

Integrated River Basin Management: A Case Study In The Catchment Area Of Wangling River Basin, Manipur

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ABSTRACT: *Water is life. Without water imagine nothing growing on earth. The surface of the earth with no water in it, would be lifeless, dead, collapsed into dust, sand, clay or rock. It is an essential part of any ecosystem; both in quantitative and qualitative terms, and reduced water quantity and quality both have serious negative impacts. It is fundamental for sustainable development and without water all living things is impossible. The present paper aims to find out the amicable solution of the Wangjing River catchment area that has many problems of social, cultural and environmental complexity as the river passes through villages of having different caste, creed and culture people settled along the river. The main objective of the study is to estimate surface and groundwater availability, present utilization and future demand for various purposes and finally to suggest water conservation measures for meeting the water deficit in the catchment area. A large part of the cultivable land in the state remains dry and adequate water for cultivation is missing for long gape. The available ground water is also scarce in these areas. A large part of land is under water during the rainy season and difficult to grow crops in these areas as there has been absence of farm canals and water regulatory norms for water sharing to the basin area. The river was perennial in nature, there was enough water for agriculture and other domestic uses, and moreover, there was no pollution in the water bodies, but today due to various anthropogenic causes in the catchment areas and river courses for sand quarry and other factors, the entire basin environment get disturbed. As a result, there is occurrence of scarcity of water for agriculture, drinking and other domestic purposes in the river basin. Based on the studies, certain water resources development schemes have been recommended for the basin with a view to optimally make use of water resources for maximizing the agricultural production and meeting other important needs.*

KEYWORDS: *Conservation, Ecosystems, Basin, Environmental Complexity, Pollution, anthropogenic, Sustainable.*

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I. INTRODUCTION

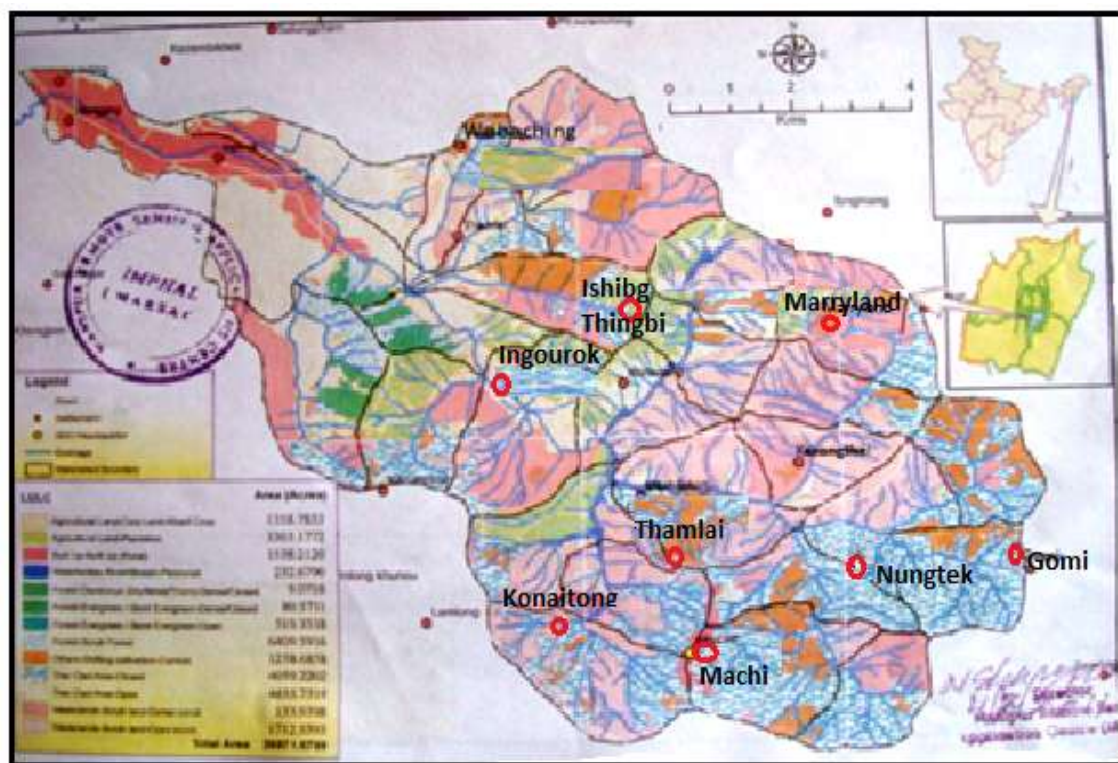
Water Integrated river basin management (IRBM) is the systematic process of coordinating conservation, management and development of water in the catchment areas for sustainable enhancement, in order to maximize the economic and social benefits derived from water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems. Implementing IWRM at the river basin level is an important element to managing water resources more sustainably, leading to long-term social, economic and environmental benefits as well as to keep the ecology balance. The Wangjing River Basin of Thoubal District, Manipur is comparatively small in compare with other river basins of the state but the basin covers highly fertile and densely populated areas (14.78%) next to Imphal west District of the state (18.13%) having inharmonious of caste, creed and culture. The Wangjing River, also known as the Heirok River, originates near Gomi Village (altitude 1520 m) of the north eastern hills of Chandel district of Manipur. It flows westward passing through Heirok village situated in the valley area of Thoubal District. The major problems in the river basin are drying of springs in the catchment areas, increase erosion in the upper channel systems of the river, greater sedimentation along the river bed, siltation to the low-lying areas and increases water level to the productivity agricultural paddy fields during monsoon season. Moreover, it causes overflow to the surrounding villages and frequently occur flood and havoc thereby affecting the lives of the people and domestic animals during the rainy season. Day by day there have been increasing conflicts amongst the different water user's communities and farmers for water sharing during summer in agriculture and irrigation have created stunted growth in local economy.

