

INDIA

VISHNUGAD PIPALKOTI HYDRO ELECTRIC PROJECT



INVESTIGATION REPORT

JULY 1, 2014

In Memoriam

Alf Morten Jerve (1953 – 2014)

Acknowledgements

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Abbreviations, Acronyms, and Terms

ADB	Asian Development Bank
AHEC	Alternate Hydro Energy Centre
BP	Bank Procedures
BPL	Below Poverty Line
CES	Consulting Engineering Services (India) Private Limited
Cumec	Cubic Meter Per Second
DHI	Danish Hydraulic Institute
DO	Dissolved Oxygen
EA	Environmental Assessment
E-flow	Environmental Flow
EFR	Environmental Flow Requirement
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FDC	Flow Duration Curve
GHG	Greenhouse Gas
GOI	Government of India
GRC	Grievance Redress Committee
Ha.	Hectare
HEP	Hydro Electric Project
HIV/AIDS	Human Immunodeficiency Virus Infection/Acquired Immunodeficiency Syndrome
HRT	Head Race Tunnel
IBRD	International Bank for Reconstruction and Development
ICIMOD	International Centre for Integrated Mountain Development
IDA	International Development Association
IIT-R	Indian Institute of Technology-Roorkee
IMG	Inter-Ministerial Group
INR	Indian Rupee
IPN	Inspection Panel
kWh	kilowatt-hour
MoEF	Ministry of Environment and Forests
MR	Management Response
MW	Megawatt
NGO	Non-Governmental Organization
NGRBA	National Ganga River Basin Authority
NRRP	National Resettlement & Rehabilitation Policy (2007)
OMS	Operational Manual Statement
OP	Operational Policy
PAA	Project Affected Area
PAD	Project Appraisal Document
PAF	Project Affected Family
PAP	Project Affected Person
PIA	Project Influence Area
PIAA	Project Immediate Affected Area

R&R	Resettlement and Rehabilitation
RAP	Rehabilitation Action Plan/Resettlement Action Plan ¹
REA	Regional Environment Assessment
SBMA	Sri Bhubaneshwari Mahila Ashram
SEA	Sectoral Environmental Assessment
SHG	Self-help Group
SIA	Social Impact Assessment
TBM	Tunnel Boring Machine
THDC	Tehri Hydro Development Corporation Limited
TRT	Tail Race Tunnel
VDAC	Village Development Advisory Committee
VPHEP	Vishnugad Pipalkoti Hydro Electric Project
WB	World Bank
WII	Wildlife Institute of India

¹ The RAP has 5 volumes that are alternatively titled Resettlement Action Plan (volumes 1& 4 which are executive summaries of the main document), and Rehabilitation Action Plan (volumes 2 & 5 which are the main documents).

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Executive Summary

Background of the Investigation

1. This report presents the analysis and findings of the Inspection Panel on issues raised by the Request for Inspection relating to the India: Vishnugad Pipalkoti Hydro Electric Project (hereinafter the “Project” or “VPHEP”), received by the Panel on July 23, 2012.
2. The Requesters, with one exception, are residents of Chamoli District, State of Uttarakhand, who state that they reside on the banks of the Alaknanda River and are “*going to be affected by the Vishnugad-Pipalkoti Hydro-electric Project.*” One Requester is a resident of Tehri District, State of Uttarakhand. Some of the Requesters have asked that their identities remain confidential. In line with its mandate, the Panel’s investigation focuses on the World Bank’s compliance with its operational policies and procedures in relation to issues of harm raised by the Requesters that can be linked to the Project.
3. The Request includes a wide range of claims of harm and non-compliance, which are examined in Chapters 2-4 of this Report. The Requesters further elaborated on some of the claims when meeting the Panel during its two missions to India in November 2012 and April-May 2013. The issues of concern raised by communities or the Panel’s experts during the course of the eligibility and investigation visits, indirectly related to but not specifically cited in the Request for Inspection, are being raised in the Report as concerns requiring Management’s attention during monitoring and supervision, rather than as issues of compliance.

Main Claims in the Request

4. The Panel noted in its Report and Recommendation to the Board of Executive Directors (November 26, 2012) that there are two broad sets of claims. The first relates to interests and concerns held by people living in the Alaknanda basin, beyond the immediate area of the Project. These are linked to region-wide impacts attributed to the cascade of hydropower projects (existing and planned) along the Alaknanda in the upper reaches of the river basin, which may be exacerbated by the Project. The key issues are: environmental impacts from construction and operation of multiple dams; cultural and spiritual significance and special qualities of Alaknanda River; and consideration of project externalities.
5. The second set of claims relate to local environmental and socio-economic impacts. Specifically, these refer to the issues of loss of water in surrounding villages, risks relating to structures, landslides and earthquakes, risk to aquatic life and ecology from altered flow, and effects of sediment release. Local socio-economic impacts include: resettlement and restoration of livelihoods, gender impacts and local benefit sharing.

Management Response

6. It is Management’s view that VPHEP is a well prepared project which enjoys wide support from the surrounding community. In general, Management believes that Project “*preparation and mitigation measures for the VPHEP have exceeded normal practices in India*”

and are consistent with Bank policies and procedures and international best practices.” Overall, Management contends that Project documentation and planning address the potential impacts and concerns of the Requesters consistent with Bank policy, and provide an adaptive management approach to address issues that may arise during preparation.

Additional Issues Raised During Panel’s Eligibility Visit

7. In meetings with the Panel team during its eligibility field visit in November 2012, Requesters and other villagers raised three additional issues which had not been stated in the Request for Inspection. These issues related to transmission lines, livelihood concerns of some of the resettled families from Haat, and a concern about the way in which resource sharing induced by the Project contributes to local level conflicts. The Panel included these issues in its Report and Recommendation (eligibility report) of November 2012 which was submitted and approved by the Board of Executive Directors.

8. The Panel recognizes that these issues were raised after the preparation of the Management Response. As a result, the Panel considered these issues as concerns requiring Management’s attention during monitoring and supervision, rather than as issues meriting compliance or non-compliance findings.

The Project

9. The VPHEP is a 444 Megawatt (MW) run-of-the-river hydro power generation project on the Alaknanda, which along with the Bhagirathi, is one of two headstream tributaries of the Ganga River. The Project Development Objectives are: (a) to increase the supply of electricity to India’s national grid through the addition of renewable, low-carbon energy; and (b) to strengthen the institutional capacity of the Borrower with respect to the preparation and implementation of economically, environmentally and socially sustainable hydropower projects. The Project comprises two components, namely construction of the 444 MW hydro electric project (HEP), and technical assistance for capacity building and institutional strengthening at Tehri Hydro Development Corporation (THDC) India Limited, the Project developer.

10. According to the Project Appraisal Document (PAD), the major features of the VPHEP are: a 65-meter-high diversion dam; a 13.4 km headrace tunnel; an underground power house; and a 3 km tailrace tunnel that will return the diverted water to the Alaknanda River. VPHEP is expected to reduce greenhouse gas (GHG) emissions by approximately 1.6 million tons of CO₂ equivalents per year over the plant operation period. It is estimated to generate 1,636 GWh of energy in a 90% dependable year. The Project is financed through an IBRD loan in the amount of \$648 million. The Borrower is the Tehri Hydro Development Corporation (THDC) India Limited and the Guarantor is the Government of India (GOI). The VPHEP is an environmental category ‘A’ project, and the World Bank safeguard policies related to Environmental Assessment (OP 4.01); Natural Habitats (OP 4.04); Physical Cultural Resources (OP 4.11); Involuntary Resettlement (OP 4.12); Forests (OP 4.36); Safety of Dams (OP 4.37); and Projects on International Waterways (OP 7.50) were triggered by the Project.

Context

11. The VPHEP is a run-of-the-river hydroelectric project of standard design and conventional engineering practice. It is not a storage-type project and does not have a large reservoir. Similar scale and style of projects have either already been constructed, or are in various stages of preparation upstream and downstream of its proposed site. It is a relatively modest scale investment within the context of the Indian economy and development efforts. However, the context within which the VPHEP is being implemented is unique in several respects, and this forms the background of the Requesters' claims and thus merits special attention.

12. **First**, the Alaknanda is a headstream tributary of the Ganga River along which several important pilgrimage sites are located; the Ganga is of great spiritual and cultural significance for millions of Hindus.

13. **Second**, the heavy rains of June 2013 resulted in extensive floods and had serious consequences for the upstream Vishnuprayag HEP, as well as for Uttarakhand state as a whole. This heavy rainfall resulted in a sudden increase in water levels giving rise to flash floods in the Mandakini, Alaknanda, Bhagirathi and other river basins. The floods induced by the heavy rains led to landslides that caused unprecedented devastation in Chamoli (where the Project is located), Bageshwar, Pithoragarh, Rudraprayag and Uttarkashi districts.

14. **Third**, in its hearing of the matter of Alaknanda Hydro Power Co. Ltd. vs. Anuj Joshi & Others, of August 13, 2013, the Supreme Court of India noted its concern about the June 2013 Uttarakhand disaster, and its apprehension regarding the development of a large number of HEPs. Consequently, and in light of circumstances described in its Opinion, the court directed the Ministry of Environment and Forests (MoEF) and the State of Uttarakhand to stop granting further environmental and forest clearances for new HEPs and instructed MoEF to establish an Expert Body to prepare a detailed study on whether existing and/or under construction HEPs have contributed to environmental degradation in the Alaknanda and Bhagirathi basins. The Expert Body submitted its Report in April 2014.

Investigation: Panel Findings and Key Observations

Cumulative Impacts

15. The potential cumulative impacts raised in the Request and reiterated to the Panel team during its visits are as follows: environmental impacts from construction and operation of multiple dams on the Alaknanda, and impacts on the cultural significance of the Alaknanda River. The Panel finds that Management complied with the provisions of OP/BP 4.01 by ensuring the preparation of a cumulative impact assessment for the Project and by incorporating the recommended increased minimum environmental flow (e-flow) into the Project to mitigate cultural, religious and biodiversity impacts. However, despite increasing the minimum environmental flow for the Project, the extent to which the cumulative impact assessments influenced other aspects of Project design is not clear.

16. The Panel recognizes Management's statement indicating that additional environmental protection measures based on the recommendations of the cumulative impact assessments will be conveyed to THDC moving forward. The implementation of these recommendations needs close monitoring by Management in view of their importance for the continued sustainability and viability of the Project, in the context of an adaptive management approach. In addition, taking into account the on-going broader debate in India regarding cumulative impacts of hydropower development in the river basin, the Panel notes the importance for the Project of adopting and implementing relevant recommendations which may result from this process.

17. The Panel also recognizes the complexities of coordinated river basin management when multiple HEPs are present, and emphasizes the importance of a mechanism to coordinate river basin management in the Alaknanda.

18. With respect to transmission lines, the Panel understands that the Asian Development Bank (ADB) is financing an integrated power transmission system under its multi-tranche Uttarakhand Power Sector Investment Program. The Panel notes that Project documents do not address the proposed 30 km transmission line which will evacuate power from the Project to the Kuwari Pass pooling station, and also the wider proposed power transmission system in the area. The Panel emphasizes the need for a clarification of both these issues.

Water Loss

19. The Requesters claim that water sources in villages close to the Project construction area are drying up due to tunneling and blasting. The Panel finds that Management complied with OP/BP 4.01 by undertaking the baseline studies to document village water sources along the tunnel alignment routes and ensuring that THDC commits to provide alternative water sources in the event that an existing source is lost. However, in non-compliance with OP/BP 4.01, the Panel finds that the Bank did not identify detailed and adequate mitigation measures that could be operationalized if a water source is lost. The Panel notes the importance of clarifying how alternative water sources will be provided in practical terms to villages for their domestic and irrigation needs, in case this risk of water loss materializes during Project implementation.

Risk relating to Structures, landslides and earthquakes

20. The Requesters claim that construction activity related to the Project has damaged houses and may trigger landslides, which would cause potentially significant harm to homes, villages, farmlands and roads, particularly in the steep mountainside landscape of the region. The Requesters also fear that access road construction along the mountainsides will cause landslides and perhaps even trigger earthquakes in a zone known to have high seismic risks. The Panel notes the steps taken to use Tunnel Boring Machine (TBM) technology to reduce potential harms from vibrations. The Panel finds that this complies with Bank Policy OP/BP 4.01 as a step to reduce or mitigate potential harm.

21. The Panel is concerned, however, regarding the possible generation of "slurry" waste as a result of the use of the TBM in view of its potential for harming the environment and water supply if it leaches into groundwater. The Panel has not been able to find sufficient information

to satisfy itself that the Project will be able to safely dispose of such slurry. The Panel notes the importance of Management clarifying the issue of slurry disposal.

22. The Panel notes that the possibility of storm events and calamities especially on major structures is recognized as a high risk by the Project. The Panel finds that, in compliance with OP/BP 4.37, Management took adequate measures to ensure the preparation of relevant studies by THDC during Project design, appraisal and implementation stages to mitigate the risks raised in the Request. The Panel notes the importance of taking into account and addressing the potential risks raised in the Request in the studies to be prepared during Project implementation.

Risk to aquatic life and ecology

23. The Requesters claim risk to aquatic life and ecology from altered flow and sediment release due to the Project. The Panel finds that in light of the proposed increased e-flow to 15.65 cumecs, the Project is not expected to have an adverse impact on aquatic life and fish populations in the 18 kilometers stretch of the river where the water is diverted into tunnels by the Project. The Panel finds the Project to be in compliance with OP/BP 4.01 with respect to the Requesters' claim about the Project's impacts on fish and aquatic fauna.

24. The Panel notes that an important issue related to sediment movement is that of mass wasting and bedload movement from extreme weather events. The Panel recognizes that Management advised Project authorities of the need to specifically study bedload movement soon after the Bank's engagement in the Project, but found that such an analysis is lacking. The Panel's expert believes it may be necessary to study this aspect to ensure such bedload could be safely passed downstream without damage to the Project and the surrounding areas.

Resettlement and Livelihood Restoration

25. The Panel is of the view that despite the changes in the location of some of the Project infrastructure, and therefore the claim by THDC that Hatsari land is no longer needed, the scale of construction impact in the Hatsari vicinity implies that relocation is the only viable longer term solution. The Project, however, focused too narrowly on offering the "Haat package" to families in Hatsari, without taking into account their different circumstances. The Panel understands that resettlement and rehabilitation efforts are underway and almost half of the eligible families have already received their R&R assistance. However, with respect to Hatsari, the Panel found that the Project RAP does not adequately assess the Hatsari reality in non-compliance with Bank Policy OP/BP 4.12 on Involuntary Resettlement. The Panel recognizes, however, Management's concern for the Hatsari issue to date and the fact that negotiations are still continuing.

26. Regarding the concern raised by some Project affected people in Haat village about diminishing agricultural land after relocation, the Panel understands that livelihood restoration efforts are being carried out by THDC and supported by Management. The Panel notes the importance of the need to closely monitor and examine, as part of RAP implementation and supervision, the impact of these efforts which are aimed at improving the affected population's socio-economic status.

Gender Impacts

27. Two interrelated issues are of relevance here. First, related to livelihoods, is the longer distances that women may have to walk to access forests, and the adequacy of the compensation being provided by the Project to cover for the loss of fuel and fodder. The second issue, pertaining to security and safety of women, is the possible impact of the expected large influx of male laborers into the area.

28. The Panel finds that the THDC Resettlement and Rehabilitation (R&R) Policy covering access to livelihood sources, i.e. fuel and fodder, complies with the requirements of OP/BP 4.01 and OP/BP 4.12. It also notes, however, that monetary compensation does not readily address the concern that with villages being further away, access to forests and greater travel distances (in some cases two more hours) raises heavy additional workload and safety concerns for women during trips to the forests. The Panel acknowledges the gender analysis included as part of the SIA, as required by OP/BP 4.01, which identifies differential impacts on women when a project changes access to resources in fragile ecosystems, which may have unanticipated impacts on women who use those resources. The Panel observes that Project documents propose certain mitigation measures to address these impacts.

29. The Panel also emphasizes that there should be systematic and regular monitoring of the conditions of the labor camps, ensuring that any breaches of agreements and standards are picked up early and not allowed to become serious conflicts between the community and labor. Going forward, the Panel notes the importance of regular supervision missions that may include gender expertise, and public consultation/information to ensure that Bank policy requirements with respect to livelihood restoration are being met, and that women are not disproportionately impacted by any possible shortcomings from changes to their *van panchayat* (community forest) in the process of Project implementation. The Panel notes Management efforts in the area of gender-responsive actions.

Local Benefit Sharing

30. Another socio-economic impact claimed in the Request, and also heard during the Panel visits to the Project area, relates to local benefit sharing, the possibility of conflicts developing over resource sharing in the Project area, and role of the Project's Grievance Redress Mechanism in resolving these conflicts. The Panel notes the importance of careful and appropriate supervision by Management to help ensure that accurate and timely information about benefits and their distribution is provided to communities in the Project area. The Panel notes that THDC has made commendable efforts in livelihood restoration, and that Bank Management has actively supported these efforts. In the Panel's view, these measures are aimed at benefitting local communities affected by hydropower investments, as recommended in "*A Guide for Local Benefit Sharing in Hydropower Projects*."

31. The Panel finds that important efforts are being made to restore the livelihoods of displaced people in accordance with the provisions of OP/BP 4.12. Close monitoring will be required to ensure that these initiatives have a sustained positive impact in the local area. The Panel notes the need for clarity on the use of the 12% royalty payment to the State and of the 1% revenue generated under the National Hydro Benefit Sharing Policy so that Project affected villages and

others that are impacted will benefit. The Panel notes, as Project implementation makes progress, that Management is responsive to OP 4.12, paragraph 13 (b) which requires that infrastructure and public services are provided as necessary to new resettlement sites and host communities to improve, restore, or maintain accessibility and levels of service for the displaced persons and host communities.

32. On the issue relating to community conflicts and the Grievance Redress Mechanism, the Panel finds that the requirement of OP/BP 4.12 to establish an appropriate and accessible grievance mechanism has been met. In accordance with the requirement of OP/BP 4.12, the Panel notes the importance of the Project GRC being accessible to host communities so that their concerns can be heard and resolved when appropriate.

33. The Panel recognizes that Management has undertaken significant actions since the Bank's involvement in the Project to introduce best practices in the context of hydropower development where complex energy, ecological, cultural, and religious values converge. The Panel highlights the introduction of cumulative impacts assessments and adaptive management approaches. For the most part, the Panel has found that the Project has remained in compliance with Bank policies and procedures, apart from some gaps as outlined above.

34. Going forward, the Panel has indicated the need for close supervision and monitoring of several issues. In light of the cascade of hydropower projects and their impact on the people and fragile Himalayan environment, on a river which holds particular significance which is the subject of ongoing national debates, the Panel encourages Management to actively seek measures for closer coordination of projects across the Alaknanda Basin, possibly through a mechanism to coordinate river basin management. Effective supervision can ensure that the innovations introduced bear fruit in a sustainable manner

Chapter 1: Introduction and Background

A. Organization of the Report

1. This report presents the analysis and findings of the Inspection Panel on issues raised by the Request for Inspection relating to the India: Vishnugad Pipalkoti Hydro Electric Project (hereinafter the “Project” or “VPHEP”), received by the Panel on July 23, 2012.²

2. The Requesters, with one exception, are residents of Chamoli District, State of Uttarakhand, who state they live on the banks of the Alaknanda River and are “*going to be affected by the Vishnugad-Pipalkoti Hydro-electric Project.*” One Requester is a resident of Tehri District, State of Uttarakhand. Some of the Requesters have asked that their identities remain confidential. In line with its mandate, the Panel’s investigation focuses on the World Bank’s compliance with its operational policies and procedures in relation to issues of harm raised by the Requesters that can be linked to the Project.

3. The report is comprised of five Chapters:

- Chapter 1 (this Chapter), briefly describes the Project and its background, summarizes the claims made by the Requesters and the Bank’s Management Response and subsequent actions, outlines the context of the Project, and describes the Panel’s investigation process;
- Chapter 2 analyzes the first set of core claims by the Requesters, namely that the Project will contribute to regional and cumulative impacts that have not been adequately assessed and addressed, particularly related to construction and operational impacts from multiple hydropower projects on the Alaknanda River;
- Chapter 3 analyzes the Requester’s second set of core claims, that the Project is likely to cause serious adverse local level environmental impacts including risks to water sources from blasting and tunneling, risks relating to landslides and earthquakes, and risks to aquatic life and ecology from altered flow and sediment release;
- Chapter 4 analyzes the Requester’s third set of claims that the Project is likely to cause serious adverse local socio-economic impacts particularly from resettlement, and gender impacts relating to livelihood and security issues;
- Finally, Chapter 5 provides the main conclusions of the Panel’s investigation and invites Management to respond with measures that might address still unresolved concerns and at the same time, to draw lessons that may be useful in the future.

4. In line with its mandate, the Panel investigation focuses solely on the issues raised by the Request related to allegations of violations of the World Bank’s operational policies and procedures and related harm arising from instances of non-compliance with them.

² The Request for Inspection is available at the Panel website at www.inspectionpanel.org.

B. Issues raised in the Request for Inspection and Management Response

5. Overall, the Requesters state that they do not want the Alaknanda River to be diverted or controlled in any way. The Request includes a wide range of claims of harm and non-compliance, which are elaborated in chapters 2-4 of this report. The Requesters further discussed some of the issues when meeting the Panel during its two missions to India in November 2012 and April-May 2013, respectively.

6. The Panel notes that the Request has two broad sets of claims. The first set relates to interests and concerns held by people living in the Alaknanda basin, including concerns relating to the expansion of hydroelectric infrastructure in this part of India. The second set relates to existing and potential adverse local impacts on the environment and people living in the Project area. The Requesters are also concerned that the main beneficiaries of the Project are electricity consumers who reside outside the Project area, while the Project's negative environmental and social impacts are experienced by the local people. These claims are listed below.

7. **Regional and cumulative impacts.** The first set of claims relate to interests and concerns held by people living in the Alaknanda basin, beyond the immediate area of the Project. These are linked to region wide impacts attributed to the cascade of hydropower projects (existing and planned) along the Alaknanda in the upper reaches of the river basin, which may be increased by the Project. The key issues raised in the Request are:

- **Impacts from construction and operation of multiple dams on the Alaknanda: accelerating environmental change.** The Requesters allege that the Project, in combination with existing, under-construction, and proposed hydropower projects on the Alaknanda and its tributaries, will disrupt the Alaknanda's seasonal flows and accelerate environmental changes. They believe that this will affect the amount of water available in the Alaknanda to a level that is insufficient to maintain an environmental flow. This situation, they believe, will seriously affect the biodiversity of the river and river-dependent habitats, and especially negatively impact migratory fish species. They also raise concerns about the risks associated with multiple (planned and existing) dams in the river basin in the event of major storms.
- **Cultural and spiritual significance and special qualities of Alaknanda water.** The obstruction of the river flow by way of a dam, according to the Requesters, will affect the special qualities of the water of the Alaknanda River and the spiritual significance accorded to it in the Hindu faith. It will diminish, in their view, the unique spiritual cleansing and healing qualities that uninterrupted flow ("*Aviral Dhara*") bestows upon the Alaknanda, and this will also, in their view, interfere with and impair the religious and cultural uses that people currently derive from the river. The Request also alleges that there was inadequate consideration of Project externalities, particularly in light of the potential impacts of the Project at a cumulative level.

8. **Local impacts.** The Request raises the following issues which may have local impacts:

- **Impacts on local water sources.** The Request states that the digging of tunnels in run-of-river projects is causing water sources to dry up. Villagers are concerned that their water supply, which comes from springs and rivulets in the mountainsides above the Alaknanda river, will be (and in some cases alleged to already have been) disrupted or permanently lost due to Project-related blasting and tunneling work.
- **Risk relating to structures, landslides and earthquakes.** Local people are concerned that the Project will trigger landslides due to road construction and blasting. Furthermore, the Project is in a high-risk seismic zone, and the Requesters claim that dams may increase the risk and/or magnitude of earthquakes in this area. There are also concerns that houses may develop cracks as a consequence of construction induced vibrations.
- **Risk to aquatic life and ecology from altered flow and sediment release.** There is concern about whether reduced sediment flow downstream of the dam, due to sediments being caught by the dam's desilting chambers, may impact aquatic and biotic life in the river.
- **Resettlement and restoration of livelihoods.** The Request raises concerns relating to the resettlement option proposed for Hatsari hamlet, located in the area where the proposed powerhouse is to be constructed.
- **Gender-related impacts: Livelihood and security issues.** There are concerns that sources of firewood and fodder for farming dependent households will be permanently diminished or even become unavailable as a result of the Project, and that women will disproportionately bear this burden. In addition, there is concern that women in the area may experience risk of gender-based violence from the influx of mostly male labor and the establishment of labor camps in the vicinity of villages during the construction of the Project.
- **Local benefits.** The Requesters claim that these types of projects transfer access of natural resources from the hands of the poor to the rich, and local people have to bear the negative impact of such projects on the environment while the electricity reaches urban centers. Moreover, they claim there has not been any overall assessment of the impact of the Project on the local people.

9. **Management Response.** Management states that the Government of India requested the World Bank to finance the Project, a “*relatively moderate risk project from an environmental and social perspective,*” in July 2006.³ Management believes that Project “*preparation and mitigation measures for the VPHEP have exceeded normal practices in India and are consistent with Bank policies and procedures and international best practices.*”⁴

³ Management Response, p. 3, para 8.

⁴ “Management Response to Request for Inspection Panel Review of the India: Vishnugad Pipalkoti Hydro Electric Project (IBRD Loan No. 8078-IN)” (World Bank, 2012), para 35.

10. With regard to the first set of claims relating to cumulative impacts, Management is of the view that these issues by and large pertain to a broader debate in India over the development of the Ganga River and its tributaries for hydropower and other economic activities.⁵ This, according to Management, is a debate that “*goes well beyond the underlying project and its compliance with Bank policies and procedures.*”⁶ Management states that a primary concern that has emerged in the debate on hydropower development on the Ganga River is the issue of ensuring adequate environmental flows.⁷ Consequently, in July 2010, the Government of India commissioned two cumulative impact assessment studies which led to the MoEF accepting the recommendation of the Indian Institute of Technology-Roorkee study (hereinafter referred to as the “Roorkee study”) to increase the environmental flow for VPHEP from the previously accepted 3 cubic meters per second (hereinafter referred to as cumeecs) to 15.65 cumeecs. Management notes that the VPHEP environmental flow requirement could be revised again once MoEF accepts the final version of the cumulative impact assessment.⁸

11. Management also notes that the increased figure for minimum environmental flow will address “*aquatic and aesthetic requirements.*”⁹ The minimum flow, according to Management, will also guarantee water is always available in the river, even at times when water levels are naturally at their lowest, thereby ensuring the Project will not interfere with the “*traditional use*” of the river, including the performance of religious rituals downstream.¹⁰

12. With respect to the second set of claims listed above (those relating to local-area impacts), Management is of the view that “(T)he project-related impacts referred to in the Request have been taken into account in the course of project preparation and are being addressed through the appropriate mitigation measures.”¹¹ According to Management, these issues of actual or potential harm either cannot be related to the Project, or for some issues there is insufficient scientific evidence linking them to the Project, or that appropriate mitigation measures are in place. Hence, Management is of the view that the Requesters have no basis to claim that they “*have been or will be directly and adversely affected by a failure of the Bank to implement its policies and procedures.*”¹²

13. Management states that some of the localized impacts raised by residents of the Hatsari Tok hamlet are unrelated to Project activities. Management also states that THDC commissioned a third party technical assessment to assess whether the cracks in houses and drying up of water sources in Hatsari were the result of geological exploratory work, as claimed by the residents, or were caused by the 1999 earthquake. This assessment, according to Management, failed to

⁵ Management Response, p. 8, para 25.

