Implementation of Flood Protection Works in Himachal Pradesh: A Critique

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Abstract

Policy analysis at regional level in respect of water resource management or a facet of it, that is, flood protection in the present case, is necessitated because water related problems being experienced across the globe are not of identical nature. They are influenced by the diversities existing in geography, climate, socio-political setup, institutional capacities, and funding and investment capabilities. Flood protection works in the form of river channelisation are being conceptualized and implemented in Himachal Pradesh to tackle floods, the resultant socio-economic misery and for protecting and reclaiming valuable but limited agricultural land resource in this small North Indian hill state. This article critically analyses the implementation of one of the major flood protection projects of state namely the Swan River Flood Management and Integrated Land Development Project Phase-I and Phase-II in district Una (HP). The study is based on a review of the approved project proposal, and thence an analysis of its implementation on the basis of examining the funding, fund utilization pattern and the corresponding work progress. The study exhibits that while the project proposal rigorously applies theoretical textbook maxims, the work actually implemented has several loose ends, implying that there is much to be desired as far as effective project implementation is concerned. The paper provides an insight about the various facets of implementation of a water resource management related public project at the regional level in India.

Keywords: floods, flood protection, funding, funds utilization, Himachal Pradesh, policy implementation

Introduction

Floods are a part of the natural hydrological cycle. Alongwith their destructive fury, floods also have certain beneficial effects and advantages due to which flood plains have attracted humankind for centuries. Flood plains provide rich natural resources and fertile lands capable of supporting high-yield crops. However, the adverse impacts of flooding include loss of life and property; mass migration of people and animals; environmental degradation due to spreading of pollutants by floodwaters; and shortage of food, energy, water and other basic needs. A greater probability of floods is foreseen in various parts of the world due to the ever increasing human activities interfering with the ecosystem. The changes in climate are already resulting in changes in the frequency, intensity and duration of heavy precipitation events. The need to prevent and mitigate the adverse impacts of floods is thus well recognized at the highest level [1].

The Associated Programme on Flood Management (APFM), a joint initiative of the World Meteorological Organization and the Global Water Partnership, promotes the concept of Integrated Flood Management (IFM) to deal with floods. IFM is an approach that integrates land and water resources development in a river basin, within the context of Integrated Water Resources Management

(IWRM), with a view to maximizing the efficient use of flood plains and minimizing loss of life and property. The approach conceptualizes IFM as a subset of IWRM [2]. According to the United Nations World Water Development Report (2003) the water crisis is mainly a crisis of governance. In order to analyse water management and governance in a holistic fashion there is need to consider the issue at international, national, and local levels, i.e. the level of funding and external support, level of policy making and at the implementation level respectively [3]. Julian Caldecott while discussing the impending global water crisis opines that water, ecosystem and climate are inextricably linked so there is need to make wise decisions about all the three. The global water crisis is rooted in tens of thousands of local crises. Local water management issues fall within the remits of national governments and their agencies but beneath the radar of international bodies. The problem is that the local managers often lack a coherent view of the broader situation [4]. Peter Gordon and R.G. Little have opined that flood protection is often presumed to be a public good and hence a government responsibility. Their study has suggested that there are alternatives to status quo in funding and financing flood protection. Risk assessment has to be an important factor in deciding about the flood protection measures. This has to be followed by risk management to arrive at decisions about risk reduction. Besides cost benefit analysis and the impact of current flood protection measures on future development options need to be a guiding factor while zeroing in on the protection measures to be adopted [5]. Asit K. Biswas reinforced the need for policy analysis in various facets of water related sector at regional and local level because according to him water problems of the world are neither homogeneous nor consistent over time. They vary from one region to another, even within the same country and from one season to another [6].

The Constitution of India lays down the legislative and functional jurisdiction of the Union, State and Local Governments regarding 'Water'. Under the scheme of the Constitution, **'Water' is basically a State subject and thus** the primary responsibility for management of internal water resources including flood control, protection and management lies with the state governments. The subject of flood control does not figure explicitly in the Constitution; however drainage and embankments are two areas specially mentioned in the State List. In practice, clearance from Centre is required for all major and minor irrigation, hydropower, flood control and multipurpose projects before they can be included in National Plans. Moreover the projects must also obtain clearances under two specific Central Acts i.e. Forest Conservation Act and Environmental Protection Act [7].