II. OBJECTIVES

The main objective of the study is to examine and disseminate the overall situation and setting geohydrological environment conditions of the river basin. The study would provide an overview of the people's perception and water sharing conflicts on the water resource management and analyze impacts on the socio-economic and cultural lives of the farming communities in the river basin and to investigate amicable solution based scientific oriented approach in the basin for long term management of the water resources in an integrated manner by stimulating relevant policies and suggestions to the water users in general. Checked deforestation in the upstream hill areas for shifting cultivation is the basic need to keep the basin safe, sound and sustainable. In addition, the ever growing vulnerability that is induced by global and local changes such as population changes, climate changes and variability, socio-economic issues and environmental degradation, can result in increasing both the frequency and severity of extreme events, including droughts and floods.

III. STUDY AREA

The Wangjing River Basin formed by *Wangjing River*, main trunk of many rivulets flowing down from the eastern hills, runs through the middle of the town, serving as a natural spring. It is connected to other parts of the state by the Imphal-Moreh national highway. The River basin spread across Chandel and Thoubal District of Manipur, India, falls within Manipur river system and lies between latitude of 24°36'0"N and 94°1'48"E. The basin is bounded by Shalungpham, Kairembikhok and Khangabok in the north; Machi Sub-Division (Chandel district) in the east, Sapam, Langathal, Phundrei, Khongjom, Tentha and Tekcham in the south of the river and Ekop Lake in the west. . The area extension of the basin is 20 km from north to south and 45 km from east to west, covering 900 sq.km (4.02%) in Thoubal and Machi Sub-Divisions in the state. The existence of the river is maintained mostly by three conserved forests in the catchment namely the Bungli, Khajinglok and Ishingthingbi respectively. There are 7 important tributaries/gorges of the river in the short course of its origin. Out of these, only three tributaries are contributing throughout the year namely Bumi, Khajinglok and turel Macha and other gorges contribute in monsoon season and these contribute to flash floods. The khajing lok forest is preserved by the local people of Machi village and biotic resource is kept intake since fishing and other activities of quarrying has banned in the area.



Catchment area of Wangjing River



Wangjing River

IV. SIGNIFICANCE OF THE STUDY

The study on river basin management as a means to restore water for social and ecological needs of the people and other bio-diversities under study is an innovative approach toward integrated water resources management in Manipur. The global community, Government and donor agencies, national and international institutions, environmental activists are needed to keep their eyes towards sustainable management of these natural resources in great extent. To-day, we all know that the phenomena of global and regional climate change occurs which give great impact on daily socio-economic and cultural lives of the people and it further gives a great threat to the food securities not only to the catchment areas but as a whole in the state.

The present paper is attempted to find out the sustainable management of water resources in the river basin environment and restoring the natural growth of all ecological aspect in the catchment areas. The comparative analysis and presentation of the facts for long term policy of water conservation measures and coordinated management approach in the river basin will educate the community and larger people in general and policy makers and research scholars in particular. The findings of the research will be a toolbox for the policy and decision makers and others research scholars who want to undergo ~~de~~ research particularly in the sector. Therefore, it is expected that the present study/investigation will explore some areas where all the user communities in the river basin are adopted a regulatory sustainable policy for water management with sharing and introduced a model which ensure conservation and optimum utilization of water resources in the basin.