⁶ Management Response, p. 11, para 38.

⁷ The World Bank describes environmental flows as “*the quality, quantity, and timing of water flows required to maintain the components, functions, processes, and resilience of aquatic ecosystems which provide goods and services to people.*” Source: World Bank website <http://water.worldbank.org/topics/environmental-services/environmental-flows> (website reviewed on June 23, 2014).

⁸ Management Response, p. 9, para 28.

⁹ “Project Appraisal Document on a Proposed Loan in the Amount of US\$ 648 Million to THDC India Limited with the Guarantee of the Republic of India for the Vishnugad-Pipalkoti Hydro Electric Project” (Report No: 50298-IN, World Bank, June 10, 2011), Annex 10, para 82.

¹⁰ Management Response, p. 17, para 56.

¹¹ Management Response, p. vii, para 9.

¹² Management Response, p. vii, para 8.

establish a link between the negative impacts claimed and the geological explorations, and THDC has offered to repair the cracks and provide water supply to the hamlet as a measure of goodwill but Hatsari residents have not responded to either of these offers.¹³

14. The Management Response states that Hatsari residents also complained of loss of crops due to exploratory activities and local authorities finalized compensation after assessing the losses. To accept this compensation, Hatsari residents were requested to submit an application and bank details which they had not done. Management also notes that THDC changed the alignment of the access tunnel to the powerhouse in March 2012 to mitigate the alleged potential impacts of the Project in the hamlet.¹⁴ Management states that the Project includes numerous benefits for communities in the Project area that exceed national statutory requirements.¹⁵

15. Management states that THDC has given “*due consideration to impacts on women, including their safety, mobility and livelihood as well as on local culture.*”¹⁶ Management notes that through the SIA process and subsequent consultations, concerns of women have been recorded and reflected in the Project design, including a number of mitigation measures. The main concerns, according to Management, revolved around possible loss of access to *van panchayat* land for collecting fuel and fodder and safety concerns arising from the influx of construction labor.¹⁷ Management further notes that in addition to compensation for food and fodder losses which will be paid by THDC, the civil works contractor will be “*contractually obligated*” to take measures to ensure the safety of women living in villages around the labor camps, including specific provisions such as fenced camps, no use of firewood, etc., to prevent the labor force from accessing community forest lands.¹⁸ Moreover, according to Management, the Project Non-Governmental Organization (NGO), Sri Bhubaneshwari Mahila Ashram (SBMA), is providing trainings in income generating activities to women in project affected villages.¹⁹

16. Management states that the Project continues to enjoy widespread local and regional support. According to Management, consultations with relevant stakeholder groups have been continuous and robust since 2007, and many suggestions from stakeholders were incorporated in the Project design. Moreover, village level consultations, according to Management, are still being carried out on various issues connected to the Project, and will continue during Project construction and operation.²⁰ Management notes that a multi-stakeholder project-level GRC has been established with representation of Project affected people from each of the affected villages.²¹

¹³ Management Response, p. 10, para 37.

¹⁴ Ibid.

¹⁵ Management Response, p. 18, para 65.

¹⁶ Management Response, p.19, para 66.

¹⁷ *Van panchayat* is a specific term which refers to forests governed by local communities, usually administered through a locally elected body.

¹⁸ Management Response, p. 19, para 67.

¹⁹ Management Response, p. 19, para 68.

²⁰ Management Response, p. 16, para 52.

²¹ Management Response, p. 15, para 51.

17. Overall, Management contends that Project documentation and planning address the potential impacts and concerns of the Project consistent with Bank policy. Management also states that the consolidated Environmental Assessment (EA)/ Environmental Management Plan (EMP) commits THDC to an adaptive management approach, whereby any additional regulatory and corrective actions arising from the ongoing review of hydropower development in the country would be incorporated into project design.²²

18. Management's specific responses to individual claims are presented in further detail in the chapters that follow.

C. Additional Issues raised during Panel Eligibility Visit

19. In meetings with the Panel team during its field visit in November 2012 to establish the eligibility of the Request, Requesters and other villagers raised three additional issues which had not been included in the Request for Inspection. These issues related to transmission lines, livelihood concerns of some of the resettled families from Haat, and a concern about the way in which resource sharing induced by the Project contributes to local level conflicts. The Panel included these issues in its Report and Recommendation to the Board.²³

20. With respect to transmission lines, the Panel was told by the Requesters that farm land and forest resources will likely be lost due to the VPHEP's 30km long transmission line, and the cumulative effects of this and other transmissions lines in a proposed power transmission corridor in the area have not been adequately considered by the Project. The Panel also heard concerns during its field visit about whether the resettlement approach adopted for the people of Haat, whose village is being acquired to make way for Project infrastructure, will allow for restoration of their livelihoods. And lastly, villagers who had resettled families living in settlements near them, complained of having to share their public services and natural resources with them without receiving any benefits in return from the Project. These villagers complained that the handling of grievances which stem from Project induced resource sharing was also not adequate.

21. The Panel recognizes that these issues were raised after the preparation of the Management Response. As a result, the Panel considered these issues as concerns requiring Management's attention in monitoring and supervision, rather than as issues meriting compliance analysis. These issues are discussed in the Panel Observations sections in related chapters below.

D. Description of the Project and its Context

22. The Vishnugad Pipalkoti Hydro Electric Project (VPHEP) is a proposed 444 Megawatt (MW) run-of-the-river hydro power generation project on the Alaknanda River, which along with the Bhagirathi River, is one of two major headstream tributaries of the Ganga River. The PAD states that India has an estimated 96,800 MW of undeveloped hydropower potential, which if developed in accordance with good practices, can provide a clean energy source which is well-

²² Management Response, p. 13, para 42.

²³ Inspection Panel, "Report and Recommendation, India: Vishnugad Pipalkoti Hydro Electric Project (IBRD 8078-IN)" (Report No. 73830-IN, November 26, 2012), <http://go.worldbank.org/MID2CD82Y0>.

suited to the country's energy needs, particularly its daily peak demand which is driven by the large number of households, their rising connectivity, and the growth in commercial demand.²⁴

23. The Project Development Objectives are: (a) to increase the supply of electricity to India's national grid through the addition of renewable, low-carbon energy; and (b) strengthen the institutional capacity of the Borrower with respect to the preparation and implementation of economically, environmentally, and socially sustainable hydropower projects.²⁵ The Project comprises two components, namely construction of the 444 MW HEP, and technical assistance for capacity building and institutional strengthening at THDC India Limited, the Project developer.²⁶

24. According to the Project Appraisal Document (PAD), the major features of the VPHEP project infrastructure are: a 65-meter-high diversion dam; a 13.4 km headrace tunnel; an underground power house; and a 3 km tailrace tunnel that will return the diverted water to the Alaknanda River. The major Project infrastructure will be located on the right bank of the Alaknanda River (opposite National Highway 58) in Chamoli District of Uttarakhand. VPHEP is expected to reduce greenhouse gas (GHG) emissions by approximately 1.6 million tons of CO₂ equivalents per year over the plant operation period.²⁷ It is estimated that VPHEP will generate 1,636 GWh of energy in a 90% dependable year.²⁸



Picture 1: Site of diversion dam near Helong village

²⁴ PAD, p. 2, para 5.

²⁵ PAD, p. 8, para 27.

²⁶ PAD, p. 8, para 28.

²⁷ Ibid.

²⁸ PAD, p 8, para 25.

Box 1: Features of Vishnugad-Pipalkoti HEP

Vishnugad Pipalkoti Hydro Electric Project is designed as a 444 MW (4 x 111 MW), run-of-the-river, hydropower generation scheme on the Alaknanda River in Uttarakhand, India. The major features of Project infrastructure are: a 65-meter-high diversion dam near Helong village in Joshimath Tehsil (sub-district); a 13.4-km (8.8 m dia) headrace tunnel; an underground power house, approximately 28 km downstream from the dam site, near Haat village in Chamoli Tehsil; and a 3-km (8.8 m dia) tailrace tunnel that will return the diverted water to the Alaknanda River near Birahi.

VPHEP will utilize the head difference between the point of diversion of the river, some 10.44 km downstream of Joshimath town, to the outfall from its tailrace tunnel at the confluence of the Birahi River with the Alaknanda. It will have a pondage of 3.63 Mm³ capacity at full reservoir level (FRL) 1267 m (from bed level at Elevation Level 1227 m) above the dam. The total catchment area of Alaknanda River above VPHEP is 4672 sq.km.

Other salient Project features, to be located on both the right and left banks of the Alaknanda, are: 3 underground sedimentation chambers, a silt flushing tunnel of size 3.6m x 4.0m, four Adits located at Gulabkoti village (Adit -1), Langsi (Adit-2), Maina Nadi (Adit- 3) and Adit-4 on U/s of Surge Shaft; 4 muck disposal sites at Haat, Siyasain, Jaisal and Gulabkoti villages to contain an estimated volume of 3.1 million m³ of muck, 3 quarry sites (Gulabkoti, Patal Ganga, Garigaon) and 3 Borrow Areas (in Bajipur, Haat and Bhagisera villages), 7 (or 4, PAD gives both numbers) approach/haul roads totaling 25.6 kms, 4 bridges, 2 labor camps (near Gulabkoti and Batula villages), and a Project office at Siyasain village.

Source: Compiled by IPN from information presented in Project Appraisal Document (2011) and Environmental Assessment (2009)

25. The Project is financed through an IBRD loan in the amount of US\$648 million. The Borrower is the Tehri Hydro Development Corporation (THDC) India Limited and the Guarantor is the Government of India (GOI). THDC, a public sector company set up in 1988, is a majority GOI owned joint venture with the Government of Uttar Pradesh in a 3:1 equity share;²⁹ its stated purpose is to develop baseload hydropower potential in Northern India and it is now expanding its operations to develop run-of-river projects, such as VPHEP, which can contribute to peak generation capacity.

26. The VPHEP is an environmental category 'A' project, and the following World Bank safeguard policies were triggered:

- Environmental Assessment (OP/BP 4.01)
- Natural Habitats (OP/BP 4.04)
- Physical Cultural Resources (OP/BP 4.11)
- Involuntary Resettlement (OP/BP 4.12)
- Forests (OP/BP 4.36)
- Safety of Dams (OP/BP 4.37)
- Projects on International Waterways (OP/BP 7.50)

27. **Loan disbursement.** The Project loan was approved by the Board of Directors on June 30, 2011 and is expected to close on December 31, 2017. About 0.25% of the loan had been

²⁹ Please see THDC website at http://thdc.gov.in/English/Scripts/Lookingahead_Futureplan.aspx

disbursed at the time the Request for Inspection was received by the Panel; disbursement had risen to 2.4% by June 2014.

28. **Project status.** The Project is under implementation but because the contract for the main civil works was yet to be awarded, major construction activities had not been undertaken at the time of the Panel's visits. This contract was awarded in December 2013 after the State Government issued the order for the transfer of forest land. Some construction activity related to the THDC office and residential colony, construction of some bridges, tunnels, and access roads, and resettlement of most of Haat village has taken place as outlined in Chapter 4.

29. **Context.** Inadequate power supply remains a critical constraint to India's sustained growth and poverty alleviation efforts. To achieve its goal of universal access to electricity, the GOI has embarked on an ambitious investment program which aims to almost double generation capacity by the end of the 12th Five-Year Plan (2012-2017) period, from 132 Gigawatts (GW: 1,000 Megawatts). During this period, GOI aims to develop about 20,000 MW of hydropower capacity and to increase hydropower's share in the country's total installed generation capacity to 40% from the current 22%.³⁰

30. The VPHEP is a moderate-sized, run-of-the-river hydroelectric project of standard design and conventional engineering practice. It is not a storage-type project and does not have a large reservoir. Similar scale and style of hydro-project developments have either already been constructed, or are in various stages of preparation upstream and downstream of its proposed site,³¹ albeit with some concern downstream,³² and a recent natural disaster upstream.³³ Also, it is a relatively modest scale investment within the context of the Indian economy and development efforts. However, the context within which the VPHEP is being implemented is unique in several respects, and this forms the background to the Requesters' claims and thus merits attention.

31. **First**, the VPHEP is on the Alaknanda, which together with the Bhagirathi River, are headstreams of the River Ganga. The Alaknanda flows past the *Char Dham* pilgrimage shrine of Badrinath (discussed in Chapter 2), and it is also host to the *Panch Prayag* (five confluence) sites, which are considered holy by followers of the Hindu religion.³⁴ In the Hindu religion, the

³⁰ PAD, p. 1 and 2, paras 4 and 5.

³¹ The WII Cumulative Impact Assessment, 2012 (Section 3.1.2, p. 18) states that a total of 38 HEPs both large (>25 MW) and small (<25 MW and >1MW) with a total installed capacity 4163 MW are being planned within the Alaknanda basin. Of these, and eight projects have been commissioned, 10 are under-construction and 20 are proposed projects. The SANDRP report suggests, for both the Alaknanda and Bhagirathi Basins, that the "*Upper Ganga System alone, including Bhagirathi and Alkananda Rivers and their tributaries, till their confluence at Dev Prayag, has more than 130 large and small hydro power dams planned, commissioned and under construction.*" Dams, Rivers and People, Volume 9, Issue 5-6-7, SANDRP.

³² This reference is to the Srinagar Hydro Electric Project, which is about 110 km downstream of VPHEP on the Alaknanda River. Srinagar HEP has been the subject of a petition filed in the Uttarakhand High Court and later in the Supreme Court; the petition highlights the necessity of keeping the Dhari Devi deity at its original spot at the Dhari Devi temple, and that any disturbance to the temple from submergence due to the Srinagar HEP would violate people's right to worship without any hindrance as guaranteed under Article 25 of the Constitution of India.

³³ The Vishnuprayag Hydroelectric Project on the Alaknanda River, approximately 56 km upstream of VPHEP, suffered extensive damages during the June 15-17, 2013 floods.

³⁴ The *Panch Prayag* are (starting from the Alaknanda's origins in the Satopanth glacier and flowing downstream) Vishnu Prayag (confluence of Dhauliganga and Alaknanda rivers), Nand Prayag (confluence of Nandakini and

Prayags are where pilgrims perform *s'nan* (bathing) before worship, carry out *Shraddha* (last rites) for departed souls, and worship the river itself as a manifestation of God. Each Prayag also has individual significance in Hindu mythology with many legends associated with it.

32. **Second**, the heavy rains of June 2013 resulted in extensive floods and had serious consequences for the upstream Vishnuprayag HEP, as well as for Uttarakhand state as a whole. During June 15 to 17, 2013, heavy rainfall (64.5 - 124.4 mm in 24 hours) to very heavy rainfall (124.5– 244.4 mm in 24 hours) hit several parts of the higher reaches of the Himalayas in Uttarakhand, including the Project area.

33. This heavy rainfall resulted in a sudden increase in water levels giving rise to flash floods in the Mandakini, Alaknanda, Bhagirathi and other river basins. Continuous rains and melting of the Chorabari glacier caused waters in the Chorabari Lake to rise. The Lake's weak moraine barrier gave way and a huge volume of water, along with large glacial boulders, came down causing devastation downstream.³⁵ The floods induced by the heavy rains exacerbated landslides in the catchment area with toe-cutting of adjacent hillslopes, which caused unprecedented devastation in Chamoli (where the Project is located), Bageshwar, Pithoragarh, Rudraprayag and Uttarkashi districts.

Box 2: Cloudbursts in the Himalayas

The following is an excerpt from a study about the fragility of the Indian Himalayas, their vulnerability to natural hazards such as extreme weather events, and the impacts on people.

"The Himalaya is considered to be the youngest mountains on the earth, and is tectonically very active, and hence inherently (geologically) vulnerable to hazards. Extreme rainfall events, landslides, debris flows, torrents and flash floods due to failure of natural dams and glacial lakes outburst are the main types of natural hazards in the Himalaya. In most cases, these natural disasters are triggered by extreme weather conditions (high or extreme rainfall events) during monsoon period. The impact of extreme events on the highly vulnerable Himalayan mountain ecosystem is increased by many folds due to inherent geological character, geomorphology (topography), seismicity, land use pattern and other anthropogenic activities. Every year several incidences of hazards are reported from all parts of Indian Himalayan region causing loss [sic] to hundreds of lives (human and animal) along with their property."

Source: Extreme Rainfall Events and Associated Natural Hazards in Alaknanda Valley, Indian Himalayan Region, Varun Joshi and Kireet Kumar, Journal of Mountain Science Vol 3 No 3(2006) : 228-236, Article ID : 1672-6316(2006)03-0228-09

34. The Project itself did not experience any damage given the limited level of construction undertaken at the time. The Requesters also reported that they were safe. However, the upstream Vishnuprayag HEP sustained damages, and several other on-going HEPs and the existing power

Alaknanda rivers), Karn Prayag (confluence of Pindar and Alaknanda rivers), Rudra Prayag (confluence of Mandakini and Alaknanda rivers) and Dev Prayag (confluence of Bhagirathi and Alaknanda rivers).

³⁵ Asian Development Bank, Government of Uttarakhand, and World Bank, "India Uttarakhand Disaster June 2013: Joint Rapid Damage and Needs Assessment Report" (August 2013), p. 18. This report indicates that a total of 580 human lives were lost, more than 5,400 persons were reported missing, 4,200 villages were affected and 3,320 houses were fully damaged. The event also left 70,000 tourists and over a hundred thousand pilgrims stranded in the upper reaches of the state.

distribution system in the state suffered heavy damage, as did the majority of access roads to these HEP sites.³⁶



Picture 2 National Highway 58. Source: Joint Rapid Damage and Needs Assessment Report, WB, ADB, GoUK.

35. **Third**, in its hearing of the matter of Alaknanda Hydro Power Co. Ltd. vs. Anuj Joshi & Others, of August 13, 2013, the Supreme Court of India noted its concern about the June 2013 Uttarakhand disaster, and its apprehension regarding the “*mushrooming of large number of hydroelectric projects in the State of Uttarakhand and its impact on Alaknanda and Bhagirathi River basins.*”³⁷ The Court opined that despite two cumulative impact studies already carried out by MoEF (the Wildlife Institute of India or WII study and Roorkee study), “[t]he cumulative impact of those project components like dams, tunnels, blasting, power-house, muck disposal, mining, deforestation etc. on eco-system, is yet to be scientifically examined.”³⁸

36. Consequently, and in light of circumstances as described in its Opinion, the court directed MoEF and the State of Uttarakhand “*not to grant any further environmental clearance or forest clearance for any hydroelectric power project in the State of Uttarakhand, until further orders,*” and instructed MoEF to establish an Expert Body to prepare “*a detailed study as to whether Hydroelectric power projects existing and under construction in the river basins of Alkananda, Bhagirathi and their tributaries have contributed to environmental degradation and, if so, to what extent and also whether they have contributed to the tragedy that occurred at Uttarakhand in the month of June, 2013.*”³⁹

³⁶ Ibid., p. 62.

³⁷ Supreme Court of India Civil Appellate Jurisdiction, “Civil Appeal No. 6736 of 2013@ (Special Leave Petition (c) no.362 of 2012), Alaknanda Hydro Power Co. Ltd. (Appellant) Versus Anuj Joshi & Ors. (Respondents) with Civil Appeal Nos.6746-6747 of 2013 (Arising out of slp(c) no.5849-5850 of 2012) and t.c. (c) no.55 to 57 of 2013, Judgment” (India: New Delhi, 2013), para 51, https://dl.dropboxusercontent.com/u/90325234/Elist_attachments/ALAKNANDA%20HYDRO%20POWER%20CO.LTD.%20Vs.%20ANUJ%20JOSHI%20%26%20ORS_imgs1.pdf.

³⁸ Ibid., para 44.

³⁹ Government of India Ministry of Environment & Forests (IA.I Division), “No. L-11011/14/2011-IA.I (Vol-II), Order” (October 15, 2013), <http://moef.nic.in/sites/default/files/ia-order-181013.pdf>.

37. The Panel has learned that the Expert Body has submitted its report to GOI on April 16, 2014 and that it is under consideration by the Supreme Court of India.⁴⁰

E. Panel process

38. **Panel's recommendation to investigate.** The Panel reviewed the Request and Management Response, visited India between November 5-11, 2012, and submitted its Report and Recommendation to the Board on November 26, 2012.⁴¹ The Panel determined that the Request met the technical eligibility criteria set forth in the Resolution that established the Inspection Panel and the 1999 Clarification. Furthermore, the Panel noted that the claims in the Request for Inspection raise issues of non-compliance and harm that are of a serious nature, and that there are conflicting assertions between the claims in the Request and the Management Response. The Panel also noted the three additional issues (transmission line, Haat village, and resource sharing and conflicts) in its Report and Recommendation.

39. The Panel recommended an investigation of the matters of policy non-compliance and related harm raised in the Request for Inspection. The investigation would focus on (a) the key concerns of local level harm or potential harm raised in the Request, (b) whether Bank Management complied with applicable policies and procedures during Project preparation with respect to broader issues of potential harm as they relate to the analysis of the project area of influence, cumulative issues and Project externalities.

40. The Panel noted that the investigation would take into account any efforts made by Management to resolve the concerns raised by residents of Hatsari hamlet in the meantime. The Panel stated it would also take into account the on-going national processes with respect to the Ganga River and implications thereof for hydropower development on the Alaknanda River.

41. The Board of Executive Directors approved the Panel's recommendation on December 18, 2012, effective as of March 15, 2013. The relevant documents were disclosed after March 15, 2013, and the Panel commenced its investigation after this date.

42. **Investigation process and methodology.** The Panel conducted a two-part investigation directed by the late Alf Jerve who was then Panel Chairperson and served as the Lead Inspector for the Panel's investigation. The first part involved detailed research into Bank records related to the Project, as well as an extensive review of relevant Project documents. The second part entailed a fact-finding mission to the Project area and interviews with Bank staff involved in the Project. The Panel retained independent experts to assist with the investigation. These experts are Ms. Malavika Chauhan (livelihoods and social aspects), Mr. Dipak Gyawali (hydropower), Mr. Anubrotto Kumar (Dunu) Roy (environment and cumulative impacts).⁴² Subsequent to the

⁴⁰ Summary of recommendations of the Expert Body report "*Report of Expert Committee on Uttarakhand Flood Disaster & Role of HEPs: Welcome recommendations*" prepared by SANDRP on April 29, 2014 and available on its website at: <http://sandrp.wordpress.com/2014/04/29/report-of-expert-committee-on-uttarakhand-flood-disaster-role-of-heps-welcome-recommendations/>

⁴¹ The Panel's Report and Recommendation to the Board of Directors is available on the Panel website at <http://go.worldbank.org/MID2CD82Y0>.

⁴² Biographies of the Panel's experts are attached to this report.

investigation visit, the Panel consulted with expert consultant Mr. Richard Fuggle on issues related to environmental impacts of the Project. Panel member Zeinab Elbakri took over as Lead Inspector for the finalization of the investigation report.

43. A Panel team composed of the late Panel Chairperson Alf Jerve, Panel Member Zeinab Bashir El Bakri, then-Executive Secretary Peter Lallas, Senior Operations Officer Mishka Zaman, and expert consultants Chauhan, Gyawali, and Roy visited India and the Project site during April 22-May 2, 2013. During its visit, the Panel team met with staff of the World Bank country office in Delhi, THDC staff in Pipalkoti and Rishikesh, Requesters, villagers, representatives of non-governmental organizations, and experts in Dehradun, Srinagar and Delhi interested in the issues under investigation.⁴³

⁴³ The Panel team was unable to meet with GOI during its investigation visit as GOI's Ministry of Finance was occupied with Asian Development Bank's 2013 Annual Meetings which were hosted by GOI.

Chapter 2:

The claim that the Project will contribute to regional and cumulative impacts that have not been adequately assessed and addressed

A. Introduction

44. The Request for Inspection expresses concerns about the cumulative impacts of the Project. These involve impacts that may extend beyond the immediate area of the Project and are of concern also to people living outside this area. These impacts are alleged to be caused by the Project in combination with other existing and planned hydro projects in the Alaknanda River basin, and include environmental impacts on aquatic and terrestrial biodiversity, social and cultural impacts from changes in flows that could affect aesthetic, religious and recreational uses of the river, and other physical alterations.

45. The potential cumulative impacts raised in the Request, except for transmission lines as clarified earlier, and reiterated to the Panel team during its visits are as follows:

- **Impacts from construction and operation of multiple dams on the Alaknanda.** These risks relate to the cumulative impact resulting from the construction of multiple dams, flow obstacles, and catchment modifications to the river. They may arise especially from the cumulative impact of extensive drilling, blasting, muck disposal, road building and tunneling in fragile areas on steep mountain-side slopes along a wide stretch of the river. One set of risks is to people and the environment in the event of major storm events, cloudbursts and natural disasters. Other risks include potential impacts on river ecology of altered river flow and sediment flushing through multiple dams, the effects of multiple “reservoirs,” and cumulative impacts on fish.
- **Impacts on the cultural significance of the Alaknanda River.** This Chapter also considers impacts on cultural and religious practices from a cumulative perspective of the proposed cascade of hydropower projects, including the loss of a “*free-flowing river*.”

46. The discussion first presents the Requesters claims and Management Response related to the above issues. This is followed by background information relevant to the consideration of these issues and claims, and the Panel’s observations. The issue of transmission lines as an associated impact of the Project is also discussed below. The final section presents the Panel’s analysis and findings of issues of harm and compliance with Bank policies in relation to these claims and issues, except for transmission lines as explained earlier.

B. Cumulative impacts of multiple dams on the Alaknanda

47. The Alaknanda River has its headwaters high in the Himalayas and flows through mountains, forests, farmlands and villages of Uttarakhand; at Devprayag, the Alaknanda joins the Bhagirathi River to form India's sacred river, the Ganga. From a cultural and religious perspective, the Alaknanda acquires special significance because it flows past the *Char Dham*⁴⁴ shrine of Badrinath.

48. In this section, the Panel focused on whether Bank Management followed Bank Policy on Environmental Assessment in assessing and taking action to address potential impacts on the river.

1. Requesters Claims and Management Response

49. **Requesters Claims.** The Requesters claim that “[t]he effects of building one dam after another on the same river has created several negative impacts. However, no cumulative impact assessment study has been done.” They state that this will lead to several negative cumulative social and environmental impacts. These include changes in environmental flows in the river basin, impacts on fish and biodiversity, as well as the cumulative impact of tunneling, drilling, blasting and road building.

50. The Requesters further claim that these potential cumulative impacts have not been properly taken into account during Project preparation, in non-compliance with Bank policies. The result, they believe, is the prospect of heightened damage to people and the environment along the banks of the Alaknanda. During the Panel team's visit, some Requesters also argued that the overall course of this development pattern linked to multiple dams, while bringing much needed electricity and some employment opportunities, is also dramatically altering the landscape at the expense of other potentially important economic and development opportunities for the region, including ecological, cultural and religious tourism.

51. These claims are briefly discussed below. Some of these claims have also been raised at a Project-specific level and will be discussed in Chapter 3.

