Kathmandu University
Journal of Science, Engineering and Technology

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ORIGINAL RESEARCH ARTICLE OPEN ACCESS

THIRD PARTY MONITORING OF IEE IMPLEMENTATION ON SAND, GRAVEL AND STONE EXTRACTION IN NEPAL

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Received 3 December, 2015; Revised 30 December, 2015

ABSTRACT

The wise use of natural resources can help to boost development. IEE (Initial Environmental Examination) is a tool which is used to check and balance environmental disorders (EPA, 1996). With the enactment of Local Self-Governance Act, 1999, district development committees have been given responsibilities to formulate and implement programs related to the use and protection of the natural resources for the development of their area. This paper is an attempt to study the scenario of IEE implementation in developmental projects in four districts namely Sarlahi, Sindhuli, Arghakhanchi and Kapilvastu. The different parameters like baseline, compliances, impact, physical, biological and socio-economic and cultural aspects are assed by use of the monitoring format developed under national EIA Guidelines 1993 and Environmental Protection Regulation 1998.

Compliance monitoring in Sand and gravel extractions projects are highly complied in hilly district as compared to Terai districts. Out of twenty-six parameters taken for the study purpose, only seven parameters are not complied in all sand excavation projects, twelve parameters are not found complied in more than four sand, gravel and boulder extraction project in the study area. However, the poorest condition is found at Lakhandehi river of Sarlahi district where only two parameter are found complied. Mitigation measures of all project sites are planned and allocated the costs, however the implementation level is found very poor. Only few activates like protection work for small irrigation canals, earthen roads and cross over are made in Arghakhanchi and safety measures in Sindhuli districts are implemented. Amount of extraction of river sediments is found greatest in Bagmati River, which is also larger than the other rivers. The extraction in Sukwel and Mainar river of Kapilvastu district are closed due to the ban imposed by the court until further notice. Continuous monitoring and strictness by authority is needed for proper implementation of IEE promises.

Key words: IEE, EMP, Compliance, Mitigation

INTRODUCTION

Initial Environmental Examination (IEE) is the tool used to check and balance any probable environmental disorders due to infrastructure development. The Environmental Protection Act, 1996 of Nepal has defined IEE as " a report on analytical study or evaluation to be prepared to ascertain as to whether, in implementing a proposal, the proposal does have significant adverse impact on the environment or not, whether such impacts could be avoided, minimized or mitigated by any means or not". In Nepal, the tenth Five Year Development Plan made IEE/EIA required for environmental monitoring [1].Environmental monitoring is then described as "an activity

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undertaken to provide specific information on the characteristics and functions of environmental and social variables in space and time" [2]. Environmental monitoring is needed in order to establish its objectives, criteria to select indicators and analyze data which provides information to the concerned parties and decision makers so as to ensure the implementation of "Environmental Management Plan". The Environmental Management Plan is a site specific environmental mitigation plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with the environmental legislations. Such a document is generally presented to the decision-makers, and is open for public review [3].

IEE report should point out that environmental impact, with corresponding Environmental Planning and Managements (EPMs) along with identified monitoring indicators which should be presented at a generic level. For each sectoral IEE site-specific impacts, EPMs should be given in detail. EMP is a structured way of working with issues using available resources wisely in order to ensure environmental performance and to obtain the best environmental results [4]. EMP guides project management in such a way that the environmental protection measures are directly implemented, effectiveness of such measures are monitored and environmental auditing is carried out to know the project performance on environmental grounds [2].Environmental Assessment (EA) should be focused on "impact", and it is necessary to characterize the nature of such impacts. Impacts can be analyzed in terms of magnitude (severity), extent (spatial) and duration (time scale) and can be beneficial or adverse [5].The concept focuses on the inclusion of planning, organization, staffing, directives, co-ordination, reporting and budgeting.

However, the compliance of these IEE and EIA report are neither fully applied nor further tracked. Thus, the process of EIA and IEE study remains merely an initial reports for official formalities. Ministry of Federal Affairs and Local Development (MoFALD) initiated a third party monitoring through Kathmandu University since 2011 through signing MoU to ensure effective implementation of IEE reports.

