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Project Evaluation : SCA-Himalayas

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DSM consulting

Rte. Barma 1, CH-1973 Nax, Switzerland, - info@dsm-consulting.ch - GSM : +41 79 423 45 42

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Authors :
Eric Bardou & Srinivas Chokkakula
DSM-consulting
Barma 1
CH-1973 Nax
Tel. +41 79 423 45 42
Email : info@dsm-consulting.ch
Mailing list:
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Summary

Executive summary / key findings

The midterm review of the SCA-Himalaya project (2020-2025) shows that it is mostly a *successful*[1] intervention. This project focused on the themes of Disaster Risk Reduction (DRR[2]) and Water Resource Management (WRM) in the Indian Himalaya Region (IHR), with the objective to transfer Swiss expertise and foster scientific-based approaches, ensure capacity building, and institutionalize climate change resilient approaches.

The review has used the OECD/DAC criteria of 2019 for the evaluation and investigated the criteria of relevance, coherence, effectiveness, efficiency, impact and sustainability. The evaluation is also mandated with making recommendations for the remaining period of the project and providing inputs for possible future project.

The review finds that the project has done well so far on account of all the criteria. The project is highly relevant to the geographic context of the IHR. The themes chosen, DRR and WRM are most critical for livelihoods, climate-change resilience and adaptation of populations in the region. Building on its earlier phases focused on climate change adaptation in the Himalayas adds to the relevance. The project components across the two themes are coherently deployed: DRR components to address landslide and GLOF related risks that the national and subnational governments are grappling with; scientific validation of springshed management to feed into the extensive ongoing springshed programs and modelling inputs for basin level Integrated Water Resources Management (IWRM) planning. Despite the Covid19 disruptions, the project interventions are on the track to achieving their objectives, with avenues for further improvement. The shift to a self-implementing mechanism through a Project Implementation Unit (PIU) has done well in yielding the expected results, effectively responding to contingencies and opportunities. The arrangement also helped in efficient utilization of resources, and reallocating resources as and when the opportunities arise to advance project's goals (see § 3.4). There is a clear impact of the project interventions of both DRR and WRM, and there is a great potential for enhancing it leading to enduring outcomes. A greater awareness about the federal and institutional processes and investing in right institutional partnerships will help (see. § 4.2.1). The coherence of the project in its geographic focus, in the IHR, has enabled great relevance for deploying the Swiss expertise in mountain ecosystems usefully to address India's emerging and critical priorities (see § 3.1). This contributed to taking forward an evolving niche ecosystem of bilateral cooperation. This is true for both the themes of DRR and WRM.

Overall, the project is on track to achieve its goals, especially the science-based interventions that triggered substantive investments from national (federal) as well sub-national governments. In the backdrop of the tragic Chamoli and South Lhonak lake events, SDC's project interventions and Swiss expertise have acquired not only salience but also offered critical and relevant inputs for Indian institutions involved in DRR. The project's objectives to enhanced institutional capacities are deeply valued and appreciated. While the same is true for WRM interventions, it requires strengthening institutional partnerships and links for the project's potential benefits to

[1] The alphanumeric qualification sticks to the IFC standards, guidance is provided in Annex 4
[2] An acronyms table is provided in Annex 3, p.30

materialize. The evaluation report offers some specific feedback and inputs in this direction for the remaining time of the project and beyond.

Overall, at the management level and at short term, the following recommendations may be considered.

- The project implementation mechanism through a PIU located within SDC seems to be an effective way to conduct a project with such a widespread range of stakeholders from the national high-level to the local level in the Himalayan region.
- The creation of a Technical Advisory Committee (TAC) constituting experts from technical and governance domains – from both Switzerland and India - for advising PIU should be rapidly put in place for enhanced impact and sound transfer of Swiss mountain expertise (see e.g. § 4.1.1).
- For building on the outcomes of previous phases and pursuing more enduring relations, a greater and sustained collaboration between different scientific institutions on both sides must be facilitated (e.g., on the Swiss-side collaboration with SERI), reinforcing the position of SDC.
- Despite the project's efforts, partners and processes appear to function in silos. This must be broken. For instance, the work being carried out by the Indian Institute of Technology Roorkee must be used across project sites and for overall objectives of the project. All the efforts related to isotopic studies and water sources quantification (at present restricted to the WRM component) must be used for flood modelling under DRR too.

In the domain of Disaster Risk Reduction (DRR)

- An integrated risk management (for GLOF and all the other processes) approach is necessary. It must consider the whole range of components involved: hazards assessment, translating the knowledge into plans including designing protection works, developing response systems, organizing training, drafting emergency plans, environmental monitoring, EWS installation and supervision, etc. A particular attention must be paid to the dynamics between national and sub-national entities.
- Following the October 2023 GLOF in Sikkim, some urgent actions linked to DRR and their translation into subnational institutional capacity building must be a focus for the rest of the project. A comprehensive post-incident analysis (apparently on-going) will reveal useful windows of opportunity for such an engagement.

For Water Resource Management (WRM)

- In the domain of WRM, an absence of coherent information flow and exchange between the partners involved in scientific validation efforts (see § 3.6.2), and those of with others (especially with the government agencies), and also with operational partners must be addressed on priority. The goal should be to set clear pathways for these efforts to inform ongoing springshed management programs.
- The local communities in the initiatives must be better integrated, through active participation of local representative institutions and functionaries for managing springs. This must include promoting transparent processes of sharing and exchanging data and knowledge being generated for collective action and community-led springshed management models. The support of PSI kind of intermediaries is crucial.
- For the IWRM and glacio-hydrological modelling inputs, right institutional partnerships are central for realizing the potential traction. The efforts must continue to reorient and strengthen the partnerships towards the project goals (see § 4.1.3). A more involved arrangement between CWC and corresponding Swiss expertise such as BAFU Hydrology Division and/or CREALP (depositary of the MINERVE modelling system) would help.

As new tracks for future actions, but as strategies towards capitalizing and building on the outcomes of the SCA-Himalaya project, the following propositions may be considered.

- Investing in and incorporating a clearer understanding of the Indian government structures and processes, especially from the perspective of federal governance arrangements, is critical – considering the extraterritorial and multijurisdictional nature of problems. It is important to understand the institutional relationships and mandates of relevant national and subnational institutions to link it with project interventions. Such an alignment helps enduring partnerships and improved uptake (see § 4.2.1).
- It is imperative to look into the current policies and practices of spatial planning for a coherent framework towards addressing DRR (and more widely a sustainable development, including climate changes adaptation in mountain realm). The spatial planning framework is equally critical for climate change resilience, as the Swiss experiences shows. The federal governance dimension is critical here. India's evolving federal governance ecosystem for addressing DRR and climate change risks can usefully benefit from Switzerland's experiences and lessons in pursuing a path of coherent federal responses.
- Science-based and state-of-the-art technologies must be implemented (esp. for detection of potential unstable locations) without necessarily erasing the more traditional and important approaches. The traditional geological/geomorphological mapping systems and practices (geologist of Swisstopo could bring the skill for using Toolmap for example) could be the foundational base for bringing in the advanced technological practices (machine learning for geoscience is an asset but cannot be done without field experience, *i.e.* AI can only help to fine-tune and extend the information on the area generated. *In short*, traditional techniques must continue to be applied in parallel or as verification for "machine teaching"). In the same theme, improving data gathering protocols, structures and processes of generating useful knowledge inputs for DRR and WRM is an area of critical importance – considering the challenges faced by the SCA-Himalayas activities.

In DRR domain

- Hydropower is a priority area for India in its climate change adaptation strategies. In IHR, the following are critical and SDC may have to locate appropriately to extend its assistance for : coordinated functioning of the downstream is crucial in minimizing the impact in a GLOF kind of event. Besides coordinated governance, some technological alternatives that take into consideration the flow velocity as well as the large boulders that may be transported during these episodes.
- It would be an advantage to link the activities with other international development agencies IDAs, especially the British and the Japanese, as well as Swiss partners not yet involved (e.g. hydrogeology).
- Monitoring and responding to GLOF, ice/rock avalanche and such risks require access to remote locations. It is imperative to ensure that the administrative constraints are minimal and must be accommodated by various relevant institutions such as the ITPB, NDRF, MEA, etc.

