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Environmental Assessment

BUTHAN (D2B17BH01)

Advisory Review of the Scoping Report for the ESIA for the Gelephu Flood Protection Project



26 June 2020
Ref: 7240



Advisory Report by the NCEA

Title	Buthan (D2B1 7BH01) Advice on the Scoping Report ESIA for the Gelephu Flood Protection Project
To	Netherlands Enterprise Agency (RVO)
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Request by	Ms Kim Tran
Date	26 June 2020
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26 June 2020

Subject: Buthan (D2B1 7BH01) Advice on the Scoping Report
ESIA for the Gelephu Flood Protection Project

Dear Ms Kim Tran,

You requested the Netherlands Commission for Environmental Assessment to advise on the scoping report for ESIA for the Gelephu Flood Protection Project in December 2019.

It is my pleasure to submit herewith the Advice of the Scoping Report ESIA for the Gelephu Flood Protection Project.

I would like to express my appreciation to the Ministry of Works and Human Settlement – Flood Engineering and Management division for the organisation of the visit to Bhutan. This has allowed the NCEA to receive the necessary information in a short period of time, which helped us to prepare our advice.

In addition, I would like to repeat once more that the NCEA would be happy to continue cooperation in the next stages of this ESIA procedure.

Yours sincerely,

Tanya van Gool
Chair of the Working Group



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1. Introduction

1.1 Brief description of the initiative and rationale

Rationale of the project

After an extreme flood in 2016 that seriously affected Gelephu, the government of Bhutan, initiated the Gelephu Flood protection project led by the Ministry of Works and Human Settlement (MoWHS – Flood Engineering and Management Divisions). A Dutch Disaster Risk Reduction Mission visited Gelephu in 2016 and supported the MoWHS to develop this project. RVO (Netherlands Enterprise Agency) is contributing to partially fund this project and provide support to develop the project through its D2B (Develop2Build) facility. A consortium of six consultancy firms has been established, led by CDR International (Coasts, Deltas and Rivers International) to carry out the required studies. The project started with a prefeasibility study – Phase I (2018–2019). Phase II – the feasibility study started in January 2020. Part of this phase is the development of an ESIA (Environmental and Social Impact Assessment), for which a draft scoping document has been drafted. The present advisory report focuses on this draft scoping document.

Description of the proposed project

Gelephu is located in one of the rare (relatively) flat areas of Bhutan near the Indian border. The project area concerns a stretch of the Mow River, approximately 10 km long between the Ai Bridge and the Indian border. This stretch of the Mow River is characterised by a gradient of 1 to 1.5% and several braiding stream channels. The width of the river corridor of the Mow River near Gelephu is between 800m and 1200m. Water- and sediment-related events have recently negatively affected Gelephu. These impacts tend to increase in future if mitigation measures would not been taken.

The problems experienced relate to:

- increasing high water levels, causing flooding of low-lying agricultural areas and vital infrastructures like the (drinking) water treatment plant (WTP) and infiltration gallery, and sewage treatment facility (STP) of Gelephu;
- increasing riverbank erosion, leading to loss of agricultural land and threats to infrastructure, among which a school and the WTP;
- increasing discharge of water and sediment through tributaries which, at the confluence of these tributaries with the Mow River and upstream, leads to severe deposition of sediment, with associated increasing highwater levels and a stronger tendency of the tributaries to shift outlets.

The interventions proposed in the prefeasibility report of Phase I and subsequent elaboration in Phase II, can be categorised in two types:

- riverbank and flood protection by using gabion-based revetments stacked (steel wires container filled with rock), where required placed on new dike sections (for simplicity sake, the gabion protections placed on new dikes are further in this report also denoted 'revetments');
- protection against further erosion and flooding by closing of less active channels using cross dams.

These types of interventions will require large volumes of rock, gravels and sand. These materials can be mined from the riverbed (so doesn't require the procurement of a new or existing quarry).