Himachal Pradesh does not have an exclusive policy for flood protection. The subject has been dealt with, with adequate importance under the aegis of the State Water Policy 2013 [8]. According to the policy all the Water Resource Management (WRM) projects including those of flood protection, control and management should have an integrated and multi-disciplinary approach in the planning, formulation, clearance and implementation thereof. Catchment area treatment and management, environmental and ecological aspects, the rehabilitation of affected people and command area development are related matters that have to be accorded importance. In context of flood control and management, the policy stipulates a master plan for each river basin, emphasises the continuation of physical flood protection measures alongwith adoption and promotion of non-structural measures. It also calls for regulation of settlements and economic activities in the flood plain zones and maintenance and modernization of the flood protection structures created.

Irrigation & Public Health (I&PH) department of the Government of Himachal Pradesh (GoHP) is the nodal agency for implementing all flood protection works in the state. The term ‘Floods’ here is taken to mean the temporary inundation of a region due to very heavy rainfall which leads to rivers and their tributaries overflowing their banks and meandering i.e. changing its course, thereby causing widespread damage to life and property. ‘Flood protection’ is used here to mean all actions by government agencies to avoid unwanted inundation and active steps by those agencies to reduce its extent and impacts.

Objective

This paper seeks to critically analyse the implementation of a major flood protection endeavor of GoHP i.e. Swan River Flood Management and Integrated Land Development Project Phase-I and Phase II.

Methodology

The analysis is based on an examination and critical review of the approved project proposal, funding arrangements, the funds utilization pattern and the corresponding physical progress of work. The methodology adopted for this study involved an analysis of the literature pertaining to flood management and protection at the national and regional level in context of GoI and GoHP respectively. Further a critical review was undertaken in respect of the Detailed Project Reports of Swan River Flood Management and Integrated Land Development Project, the Environmental Impact Assessment (EIA) reports, the legal and administrative documents, the statements pertaining to financial and physical progress of works and the reports of monitoring, evaluating and auditing agencies. The information was obtained from the field office of the implementing agency. The internet was also used to access the government documents in public domain.

Theoretical Considerations

Policies, the higher level statements of intent, need to be translated into programmes of actions to achieve intended outcomes; policies generally enable programmes [9]. According to Owen and Rogers a programme is a set of planned activities directed towards bringing about specified changes in an identified audience. A programme has two essential components: a documented plan and action consistent with the information contained in the plan. Many programmes are described as social interventions. They are provided to the community by government or social service agencies, on the basis of 'nonmarket' criteria [10]. R.V.V. Ayyar has opined that a policy is ripe for implementation only when the decisions are taken on the goals and objectives of policy, the strategy for achieving these, the specific activities (programmes, schemes, and regulatory instruments- called policy levers) for implementing the strategy, and, operational guidelines, administrative structure and financial provision for implementing the activities [11]. According to Helga Pulzl and Oliver Treib [12] implementation is a continuum between central and local autonomy. The preferences of street level bureaucrats and negotiations within implementing networks are as important as the centrally defined policy objectives. Implementation thus is a political process during the course of which the decisions taken during the formulation stage are frequently reshaped and redesigned. According to Larry Gerston [13] implementation process involves transfer of policy commitments into practice thereby converting the decisions into actions and is fraught with challenges and obstacles. For implementation, bureaucracy and their workforce must operate with four important elements namely– translation ability, resources, limited number of players and accountability at their disposal.