In WRM domain

- Contributing to building a comprehensive and scientific springs census in IHR to support national and subnational efforts of springshed rejuvenation and management.
- Brainstorming with CWC on different available modelling tools may be organised. Again, in coherence with the project's interests (Swiss expertise and demand for a longer-term collaboration from CWC), additional tools and approaches may be proposed. For example, building on the use of near real time modelling system, like RS MINERVE.

- Overall, capacity building requires stakeholder analysis and development of comprehensive targeted actions for facilitating sustainability of project outputs and overall outcomes. This implies expanding the scope beyond government/scientific/professional agencies towards development of specialized technical and management skills of the communities. These skills are often unavailable after project implementation.
- Further, SDC's support in hydrogeology for springshed management must converge with landslides studies for a more integrated approach of DRR and WRM.
- The ongoing efforts of Sikkim government for drafting a legal framework for springshed and groundwater regulation offers a huge window of opportunity. Exploring the possibilities of how the scientific validation efforts inform this process can open up opportunities to strengthen the science-policy-practice connect under the program.

1 Introduction

1.1 Goal of the mid-term review

The mid-term review covers the ongoing phase II of the project, Strengthening Climate Change Adaptation in Himalayas (SCA-Himalaya) in order to take informed decision for the remaining time of the project (ends in December 2025), as well as about potential future initiatives. The mandate for evaluation of SCA-Himalayas project has set the following objectives:

1. to assess the overall performance (in terms of progress, achievements, best practices and challenges)
2. to make recommendations for the remaining time of the ongoing phase.
3. to make recommendations for a potential new project in the Himalayan context.

1.2 Project: Description and Key Considerations

The Swiss Agency for Development Cooperation (SDC) in India has been involved in supporting climate change resilience and adaptation in the Indian Himalaya Region (IHR) since 2011 under its Global Programme for Climate Change and Environment (GPCCE). The ongoing phase of SCA-Himalayas is its recent project that began with the timeframe of 2020-2023 but later extended to December 2025 due to the COVID19 pandemic disruptions. It is important to recognize this history for a fair and informed review. Besides the pandemic, there are other elements that have been taken into consideration in this evaluation. These are the following.

1.2.1 Relevance builds on the history

The SCA-Himalayas project builds on earlier projects related to climate resilience in the Indian Himalayan Region (IHR) since 2011 under GPCCE.

1. Indian Himalayas Climate Adaptation Programme (IHCAP) (2012-2019)→ Government of India's request for Swiss expertise (esp. in glaciology and other mountain related hazards).
2. 3SCA Phase 1 (2015-2019)→ assist the state governments (including two Himalayan States, i.e. Sikkim and Uttarakhand) to identify and mainstream climate adaptation measures into sectoral programs for the final benefit of local communities.

The current project of SCA-Himalayas (Phase 2 of 3SCA) (2020-25)→ concentrates on IHR (esp. Sikkim, Uttarakhand, Himachal Pradesh, Manipur and Ladakh) and with its thematic focus on Water Resources Management (WRM) and Disaster Risk Reduction) DRR.

1.2.2 Focused themes and geography

The project has a clearly articulated thematic and geographic focus. It is also distributed well, both in terms of its engagement in states across the IHR and also across various scales of governance. The project focused on climate-resilient approaches in two critically important themes of DRR and WRM for IHR. The project began with the thematically relevant interventions located in four states of IHR: Sikkim (SS), Uttarakhand (UK), Himachal Pradesh (HP) and Manipur. The project then responded to emerging opportunities eventually and began working in Ladakh as well. The interventions also engaged with various scales of governance, from national agencies to subnational departments and village level communities.

During the review process, the evaluation team had the opportunities to visit the two main states of SS and UK, where the project interventions were most concentrated. For interventions in other

states, we relied on documentation provided by the SDC (HP, Ladakh, Manipur and also Madhya Pradesh), and key informant interviews with partners.

1.2.3 Clearly articulated and consistent outcomes

The SCA-Himalaya project aims achieving three specific outcomes, listed as the following.

- Integrated approaches for climate resilient management of WRM and DRR are developed and validated.
- Enhanced technical and institutional capacities related to WRM and DRR.
- Climate resilient approaches get embedded in policies and are replicated.

These are consistent with the history of SDC's sustained engagement in climate change resilient approaches in IHR, commanding much of relevance and coherence. The project is also consistent with its intended future engagements – as indicated in its future plans for focussing on integrated disaster risk management in the Himalayas, shared by SDC.

1.2.4 COVID19 impacts

The project was designed in 2019 and the implementation began in 2020. Due to COVID19 linked lockdown and travel restrictions, the work pace slowed down in the early stages. For achieving the planned goals, the project received two extensions. The end of the project is now fixed to December 2025.

2 Methodology

The methodology for this evaluation has been guided by the OECD/DAC criteria. SDC proposed a set of questions under the six criteria categories of the OECD/DAC. These are provided in annex 2.

For an assessment under these criteria, the methodology constituted three steps. In the first, we reviewed a large set of documentation provided by the SDC on the project design, progress, and outputs – assisted by related literature review. In the second, we reached out to project partners and the stakeholders directly and interviewed them. This included primarily the international consultants involved in the project (Switzerland, Netherland, Nepal, and India) in virtual mode. The stakeholders included the stated beneficiaries and the agencies as well. In the third, we carried out a mission to the field sites in India: Delhi, SS and UK states. This step included interviews with the SDC's PIU team, and several other stakeholders located at different scales: national and subnational scales. We also visited the pilot field sites, interacted with communities and other stakeholders in the pilot project villages. The deploying of the same set of questions with the variety of stakeholders located at different levels has contributed to triangulation of narratives towards an objective understanding.

An inception report was prepared based on the review of documentation and literature. This anchored the interactions and feedback from SDC India to design the interviews and the mission in India (mission from 11.03 to 22.03).

At the end of the mission, a presentation of the findings has been done at SDC office in New Delhi. This debriefing (as in two ways exchange proposed by the OECD methodology) based on the findings allowed clarifications on several pertinent points (hands out of the presentation is provided in annex 4). These processes have informed this final report.

3 Findings

As an overall assessment, it can be said that the project is mostly satisfactory (see Annex 4). Looking at the three outcomes, development of scientific approaches, enhanced capacities and integration of climate resilient approaches in policies, one could say that they are all above 50% success. The success percentage however varies amongst the three outcomes. For instance, the component of developing scientific approaches is a near 100% success based on implemented pilots while integration of approaches in policies is ongoing as a way forward of the demonstrated approaches (with a slightly lower score).

A broad sense of our assessment based on the findings is presented in the Table 1. It summarizes the review on a scale of + (lower appreciation) to +++ (higher appreciation), across the different themes and states of the project (DRR and WRM in SS, UK and other locations) under the criteria used, that of OCED/DAC. When it comes to effectiveness and impact, we found that for certain components, results differ greatly between different stakeholders (especially between the academic, on the right and the governmental ones on the left). Therefore, we have used sub-categories to indicate these differential impressions in the Table 1

Table 1. Overall assessment of the criteria across the different segments of the project (see related § thereafter for understanding sub-divided appreciations).

Indicators of the review	DRM		WRM		Others
	Sikkim	UK	Sikkim	UK	
Relevance	+++	+++	+++	+++	+++
Coherence	+++	+++	+++	+++	+++
Effectiveness	++	+ / +++	+ / ++	++	++
Efficiency	+++	++	+++	+++	++
Impact	+++	++	+ / ++	+ / +++	+++
Sustainability	+++	+++	++	+++	+++

Keys

+++	high
++	medium
+	low

In the following sections we detail the findings, mostly focusing on where enhancement/adaptation may be needed for the remaining part of the project. The next chapter will contain some feedback with critical inputs, but the overall positive appreciation should not be missed.