Monitoring is a continuous measurement of actions to examine what changes have taken place, what has gone wrong and how to improve them. National EIA guidelines 1993 and Environmental Protection Regulation (EPR) 1998 provides some guidance on the requirement of monitoring with the need of a clear monitoring mechanism, capacity building with trainings and exposure visits, environmental and social enhancement activities [6,7].The National EIA Guidelines 1993 proposes the following three types of monitoring: Baseline Monitoring, Compliance Monitoring, and Impact Monitoring.

Sand and gravel have been used as aggregate for infrastructure such as road and building constructions for a long period of time. Still the demand of these materials continues to rise. In Nepal, the main source of sand and gravel is from riverbed mining. Extraction of sediments from riverbed has both positive and negative impacts. Positive in terms of financial gains to the local authorities and government for the investment in development plans and projects, helps maintaining the natural course of the river system, employment opportunities to local poor and marginalized communities and negative in terms of the adverse environmental impacts associated

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with potential sand mining operation [8]. It has always been a matter of debate at the national level whether to extract or import the sediment or not. Even the Government of Nepal (GoN) has allowed and banned the export of sediment many times. The trade treaty between Nepal and India has listed sediment as a major item for trade from Nepal [9]. The yield of sand and gravel from the riverbed for building and road construction is a traditional form of activity which has developed periodically depending on the emerging demand and under lack of real control on the disturbance caused on the environment [10]. There is a need to study and review the implementation status of IEE reports on Sand and Gravel Extraction monitoring projects and to carry out the comparison of compliance and impact monitoring of study sites in the study districts. This is a study undertaken in 2013 in four district of Nepal two hilly districts and two Terai districts as mention in Table 1 and Figure 1 below.

Table 1: Project undertaken in 2013 by Kathmandu University

District	Projects
Arghakhanchi district:	1. Sustainable collection and extraction of sand, gravel and boulder from Jare River 2. Sustainable collection and extraction of sand, gravel and boulder from Bangi River
Sindhuli district:	3. Sustainable collection and extraction of boulder, gravel and sand from Gwang River.
Kapilvastu district:	4. Sustainable collection and extraction of boulder, gravel and sand from Sukwel River 5. Sustainable collection and extraction of boulder, gravel and sand from Mainar River
Sarlahi district:	6. Sustainable collection and extraction of boulder from Bake River 7. Sustainable collection and extraction of boulder from Bagmati River 8. Sustainable collection and extraction of boulder Kalinjor and Phuljor River 9. Sustainable collection and extraction of boulder from Lakhandehi River

Figure 1: Map of Nepal showing the projects located district

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METHODS

Firstly, approved IEE reports of various development projects were gathered from the MoFALD. Second, the monitoring variables were extracted from the reports and finalized in consultation with MoFALD officials. Then, tools and techniques such as participatory rural appraisal (PRA), focus group discussion (FGD), and key informants interview (KII) were used on a random basis. Checklist was formatted with the parameter of physical, biological, socio-economic and cultural aspects for baseline, compliance and impact monitoring. The data and information obtained from the field observation and inquiries was shared with district based stakeholders and MoFALD officials. From such validated data, result was deducted. The Fig.2 below illustrates the data collection sequences.

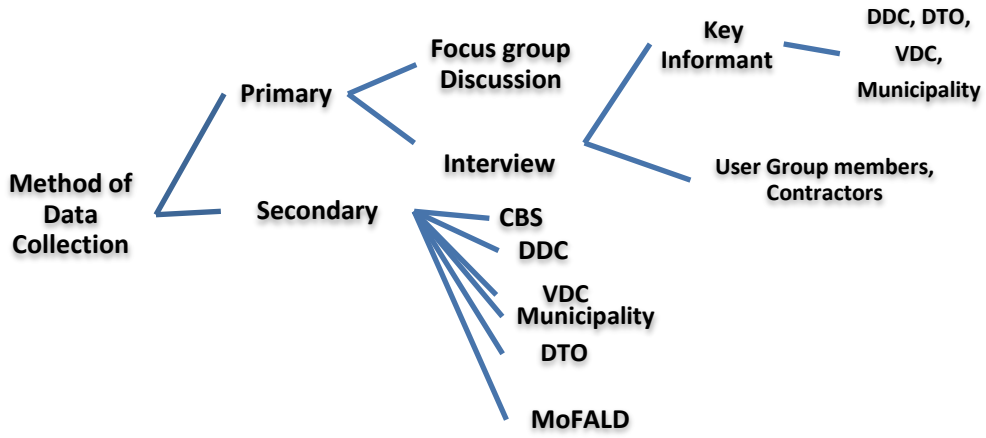

Figure 1: Strategy of Data Collections

The scoring method as provided in National EIA Guidelines 1993 was used to determine the level of impact. In which each of the parameter is given the score on the basis of Magnitude, Extend and Duration as shown in Table No. 2.