One or a combination of these type of interventions are proposed at six sites along the Mow River, see figure 1 for the location:

1. flood and riverbank protection by placing a revetment along the infiltration gallery (IG) and WTP;
2. erosion protection by placing a revetment at the Serzhong primary school at the Thewar Chhu;
3. erosion protection by means of a cross dam (and possible flow regulator) in the branch North of Jogi Chhu;
4. erosion protection by means of a cross dam close to the (STP);
5. erosion protection by means of a cross dam and revetment at Chuzergang Gewog (east riverbank);
6. flood protection by means of sediment management of the Shethikari Chhu, Dawla Chhu, and Jogi Chhu.

Implementation of the interventions will require a considerable number of workers, possibly from India. None of the interventions will require acquisition of privately held land nor replacement of any persons.

ESIA requirements

According to the EIA legislation in Bhutan, the proposed project does not require an EIA¹. RVO, however applies the IFC-Performance Standards and therefore requires an ESIA, as social issues are included. During the meeting between the NCEA and the Environmental Commission the latter decided that an ESIA should be carried out after all, and that this will be done using the legal procedure in Bhutan.

1.2 Role of the NCEA and justification of the approach

Role of the NCEA

In January 2020, the RVO asked the Netherlands Commission for Environmental Assessment (hereafter referred to as 'the NCEA') to assess the quality of the draft scoping report of the Environmental and Social Impact Assessment (ESIA) study for the Gelephu Flood Protection project (26th February 2020).

The quality assessment is prepared by a working group of experts that acts on behalf of the NCEA. The group comprises expertise in the following disciplines: river engineering and morphology, hydraulics, land use, ecology, socio-economic and gender aspects. The composition of the working group can be found in the colophon.

It is important to emphasise that the NCEA does not assess acceptability or feasibility of the Gelephu Flood Protection Project.

¹ The NCEA generally uses the term ESIA, to emphasise that social impacts are included in this process. The Bhutan regulations refers to EIA. Note that these regulations do require that social impacts are addressed.