V. LACK OF MASS AWARENESS

Any schemes or projects, whether governmental or private whatsoever, to be effective needs mass awareness and sincere support of the people to keep sustainable. In the context of the catchment areas, majority of the hill people are yet to fully realize about the harmful effects of deforestation for jhum cultivation on ecosystem. The hill people in the upstream of the catchment areas still need a lesson on jhum cultivation and its impacts on ecology. The Village Councils, be it traditional or of state government, hardly had any ideas on ecology as the topic is incomprehensible to the traditionally blended mindset councilors whose understanding and knowledge of nature have been clouded with myths and superstitions. In fact, the tribal understanding that the land and forests are rejuvenates itself in its natural course still rules the mind of the hill people vis-a-vis hill forests. Deforestation, slash and forest fire are the common and traditional behaviour of the hill people for the purpose of shifting agriculture. Nevertheless, the settlements in the downstream of the river don't care about the sanitation and they think the natural course of river is only for their own but never think for the others.



Open toilet near Wangjing River

Downstream River used for domestic purposes

VI. PRESENT SCENARIO OF THE RIVER CATCHMENT AREA

About 15 years back, the river was perennial in nature, there was enough water for agriculture and other domestic uses, and moreover, there was no pollution in the water bodies, but today due to various anthropogenic causes in the catchment areas and river courses for sand quarry and other factors, the entire basin environment gets disturbed. As a result, there is occurrence of scarcity of water for agriculture, drinking and other domestic purposes in the river basin. Deforestation in the upstream of the catchment area for shifting cultivation is the prime factor for that the Wangjing river basin environment has been deteriorated in a considerable extent. Consequently, many rare species of the flora and fauna found abundantly in the forests are now in a state of extinction and the natural beauty and charm of this tiny state has virtually been reduced to a near barren land infested by human moth. The situation is compounded with the dumping of household garbage thereby creating water pollution and contamination. Absence of water regulatory norms and institutional system of management and coordinated management approach in the basin has resulted into the sluggish growth of agricultural economy of the farmers. Divergence of Local wisdom, immature political decisions on water management, top down oriented approach of Wangjing River Project have largely affected the ecological aspect of the river basin. Owing to this man made disorder management, the Ekop lake environment is highly disturbed and it is about to extinction as the river discharges a large volume of annual siltation and nutrients into the lake. Considering all these above mention statement, the researcher felt the need of adopting a locally accepted coordinated management approach of Wangjing River Basin for sustainable uses of natural resources available and human and animal requirements.

VII. SHIFTING CULTIVATION AND TRIBAL PEOPLE

Protecting forest and keep our ecology friendly is a positive step. However, if we really are optimistic in transforming the entire barren and fallow lands of the hills into evergreen forests with healthy environment, our foremost priority should be to focus attention to the hill people because forests and tribal are inseparably linked together since immemorial. In other words, any policy or program of the government on forests whether short-term or long-term can be fruitful only when the tribal are aware of the policies and extend full co-operation. Therefore, the best policy should be, "Go to the villages and tell them about the harmful effects of jhum cultivation on environment by providing them with alternative livelihood" (Marchang Reimeingam, 2017)"Usage of Land and Labour under Shifting Cultivation in Manipur", The Institute for Social and Economic Change, Bangalore, ISBN 978-81-7791-240-1.

Table 1: Distribution (%) of ST/All Social Groups Households by Size and Class of Land Possessed and Cultivated in Rural Areas, Manipur (India), 2009-10

Land Size Class (Hact.)	Manipur				India			
	ST		All		ST		All	
	P	C	P	C	P	C	P	C
0.000	16.2	21.4	21.6	24.5	10.1	37.2	8.3	45.4
0.001-0.004	0.0	0.0	0.4	0.4	13.8	1.0	11.7	0.8
0.005-0.40	24.7	20.7	30.9	25.8	32.8	18.6	44.8	20.3
0.41-1.00	36.6	36.3	31.7	34.8	19.8	20.8	16.1	15.5
1.01-2.00	17.1	16.2	12.2	11.7	13.0	12.7	9.7	9.5
2.01-4.00	4.5	4.0	2.5	2.1	8.3	7.6	6.5	6.1
>4.01	0.8	1.4	0.7	0.8	2.2	2.0	3.0	2.5

Source: NSS (Report No. 543)

Note Figure given per 1000 in NSSO Reports are converted into percentage ST-scheduled Tribe, P-possessed and C-Cultivated