Adequate financial resources and their proper utilization is the cornerstone for translating the objectives formulated into implementation. An analysis of the funding and fund utilization pattern throws light on, informs and explains what is being done in practice by implementing agencies, fixes their accountability and thus helps in smooth implementation. According to a World Bank document quoted by Mohit Bhattacharya [14] two broad types of accountabilities have been identified - the micro-level accountability which involves ensuring government responsiveness to the views and needs of the public; and the macro level accountability that further has two major dimensions, financial accountability and accountability for overall economic performance. Financial accountability involves a sound government accounting system, an external audit system and finally a mechanism to review and act on the results of audit and to ensure that remedial follow up action is taken. In the absence of an efficient system of financial accountability the government efficiencies are likely to be poor and the

probability of corruption increases. Accountability of economic performance involves review of resources used in public investment programmes and a strengthening of the capacity of government to monitor and evaluate their own economic performance. Larry Gerston has stated 'accountability is a critical element that distinguishes constitutional democracies from authoritarian regimes' [15]. Though in a democracy almost everyone is accountable to someone, accountability is a little trickier with bureaucracies because bureaucrats are not elected by anyone. Instead a bureaucrat is usually accountable to the political bodies that create, oversee and provide funds for his or her agency. To demonstrate its worth a bureaucracy must complete its assignments on time, as per budget and within all rules governing its existence [16].

Setting of the Study

Himachal Pradesh [17] is one of the northern states of the country**.** It is situated in the lap of the Himalayas between 30^0 $22^/$ $40^{//}$ to 33^0 $12^/$ $20^{//}$ North latitudes and 75^0 $45^/$ $55^{//}$ to 79^0 $04^/$ $20^{//}$ East longitudes. The altitude in the state ranges from 350 metres to 6975 metres above mean sea level. The entire region of state forms the catchment of Sutlej, Beas, Yamuna, Ravi and Chenab rivers. The state is mainly mountainous with exception of small pockets bordering Punjab and Haryana. Geographical area of the state is 55,673 km^2 and it has population of 6.6 million. About 90 percent of the population resides in rural areas [18] and is mainly dependant on agriculture.

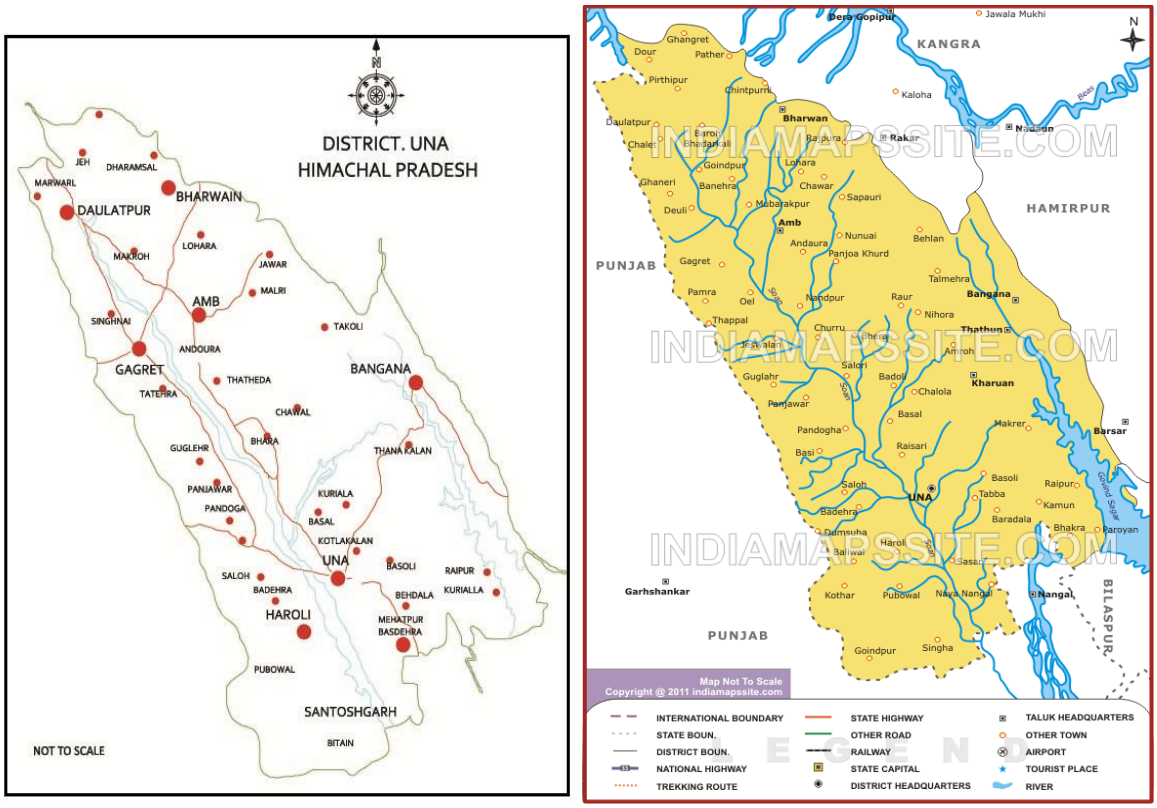
Una is one of the 12 districts of Himachal Pradesh. The district headquarter Una is situated about 212 km from the state capital Shimla and is in the North-East of the state. The geographical area of the district is 1540 km^2. The district lies at an altitude ranging from 350 to 1200 meters above Mean Sea Level (MSL), in the Shivalik hills zone between 31^o $21^{//}$ to 31^o $50^{//}$ latitude and 71^o $55^{//}$ to 76^o $28^{//}$ longitudes.