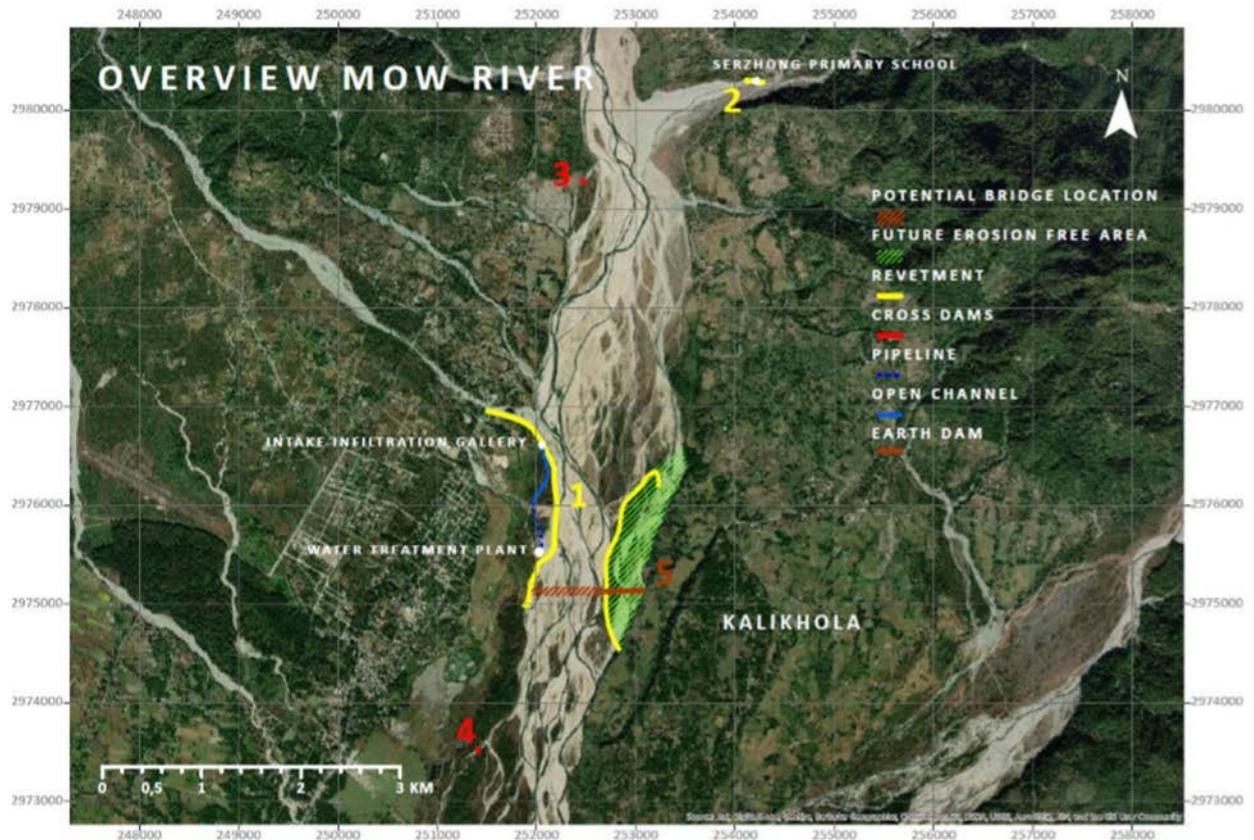


Figure 1 Overview of all possible interventions along Mow River.

Justification of the approach to this quality assessment

The NCEA has reviewed the draft scoping report (issued 26th of February 2020). To review the scoping report the NCEA used:

- IFC – Environmental and Social Performance Standards;
- international ESIA good practice as a reference framework;
- its long-term practice experience in assessing the quality of scoping report of ESIA's by applying the following review criteria: completeness of the information, quality of the information and relevance of the information for decision-making.

In addition, the following documents have been read to obtain better insight in the project:

- Final report – August 2019 – Volume I – Main report;
- Final report – August 2019 – Volume II – Appendices. Appendix D of this report contains a preliminary ESIA.

The NCEA working group visited Bhutan, including the project area, in the period 5–13 February 2020, see Annex 1 for the programme of the visit.

The NCEA observed that during their visit to Bhutan the design of the interventions and especially intervention no. 5 at the east bank was still under development and under discussion. The discussions were based upon the progressive design of the interventions as presented in an earlier version of the draft scoping report that we received on the 5th of February. This report had no formal status and was replaced by the draft scoping report (26th of February 2020).

A draft of this advisory report has been sent to the MoWHS and the RVO for comments April 17th 2020 and is publicly available on our website www.eia.nl .

The structure of this advisory report is as follows: after the present introductory Chapter 1, Chapter 2 presents the main findings of the assessment of the quality of the draft scoping report and Chapter 3 presents the other remaining findings.

2. Main Observations

2.1 General conclusion

The NCEA concludes that the draft scoping report provides, in general, adequate guidance to carry out an ESIA that will meet IFC Performance Standards. This conclusion is also based on the good quality of the preliminary ESIA report that was prepared as part of the prefeasibility study (Phase I – Appendix D) and that can be used to develop the ESIA.

Overall, the need for the proposed interventions seem well justified, also from a socio-economic viewpoint, without any major negative environmental, social or socio-economic impacts. In particular, no land acquisition or resettlement will be needed, communities will primarily benefit from the interventions. The NCEA therefore concludes that the proposed interventions in the draft scoping report are based on a sound rationale and pose no major negative impacts.

The NCEA supports the conclusion presented in the draft scoping report (section 3.7) that the following three IFC Performance Standards are relevant for this project:

- No.1 – Assessment and management of environmental and social risks and impacts: these risks and impacts are well defined in the draft scoping report, see sections 2.2.2 and 3.2, and section 3.3 on how to involve the public more effectively;
- No.2 – Labour and working conditions: implementation of the interventions require a considerable number of temporarily workers and therefore this is important, see section 3.4.
- No.6 – Biodiversity conservation and sustainable management: the Mow River provides different ecosystem services and is considered to be an important habitat for flora and fauna, see section 3.6.

However, the NCEA concludes that the following IFC-PSs are also relevant:

- No.3 – Resource efficiency and pollution prevention: the use of sediment from the riverbed is proposed and can be considered an efficient use of resources, see section 2.2.2.
- No.4 – Community health and safety: transport of boulders by road from the Mow River to India is considered to be an important safety issue when trucks with boulders are passing Gelephu, see section 3.5.