- **Drilling, blasting, and tunneling.** The Request raises concerns about the cumulative impact of extensive drilling, blasting and tunneling in fragile areas on steep mountain-side slopes. It is claimed that with the digging of tunnels in the whole river valley, the mountains are weakening and there is an increase in landslides; sources of water are drying up; cracks have appeared in houses making them vulnerable to earthquakes; and the risk of earthquakes increases with the building of so many dams in a highly seismic area. The Requesters also fear that blasting in connection with access road construction for the VPHEP and other HEPs in the region will imperil the already fragile mountains.
- **Changes in river flow and impacts of flushing of sediments on downstream ecology.** The Request raises concerns relating to the cumulative impact of changes in the river flow

⁴⁴ *Char Dhams* are four pilgrimage destinations devout Hindus wish to make at least once in their life time. Badrinath is the northernmost, the other three being Jagannath at Puri in the east, Ramseshwaram at the southern tip of Indian peninsula and Dwarka in Gujarat in the west.

by multiple dams. This includes impacts on downstream river ecology of flushing by multiple dams with high coarse and medium sediment concentrations. The Requesters claim that water flow in the river will be uncertain because its release would be determined by the needs of electricity generation. They contend that adequate environmental flow for maintaining the current ecological status of the river has not been estimated, and because of the diversion of water into tunnels, the river bed will be either dry or will have little water for aquatic life.

- **Reservoir effects.** The Request states that the construction of reservoir-based HEPs on the Alaknanda will turn the flowing water of the river into stagnant reservoir water, which may lead to a reduction of oxygen in the water. The Request also alleges that the VPHEP reservoir will cause fog and disease, and will negatively affect the land upstream of the reservoir.
- **Impacts on Fish.** According to the Requesters, the Project will impact fish at a cumulative level as a result of multiple dams along the Alaknanda River, and also at a local level when water is diverted from the river and passed through turbines. The Panel team was told that this will reduce fish populations on which some villagers rely as a source of their food and livelihoods.
- **Issues related to climate change.** The Request also raises issues relating to the impact of the Project, in combination with other hydro projects on the Alaknanda, on methane gas emissions and climate change. They contend that deforestation has led to an increase in temperature which affects local crops and contributes to global warming, as does emission of methane gas from the reservoirs.
- **E-flow, including the consideration of cultural values.** The Requesters claim that the diversion of river water into tunnels to be constructed for VPHEP, and other tunnel-based HEPs along the Alaknanda, will have potentially serious negative effects on the special qualities of the river that are associated with its cultural and religious significance. These obstructions and diversions, according to the Requesters, will diminish the unique cleansing and healing qualities which are derived from the free flow of the river. The Requesters state this will be the case as the fast flowing water will no longer erode rocks and stones, thereby preventing the creation of sediments which, according to them, will diminish the water's special qualities. To support their claim, the Requesters cite data from a study done by IIT-Roorkee for water quality upstream and downstream of the Vishnuprayag project.⁴⁵

52. The Request also claims that there has been no estimation of the joy of a free-flowing river. The Request claims that the obstructions and diversions of the natural flow will result in a serious loss of aesthetic, non-use spiritual and cultural values of the Alaknanda, which they

⁴⁵ A study presented by the Requesters provides one source of information on this subject. See Request, p. 14-15, reproduced from Indian Institute of Technology Roorkee, Alternate Hydro Energy Center (AHEC), "Assessment of Cumulative Impact of Hydropower Projects in the Alaknanda and Bhagirathi Basins," (2011, Table 6.8, p. 6-21, http://www.indiawaterportal.org/sites/indiawaterportal.org/files/assessment_of_cumulative_impacts_of_hydropower_projects_in_alaknanda_bhagirathi_basin_ahec_iit-roorkee_report_2012.pdf)

assert, have not been considered in the Project's economic analysis.⁴⁶ The Request contains information and examples on methods to quantify the negative impacts of the Project on social and cultural values, and contends that greater effort should have been applied under the Project to assign value to these externalities to create a more accurate reflection of its costs.

53. With respect to the issue of the spirituality of the river and impacts upon it from “*breaking its continuity*,” the Requesters contend that this is a likely cumulative impact of the cascade of existing and proposed hydropower projects along the Alaknanda, including VPHEP. One Requester has presented statements by three of the senior-most spiritual heads (*Shankaracharyas*) from the *Peeths* (seats of learning) of Puri, Sringeri and Dwarka in support of not undertaking any human activity that interferes with the flow of the Ganga.

54. The Requesters also claim that the rights of the local people with respect to the river have not been protected. They believe that once the Project is constructed, there will be no, or not enough, river water available for religious and cultural rituals including bathing festivals, funeral rites and river worship along the stretch of the river where water will be diverted into tunnels.

55. **Management Response.** Management states that the GOI, fully cognizant of the potential impact of multiple projects on a river and of the importance of an understanding of basin-level cumulative impacts in addition to project-level impacts, carried out the first comprehensive cumulative impact assessment of the impacts of hydropower development on a major river system (the upper reaches of the Ganga), consistent with international best practice. This reference is to the Roorkee cumulative impact assessment study which examined the broader environmental impacts of hydropower projects (actual and planned) on the Alaknanda and Bhagirathi Rivers, and the WII study which focused on aquatic and terrestrial biodiversity.⁴⁷ These two institutes of national standing were tasked with studying different aspects of cumulative impacts, delivering their analytical outputs and recommendations over the April 2011 to April 2012 period, which, according to Management, have informed Project design.⁴⁸

56. The Management Response mentions that a petition was filed with India's National Green Tribunal in July 2011 which requested the Tribunal to revoke the first stage forest clearance granted to VPHEP by the MoEF. This petition claimed that the cumulative impact assessment commissioned by the MoEF for the series of hydropower projects along the Bhagirathi and Alaknanda Rivers was not properly conducted and its recommendations could not, therefore, serve as the basis for the forest clearance.⁴⁹ The Tribunal, in its judgment of

⁴⁶ The Request defines non-use value as “*the satisfaction or utility obtained by people from the knowledge that a particular resource exists even though they may not use the resource. People of India derive satisfaction from knowing that River Ganga is flowing freely. This value will be reduced by the Pipalkoti project.*” Request for Inspection, p. 16, section 2.

⁴⁷ Throughout this Report, reference is made to three separate Cumulative Impact Studies: (i) “Large-Scale Hydropower on the Alaknanda River Cumulative Impact Assessment, October 2009, Mott MacDonald” and referred to as the “World Bank cumulative impact assessment report,” (ii) “Assessment of Cumulative Impact of Hydropower Projects in Alaknanda and Bhagirathi Basins. 2011. Indian Institute of Technology at Roorkee” and referred to as the “Roorkee Report,” and (iii) Assessment of Cumulative Impacts of Hydroelectric Projects on Aquatic and Terrestrial Biodiversity in Alaknanda and Bhagirathi Basins, Uttarakhand. 2012. Wildlife Institute of India” and referred to as the “WII Report.”

⁴⁸ Management Response, Annex 1, section 10, p. 31.

⁴⁹ Management Response, p. 5-6, para 19.

December 14, 2011 upheld the first stage forest clearance (and its various conditions) for VPHEP, taking into consideration the nature of the Project and its likely benefits and the comparatively minimal loss of forest cover. Further, the Tribunal commended Project preparation and appreciated the Bank's stringent project preparation norms.⁵⁰

57. As described below, the Management Response addresses several of the Requester's claims from a cumulative perspective. Other claims of a cumulative nature raised in the Request to which Management does not respond from a cumulative perspective are tunneling-induced landslides, flow obstructions in the river, and the effects of multiple existing and proposed reservoirs to be built in connection with HEPs. In these instances, the Management Response provides Project-specific information by citing the Project EA and Project EMP.

58. **Drilling, blasting and tunneling.** Management states that there is no scientific evidence that the tunneling associated with the Project can lead to an increase in the incidence of landslides. Management further notes that the volume of tunneling anticipated for VPHEP is minimal and will have no impact on the integrity of the surrounding mountains.⁵¹ In this context, Management mentions that the Alaknanda River valley has only one completed tunnel (the Vishnuprayag Project) and one tunnel under construction (the Tapovan Vishnugad Project).⁵²

59. **Changes in river flow and impacts of flushing of sediments on downstream ecology.** The Management Response indicates that in evaluating the Project, the Bank took into account the importance of maintaining a free-flowing river, and this aspect was comprehensively assessed through a study on Managed River Flows, which forms part of the Project EA.⁵³

60. According to Management, the minimum e-flow requirement (EFR) of 15.65 cumecs⁵⁴ "mandated" in this Project will assure continuous water flow in the river, even at the driest time of year.⁵⁵ Moreover, Management states that the GOI reserves the right to further amend the environmental flow requirement in the future.⁵⁶ In addition to the 15.65 cumecs, Management states that the river flows downstream of the diversion dam will be augmented by natural inflows from tributaries as well as the water which will be released through the spillway gates during the monsoon when the natural flow will exceed the discharge capacity of the tunnel and turbines.

61. Management states that the EA found no evidence to suggest that there will be any negative impact on critical aquatic biodiversity as a result of the Project.⁵⁷ Management also states that potential impacts on aquatic and terrestrial biodiversity in the Alaknanda and Bhagirathi basins have been studied in the WII cumulative impact assessment commissioned by the GOI.⁵⁸

⁵⁰ Management Response, Annex 1, p. 30-31, para 9.

⁵¹ Management Response, Annex 1, section 16, p. 37.

⁵² Management Response, Annex 1, section 16, p. 37.

⁵³ Management Response, Annex 1, Section 6, p. 28.

⁵⁴ The cumec is a measure of flow rate, as shorthand for "cubic metre per second"

⁵⁵ Management Response, p. 14, para 47.

⁵⁶ Management Response, Annex 1, section 12, p. 35.

⁵⁷ Management Response, Annex 1, section 8, p. 30.

⁵⁸ Management Response, p. 8, para 27.

62. Management states that the EA has concluded that the Project will have no appreciable negative impact on water quality whether during construction and/or operation.⁵⁹ In addition, during construction, the Project will implement a muck disposal plan which, according to Management, includes safe disposal of all the debris and silt generated from the tunneling and construction works, thereby preventing debris from being dumped into the river or affecting water quality during construction.⁶⁰

63. **Reservoir effects.** Management states that VPHEP is designed as a run-of-river project with a small reservoir of gross storage of 3.63 million cubic meters, with capacity to store up to 5 hours of average flow, with an average residence time of 1.75 hours. Management therefore believes the Project does not require significant, long-term impoundment of water⁶¹ and will not create any health impacts or cause fog.⁶²

64. **Impacts on Fish.** The Management Response states that the e-flow recommended for the Project will ensure that water is always available in the river to support aquatic life. Moreover, Management states that the Project EA identified the *mahaseer* as a fish species of significance in the influence area of the Project, but the Project itself will not have any impact on the *mahaseer* and its migration route.⁶³ Moreover, Management highlights some mitigation efforts, such as a Fish Management Plan to be prepared in consultation with the Uttarakhand State Fisheries Department and funded by the Project EMP.⁶⁴ The Response states that none of the Project affected households reported a dependence on the river for their livelihoods, and that the SIA also concluded that none of the households reported a dependence on the river for sand quarrying or fishing.⁶⁵

65. **Issues related to Climate Change.** Management states that the Project is not contributing to deforestation. On the contrary, the Project will undertake compensatory afforestation for every hectare of forest, grazing and *van panchayat* (community forest) land transferred to the Project.⁶⁶

66. The Management Response further states that there is no evidence of a rise in temperature due to dams in Uttarakhand,⁶⁷ or that dams in the Himalayas are causing increased methane emissions.⁶⁸ Management states that methane emissions from reservoirs are more

⁵⁹ Management Response, p. 17, para 58.

⁶⁰ Ibid.

⁶¹ Management Response, Annex 1, p. 46, section 37.

⁶² Management Response, Annex 1, p. 35-36, section 14.

⁶³ Management Response, Annex 1, p. 33, section 11.

⁶⁴ These include: setting up of a hatchery for snow trout; steps to improve the propagation of *mahaseer*; measures to improve vegetation cover on the banks of the Birahi River which has been identified as the habitat of vulnerable fish species; supporting the ongoing efforts of relevant fisheries' institutions to divert the migration route of the *mahaseer* to the Birahi River; and controlling extraction of sand, pebbles, gravels and stones from the Alaknanda River. See Management Response, section 12, p. 34.

⁶⁵ Management Response, p. 18, para 63.

⁶⁶ Management Response, p. 18, para 62. The EMP (section 4.3.2, p. 5) states that compensatory afforestation, financed by THDC, will be carried out by the State Forest Department in the Project Influence Area (i.e. 7km around Project sites)

⁶⁷ Management Response, Annex 1, section 21, p. 39.

⁶⁸ Management Response, Annex 1, section 23, p. 40.

typically from a combination of relatively shallow reservoirs with very long residence times with large submerged biomass, in tropical and sub-tropical locations. The small pond created by the Project, according to Management, corresponds to none of these criteria.⁶⁹ Management also states that the Project, in using hydropower, provides a less carbon-intensive form of energy production than others, and hence can be considered beneficial in respect to the concern of climate change.

67. **E-flow, including the consideration of cultural values.** Management considers that the issue of the impacts on the spiritual and religious qualities of the Alaknanda and Ganga extend well beyond the Project. The Management Response asserts that the 15.65 cumecs e-flow requirement of the Project took into consideration the cumulative impact of a series of projects along the same river.⁷⁰ Management also notes that the e-flow of 15.65 cumecs will ensure that water flows will always be available, even at the time of year when the flows are naturally lowest.⁷¹

68. With respect to the valuation of Project externalities, Management contends that the Bank considered the potentially adverse externalities of the Project by including the 15.65 cumecs e-flow requirement in the economic analysis of the Project. Furthermore, the Management Response states that the environmental flow requirement for the Project can be viewed as a composite measure of the value that society as a whole accords to preserving the river in its natural state as opposed to using the river for other purposes.⁷² Management also states that a study of the non-use value is not required under the operational policies triggered by the Project, and the Project EA and EMP considered the use value (direct and indirect) of the river, and analyzed the potential effect of the Project on these values.⁷³ Moreover, Management states that the “*value of a free-flowing river*” is an example of a value that can be posited but which is difficult or impossible to measure with existing data or contingent valuations methods in general, as many “*methodological pitfalls*” exist with respect to valuing such non-use externalities.⁷⁴

69. With respect to local religious customs and uses of the river, Management states in its Response that a guiding principle of Project preparation was to respect local customs and protect the rights of the people living in the Project area.⁷⁵ According to Management, for example, the impact on the cremation *ghat* at village Haat was completely avoided through a re-design of the Project layout, and THDC has invited tenders for constructing a new cremation *ghat* in place of the existing one at Gulabkoti village.⁷⁶

⁶⁹ Management Response, Annex 1, section 23, p. 39-40.

⁷⁰ Management Response, para 47, p. 14.

⁷¹ Management Response, Annex 1, p. 26-27, No. 5.

⁷² Management Response, para 47, p. 14.

⁷³ Management Response, Annex 1, p. 43, section 28.

⁷⁴ Management Response, Annex 1, p. 28, section 6.

⁷⁵ Management Response, Annex 1, p. 26, section 5.

⁷⁶ Management Response, Annex 1, p. 26-27, section 5.

2. Panel observations and analysis

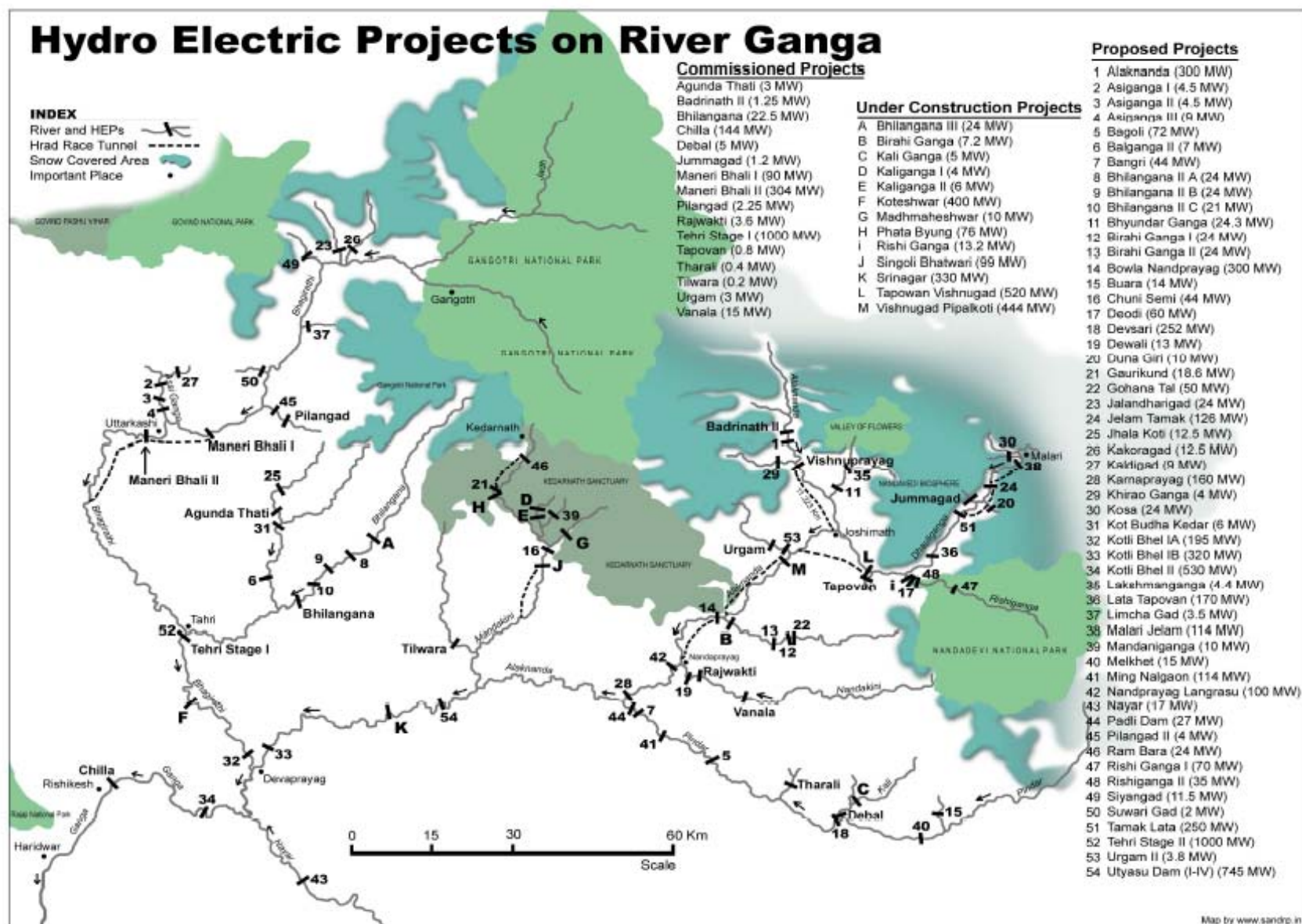
2.1 Link between the Project and harm or potential harm

70. **Existing and planned hydro projects in the Alaknanda Basin.** Management states that if India's estimated 96,800 MW of undeveloped hydropower potential is developed "*. . . in accordance with good practice, this untapped potential can provide a clean energy source which is well-suited to the country's energy needs.*" In Uttarakhand, Management estimates hydropower potential of 18,000 MW, of which 18% has been developed, mostly before the state was created in the year 2000. The WII Report states that about 3,164 MW (16% approx.) of Uttarakhand's hydro potential will be harnessed through 45 projects.⁷⁷

71. The map reproduced here, entitled "*Hydro Electric Projects on River Ganga*" illustrates the number of existing, planned or proposed hydro projects in both the Alaknanda and Bhagirathi basins.⁷⁸ It divides these into Commissioned Projects, Under Construction Projects, and Proposed Projects. Some are quite small, while others are larger. The total number of dams illustrated on this map that fall in these three categories is 83.

⁷⁷ Assessment of Cumulative Impacts of Hydroelectric Projects on Aquatic and Terrestrial Biodiversity in Alaknanda and Bhagirathi Basins, Uttarakhand, Wildlife Institute of India (WII), 2012, Section 1.1, p. 2.

⁷⁸ Map prepared by South Asia Network on Rivers, Dams, and People (SANDRP), www.sandrp.in. The WII study references this map, and also mentions that a total of 70 Hydro Electric Projects both large (>25 MW) and small (<25 MW and >1MW) with a total installed capacity 9563 MW are being planned within the Alaknanda and Bhagirathi basins (WII, Section 3.2, p. 18).



72. The length of the Alaknanda River, from its origins in the Satopanth and Bhagirath Kharak glaciers near Badrinath to its confluence with the Bhagirathi River at Devprayag is 224 kms. The main tributaries of the Alaknanda are the Nandakini, Pindar, Dhauliganga, Mandakini, and Birahi Rivers, and several smaller streams join it at various points. A total of 38 HEPs both large (greater than 25 MW) and small (less than 25 MW and greater than 1MW), with a total installed capacity 4,163 MW are being planned within the Alaknanda basin.⁷⁹ According to the WII Report, “*allotted hydropower development*” will cause 27% of the length of the Alaknanda River to be diverted, and the portions of the water diverted will flow submerged for 21% of its length.⁸⁰ The Project EA (2009) lists 9 HEPs that were “*expected to come up upstream and downstream of VPHEP*” on the Alaknanda River.⁸¹

73. **Cultural and Spiritual Significance.** A key consideration, as discussed in Chapter 1, is that the Project is on the Alaknanda River, which has spiritual significance as it is a headstream tributary of the Ganga, flows past the *Char Dham* pilgrimage shrine of Badrinath, and hosts the *Panch Prayag*. As such, potential cumulative effects in the Alaknanda basin merit special attention and consideration, as their implications extend far beyond the immediate confines of the Project vicinity.

74. Management has noted that cultural and spiritual issues attained national significance in 2008 when religious and environmental civil society organizations demanded the cancellation of 3 hydropower projects (none of which involved Bank financing) on the Bhagirathi River.⁸² Also, in November 2008, in recognition of the significance of the Ganga, the Prime Minister declared the Ganga a “national river” and in February 2009 the Prime Minister established the National Ganga River Basin Authority (NGRBA) whose mandate is to ensure effective abatement of pollution and conservation of the Ganga and maintaining minimum ecological flows.⁸³

75. **June 2013 Floods.** As described in Chapter 1, heavy rainfall and resulting floods in June 2013 caused loss of life and major damage to property and existing dams on the Alaknanda River, attributed by some to the impact of either construction muck that was dumped in the rivers or from landslides triggered by tunnel and road construction.⁸⁴ The Supreme Court of India ordered in its judgement of August 13, 2013 that a study be conducted by an Expert Body

⁷⁹ WII Cumulative Impact Assessment, Section 3.1.2, p. 18.

⁸⁰ WII Cumulative Impact Assessment, Table 3.5 “*Affected lengths of Bhagirathi and Alaknanda river and its tributaries due to allotted hydropower development*,” p. 25.

⁸¹ Environmental Studies for Vishnugad Pipalkoti Hydro Electric Project, Final Report, Consolidated Environmental Assessment (EA), Consulting Engineering Services (India) Private Limited (CES), Volume 1, November 2009, (hereinafter referred to as EA), Section 1.9, p. 18. The proposed upstream projects listed in the EA are (i) Tapovan Vishnugad (Dhauli Ganga River), (ii) Lata Tapovan (Dhauli Ganga River), (iii) Vishnu Prayag Scheme Alaknanda River- Badrinath HPP, (iv) Malari Jhelum (Dhauliganga), and (v) Jhelum Tamak (Dhauliganga). The proposed downstream projects listed are (i) Bowala Nand Prayag Hydro Electric Project (Alaknanda River), (ii) Nand Prayag-Langasu (Alaknanda River), (iii) Utvasu Dam (Alaknanda River), and (iv) Srinagar Hydro Electric Project (Alaknanda River).

⁸² These were the Loharinag-Pala Hydel Project, Pala Maneri Hydel Project, and Bhaironghati Hydel Project in Uttarakhand.

⁸³ NGRBA Annual Plan, 2012-13, Chapter 1: Overview & Summary of Annual Plan 2012-13. Available at: <http://moef.nic.in/sites/default/files/ngrba/annualplan-ngrba-2012-13.pdf>

⁸⁴ Sati, S.P. “Preliminary assessment of the cause of devastation around Srinagar Township by the Alaknanda flashflood event of June 2013,” Department of Geology, HNB Garhwal University, Srinagar Garhwal

to examine the role of hydropower projects in the devastating floods of June 2013. The recommendations of this Expert Body are presented below.

76. All of the above considerations and events underscore the importance of considering the various types of impacts from hydro power development in the Alaknanda River from a cumulative perspective.

2.2 Assessment of the issues in Project and other documents

77. During the course of the preparation of the Project, three studies looking at the cumulative impacts of HEPs on the Alaknanda basin were commissioned. These studies, and other relevant Project documents, are discussed below.

78. **The Consolidated Project EA 2009.** THDC originally prepared a Project EA in 2006. In 2007, MoEF had provided the environmental clearance for the Project based on the 3 cumecs minimum environmental flow recommended by this EA.⁸⁵ When the World Bank became engaged in the Project, it advised the Government to conduct additional studies in light of World Bank policy requirements. A consolidated Project EA with additional studies was completed in November 2009. The Consolidated EA referred to potential impacts on river ecology and the carrying capacity of the river, and proposed a minimum environmental flow of 3 cumecs.

79. **Cumulative Impact Assessment commissioned by World Bank.** During the preparation of the Project EA, the Bank took the additional step of commissioning a cumulative impact assessment of the impacts of large-scale hydropower development on the Alaknanda River.⁸⁶ The ToRs of this study, state that the study *“is a component of the Bank's due diligence that it will carry out in determining the suitability of VPHEP for Bank finance; more broadly, it is hoped that the study will contribute to efforts to ensure the long-term economic, social and environmental sustainability of the significant investments being made in hydropower generation in the Alaknanda Basin.”*⁸⁷

80. The ToRs note that the Alaknanda is dotted with numerous Hindu shrines and the major pilgrimage center of Badrinath lies near the river's head. It states that the Alaknanda is also known for adventure sports like rafting, and that *“[i]f all of the projects planned on the Alaknanda River and its tributaries are developed, the impact on the river and life in and around the river will be profound.”*⁸⁸

81. This study considered the possible cumulative impacts of hydropower development with respect to several key themes, including: river flow and water quality; landscape and biodiversity; settlements and social infrastructure; sacred sites and tourism; employment and economic development; and energy project income and revenue. According to Management, the

⁸⁵ Vishnugad-Pipalkoti HEP (4/111) MW in Uttarakhand - Environment clearance, Letter No. J-12011/29/2007-IA.I, dated 22.08.2007, Ministry of Environment and Forests, Government of India.

⁸⁶ Large-Scale Hydropower on the Alaknanda River Cumulative Impact Assessment, October 2009, Prepared by Mott MacDonald for World Bank.

⁸⁷ Terms of Reference “Analysis of the Cumulative Impacts of Large-Scale Hydropower Development on the Alaknanda River in Uttarakhand,” World Bank, 2009), p. 2

⁸⁸ Ibid, p. 2.

cumulative impact assessment was based on scenario analysis derived from the current development plans for the Alaknanda River, and considered “*positive as well as negative impacts of the expected development of numerous hydropower projects in the Alaknanda River Valley.*”⁸⁹

82. The Bank formally submitted this study to the Government of Uttarakhand in November 2009. The PAD refers to this study as a response to the risk of “[d]eficiencies in river basin planning, particularly with respect to hydro power projects.”⁹⁰ However, this study was not pursued further because in the same period (roughly July 2010), the Government of India (GOI) commissioned two cumulative impact assessment studies of hydro projects in the Alaknanda and Bhagirathi Basins: the Roorkee study and the WII study⁹¹. Management informed the Panel during interviews that the Bank deferred to this national process as it was part of a broader dialogue that was emerging in India about the wider and cumulative impacts of the many proposed hydro projects on the rivers that were part of and flowed into the Ganga.