3.1 Relevance

The project is very relevant. The thematic and the geographical focus of the project makes it very relevant. The historical legacy of the focus weighs-in further. However, it must be acknowledged that the project components are spread over two worlds - the collaboration in sciences world for which there is the beginning of a good synergy (the momentum must be kept) and the more cooperation and development perspective for climate resilience of communities on the ground.

Another element is the synergy of the specific project components with the current priorities of the IHR states. For instance, the pilot projects of springshed management embed in the long history and evolving significance of springs for water security in IHR as in *Dhara Vikas* programme of SS. If the relevance of SCA-Himalaya is in accordance with its goals, the slight shifts since SDC work on these topics namely : i) request for Swiss expertise in DRR and WRM; ii) identification and mainstreaming climate adaptation measures; iii) concentration on the IHR; in the project goals (see § 1.2.1) is not completely understood by the Indian partners. Especially the request for Swiss expertise is still in demand and yet seems less prominent in the recent time (see e.g. § 4.1.1).

3.1.1 Disaster Risk Reduction

The project is very relevant to DRR in IHR. This is also quite obvious as it is a follow up of previous projects. In this phase, some components of the project go from research to operational phase including the one focusing on the South Lhonak and Shako Sho glacial lakes for glacial risk management. The recent glacial lake outburst flood event (GLOF) in October 2023 in Sikkim brings the SDC project efforts into sharp focus. Component focussing on development of tools for tackling large mountain mass movements is still ongoing and is well appreciated by many Indian specialists (a training focused on modelling was conducted in 2023 and a related training will be reconducted in 2024).

Despite the tragic nature, it must be noted that the GLOF event opens a window of opportunity for the project to intervene usefully bringing in the technical know-how and knowledge of Swiss institutions which have vast experience in this domain to the IHR context. Indeed, Swiss experts are tackling GLOF at least for over the last 2 centuries in the Alps (the Gietro event of 1818 may be seen as a starting point, for GLOF as well as for the glacial theory). It offers the possibilities of quick enhancements to the component of DRR. The focus of the ongoing initiatives in India appears to be more on disaster response than on disaster prevention or preparedness. For institutionalisation of preparedness, the logic may slightly differ but must be adapted (allowing time) for a better sustainability.

3.1.2 Water Resources Management

The WRM project components too are very relevant. The approach taken is similar to that of DRR. With continued emphasis on scientific climate-resilient approaches, the project components related to WRM had a greater focus on operational aspects by taking up implementation of pilot springshed management initiatives. The strategy of adding value to existing programs of springshed management is well-conceived and was received well from its relevance point of view.

In SS, the Rural Development Department (RDD) of Government of Sikkim has an ongoing programme called *Dhara Vikas*, a pioneering initiative of springshed management. The pilot interventions under SCA-Himalayas are aimed at validating and developing a scientific and comprehensive approach for springshed management. These are being carried out in close collaboration with RDD based on their prior experience of *Dhara Vikas*. In SS the pilot project is only supported because of the salary paid to the community workers. We are said that once the project end (hence the salaries) the community will stop as they don't see any interest for them. In contrast, the pilot interventions in UK are well received and seen as very relevant and the community see the importance of monitoring. They are now owning the system for themselves. The scientific approaches are expected to inform, improve and strengthen the larger state government programmes such as *Dhara Vikas* in UK and others elsewhere in IHR.

The other components of scientific approaches for Integrated Water Resources Management (IWRM) and glacio-hydrological modelling were also seen relevant to the context. These have suffered however due to issues linked to data availability, institutional embedding and coordination. For instance, the Wadia Institute of Himalayan Geology (WIHG), a repository of glaciers related data for glacio-hydrological modelling, was reluctant to share the data. Later, the CWC has been brought in as a partner to review and provide inputs towards developing national guidelines for glacio-hydrological modelling. This partnership may eventually lead to a glacio-hydrological modelling framework in India.

The WRM component however does not use any Swiss expertise, either in IWRM or springshed management components. The WRM components missed opportunities for exchange of relevant Swiss expertise and skills (e.g. isotopic studies, hydrogeology for springs, operational hydrologic modelling).

3.2 Coherence

The project is coherent with the delivery of a unique set of skills and expertise within the larger ecosystem of development interests and ecological risk management within IHR. It aligns with the Indian government’s focus on climate change risks management in mountains and water security. These also align with other ongoing efforts at the subnational scale by the governments and civic society agencies – including other international development agencies (IDA). For the landslides' theme there have been similar ongoing initiatives in collaboration with the British and the Japanese.

3.2.1 Disaster Risk Reduction

The GLOF support is completely coherent. The recent outburst floods (from glacial-origins of South Lhonak lake in SS and earlier at Chamoli in UK) in the IHR set the landscape with extensive appetite for acceptance and uptake. As one of the informants observed rightly, the DRR expertise in India is limited and fragmented. The Swiss expertise, tested and tried, is sought after across the board among the stakeholders. However, the execution and integration with sub-national scale of governance is a work in progress. Some efforts still need to be done for transforming the scientific knowledge acquired into a smooth workflow at subnational scale. The institutional channels between the agencies at the national (NDMA, CWC, etc) to sub-national levels (such as SSDMA, UKSDMA and further down) must be strengthened to get the best out of the coherent design of the project. For instance, the landslide modelling uptake suffered – among other reasons – primarily due to weak links with the subnational agencies responsible for DRR. Central Building Research Institute (CBRI) is a key institution (with high level competencies) under the ongoing

mandate on rock-ice avalanche supported by SDC, to work on any landslide modelling related initiative. They also work with other IDAs such as JICA and FCDO. The CBRI is a scientific laboratory with some mandates from the subnational government of UK. However, its role within the subnational institutional ecosystem is not clearly defined for ensuring effective DRR. In the absence of these crucial institutional coordination elements in place, the project's potential impact has suffered. Having a collaboration with SDC presents a beneficial arrangement for local authorities in terms of external communication, however it requires substantial awareness to manage any risks for SDC related to reputation and institutionalization.

3.2.2 Water Resources Management

The WRM components are mostly coherent. Springshed management is a priority and has acquired significant traction in the IHR as a key strategy towards climate resilience and drinking water security. Several states of IHR have ongoing programs for the conservation and management of springs. The ministries and institutions at the national scale too have begun emphasizing the critical importance of springshed management. As a result, there are wide range of development programmes converging into supporting springshed management efforts. Sikkim is a fine example here. As noted earlier, there is an exclusive programme for springshed management, *Dhara Vikas* launched in 2008. The state synergizes *Dhara Vikas* with various central (national) sponsored schemes such as MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Scheme), Jal Jeevan Mission (JJM) and CAMPA (Compensatory Afforestation Fund Management Authority) for springshed management. The other IHR states including UK have also begun doing the same. In addition to these trends at the subnational scale, the national agencies like the NITI Aayog and the Department of Land Resources (DoLR) of Ministry of Rural Development, Government of India also have definitive plans to focus more on springshed management in IHR. The DoLR is considering a centrally sponsored scheme exclusively for supporting springshed management. SDC's pilot projects are strategically located in this conducive landscape with its goals of providing scientific validation and improving the models of ongoing springshed management programs. However, the pilot projects offer varied experiences – both positive and negative - in their effectiveness in generating the intended outcomes (elaborated in Section 3.3.2).

