland. It is a good locale for silvi-pastoral efforts (Ramakrishna & Osma 2004).

Using an alternative detailed classification, we find that Aqualfs-Ustalfs are restricted to Bastar Division, and are mainly found along the valleys of Indravati river and its tributary Baordhig as well as the Sabari river valley above Gallopalli hills. The Kanker basin, in the northern part of the district, spilling over in southeastern Durg and southwestern Raipur, is also composed of the same soil type. Ustalfs-rocky outcrops are spread over the remaining part of Bastar division except the Gallopalli Plateau and Chintavagu valley. In the districts of Raipur Division, they lie along the Mahanadi river up to a few kilometres on both the sides extending up to the eastern end of the river in the state in the southern tip of Raigarh. They are also found in the southern parts of Durg and the southern and western parts of Rajnandgaon. In the north, in Surguja district, they are found in the upper reaches of Hasdo-Rampur basin and Surguja basin. Ustalfs-Ochrepts-Orthents characterize the northeastern parts of erstwhile Rajnandgaon and northern parts of Durg. The extreme northwestern tip of erstwhile Raipur and the Raipur uplands also have the same type of soil. In the district of Bilaspur the soil type is confined in a small area to the northwest of Pendra Plateau and the north of Lormi Plateau (Misra 2004).

Table 2: Particulars of the schemes of watershed in Chhattisgarh State.

S.No	Particulars	EAS	DPAP	IWDP
1	Number of mini-watersheds	180	149	33
2	Number of micro-watersheds	1324	660	359
3	Number of dependent villages	2190	1100	481
4	Treated area (hectares)	681287.85	106176.97	61689.7
5	Total number of S.H.G. constituted	5727	1430	675
6	Total number of WT & C Gs constituted	3493	1166	417
7	Total number of WCs Constituted	1744	861	292

Ochrepts-Usters-Ustalf are mainly found in the east of central part of Rajnandgaon continuing in the central part of Durg and stretching further into the northwestern section of Raipur and the southeastern part of Bilaspur. Orchepts-Orthents-Ustalfs occupies almost the entire districts north of Mahanadi. In Bilaspur, the soil forms little continuity in the eastern fringe of the district bordering Raigarh. Rest of it is spread in the south and southwestern part of the district. In Surguja it is located in the tehsils of Surguja and Wadrafanagar. Orthents-Rock Outcrops is mainly located in the erstwhile district of Surguja. Deogarh Hills, Sonhat Plateau, Korea Hills, Jashpur Pat and Jamira Pat are covered by this soil. In erstwhile Bilaspur it is located in the Chhuri Hills. Orthents-Tropepts are found only in Korba-Bilaspur's Korba basin and north of Pendra Plateau. Orthents-Ochrepts-Ustalf too are only located in Bilaspur division on the Pendra and Lormi Plateaus. Ustalfs-Ochrepts are scattered and found in the northeastern fringes of the Surguja district, bordering Chhota Nagpur Plateau in Jharkhand, and continuing into the northeastern tip of the Raigarh district. The Gollapalli hills in the southernmost tip of Bastar district is the only other region with this type of soil (Misra 2004).

Watershed management programme in Chhattisgarh: Watershed management program was intensively taken as a campaign in Chhattisgarh region with a mission based approach namely Rajiv Gandhi Mission for watershed Development during the year 1995-96 within the undivided Madhya Pradesh. Precisely, it was a sincere approach of the State Government subsequent to the recommendations of Dr. Hanumantha Rao Committee. Based on the recommendations, this programme was implemented with community involvement in two major dimensions of watershed i.e., Drought Prone Area Programme (DPAP), and Integrated Wasteland Development Program (IWDP) with an amalgamation of the fund of Employment Assurance Scheme (EAS) (Gupta 1995). Particulars of the schemes of watershed in Chhattisgarh state are given in Table 2.

Watershed Development Programme sponsored by Ministry of Rural Development, Government of India with a matching State share is being implemented in the state of

Chhattisgarh. In Chhattisgarh a total of 8,49,154.89 hectares land covering 3771 villages was treated under the DPAP, EAS and IWDP. The suggestive practices like soil conservation, water conservation, forestry and fodder development activities, by forming users-group, women thrift and credit groups, self help groups had been undertaken in each watershed project, and the completed projects are being handed over to the community following Order-20 of the State Mission for watershed development in Madhya Pradesh and Chhattisgarh (Joy et al. 2005).

PROBLEMS

The project has been formulated to address following main critical gaps that are learnt on the basis of participatory research (Farrington et al. 1994).

- Poor road connectivity and badly damaged physical infrastructure.
- Low agricultural productivity due to insufficient irrigation facilities.
- Socio-economic limitations of primitive tribes and other backward communities.
- Poor health-education and veterinary infrastructure and opportunities.
- Need for training and capacity building of vulnerable groups e.g., women, scheduled tribes and scheduled castes and other backward classes.

STRATEGY

Rural people have vastly inferior access to basic social services and the economic mainstream. In this context, the delivery of rural transport infrastructure would be a significant catalyst for sustainable economic development, and poverty alleviation. The thrust areas to improve livelihood conditions are:

- Infrastructure on agriculture, irrigation, veterinary, fisheries, etc.
- Value addition in NTFP, farm and non-farm activities
- Capacity building and training

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