83. **Cumulative Impact Assessments commissioned by GOI.** In February 2009, the Supreme Court of India, in response to a citizens petition, asked for a comprehensive study of the foreseeable cumulative impacts of the existing and planned dam projects on communities, river systems, and local and regional ecosystems.⁹² On July 14, 2010 the Government of India, through the MoEF, assigned the IIT-Roorkee and the WII to study the cumulative impacts of commissioned, under construction and proposed HEPs in the Bhagirathi and Alaknanda River basins in Uttarakhand. During its field visits, the Panel met with community groups, citizens, activists and religious leaders who also described some of these events, including acts of demonstration and protest, that took place in those years and which contributed to the decision to commission the Roorkee and WII studies.

84. **IIT-Roorkee study.** The Alternate Hydro Energy Centre (AHEC) at IIT-Roorkee was tasked with studying the cumulative environmental impacts of hydroelectric projects in the Bhagirathi and Alaknanda basins. The Roorkee study, released in April 2011, covers aspects related to impact assessments, geology and seismology, soil erosion and sedimentation, hydrological aspects, hydropower related aspects, environment and biodiversity, religious and social aspects, and monitoring and construction related aspects. The study offers a number of recommendations on each of these issues. Of relevance to the Panel’s investigation is the fact that the Environmental Clearance provided by MoEF to the VPHEP states that the earlier Environmental Flow Requirement (EFR) of 3 cumecs was raised to 15.65 cumecs “...in the light of the recommendations of a study on Cumulative Impact of Hydropower Projects in Alaknanda

⁸⁹ “Assessment of the Cumulative Impact of Hydropower Development on the Alaknanda River,” (Letter from World Bank New Delhi Office to Principal Secretary (Energy) at Government of Uttarakhand, November 16, 2009). The Bank also offered to “facilitate a round table of stakeholders in Dehradun” at which the assessment could be presented along with other issues of relevance to the hydropower development program of Uttarakhand. This study was circulated internally within the Bank to ensure that the “findings have been incorporated in the draft PAD and ESA.” World Bank correspondence dated 08/29/2009.

⁹⁰ PAD: Table 1-Key Governance Risks and Mitigation Steps (p.149).

⁹¹ Management Response, p. 8, para 27.

⁹² “Brief Note on Need and Scope of Study On Cumulative Environmental Impact of Various Hydro Electric Projects Particularly On the Riverine Eco System Etc To Be Undertaken by the Wildlife Institute of India,” Appendix-2.1, WII Study. Reference is made in this Brief Note to the Supreme Court of India, Order dated 30.02.2009, which triggered certain processes (as mentioned in the Brief Note) which culminated in the IIT-Roorkee Cumulative Impact Assessment (2011) and the WII Cumulative Impact Assessment Study (2012).

*and Bhagirathi Basins up to Devprayag on environment, which was sponsored by this Ministry to IIT- Roorkee. These recommendations are further being examined in MoEF.”*⁹³

85. According to the Roorkee study, environmental flow requirements of rivers depend on a number of factors, including: size of the river, natural state of the river, ‘type’ or perceived sensitivity, the desired state of the river, and uses of river water. The study later notes that EFR “*are based on the integration of hydrological, hydraulic and biological response data.*”⁹⁴ It cites numerous other studies and approaches to the EFR issue, including that of Shofiul Islam (2008) which “*presented a methodology which deals on human well-being, river functions and their relation with river flow based in Asian environment,*” with an emphasis on looking at flow requirements from “*people perspectives.*”⁹⁵

86. On the basis of its analysis, the Roorkee study arrived at a new and much higher recommendation for the minimum e-flow that should be associated with the VPHEP. Specifically, it recommended raising e-flow from 3 cumecs (as suggested in the Consolidated Project EA) to 15.65 cumecs, a 5-fold increase.⁹⁶

87. **WII study.** The WII study was issued in April 2012. The study was tasked with assessing the baseline status of rare, endangered and threatened (RET) species, identify critically important habitats likely to be impacted by existing and planned projects, delineate river stretches for conservation of RET aquatic species, and assess key habitat variables for RETs. This study specifically recommended that 24 of the 39 proposed projects in the two basins be re-evaluated (it should be noted that VPHEP is not included in this list of 24 HEPs).⁹⁷

88. **Inter-Ministerial Group (IMG) (Chaturvedi) Report.** After receiving the Roorkee and WII studies, which had different areas of focus, the Prime Minister of India constituted an IMG, also known as the Chaturvedi Committee led by a Member of the Planning Commission, to examine key issues in the use of the Ganga for large hydropower development, including societal trade-offs, and to put forward recommendations for consideration by the GOI. The Chaturvedi Committee was also tasked with reconciling any possible discrepancies in the recommendations of the Roorkee and WII studies.⁹⁸ The Chaturvedi Committee submitted its report to MoEF in April 2013. The recommendations of this Committee have been presented in the media and other online sources, although the report has not been officially released.

89. **Supreme Court decision and Expert Body report.** The Panel notes, as mentioned in Chapter 1, that the August 13, 2013 Supreme Court decision led to the setting up of another high level, multi-disciplinary Expert Body which was to study whether existing and under-construction HEPs in the Alaknanda and Bhagirathi River basins may have contributed to environmental degradation and especially the floods that occurred in Uttarakhand in June, 2013.

⁹³ Vishnugad-Pipalkoti 4x111 MW HEP in Pipalkoti of Chamoli District in Uttaranchal by M/s Tehri Hydro Development Corporation Limited – Revision in Environmental Clearance regarding., Ministry of Environment and Forests, Government of India, File No. J-12011/29/2007-IA-I, 31st May, 2011.

⁹⁴ IIT-Roorkee, p. 7-24.

⁹⁵ IIT-Roorkee, p. 7-28.

⁹⁶ IIT-Roorkee, chapter 7, p. 7-47, Table 7.16.

⁹⁷ WII, p. 184, Category – III: Proposed projects

⁹⁸ Management Response, para 30, p. 9.

The report of this Expert Body, titled “*Assessment of Environmental Degradation and Impact of Hydroelectric Projects During the June 2013 Disaster in Uttarakhand*,” which may have implications for future dam construction in the Alaknanda basin, was submitted to the Supreme Court in April 2014.

90. The Expert Body concluded that of the 24 proposed HEPs that the WII recommended for review (we note again that the VPHEP is not on this list), 23 HEPs would have significant irreversible impacts on biodiversity values. The Expert Body recommended that these 23 HEPs not be considered for construction if they fall inside wildlife Protected Areas such as National Parks and Wildlife Sanctuaries, fall within the Gangotri Eco-sensitive Zone, fall above 2,500m (as such zones are fragile in nature due to unpredictable glacial and para-glacial activities), or may be located in areas that encompass critical wildlife habitats, possess high biological diversity, are movement corridors, or fall within 10 km from the boundary of Protected Areas and have not obtained clearance from the National Board for Wildlife.⁹⁹

91. Other relevant recommendations of the Expert Body include a recommendation that Social Impact Assessments (SIAs) should be carried out for all river systems in Uttarakhand, that the distance between projects in a cascade should be significantly revised upward from the current consideration of 1 km, that a National Himalayan Policy be developed, that a study of sediment transportation of projects existing on Himalayan rivers be carried out, that the Ministry of Culture along with the local representatives and spiritual leaders should undertake a comprehensive study of the cultural impacts of HEPs in the spiritually rich state of Uttarakhand, that technically sound and ecologically sustainable methods for muck disposal and rehabilitation in Uttarakhand be developed, and that e-flows of 50% during the lean season and 30% during the remaining non-monsoon months be maintained by all projects until such time as the India Institutes of Technology (IITs) Consortium report on River Basin Planning is released.¹⁰⁰

92. **The Project Appraisal Document.** The Bank’s Project Appraisal Document (PAD) refers to the MoEF commissioned Roorkee study. It notes that on the basis of this study, MoEF raised the downstream flow requirement of the Project from the 3 cumecs that was stipulated in MoEF’s environmental clearance of August 2007, to 15.65 cumecs stipulated on May 31, 2011. The PAD also mentions that additional environmental protection measures are under consideration based on the recommendations of the cumulative impact assessment and related wildlife study, and that these will be conveyed to THDC before the Project comes online.¹⁰¹

93. The PAD’s analysis of Risks and Mitigation Measures refers to broader reputational risks of the Project. It mentions two factors: (1) “*Cultural-religious sensitivities*” associated with Ganga (of which the Alaknanda is a tributary); and (2) “*Negative attention from activists/NGOs*” opposed to hydropower development in general. The PAD proposes mitigation measures related to “*good social and environmental management practices*,” such as ensuring adequate river flow to allow rituals to be conducted, consultations and communications with stakeholders (Project Affected Persons, non-governmental organizations, civil society organizations, media, etc.),

⁹⁹ See: <https://sandrp.wordpress.com/2014/04/29/report-of-expert-committee-on-uttarakhand-flood-disaster-role-of-heps-welcome-recommendations/>. The recommendations of the Expert Body report have been presented in the media and other online sources.

¹⁰⁰ Ibid.

¹⁰¹ PAD, p. 26, para 69.

enhanced transparency and disclosure around the Project, and third-party monitoring of environmental and social issues.¹⁰²

94. With regard to quantifying the non-use values of the river (existence, spiritual, aesthetic), the PAD states that the economic evaluation of VPHEP is based on cost-benefit methodology which includes a calculation of the direct and quantifiable welfare benefits of the Project on beneficiaries. The World Bank cumulative impact assessment report and Roorkee Report also discuss the religious and cultural significance of the Alaknanda River.

95. **Panel observations.** The sections below provide the Panel's observations on some of the cumulative impacts associated with hydropower development in the Alaknanda basin in the context of this Project, and the issue of transmission lines.

96. During its field visit and meetings, the Requesters, villagers, and members of civil society met by the Panel team did not question the need for electricity. However, they expressed concerns about the broader environmental and social implications of VPHEP in the context of a series of other dams being constructed along the river.

97. **Drilling, blasting and tunneling.** Along the Alaknanda River, 68 km, translating into 37% of the river's length, would be affected by current and planned hydropower developments.¹⁰³ The Roorkee study predicts that as much as 27% of the Alaknanda River length would be affected by water diversion into tunnels.¹⁰⁴ The total length of tunnels from all proposed projects on the Alaknanda would be 74.38 km with an estimated construction period of 247 months in which blasting would occur, if this construction method is used.¹⁰⁵

98. The discussion in Chapter 3 of this Report notes the impacts that drilling, blasting and tunneling associated with the Project could trigger in the local area. During its drive along the stretch of the river downstream of the proposed dam site, local people pointed out to the Panel team areas of the mountainsides where they believed that Project-related road construction had triggered landslides. The Panel was also informed that one village (Chayeen) had been covered by a landslide after construction had started on the upstream Vishnuprayag HEP and that there has been an increase in the occurrence of landslides in the past decade. Villagers also related this to changing rain fall patterns, with fewer rain days and more intense downpours (described as "cloud bursts.").

99. Another key consideration is the extent of road construction, especially in light of the cumulative impact of the multiple hydro projects in the watershed, including VPHEP. The total length of the Uttarakhand road network in 2006-07 was about 28,660 km. The Government of India, with financing from the Asian Development Bank, has initiated road development plans to upgrade 10,800 km to national standards, and maintain them in good condition. Within the

¹⁰² PAD, Table 3. Vishnugad Pipalkoti HEP: Risks and Mitigation Measures.

¹⁰³ World Bank cumulative impact assessment report (2009), p. 4-24.

¹⁰⁴ IIT-Roorkee, p. 8-42.

¹⁰⁵ World Bank cumulative impact assessment report (2009), p.6-19, Table 6-10: Blasting Numbers and Duration. According to this Table, "*The blasting number is based on a typical 500 blasts per kilometre such that the tunnel length in kilometres is multiplied by 500. The duration is derived by dividing the blasting number by 5 to get the number of days and then producing the number of months assuming 30 days for each month.*"

Alaknanda Basin, the roads from Nandprayag to Ghat and Rudraprayag to Pokhri and part of the 42 km road from Pauri to Srinagar are to be prioritised for construction work.¹⁰⁶

100. National Highway 58, which follows the Alaknanda River, is heavily travelled by pilgrims, especially to Badrinath from May to November. Although the Asian Development Bank road plan makes no mention of providing access to HEP projects, the latter will be dependent upon the existing roads to move their construction equipment and labor.

101. Another relevant issue is the transportation of the Tunnel Boring Machine (TBM) to the Project site. The TBM is expected to bore a tunnel with a length of 12 km and a diameter of 8.8 meters. The excavation is planned to start from the downstream end of the Head Race Tunnel (HRT) near old Haat village. Project documents reviewed by the Panel do not explicitly indicate how the TBM will be transported; this will need to be carefully considered given existing road conditions.

102. To the extent that additional road building or widening takes place due to the construction and maintenance of the planned HEPs, this may be followed by an increase in vehicular traffic, leading to a potential increase in tourism, growth in settlements, and transport of goods for the consumption of this growing population. The Panel observes that the cumulative impact from the collective road building, drilling, blasting, and tunneling has been considered in the Bank's 2009 cumulative impact assessment and the Roorkee cumulative impact assessment.

103. **Changes in river flow and impacts of flushing of sediments on downstream ecology.** The Project EA contains a river flow analysis, including flow duration curve (FDC) and temporal variation¹⁰⁷ of the Alaknanda River, based on 10-daily discharge data at the dam site for the period 1971 to 2004. The Project EA states that a minimum flow requirement of 3 cumecs has been developed with the ecology of the river basin, or the '*carrying capacity*' of the river in mind.¹⁰⁸ It should be noted that other studies – such as the WII study – have recommended much higher environmental flows of up to 30% of lean flows, and that the proposed e-flow for the Project has been increased by the Government of India from 3 cumecs to 15.65 cumecs.

104. The conclusion reached in the EA is that flushing under the Project will be done about 4 times each year, with each flushing lasting about three days, and the revenue loss due to closure of turbines is about 5%, which will be much less than the cost and the consequences of damage to the machinery.¹⁰⁹ This implies that the VPHEP will release a higher concentration of sediments four times per year.

105. The Panel notes that a Sediment Optimization Study was carried out for the Project and this is discussed in Chapter 3 of this report.¹¹⁰ Management Response notes that the Project design calls for a portion of the river to flow unimpeded through the spillways of the diversion dam. Management states that the water that is diverted into the tunnel will pass through de-silting

¹⁰⁶ Uttarakhand State Road Investment Program, Asian Development Bank, November 2006. See: <http://www.adb.org/projects/38255-043/documents>

¹⁰⁷ EA, p. 3-32, section 3.7.6.

¹⁰⁸ EA, p. 3-58, section 3.7.10.

¹⁰⁹ EA, p. 20, section 3.6.5, Optimum Sediment Operation.

¹¹⁰ DHI Denmark, "Vishnugad Pipalkoti Hydroelectric Project Sediment Handling Optimization Study"(June 2008).

chambers, and any retained sediment will be released into the river immediately downstream of the dam at regular intervals in the operation phase. Management concludes that the quantity and characteristics of sediments in the river water are not expected to be substantially altered by the Project operation.¹¹¹ The PAD also notes that additional studies, to be carried out during the implementation phase, will further define optimal operating procedures, taking into account the sediment flushing schedule of upstream HEPs.¹¹²

106. The Panel observes that the Roorkee study measured 10 indicators of water quality, including turbidity, and found no significant impact of current projects in these values. The 2009 Bank cumulative impact study, however, notes that *“the changing flow pattern in the river as a result of the HEP schemes will change the areas of slower flow and hence where silt would naturally be deposited. This could result in stretches of the river not previously subject to siltation.”*¹¹³ Therefore, the impact of the sediments that enter the river bed through the quarterly flushing operations of this Project, and the cumulative impacts of flushing of additional HEPs on the Alaknanda River, is an issue that may require monitoring and additional study.

107. **Reservoir effects.** The Panel notes the short water retention time (1.75 hours approximately) in the VPHEP reservoir, its small pondage and sparse vegetation in the reservoir area, all of which are not sufficient to trigger biochemical or eutrophic reactions.¹¹⁴

108. The Bank’s 2009 cumulative impact assessment suggests, *“[w]ith the construction of multiple HEP schemes, the highly oligotrophic Alaknanda River system may be predicted to turn into a much more eutrophic system...the river would however only become eutrophic if there was an increase in nitrogen and phosphorus compounds proportionately to a decrease in flow that would lead to more favourable conditions of eutrophication to occur.”*¹¹⁵ The study also mentions that *“the addition of all the proposed projects to the Alaknanda River would be expected to reduce the dissolved oxygen (DO) levels at all points on its length, although the impact would be most significant under low flow conditions.”*¹¹⁶

109. The Panel observes that according to the Roorkee study, the diverted portions of as much as 21% of the river length of the Alaknanda is likely to flow under submergence and in parallel with the e-flows left in the river.¹¹⁷ Although the Panel recognizes that individual run-of-the-river projects do not have much biochemical or eutrophic impacts, it notes that the cumulative impacts of multiple reservoirs on the Alaknanda River deserve monitoring and further studies in the future.

110. **Impacts on Fish.** The issue of aquatic ecology is detailed in the EA¹¹⁸ and it is accepted that the stretch between the dam construction site and the powerhouse construction site is rich in biodiversity which will be affected by the dam construction activities.¹¹⁹ The EA focuses on the

¹¹¹ Management Response, p. 17, para 58.

¹¹² PAD, Table 3. Vishnugad Pipalkoti HEP: Risks and Mitigation Measures, p. 15.

¹¹³ World Bank Cumulative Impact Assessment Final Report (2009), p.4-19.

¹¹⁴ IIT-Roorkee, p. 8-42.

¹¹⁵ World Bank cumulative impact assessment report (2009), p. 4-19.

¹¹⁶ World Bank cumulative impact assessment report (2009), p. 4-25.

¹¹⁷ IIT-R, Section 8.1, p. E-13.

¹¹⁸ EA, p. 3-72 to 3-89, section 3.8.

¹¹⁹ EA, p. 3-85, section 3.8.7.

migration route and period of migration of the *Mahaseer* fish,¹²⁰ wherein it is said that there has been a sharp decline in the presence of *Mahaseer* due to obstruction created by some private developers (the downstream Srinagar HEP) and *Mahaseer* was not found to occur in the Alaknanda River in the Project stretch upstream and downstream of the dam site during the period of study (November 2008-May 2009).

111. It is also recognized that construction of the dam will block local movement of the snow trout. The EA proposes a series of mitigation measures that consist of providing habitat in the tributaries, scientific management of stock in hatcheries, banning of fishing, a release of minimum flow of 3 m³/s (which as mentioned earlier was increased to 15.65 cumecs), and prevention of pollution.¹²¹

112. The World Bank cumulative impact assessment report mentions that “*increased fragmentation of the river and potential changes in water quality may also change aquatic and fish species within the river*”¹²² while “*early schemes may limit fish migration and hence construction of later schemes would have a lower cumulative impact.*”¹²³ The WII study comprehensively addresses potential impacts of the HEPs on the Alaknanda River, with detailed analysis of terrestrial and aquatic biodiversity, and discussing the impacts by way of habitat loss, barrier effects, changes in sedimentation flows, changes in environmental flows, and changes in nutrient flow. It identifies data gaps and recommends future mitigation and monitoring needs.

113. The Roorkee study considers the minimum flow required for preserving fish habitat, and divides the Alaknanda and Bhagirathi basins into a “No Fish Zone,” a “Trout Zone,” and a “Mahseer Zone.” It does not consider the cumulative impact on fish biodiversity other than stating that it is high dams that increase fragmentation of the river while run-of-the-river projects do not cause such impacts unless all the water is diverted for long distances into tunnels.¹²⁴

114. The Panel observes that there is recognition in the different impact studies that overall fragmentation of the river flow through a series of dams and diversions will affect fish biodiversity, water quality, nutrients, sediments, eutrophication, and fish migration. The Panel also observes that impacts on aquatic and terrestrial biodiversity in the Alaknanda and Bhagirathi basins have been studied in the cumulative impact assessments, and as a result, the environmental flow regime for the Project was increased. The Panel notes that the Project has proposed mitigation measures for fish life in the river, and that a Fish Management Plan will be prepared.

115. **Issues relating to climate change.** The Panel acknowledges that the small size of the reservoir, the slow water retention period, and the lack of significant biomass to be submerged suggest that any potential release of methane will be negligible and thus will not result in any significant addition of greenhouse gases to the atmosphere. The inverse is more important and has been emphasized by Management, i.e., the positive contributions of hydropower to fight climate change as it provides electricity in a more climate-friendly way than a number of other

¹²⁰ EA, p. 3-84, section 3.8.5.

¹²¹ EA, p. 4-34, section 4.7.3.

¹²² World Bank cumulative impact assessment report (2009), p. S-9.

¹²³ World Bank cumulative impact assessment report (2009), p. S-10.

¹²⁴ IIT-R, Section 6.14, p. 6-59.

sources (e.g., from fossil fuels).¹²⁵ The Panel considers this to be a valid position and notes that in general hydropower provides a clean source of energy which may reduce dependence on coal thereby reducing carbon emissions.

116. The Panel also notes that Management's concerns have been directed primarily towards whether climate change poses a risk to dams. According to the PAD, these are: (i) increased hydrological variability; (ii) increased occurrence of extreme weather events, such as flooding; and (iii) increased or changed patterns of sediment load in the river.¹²⁶ The PAD also suggests that the sensitivity analysis, carried out as part of the economic and the financial analyses, submits that the viability of the Project is not affected by the worst-case scenarios for climate change and possible extreme events.¹²⁷

117. **E-flow, including the consideration of cultural values.** The Panel notes that this claim relates to a deeply held cultural system pertaining to peoples' beliefs about the spirituality and power of the Alaknanda which in their view is drawn from its bountiful and uninterrupted flow.

118. During its field visits, the Panel team heard contrasting views regarding the Project's location on the Alaknanda River. While some local people said that they were in favor of the Project and did not believe that the Alaknanda was the Ganga, others affirmed the importance of the unimpeded natural flow of the Alaknanda to their religious and cultural beliefs.



Picture 3 Confluence of Bhagirathi (silt-free) and Alaknanda Rivers at Devprayag.

119. Local people with whom the Panel met expressed strong concerns about the effect that changing river flow would have on Hindu water-related rituals, and there remains significant concern about what the impact will be and what will be done to mitigate this impact. They also told the Panel team that they had already experienced disruptions in their religious practices related to last rites which require that the remains of the deceased be consecrated in the river, but low flow and unpredictability of water release from the upstream Vishnuprayag HEP made these rituals difficult to perform.

¹²⁵ PAD, Annex 1, p. 30, para 6.

¹²⁶ PAD, p. 82 and Table 3. Vishnugad Pipalkoti HEP: Risks and Mitigation Measures, p. 15.

¹²⁷ PAD, Annex 10, p. 128, para 92.

*Box 3 : Water-related rituals in Hinduism*¹²⁸

In Hindu spirituality and ritual, water is one of the five primal elements that make up Nature, and it has the special character of a purifier. Use of water in religious rituals (of which river water is only a subset) is discussed in the *Dharmashastras* (Hindu religious laws) only in the context of cleanliness or *suchitva*. Water that is naturally pure should be on the ground, in its natural state, should not be mixed with anything impure, and should have its natural colour, taste and odour. Only pure water is to be used for daily bodily purification, as well as to wash off one's sins and to be cremated and have one's ashes immersed. Besides bodily purification, pure water is used in rituals for bathing of idols, sprinkling on devotees, and ceremonial sipping at the start and conclusion of religious ceremonies. Even though rituals can differ from sect to sect, the role of water as a spiritual purifier can remain important to all sects.

Confluences of two rivers are considered especially auspicious *teertha* (pilgrimage) sites. On the Alaknanda, there are several such sites that are graded in terms of their importance. The most important, starting from the top, are Badrinath, followed by Devprayag (Deoprayag), Rudraprayag and Haridwar, and followed by other sites such as Dhari Devi at Srinagar.

All along the river, there would be many sites that are considered holy locally, as for instance places where an ascetic might have lived or is buried. But cremation may be conducted anywhere along the river, depending upon the sect or family/cult traditions, even though it might preferably be conducted at the holier of sites. Post cremation and the consigning of the ashes to the river, the relatives of the deceased have to take a cleansing bath in the river, which are also taken during particular religious occasions and on special holy days.

120. During Project preparation, Project documents recognized that the construction of the VPHEP would reduce the flow of the Alaknanda for approximately 18.32 kilometers¹²⁹ below the dam, and especially in a 2.69 km stretch immediately downstream of the dam which receives no significant in-flow before the perennial Tapan *Nala* joins the Alaknanda.¹³⁰ The documents describe in detail the system for diversion of waters into tunnels along this stretch.

121. Based on its review of relevant information, the Panel acknowledges that the Requesters raise an important concern as to whether the Project, on its own or cumulatively with other HEPs along the Alaknanda and its tributaries, will affect the Alaknanda's free flow and mix of sediments, minerals and bacteriophages which allow it to re-oxygenate rapidly, absorb organic waste and kill off bacterial pathogens. The Panel notes that in response to concerns raised by Requesters, the Bank has provided additional information on the question of whether the dams would change the sediment flow of the river,¹³¹ indicating that sediment will still flow, though at different intervals.

¹²⁸ Much of what follows is summarized from P.V. Kane, "History of Dharmasastra (Ancient and Medieval Religious and Civil Law)," *Government Oriental Series*, class B, no. 6, vol. IV, 3rd edition. (Poona, India: Bhandarkar Oriental Research Institute, 1991), S. Sharma, "Water in Hinduism: Continuities and Disjunctures between Scriptural Canons and Local Traditions in Nepal," *Water Nepal*, vol. 9/10, no. 1/2 (2003): p. 215-247, as well as Dipak Gyawali, "Water and Conflict: Whose Ethics is to Prevail?" in *Water Ethics – Marcelino Bot in Water Forum 2007*, eds. M. Ramon Llamas, Luis Martinez-Cortina, and Aditi Mukherji, (London: Taylor and Francis Group, 2009).

¹²⁹ EA, chapter 3, section 3.7.9, p. 38.

¹³⁰ EA, chapter 3, p. 43, Table-3.7.11 Existing Inflows (February 2009) in Alaknanda River (study stretch).

¹³¹ World Bank Response to Representation on Vishnugad Pipalkoti Hydro Electric Project, May 22, 2012, provided as an annex to Request for Inspection, p.190-199. Available at: <http://ewebapps.worldbank.org/apps/ip/Pages/ViewCase.aspx?CaseId=13>

122. The new minimum e-flow figure of 15.65 cumecs is substantially higher than the e-flow recommended in the Project EA, and Management accepted this increased amount on the basis that it could be viewed as a composite measure of the value that society as a whole accords to preserving the river in its natural state. Management also notes that once operational, VPHEP will have sufficient water in the river throughout the year, which will not obstruct its traditional use by local people, including for performance of religious rituals in the stretches downstream.¹³²

123. The Panel notes in this regard that a totally unobstructed or free flow (*Aviral Dhara*) of the river would have meant that by definition no project would be possible. Management states in its Response that a partial obstruction of the river (along the lines of the Bhimgoda Barrage near Haridwar) is not technically feasible, in particular since it would not allow VPHEP to contribute to peak generating capacity available in the Northern Grid.¹³³ Also, Management notes that from an economic perspective, the partial obstruction of the river would dramatically reduce the amount of energy generated, and therefore was not considered a viable alternative.¹³⁴

124. **Transmission lines.** During the Panel's field visit, villagers raised concerns about the potential loss of farm land and forest resources due to transmission lines construction, which they argued are irreplaceable in that geographical environment and topography. They also expressed concern that the transmission line towers in particular, set on steep slopes may fall and/or increase the risk of landslides and have other safety implications. The villagers said no mitigation measures were being proposed to deal with potential losses due to transmission lines. The Panel noted these concerns in its Report and Recommendation (eligibility report) to the Board.¹³⁵

125. According to the PAD, the power generated by VPHEP is intended to be evacuated through a proposed 30 km, 400 kV line to a pooling station near Kuwari Pass in Chamoli district.¹³⁶ In conversations with THDC, the Panel team was informed that this line will be managed by the Power Transmission Corporation of Uttarakhand Ltd (PTCUL).