The scientific approaches for IWRM integrating glacio-hydrological modelling are obviously important for IHR. There is significant interest in the approaches which are valued by the scientific and professional communities. However, it suffered from lack of an institutional coherence, especially in its location for its effective uptake. For instance, due to limited framework of the project (time and resources), the geographical scale of the IWRM model is at a smaller scale compared to the scale at which the institutional ecosystem operates - as administrative divisions and not at river basin scales. IWRM paradigm is best pursued at an elevated scale with state water resources development agencies. In a similar way, focusing on glacio-hydrological modelling only on the upstream and not including the downstream does not fit with the scales of engagement in place for IWRM planning.

3.3 Effectiveness

As such, these activities (especially the ones related to uptake of scientific approaches) have their own gestation periods. The uptake and internalization of the approaches by the targeted agencies and institutions goes beyond the time period of the project, the SCA-Himalayas. This has also been observed and acknowledged by the Programme Framework 2021–24 of the GPCCE. While

each phase may shift in its paradigms, priorities and partners, it is desirable to find ways of continuing earlier collaborations and building on them.

The shift from an implementing mandate through UNDP (Phase 1 of 3SCA) to the mode of self-implementation through SDC's own PIU received varied feedback, in general mainly positive for specialised activities. Some of the international science institutions were of the opinion that they faced some discrepancy between the contract ToR and what was requested from them as an outcome. The PIU's ability to respond to changing conditions on the ground was appreciated. But it was found constraining for some partners (especially the international and national) to seamlessly work with other partners and stakeholders towards the effective implementation of the project components.

3.3.1 Disaster Risk Reduction

In SS, Swiss support is clearly a success, however the activities take place in a somewhat illogical order. Some steps could have been implemented before designing of early warning systems (EWS) to have an integrated disaster management approach. These include a vulnerability mapping based on the risk assessment and development of a SOP for GLOF risk management. The South Lhonak event brought these deficiencies into sharp focus. Some essential tasks should still be done. Fragmented and contradictory information related to emergency planning and population awareness appear to be the major concerns. This point couldn't be fully triangulated by the consultants. A visit to Chungthang dam would have helped. It was out of reach during the mission due to time constraints. Further, the incoherent institutional linkages and lack of clarity about distinctives roles and responsibilities between national and subnational (between CWC and DST-S – Department of Science and Technology, Government of Sikkim), and within the subnational institutions (between DST-S and SSDMA) is another limiting factor that would be relevant for future areas of cooperation.

In UK, there is a large discrepancy between the needs of officials, the outputs of the projects and what is done in CBRI. The stakeholders often shared their deep appreciation for the strategically located interventions, but it often accompanied a disappointment about the unavailability of usable products and outputs to address DRR. This is a critical area that requires constant science-based communication efforts to address institutional risks and ensure proper coherence between expectations and limits of scientific approaches.

Some interesting results regarding the hazard status are observed in other states. For e.g., flood maps drafted before the effective floods in HP show a good match between predicted and observed event, but fall short in implementation due to spatial information related constraints.

3.3.2 Water Resources Management

The project components under WRM are undeniably relevant and coherent, but there is scope for strengthening the established institutional partnerships to get maximum benefits and impact.

Even though the springshed management had the most visibility, it could benefit from reinforcing links with subnational institutions for scientific validation. In Sikkim, there is a gap between the project partners working in the pilot villages and the implementing line department, the RDD. RDD was of the opinion that the findings of the pilot initiative from SCA- Himalayas should help in improving the *Dhara Vikas* program. This implies that the feedback process of informing and aligning with the ongoing government initiative needs to be improved. Efforts to mobilize and engage with the communities will help in increasing their awareness on data usability. In UK too,

enhancing linkages with the relevant departments such as the Forest Department and the State Environment and Climate Change Department will be beneficial. In addition, the initiative can strengthen the existing collaboration with other relevant departments, specifically with Watershed Management Directorate (WMD) and the newly constituted Spring and River Rejuvenation Authority (SARRA).

The springshed management pilots in SS and UK presented a useful contrast in terms of their effectiveness. The absence of a community mobilization partner in SS has had an adverse impact on the community's ownership of the assets or knowledge created. The community was equivocal about how they would manage the assets created or use the data collected. In UK, the presence of community mobilizing partner had a clear impact in their ownership of the assets, their management in future. But they were equally unsure about the data being collected, and how they could use it in their own decision making. The gap between the scientific validation and the intended users runs across the scales, from communities to the line departments. This has an impact on the potential for integrating the new knowledge produced through pilot projects with the ongoing efforts for scaling up springshed management.

The gap between scientific validation efforts and the targeted users appears to have produced some sourness that must be addressed. These arise from perceptions of poor acknowledgement of due credits to the RDD and the perceived opaque functioning of partners. There are two compelling reasons for this. One, the partners involved in scientific approaches to validation of springshed management are seen to be making claims about developing the springshed models without due acknowledgement to the pioneering *Dhara Vikas* efforts of RDD. Two, the approaches and validation efforts have not so far offered concrete ways of improving *Dhara Vikas* programme. Creation of avenues for frequent interactions and exchange between partners and users may help. This is necessary to improve the quality of capacity building activities as well.

Access to critical data for IWRM and glacio-hydrological modelling has affected the exercises. Right kind of institutional partnerships is crucial here (see our proposal § 4.2.1). Further, addressing the constraints due to conflicts of interest involved is important. This may require better understanding of the scientific world and improved institutionalisation of data gathering and monitoring mechanisms.

3.4 Efficiency

Overall, the project is very efficient in using the resources. The project remains on track to implement original set of activities with no additional costs, even though the timeframe is extended. The project also triggered significant investments from the government agencies. The flexibility and responsiveness of SDC was appreciated by most of the partners.

3.4.1 Disaster Risk Reduction

The GLOF situation in SS is still acute. A continuous support is required. SDC's continued support is valued and sought after. The funding availability from the state government do not appear to be in commensurate with the degree of risks, but there are allocations available from the central government. These are yet to be available for the state government's use. The challenges are however a different one and linked to the institutional coordination within the state government departments, as well as with the central agencies.

At government level, there is indifference because the project is perceived as not meeting their immediate needs. This may be because of the difference between the immediate needs expressed by the government agencies and the more mid-term results achieved by science-based approaches. It should be acknowledged that the government agencies do not always react pro-actively to the PIU's proposals.

Enhancement, in both cases, would not be feasible without the right institutional linkages in place.

3.4.2 Water Resources Management

The IWRM and springshed management components did not use any Swiss expertise. The scientific approaches for IWRM have generated extensive interest in the scientific and professional networks. But the subnational government agencies remain indifferent due to their lack of immediate utility, or embeddedness in the existing institutional processes. The scientific validation of springshed management too requires stronger links with government agencies and must explore ways of effectively feeding into the programmatic aspects. Some pitfalls (e.g. isotopic studies) may have been avoided with just some expert advisory inputs to improve the design of different study components and to link them. There is a need for sustained exchange between the project partners and other stakeholders involved in the entire scheme of scientific validation of springshed management.

The springshed management pilots bring the role of community engagement into sharp focus. As noted, the presence of People's Science Institute (PSI - a local partner in UK) in bridging the community with the partners as well as government agencies made significant difference. Yet it has failed to show effective ways of putting the data gathered for improved springshed management either by the community or the line department. Notwithstanding this limitation, it is worth considering investing in a state-level or regional level nodal agency for catering to the role and functions of an intermediary towards improved springshed management.

Isotopic study (and conductivity measures!) must receive an attention right now.

3.5 Impact

Most of the actions of the project are impactful. However, the second outcome of institutional capacities will need sustained engagement in terms of attention, efforts and time till 2025 (even if some actions are already on-going).

3.5.1 Disaster Risk Reduction

In SS, the impact is obvious. In the aftermath of the South Lhonak incident, the focus was primarily on the SDC supported 'early warning systems' (EWS), though what was installed was a monitoring station. The impact and visibility will be lasting when the GLOF detection devices (EWS) are in place and coordinated with due local emergency plans.

In UK, all the actions underway in IIT Roorkee (modelling training, isotopes analysis, calibration of glacial-hydrologic model, the last 2 being not yet in the DRR portfolio now) will be a promise for building an impactful result. It must be promoted and continued.