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Table 2: Description Table for Scoring Impacts

Nature	Categories	Score Given	Basis of Classification
Magnitude (M)	High (H)	60	Observation on magnitude and reversibility of impact
	Medium (M)	20	
	Low (L)	10	
Extend (E)	Regional (R)	60	Beyond the watershed
	Local (Lc)	20	Close to project area/ within watershed
	Site Specific (Ss)	10	Confined to project area
Duration (D)	Long Term (Lt)	20	>20 years
	Medium Term (Mt)	10	3 to 20 years
	Short Term (St)	5	< 3 years

RESULT AND DISCUSSIONS

Out of 9 sand and gravel extractions projects monitored 6 projects are in Terai districts and three are in hill district. There are more sand and gravel extractions projects in Terai because of exports opportunities and business motives. While the monitoring team was in Kapilvastu district, the sand and gravel extraction process there was out of operation due to political influences. While discussed in the District Development Committee (DDC) meeting, the DDC officials were found positive and motivated to lift the ban of extraction. Sand and gravel excavation projects in Sarlahi district were given highest priorities and importance of monitoring by MoFALD. This district is equipped with more number of rivers permitted for the excavation works. These rivers have a larger river bed, and are easily accessible up to the excavation sites and have way to Indian border.

Monitoring of Baseline Information: Maps in the IEE reports does not give the exact and present use locations of extraction sites. In Sarlahi district, some places of Bake, Bagmati, Lakhandehi rivers extractions were seen beyond the area mentioned in IEE reports.

Compliance Monitoring: Extraction were noticed from environmental sensitive areas likes flood prone zone, river bank cutting, within 300 m of the bridges, and from flowing river channels in Jare river of Arghakhanchi .Other parameters such as; occupational health and safety measures, environmental awareness program, health and sanitation also did not comply with IEE reports. Compliance monitoring was found very weak in all study areas. There should be instant attention needed by the concerned proponent i.e. District Development Committees. More over 61% of important parameters are mentioned in the IEE report but only one third of that is complied. The untouched parameters eg:width between collection area and river bank, health and sanitation facilities to workers, occupational health and safety measures and emergency warning device are fully not complied in seven rivers of Nepal where as other parameters like extraction amount is compiled only in Bangi River.

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Impact Monitoring: Many of sand and gravel extraction projects created negative impacts on the environment and people in both direct and indirect ways. In all the study area mitigation measured either was not implemented or is at very insignificant levels. Numbers of complains from communities is registered for Sarlahi district**.**