The NCEA would like to address the following three main issues that are further elaborated in section 2.2 of this advice by providing recommendations for the final scoping report:

- Design of interventions – bank stabilisation works (section 2.2.1): for interventions 1 and 5 the NCEA recommends studying alternative options for bank protection.
- Management of sediment mining (section 2.2.2): the NCEA concludes that management of sediment mining is one of the main factors determining whether the objectives of the project will be achieved. When executed appropriately, it will contribute to the project objective, but uncontrolled execution may lead to failure of the project or may lead to more serious impacts. This is especially important as sediment mining is mentioned as a necessary intervention, see section 2.2.2 for more information.
- Exchange of knowledge and experience through systemic monitoring (section 2.2.3): this issue is included in our advice as the NCEA is of the opinion that it is essential for the successful implementation of the project, see section 2.2.4 for more information.

In chapter 3 a number of additional observations are presented and we recommend that they be considered in the final scoping report.

2.2 Main issues

2.2.1 Design of interventions – bank stabilisation works (IFC–PS 1 + 3)

The design of the proposed gabion revetments is directly related to the strength of the flows. Current practice in Bhutan shows steep gabion walls to be generally applied, not only for bank protection, but also for bed stabilisation (e.g. prevention of erosion on steep mountain slopes), flow guidance (flow-guiding buns, river spurs). This indicates their potential feasibility in the harsh environmental conditions (e.g. general absence of damage by uprooted trees during flood flows). Gabion-type stabilisation works, most probably, are the most sustainable solution here. It was however reported that these structures sometimes failed, or partly failed, as can be observed for the west bank protection near the WTP in the Mow Chhu (geotechnical instability, wire-mesh corrosion). The design of the interventions is triggering IFC–PS 1 and 3.

Recommendations:

- Further reconnaissance in causes of failure of applied gabion protections in Bhutan, in order to incorporate improvements in the design of the gabion-type stabilisation works for this project.
- Incorporation of sufficient focus on the protection works. The boundary conditions for the alignment design, as well as for the design of the bank stabilisation, should be derived from sophisticated modelling. Potential morphological changes can also be assessed with the support of such modelling, as a support to the assessment based on expert judgement.

Recommendations:

For intervention no 1, the following two types of bank protection need to be described and compared:

- A. Proposed dike type protection as shown in figures 3 and 4 of the draft scoping report with only a gabion protection at the river slope side.
- B. Alternative option: a more stand-alone gabion wall, comparable to the present walls (however improved when compared with the present structures. Such a design should also take into account the use of construction space and the possibility to maintain the present protection as a back-up structure. The protection as shown in Figure 4 of the Draft Scoping Report may easily slide down the slope in the event of settlement of the toe, so maintaining toe integrity is absolutely necessary here, possibly at the cost of additional toe protection. As already mentioned above, the alignment of the protection works should be scrutinised (see Figure 13 of the draft Scoping Report, in which the alignment seems to extend too far into the river corridor at the height of the WTP). This especially is a concern as at the east bank the foreshore channel will be closed off and flow will concentrate in the western part of the Mow Chhu.

For the bank protection at the east side of the Mow Chhu (intervention no. 5) the draft scoping report indicates bank protection all along the geologically controlled 'island' and closing off even the southern part of the foreshore channel. The latter closure would hamper the water exchange south of the closure dam and that might result in a locked-in area downstream of the closure dam, with stagnant water during intermediate flood stages. Concerning the proposed bank protection all along the 'island' the NCEA has some doubts whether that is absolutely necessary to achieve the objective: 1) as a major part of the ridge may allow for some erosion, possibly leaving the approach section of the ridge and critical parts to be conventionally protected, and 2) remaining parts may be sufficiently protected by selective dumping (boulders) at the toe and slope of the ridge. These boulders may for instance be collected from the foreshore channel (east of the 'island') which will be without significant flow after closure. Therefore, the NCEA recommends to also elaborate on another alternative, taking into account the above considerations. Activity 2.2.5 erosion protection along the east bank, as depicted in figure 13: it is not clear whether this leads to a locked-in area south of the earth dam, with possibly standing water which won't be refreshed. If so, the impacts and mitigating measures need to be addressed.