Overview of the flood problem in Swan River

Swan River, a tributary of river Sutlej flows through the inter mountainous valley of Una district from North West Longitude 76° $01^/$ Latitude 31° $48^/$ to South-East Longitude 76° $13^/$ Latitude 31° $16^/$ dividing Una district longitudinally and finally joins river Sutlej near Anandpur Sahib in Punjab. Of the total length of the river (85 Km), 65 km is in Himachal Pradesh. Total catchment area of the river is about 1400 km^2, out of which 1200 km^2 falls in Una district and rest of the catchment area falls in Punjab. Swan river has nearly 73 major tributaries which join it from both the left and right banks [19], [20]. Figure -1 illustrates the course of the Swan River and its tributaries flowing through district Una.

Figure 1

Swan River and its tributaries, District Una, Himachal Pradesh



Source: IndiaMapsSite <.http://www.indiamapssite.com/himachal-pradesh/district/una.html > 5 June 2015.

Swan River, the lifeline of district Una is also termed as the 'Sorrow of Una' as it has a history of creating flood havoc during monsoon every year. The catchment of the river mainly comprises of loose fragile Shivalik foothills having very little vegetative cover. Heavy demand of local population for fuel wood & timber and grazing requirements of livestock have resulted in large scale denudation of forests and land degradation. Large scale development projects like road construction, irrigation facilities, industrial and residential areas have aggravated drainage problem. Thus during heavy rainfall, the entire precipitation results into rapid flow into the tributaries and ultimately into the main Swan River. Besides, heavy erosion caused siltation in the bed of the main river and its tributaries; this in turn caused the river to meander leading to floods (prior to implementation of the flood protection project). Due to meandering of the river many new areas came under the threat of floods every year.

Such floods in the catchment caused large scale land erosion, extensive damage to life, property and crops, contamination of food and water, disruption of transport and communication, and continuous fear, anxiety, distress in the minds of people residing in the flood plains. Due to these floods valuable agricultural land was either washed away or rendered unproductive due to sand deposition over fertile land. As per official statistics, approximately 10,000 hectares of agricultural land was affected by floods in Swan River and nearly 2,000 hectares of fertile land was not cultivated due to fear of floods. Since, agriculture is the primary means of earning livelihood for majority population of the district, the recurrent yearly flood phenomenon in the river had a crippling effect on the socio-economic status of the district.

Swan River Flood Management and Integrated Development Project

- ***Phase -1***

A flood protection project for Swan River was envisaged in late 1970s. On the basis of hydraulic model studies of the river in the year 1978 and related recommendation for channelisation of the river, the I&PH department framed a flood protection project in 1984. The proposal was submitted to Central Water Commission, Ministry of Water Resources Government of India for the necessary techno-economic clearance. The project remained under consideration and correspondence with Government of India for many years.

This proposal had to be reviewed and reformulated by the state government a couple of times before it was finally accepted and approved by Ministry of Water Resources, Government of India in January 2000. Salient features of 1st phase of the project as per the approved proposal are shown in Table 1.

