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Short Review Paper

River basin management in India: contemporary issues and future governance

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Abstract

The present paper highlights the existing approach and address the problems associated with river basin management which are historically ignored by the policy makers in India. Land degradation, soil erosion, sedimentation of reservoirs affects agricultural production and pose greater threat to food security and economic growth of the country. Participatory and self-management institutional framework for administering the catchments through a dedicated State Boards with a combination of engineering, social and scientific management is the key objective of the proposed Catchment area Treatment and Soil Conservation bill. Downward accountability of program objectives by Project Implementation Units and public have enabling role for catchment management are some of the key highlights of the proposed bill.

Keywords: River basin, soil conservation, sedimentation, governance, participatory management.

Introduction

The economic growth of the country is depends on sustainable natural resource management. The unpredictable climatic changes and adverse weather phenomenon affects food security and creating a barrier to alleviate poverty in the country. It is necessary to adopt for such metamorphic transformations such as soil erosion, desertification, deforestation and land degradation. Ancient Indian civilizations flourish on the banks of rivers. Rivers provide water for drinking purpose, irrigation, electricity and essential for overall socio-economic development of the country[1]. Currently, river basin management or watershed management is one of the vulnerable areas where conflicts are common. The watershed or river basin management in India starts in the early 1980s and 1990s where engineering models were not successful and also NGO's efforts were not reciprocated outside the pilot areas[2].

The Integrated Water Resource Management (IWRM) has been introduced in India in the early 2000s but it was not successful and having several barriers in the multifaceted socio-ecological settings to achieve the benefits[3,4]. The structure of watershed and soil in relation to physical settings, ecological succession and complex ecosystem services are influencing the health of natural resources. The ecological functions such as purification of water, balancing microclimatic conditions, habitat improvement and enrichment of riparian and aquatic biodiversity, wildlife management are in often associated with better management of river catchments and soil conservation. When compared to other sectors such as energy, infrastructure and urban development, water sector is facing too many hurdles to integrate the policies[5]. The present paper highlights the contemporary gaps in addressing soil and catchment area treatment anomalies and to find a legal remedy to address those issues. In this article, we propose the Catchment Area Treatment and Soil Conservation Bill comprising of three tired governance hierarchy involving various subject specialists including public investment for accountability and measurement.

Problems and Challenges

Rivers are integral part of maintaining forest and riparian ecosystems. Central Water Commission (CWC), an apex organization of Ministry of Water Resources, Government of India reported that per capita surface water availability in 1951, 1991, 2001 and 2010 was 5200 m^3, 2309 m^3, 1902 m^3 and 1588 m^3 respectively. There was a continuous decreasing trends in per capita surface water availability and in near future India become 'water stressed (<1000 m^3).

In India, the era of post-independence was suffered due to scarcity of food grains and as a result in the name of Green Revolution, several multipurpose dams and reservoirs were planned and implemented. Often, these dams were described as 'modern temples' of India[6]. Out of 5202 dams, 4857 dams are completed and remaining 345 dams are under construction and several hydroelectric projects generating 46457 MW of power per year[7]. Therefore, net irrigated area is considerably increased and subsequently the investments on irrigation sector in every five year plan were also being significantly augmented. According to Planning Commission, Government of India reports, the expenditure incurred on irrigation sector in the first five year plan (1951-1956) was 441.8 crores and it was increased to 2,11,200 crores in the XII five year plan.

Hence, the entire investments in India on irrigation and agricultural production are depending on water availability. Where does water come from for these dams or irrigation projects? The area or land where the surface and sub-surface water flows downstream and join a single source called 'rivers' is defined as 'catchment' of a river. Thus, catchment comprises of huge area in terms of square kilometers constituting variety of land uses including hillocks and forests depending on topological features. The treatment of these areas to improve the efficiency of water draining into the river through engineering and biological measures is of utmost important for sustenance and planning of water resource projects. Catchment area treatment is defined as a process and programme of works intended to reduce soil erosion through engineering and biological means to facilitate the soil to increase its moisture content[8].