126. In addition to the 444 MW produced by VPHEP, the transmission system in this region is expected to evacuate another 2,824 MW from 16 more HEPs in the Alaknanda Basin.¹³⁷ The Asian Development Bank is financing an integrated power transmission system under its multi-tranche Uttarakhand Power Sector Investment Program which intends to evacuate 2,500 MW of power by constructing eight high-voltage transmission lines and associated substations with the intention of connecting Uttarakhand to the Northern Grid.¹³⁸ The total length of transmission lines in the Basin is likely to be over 500 km and the potential cumulative impacts would be significant within the basin.

¹³² Management Response, section 7, p. 29.

¹³³ Management Response, p. 24, para 3.

¹³⁴ Ibid.

¹³⁵ Inspection Panel Report and Recommendation, Report No. 73830-IN, dated November 26, 2012, p. 16.

¹³⁶ EA, p. 20, section 1.13. The PAD (Annex 9, p. 78, para 3) states that the pooling station is "proposed."

¹³⁷ These numbers are generated from the document "Proposed Transmission system of Alaknanda Basin" which was given by THDC Rishikesh to the visiting Panel team after a meeting on April 30, 2013.

¹³⁸ Uttarakhand Power Sector Investment Program - Tranche 4, Project Data Sheet, Project Number 37139-053, April 29, 2014.

127. The Panel notes that OP 4.01 on Environment Assessment (EA) requires that the EA evaluate a project's potential environmental risks and impacts in its area of influence, which is defined as the area likely to be affected by the Project, including all its ancillary aspects, including power transmission corridors.¹³⁹ The Project EA and EMP however do not discuss the environmental or social impacts of the construction of the 30 km transmission line. There is also no mention of the environmental impacts of transmission lines in the Detailed Project Report.¹⁴⁰

128. During the course of its investigation, Bank Management indicated to the Panel its view that the proposed 30 km lines evacuating power from the Project to the Kuwari Pass pooling station are connected to the Project, but that the potential impacts of these lines have not been considered under the Project. The Panel notes that Management, in its preliminary review of the 2006 Project EA, advised THDC that one of the issues where there was a need for "*additional analyses and plans*" was the proposed 30 km transmission line. The Panel, however, cannot ascertain from its review of Project documents whether Management's advice to carry out an "*impact assessment*" of the proposed transmission line was indeed undertaken. **The Panel notes that Project documents do not address the issue of transmission lines, both the proposed 30km line which will evacuate power from the Project and the proposed wider transmission network, and emphasizes the need for a clarification of these issues.**

2.3 Relevant provisions in Bank policy

129. **Bank Policy Framework.** Under OP 4.01 on Environmental Assessment, the Bank requires environmental assessment of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, so as to improve decision making. An EA should "*predict and assess the project's likely positive and negative impacts*" within its area of influence, which may include direct, indirect and cumulative impacts as relevant to the particular circumstances.

130. The policy also provides that the purpose of an Environmental Assessment of a project is to examine project alternatives, and identify measures to prevent, minimize, mitigate or compensate for adverse impacts.¹⁴¹ In this analysis, the EA takes into account the natural environment, human health and safety, and "*social aspects (involuntary resettlement, indigenous peoples, and cultural property)*."¹⁴² The policy also requires that appropriate measures be taken to avoid or mitigate such impacts as part of the EA process.

131. Paragraph 7 of OP 4.01 states that depending on the type of project, a range of instruments can be used to satisfy the Bank's EA requirements. The types of EA instruments mentioned include an environmental impact assessment (EIA), and regional or sectoral EA. Of particular relevance to the present Request, Annex A of the policy states that where a project is

¹³⁹ OP 4.01 para 2, and Annex A, para 6.

¹⁴⁰ THDC, "Detailed Project Report for Vishnugad Pipalkoti H.E. Project (4X111MW)" (December 2006), chapter 10.

¹⁴¹ OP 4.01, para 2.

¹⁴² OP 4.01, para 3. The footnote to this quotation in the policy refers to the relevant Bank policies on Involuntary Resettlement, Indigenous Peoples, and Cultural Properties.

likely to have regional or sectoral impacts, a Regional or Sectoral EA is required, and both must pay particular attention to the cumulative impacts of multiple activities.¹⁴³

132. Furthermore, Annex B of OP 4.01 when examining the analysis of alternatives, states that *“for each of the alternatives, quantifies the environmental impacts to the extent possible, and attaches economic values where feasible.”*¹⁴⁴

3. Panel findings – Assessment of Cumulative Environmental and Cultural Impacts

133. As described in this Chapter, the Panel considers that the VPHEP is closely linked, together with other hydro projects already constructed or planned, to cumulative impacts in the Alaknanda River. Unless mitigated appropriately, the Project and other HEPs may pose a series of risks at a regional level including: the risk of heightened damage during major storms; impacts across the landscape due to accelerated environmental change; and other social, environmental and developmental impacts in the region.

134. The Panel notes the significant and continuous efforts subsequent to the development of the 2006 Project EA to consider the Project’s potential role in the context of the cumulative impacts of hydropower projects in the region, and the efforts of Bank Management in support of this work. As described above, the Panel notes that the national process looking at the cumulative impacts of HEPs on the river basin, including Alaknanda and Bhagirathi Rivers, is still on-going.

135. The Panel notes that during the preparation of the Project EA, Management commissioned a cumulative impact assessment of hydropower in the Alaknanda River basin and the GOI subsequently commissioned the Roorkee study and the WII study of cumulative impacts in both the Alaknanda and Bhagirathi Rivers. As a result of the Roorkee study, the initial figure of 3 cumecs of minimum e-flow for the Project was raised to 15.65 cumecs. In this regard, the Panel recognizes the importance of Management’s advice to GOI to study cumulative impacts and its commissioning of the Bank’s 2009 cumulative impact study.

136. The Panel notes that Management accepted the increased minimum flow of 15.65 cumecs recommended by GOI for the Project. Management states that this minimum flow is equivalent to approximately 45% of the average low flow recorded for the Project and exceeds the recorded low flows of the river in many years, which means that water flows are likely to always be available, even at the time of year when the flows are naturally lowest. Management adds that the anticipated flow, in the low flow season will be within the range of natural conditions experienced in this part of the river. The Panel considers that this was an important step by Management to mitigate cultural, spiritual and biodiversity related impacts.

¹⁴³ OP 4.01, Annex A describes an REA as “[a]n instrument that examines environmental issues and impacts associated with a particular strategy, policy, plan, or program, or with a series of projects for a particular region (e.g., an urban area, a watershed, or a coastal zone)...” and describes an SEA as “[a]n instrument that examines environmental issues and impacts associated with a particular strategy, policy, plan, or program, or with a series of projects for a specific sector (e.g., power, transport, or agriculture)...”

¹⁴⁴ OP 4.01, Annex B, section 1(f).

137. The Panel notes that GOI's Roorkee study, one of two primary cumulative impact assessments for the Project, was finalized after the consolidated Project EA was prepared and approximately 2 months prior to Board approval. Management incorporated the higher minimum flow recommendation of this cumulative impact study for the Project. However, Project documents do not address the practical question of how VPHEP would be able to allow a 15.65 cumecs flow in the context of the existing and proposed cascade of upstream HEPs. The Panel therefore, recognizes the importance of the requirement that during Project implementation, THDC would monitor and report to the Bank monthly water flow measurements at different points in the Alaknanda River.¹⁴⁵

138. The Request claims that the obstruction of the natural flow of the Alaknanda will result in a serious loss of the river's non-use (aesthetic, spiritual, cultural) values, and that these values have not been considered by the Project. The Panel recognizes that there are differing views on how to approach the question of unobstructed continuous flow to enable non-use value. With regard to quantifying the non-use values of the river, the PAD states that the economic evaluation of VPHEP is based on cost-benefit methodology which includes a calculation of the direct and quantifiable welfare benefits of the Project for beneficiaries. The Management Response notes that with respect to methods of valuation of externalities related to religious and cultural values, a more appropriate level of analysis is the river basin level as opposed to the individual project level. The Panel agrees with Management's response and notes that there is an ongoing national debate on the value to society of a free flowing river and its use to generate electricity.

139. **Based on the foregoing, the Panel finds that Management complied with the provisions of OP/BP 4.01 by ensuring the preparation of a cumulative impact assessment for the Project and by incorporating the recommended increased minimum environmental flow into the Project to mitigate cultural, religious, and biodiversity impacts.** The Panel notes, however, that despite increasing the minimum environmental flow for the Project, the extent to which the cumulative impact assessments influenced other aspects of Project design is not clear.

140. The Panel recognizes Management's statement indicating that additional environmental protection measures based on the recommendations of the cumulative impact assessments will be conveyed to THDC moving forward. The Panel notes the importance of Management's close monitoring of the implementation of these recommendations, within the context of the Project's adaptive management approach, to ensure continued sustainability and viability of the Project. In addition, taking into account the on-going broader debate in India regarding cumulative impacts of hydropower development in the river basin, the Panel notes the importance for the Project of adopting and implementing relevant recommendations which may result from this process.

¹⁴⁵ Loan Agreement, VPHEP, Schedule 2, section 1 (f), August 10, 2011.

Finally, the Panel recognizes the complexities of coordinated river basin management when multiple HEPs are present, and emphasizes the importance of a mechanism to coordinate river basin management in the Alaknanda.¹⁴⁶

¹⁴⁶ The Panel is aware that the Bank is providing support to the NGRBA via the National Ganga River Basin Project (P119085) for pollution abatement, conservation, and institution building activities, but notes that the NGRBA is not tasked with coordinated river management, involving multiple HEPs, for the Alaknanda Basin.

Chapter 3:

Claim that Project is likely to cause serious adverse local environmental impact

A. Introduction

141. One of the overarching claims in the Request is that Bank Management did not ensure that a proper environmental assessment was carried out to identify and address certain significant environmental risks. These include impacts at regional and cumulative levels (already discussed in Chapter 2), and local-level impacts, the subject of this Chapter.

142. The claims of the Requesters relating to local-level environmental impacts and risks fall into three main categories:

- **Risks to village water sources from tunneling and blasting.** The Requesters state that construction-related blasting has caused local water sources to dry up. They are also deeply concerned that the proposed two tunnels of 13.4 km and 3 km which will run beneath the mountain will disrupt other critical water springs and sources on which many villages rely.
- **Risks relating to structures, landslides and earthquakes.** The Requesters fear that construction activity related to the Project has damaged houses and may trigger landslides and earthquakes, which would cause potentially significant harm to homes, villages, farmlands and roads, particularly in the steep mountainside landscape of the region.
- **Risks to aquatic life and ecology from altered flow and sediment release.** The Requesters are also concerned that reduced sediment flow downstream of the dam, due to sediments being caught by the dam's de-silting chambers, may impact aquatic and biotic life in this part of the river.

143. The discussion below presents the analysis of the Panel on each of the above-mentioned impacts in the local area, some of which are alleged to already have been experienced, and whether appropriate steps have been taken to avoid, minimize or mitigate them in line with applicable Bank policies.

B. The risk to village water sources from blasting and tunneling

1. Requesters' claims and Management Response

144. **Requesters' Claims.** The Request claims that 6 water sources in Hatsari hamlet have dried up as a result of blasting and tunneling related to exploratory geological work undertaken by the Project and that alternative water sources have not been provided to this hamlet. They also contend that other sources of water are similarly drying up. In addition, during its field visits the Panel was informed by villagers of their deep concern that the planned tunnels on the right bank of the river may disrupt the sources and flow of water on which the villages depend.

145. This fear of a disruption in water sources for villages is expressed in the context of the experiences of the two upstream power projects, the Tapovan-Vishnugad HEP and the Vishnuprayag HEP, which according to villagers living in the vicinity of those HEPs, have had

serious impacts on their water sources. A main fear is that the same may occur in the VPHEP area more widely as the Project progresses, and especially along the 13.4 km Head Race and 3 km Tail Race tunnels, which may result in farmers not being able to irrigate crops and likely suffer crop losses for multiple seasons, in addition to experiencing water shortages for domestic use.

146. **Management Response.** Management states that in response to a complaint from residents of Hatsari about their water supply being disrupted by geological survey work, THDC carried out geological investigations which failed to establish a link between the excavation of the exploratory drift and the reduction of water supply at the hamlet. Management also mentions that THDC has offered to finance a water supply scheme for Hatsari and offered the contract to a cooperative formed by the villagers, and the District Magistrate has facilitated discussions between THDC and the villagers. Management states that the villagers of Hatsari however, have not responded to THDC's offer. Management also states that Hatsari residents have not submitted an application to claim compensation for loss of crops allegedly resulting from exploratory activities.¹⁴⁷

147. The Management Response does not address the concern that villages other than Hatsari may also have their water sources affected. During its investigation, the Panel learned of steps being taken with respect to this issue. These are described further below in this Chapter. At a more general level, Management states that “[t]he environmental impacts of the project have been comprehensively examined in the consolidated EA, and all impacts will be mitigated and monitored through the EMP.”¹⁴⁸ Management also states that the EMP will be adapted to include additional corrective actions to address new issues, if identified during implementation.¹⁴⁹

2. Panel Observations and Analysis

2.1 Link between the Project and the harm or potential harm

148. **Nature of hill livelihood and water supply.** The villages in the Project area are typical Himalayan hamlets perched high above rivers and river valleys. The larger the river in the Himalayas, the deeper the gorge or valley it will have cut over geological time. In the stretch of concern of the Alaknanda where the Project is located, the gorge is steep and deep. The settlements are either on ridges higher up, or on river terraces left behind as the river eroded a deeper gorge. The old river terraces are tens or even hundreds of meters higher than the present day riverbed, making lifting of river waters to the villages energy intensive, whether by traditional means or by pumping.

¹⁴⁷ Management Response, p.10, para 37.

¹⁴⁸ Management Response, p. 18, para 61.

¹⁴⁹ Ibid.



Picture 4: Alaknanda River and steep gorge

149. The socio-ecological implication of this is that settlements in the Project area do not depend on the Alaknanda River water for drinking, irrigation, or livestock purposes but instead use water emanating from springs or “rivulets” fed by springs coming from higher elevations. This water is typically gathered through pipes, sometimes stored in small reservoirs, and provided to the villages. An exception is the use of river water for livestock watering when animals are herded from village stalls to adjacent pastures or forests.

150. In the mid-hill Himalayas, most areas in the 2500-3000m elevation range rarely receive snow, but instead primarily receive rain during the summer monsoon season. Some of this rain, as well as snow from higher altitudes, percolates in the soil and rock fractures and is then released through springs. Digging a tunnel or blasting very often traverses these fractures and disrupts or changes the groundwater flow within the mountains, allowing the water to flow not to the natural spring, but instead to the new fracture or into the tunnel itself, thus causing disruptions to the springs and to the construction schedules of the tunnels.¹⁵⁰

151. There are different types of springs in the Himalayas and its foothills. The most important are perennial springs that flow throughout the year (except in years of extraordinary drought or failure of monsoon rains). Their primary use is for drinking water and domestic use, including livestock watering, and only if sufficient are those waters used for kitchen gardens and agriculture. Next in importance are seasonal springs, graded according to the number of months they flow following monsoon rains or winter precipitation, mostly used for agriculture, although only 15% of the agricultural lands in Chamoli District are irrigated this way.¹⁵¹ Various studies have shown an apparent decrease in spring water flows in several parts of the Himalayas, and this decrease has been variously attributed to the effects of natural variations, anthropogenic causes, and climate change.¹⁵²

¹⁵⁰ For more on groundwater and tunneling, see “*Groundwater in fractured rocks: selected papers from the Goundwater in Fractured Rocks International Conference*,” Prague 2003/edited by Jiry Krasny and John M. Sharpe, Jr.

¹⁵¹ EA, section 3.7.12, p. 63.

¹⁵² Sandeep Tambe, *et al*, “Reviving Dying Springs: Climate Change Adaptation Experiments From the Sikkim Himalaya,” *Mountain Research and Development*, 32(1):62-72. 2012, URL: <http://www.bioone.org/doi/full/10.1659/MRD-JOURNAL-D-11-00079.1>

152. The hamlets in the Project area, therefore, perched on ridges and terraces high above the Alaknanda River, are highly dependent on springs. If a spring dries up (following changes due to climate change, an earthquake, or road or tunnel construction), the hamlet may be abandoned unless an accessible alternative water source can be found to meet domestic as well as farming and livestock needs.

2.2 Relevant provisions of Bank policy

153. The Bank's Environmental Assessment Policy (OP 4.01) requires the preparation of an Environmental Assessment (EA) which "*evaluates a project's potential environmental risks and impacts in its area of influence.*" The EA must examine project alternatives and identify ways to prevent, minimize, mitigate or compensate for adverse environmental impacts, as well as enhance positive impacts. The impact analysis considers the natural environment, human health and safety, as well as social aspects.¹⁵³

154. Also, according to OP 4.01, the Bank bases supervision of the project's environmental aspects on the findings and recommendations of the EA, including measures set out in the legal agreements, any EMP, and other project documents.¹⁵⁴ An EMP is described as an instrument that details the measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental impacts, or to reduce them to acceptable levels, and the actions needed to implement these measures.¹⁵⁵

155. Annex A to OP 4.01 elaborates on the important concept of the project "*area of influence,*" defined as "*the area likely to be affected by the project,*" including all its ancillary aspects as well as unplanned developments induced by the project.¹⁵⁶ The Policy states that the area of influence is determined with the advice of environmental specialists, and is set out in the EA terms of reference.¹⁵⁷

156. In addition, OP 4.01 requires the Bank to advise the borrower on the Bank's EA requirements, and for the Bank to review the findings and recommendations of the EA to determine whether they provide an adequate basis for processing the project for Bank financing. Moreover, when the borrower has completed or partially completed EA work prior to the Bank's involvement in a project, as in the present case, OP 4.01 requires the Bank to review the EA to ensure its consistency with Bank policy, and to require additional EA work, if needed.

2.3 Assessment of the issues in Project documents

157. **The Project EA.** As mentioned in Chapter 2, THDC commissioned an EIA in 2006. According to the Management Response, when the Bank became formally engaged with the Project, it reviewed the 2006 EIA and advised that additional studies were needed to meet Bank

¹⁵³ OP 4.01, Annex A, para 6.

¹⁵⁴ OP 4.01, para 19.

¹⁵⁵ OP 4.01, Annex A, para 3.

¹⁵⁶ OP 4.01, Annex A, para 6.

¹⁵⁷ OP 4.01, Footnote 3.

policy requirements.¹⁵⁸ A revised and consolidated EA (the Project EA) was prepared in 2009 and used by the Bank as part of Project appraisal.¹⁵⁹

158. In considering the Requesters' concerns, the Panel first reviewed the delineation of the Project "*area of influence*" in the Project EA to determine if the potential impact on village water sources along the alignment of the 13.4 and 3 km tunnels was included. The Project EA recognizes three areas, or zones, likely to be impacted by the Project: "Project Influence Area" or "PIA" (7 km around the Project Sites), "Project Immediate Affected Area" or "PIAA" (500m around the Project Affected Areas), and "Project Affected Areas" or "PAA" (land acquired for the Project).¹⁶⁰ The total land requirement for the Project according to the EA, is 141.55 ha that has been acquired to house the main Project components and Project-related infrastructure and facilities.¹⁶¹ All of this infrastructure will fall within the ambit of the three impact areas defined above.

159. The Project EA also includes factual information relating to natural springs and water sources. It states that "[t]he natural springs and streams are the sources of water for people living in the area for consumption, livestock as well as irrigation purposes."¹⁶² In addition, the EA mentions a "Water Usage Survey" which states that natural springs and "*small streams*" are used for drinking and irrigation purposes, although as mentioned above, only 15% of agricultural lands in Chamoli are irrigated.¹⁶³ The conclusion to this section states that "[i]n view of the above findings, it may be stated that the construction of the project will not have any adverse impacts on the water requirements of the villages in the area."¹⁶⁴

¹⁵⁸ Management Response, section 2, p. 22. Management has informed the Panel that its comments on the 2006 EA also indicated the need for other analyses and plans on topics related to the 30 km long 400 kV transmission line, access roads, cumulative impact assessment, and cultural properties impact analysis, and safety. The Bank also provided comments on different aspects of the social impact assessment in the EA.

¹⁵⁹ Consulting Engineering Services (India) Private Limited (CES), "Environmental Studies for Vishnugad Pipalkoti Hydro Electric Project Final Report Consolidated Environmental Assessment (EA)" (Vol. 1, November 2009.).

¹⁶⁰ The EA states the following when it describes the Project area: "*The environmental study was conducted in the Project Influence Area-PIA (7km around the Project Sites), Project Immediate Affected Area-PIAA (500m on either side of Project sites) and at the Project Affected Areas-PAA (land acquired for Project).*" Chapter 3, p. 1, para 3.1.

¹⁶¹ This includes the Project township (at Siyasain), three quarry sites (at Gulabkoti, Patal Ganga, and Birahi), four muck disposal sites (at Gulabkoti, Guniyala, Haat and Siyasain), contractors accommodation, labor and construction workers camps (at Gulabkoti, Langsi, Guniyala and Batula), the spillway, and the four approach/access roads (covering a total length of 25.578 km) These are (i) Approach Road to dam site (Animath to Dam), (ii) Approach Road to Langsi Adit (Gulabkoti to Dwing), (iii) Approach Road to Maina Adit (Pipalkoti to Maina Nadi), and (iv) Approach Road to Power house & colony site (Koriya to Siyasain). EA, Vol. 1, section 1.8.2.

¹⁶² EA, Vol. 3, p. 61, para 3.7.11.,.

¹⁶³ Ibid, p. 64, para 3.7.13.

¹⁶⁴ Ibid.

160. The EA provides a table in which it documents drinking water sources for 23 villages from both the left and right banks of the Alaknanda River in the area. These sources are either tube wells or a pipe connected to a natural spring. The Panel notes that 6 out of these 23 villages overlap with the 18 villages that are part of the “Project Affected Area.”¹⁶⁵ Also, Annex 3.7.2 of the EA provides a list of 66 drinking water sources, situated in villages that are located on both the right and left banks of the Alaknanda River; these sources are a combination of *nallas* (seasonal streams), spring sources, and tributaries of the Alaknanda.¹⁶⁶

161. The Project EA, in a section on “Waterborne Diseases,” mentions that blasting and tunneling activity in the area may divert water sources or the sources may get dried up,¹⁶⁷ and it proposes that alternative sources may be explored or the river water can be utilized.¹⁶⁸

162. **The Project SIA/RAP.** In addition to the Project EA, the Project also prepared a Social Impact Assessment and Rehabilitation Action Plan (SIA/RAP) which notes that the Project may have an “*affect on the village water resources by way of blocking the natural sroth.*”¹⁶⁹ The SIA/RAP also notes that concerns about impacts on water sources were raised during consultations. In a section entitled “*Key Issues Raised During Local Level Consultations*” it notes the “*perceived*” impact from blasting on water sources (locally referred to as *Jal Sroth*):

*“Another major impact perceived from blasting is the loss of natural water springs (Sroth) due to blasting and construction of roads and others structures. In Haat village some observed a drop in the water levels due to the blasting activities as part of the testing activities under the project. They also observed that blasting will disturb the layers of water and result in loss of moisture in the soil and affect their agriculture production.”*¹⁷⁰

163. In separate consultations held at Tapon and Math Jadeja villages in August 2007, the SIA/RAP records concern from inhabitants about the possible disturbance to village water resources from the construction of the proposed Head Race Tunnel.¹⁷¹

164. In the 19 villages (later amended in the PAD to 18 villages¹⁷²) affected by land acquisition, socio-economic and demographic surveys were conducted and several questions

¹⁶⁵ Ibid, p. 61, “Table 3.7.15 Drinking Water Sources in the Area.” The 6 villages which overlap with the 18 PAA villages are Gadi Gaun, Jaisal, Haat, Durgapur, Tenduli, and Helong.

¹⁶⁶ EA, Vol. 5, Annex 3.7.2.

¹⁶⁷ EA, section 3.7.14 Waterborne Diseases, Impact on Human Health

¹⁶⁸ EA, vol. 3, Chapter 3, p. 66.

¹⁶⁹ Ibid., p. 74.

¹⁷⁰ Rehabilitation Action Plan for Vishnugad Pipalkoti Hydro Electric Project, Vol. 5, (hereinafter known as SIA/RAP), Village Level Consultations, p. 102.

¹⁷¹ Ibid., p. 76.

¹⁷² The PAD refers to 18 villages as Project affected villages, i.e. villages impacted by land acquisition (see PAD, p. 22, para 57), whereas the RAP considers 19 villages as Project affected villages. The PAD does not explain this difference in numbers. The Panel was informed, after it enquired with Management, that originally 19 villages were getting affected but village Langsi was taken out as non-titleholders squatting on a Public Works Department road were not displaced, and the road was constructed within the available space. The RAP (Table 2.6) states that an Approach Road will affect 90 households in Langsi

related to water use and water sources were asked.¹⁷³ These questions indicate that baseline information on drinking water sources is available for 19 “project affected villages.”

165. The SIA/RAP also states that “the NGO contracted for implementation of RAP, has recorded and visually captured all such water sources in the affected zone. THDC will provide alternative water sources if any of the recorded natural water sources dries up during the implementation of the project.”¹⁷⁴ The SIA/RAP further notes that “[t]he loss of common property resources like grazing lands, cremation place, **water supply**, road, electricity, communication system, path etc. will be restored and the cost for these is presented as part of Community Development Activity for the affected villages...” [emphasis added].¹⁷⁵

166. The SIA/RAP proposed to have the water related mitigation measures financed through “Up gradation of pipe water supply facilities in 7 affected villages” from the overall resettlement activities budget which is estimated to be Indian Rupees (INR) 615.5 million.¹⁷⁶

167. **Environmental Management Plan.** The Report of the Project’s Environment and Social Panel (2008) also refers to the issue of drying up of natural springs, and the need to develop measures to protect these springs. Specifically, it states that “[t]here are few natural springs in the catchment area which are the important source of drinking water for rural people, cattle, and wild animals. Therefore, the Construction Environmental Management Plan should include measures for protecting these natural springs.”¹⁷⁷

168. The Project EMP has a general reference to “vegetation” in the area being dependent on rainfall “and to some extent on small streamlets” and how “the afforestation programme in the vicinity is not supplemented by any irrigation system.” For these, it suggests that “portable water pumps along with requisite PVC pipes need to be utilized to draw water from immediate down slope sources” and for “sites where no immediate source of water is available for this irrigation, the water will be provided by project tankers.”¹⁷⁸ For drinking water sources, it suggests that “JAL Sansthan/ Jal Nigam [water foundation/water department] will be sought for providing drinking water facility in the villages.”¹⁷⁹

¹⁷³ For example, the SIA/RAP provides a “Checklist for Focus Group Discussion” and one question to be asked was “Impact on ground water due to Dam for both drinking water as well as irrigation.” Similarly, while developing a “Village Profile,” the SIA/RAP required that information about “Basic Infrastructure Facility” be collected for impacted villages, and one of the questions to be asked was about the “Drinking water facility and no. of people dependent and location in the village,” and where the “Collection of drinking water” for households occurs. Another question about “Household Particulars” asks that the type of drinking water facility be identified by asking “Drinking water facility (Type): 1. Piped water supply 2. Public tap 3. Streams/nala 4. **Natural Spring/stroth** 5. Others (Specify)_____” [emphasis added]. SIA/RAP, Final Report, Vol. II, Annexure, p. 18.