Table 1

Swan River Flood Management & Integrated Land Development Project Phase-1

1	Start and end Points	Jhalera Bridge to Santokhgarh Bridge
2	Length	16.67 km
3	Location	Approximately 6 km from Una town.
4	Mathematical Model Studies & design	CWPSR Pune Report 3347 of 1996
5	Approved cost of the project	Rs. 106.03 Crores
6	Land to be reclaimed	2260 Hectares
7	Project clearance from MoWR, GoI	18th January, 2000
8	Environment Clearance MoEF, GoI	21st February, 2000
9	Investment Clearance	30th March, 2000
10	A/A & E/S* accorded to the Project	11th April, 2000
11	Project components as approved by GoI • Engineering works for construction of embankments • Fishery works in 500 hectares • Horticulture works in 300 hectares • Forestry works in 600 hectares • Cost of EIA Total	 = Rs. 9164.04 Lakh = Rs. 675.00 Lakh = Rs. 279.64 Lakh = Rs. 153.29 Lakh = Rs. 331.36 Lakh = Rs.10603.33 Lakh = Rs. **106.03** Crores
12	Project financial support	NABARD Loan under RIDF**-VII, IX and XII.
13	Economic viability of the project	The benefit to cost (BC) ratio 1.37

Source: I&PH Flood Protection Division, Gagret, Una (HP)

*Administrative Approval & Expenditure Sanction
**Rural Infrastructure Development Fund

The work of the 1st phase has been completed in all respects and 2,260 hectares land has been reclaimed as per the scope of the project. People of the area have started large scale cultivation on

reclaimed land. Year wise detail of the expenditure incurred and achievements thereof in this phase of the project is given in Table 2.

Table 2

Physical and Financial Progress of Swan River Flood Management & Integrated Land Development Project Phase-I

Year	Budget (Rs. Lakh)	Expenditure incurred (Rs. Lakh)	Physical Progress (area/land reclaimed in hectares)
2000-01	200.00	200.01	50
2001-02	201.20	225.00	50
2002-03	722.60	725.67	120
2003-04	902.98	999.23	120
2004-05	900.00	984.50	315
2005-06	1145.00	1216.31	400
2006-07	1200.00	1200.01	450
2007-08	900.00	1090.00	450
2008-09	505.89	505.89	305
2009-10	102.00	102.31	0
2010-11	0	198.69	0
2011-12	48.58	48.58	0
2012-13	188.33	188.83	0
Total	**7016.58**	**7685.03**	**2260**

Source: I&PH Flood Protection Division, Gagret, Una (HP)

- ***Phase-II***

Keeping in view encouraging results of 1st phase of the project, Government of Himachal Pradesh decided to take up the work of 2nd phase. The engineering component of this phase costing Rs. 184.27 crores was approved for funding under Flood Management Programme (FMP) of Govt. of India wherein 90% cost of engineering works has been provided by Govt. of India as assistance and the rest 10% cost borne by the state government. Salient features of this phase of project as per the approved proposal are depicted in Table 3.

The work of 2nd phase has been completed in all respects and 5,000 hectares land which had become useless due to the flood, has been reclaimed as per the scope of the project and the people of the area have started large scale cultivation on reclaimed land. Year wise targets fixed and achievements during the implementation of the work in 2nd phase of the project are illustrated in Table 4.

Table 3

Swan River Flood Management and Integrated Land Development Project Phase-II

1	Start and end Points	Jhalera Bridge to Gagret Bridge
2	Length	28.34 km
3	Location	Nearly 35 km from Una Town
4	Mathematical Model Studies &design	CWPSR Pune Report 3347 of 1996
5	Approved cost of the project	Rs. 235.52 crores
6	Land to be reclaimed	5,000 Hectares
7	Project clearance from MoWR, GoI	12th May, 2005
8	Environment Clearance MoEF, GoI	31st March, 2006
9	Investment Clearance	2008
10	A/A & E/S accorded to the Project	29th March, 2008
11	Project components as approved by GoI • Engineering works for construction of embankments • Fishery works in 400 hectares • Horticulture works in 670 hectares • Forestry works in 1330 hectares • Agricultural works in 2600 hectares Total	 = Rs. 21524.94 Lakh = Rs. 1058.00 Lakh = Rs. 438.03 Lakh = Rs. 292.00 Lakh = Rs. 239.21 Lakh 235552.18 Lakh = Rs. **235.52** Crores
12	Project funding	Under Flood Management Programme (FMP) of GoI in 11th Five Year Plan.
13	Economic viability of the project	The benefit to cost (BC) ratio 1.33