Recommendations:

- Justify in the ESIA the type of protection at the west side (option 1: placed on a new dike or option 2: placed stand-alone), taking into account safety considerations, alignment considerations may (be critical for the alignment as shown in the Draft Scoping Report), costs, sustainability aspects, etcetera.
- Activity 2.2.5 erosion protection along the east bank, as depicted in figure 13: it is not clear whether this leads to a locked-in area south of the earth dam, with possibly standing water which won't be refreshed. If so, the impacts and mitigating measures need to be described.
- For the east bank also: elaborate an alternative option with a potential reduction of the bank protection alongside the natural 'island' ridge and leave an opening at the downstream end of the present foreshore channel, as suggested above.

2.2.2 Management of sediment mining (IFC PS 1 + 3)

Sediment management is indicated as an important issue in section 2.2.6 of the Draft Scoping Report, with the suggestion to apply an effective sediment removal strategy. This item has not been elaborated further. The NCEA emphasises that adequate sediment management is one of the most important conditions for this project to achieve its objectives and therefore in this section a brief explanation is given to better understand this emphasis and to reach to some recommendations.

The natural bed sediment of the Mow Chhu is a composition of strongly graded material, ranging from sands, gravels to large boulders. The larger fractions are important for the morphological stability of the riverbed. This bed will typically show 'armouring' under high flows, in which the top of the bed is paved with the larger boulders and thus sediment transport is (partly or fully) controlled. During floods, finer sediment may pass over the armour layer in the form of dunes. In such a situation, the bed material observed from above may seem rather fine, with occasionally some boulders, but a more continuous boulder layer, or even more layers, may still exist below the bed surface, hence still guarding the river for

excessive overall erosion. Temporarily, during very strong flows, the armour layer may break up, causing a shock wave of sediment, but when the strong flows recede, the armour layer can be naturally 'installed' again.

During the site visit, the NCEA observed proof of massive deposition of bed materials in the major tributaries as well as in the Mow Chhu itself. The major tributaries, e.g. Shetikari Chhu, Dawia Chhu, Jogi Chhu, Lodari Chhu and Thewar Chhu, are reported to be so heavily charged with deposited sediments in one flood season that *yearly* sediment removal is required to maintain sufficient flow conveyance and hence keep flood levels within acceptable limits. The excessive sediments in the tributaries form mini deltas in the Mow Chhu. During the site visit, in the Mow Chhu itself, extensive sediment mining activities were observed, for instance near the debouchment of the Shetikari Chhu and further downstream in the Mow Chhu along the west bank at the height of the WTP. There, in the currently dry river a large sediment stockpile (of a few hectares) was made, with sieving facilities and separate sediment dumps with sands, gravels and boulders.

The problem with uncontrolled sediment mining is that the above morphological controlling mechanism can be disturbed to such an extent, that the river becomes more susceptible to strong uncontrolled erosion and to a more dynamic behaviour of changing channel patterns. This can be considered as a potential 'hidden consequence' of uncontrolled sediment mining. It is obvious from the above that selective mining of large boulders is especially detrimental. On the other hand, extensive sediment control (bulk sediment removal) is required in order to prevent bed levels in Mow Chhu and tributaries to rise too much as a consequence of the excessive sediment input due to for instance climate change effects. The question here is: how can sediment management be executed in such a way that this is efficient, useful, profitable and yet contributing to the overall stability (and water level control) of the river systems. At present, sediment mining is being carried out by the private sector and is licensed and controlled by the local authorities. Sediment mining is triggering IFC-PS 1 and 3.