The land class and drying up of rivulets in the river catchments is mainly due to Land degradation, soil erosion and deforestation, climate change and other anthropogenic activities pose biggest threat to food security. Soil erosion also causes economic losses to the farmers and society[9]. CWC in 2015 reported that, out of 239 major reservoirs studied in India, 81 reservoirs lost 0-10% storage capacity and 66 reservoirs lost 10-20% capacity due to soil erosion and improper treatment of their catchment. The sedimentation not only reduces the dead storage capacity of the reservoir but also affects the live storage capacity and damages the intended purpose for which it was built. People of the region heavily depend on these dams and de-silting of these dams is not practical at this cross juncture. The risk of sedimentation increases the chances of reducing food production, water wars in the command area, regional imbalances and affects already built infrastructure amidst causing socio-economic problems. The first five year plan (1951-1956) emphasize on importance of soil conservation and suggested state governments to enact suitable legislations for soil conservation which could broadly cover to execute specified improvements on the farmer's fields and allocation of costs between farmers and the State. It also empowers to declare 'protection areas' and impose restriction on usage of such areas with an objective to protect these areas from soil erosion, floods, silting and desiccation. For an effective implementation of programs on ground, it was suggested to establish Central and State Soil Conservation Boards. However, these suggestions were completely ignored.

Synchronization of Forest, Land and Water Policies

Hydrology is a science of water which includes physical, chemical and biological environments[10]. The ecosystems, land use pattern, vegetation structure and ecological succession are part of inclusive watersheds. Forests are the larger catchments for major river basins in India. Hence, relationship between forests and water is significant and the issues need to be taken up with highest priority.

These problems are still more intensive with climate change complexity until properly addressed at the policy level[11]. Similarly, non-forested landscapes are also contributed to the water availability but have least priority. In recent years, climate change is posing biggest threat to forests and altering the role of forests in respect of water availability[12]. The forest management practices has direct influence on availability of water and stream flow. But it should be quantified with cost and benefits with a due consideration to downstream users[13]. Watershed management is one of the functions under Gram Panchayath under XI Schedule of the Indian constitution. The understanding of managing these resources at the implementation level is poor and no downward accountability and hierarchy for implementation / success measurement[14] at the Panchayath level. Severe droughts in the past few years engage local communities in watershed management and now the communities are identifying their requirements of local needs without depending on local governments.

International Legislations

Internationally, the awareness on river basin management or soil conservation and CAT is much more intensive than Indian context. Globally, many countries have already enacted suitable legislations prior to Indian Independence. To name a few, United States of America (USA) enacted Soil Conservation and Domestic Allotment Act in 1936. The act empowered the people to use soil as' national resource' for the purpose of unprofitable economic activities without declining the soil fertility. Within three years after the enactment of the legislation, soil erosion has come down to 21.7%.

Australian Government enacted Soil Conservation Act in 1938 with an objective of soil conservation, on-farm water resources management and alleviation of erosion. Similarly, New Zealand government enacted Soil Conservation and Rivers Control Act in 1941 for better management of soil resources damaged due to high floods. Catchment Boards was constituted under the act and recognised Soil conservation reserves was for successful management and reduction of soil erosion. Canadian Parliament enacted Soil Conservation Act in the year 2000. The act provides duties for the land holder to prevent soil loss or deterioration. Under the act, every municipality is required to appoint Soil Conservation Officer to perform the duties to prevent soil erosion. The act empowers to obtain permission for removal of top soil, burning of stubble on land. If any person fails to comply with the act are liable for to a fine up to $ 5000.

Present river basin management practices

Ministry of Agriculture and Family Welfare, Government of India is responsible for development of agriculture in the country. The Ministry has 27 divisions and Natural Resource Management is one of the division to look after the issues connected with soil resource management of the country.

The division has various programs for watershed development, flood erosion and management alkaline and acidic soils. Under these programs, various catchment area treatment activities were undertaken with the help of State Agriculture Departments. The success of these programs were not measurable and becomes unproductive over a period of time and hence the then Planning Commission of Government of India, abandoned these programs and they no longer exist now. The Ministry in 2006 established National Rainfed Area Authority as an advisory body for policy and program formulation agency for monitoring of schemes related to degraded land development. However, no remarkable achievement has been made by this organization due to lack of support and co-ordination from Central and State Governments respectively.