In UK, government agencies did not find the landslide modelling of use for their operational needs. The wide scope over a whole territory is not aligned with the newly identified urgent needs in specific areas (pilgrimage roads). The gap is not about capacities or resources, it is about more about the Swiss expertise and the needs of the institution.

3.5.2 Water Resources Management

The pilot projects for scientific validation were embedded in the ongoing efforts of springshed management in all the states including the most visible *Dhara Vikas* program in SS. The field interactions suggested a clear impact in terms of springs rejuvenation in the pilot villages, with improved status and yield from the springs. The springs have had adequate yields in the lean season as well, showing a tangible impact in improving the drinking water security, and thus enhancing climate change resilience of the communities in the pilot villages.

The scientific validation approaches however have left much desired. There is no baseline study to compare the impact in the pilot projects, other than the inputs from field interactions. There is no clear trajectory on how the science-based approaches would eventually inform or improve the springshed management programmes. Neither the government agencies nor the partners were sure about the utility of the scientific validation efforts. Further, there is a disconnection between all partners involved – which is adversely affecting the realization of the potential impact of the project.

In UK, IWRM modelling is not usable due to incoherence with scales of engagement of state institutions. The models are not usable by government agencies mandated with water resources management in the states. The support is perceived as very important, as it could provide scenarios for the future, depicting the effect of the climate changes. However, the operational needs of the designated institutions – CWC at national level or departments at subnational scale – are not met by the models. Further, relevant Swiss expertise is not fully deployed. Finally, the glacio-hydrological modelling is of immense interest, but suffered from data access and late on-boarding of CWC.

3.6 Sustainability

Most of the elements of the project are owned by Indian institutions (including the community as an institution). Therefore, most of the project interventions may be considered sustainable. However, there exist some pitfalls.

3.6.1 Disaster Risk Reduction

In SS, the project has led to sustainability elements of increased awareness among the stakeholders, especially among state level agencies such as the DST-S and SSDMA. There is a greater appetite more of such interventions. The data produced by the SDC supported monitoring stations is much sought after for an objective post-event analysis for greater preparedness. The national and subnational agencies are keen to invest in reliable infrastructure for DRR. They are also open to necessary institutional transformation. For instance, there is a greater awareness of the need for a SOP for DRR building on the data generated by the SDC supported instrumentation.

In UK, SDC's support to an appropriate institutional partner, the CBRI usefully contributes to the sustainability of its project. The CBRI, through its competent scientists and professionals (across all its labs, and not just the one working on DRR right now), is well-embedded into the policy and institutional ecosystem within the UK. This however requires some additional effort and investments in promoting a more scientific approaches to inform DRR in the state.

3.6.2 Water Resources Management

Springshed management pilot projects in Sikkim and UK vary in producing sustainable outcomes. In the Sikkim pilot, the disconnect of the project partners (involved in scientific validation) with the RDD has affected the sustainability of its impact. The absence of a clear path for the data gathered and its role in validation for informing the program also has an impact. Establishing clear pathways for the data generated and the scientific approaches for validating springshed management can ensure tangible and enduring impact. The communities expect continued inputs and support – if not from SDC, certainly from RDD is the hope. This was due to lack of efforts in community mobilization by RDD and absence of partner for community mobilization. On the other hand, the active engagement of PSI as a community mobilization partner in the Moldhar pilot project in UK have produced clearly discernible sustainability elements. The PSI worked with women in the village to build and nurture resilient institutional responses to manage the springs, even after the project is over.

IWRM modelling may not be of immediate interest to institutions – thus does not fare well with respect to sustainable impact. But the glacio-hydrological modelling component has a potential to generate enough traction within the institutional ecosystem towards sustainable impact. Immediately, it is worth investing in the CWC partnership for rewarding outcomes.

3.7 Overall outcomes

The review has shown that the project has achieved the envisioned outcomes despite the challenges and constraints. It could be summarized as the following.

1. Development and validation of scientific based approaches related to WRM and DRR.
    - Most of the actions aiming at embedding scientific elements as new elements for a better management of the water resources or the risk mitigation achieved their goals.
    - In order to produce sustainable results, this outcome will need some more effort, especially with the new partners.
2. Enhanced technical and institutional capacities related to WRM and DRR.
    - Technical and scientific approaches are now circulating within institutions. These are perceived as valuable inputs. Their adaptation to the institutional and governance context is the challenges. Data sharing and embedding of these elements in a logical framework (i.e. easily replicable) will still require efforts.
    - Logical framework for problem solving, as well as accommodating for the federal processes must still be enhanced.
3. Climate resilient approaches get embedded in policies and are replicated.
    - The project's climate-resilient approaches are appreciated and there is extensive potential for gaining traction. The project has achieved its milestones in terms of deliverables, but their uptake into policies for scaling up requires efforts. A deeper understanding of outcomes produced in the pilots (location) and events (temporal) offer opportunities towards creation of resilient communities.

4 Short-term recommendations

4.1 Management level

The project implementation mechanism through a PIU located within SDC has proved to be a better way to conduct a project with widespread range of stakeholders from the national to the local level. It is recommended to keep the current setting of a PIU with an addition of a Technical Advisory Committee (TAC) to support PIU. SDC can also rely on some of the TAC members as backstopper experts for the complex activities (requiring high-level scientific and technological inputs), including for reviewing the ToR before their publication.

We would highlight that there are areas for improvement both at strategic and activity level under the project. These include: (a) better integration of project with the Indian federal state and its institutional processes; (b) actively seeking out additional relevant institutional partnerships and building on relevant historical relationships; and (c) proactively improving communication channels among project partners and stakeholders at subnational levels. In this regard, strengthening the coordination between the Steering Committee and the PIU from the point of view of strategic and operational directions will add significant value. TAC may be located suitably to facilitate this coordination.

The project and its previous phases have led to good synergies between different scientific institutions on both sides. These relationships appear to be resilient and reliable. It is in the interest of SDC to strengthen and sustain these relationships. Overall, the project may derive advantages from effectively utilizing Swiss expertise in the following domains:

- Hydrogeology for springshed delineation and all the requirements for ensuring the water quality (from organic pollutants), delineating springsheds as well as the spatial planning of springs protection. Collaboration with the The Centre for Hydrogeology and Geothermics of University of Neuchâtel (CHYN), the Swiss Federal Institute of Aquatic Science and Technology EAWAG, as well as BAFU may be explored for this component.
- Isotopic studies for aquifer mapping and developing an understanding of springshed baseflow, and its sources (contributions of snow or rain, which is also useful for flood management). Additional collaboration with the CHYN-University of Neuchatel and UNIL may be an asset here.
- Integrated risk management (including for GLOF, Flash flood, floods, landslides or dam safety plans, but not limited to) comprising hazards assessment, translating the knowledge into plans - designing protection works, developing response systems, organizing training, drafting emergency plans, environmental monitoring, EWS installation and supervision, etc. Additional resources from BAFU, some Cantonal authorities as well as Universities and private organizations in Switzerland (like CREALP) could be utilized for the benefit of the project and may also be shared with a wider set of stakeholders.

4.2 Disaster Risk Reduction

The efforts in the SS must continue as it will build a powerful example to showcase in DRR for IHR. However, due to the proximate exposure to the recent GLOF event, the following elements should be kept in mind :

- Responding to an event differs from proactively preparing for unforeseen occurrences, even if probability assessments are conducted. Institutionalizing the disaster preparedness is critical. The government's actions with particular attention to the dynamics between national and sub-national entities (including resource flow, knowledge exchange, and practices), should be integrated into the daily administrative framework by reworking institutional processes and developing Standard Operating Procedures (SoP). The SDC's knowhow and the results linked to SCA-Himalayas project's instruments and interventions could serve as a promising template for replication in other IHR states.
- The implementation must be based on the post-event analysis (partly on-going), the scientific basis and the Integral Risk Governance cycle. Such an analysis must have strategically defined and institutionally embedded scope (for instance, the institutional disconnect within the departments of Sikkim government). It also should include working with local communities potentially affected by such hazards.
- The response to the training organised jointly by CBRI- and WSL is impressive. One should look into involving these scholars and professionals (participants of the training) into operational studies useful for Indian Authorities, as well as continuing the collaboration with CBRI or Department of Science and Technology of Government of India (DST) for providing some other trainings (like geomorphological mapping, glacio-hydrologic modelling, etc.).