Source: I&PH Flood Protection Division, Gagret, Una (HP)

Table 4
Physical and Financial Progress in respect of Swan River Flood Management & Integrated Land Development Project Phase-II

Year	Budget (Rs Lakh)			Expenditure incurred (Rs Lakh)	Physical Progress (area reclaimed in hectares)
	Central Assistance (Rs. Lakh)	State Share (Rs. Lakh)	Total (Rs. Lakh)		
2008-09	0	398.65	398.65	398.65	0
2009-10	2700.00	1147.68	3847.68	3848.40	500
2010-11	7425.00	3675.00	11100.00	10830.50	2000
2011-12	4467.00	0	4467.00	3411.63	2200
2012-13	1992.00	124.00	2116.00	2613.24	300
Total	16584.00	5345.33	21929.33	21102.42	5000

Source: I&PH Flood Protection Division, Gagret, Una (HP)

Discussion

Though everything that the government does may not be reflected in the government expenditure, but government spending is an indicator of its functions and priorities. A review of the funding and fund utilization pattern in the implementation of Swan river flood protection project exhibited certain modalities and features that have been discussed hereunder:

- ***Direct Correlation between Financial Adequacy and Sound Implementation*:** The Swan river project was envisaged in late 1970s but the implementation of 1st phase of the project could be initiated only in 2000-2001. In contrast to this, the implementation of 2nd phase of the project was smooth and expedited because of the regularity and stability in financial arrangements. 2nd phase of the project was funded under "Flood Management Programme" (FMP) [21], [22] a state sector scheme introduced in the 11th Five Year national Plan. Himachal Pradesh got funds under FMP for the flood protection works as a special category state.

  The long gestation period and the delay in initial phase of the project were attributed by the implementing agencies to non-availability of requisite funds with the state government and complete financial dependence on external funding agencies. It is implicit that unavailability of sufficient financial resources and sound financing arrangements critically influenced the implementation of the recommended options and strategies for flood protection and management in this case. This exhibits that budgeting, resource allocation, organizational behavior and performance and eventually the policy outcome have a direct correlation. Stable and long term resource allocation is likely to have a positive impact on outcomes as compared to punctuated nature of funding and financial resource allocation.

- ***Implementation vis-a-vis approved Project Proposal has been Partial***: The Swan River Flood Management and Integrated Land Development Projects Phase-I and Phase-II were envisaged, formulated and approved as projects with integrated perspective. The projected benefits that were to be accrued were calculated as a summation of integration of economic benefits from agricultural, horticulture, forestry, fisheries development activities etc. on the reclaimed land. The cost benefit ratio worked out in the project proposals of the 1st & 2nd phase was 1.37:1 and 1.33:1 respectively. However, only the engineering components of the proposals, i.e. construction of embankments, were executed by spending Rs. 76.85 crores and Rs. 211.02 crores respectively. The other components of projects pertaining to agriculture, horticulture, forestry and fishery development activities, on the basis of which the total benefits of this project were estimated, were not undertaken or implemented since no funds were made available for them. This indicates that the integrated aspect of the projects and the ensuing cost benefit ratios projected in the detailed project reports were actually never achieved in case of both the phases of Swan River Project.

  The theory of implementation entails that the implementing agency is required to transfer the commitments of the project proposals into practice, because it is on this basis that the proposals are approved by competent authorities. However in this case the projected goals when reviewed against the efforts undertaken i.e. on a comparison of 'before' and 'after' scenarios, exhibits that the actual results do not correspond with the intentions.