The conservation, planning and management of water in the country has been administered by the Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR). The Ministry has enacted River Boards Act and Inter-state River Dispute Acts in 1956. These legislations are mainly focused on constitution of Boards and Tribunals to resolve the inter-state water sharing matters. This Ministry being the largest consumer of surface water does not have legislation to address catchment area treatment and soil conservation aspects in the country. The Ministry has a programme called Flood Management Programme under which flood management, river bank erosion and sediment erosion among the selected catchments will be addressed with the help of State Governments. But, the extent of utilization of funds and achievement of programme objectives at ground level is questionable. Recently, the Ministry invited public comments for 'National Water Framework Bill-2016'.Unfortunately in the proposed bill, the importance of CAT and soil conservation aspects were not addressed and there is no specific program of activities and action plan for protection, management and rejuvenating the water courses of the country.

Ministry of Rural Development has two distinct divisions viz., Rural Development and Land Resources with an objective to undertake rural development and management of land resources. Several programmes were launched by this Ministry during 2009-10 for the development of drought and desert prone areas including Wasteland Developments. The objectives of the programmes "is to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water" of the country. Under these programmes, many institutions were formulated at State, District and also at Village level. Now these programmes have been renamed under 'Pradhan Mantri Krishi Sinchayi Yojana'. By and large, these institutions are not functional at ground level for implementation due to lack of funds, staff, technical know-how and non-involvement of public participation. Certain states depends on external funding agencies to continue but couldn't succeeded too. Further, these institutions are managed by the Agriculture Departments of the state where there is a lack of understanding and non-involvement by other subject experts. The committees and institutional framework formed under the programs are exists to avail project funds rather to fulfill the objectives of the program[15].

The planning, promotion, co-ordination and management of country's environment and forests are administered by the Ministry of Environment, Forests and Climate Change. The Water (Prevention and Control of Pollution) Act, 1974, the Wildlife (Protection) Act, 1972, the Forest (Conservation) Act, 1980, the Environment (Protection) Act, 1986 and the National Forest Policy, 1988 are the umbrella legislations govern the protection of environment and forests of the country. Section 4.8 of the guidelines issued under the Forest (Conservation) Act, 1980 in 2004 mandates catchment area treatment for major and medium irrigation projects including hydroelectric projects for forest diversion proposals and such a condition was not mandated for minor irrigation projects and hydroelectric projects with less than 10 MW installed capacity. Forests are the largest catchments for any river and rivulets. If the proposal of irrigation or hydroelectric project invariably involves diversion of forest land, then only the Ministry mandates CAT plan, which is truly unscientific. Apart from these, no environmental legislations mandates implementation of CAT and soil conservation aspects in forest areas. In addition, presently, the State Forest Departments are not allowing the other parallel Departments to implement CAT and soil conservation measures inside the forest areas which it was previously allowed. There is a huge gap between the parallel departments and ministries to undertake CAT and soil conservation programs on ground. Individual states such as Andhra Pradesh, Orissa, Bihar, Rajasthan, Jammu and Kashmir and Uttar Pradesh have state level legislations for soil conservation. However, the state efforts have been undermined by various geopolitical factors and these are ineffective in delivering the duties in which it was enacted for.

Legacy behind watershed programs

Under the given complexity of protection, conservation, regulation and management of water, MoWR, Government of India introduced draft National Water Framework Bill in the year 2016 for inviting public comments and suggestions. Section 5 and 6 of bill contemplates continuous flow of unpolluted flow with clean and aesthetic river banks. For implementation of this objective, the Central Government rely on State Governments and its locally administered self-government institutions to ensure the integration of participatory management principles. Section 7 of bill reveal about people centered water management to involve informal intuitions and formal local governance for water and river management. The entire bill depend only on the existing local self authorities which has been which has been already a failure saga in the past three decades under various watershed programs and IWRM. It is the failure of the Central Government to address need based policy framework of bottom - up approach instead of top-down approach.

Chapter-IV of the bill discuss about Integrated River basin development and management and empower each state to establish River Basin Authorities to ensure river basin master plan. However, the bill fail to outline institutional mechanism for implementation of the programs.

The expenditure on CAT and soil conservation of various ministries is significantly increased from every successive financial year. Simultaneously, the human induced desertification, wind and water erosions problems are also increasing alarmingly. All these programs are ultimately end up at the Panchayath Raj institutions where there is no downward accountability[14]. Many of the rural development experts believe that, all the Central and State Government programs are routed through Panchayath Raj Institutions. These intuitions are not having a sufficient human resource, technical skills and required qualifications for the implementation of such programs. Many watershed programs have implemented under various programs of State and Central Governments funded by World Bank in 1980s and 1990s. The pilot projects of World Bank were not successful because of collective action and poor management in understanding the resources[16]. Most of the NGOs actively participated in watershed management programs. But, these are small scale and not do not replicated to other areas of the country[2].