4.3 Water Resources Management

Springshed management is a priority for the IHR and has gained considerable traction. SDC may continue to invest in this component, but with a more strategic and long-term approach. The disconnects within the scientific validation efforts must be addressed to inform and improve the ongoing springshed management programs such as *Dhara Vikas* in SS. This can be done through:

- improved flow of information and exchange between partners towards a clearly articulated pathway for the scientific validation efforts to input the existing models of springshed management;
- better integration of the local communities in the initiatives, through active participation of local representative institutions and functionaries for managing springs; and;
- promoting transparent processes of sharing and exchanging data and knowledge being generated for collective action and community-led springshed management models.

The impressions from the pilot interventions in UK and SS emphasize that it is essential to invest in and build on locally embedded institutions. Some stakeholders felt alienated from the distant scientific partners. It is advantageous to promote local institutions of excellence as long-term partners to:

- enhance the accessibility and accountability to diverse stakeholders
- provide enduring connections with the international (Swiss), national and sub-national level scientific institutions and
- ensure convergence of research agendas with operational interests. For instance, related to hydrogeology, detailed geological mapping and operational hydrological modelling.

The contrasting experiences of Suldung Kamling in SS and Moldhar in UK highlight the critical role of PSI kind of intermediaries for community mobilization towards sustainability of project impacts. It is worth considering supporting a regional level institution to train and handhold both government and nongovernmental agencies for the intermediary role of community institution building for springshed management. This can potentially have regional scale impact and strengthen the ongoing springshed management programs in the IHR.

In the specific pilot locations, the case of Moldhar, UK (working on the quantity and the quality of water) is an example that offers useful model to be replicated, even though the link between scientific validation efforts and program improvement remains a concern. In more specific terms, some support from Swiss hydrogeologists may be of interest in collaboration with a local level institution such as PSI to address the link partially.

In SS, efforts on springshed should be continued with similar caveats. The convergence between the scientific validation with the perspective of the administration: with the *Dhara Vikas* program implemented by RDD is crucial.

Such an intervention at subnational scale may be an advantage for SDC to engage strategically and usefully at national scale as well. The DoLR's plans to organize a national conference with the goal of a central program for springshed management is a major opportunity for advancing the project's relevance.

The IWRM and glacio-hydrological modelling will gain greater momentum through strengthening institutional partnership with CWC. The CWC partnership must be targeted appropriately within CWC and also consider a change in the nature of partnership for impactful outcomes. A more involved exchange between CWC and corresponding Swiss expertise such as BAFU Hydrology Division and CREALP (depositary of the MINERVE modelling system) will help. Instead of a feedback-based relationship, a more collaborative relationship where the two sides can have an opportunity for a sustained exchange will improve the outcomes of the partnership.

5 Long-term recommendations

It is suggested that a consultation workshop or similar event be held, including technical and policy experts from India and Switzerland, to discuss and refine future thematic selection in collaboration with local actors and institutions. This should not be regarded as an additional recommendation, but rather as a proposal to structure and prioritise the evaluation findings.

5.1 Management level

- As mentioned in the short-term recommendations, the creation of a TAC constituting experts from technical and governance domains, – from both Switzerland and India - for advising the project will be helpful. A key function of it may be to propose the available expertise from the mountain domain in Switzerland, as well as in the policy, structural and governance in India, and how it can be applied in the IHR context. This TAC may help finding entry points within the policy and institutions ecosystem for embedding the project interventions. The annual Steering Committee meetings can facilitate these entry points. The TAC may also be helpful in advising PIU about potential collaborations and activities and structuring the same for the Steering Committee to support.
- Many stakeholders highlighted the importance of detailed geological/geomorphological mapping. This element is present in the project only via the SARMAP activities. In total coherence with the project's strengths (Swiss scientific expertise in mountain context), a possible intervention could be capacity building on thematic mapping (using Swisstopo geological mapping software named Toolmap or other). Again, for an efficient institutionalisation the appropriate counterpart and pathways must be identified at national and sub-national levels in India.
- The nature and type of the scientific partnership calls in Switzerland are not in commensurate with the time and efforts required for enhancing the relationships developed between scientific institutions in India and Switzerland. Some coordination may be done with the State Secretariat for Education, Research and Innovation (SERI) for investments and initiatives in this direction.
- The institutional relations and administrative settings within the Indian government (national and sub-national) is quite complex and in constant evolution. For the sake of sustainability, it is recommended that for any actions (done with the same philosophy as that of SCA project) an institutional mapping take place (with a special attention to flow of data) prior to defining in detail the actions.
- SCA offers an opportunity to replicate many elements of the SCA in other countries of the Himalayan region (especially Nepal, Bhutan and North of Bangladesh).

5.2 Disaster Risk Reduction

- From a policy perspective, the implementation of emergency plans and spatial planning (a key element for sound risk reduction at the sub-national scales with adherence to the existing legal framework) must be studied. An affordable process to put in effective spatial planning (including hazard and vulnerabilities maps, but also springshed) on the ground must defined. This is very important, as all the work done on modelling and hazard mapping is of use only if it could accommodate the landuse constraints. Again, it must be recognized that India does not have a statutorily mandated spatial planning framework outside urban areas. SDC may pursue the idea of advocating for and supporting spatial planning framework at an appropriate scale, at least in IHR, via the consolidated partnership with the NDMA. Bringing in the historical relationships into new partnerships with the support of NDMA may be a potent option for pursuing the spatial planning framework for DRR.
- Hydropower is a priority area for India in its climate change adaptation strategies. In IHR, the following are critical and SDC may have to locate appropriately to extend its assistance:
    - Coordinated functioning of the downstream dams is crucial in minimizing the impact in a GLOF of such an incident. Developing sensibilities in this context through a viable spatial planning and governance framework may be useful.
    - Depending on the proximity of the GLOF sources, technological alternatives such as submersible dam design may be promoted. Such design must take into consideration the flow velocity as well as the large boulders that may be transported during these episodes. Swiss expertise may be useful in this context. SS government is considering setting up a GLOF monitoring cell. SDC's project may usefully locate itself in such a venture.

- To address landslide risks (or any other similar phenomena) it would help to link the activities with other IDAs working on the issue, especially the British and the Japanese that have on-going activities on this subject.
- In parallel a reflection on the integrated approaches for risk mitigation must be conducted. The importance of spatial planning (useful for many other applications) should be put as a priority and then linking it to emergency planning and monitoring needs.
- Monitoring and responding to GLOF, ice/rock avalanche and such risks require access to remote locations - a challenge due to the environmental conditions. It is imperative to ensure that the administrative constraints are minimal and must be accommodated by various relevant institutions such as the ITPB, NDRF, MEA, etc. They must be aware of the project, if not partners. It is of primordial importance regarding maintenance of any measurements stations that access is very easily granted with the corresponding logistics.
- For ensuring institutionalisation it is required that the project addresses the needs expressed by the government bodies (esp. in UK), even if their responses may be in question. But be aware that some of the existing results may already answer to these needs (*e.g.* landslide detection applied to the two main pilgrims' routes).