Recommendations:

- Quick reconnaissance of the riverbed characteristics for Mow Chhu (visual inspection of potential presence of continuous armour layers at various depth, e.g. to be seen at the slopes of incised channels and at excavation pits).
- The following three alternatives of sediment mining to be elaborated in the ESIA:
 - Alternative 1 – no sediment mining, this can be considered as a reference situation and it is expected that this situation will justify the need for sediment management.
 - Alternative 2 – current practice of sediment management. Identify the baseline by considering the present sediment mining: bulk mining, selective mining, shallow mining, deep mining, in how far is the bed restored before the flood season, are dumps removed before the floods, size and location of sediment deposits, rough sediment balance of sediment yield of the rivers and mining yield, experiences over the last decade(s). Identify undesirable methodology and possible consequences.
 - Alternative 3 – smart sediment management; improvements of the sediment mining process in harmony with riverbed and bank stabilisation.

- For each of these scenarios the impacts and mitigating measures need to be described and compared.
- Develop a five-year sediment management and monitoring plan for the Mow Chhu as part of the ESIA. The implementation of this plan needs to be monitored constantly and adjusted on an annual basis. This plan provides guidance to the authorities for licensing and compliance monitoring of sediment mining.

2.2.3 Exchange of knowledge and experience through systemic monitoring (IFC-PS 1)

During the field visit the NCEA observed that government representatives, responsible for planning and maintenance of activities related to river training, would appreciate learning from the experience of the Dutch consultants. These consultants apply the adaptive management approach, which fits the wish of the authorities on river training to maintain the ecological balance of the river as much as possible. This approach is new in Bhutan and not applied by consultants from other countries providing support on river training.

A characteristic of adaptive management is close and continuous monitoring by modelling and field observations to find out how the river is responding to the interventions and subsequent preparation of a plan of action, to be carried out in the dry seasons and should be ready for the next rainy season. If this annual cycle of monitoring, planning and implementation is systematically carried out during a period of at least five years, accompanied by a training programme the responsible authorities will be capable to apply the adaptive management approach not only in the Mow River but in all rivers in the south of Bhutan also enhancing the sustainability of the interventions.

Recommendations:

- To ensure that the proposed interventions will contribute to the proposed project objectives, a monitoring and training programme needs to be developed for a period of five years. The need for monitoring triggers IFC-PS 1. During these five years the Dutch consultants can share their knowledge and experience through the following practical activities to be carried out annually after the wet season:
 - o Joint monitoring and evaluation of current practice with the application of gabion-type structures. This might result in improved principles that are applied all through Bhutan.
 - o Joint monitoring and evaluation of sediment mining resulting in the development of the annual plan for sediment management. This plan provides guidance for planning and licensing of sediment mining.
 - o Joint application of the lessons learnt to other rivers in the south of Bhutan.

3. Other observations

3.1 Autonomous development (IFC – PS 1)

The government of Bhutan is planning to construct an 800 meters long pillar bridge crossing the Mow Chhu between intervention 1 and 5, see figure 1. The bridge will use the cross dam with a length of approximately 400 meters, part of intervention 5, as foundation for the bridge. The cross dam therefore serves two purposes and will save costs for bridge construction and this intervention can therefore be considered as a win-win option. During the visit of the NCEA it was not clear whether the final decisions to construct this bridge had already been taken.

The construction of a pillar bridge will have an influence on the morpho-dynamics of the river. To what extent it will have consequences for the design of the proposed interventions number 1 and 5 needs to be taken into consideration in the modelling.

Recommendation

As long as it is not clear whether a bridge will be constructed at the indicated location, it is recommended that two autonomous developments will be considered, one situation with the bridge and one situation without the bridge. This information is triggered by IFC-PS 1.

3.2 Water for agricultural land and the aquaculture centre (IFC-PS 1 + 3)

The NCEA's field visit showed that (gravity) irrigation is important for agricultural production in the project area. Along the paddy fields, small irrigation channels could be observed. At the east bank the lining (in concrete) of an irrigation canal was ongoing, demonstrating that investing in improving irrigation is seen as profitable. At the east bank, mountain springs form the source of irrigation water; at the west bank, irrigation water is apparently supplied by diverting river water through intakes upstream of the paddy fields, allowing for gravity irrigation. Also, water is needed daily for the National Research and Development Centre for Aquaculture (NR&DCA) located at the west bank of the Mow Chhu, south of the WTP. Currently the intake channel for the water treatment plant is used to supply irrigation water as well as water for this aquaculture centre. The scoping report does not explicitly refer (e.g. in section 2.2.1) to these functions when discussing the intake channel for the WTP. Section 2.2.3, on the cross dam north of Jogi Chhu, does recognise the need to investigate the potential dependence of agricultural land on the water channel concerned, as a source of irrigation water.