¹⁷⁴ SIA/RAP, v5, p. 84.

¹⁷⁵ Ibid., Final Report, Vol. I, p. 109.

¹⁷⁶ SIA/RAP, Table 11.4, p. 157.

¹⁷⁷ “Environment and Social Panel Report, Vishnugad-Pipalkoti Hydro Electric Project Report – February 2008” (Word Bank, unpublished report, 2008) p. 5. Management has subsequently clarified that “[t]here is no separate construction “EMP” and the EMP developed for the project includes all aspects of construction and operation.” Email to Inspection Panel, dated March 5, 2014.

¹⁷⁸ CES, “Environmental Studies for Vishnugad Pipalkoti Hydro Electric Project, Final Report Environmental Management Plan (EMP)” (Vol. II, November 2009), p. 32.

¹⁷⁹ EMP, p. 8. The Panel notes that a Jal Sansthan is a water foundation/NGO, and a Jal Nigam is a water department which is usually a government body.

169. **Project Appraisal Document.** The PAD presents some information on drinking water sources in the Project area. It states, in the context of health and safety issues for the local community and incoming workers, that streams and rivulets are used for drinking water in the “*project influence area.*”¹⁸⁰ The PAD also mentions that irrigation in the “*affected villages*” is “*based on tributary streams and springs, not on intakes in the Alaknanda River.*”¹⁸¹ Furthermore, the PAD notes the issue of potential impacts of the tunnels on the mountainside for people in villages affected by land acquisition (7 villages as mentioned in PAD) as well as the 12 non-affected villages situated on the mountain above the head- and tailrace tunnels.¹⁸²

170. **Follow-up studies.** In September 2012, THDC contracted a non-governmental organization (NGO), the Sri Bhubaneshwari Mahila Ashram (SBMA), to measure and document the natural water sources/sroths and develop a baseline of seasonal and perennial water sources in the affected villages along the tunnel alignment area. SBMA has carried out such documentation at least twice, once in December-January 2012-13 and the second time in June 2013.

171. **Observations from the field.** In meetings with World Bank staff and THDC during its investigation visit, the Panel team was informed that the possibility of drinking and irrigation water sources drying up is a concern recognized by Project authorities. The Panel was informed that the Project, through SBMA, is documenting water sources in villages which are situated within 250m on either side of the two tunnels, i.e. the Head Race Tunnel (13.4km) and the Tail Race Tunnel (3km). According to THDC, this is so the Project can provide alternative water arrangements for villages whose water sources dry up as a result of activity that can be attributed to Project works.

172. During the Panel’s field visit, the Requesters claimed that there are indications of disturbances in the spring hydrology regime allegedly due to Project activities related to drilling and tunneling. At the Hatsari hamlet (adjacent to Haat village), after the digging of the drift tunnel, a spring dried up and water started coming from the tunnel itself, although the Panel could not confirm that these events are linked. On the ridge near Surenda village, below which the main headrace tunnel is to pass, the Panel team was informed by villagers that the stream that used to power a traditional grinding mill had dried up subsequent to exploratory drilling. The Panel team visited the dried up stream that used to power the grinding mill, and THDC staff stated they would visit the location after being informed of the alleged impact by the Panel team.

¹⁸⁰ PAD, Annex 10, p. 126, para 84.

¹⁸¹ Ibid., p. 111, para 34.

¹⁸² PAD, p. 23, para 61.



Picture 5: View of Bemru village visited by the Panel team in connection with water source mapping



Picture 6: Surenda water mill



Picture 7: Water flowing from Hatsari drift tunnel

173. It is well documented that tunneling activities impact the hydrogeology of spring sources in many parts of the world, but reliable scientific data for the Himalayas is scant, except for

isolated observations such as the PuwaKhola HEP in Nepal. Closer to Uttarakhand, in neighboring Himachal Pradesh state, several HEPs are facing challenges from local populations because tunneling has allegedly caused disruptions to water sources.¹⁸³ The Panel team was also told by villagers of impacts on the water sources of villages in the vicinity of the two upstream power projects, the Tapovan-Vishnugad HEP and the Vishnuprayag HEP.

174. It is the Panel's view that the possibility of water sources drying up, beyond a distance of 250m on either side of the tunnel alignments warrants careful consideration by Management. According to the Panel's expert, depending on the fractures in the bedrock of the mountains, local impacts from the construction and allied activities can span an area potentially much wider than 500m around the Project infrastructure ("*Project immediate affected area*"), and 250m from the alignment of the tunnels. If this type of risk materializes, the consequences for affected villagers will be very serious. The cost of transporting water to these villages other than by gravity (i.e. either by pumping or by the use of trucks or tankers), will be prohibitively expensive and not sustainable in the long term. Providing water from alternative springs may not be a likely option either, as these springs may already be used by other hamlets, and issues of water rights and conflicts could arise.

175. In this context, mitigation options for Project-related spring failure have to be seriously considered; at the same time, better knowledge of spring hydrogeology could certainly improve safety of tunneling operations in this region.

2.4 Mitigation measures introduced and Bank supervision

176. As stated above, the Panel team was informed by THDC that if Project activities impact or disrupt water supply of villages that are located 250m from the alignment of the tunnels, THDC will make alternative supply arrangements, not only in the 18 "*Project Affected Villages*," but also in other villages that may experience water disruptions due to underground tunneling linked to the Head Race and Tail Race Tunnels.¹⁸⁴

177. The Panel has also received from Management signed copies of minutes of four meetings that took place in 2009 and 2010, attended by THDC and representatives of Math and Jaisal villages and the Vishnugad-Pipalkoti *Sangharsh Committee* (membership of this Committee is not clear from the letters). These minutes indicate that the villagers were concerned about the drying up of water sources and other impacts from the proposed tunneling activities, and requested that their villages be included in the list of Project affected villages. While not agreeing to this request on the basis that this had not been done in other projects, THDC assured the villagers that it shall take up corrective measures and would ensure the availability of water to the affected people/villages in case any disruption to water sources were to occur.¹⁸⁵

¹⁸³ The Panel has received a copy of a letter from Himdhara Environment and Research Collective and Him Lok Jagriti Manch Kinnaur, dated June 5, 2013, "*Subject: Issues related to tunnelling for hydropower projects : Need for immediate action*" which alleges that water sources in Himachal Pradesh have been disrupted by tunneling related to the Karchham Wangtoo, Budhil, Chamera, Parbati II, Parbati III and Larji hydroelectricity projects.

¹⁸⁴ Panel team discussions with THDC in Pipalkoti during investigation visit of April-May, 2013.

¹⁸⁵ Documents (agreements/MoUs) in original Hindi received from Management on March 5, 2014. Translation provided courtesy Management.

178. While this assurance by THDC is important, the Panel found that people had not been informed how this proposed mitigation measure would be implemented, if the need arose. Villagers met by the Panel team in Math and Bemru complained about lack of clarity regarding (i) who will determine whether the Project has a responsibility, and (ii) how village water sources will be replaced if damaged or disrupted, given the topography of the area; (iii) whether this proposed mitigation is limited to domestic drinking water or if it also covers irrigation water; and (iv) for how long mitigation will continue if provision of water is done through trucks/tankers, as this is clearly not a sustainable solution.

3. Panel findings on issues of policy compliance and harm

179. As described above, the Panel is of the view that impacts on village water supplies from the headrace and tailrace tunnels constitute a real risk under the Project. The consolidated EA, the SIA/RAP, and the Expert Panel Report document and discuss the Project's potential impact on village water sources with varying degrees of thoroughness, and make some references to peoples' concerns. The consolidated EA, as a mitigation measure, notes that in case the natural sources dry up, alternative sources may be explored or river water can be utilized. The EA, however, does not explain how water could be speedily and adequately provided on a sustainable basis, the key issue of concern to the Requesters and villages along the alignment of the tunnels.

180. As noted earlier, the EMP states that portable water pumps will be utilized where no immediate source of water is available for irrigation, or water will be provided by trucks or tankers. Regarding drinking water sources, the EMP suggests that the relevant government water department or a water-related foundation/NGO will be asked to provide drinking water facility in the villages. However, the EMP does not provide details of how village water supplies will be permanently reinstated should the need arise.

181. The PAD notes that all water sources have been mapped and measured by THDC to enable assessment and mitigation of any future decrease in water availability caused by Project construction activities in order to address the concerns of the people in villages affected by land acquisition and the 12 non-affected villages situated on the mountain above the head and tailrace tunnels.¹⁸⁶ The PAD states that the Project has committed that any water source that dries up during construction or operation of the Project will be compensated by the Project, either by supplying water directly or by developing and protecting alternative sources. As in the case of other Project documents noted above, the PAD does not specify how water will be supplied to the villages for different uses on a sustainable basis in the event that village water sources are compromised by the Project.

182. The Panel acknowledges that THDC, subsequent to Project approval, has started documenting spring sources through SBMA, and has made a broad commitment to monitor and provide water using alternate sources in the event that a source dries up as a result of Project activities. This documentation initiative by THDC is important. Additionally, the Panel notes the importance of correlating water availability to its uses by the villagers in such documentation.

¹⁸⁶ PAD, p. 23, para 61.

183. The Panel also notes that Bank policy requires that mitigation measures of this kind are clearly elaborated, broadly consulted on, and entitlements explicitly defined in Project preparation documents. As noted above there is no clarity yet about the manner in which sustainable mitigation measures will be taken to provide alternative water sources.

184. **The Panel finds that Management complied with OP/BP 4.01 by undertaking baseline studies to document village water sources along the tunnel alignment routes and ensuring that THDC commits to provide alternative water sources in the event that an existing source is lost. However, the Panel, finds that the Bank failed to identify detailed and adequate mitigation measures that could be operationalized if a water source is lost, in non-compliance with OP/BP 4.01.** The Panel notes the importance of clarifying how alternative water sources will be provided in practical terms to villages for their domestic and irrigation needs, in case the risks materialize during Project implementation.

C. Risks relating to structures, landslides, and earthquakes

1. Requesters' claims and Management Response

185. **Requesters' claims.** The Requesters claim that blasting and tunneling associated with exploratory activities has already led to cracks and damages to a number of homes and structures. They fear that these impacts will be even more widespread as a result of yet to be initiated main construction work, including the construction of the 13.4 km headrace tunnel and the 3 km tailrace tunnel.

186. The Requesters also fear that access road construction along the mountainsides will cause landslides and perhaps even trigger earthquakes in a zone known to have high seismic risks. In meetings with the Panel team, Requesters and villagers raised concerns about the potential for landslides resulting from the widening of existing roads (necessary for transporting some construction equipment). References were made to experiences with the two hydro projects upstream of VPHEP, namely the Vishnuprayag and the Tapovan-Vishnugad HEPs.¹⁸⁷ The Requesters believe that clear mitigation measures for such events are not in place and question whether the risks have been adequately assessed.

187. **Management Response.** Management states that a number of technical assessments, including a geo-technical baseline report, seismology study, a road construction management plan and a landslide management plan have been prepared for the Project. Management also states that a third party technical assessment was commissioned by THDC to assess whether the cracks in houses in Hatsari were the result of geological exploratory work, as claimed by the residents, or were caused by the 1999 Chamoli earthquake.¹⁸⁸ This assessment, according to Management, failed to establish any link between the negative impacts claimed and the geological explorations. Management states that “*as a measure of goodwill,*” THDC in agreement with the District Magistrate has offered to repair the cracks, but Hatsari residents have not responded to this offer.

¹⁸⁷ Vishnuprayag Hydro Electric Project (400MW) and Tapovan-Vishnugad Hydro Electric Project (520 MW).

¹⁸⁸ Management Response, p. 10, para 37.

188. Management also states that “[t]here is no scientific evidence that the tunneling associated with the project can lead to an increase in the incidence of landslides” as the “[t]he volume of tunneling anticipated for VPHEP is minimal and will have no impact on integrity of the surrounding mountains.” Furthermore, with respect to earthquakes, Management states that detailed seismic analysis was carried out during Project preparation and “[t]here is no evidence that the project will lead to increased seismic risks of the region.”¹⁸⁹

189. Nevertheless, Management states that given the “genuine apprehensions” of villagers about construction related impacts on houses, THDC has opted to use a tunnel boring machine which has more environmental and technical benefits than the traditional drill and blast method of tunneling; THDC has also started insuring all houses in a 500m corridor along the alignment of the headrace tunnel to ensure that any unforeseen damage to structures is efficiently and adequately compensated and a physical survey of all structures in 12 villages that lie along the alignment has been completed.¹⁹⁰

2. Panel Observations and Analysis

2.1 Link between the Project and the harm or potential harm

190. **Risks to houses and structures from tunneling/blasting.** The Panel’s expert believes that the Project’s construction activities pose a risk to conventional housing structures in its vicinity. The houses are built in traditional fashion and are not designed to sustain the stress of the intensity or frequency of vibrations caused either by conventional blasting using a Drill & Blast Method (DBM) which will be used in some sections of both tunnels, or from heavy vehicle movements.

191. A primary issue of concern according to calculations done by the Panel’s expert is that even after the substantial reduction in excavation volumes through the use of the TBM technology, conventional blasting techniques will still be used for approximately half of the overall volume of underground excavations, some of which will be carried out in close proximity to settlements. While some construction activity has already started, the Panel notes that the main construction activity, including tunneling, is to start approximately a year after the award of the construction contract (contract was awarded in December 2013).

192. Project authorities believe that because they are using TBM technology, such risks as mentioned above, are minimal. The Panel notes that TBM will be used in 12 km of the 13.4 km Head Race Tunnel, but conventional blasting techniques will be used in the remaining excavation works; these will be related to the construction of the Tail Race Tunnel, access tunnels, the underground powerhouse, and desilting and transformer caverns. These structures are closer to the affected hamlet of Hatsari and other villages.¹⁹¹ The Panel expert estimates that

¹⁸⁹ Management Response, p. 37, sections 16 & 17.

¹⁹⁰ Management Response, p. 41, section 24.

¹⁹¹ The TBM Contingency Plan (“Annexure 1: Contingency Plan for Use of TBM Tunneling” mentions that this technology is to be used only for 12 km (out of 13.4 km) of the headrace tunnel. It is not to be used for the 3 km tailrace tunnel, nor for the access tunnel, underground power house or underground desilting caverns. The Plan further states that a “Risk Matrix” has been “included in the tender documents which provides information related to mitigation means in case of unforeseen conditions such as TBM getting stuck up.”

the use of TBM technology will reduce the potential volume of excavation (muck) by more than 50% if DBM only had been used throughout; this will greatly reduce potential impacts.

193. As noted earlier, the Panel has chosen to include issues of concern raised by communities or the Panel's experts during the course of the eligibility and investigation visits in the spirit of the Project's adaptive management approach. One such issue requiring Management's attention is that of slurry disposal in relation to the TBM. According to the Panel's expert, TBM technology can produce large volumes of slurry (a fluid mixture of pulverized solid with a liquid, normally water). The slurry produced by a TBM is much more liquid in consistency than the "muck" (material removed in the process of excavating or mining) from conventional drill and blast methods; while the conventional drill and blast muck can be trucked away as bits and pieces of rock, slurry has to be pumped out. This raises the question of whether the existing muck disposal plan given in the EMP is equipped to dispose of slurry waste. According to the Panel expert, slurry in this region can be extremely high in heavy metals and cannot be disposed of in the same way as dry excavated material. The Panel's expert notes that in order to treat large scale slurry, and to ensure slurry does not seep into groundwater and risk contaminating water sources, a slurry treatment plant including a wastewater tank, water pump regulation, clay dissolution and back fill plant, sand separator, and storage area is usually required to transform the slurry into solid form to facilitate disposal.

194. Regarding the possible generation of "slurry" as opposed to "muck" by the use of the TBM, the Panel could not find any mention of this issue in the PAD, EA, or EMP and has not been able to find sufficient information to satisfy itself that the Project will be able to appropriately dispose of such slurry, since the existing muck disposal plan and corresponding documents do not cover slurry disposal. **The Panel notes the importance of Management clarifying the issue of slurry disposal.**

195. **Risk of landslides.** This section of the Himalayas is a highly landslide prone area, mainly because of the young and unstable geology and the high intensity monsoon rainfall; frequent tremors contribute to the inherent instability of the Himalayas. Landslides, especially in Patal Ganga and near other tributaries of the left bank in the Project area, have not stabilized. They were already active but were exacerbated with the NH 58 construction and increasingly frequent traffic associated with pilgrimage to the Badrinath shrine. The risk is that the same situation may be repeated on the right bank where the Project is constructing access roads across already unstable slopes to construction sites and adit tunnels.

196. There is also concern about the proposed approach road from Koriya to Siyasain which leads to the Power House and THDC office complex site on the right bank of the Alaknanda. This access road is an expansion of the traditional pilgrimage walking and mule trail leading to the Badrinath temple, as also noted in the PAD.¹⁹²

¹⁹² PAD, p. 118, para 62.



Picture 8: A view of the pilgrim trail leading to THDC colony in Jaisal

197. During its field visits, the Panel team witnessed the serious risks of landslides from road construction and other activities in the steep mountainside topography of the local area. The Panel team was informed that one village had been covered by a landslide after construction had started on the upstream Tapovan-Vishnugad HEP and that there has been a dramatic increase in the occurrence of landslides in the past 5-7 years. Villagers also related this to changing rainfall patterns, with fewer rain days but more intense rainfall. The Panel saw *prima facie* evidence of many landslides on both banks of the Alaknanda River.



Picture 9: view of landslide on right bank near diversion dam site

198. **Risks relating to earthquakes.** Keeping in mind that timing and intensity of earthquake events are not possible to predict, the Project is designed for a Zone V seismic risk, which is the highest risk category possible. While dams can certainly be built, and have been built for such conditions, the issue of concern in such situations is the careful monitoring of construction necessary to ensure that the requisite standards in material and methods are maintained to avoid structural failures during earthquake events. While the Project may have adopted sufficient caution regarding earthquake risks to the dam and other structures in the design, assuring quality control during actual construction and the robustness of the institutional monitoring mechanism will continue to require attention during Project implementation.

2.2 Relevant provisions in Bank policy

199. As noted previously, OP 4.01 on Environmental Assessment requires an assessment of potentially significant impacts or risks of a project, and actions to mitigate or avoid such impacts. The policy further notes that different instruments may be used in combination with each other, according to the nature of the project and its specific risks. Of particular relevance to the types of risks noted above, paragraph 7 of OP 4.01 lists a “Hazard Assessment” or a “Risk Assessment” as an instrument that can be prepared and used.¹⁹³ The Policy goes on to state that the Bank routinely requires Risk Assessment for “*construction of dams in locations vulnerable to seismic activity or other potentially damaging natural events.*”¹⁹⁴ (emphasis added).

200. Another relevant Bank policy is OP/BP 4.37 Safety of Dams. BP 4.37 requires the preparation of several plans to cover safety and supervision related aspects of dam construction. These include a (i) plan for construction supervision and quality assurance to be prepared by Project appraisal; (ii) an Instrumentation Plan which is a detailed plan for the installation of instruments to monitor and record dam behavior and the related hydrometeorological, structural, and seismic factors. This plan is provided to an independent panel of experts and the Bank during the design stage, before bid tendering; (iii) an operation and maintenance (O&M) plan, a preliminary version of which is required at appraisal and a final plan is required not less than six months prior to the initial filling of the reservoir. This plan also covers organizational structure, staffing, technical expertise, and training required; equipment and facilities needed to operate and maintain the dam; O&M procedures; and arrangements for funding O&M, including long-term maintenance and safety inspections;¹⁹⁵ and (iv) an Emergency preparedness plan which is prepared during Project implementation and is provided to the Panel of Experts and Bank for review not later than one year before the projected date of initial filling of the reservoir.¹⁹⁶

2.3 Assessment of the issues in Project documents

201. **Risks to homes and structures from tunneling/blasting.** THDC commissioned two studies in 2009 to assess the impact of blasting on civil structures in and around villages located close to the alignment of the tunnels. One study was specifically for Haat village and the other covered Jharetha, Surenda, Tapovan, Lanji, Dwing, and Dhari which are villages located close to the Head Race Tunnel and Tail Race Tunnel. Given that Haat village was between 120 to 250 meters from the power house cavern and Head Race Tunnel and Tail Race Tunnel, where drill-and-blast methods will be used for excavations, the THDC study recommended a “weight per delay” rate of blasting to minimize impact of vibrations.¹⁹⁷ Since construction blasting involves small blasts with small travel distance for shock waves, no adverse impact is expected. However,

¹⁹³ OP 4.01, para 7.

¹⁹⁴ Ibid., Annex A, paras. 5 & 8.

¹⁹⁵ BP 4.37 notes that in the dam safety practice of several countries, the operation and maintenance plan includes both the instrumentation plan and the emergency preparedness plan as specific sections. This practice is acceptable to the Bank, provided the relevant sections are prepared and finalized according to the timetable set out in Annex A of BP 4.37.

¹⁹⁶ BP 4.37 – Safety of Dams, Annex A Dam Safety Reports: Content and Timing, paras 1-4.

¹⁹⁷ The Panel notes that the entire Haat village is now being relocated.

the report recommends monitoring of actual blast vibration and assessing the damage potential of the vibrations of ground settlement during the construction stage.

202. The PAD refers to this study, and recognizes the possible risk of damage to structures by blasting and tunneling associated with the Project. The PAD states that the Project provides an insurance scheme to cover any impacts that might arise from Project related blasting in a 500m corridor along the tunnel alignment to structures, and has established a baseline of the current condition of all habitations against which damage assessments can be made.

203. **Risk of landslides.** The Project EA refers to the issue of landslides. It states that “... *major environmental issues in the project would include... (c) induced erosion and landslides in the project area and its vicinity.*” The Project EA notes that a Landslide Hazard Zonation Study considered the geo-environment in the area and identified five categories of hazard zones. The study mentions that some major landslides occur along the road section (left bank) of the Project area which, particularly during the monsoon period, disrupt communication systems in the area. These are the Pipalkoti, Pakhi, Tangri, Patal Ganga, Langsi, Gulabkoti and Helong landslides and, according to the EA, these are not likely to have adverse impacts on downstream river flow. On the right bank, the EA notes the Dam Axes landslide, as well as the Tapon and Dwing landslides. The PAD also notes that the four approach and haul roads to be constructed under the Project, which have a total length of 25.6 km, may accelerate landslides and erosion in addition to generating a host of other impacts.¹⁹⁸

204. The PAD also states that in addition to an Operations Manual, arrangements for specific aspects of the Project have been detailed in separate plans, including a TBM Contingency Plan, a Dam Safety Plan which also covers Quality Management, Reservoir Operation and Maintenance, Safety of Dam and Other Structures, and an Emergency Preparedness Plan which was under preparation at the time of Project approval.¹⁹⁹

205. **Risk relating to earthquakes.** The Risk Assessment and Risk Register for the Project states that the Project falls in earthquake Zone V which is the highest categorization with respect to possible earthquake impacts.²⁰⁰ Several earthquakes have been recorded in the area, the most severe one in recent history, the Chamoli earthquake, having occurred on 29 March 1999, with a moderate magnitude of 6.8 on the Richter scale.²⁰¹ Earthquakes with intensities as high as 8 on the Richter scale have occurred along the Himalayas.

206. The PAD states that detailed seismic analysis was carried out in the course of Project preparation, and the Project design has been cleared by the Indian National Committee on Seismic Design Parameters and reviewed by the international Panel of Experts/Dam Safety who gave additional guidance on aspects of the design.²⁰² The PAD also states that an emergency action plan (EAP) is also in place, to take care of potential hazards posed by a dam break, and

¹⁹⁸ PAD, p. 126, para 86.

¹⁹⁹ PAD, Annex 6, para 6.

²⁰⁰ Tehri Hydro Development Corporation Ltd. (THDC), Design & Engineering Department, “Risk Assessment and Risk Register for Vishnugad Pipalkoti HEP,” (Rishikesh, September 2009), p. 3, section 2.2.

²⁰¹ PAD, p. 113, para 43.

²⁰² PAD, p. 16, Table 3. Vishnugad Pipalkoti HEP: Risks and Mitigation Measures.

preventive actions to minimize, to the extent possible, the loss of life and damage to property in any event of dam failure.²⁰³

207. The Panel also notes the advice provided by Management to THDC regarding dam safety studies required by OP 4.37. In this advice, Management outlined the different studies (that THDC would need to prepare, the issues to be covered by these studies, and the timelines of their preparation and finalization.²⁰⁴

2.4 Mitigation measures offered under the Project

208. **Risks to structures and houses from Tunneling/Blasting.** The PAD indicates that the bulk of the tunneling will be carried out without blasting since a TBM will be used for the headrace tunnel. The PAD also mentions that a Project Review Panel consisting of Indian and international experts was formed, which reviewed the Project design from a geotechnical perspective and offered guidance on a number of points. The PAD states that THDC decided to mandate the use of a TBM to drill the headrace tunnel in response to concerns over possible impacts of blasting voiced by people in the Project area, and a contingency plan has been prepared in the event that the TBM experiences difficulties.

209. During the Panel team's visit, concerns were also raised by some villagers about construction related impacts on the Lakshmi Narayan temple at Haat village. This temple is located approximately half-way between Haridwar and Badrinath; the Project EA dates it to 9th-10th century A.D.²⁰⁵ Before 1960, pilgrims used to walk all the way from Haridwar to the holy site of Badrinath, stopping to pay homage at this temple. Many old pilgrims, who could go no further due to their physical condition, paid homage to Badrinath at this temple site as a surrogate and asked for forgiveness for not being able to make it all the way. While the VPHEP will not submerge this *swayamprakat* temple and it does not have to be relocated, it may experience construction-related disturbance as one of the main tunnel adits is located near the temple.²⁰⁶

210. During its field visit, Project authorities indicated to the Panel that the Project intends not only to provide special protection to the temple against damage during construction, but also make additional improvements such as providing a suspension bridge across the Alaknanda for people on the left bank to come worship at the temple. The Panel was also told of plans to develop the vicinity around the temple as an aesthetically pleasing park, once Project activities cease.

211. **Risks relating to landslides.** With respect to Project-induced landslides, the EA proposes the preparation of a map indicating landslide danger levels, and not allowing

²⁰³ PAD, p. 125, para 83.

²⁰⁴ Management correspondence with THDC advising on preparation of dam safety-related plans as required by OP 4.37, September 21, 2009. The studies discussed are the Construction Supervision and Quality Assurance Plan, Operation and Maintenance Plan, and Emergency Preparedness Plan.

²⁰⁵ EA, chapter 3, p. 175.