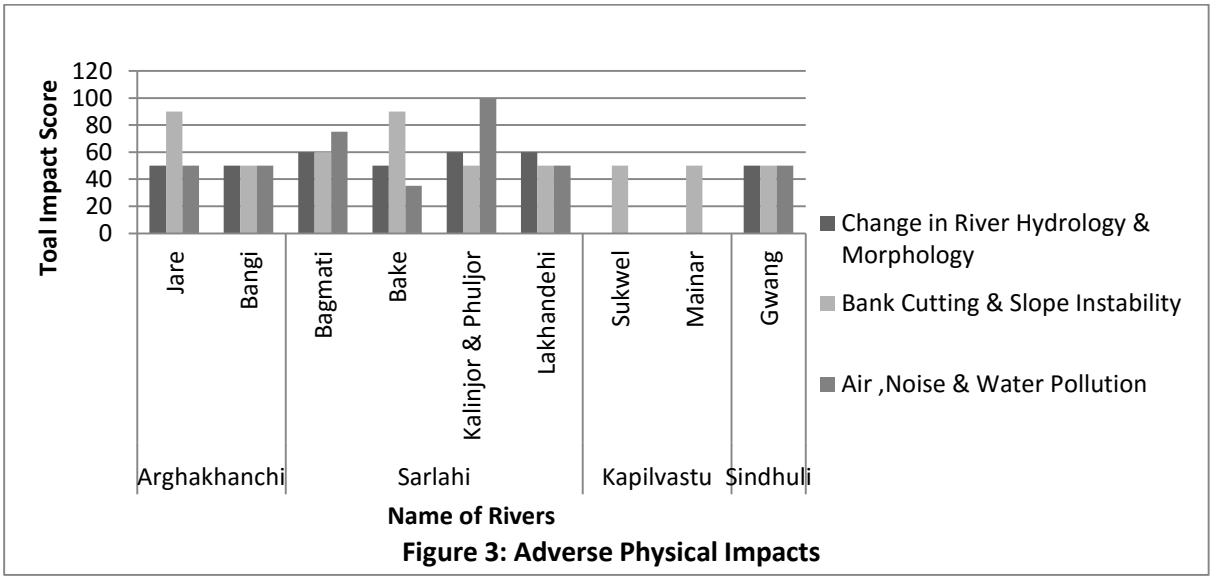

Figure 3: Adverse Physical Impacts

Physical Impacts: Bank cutting and slope instability are significantly high in all the river projects specially most serious in Jare river of Arghakhanchi and Bake river of Sarlahi district which have significant adverse impact with a total score 85. The river course changes were seen in Kalinjor and Phuljor at a 100 score followed by Bagmati river around 80 (Figure 3). Different mitigation measure like construction of retaining wall and no extraction within 300m/ 250m from the road and bridges were not in practice. The air, noise and water pollution scored 60 in Bagmati river followed by Kalinjor an Phuljor rivers the significant level of adverse impact was observed due to higher level of dust produced by the extraction activities. Rest of the other rivers were found medium level of adverse impact except Sukwel and Mainar river of Kapilvastu district, where there are no extraction operations. Mitigation measures like covering of transport material, prohibitation to blow horns and no spill of fuel in water are not followed by the companies involved in extraction and ignored by the regularatory authorities and administration .

Biological Impacts: As shown in Figure 4 all of the parameters in Jare river of Arghakhanchi (except wildlife disturbance which have medium significance) and Kalinjor & Phuljor of Sarlahi district are found to have significant adverse impacts with a total score 100. Those were found due to illegal collection of fire wood and other forest products as well as poaching of wild animal said by the local communities during the field study. The vegetation and wildlife disturbances are found to have least significant impact on Bagmati River, perhaps due to absence of forests nearby. Bangi river of Agrhakhanchi and Lakhandehi river of Sarlahi are found to have medium significant adverse impact.

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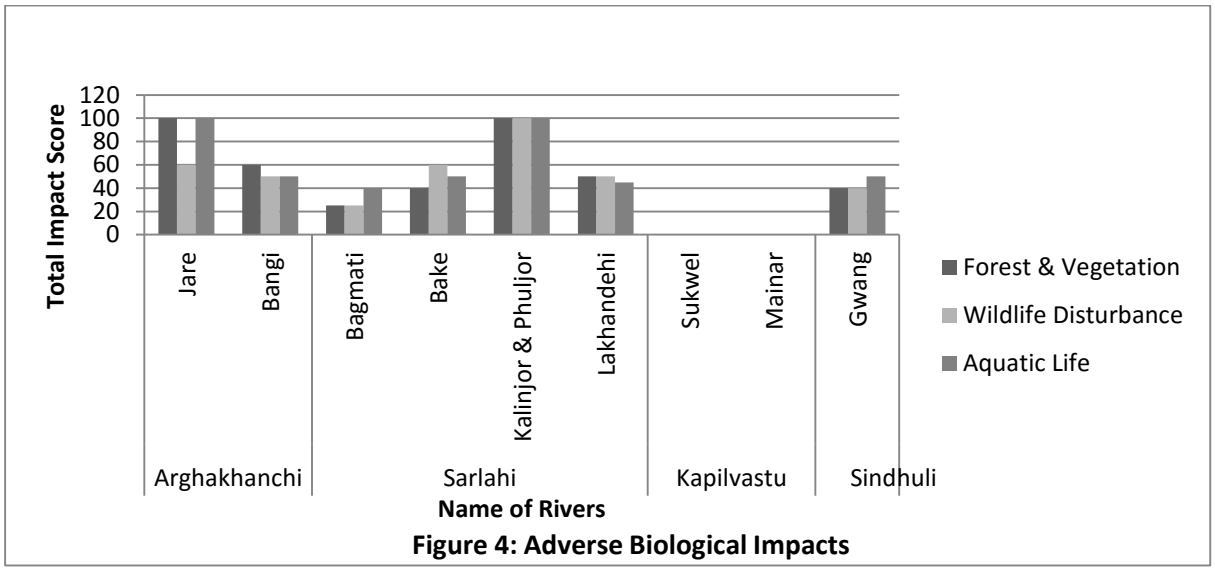