5.3 Water Resources Management

- The springshed management component may be continued with the strategic directions as outlined under the project level recommendations. Further, IHR states are increasingly keen on springshed management; they are relying on and reorienting the existing development schemes towards springshed management. It is likely that there will be exclusive in other states of IHR as well, similar to *Dhara Vikas* in Sikkim. The federal government is considering launching a programme to support and promote springshed management. To the extent it is observed, these efforts tend to be hasty and rely on poor information on springs. Sikkim's most visible effort to draft a legislation for regulating groundwater and springs too has suffered due to these gaps. A comprehensive census of springs can be a foundational activity to support the evolving programs towards greater resilience of communities in IHR. SDC may consider extending support to such a census and contributing to a scientific and comprehensive springs protection planning.
- The WRM components may continue the focus on the climate-resilient scientific approaches. The CWC partnership is an important one. Brainstorming with them on different available modelling tools may be organised. Again, in coherence with the project's philosophy (Swiss expertise and demand for a longer-term collaboration from CWC), additional tools and approaches may be proposed. Building on what is produced with FutureWater, the use of near real time modelling system, like RS MINERVE, may be in adequation with the needs of CWC.
- Springs in IHR exhibit significant variability in hydrogeological, ecological, socioeconomic and governance/institutional contexts. Increasing the number of pilots along with a robust feedback mechanism to strengthen the program design could enhance the impact and sustainability of spring rejuvenation initiative. SDC may consider providing seed funding to explore ways of building a centralized, shared database on springshed rejuvenation efforts for the partners to access. The effort may also include figuring out effective channels to integrate the scientific approaches and add value to the springshed management efforts.
- In terms of capacity building, there is a need to focus on stakeholder analysis and develop comprehensive targeted actions for facilitating sustainability of project outputs and overall outcomes. This implies expanding the scope of capacity building initiatives beyond government/scientific/professional agencies towards development of specialized technical and management skills of the communities. These skills are often unavailable after project implementation. Investing in institutions for skill-imparting on a regular basis for springshed management is an impactful supplemental intervention.
- Further, SDC's support in hydrogeology for springshed management must converge with landslides studies for a more integrated approach of DRR and WRM. Accumulated groundwater can often trigger landslides.
- The ongoing efforts of Sikkim government for drafting a legal framework for springshed and groundwater regulation offers a huge window of opportunity. First, exploring the possibilities of how the scientific validation efforts inform this process can open up opportunities to strengthen the science-policy-practice connect under the program. Secondly, drafting of the legislation on groundwater regulation with springs as the central focus is a first-of- its-kind. Sikkim chose to rework the model groundwater bill recommended by the Government of India in its entirety; and, decided to shift the focus to springs towards a better legislation. SDC can consider supporting this effort to showcase a model for state governments in the IHR in approaching springshed management, and groundwater management generally.

Annex 1

Table 2. List of the criteria and typical questions of the review

	OECD/DAC criteria	SDC specific questions
1	**Relevance** → is the project doing the right things ?	a) How relevant are the project's thematic and geographic focus in India? b) How relevant is the Swiss and international expertise of the project for the Indian key partners (MoEFCC, NDMA, states, CWC) with regards to their frameworks and institutional priorities? c) Has the project been based on the correct assumptions regarding risks, opportunities and challenges?
2	**Coherence** → how well does the project fit ?	d) Are the project and its objectives aligned with the Swiss priorities and strategies (Switzerland's International Cooperation dispatch 2017-2020/ 2021-24, GPCCE strategy)? e) Are there any unintended results (outcomes / outputs)? If so, which are their effects? f) Is the project compatible i) with other SDC interventions in the region /thematic field; ii) with interventions by other thematic key actors (bilateral and multilateral donors, private sector, UN, NGOs, etc., with respect to complementarity and synergies; iii) with global, regional and national frameworks?
3	**Effectiveness** → is the project achieving its objectives ?	g) What is the status of the results achieved from the project start until the start of the review? h) Is the geographic focus with pilots in four Himalayan states effective with respect to aspiration for upscaling the in the IHR and across the Himalayan region? i) Is the project implementation set-up effective (PIU/self-implementation, mandates with expert agencies)? What are the advantages and short comings? j) Was the project engaged with the right mix of partners/stakeholders? k) Did the adjustments made during the project implementation contribute towards greater achievements (e.g. additional states, partners, activities)? l) Are project's approaches and modalities effective? m) What are the recommendations for the remaining phase?
4	**Efficiency** → how well are resources being used ?	n) Were the funds spent efficiently in accordance with the project budget and SDC's procedures? o) What have been unforeseen challenges/opportunities in terms of resource allocation (technical human, and financial)? How well were these handled?
5	**Impact** → what difference does the project make ?	p) What is the impact of the project towards resilience building of communities in a mountainous context (lasting effects and behavioural change)? q) How has the project contributed towards innovation, capacity building, policy processes and catalysing implementation? r) What is the potential (today/expected by the end of the phase) for upscaling of the project experience in the IHR and the Himalayan, mountain context? Which are relevant international initiatives /institution for this purpose(e.g. ICIMOD, CDRI)?
6	**Sustainability** → will the benefit last ?	s) Do the outputs have longer-term continuing purpose - will the archived results continue after the project? Why? t) What are the recommendations to make the project results sustainable until the end of the phase and beyond? u) Are there important synergies or complementarities to be considered with relevant/related initiatives (by SDC or other) in view of a future engagement?

Annex 2

Table 3. Acronyms table

3SCA	Strengthening State Strategies for Climate Action (phase
BAFU	Swiss Federal Departement of Environment
CBRI	Central Building Research Institute
CDE	Climate, Environment and Disaster Risk Reduction
CHYN	The Centre for Hydrogeology and Geothermics of University of Neuchâtel
CoEDMM	Centre of Excellence in Disaster Mitigation & Management
CREALP	Centre of Research on Alpine Environement
CSIR-CBRI	Central Building Research Institute (now Building Research Unit)
CSTEP	The Center for Study of Science, Technology and Policy
CWC	Central Water Commission
CWC	Central Water Commision
DAC	Development Assistance Committee
DFE	Forest and Environment Department
DMMC	Disaster Mitigation and Management Centre
DRR	Disaster Risk Reduction
DST	Department of Science and Technology, Government of India
DST-S	Department of Science and Technology, Government of Sikkim
EAWAG	Swiss Federal Institute of Aquatic Science and Technology
EWS	Early Warning System
GLOF	Glacial Lake Outburst Flood
GoHP	Governments of Himachal Pradesh
GoI: JJM	Sanitation Ministry of Jal Shakti, Jal Jeevan Mission, is envisioned to provide safe and adequate drinking water through individual household tap connections
GoL	Governments of Ladakh
GoM	Governments of Manipur
GoS	Government of Sikkim
GoUK	Governments of Uttarakhand
GPCC	E Global Programme Climate Change and Environment
GSI	Geological Survey of India
ICIMOD	The International Centre for Integrated Mountain Development is an intergovernmental knowledge and learning centre working on behalf of the people of the Hindu Kush Himalaya
IDA	International Development Agencies
IHCAP	Indian Himalayas Climate Adaptation Programme
IHR	Indian Himalayan Region
IIRS	Indian Institute of Remote Sensing
IIT Guwahati	The Indian Institute of Technology Guwahati
IIT Mandi	The Indian Institute of Technology Mandi
IIT Roorkee (IITR)	The Indian Institute of Technology Roorkee
ITBP	Indo-Tibetan Border Police