The implementation of watershed programs funded by World Bank in the early 1990s and 2000 was failure due to lack of consultation at local level and deviation of project guidelines as well. The plantation activities undertaken under the programs and the structures built under the programs were not qualitative. Therefore, the failure of watershed programs has tendency to increase the sedimentation in non-forest areas[17]. The command area development was included while designing the irrigation projects. However, significant attentions have not been given in the case of catchment area of commands as it is associated with many departments. Hence, an integrated approach for catchment area planning is necessary. The concept of common umbrella organization at the project implementation level is necessary to coordinate the CAT activities[8]. Several research studies were conducted for evaluation of watershed programs and found that participatory management of watersheds with the public involvement and NGOs are more successful but could not replicate to other areas[18-21]. It is also important to note that, informal organisations are playing crucial role in bridging gaps between social needs and government. The support for these organizations shall be ensured within the legal sanctity[22].

Conclusion

The problems associated with catchment area treatment and soil conservation measures and river basin management are directly connected with economic growth, poverty, increased sedimentation of reservoirs, soil erosion, desertification, food security, etc. The governance of such important aspects is spread across multilevel horizontal departments posing non accountability of implementable expenditures and causing threat to physical and biotic environments. International commitment towards linking soil, water and land policies and governance are historical. A multidimensional approach of participatory, downward and measurable policy to address the contemporary soil and water issues is utmost important to India under the current climate change resilience.

With the current magnitude of water scarcity, riverine pollution, sedimentation of reservoirs and unplanned water usage, the present policies are not commendable to address the gaps between supply and demand. Hence, a dedicated institutional mechanism for better river basin management is required to address the gaps. Profound dependency on panchayath raj institutions many a times give negative results in terms of natural resource management and ecosystem concerns. The current National Water Framework bill, 2016 of Central Government deals about water quality, river rejuvenation, land use, river basin management, water security and conflicts, sectoral use and finally concluded at existing panchayath raj institutions for implementation of these programs. The bill is not focused on critical aspects of river management and touched every aspects. It is necessary to re-think on the carrying capacity and technical know-how of institutional support to implement watershed development programs. Hence, it is necessary to enact Catchment area Treatment and Soil Conservation Bill. The objective of the bill is to conserve the hydrology, water courses, preventing soil erosion, development of agro forestry and to enhance the water availability of rivers and streams by proper treatment of its catchment areas in forest and non-forest areas.

Under the new bill, every State shall establish dedicated State Boards and offices at the District level to prepare comprehensive plans to control sedimentation, pollution, anti erosion structures, fodder crops, afforestation, sylvicultural practices, etc by adopting suitable engineering and biological measures. These Boards are empowered to declare 500 m on either side of the river as 'no go zone' and discharge of effluents, dumping of solid waste to any streams and river are completely prohibited. Concerned Irrigation Department or who so ever is the user shall obtain permission from the Boards for use of water. Some of the highlights of the new bill are no person is empowered to distract or disturb hydrology, water courses and carry out any such activities that affect the river catchments and lead to soil erosion without the prior consent of the board after reviewing and approval of proposed activities.

The District Office in consultation with such other horizontal departments prepares a sand mining plan and shall notify areas for removal of sand. At the bottom level, Project Implementation Units are to be proposed comprising of qualified technical graduates in the field of Forestry, Agriculture and Horticulture, Engineering and Social Work to deal with the aspects of implementation at Panchayath level. The failure of implementation of the bill is liable for punishment with imprisonment for a term of five years including a fine of rupees

one to five lakh rupees or with both. In the proposed bill, it shall be the duty of every land owner to plant ten trees per hectare in irrigated areas and agriculture areas as specified by the Panchayath offices. The seedlings/species required for plantation shall be decided by the land owner in consultation with Panchayath office. Towards conservation of water, soil, catchments and such other natural resources, no state governments are empowered to interfere in any activities of the state boards. Whereas, in any unforeseen circumstances, the chief minister of the state shall request the Prime Minister to resolve the disputes if any arising out in any state in respect of such matters for the benefit at larger interest.

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