Figure 4: Adverse Biological Impacts

While discussing on the adoption of mitigation measures, Sarlahi district river projects has taken some initiatives to adopt the biological mitigation measures by afforestation. Rest of other districts the explained mitigation measures in IEE report were not adopted.

Socio-Economic and Cultural Impacts: The common adverse impact on socio-economy and culture are occupation health and safety measures (observed in four river projects). Significant impact is found in two rivers of Sarlahi i.e. Bagmati and Bake, and Bangi river of Arghakhanchi district, and Gwang river of Sindhuli district respectively (Figure 5). The reason of significant adverse impact is safety measures such as use of helmet, mask and glove not has been provided to the worker, whereas the impact is found medium significant in rest of other river projects of Sarlahi. While discussed on sanitation and solid waste management, there is significant adverse impact found in Bagmati and Gwang rivers of Sarlahi and Sindhuli district respectively. As there is no toilet and safe drinking water facilities, communities nearby the rivers are found to dispose their solid waste into the river. Highest adverse impact due to solid waste is observed in Bake River. Jare and Bangi river of Arghakhanchi district are not seen with any negative impact on Cultural and religious aspects. River water quality in Sarlahi is found poor due to running extraction projects, whereas water quality and river bank sites of Gwang river of Sindhuli is found to have low and medium level of adverse impacts respectively.

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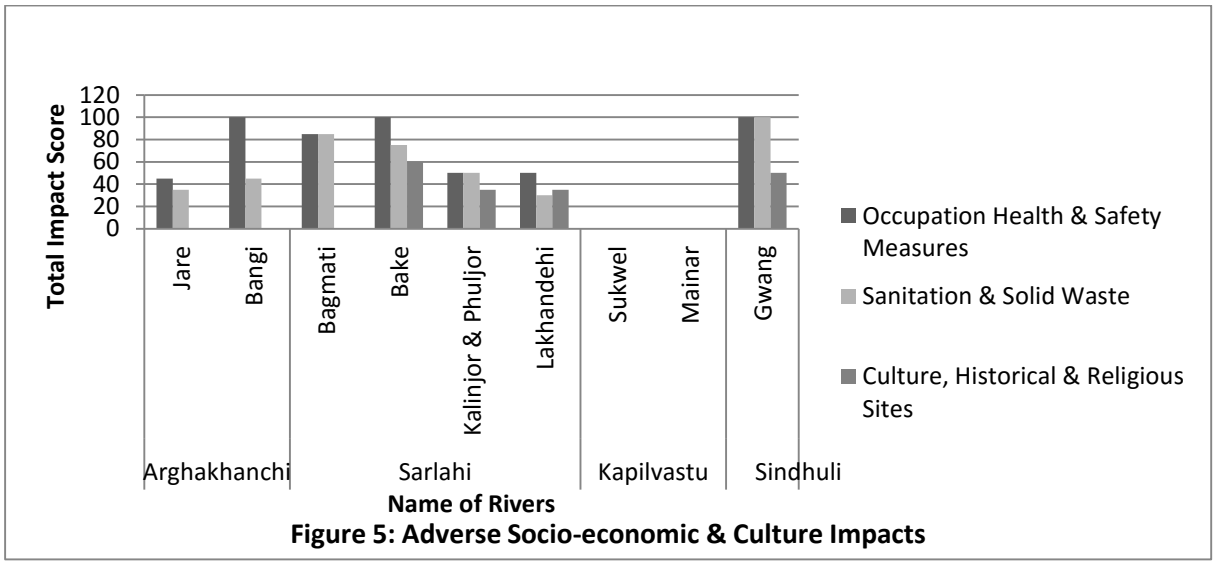

Figure 5: Adverse Socio-economic & Culture Impacts

On the positive side sand, gravel and boulder extraction projects have been able to generate ample opportunities of employment for rural men and women The Jare & Bangi river of Arghakhanchi district and Bagmati river of Sarlahi district generated 100 score to generate the employment opportunities in and around the project sites. The local people have a higher expectation of employment opportunities from the sedimentation collection projects. It is found that local community people are generating Rs.400-500 per tractor per day. Discrimination in wage labor payment by sex and gender is not observed. In contrast there are low employment opportunities generated in Bake and Gwang River due to use of stone crusher through installation of heavy machine and equipments.