IWMI	International Water Management Institute, research-for-development organization is a Research Center of CGIAR (is a global research partnership for a food-secure future dedicated to transforming food, land, and water systems in a climate crisis.)
LR&DMD	Land Revenue and Disaster Management Department
MFA	Ministry of Foreign Affairs
MHA	Ministry of Home Affair
MoEF	CC Ministry of Environment, Forest and Climate Change
MoEFCC	Ministry of Environment, Forests and Climate Change
MoJS	Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation
MoRD	Ministry of Rural Development
MOSDAC	Meteorological and Oceanographic Satellite Data Archival Centre is a Data Centre of Space Applications Centre (SAC) for satellite data reception
NDMA	National Disaster Management Authority
NDMA	National Disaster Management Authorities
NHPC	National Hydro Electric Power Corporation Limited
NIH	National Institute of Hydrology
NIH	National Institute of Helath
NITI Aayog	resource centre, promoting research and innovation, provide strategic policy vision for the government, and deal with contingent issues. It is supported by an attached office, Development Monitoring and Evaluation Organisation
OECD	Organisation for Economic Co-operation and Development
PIU	Project Implementation Unit
PIU	Project Implementing Unit
PMU	Project Management Unit
PSI	People Science Institute
RDD	Rural Development Department
SAR	Synthetic Aperture Radar
SCA	Strengthening Climate Change Adaptation in Himalayas (phase II)
SD	Sanitary Department
SDC	Swiss Developement and Cooperation
SECCCD	State Environment Conservation and Climate Change Directorate
SIRD	Sikkim Institute for Rural Development
SSDMA	State of Sikkim Disaster Management Authorities
SSPW	Public Work
SSWRD	Sikkim state water resources department
TERI	The Energy and Resources Institute
ToR	Terms of Reference
UNIGE	University of Geneva
UNINE	University of Neuchâtel
UNIZH	University of Zurich
USDMA	Uttarakhand State Disaster Management Authorities
WMD	state line department of Watershed management Directorate
WRM	Water Resources Management
WSL-SLF	SLF Swiss Institute for Snow and Avalanche Research

Annex 3

Table 4. Quantification of the word evaluation according to International Finance Corporation (IFC)

Term	Quantification [%]
highly successful	100-95
successful	80-95
mostly successful	50-80
mostly unsuccessful	20-50
unsuccessful	5-20
highly unsuccessful	0-5

Annex 4

SCA – Debriefing
21.03.2024

Srinivas Chokkakula & Eric Bardou
info@dsm-consulting.ch

1

Introduction

- **Project objectives, a legacy ?**
  - Initial project (IHCAP) → Government of India's request for Swiss expertise (esp. in mountain realm).
  - Phase 1 (3SCA) → assist the state governments to identify and mainstream climate adaptation measures into sectoral programs for the final benefit of local communities.
  - Phase 2 (current) phase (SCA-Himalaya) → concentrate on Himalayan states.
- **Outcomes**
  1. Development and validation of scientific based approaches related to WRM and DRR
  2. Enhanced technical and institutional capacities related to WRM and DRR
  3. Climate resilient approaches get embedded in policies and are replicated

2

The indicators at a glance

Indicators of the review	DRM		WRM		Others
	Sikkim	UK	Sikkim	UK	
Relevance	+++	+++	+++	+++	+++
Coherence	+++	+++	+++	+++	+++
Effectiveness	++	+ +++	+ ++	++	++
Efficiency	+++	++	+++	+++	++
Impact	+++	++	+ ++	+ +++	+++
Sustainability	+++	+++	++	+++	+++

3

Relevance

Between IIT Roorkee and Moldhar/Suldoing Kamling the project spread over two contexts, cooperation and development, this may require involving SEFRI/SECO and SDC skills.

DRM

- Very relevant
- As it is the follow up of previous projects, this question is quite obviously
- This phase goes from research to operational

WRM

- Very relevant
- In Sikkim they also working with RDD before, so continuity is also there
- It is also now in way of operationalization
- Disconnect between states agencies and the projects
- Swiss expertise is hardly provided and the opportunities of exchange with skilled Swiss experts are missed (e.g. isotopic studies)
- One should emphasizes the coordination between hydrogeology and landslides studies

4

Coherence

DRM

- The GLOF support is completely coherent.
- For landslide there is some others donors (British, Japanese, …) that are also working on the topic, as well as CBRI.
- The GLOF open a window of opportunity that must be used. However, the integration with sub-national scale of governance is weak, thus compromising resilience.
- Without the crucial institutionl coordination elements in place, it exposes SDC to reputational risks (e.g. South Lohnak experience).

WRM

- It is mostly coherent
- Springshed is coherent because it embedded into the Dhara Vikas and a long history of springshed management efforts in the IHR
- For glacio-hydrological model is coherent but is made at a scale that does not fit the IWRM perspectives

5

Effectiveness

As such activities requires time to be implemented (acknowledged by GPCCE) and that in each phases there is a shift in paradigm, one should find a way allowing the continuation of previous collaboration.

DRM

- In Sikkim, Swiss support is clearly a success, however the activities take place in a non-logical order (also due to the "Nature"!), some essential tasks should still be done.
- As the consultants couldn't reach Chungthang some observations rely only on ambiguous statements of non experiences staff.
- In Uttarakhand, there is a large discrepancies between the view of officials and what is done in Roorkee (SEFRI and SECO must be involved)

WRM

- Absence of a bridge between science based approaches and the RDD (Dhara Vikas) and F dept. (UK) is having adverse impact on the integration of approaches and scaling up.
- Sikkim and UK pilots contrast in terme of community mobilization and the sustainability (PSI vs. RDD).

6

Efficiency

Overall the project is very efficient, triggering significant investments from the government agencies. The flexibility and responsiveness of SDC impress most of the partners.

DRM

- Situation about GLOF in Sikkim is urgent and support is required.
- In UK the link with IIT Roorkee must be reinforced as via UK government things may be slow and less efficient.
- Again, this would not be feasible without the right institutional linkages in place.

WRM

- Support in hydrogeology from the University of Neuchâtel must be sought (but it is late and it will be delicate to implement smoothly).
- Community involvement is a key, PSI kind of institution are critical for ensuring a better community mobilization and handholding of line dept.
- Isotopic study (and conductivity measures!) must receive an attention right now.

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Impacts

Most of the actions of the project has an impact, however outcome 2 (institutional capacities) will still require attention and time.

DRM

- In Sikkim the impact is obvious.
- In UK, via IIT Roorkee, the impact is obvious.
- In UK, at government level it seems that we are facing some limitations, the needs is not about capacities or resources. It is about Swiss expertise and must be provided in a usable manner.

WRM

- The pilot projects are embedded in ongoing efforts and programs like the Dhara Vikas- clearly impactful.
- No clear trajectory of how the science-based approaches impact implementation. Disconnect between partners.
- In UK, IWRM modelling is not usable due to incoherence with scales of engagement of state institutions, models not useful for operationalization.
- Glacio-hydrological modelling is of immense interest, but suffered from data access and late on-boarding of CWC.

8

Sustainability

Most of the elements of the project are taken by Indian institutions (community seen as an institution) in charge. Therefore, it will be sustainable. There exists some pitfalls

DRM

- In Sikkim no doubts that it will be sustainable.
- In UK, via IIT Roorkee, sustainability is there.

WRM

- Springshed management is mostly sustainable, apart from the community mobilization in Sikkim (measures will stop when the project stops).
- IWRM modeling may not be of interest, but glacio-hydrological modelling can contribute to long-term sustainability with right investments in CWC partnership.

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Entry point

DRM

- Continue to use the window of opportunities in Sikkim, however a better inclusion of the local communities is important.
- Dam operations (creating extensive deposition, but laminating the floods) must be studied (may be with involvement of IIT Roorkee).

WRM

- Looking to model that could fit the needs of the actors for watershed management.
- Springshed need continuation of studies and data acquisition (with a better sharing across the partners, incl. local communities).
- Support from Swiss geologist/hydrogeologist may be an asset
- Training about toolmap software for geological/hydrogeological/geomorphological mapping woud be a nice asset.
- CWC request for a long term partnership in glacio-hydrological modelling along the lines of partnership with DST in earlier phases.

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Big points to ponder

- Disconnect – historical: shift towards operational engagement
- Disconnect: Scale – national vs subnational engagement
- Blind spots - about Indian federal state and institutional linkages
- Partnerships and coordination challenges – a case for a Technical Advisory inputs for PIU.

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