Recommendation

To investigate for all interventions at the west bank of the Mow Chhu the impact on the use of water for irrigation and/or other purposes (such as the aquaculture centre) and consult relevant stakeholders, such as farmers. This triggers IFC-PS 3. If there is a risk that the protection works may negatively affect the intake of water, special features in the design should be included, such as inlets, to ensure the continued supply of water for such purposes. This triggers IFC-PS 1.

3.3 Public consultations (IFC– PS 1)

The draft scoping report (section 3.2) proposes to keep the public consultations limited to meeting those stakeholders who are likely to be directly affected, such as the owners of agricultural land that will possibly be impacted by the interventions. The NCEA’s field visit confirmed the need for information and consultation, though for a broader range of stakeholders, including local government officials and community representatives, such as representatives of facilities near the river (aquaculture centre, WTP, STP), farmers (M/F) and any interested men and women in the communities, including from the gewogs at the east bank. This triggers IFC–PS 1. The NCEA observed that such information should also “manage” expectations, especially since the project cannot solve all Mow Chhu problems, such as those related to the heavy sediment load and the worsened or interrupted accessibility of Gelephu Thromde in the monsoon season for inhabitants of the gewogs at the west bank.

The NCEA recommends that information and consultation events are to be organised for a possibly broader range of stakeholders than foreseen in the draft scoping report, from government as well as men and women of the community, including the above-mentioned categories. It should be checked whether notifications in local newspaper will be adequate enough, or whether a more active approach to invite stakeholders should be applied. The provided information, including the information gathered during the consultation meetings, should well explain the scope and expected effects of the project, but also clarify which problems the project cannot solve. As the draft scoping report already mentions, such meetings should also provide opportunities for raising questions, expressing concerns and making suggestions, which should be taken into account – whenever possible and relevant– when elaborating the detailed design of the interventions.

Furthermore, in Bhutan, the role of women in agricultural production seems to be increasing (feminisation of agriculture) as men tend to become more engaged in off-farm employment. This also seems the case in the project area. In Bhutan both men and women can be landowner, though male landowners are more common (roughly two-thirds of the land) than women owners (one-third).

The NCEA recommends, when inviting landowners, to include representatives of female landowners and the farmers (M/F) who actually cultivate the land, whether they are owner or not. Moreover, a grievance mechanism needs to be established.

3.4 Employment of construction workforce (IFC–PS 2+4)

The NCEA observes that the draft scoping report recognises the importance of meeting IFC Performance Standard 2 on Labour and Working conditions, as well as the interest of GoB to promote deployment of Bhutanese workers. These issues are especially important considering the potentially high number of workers from India; the preliminary ESIA provided an estimated need of in total 1200 labourers.

The NCEA recommends and reconfirms the importance of assessing any potential adverse impacts of the employment of such high numbers of outside workers, though recognising that within Bhutan there is relatively wide experience with hiring Indian labourers, including their selection procedures and issuing temporary permits. This is possibly the largest potential adverse social impact and therefore deserves in-depth attention. It is also recommended to explore if and how the deployment of Bhutanese workers can be fostered. A comparative assessment needs to be made of the following two options: one option with a relatively large share of workers from India and another option with a relative large share of workers from Bhutan. The impacts of the location(s) of construction camps, also need to be assessed and compared in case different locations are suitable as this triggers IFC-PS 4.

The NCEA would like to reconfirm that the only transboundary effect of the proposed interventions is the possible influx of workers from India, other hydrological / environmental effects are considered to be minimal.

The NCEA recommends addressing the hydrological/environmental transboundary effects as it is important to justify in the communication with India that these effects are minimal.