- ***Integrated Perspective Missing in Implementation***: The integrated aspects of the Swan river flood protection project proposals pertaining to agricultural, horticulture, forestry and fisheries development activities were not implemented because the implementing department arranged funds only for execution of civil engineering works pertaining to embankment construction. The projects were by no means implemented with an integrated, holistic approach.

  The concerns for adopting a holistic perspective towards water resources management projects, the need to overcome sectoral policy fragmentation and piecemeal efforts in favour of

cross boundary, inter disciplinary and integrated mechanisms and the importance of combining structural methods of flood protection with non-structural methods seem to be clearly missing from the implementation of these projects.

- ***Inefficacious Expenditure:*** Audit of accounts is an indispensable tool for ensuring sound financial administration and fixing the accountability of the executive in this regard. The efficacy of the expenditure made in the implementation of Swan River flood protection project phase 1st had several loose ends as highlighted in the Report of the Comptroller and Auditor General of India for the Year ending 31st March 2005 (Civil and Commercial), Government of Himachal Pradesh [23]**.** As per this report of C&AG, in case of Swan River flood protection works, there were instances of lack of long term planning, duplication of efforts, wasteful expenditure and also diverting of funds along with undue financial aid to the contractors.

- ***Lack of Maintenance of Completed Works***: The data and information supplied by the department does not show any budget provision or expenditure incurred for maintenance, implying that no maintenance works have been undertaken in respect of these projects. In contrast, the theory of public programme implementation entails that the aspect of maintenance should be an integral part of a project implementation as due to weathering and wear and tear with passage of time the structures erected are continually degraded. The C&AG of India has observed that maintenance of assets is an important activity. Failure to maintain the assets is tantamount to an act of disinvestment for it implies the sacrifice of past investment [24]. Thus regular maintenance and periodical inspections of existing embankments is extremely significant. However an analysis of the implementation of the Swan projects under study exhibits lacunae in this aspect.

- ***Lack of Ex-post Evaluation Studies:*** Retrospective evaluation is significant to assess the impact, consequences and worth of the policy programme that has been implemented. It plays an important role in exhibiting whether the stated objectives have been met and the outcomes and the consequences are in consonance with the pre-set goals and targets. Besides, it also highlights the unintended outcomes and consequences i.e. any negative fallouts and problems that may have arisen as a result of implementing the project. Evaluation helps decision makers and implementing agencies understand the extent to which their policies have succeeded or failed, as well as the emergence of issues they never expected [25].

  However, in this case there was no evidence of any summative, ex-post, retrospective evaluation being undertaken to assess the intended and long term unintended consequences of efforts undertaken, which on one hand entailed expenditure of crores of rupees of public money and on the other involved works that have direct implications for the environ, ecology, flora – fauna and their habitat, land resources and water resources of the region.

Conclusion

The Irrigation & Public Health department of Government of HP is the nodal agency responsible for undertaking flood protection works in the state. Review and analysis of implementation of the Swan River Flood Management & Integrated Land Development Project Phases-I and II exhibits that these projects have helped check the menace of floods in the region and have also helped reclaim 2260 hectares and 5000 hectares of agricultural land respectively. However, the state government lacked adequate funds and technical expertise for the purpose and had to depend on the Central Government for assistance. This was the reason behind extremely long gestation period and commencement of implementation. Moreover, the implementation has been found to be partial and incomplete as the approved targets have not been achieved thus implying that the projected cost benefit ratios have not been achieved. The report of C&AG points out that the efficacy of expenditure made therein had several loose ends. These relate to wasteful and infructuous expenditure, diversion of funds, the work executed

being below specification, and undue financial aid to contractors. Though crores of rupees of public money have been expended on construction of embankments for flood protection, there is no provision for inspection or maintenance of these structures for the purpose of their upkeep. The findings also show that credence has not been paid to the Integrated Flood Management Approach (IFM) that is being propagated by international agencies. The concerns for adopting holistic perspective towards WRM projects and the need to overcome policy fragmentation and piecemeal endeavors in favour of cross boundary, inter-disciplinary approaches and combination of structural as well as non-structural measures is clearly missing in the implementation of these projects.

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