²⁰⁶ The Lakshmi Narayan temple at Haat is considered a *swayamprakat* temple of Vishnu and Lakshmi. The Panel's expert opines that *swayamprakat* temples cannot be relocated because it is not the temple or the idol therein that is the primary object of holiness, but the very site itself.

construction in these danger areas, as well as erecting signboards showing no-construction zones. The EA notes that the occurrence of landslides due to road cutting may take place on the right and left bank sides of the river, but *“since the dam and surge shaft area come under the low hazardous zone while the TRT outfall area come under the moderate hazardous zone, the triggering of landslide due to project activities is likely to be insignificant or moderate.”*²⁰⁷

212. The Project EMP notes, with respect to landslide prevention and mitigation, that an “expert agency” to be identified by the Forest Department, be tasked with carrying out “heavy engineering works” to control landslides.²⁰⁸ Also, erosion control and slope stabilization measures, such as tree, brushwood and grass planting, will be carried out,²⁰⁹ as well as suitable drainage options, such as surface drainage, sub-surface drainage, toe protection and rock bolting to help prevent landslides in the approach road areas.²¹⁰ Lastly, the EMP proposes for landslides to be monitored through photographic analysis of pre-selected areas of rock and land strata at 6 monthly intervals, and any noticeable changes will serve as advance warning of the possibility of landslides occurring.²¹¹

213. **Risk relating to earthquakes.** With respect to seismicity, the seismic studies carried out during Project preparation indicate that these factors have been acknowledged, and these reports are thorough in addressing whether the dam would withstand the kind of earthquake induced vibrations or suffer a failure or crack.²¹²

3. Panel findings on issues of policy compliance and harm

214. The Panel notes that a number of studies, as mentioned above, related to landslides, seismicity, dam safety and risk assessment have been carried out and have been accepted by Management, and a number of mitigation measures have been specified for the different types of risks as they pertain to dams and other major structures. Moreover, Management has ensured that THDC is aware of the requirements of OP 4.37 relating to dam safety studies.

215. As described above, the TBM will be used in the 12 km stretch of the 13.4 km long headrace tunnel. Conventional blasting techniques will be used for the remaining excavation works (Tail Race Tunnel, access tunnels as well as the underground powerhouse), because these works are not technically suitable for TBM use. The Panel notes the importance of learning lessons from the experience in using TBM machines elsewhere in the Himalayas, including the experience of TBM use in the upstream Tapovan-Vishnugad HEP where the machine remains blocked in the tunnel. Additionally, the Panel notes the potential environmental and human harm from heavy metals leaching into water from untreated slurry produced by the TBM.

216. Given that conventional blasting has occurred, and is still planned near residential areas, it is essential to ensure that proper steps are taken to avoid, minimize and/or compensate for any

²⁰⁷ EA, Vol. 3, p. 71, para 3.7.15.

²⁰⁸ EMP, Vol. 2, p. 15, para d.

²⁰⁹ Ibid., section 4.5.6

²¹⁰ Ibid., p. 45, para 4.12.

²¹¹ Ibid., p. 81.

²¹² These references are to the Seismic Analysis of Dam & Foundation System study and the Design Seismic Parameters for VPHEP.

harm that may arise. With respect to the potential impacts on houses and structures (e.g., cracks in homes) from tunneling and blasting, the Panel notes the importance of the decision to use a TBM machine as it will decrease the total volume excavated by more than 50%, as well as reduce vibrations and related impacts in the areas where it is to be used. **The Panel notes the steps taken to use TBM technology to reduce harms from vibrations.** The Panel also notes the provision in the Project of an insurance scheme to cover potential losses for structures falling within a 500m corridor along the tunnels.²¹³ **The Panel finds that these measures comply with Bank Policy OP/BP 4.01 as a step to reduce or mitigate potential harm.**

217. With respect to **landslides**, given the extreme conditions of geology, geomorphology, meteorology and seismicity in the Himalayas, the Landslide Zonation Study does not examine the impacts of cloudbursts and extreme meteorological phenomena on the unstable mountain slopes and geological formations, which when compounded with intense rainfall, are a major cause of landslides. Also missing from the analysis is an examination of Glacial Lake Outburst Floods (GLOFs) and the regular Himalayan phenomenon of ‘landslide dammed lake outburst flood’.

218. Project authorities are aware that they are working in steep and unstable Himalayan topography, and that this could have adverse impact that could inflict damage to above ground structures. Management has proposed mitigation measures that have provided mixed success in normal event conditions. In extreme conditions of cloudbursts and high seismicity events, more anticipatory caution should be required as is a better understanding of wider watershed behaviors under conditions of cumulative impact. The June 2013 cloudburst event has highlighted this concern and the need for anticipatory contingency planning. In addition, the concern that landslides that could result not only from Project-related road construction or expansion, but also from other rural road extension schemes, needs attention. In the event of a major calamity, the institutional arrangements, responsibilities, and modalities of preventative and/or emergency measures be operationalized and detailed in the Emergency Preparation Plan and the O&M Manual which is consistent with the requirements of BP 4.37. The Panel notes the importance of the organizational and institutional modalities of the final Operation and Maintenance Plan and Emergency Preparedness Plan with respect to the risks discussed in this chapter.

219. In light of the above, **the Panel finds that, in compliance with OP/BP 4.37, Management took adequate measures to ensure the preparation of relevant studies by THDC during Project design, appraisal and implementation stages to mitigate the risks raised in the Request related to earthquakes, landslides and extreme weather events.** The Panel notes the importance of taking into account and addressing the potential risks raised in the Request in the studies to be prepared during Project implementation.

D. Risk to aquatic life and ecology from altered flow and sediment release

1. Requesters’ claims and Management Response

220. **Requesters’ claims.** The Request raises concerns related to silt getting collected in the reservoir, and this affecting aquatic life downstream. In the Representation attached to the

²¹³ PAD, p. 128, para 91.

Request, it is proposed that the Project be re-designed to allow some water to flow freely by not obstructing the entire river with a barrage. This, in the Requesters view, will reduce the Project's negative environmental impacts and allow for sediment flow and fish migration.²¹⁴

221. **Management Response.** Management states that according to the Environmental Assessment there will not be any impact on “*critical aquatic biodiversity*,”²¹⁵ and that the EMP contains several measures to preserve aquatic and terrestrial biodiversity in the Project stretch.

2. Panel observations and analysis

2.1 Link between the Project and the harm or potential harm

222. As a run-of-river project, the small VPHEP pondage will store a very small volume of sediment, especially fine silt and detritus.²¹⁶ However, the discharge of silt and fine sediment into the river will change with the schedule of flushing. When the desilting chamber in the headrace tunnel's cavern near the dam is flushed out, a lot more sediment will reach the river in high concentration pulses which will not be the normal quantity of fine silt and detritus coming from natural flow.²¹⁷ What will come from the tailrace tunnel into the river, however, will be almost silt-free water.

223. **Nutrients.** As a run-of-river project, despite the pulse nature of the proposed flushing system, all the organic detritus part of the sedimentation would be flushed down the river below the tailrace and not be retained in the daily pondage upstream of the dam beyond about 1.75 hours a day. This is not a sufficient time for any biochemical or eutrophic reactions to take place. The pondage at VPHEP is very small compared to the volume of flow in the river. It is only in the driest period of the year, when the river flow goes down to about 8 cumecs (and in one recorded case as low as 2 cumecs) that even a five hour stoppage of flow to fill the pondage would leave the 18 km stretch downstream (till the Tail Race Tunnel outlet) dry.

224. It is the Panel's assessment that while the nutrient-rich detritus portion of the sediment budget might be slightly reduced in the impacted stretch of the river between the dam and the tailrace, which is approximately an 18 km stretch, more of it having gone through the tunnel, the nutrient budget below the tail race at Birahi would not be significantly altered by the Project. Furthermore, the proposed e-flow of 15.65 cumecs is noteworthy and even in the impacted section of the 18 km stretch, no significantly adverse impact in terms of organic nutrient content is likely. The impact of VPHEP will be limited as its pondage retention time is small and much of the organic detritus will have been flushed down.

225. A risk from the Project to river ecology, as mentioned in the IIT-Roorkee Sediment Handling study, may occur from the change in sediment pulse, and the lag time in its transport downstream due to changed hydrology in the stretch of river between the dam and the tailrace

²¹⁴ Potential cumulative impacts on fish of multiple dams is considered in Chapter 2.

²¹⁵ Management Response, Annex 1, section 8, p. 30.

²¹⁶ The Management Response, p.30, states that “*The ‘dead storage’ of the pondage is only 0.45 million cubic meters, which is a minuscule volume compared to the volume of silt transported annually by the river.*”

²¹⁷ IIT-Roorkee Sediment Handling Optimization Study.

outlet that will have reduced flow. With the e-flow of 15.65 cumecs, this risk is not significant. During the high flow (high sediment content part of the year during the monsoon) the water diverted into the Head Race Tunnel will go through the settling basin that will precipitate out much of the silt and sediment, the accumulation of which at the bottom of the desilting chamber will be periodically (frequency determined by sediment accumulation) flushed out. Given the high flow in the river and the high e-flow requirement, the transport downstream of the pulsed release of flushed sediment can be expected to join the normal course of the Alaknanda.

226. **Bedload.** As noted earlier, in alignment with the Project's adaptive management approach, the Panel has chosen to include issues of concern raised by communities or the Panel's experts during the course of the eligibility and investigation visits. One such issue requiring Management's attention is that of bedload in relation to sediment flow.²¹⁸ The Panel's expert notes that the Project's flushing system will release fine silt and other smaller particles, but bedload brought down by landslides, glacial lake outburst floods (GLOF), and mass wasting may get stuck behind the dam. In light of the June 2013 floods, there is concern from the Panel expert that such high bedload movement could seriously damage the dam, roads, structures and the ecology in this area.

227. Early studies in the Nepal Himalayas by the International Centre for Integrated Mountain Development (ICIMOD)²¹⁹ have indicated that in mass balance terms, the mass carried by the major Himalayan rivers could have as much as 90% heavy bedload (i.e. big boulders) and the rest suspended silt and small size sediments. The PAD notes that in the Himalayas sediments can be a serious risk as the rivers can carry high concentration of sediments.²²⁰ It further notes that the "[h]igh sediment load of Alaknanda will erode the turbine runners and other mechanical parts, reducing generation efficiency. There may also be sudden increase in sediment load due to release from upstream HEPs."²²¹

228. Significantly, however, the analysis of bedload movement (the dominant form of mass transfer in the Himalaya-Ganga system due to mass wasting) was not required in the Sediment Handling Optimization Study.²²² According to the Panel's expert, the pondage flushing regimes and mechanism proposed might not be adequate to remove the bedload from VPHEP pondage. This means that pondage volume may diminish, thereby reducing peak capacity. Moreover, bigger size sediments may enter the tunnel and will have to be removed with bigger settling basin and flushing mechanisms, which will require more closure time of the power plant. In the context of the Project, flushing in the Alaknanda during monsoon season will increase peak pulses. The efficacy of the proposed sediment flushing mechanism through the current design of the flushing chamber in VPHEP is uncertain since no study of bedload was commissioned and there is uncertainty regarding the ability of the pondage flushing mechanism to remove material.

²¹⁸The term "bed load" or "bedload" describes particles in a flowing fluid (usually water) that are transported along the bed of a river. The concern is that boulders and heavy gravel can be transported along the bed of a river or stream by strong currents during high flood events.

²¹⁹ Brian Carson, "Erosion and Sedimentation Processes in the Nepalese Himalaya" (International Centre for Integrated Mountain Development, ICIMOD Occasional Paper No. 1, Nepal: Kathmandu, 1985), <http://lib.icimod.org/record/21453>

²²⁰ PAD, Annex 1, p. 30, para 7.

²²¹ PAD, p. 16 "Table 3. Vishnugad Pipalkoti HEP: Risks and Mitigation Measures"

²²² DHI Denmark, "Vishnugad Pipalkoti Hydroelectric Project Sediment Handling Optimization Study"(June 2008).

Given the extensive damage of the upstream Vishnuprayag HEP from massive debris during the June 2013 cloudbursts, a study of sediment movement in the Alaknanda becomes vital.

229. During its investigation, the Panel learned that once the Bank became involved in the Project, Bank Management did advise GOI of the need to study specifically the question of potential impacts on VPHEP from heavy bedload and upstream mass wasting.²²³

230. The Panel therefore notes that while Project documents focus mainly on possible turbine erosion from sedimentation, the mass wasting and bedload movement from extreme events is not prepared for adequately. The Panel notes and commends Management for advising Project authorities of the need to specifically study this issue soon after the Bank's engagement in the Project, but found that the study analysis is lacking. The Panel's expert believes it may be necessary to study this to ensure such bedload movement could be safely passed downstream without damage to the Project and the surrounding areas.

2.2 Relevant provisions in Bank policy

231. As described previously, OP 4.01 Environmental Assessment requires an assessment of potential impacts and risks of a project, and actions to avoid or mitigate those impacts. Similarly, Operational Manual Statement (OMS) 2.20 on Project Appraisal requires identification of key risks presented by a project as part of the appraisal project.²²⁴ These would include potential impacts and risks of a dam on nutrient flow and ecological systems.

2.3 Assessment of the issues in Project documents

232. **PAD.** The PAD includes a discussion of in-stream flow, water quality, and aquatic life. It finds that the stretch of the Alaknanda immediately downstream of the dam will be affected by construction activities which may increase turbidity and erosion, but finds that the impacts on aquatic life in the river may not be significant because there is a relatively small fish population.²²⁵ During implementation, THDC is responsible for monitoring river flows on a monthly basis and will carry out a study of aquatic sustainability and downstream flow requirements.²²⁶

233. **EA.** Aquatic ecology in the EA includes a secondary data review on fish diversity, a primary survey of six sampling sites, a methodology for identifying site selection, results and analysis of findings, migration route analysis, riparian vegetation measurements, and mitigation measures.²²⁷ The managed river flow chapter outlines a Scope of Work with river flow measurement, water usage surveys, pollution load studies, assessment of water borne diseases, and downstream hazards.²²⁸ The EA also states that project authorities are required to maintain

²²³ Vishnugad Pipalkoti HEP (THDC), World Bank comments on Detailed Project Report, October 2008.

²²⁴ OMS 2.20, see Section B for requirements related to Technical Aspects of a project including engineering design and environmental considerations.

²²⁵ PAD, p.125, para 81.

²²⁶ PAD, p. 11, para 31(f).

²²⁷ EA p. 72, para 3.8.

²²⁸ EA, p. 22

the minimum flow for the survival and propagation of aquatic life and that extra flow in addition to the required 3 cumecs from the dam may be released.²²⁹

234. **EMP.** The EMP contains a fish management plan which includes characteristics of endangered fish, management measures with habitat restoration, management of snow trout, producing and stocking fish seed and stock in the river, monitoring water quality, and a budget that includes operations and maintenance to upgrade the fish hatchery.²³⁰ The environmental monitoring plan includes both construction and operation phase guidelines for detailed surveys, monitoring of aquatic ecology, and afforestation programs.²³¹ Aquatic monitoring is also a key component of the adaptive capacity building plan which includes a mandate for a Memorandum of Understanding with the State Fisheries Department.²³²

235. The Project sediment management study was required to address silt and sediments with less than 0.2mm size particles and suggest ways of protecting the turbines from sediment abrasion. Despite Management's advice, no study of bedload was commissioned. As the recent floods have shown the importance of bedload movement during extreme events, a bedload study would strengthen the mitigation measures offered under the Project.



Picture 10 Vishnuprayag HEP (upstream of VPHEP) during June 2013 flood (photo courtesy India Today)

²²⁹ EA, p. 88

²³⁰ EMP, p. 33 - 36

²³¹ EMP, p. 77, para 4.16.5

²³² EMP, p. 112, para 4.18.7



Picture 11 Vishnuprayag HEP (upstream of VPHEP) after June 2013 flood (photo courtesy Matu Jan Sanghatan)

2.4 Mitigation measures introduced and Bank supervision

236. The Project sediment management study was required to address silt and sediments with less than 0.2mm size particles and suggest ways of protecting the turbines from sediment abrasion. Despite Management's advice, no study of bedload was commissioned. As the recent floods have shown the importance of bedload movement during extreme events, a bedload study would strengthen the mitigation measures offered under the Project.

3. Panel findings on issues of policy compliance and harm

237. The Panel's assessment is that while the nutrient-rich detritus portion of the sediment budget might be slightly reduced in the impacted stretch of the river between the dam and the tailrace, the nutrient budget below the tail race at Birahi would not be significantly altered by the Project. The impact of the lower e-flow requirement of upstream Vishnuprayag HEP on the e-flow release required of the Project, however, remains to be clarified.

238. The Panel finds that in light of the proposed increased e-flow figure of 15.65 cumecs, the Project is not expected to have an adverse impact on aquatic life and fish populations in the 18 km stretch of the river where the water is diverted into tunnels by the Project. **Based on the foregoing, the Panel finds the Project to be in compliance with OP/BP 4.01 with respect to the Requesters' claim about the Project's impacts on fish and aquatic fauna.**

Chapter 4:

Claim that the Project is likely to cause serious adverse local socio-economic impacts

A. Introduction

239. The Request, and the Requesters in subsequent meetings with the Panel during field visits, raised specific concerns about resettlement and the restoration of livelihoods under the Project. They also expressed broad concerns that the Project will adversely affect vulnerable communities, including women, and that potential development benefits in the impact area of the Project are unequally shared.

240. This Chapter looks at three key areas of alleged harm and related issues of compliance with Bank policies and procedures, as follows:

- **Resettlement and restoration of livelihoods.** The impacts on Hatsari hamlet and Haat village are examined from the perspective of the claim that the Project may not succeed in restoring the livelihoods of displaced people post-Project, as required by Bank policy. As noted earlier, the issue of Haat village is not included in the Request but was conveyed to the Panel during its field visit of November 2012.
- **Gender related impacts and security issues.** The Requesters claim that impacts of the Project on sources of fuel wood and fodder have not been adequately analyzed and mitigated. Specifically, concerns remain that sources of firewood and fodder for farming dependent households will be permanently diminished, and that it is women who will disproportionately bear the burden of this impact. A related gender impact, allegedly not adequately analyzed, stems from the influx of mostly male labor during the construction period which may pose security issues for women and increase the risk of gender-based violence.
- **Local benefits.** The Requesters claim that the Project transfers access of natural resources from the hands of the poor to the rich, and that the local people will bear the negative environmental impacts while consumers in urban centers benefit from the electricity generated. They also claim that there has not been any overall assessment of the impact of the Project on the local people. Another issue raised with the Panel team during its field visit was about some villages having to share their natural resources and public services with resettled families without receiving any benefits in return, and the inadequacy of the Project's Grievance Redress Mechanism in resolving these matters.

241. The Panel looked at these allegations from the perspective of actual or potential harm, and related compliance with Bank policies and procedures. The Panel considered whether the Requesters' concerns were warranted, whether Management overlooked or underestimated the associated risks, whether the proposed mitigation measures were adequate, and whether the Bank's actions or omissions constitute lack of compliance with relevant Bank Policies and Procedures. The Panel's findings are summarized at the end of each section below.

B. Resettlement and Restoration of Livelihoods

1. Requesters' Claims and Management Response

242. **Requesters' Claims.** As described in Chapter 3, the Request specifically refers to impacts from Project activities on houses and water sources at Hatsari hamlet.²³³ Hatsari hamlet and adjacent farm land, which administratively is part of the Haat revenue village but is located at some distance from it, were originally scheduled for acquisition under the Project. The affected households in Hatsari, however, refused to accept the compensation package offered under the Project, and have informed the Panel of several concerns about the compensation being inconsistent with the Bank's Policy on Involuntary Resettlement.

243. **Management Response.** Management states that Hatsari, a small hamlet of eight households in the revenue village of Haat, is the only village where no agreement on resettlement could be reached thus far. Management notes that while the residents of the main Haat village requested THDC to acquire their lands and houses and relocate them across the river where the majority owned additional land, the residents of Hatsari, who do not own land on the other side of the river, opted not to relocate. According to Management, while most of the Hatsari area was initially slated for acquisition, THDC subsequently decided to reduce the required area for acquisition from 8 ha to 0.6 ha and re-aligned the access tunnel to the powerhouse *"to mitigate the alleged potential impacts of the project in the hamlet."*²³⁴

244. Management notes that despite the failure to reach a negotiated settlement with the residents of Hatsari, THDC remains committed to finding a solution satisfactory to all parties and has offered to relocate the entire hamlet keeping in mind temporary inconvenience during construction. However, according to Management, the community remains steadfast in its demands for land in either Rishikesh or Dehradun, which is beyond the regulatory norms in India.²³⁵

245. More generally, the Management Response notes that in comparison to other projects of its type and size, the VPHEP has a *"very small footprint"* in terms of environmental and social risks and *"a relatively low level of resettlement."* Specifically, the Response notes that resettlement involves 265 families, of whom 92% are *"families who requested relocation from village Haat to the other side of the river."*²³⁶

246. At the time of the submission of this report, Management's latest information states that the Project does not require Hatsari land. However, THDC is willing to compensate Hatsari residents for indirect impacts on the basis of the "Haat Package" and negotiations are ongoing (see Box 4 for the "Haat package"). Of the 13 Hatsari families, Management states that two families have accepted THDC's offer of one-time payment and have shifted to Mayapur, and two

²³³ Project documents use both "Hatsari" and "Harsari" when referring to the hamlet.

²³⁴ Management Response, p. 10, para 37.

²³⁵ Management Response, p. 11, Box. 1.

²³⁶ Management Response, p. 3, para 11.

non-resident landowners have indicated willingness to sell their lands to THDC, and discussions are ongoing with the remaining families residing in the village.²³⁷

Box 4 – the Haat package

The resettlement agreement (the so-called “Haat package”) was signed between the villagers and THDC on June 26, 2009. Households who had to resettle from Haat were offered:

- **Cash amount:** INR 1 million paid in three installments (30:30:40), for self-resettlement, primarily meant to build a house on a self-owned agricultural plot at a different location. At the time of the Panel’s visit, families which had agreed to shift had received the first two installments.
- **Public infrastructure:** THDC is building roads, footpaths, and providing water and electricity at two relocation sites on the other side of the river.
- **Income rehabilitation support:** Through SBMA, an NGO contracted by THDC, selected families participate in income generation training programs and schemes, and there are special measures for vulnerable households.

247. The discussion below begins with a brief review of the scale of land acquisition under the Project. It then examines the claims related to displacement, resettlement and livelihood restoration involving Hatsari hamlet, and a related issue about livelihood restoration of concern to families from Haat village.

2. Panel observations and analysis

2.1 Link between the Project and the Harm or Potential Harm

248. **Scale of land acquisition by the Project.** According to the RAP, VPHEP will affect a total of 1,223 households (1,477 families with 5,159 persons) in 19 villages (amended to 18 villages in the PAD).²³⁸ The Project will require a total of 141.53 ha of land comprising 31.62 ha of private land, 90.09 ha of government forest/grazing land, 10.3 ha of *van panchayat* land (community held grazing and forest land), and 9.54 ha of state land owned by the Public Works Department.²³⁹

249. Seven villages are directly impacted through loss of privately owned land.²⁴⁰ Furthermore, the acquisition of private land will affect 769 families, while an additional 708 families are partially impacted in the rest of the 12 Project-affected villages in terms of losing partial access to government forest/grazing and/or *van panchayat* land.²⁴¹

250. Project documents also provide information about land acquisition on a village-by-village basis. In Haat village, 68.75% of total private land is to be acquired, followed by Jaisaal village (21.58%) and Gulabkoti village (10.44%).²⁴² According to more updated information, the number of families losing privately-owned land in the seven villages is now 894 families (558

²³⁷ Aide-Memoire March 9-14 2014, p. 4, para 14.

²³⁸ RAP, Annex 10A, 2.0: Project Background.

²³⁹ RAP, Annex 10 A, p. 1, Section 2.0 Project Background. The PAD provides slightly higher numbers and states that 1,481 families and 5,294 persons will be affected (p. 22 para 57 and p 101, Sec 7 Land Acquisition Impacts)

²⁴⁰ RAP, section 1.3, p. 2.

²⁴¹ THDC, “Rehabilitation Action Plan for 444 MW Vishnugad Pipalkoti Hydro Electric Project,” World Bank, Report no. RP856-v5, (2009), Annex 10 A, p. 2.

²⁴² Ibid, Table 3.1: Village wise extent of Land under Acquisition, p. 32.

titleholders).²⁴³ A total of 265 families will have to resettle, of which 92 percent (242 families) are from Haat who requested THDC to acquire their land.²⁴⁴

251. **Impacts at Hatsari Hamlet.** The PAD states that Hatsari hamlet consists of eight extended households comprising 11 families (the latest Aide Memoire mentions 13 families²⁴⁵).²⁴⁶ It is located at a short distance downstream from the larger Haat village on the right bank of the Alaknanda River. The area from Haat village, passing Hatsari hamlet, and downstream to Jaisal village, is the location of major Project infrastructure, including works sites for the tunneling to the underground pump house, access roads, muck disposal areas, the switchyard, and the already constructed THDC office complex and residential quarters.

252. The Management Response indicates that while most of the Hatsari area was initially slated for acquisition, THDC subsequently decided to reduce the area for acquisition from 8 ha to 0.6 ha and re-aligned the access tunnel to the powerhouse “to mitigate the alleged potential impacts of the project in the hamlet.”²⁴⁷ The families of Hatsari, nevertheless, are concerned that the proposed major Project works and construction activity near Hatsari will render their homes uninhabitable.

253. During the Panel team’s field visits, the residents of Hatsari talked about the value the hamlet holds for them. This value, according to them, is reflected not only in the homes and structures of their hamlet but also in the communal areas, the farm land, the religious sites, the proximity to the river, the forest cover, and the fact that Hatsari is located on the historic pilgrim path leading to Badrinath. In their view, any relocation option should take into account these tangible and intangible features and values.



Picture 12: A view of Hatsari

²⁴³ “Vishnugad Pipalkoti Hydro Electric Project Status Update March 2013,” World Bank, March 20, 2013, <http://www.worldbank.org/en/news/feature/2013/03/20/Vishnugad-Pipalkoti-Hydro-Electric-Project-Status-Update-March-2013>.

²⁴⁴ PAD, p. 23, para 57.

²⁴⁵ Aide-Memoire March 9-14 2014, p. 4, para 14.

²⁴⁶ PAD, p. 23, para 58.

²⁴⁷ Management Response, p. 10, para 37.



Picture 13: Hatsari hamlet

254. The Panel also notes that Hatsari hamlet is in the midst of the Project construction zone. Hatsari is located on a narrow strip of land with steep slopes in the corridor between the Project's main construction site at Haat and the THDC colony. By May 2013, drilling of an exploratory drift a short distance downstream of the hamlet had started and muck was disposed along the river bank. It is THDC's assessment, with which the Panel concurs, that Hatsari will not be a habitable area during the construction period (estimated in Project documents to last for 5 years), and the conditions thereafter are highly uncertain. Hence, all households at Hatsari will potentially be seriously affected, irrespective of the scale of land acquisition.

255. **Impacts at Haat - the issue of livelihoods.** As noted previously, during its field visit of November 2012, the Panel received expressions of concern from members of the relocated Haat village about a loss of livelihoods as a result of their relocation across the river to resettle on their own land. Because these issues of livelihood at Haat village were not raised explicitly in the Request for Inspection, they are not addressed in the Management Response.

256. The Panel notes that while all Project Affected Family (PAFs) at Haat have agreed to the "*Haat package*," their capacity for successful resettlement and rehabilitation varies. The Project is taking over 20.271 hectares of private land of Haat village to use for Project related construction and activities.²⁴⁸ A majority of PAFs in Haat are small landowners owning less than 20 *Naali* (according to Annex 4 of the RAP, 20 *Naali* is 1 acre; 50 *Naali* is 1 Hectare) of land.²⁴⁹ Although the Panel was unable to find in Project documents the average size of landholdings in Haat, the district-wide figure of 48% of the population being marginal farmers owning less than 0.5 ha of land, is likely to be true for Haat as well.²⁵⁰

257. Of the 136 households from Haat whose houses were to be acquired, 95 reside in the village and are entitled to the compensation provisions of VPHEP's R&R Policy and the special assistance grant of INR 1 million that THDC provides to households that choose to resettle on

²⁴⁸ RAP, section 2.4.6, p. 14. The RAP states Haat land is needed for the powerhouse, access road, and Switchyard (para 2.4.3, p. 14).

²⁴⁹ RAP, Annex 3, p. 23, Microplans of PAFs in Haat Village based on Loss of Land.