People living in the hill areas of Manipur are largely depends on land and forests for their livelihood through agriculture, food gathering and hunting."Jhum cultivation"(Gupta, 2000:605) or "shifting cultivation or slash and burn" (Seavoy, 1973-522) or Swidden cultivation" (Eden, 1993:146) or simply jhumming or "jooming"(Peal, 1874:476) has practiced as a way of life within the tribal communities and hill people from time immemorial. Roy, Xavier and William noted that ILO Convention No. 169, Article No. 14 specifically recognized the right of ownership and possession of the people concerned over the lands which they traditional occupy including the rights of the shifting cultivators. Further, ILO Convention No. 107 safeguards land and resources rights of the indiginous people. The ILO Convention No.111 guaranteed that shifting cultivators may exercise the right to practice a traditional occupation. Moreover, the United Nations declared on the rights of indigenous people recognised several rights for the communities to practicing shifting cultivation. The countries in Asia have long been contributing to the sustainable livelihoods; food security; sustainable natural resources management; and biodiversity conservation and enhancement. The traditional knowledge, cultural, spiritual and nutritional values attached to these livelihood systems demonstrate that they are not merely a technique of land use but their way of life. Most of the countries in Asia have adopted the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) that guarantees the rights of indigenous peoples to continue their traditional land use systems.

Today most hills of the state are becoming barrel due to shifting cultivation in some areas in Manipur (Fig.I) and decline in fertility of soil, and then keep it fallow for some years. For example in Nagaland, jhum fields are deserted after the first year of jhum cycle mainly due to labour constrains and decline in soil fertility (Jamir and Lianchawai, 2013)

Table-2: Distribution of Jhum Area in Hill Districts of Manipur (1991-92 to 2001-02)

Sl. No	District	Total Area in ('000 ha)	Jhum Area in ('000ha)		% to State's total Jhum Area	
			1991-92	2001-02	1991-92	2001-02
1.	Senapati	327.10	2.73	2.74	11.24	6.45
2.	Tamenglong	439.10	8.26	10.49	34.00	24.70
3.	Churachandpur	457.00	4.90	10.55	20.17	24.84
4.	Chandel	331.30	3.22	6.53	13.26	15.38
5.	Ukhrlul	454.40	5.18	12.16	21.33	28.63
	Total	2008.90	24.29	42.47	100.00	100.00

Source: Report on crop-estimation survey, Dept. of Economics and Statistics, Govt. of Manipur.

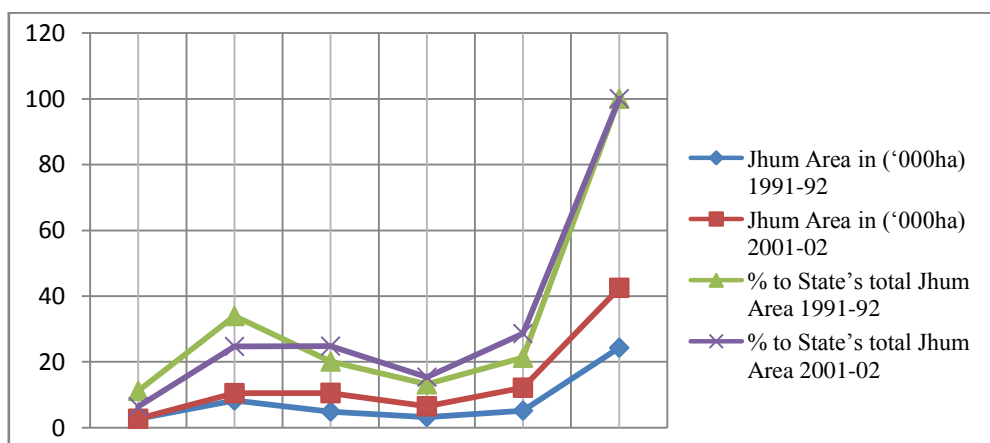


Fig. 1: Distribution of Jhum Area in Hill Districts of Manipur (1991-2002)

VIII. CONCLUSION

Integrated river basin management (IWRM) is an important global issue for water conservation and sustainable development. It is a new approach in Integrated water resource management presently practices all over the world as a part to manage water resources for various purposes in an integrated manner. It is a powerful concept and increasingly dominates natural resource management. Many developed countries of the world have created highly effective and resilient institutions for Integrated River Basin Management (IRBM). Today, the rivers in India are very critical for the development of the country for fulfill the water requirement and

maintaining the ecological balance in the basin and other associated adjoining areas. Therefore, it is expected that the present study will explore some areas where all the user communities in the river basin are adopted a regulatory sustainable policy for water management with sharing and introduced a model which ensure conservation and optimum utilization of water resources for sustainable development in the basin.

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