3.5 Impact of works and transport of materials (IFC-PS 4)

Section 3.5.4 of the draft scoping report addresses potential impacts of the implementation of the proposed works. It is not clear to what extent these impacts will apply to the “construction period” of the proposed works only, or also to the implementation of especially the sediment management strategy, which is foreseen as a continuous measure, requiring annual mining of sediment materials. This issue needs to be addressed under IFC-PS 4, community health & safety.

The NCEA recommends addressing under the heading “impacts of work and transport of materials” also the expected mining activities related to the implementation of the sediment management strategy, which is expected to lead to annual mining and material transports. Apart from the four domains mentioned in section 3.5.4 of the Draft Scoping Report, the expected impact of the transports on road damage and possibly dangerous traffic situations need to be explicitly assessed as well, including measures that may mitigate or reduce negative effects.

3.6 Biodiversity (IFC-PS 6)

The Mow River at Gelephu is highly dynamic and characterised by a large variety of habitats, ranging from small perennial streams and dune areas during the dry period to a high-flowing river during the wet season, and riverine vegetation types characteristic for this type of rivers. One of the local experts identified one tree species that primarily and exclusively grows in the riverbed. It is expected that the biodiversity value of this river in terms of flora and fauna including fish species, as well as the ecological function of the river, is considerable. This

triggers the need to address IFC-PS 6 biodiversity conservation and sustainable management of living natural resources.

Recommendation

The biodiversity value of the river and relevant ecosystem services need to be described as well as the impact of the interventions and in case of negative effects how they can be mitigated.

Annex 1: Programme Field Visit

Programme Schedule for NCEA and CDR Visit to Bhutan from 6th Feb 2020 to 15th Feb 2020	
Thur.6 th Feb 2020	<ul style="list-style-type: none"> • Morning: Arrival (Airport pick 3x separately arranged by CDR) <ul style="list-style-type: none"> ○ Arrival Paro from Delhi 07.15 NCEA: Tanya van Gool, Kitty van Bentvelsen, Gert Jan Akkerman; CDR: Ad de Goffenau ○ Arrival from Bangkok 09.50 NCEA: Arend Kolhoff. ○ Arrival from Kathmandu 11.05 CDR: Bert te Slaa. • Check in at hotel Riverview, Thimphu • 01.30 PM –Joint lunch Hotel River View • 02.00 – 04.00 PM: Meeting with FEMD, DES Director and Environment Officer of MoWHS
Fri. 7 th Feb 2020	<ul style="list-style-type: none"> • 02.00 – 04.00 PM: Meeting with CDR team
Sat.8 th Feb 2020	<ul style="list-style-type: none"> • Check out Hotel River View • Travel to Gelephu – two cars arranged by CDR • Check in Hotel Kingacholing
Sun. 9 th Feb 2020	<ul style="list-style-type: none"> • Site Visit to Mow River
Mon. 10 th Feb 2020	<ul style="list-style-type: none"> • 09.30 – 10.00AM Courtesy call to Dasho Dzongdag • 10.30 – 12.30 AM: Meeting with Dzongkhag Officials (Dzongkhag Engineer, Environment Officer, RNR Sector heads(forest, Agriculture and Livestock) • 08.00 – 04.00PM Meeting with Dasho Thrompon , Executive Secretary, Thromde Environment officer and Thromde Engineer
Tues.11 th Feb 2020	<ul style="list-style-type: none"> • Check out hotel Kingacholing • 08.00 AM: NECA Team and Bert te Sla travel back to Paro and Thimphu by flight KB021. Arrival in Paro 08.40 and Thimphu 10.30 hrs. • Check in Hotel Druk • Drafting report by NCEA Team
Wed. 12 th Feb 2020	<ul style="list-style-type: none"> • Drafting of report by NCEA Team • 10.00 – 11.00 Debriefing representative of Environmental Commission by NCEA team • 11.00 – 12.00 Meeting with representative responsible for environment / water of the UN delegation • 02.00 – 04.00PM Debriefing FEMD, DES Director of MoWHS by NCEA Team
Thur. 13 th Feb 2020	<ul style="list-style-type: none"> • Check out Hotel Druk • 08.00 AM: NCEA team – Departure from Paro to Kathmandu KB400 • Departure from Paro