Table 3: Beneficial Socio-Economic and Cultural Impacts

Districts	**Arghakhanchi**		**Sarlahi**				**Kapilvastu**		**Sindhuli**
River / Issues	**Jare**	**Bangi**	**Bagmati**	**Bake**	**Kalinjor & Phuljor**	**Lakhandehi**	**Sukwel**	**Mainar**	**Gwang**
Employment Opportunity	100	100	100	45	40	60	0	0	60
Community Development	100	60	60	100	40	60	0	0	100
Revenue Collection	60	60	100	50	80	100	0	0	100

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While discussing community development, Jare river of Arghakhanchi district, Bake river of Sarlahi and Gwang river of Sindhuli district obtained 100 scores and have done community development work such as reduction of dust pollution by sprinkling water on road, plantation etc. in respective communities nearby the project sites. Revenue collection is found at a higher amount from Bagmati & Lakhandehi river of Sarlahi district which obtained 100 score and with the same weightage for Gwang river of Sindhuli district, whereas rest of the rivers are contributed a medium level of revenue to their respective DDC. A comprehensives chart is tabulated above in Table 3.

EMP, Monitoring Responsibility and Cost: Environmental Management Plan in IEE reports mainly deals through awareness campaigns, provision of safety measures and sanitation such as construction of pit toilets, provision of first aid kit, river training and maintenances etc. Cost required for implementation of Environmental Management Plan and mitigation measures in the river project is also mentioned in the IEE report. None of them are found to be carried out except in the Arghakhanchi district. In Jare and Bangi river of Arghakhanchi some parameters such as passage over rivers are constructed. Protection work for irrigation canal and earthen road activities are moderately implemented only in Arghakhanchi district where as Technical monitoring, awareness campaign and safety measures are taken into consideration in the project of Sindhuli district.

MoFALD and DDC are the institutions directly involved in approving and implementing the IEE of these aforementioned projects. The DDC is supposed to be taking the main responsibility of IEE monitoring through district monitoring and coordination committee representing government line agencies such as Chief District Office (CDO), DDC, District Forest Office (DFO) and District Soil Conservation Officer (DSCO) etc. for the effective implementation of Environmental Management Plan. This internal monitoring pattern is also found to be lacking though a reasonable fund have been also allocated for the process in the IEE reports. Because of this, EMP of forest condition, river bank condition, soil erosion, floodplain condition, and landslide and flood prone areas are not attained. No other responsibilities except collection, extraction, and transportation of materials and goods are given to the contractor.

CONCLUSION

The most important monitoring project is sand, gravel and boulder extraction, and the best result of importance is found in Terai Districts, especially in Sarlahi district.

The compliance monitoring in Sand and gravel extractions projects are found high level of implementation in hilly district as compared to Terai districts. As per National EIA Guidelines 1993, altogether there are twenty-six parameters taken for study purpose, out of them, 19 parameters are compiled in all the rivers. Twelve parameters are not found complied in more than four rivers. However the poorest condition is found at Lakhandehi river of Sarlahi district where only two parameters are found complied.

Mitigation measures are prescribed in Environmental Management Plan of all the projects. There is a cost allocated for implementation but the level of implementation is very poor.

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There is no such presence of governance towards proper implementation of extraction as mentioned in IEE reports. Regular IEE monitoring that may be internal by DDC or through third-party by MoFALD is a must to regulate the normal environmental flow and to ensure sustainable revenue generation to DDC.

RECOMMENDATIONS

Regular studies in IEE implementation are needed from researchers, authorities, observers and experts. Compliance has to be checked by concerned authority and mitigation should be implemented effectively. Regular internal monitoring of the DDC on EMP has to be made functional with valid reports. Third party monitoring is best practice to find gaps and should be continued.

ACKNOWLEDGEMENT

This project was supported by the Ministry of Federal Affair and local Development (MoFALD), Nepal for Department of Environmental Science and Engineering, Kathmandu University.

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