²⁵⁰ PAD, Annex 10, para 2, p. 100.

their own.²⁵¹ The self-construction of new houses across the river for the families resettled from Haat village is ongoing and some households have already made the move. With respect to Haat, 53 titleholders are yet to receive their compensation and, according to Management, most of these titleholders have either taken their case to litigation or are non-residents demanding the special assistance package given to other resident families of the Haat village. Of the 253 Haat families eligible for R&R assistance, 127 families have received their R&R assistance as of December 2013.²⁵²

258. As residents of Haat are relocating to their own lands across the river, the Haat package implies that farming land is at least partly being turned into housing areas. It is evident that many in Haat welcomed the opportunity to rebuild their houses on lands on the Pipalkoti (right bank) side of the Alaknanda River which has better road connectivity and more economic opportunities.



Picture 14: A view of old Haat village (right bank)



Picture 15: New Haat houses at resettlement site (left bank)

²⁵¹ RAP, section 2.4.6, p. 14.

²⁵² Aide Memoire, para 13, p. 3 & 4. March 9-14, 2014.

259. As baseline studies observed, most families in the region would usually own land in two or more parcels of differing quality. Land in the valley, closer to the river, is more productive while requiring some irrigation, while that in the uplands is only rain-fed and used typically to graze animals or to grow hardy crops like pulses. The land where Haat families are building their new houses is flat with some amount of seasonal irrigation, and has been important agricultural land. The Panel notes, that the water supply made available by THDC to resettlement sites is for domestic use, and not for irrigation, and therefore may not be sufficient to meet both demands, which is an issue of concern for some Project Affected Persons (PAPs).

260. In this area, with high natural variability and risks, agriculture is the predominant source of income and provides food security for almost all households. Remittances from migrant labor are also a substantial part of the economy. The Panel notes that as a result of this resettlement approach, PAFs will be left with less agricultural land, or in some cases none at all,²⁵³ which raises a question about the longer term effects on the livelihoods of these PAFs.²⁵⁴ The Panel notes that the Project R&R policy offers a “Rehabilitation Grant” according to the severity of agricultural land loss experienced by PAFs. However, this is a one-time grant, based on the minimum agriculture wage (MAW) at INR 100/- per day.²⁵⁵

261. The Panel notes that though the Haat resettlement is explained in detail in the RAP, the repercussions of diminishing farm land on the livelihoods of the Haat PAPs subsequent to resettlement is not addressed. The Panel also notes that such livelihood restoration efforts carry a number of risks, especially for the poorer and most vulnerable families. The THDC R&R Policy, augmented with resources from THDC’s corporate social responsibility programs, meets Bank policy requirements, but judging from statements given to the Panel team and the Panel team’s own observations, there is a lack of clarity on how these livelihood restoration initiatives will translate into actual improvements in the lives of the PAFs. The Panel notes that to be effective and profitable, livelihood and self-employment schemes, particularly those that are non-farm based, require long term follow-up to foster leadership, entrepreneurial and institutional skills, and also need lucrative marketing opportunities.

262. The Panel understands that Haat village is among the 18 Project affected villages, which will be eligible to benefit from INR 310 million dedicated funds during the construction period. These funds will finance investment plans prepared by the communities in all 18 villages. THDC will also provide 100kWh of free electricity per month to Project affected households for a period of ten years.

263. In sum, the Panel notes the substantial steps taken under the Project to identify and address the resettlement needs of displaced families from Haat village under the THDC R&R Policy. At the same time, the resettlement approach for Haat village implies, for most households, reduced land holdings and a need to develop new sources of income and food. This suggests a risk that vulnerable households may not succeed in restoring their pre-Project

²⁵³ RAP, Section 3.3.2, p. 44 states that six households will become landless after land acquisition.

²⁵⁴ The Panel was unable to locate from Project documents the exact size of landholdings in the resettlement sites of El Dana and Daswana to which Haat families are relocating, so it is not clear what amount of agriculture land is being used for housing.

²⁵⁵ RAP, Table 11.3: Rehabilitation Grant according to severity of agricultural land loss, p. 153.

livelihoods. **The Panel understands that livelihood restoration efforts are being carried out by THDC and supported by Management. The Panel notes the importance of the need to closely monitor and examine, as part of RAP implementation and supervision, the impact of these efforts which are aimed at improving the socio-economic status of the affected population.**

2.2 Relevant provisions in Bank policy

264. **OP 4.12 on Involuntary Resettlement.** OP 4.12 on Involuntary Resettlement sets out Bank policy provisions on issues involving land acquisition and resettlement. The Policy covers direct economic and social impacts²⁵⁶ that result from Bank-assisted investment projects, and are caused by “... *the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) loss of assets or access to assets; or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location.*”²⁵⁷

265. The Policy provides that involuntary resettlement “*should be avoided where feasible, or minimized, exploring all alternative project designs.*”²⁵⁸ Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed “... *as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits.*”²⁵⁹ Displaced persons should be assisted in their efforts “*to improve their livelihoods and standards of living or at least restore them, in real terms*” to pre-displacement levels or levels prevailing prior to the beginning of project implementation, whichever is higher.²⁶⁰ The resettlement plan developed under the Policy, among other things, provides prompt and effective compensation “*at full replacement cost for losses of assets attributable directly to the project.*”²⁶¹

266. OP 4.12 includes other provisions that are particularly relevant for the Hatsari residents, including that “[p]reference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based,” and that whenever replacement land is offered, it should be “*at least equivalent to the advantages of the land taken.*”²⁶²

267. **National Law and Policy.** The process of land acquisition in the Project follows the ‘National Law for Acquisition of Private Properties’ also referred to as the Land Acquisition Act of 1894. In addition, the Project follows the 2007 National Resettlement and Rehabilitation (R&R) Policy (referred to as NRRP) which establishes a framework for extending rehabilitation

²⁵⁶ In cases of ‘adverse indirect social or economic impacts’, the Policy states that it is good practice to undertake a social assessment and implement measures to minimize and mitigate adverse economic and social impacts. It adds that other environmental, social and economic impacts “... *that do not result from land taking may be identified and addressed through environmental assessments and other project reports and instrument.*” OP 4.12-Involuntary Resettlement, footnote 5.

²⁵⁷ OP 4.12, para 3. The term ‘involuntary’ is explained as meaning “*actions that may be taken without the displaced person's informed consent or power of choice*” (OP 4.12, Footnote 7).

²⁵⁸ OP 4.12, para 2(a).

²⁵⁹ OP 4.12, para 2(b).

²⁶⁰ OP 4.12, para 2(c).

²⁶¹ OP 4.12, para 6.

²⁶² OP 4.12, paragraph 11.

assistance to Project Affected Families (PAFs) over and above the compensation for assets provided under the Land Acquisition Act and also provides for consultation between PAFs and project authorities.²⁶³

2.3 Assessment of the issue in Project documents

268. A Social Impact Assessment (SIA) was prepared for the Project, including a draft R&R Policy.²⁶⁴ This Policy was later revised to include an alternative option for compensating land. This option is referred to as a negotiated settlement, and forms part of the Rehabilitation Action Plan (RAP) publicly disclosed in-country on 17th August, 2009 and on 14th September, 2009 in the Bank's InfoShop.²⁶⁵

269. The Panel notes that the RAP only brings up the Hatsari issue to point out the fact that the villagers were refusing to move, and that the resolution was one of shifting the location of the switch yard to Haat village to avoid requiring the acquisition of land from Hatsari families.²⁶⁶ The PAD mentions that 11 families (8 households) of Hatsari had refused to shift, causing the Project to be redesigned, and reducing land impact on the households.²⁶⁷

270. As per clause 2.3.1 of the THDC R&R Policy, a land-for-land option is applicable to PAFs "*owning agricultural land in the affected zone, whose entire land has been acquired or has been reduced to status of marginal as a consequence of the acquisition,*" but this is subject to a maximum of one hectare of irrigated land or two hectares of unirrigated/cultivable wasteland and the availability of government land in the district.²⁶⁸

271. The RAP later asserts that government land is not available for land-for-land compensation.²⁶⁹ Given this situation, the RAP states that "*THDC through NGO will facilitate purchase of private land for the land losing PAFs on a "willing buyer-willing seller" basis.*"²⁷⁰ The assumption is that cash compensation for land and other immovable assets will be sufficient to meet the Bank policy objective of livelihood restoration.

²⁶³ The Panel notes that a new national land acquisition act, the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, has been passed which was to come into force from January 1, 2014 across the country. It has been confirmed by Management, however, that this Act will not affect any remaining land acquisition for the Project since THDC has already paid compensation and has taken physical possession of the land.

²⁶⁴ RAP, Annexure 8, "Resettlement [sic] & Rehabilitation Policy of Vishnugad Pipalkoti Hydro Electric Project (444 MW)."

²⁶⁵ THDC, "Rehabilitation Action Plan for 444 MW Vishnugad Pipalkoti Hydro Electric Project," Report no. RP856-v2 (July, 2009).

²⁶⁶ RAP, p. 86.

²⁶⁷ PAD, p. 23, para 58.

²⁶⁸ RAP, p. 40.

²⁶⁹ RAP, section 3.3.54, p. 42. Also, the PAD (p. 105, Footnote 66) states that "*Land for land,*" although included as an option in THDC's corporate R&R Policy, could not be applied in the case of VPHEP as (i) no replacement government land was available; and (ii) the absence of a functioning land market in the area renders it impossible for THDC to furnish land losers with adequate replacement land. Furthermore, all affected families have chosen to obtain possible replacement land on their own."

²⁷⁰ RAP, p. 40.

2.4 Mitigation measures introduced and Bank supervision

272. The Management Response notes that THDC offered residents of Hatsari the Haat package which was refused.²⁷¹ Subsequently THDC has offered temporary arrangements (i.e. relocation only for the construction period), or assistance to identify replacement land to be purchased with the compensation provided under the R&R Policy.²⁷² According to Management, the resistance to move is rooted in a persistent “*demand for land in the urban area of the plains*” which is “*beyond the regulatory norms in India.*”²⁷³

273. Management has kept a close eye on the Hatsari issue since the time when the Hatsari residents refused the Haat package. Supervision reports document THDC’s efforts to dialogue with Hatsari residents, sometimes in the presence of Bank staff, and while this dialogue and efforts to negotiate are to be commended, there is no indication of Management offering an explanation for why the Haat package is unacceptable to Hatsari residents other than suggesting that Hatsari residents wish to relocate to urban areas in the plains.

274. Given the urgency of the situation and the desire on all sides to find an acceptable solution, the Panel team met with Bank staff upon returning to Delhi from the field to convey observations of the Hatsari situation and the desire expressed by Hatsari residents for the Bank to assist them in arriving at a solution. The Panel was informed by Management that Bank staff met with the Hatsari residents in June 2013, and discussed the situation with them, including the idea of a compensation plan that would address their particular situation, i.e. a “Hatsari Package.” However, the latest supervision document does not discuss a Hatsari Package, and states that THDC continues to prefer to facilitate Hatsari relocation on equal terms as those agreed with the residents of Haat, and negotiations with the families at Hatsari are on-going.²⁷⁴

275. **Assessment of livelihood initiatives.** The Project’s R&R Policy includes several measures to assist people to develop new livelihood options. At the time of writing of this report, since negotiations with the remaining Hatsari residents have not concluded, it is not clear to the Panel whether the Project’s R&R provisions related to livelihood improvements will be made available to all Hatsari residents.

3. Panel findings on issues of policy compliance and harm

276. The Panel’s investigation shows that a key difficulty in reaching an acceptable resettlement solution for Hatsari relates to the fact that they have been offered the same package as the one developed for the residents of the main Haat village. The Panel notes that the situation

²⁷¹ Management Response, p. 11, vii.

²⁷² According to a THDC presentation made to the Panel team in May 2013, THDC’s offer to the Hatsari households includes the following: similar to the main village of Haat, THDC would support the purchase of land on willing buyer-willing seller basis, and THDC will provide logistical support. Or, Hatsari land may be leased out to the Project for the construction period and returned after completion of Project; or, if not willing to vacate land, alternate accommodation will be provided including compensation for existing houses. THDC also offered to construct “*pucca*” (concrete/permanent) houses for Hatsari households within the vicinity.

²⁷³ Management Response, p. 12, vii.

²⁷⁴ Aide-Memoire for Project Launch & Implementation Support Visit, March 9-14, 2014, World Bank, para 14, p. 4.

at Hatsari hamlet is different from that of Haat village as Hatsari families do not possess additional land in the vicinity where they can relocate, unlike the Haat families. Hence they have been holding out for a different solution that is suitable for them.

277. The Panel notes that the protections and safeguards under OP/BP 4.12 Involuntary Resettlement apply to the Hatsari residents. As described above, Project construction activities (even after the design realignment) will take over a portion of Hatsari land, and the hamlet will be uninhabitable during the years of large-scale Project-related construction estimated to be at least 5 years, and very possibly later as well.

278. OP/BP 4.12 on Involuntary Resettlement provides that project affected people should be assisted to improve or at least restore their livelihoods and standard of living to pre-displacement levels.²⁷⁵ This focuses on restoration of livelihoods as a core objective, and the Policy provides guidance on how to achieve this, while allowing some flexibility in approaches to be taken.

279. The Policy further states that land-for-land is the preferred approach for people whose livelihoods are land-based,²⁷⁶ as is the case in Hatsari hamlet. It states that whenever replacement land is offered, the resettled people *“are provided with land for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the land taken.”*²⁷⁷

280. The Policy also states that payment of cash compensation for lost assets *“may be appropriate where (a) livelihoods are land-based but the land taken for the project is a small fraction of the affected asset and the residual is economically viable; (b) active markets for land, housing and labor exist, displaced persons use such markets, and there is sufficient supply of land and housing; or (c) livelihoods are not land based.”*²⁷⁸

281. The Panel notes the need for a specially negotiated *“Hatsari package”* to facilitate a ‘voluntary resettlement’ for families wanting to relocate within the local area, similar to what was achieved with the *“Haat package.”* In the case of Hatsari, the core element needs to be replacement of agricultural land or non-land-based livelihood restoration options, or a combination of the two, sufficient to meet the core elements of Bank policy noted above.

282. Compliance with Bank policy requires that a solution for satisfactory mitigation of Project impacts on the Hatsari community is found, and livelihood restoration options are provided. The Panel is of the view that efforts should be made to identify replacement land in the vicinity that is *“at least equivalent”*²⁷⁹ to their existing land. The Panel also notes that Bank policy and the recent *“Guide for Local Benefit Sharing in Hydropower Projects”* recognizes that livelihood restoration can involve non-land-based options built around opportunities for employment or self-employment.²⁸⁰

²⁷⁵ OP 4.12, para 2.

²⁷⁶ OP 4.12, para 11.

²⁷⁷ OP 4.12, para 11.

²⁷⁸ OP 4.12, para 12.

²⁷⁹ OP 4.12, para 11.

²⁸⁰ Wang, Chaogang. A Guide for Local Benefit Sharing in Hydropower Projects, World Bank, Social Development Papers, Paper No. 128/June 2012.

283. As noted earlier, the Panel understands that resettlement and rehabilitation efforts are underway and almost half of the eligible families have already received their R&R assistance. With respect to Hatsari, however, which had 13 families residing, **the Panel finds that the Project RAP did not adequately assess the Hatsari situation in non-compliance with OP/BP 4.12 on Involuntary Resettlement.** The Panel notes that 2 families from Hatsari have accepted the Haat package and 2 non-resident families have agreed to sell their land to THDC. Negotiations are still continuing with the remaining 6 Hatsari families that reside in the village.

C. Gender Impacts: Livelihoods and Security Issues

284. The discussion below examines: (a) the impacts of the Project on livelihoods, including collection of fuel wood and fodder, and drinking water from a gender perspective, taking into account that approximately 23% (33 HHs) of the 142 vulnerable households are female-headed, that 90% of all Below Poverty Level (BPL) households are also female-headed, and that these impacts are likely to be felt disproportionately by women;²⁸¹ and (b) the concern about potential risks for women in the area from the expected influx of mostly male workers during the construction period.

1. Requesters' Claims and Management Response

285. **Requesters Claims.** The Requesters allege that “[d]ue to the dust arising from the dam construction site, fodder for animals is getting destroyed. This is also affecting agricultural land and the forest cover of the state.” The complaint also mentions that “[t]he rise in temperatures due to the dams is also affecting local crops and plants,” and “[t]he impact of the project on different stakeholders has not been assessed.” The Request does not specify in further detail what impacts on livelihoods are likely to happen.

286. Such concerns were, however, elaborated by several villagers in meetings with the Panel team. The Panel team was told that access to forests and non-cultivated land for collection of firewood for domestic use and fodder for livestock (grass, leaves) is an important part of the family economy, and especially of poor and vulnerable female-headed households. The gathering of fuelwood and fodder is considered women’s work. These resources are becoming increasingly scarce with new infrastructure development, population growth,²⁸² and landslides.

287. The Request further states that “[t]housands of people are engaged in construction work. They live in the same place. The dirt and unhygienic conditions has resulted in an escalation in the spread of diseases. Since most of the workers are immigrants, this movement of people also has an effect on the local culture, and environment for which there can be no compensation.” It also states that “[t]he local culture and women’s freedom are the worst affected. There can be no compensation for this.”²⁸³ During its visit, the Panel team met with a number of people,

²⁸¹ RAP, table 2.27 and on p. 35 RAP states “...women constitute about 49% the affected population in the project.”

²⁸² The population growth of Chamoli District between the 2001 and 2011 censuses was 5.7%, compared to 13.9% between 1991 and 2001. This reflects substantial out-migration from the valley to lowland urban areas.

²⁸³ Request for Inspection, p. 7. Translation from Hindi to English provided by Requesters.

including women, from several villages and communities, who expressed similar concerns about negative impacts of the Project on women.

288. **Management Response.** The Management Response states that the National Green Tribunal commended good practices under the Project, including that “*disbursements to households eligible for assistance arising from the loss of community amenities have largely been completed, as have disbursements for compensation for fuel and fodder.*”²⁸⁴

289. Management also states that “[t]he main concerns expressed by women centered on possible loss of access to *van panchayat* (community forest) land for collecting fuel and fodder (a daily chore for most village women) and safety concerns arising from the influx of construction labor.” It further goes on to state that “[i]n addition to compensation for food and fodder losses paid by THDC, the civil works contractor will be contractually obligated to undertake measures aimed at securing the safety of women living in villages around the labor camps. The contract document contains specific provisions (like fenced camps, no use of firewood, etc.) to prevent the labor force from accessing community forest lands to ensure the safety of women collecting fodder and firewood.”²⁸⁵

2. Panel observations and analysis

2.1 Link between the Project and the harm or potential harm

290. One of the major issues stated to the Panel team by women of Haat village is the loss of their *van panchayat* (community forest) land, which was located just above the original village, and the fact that from any new location access to this forest would mean a walk of several additional kilometers.²⁸⁶ It also came up in meetings in other villages where it was stated that the availability of fuel and fodder will be impacted by the extensive dust created by road traffic and construction works. People also said that dust pollution affects the blossoming of fruit bearing trees and ultimately the harvest.



Picture 16: women carrying fodder

²⁸⁴ Management Response, p. 4, para 12.

²⁸⁵ Management Response, section 22, p. 39.

²⁸⁶ Meeting of IPN with women of Haat village, May 27, 2013.

291. As mentioned earlier, the Project will be acquiring 141.57 ha hectares of land, including 90.09 ha of government forest/grazing land and 10.3 ha of *van panchayat* land. In this area, these forestlands are the main source of fuel wood and fodder for households, and 92% of all Project-affected households depend on the *van panchayat*.²⁸⁷

292. The Panel team was informed by Requesters that not only parts of community forest areas are being lost, but (i) that since households (in Haat) were relocating, the distance traveled for access would increase, thus increasing women's workload and raising security concerns for women especially in the context of the impending arrival of a mostly male labor force, and (ii) that this may lead women to access community forests which are closer to them, but where they do not have traditional rights, and this could be a source of conflict with other villages.

293. The Panel considers that these potential impacts are of a serious nature, in particular since poor and marginal households, especially those headed by women, stand to be most affected. Various Project documents highlight this issue, and in response to demands from villagers a specific compensation for the loss of forest resources was designed,²⁸⁸ but people still believe this is inadequate and that it does not cover all who are impacted.

294. In addition, the construction phase of the Project, likely to span 5 years, is estimated to bring 2000 semi-skilled and unskilled workers and 600 highly skilled workers to the area. These workers are proposed to be boarded in 2 labor camps in Gulabkoti and Batula villages, which invariably will bring the labor in close contact with villagers.

295. The Panel notes that there are three ways in which the arrival of male labor could impact women in the area, especially given the context of a high percentage of female-headed households and male out-migration. These impacts are in the realm of (i) livelihood security, i.e. fuel wood collection, as workers may access *van panchayats* to meet their fuel needs; (ii) the increased risk of gender-based violence when women visit forests, work in their fields, or perform other household chores outside their homes; and (iii) the likely competition for water in an area where water sources are already identified for use by specific villages, and the arrival of the labor population may exacerbate problems of access and availability, possibly leading to conflicts.

2.2 Relevant provisions in Bank policy

296. Bank Policy OP 4.01 requires the Project EA to assess the environmental and social impacts of a project, and set out steps to avoid, mitigate and/or compensate for adverse impacts. The EA should also describe relevant baseline data, including socioeconomic conditions.²⁸⁹

297. The Bank's Environmental Assessment Sourcebook 1999 provides guidance on how to apply OP 4.01 in respect to social issues. It states that a "[s]ocial assessment for EA purposes focuses on how various groups of people affected by a project allocate, regulate and defend

²⁸⁷ RAP, Section 2.8, p. 29.

²⁸⁸ RAP, Section 6.4, p. 84.

²⁸⁹ OP 4.01, Annex B, paragraph 2(e).

*access to the environmental resources upon which they depend for their livelihood.”*²⁹⁰ The Sourcebook notes that important social differences which may be environmentally significant include, among others, socioeconomic status, age and gender.

298. With respect specifically to “Age and Gender,” the Sourcebook states that a “social assessment” should identify project impacts on different individuals within households, and notes that projects may have differential impacts on men, women and children. Specifically, it states that:

*“Men, women and children play different economic roles, have different access to resources, and projects may have different impacts on them as a result. **For example, a project that changes access to resources in fragile ecosystems may have unanticipated impacts on local women who use those resources for income or domestic purposes.**”* (emphasis added)²⁹¹

299. The Bank’s Gender and Development Policy OP/BP 4.20 aims to assist member countries to reduce poverty and enhance economic growth by addressing the gender disparities and inequalities that are barriers to development. BP 4.20 notes the need for Bank task teams to ensure that project design addresses, *inter alia*, the ways in which the project might be disadvantageous to one gender relative to the other; and that the project’s proposed monitoring mechanisms follow up the different impacts of the project on females and males.²⁹²

300. Similarly, with respect to women, OMS 2.20 states:

“Women are sometimes a particularly important group of project participants and beneficiaries. Appraisal should therefore examine whether the project design takes into account adequately (a) the local circumstances that impede or encourage the participation of women; (b) the contribution that women could make to achieving the project’s objectives; (c) the changes which the project will introduce that might be disadvantageous to women; and (d) whether the implications for women are included in the provisions for monitoring the impact of the project.”

301. Bank Policy OP 4.12 on Involuntary Resettlement applies to the involuntary taking of land resulting in, among other things, “*los[s] of assets or access to assets*” or “*loss of income sources or means of livelihood, whether or not the affected persons must move to another location.*”²⁹³ (emphasis added). The Policy also states that to achieve its objectives, “*particular attention is paid to the needs of vulnerable groups*” especially those below the poverty line, the elderly, the landless, **women**, children, indigenous peoples, ethnic minorities and other displaced people who many not be protected through national legislation (emphasis added).²⁹⁴

²⁹⁰ Environmental Assessment Sourcebook, Social and Cultural Issues in Environmental Review, 1999, World Bank, para 1, Chapter 3. Available at: <http://go.worldbank.org/LLF3CMS110>

²⁹¹ Environmental Assessment Sourcebook, Social and Cultural Issues in Environmental Review, 1999, World Bank, para 2, Chapter 3. Available at: <http://go.worldbank.org/LLF3CMS110>

²⁹² BP 4.20, para 3 (c) and (d).

²⁹³ OP 4.12, para 3(a)(ii) and (iii).

²⁹⁴ Ibid, para 8.

2.3 Assessment of the issue in Project documents

302. Project documents confirm the critical importance of community forests for rural farming households. The baseline survey results done for the SIA/RAP show that 92 per cent of the households in affected villages depend on *van panchayat* lands.²⁹⁵ It is further stated that about 87 per cent of the households use fuel wood for cooking and heating, and that 83 per cent use *van panchayat* lands for fodder for livestock and 56 per cent to get timber for construction purposes. Further, the baseline survey showed that, among various household chores, women spend the maximum number of hours in collecting fuelwood and fodder, an average of 3.82 hours daily, with the majority visiting the forest daily.²⁹⁶ The RAP also identifies that for the women of Haat, in particular, a walk to their *van panchayat* from their resettlement site will take approximately two hours.²⁹⁷

303. In addition, the SIA/RAP finds that the value of lost fodder ranges from Rs. 2841 per household annually to Rs. 5849 annually to meet requirements for livestock. It states that families only purchase fodder during the months of November-December, and months of extreme shortage. The value loss of fuel is Rs. 1643 per household annually.²⁹⁸

304. The SIA/RAP suggests that *“the loss of common property resources like grazing lands, cremation place, water supply, road, electricity, communication system, path etc. will be restored and the cost for these is presented as part of Community Development Activity for the affected villages. The extent of these measures will be finalized in consultation with the VDAC and local stakeholders.”*²⁹⁹ The VDAC is the Village Development Advisory Committee which will be implementing and carrying out all the activities in the village with the help and guidance of the Project NGO (which presently is SBMA) and THDC.

305. With regard to the non-local work force peaking around 2,000, most will be accommodated in camps located at the villages of Gulabkoti and Batula to minimize associated impacts and the need to create additional infrastructure. According to the latest information from Management, the contractor is in the mobilization process and has deployed key staff to site. They are engaged currently in identifying suitable land for the labor camps in Gulabkoti and Batula, and carry out negotiations for private land rental. Labor camps will be constructed once land has been acquired. Until then the contractor will be housing the labor in rented accommodations.

306. The PAD points out possible issues related to construction camps: sewage and solid waste disposal, health and hygiene including the possible incremental threat of communicable diseases such as Human Immunodeficiency Virus Infection/Acquired Immunodeficiency Syndrome (HIV/AIDS), improper use of local community resources, poaching of wildlife, and incremental extraction of fuel wood.³⁰⁰ The camps must comply with relevant state and national

²⁹⁵ RAP, p. 29.

²⁹⁶ RAP, Section 2.8.5, p. 35.

²⁹⁷ RAP, Section 3.4.2.4, p. 52.

²⁹⁸ SIA/RAP, Section 3.4.2.1, p. 50.

²⁹⁹ SIA/RAP, p. 109.

³⁰⁰ PAD, p. 126, para 86.

regulations related to environment protection, pollution prevention, forest conservation, safety, and any other applicable laws. The EMP specifies the standards and activities required to comply with the regulations, and manage issues such as emission and dust, borrow areas management, site storm water drainage, sewerage, solid waste management, and public or workers' safety. The issue of women's security is not discussed however in the EMP.

307. To ensure proper site sanitation and prevention of water contamination around the site, public toilets with adequate primary treatment are proposed (with septic tanks and soak pits). The EMP includes provisions for medical and first aid-kits, health and hygiene awareness camps; emergency evacuation and referral in case of emergency and diseases; HIV/AIDS awareness campaign and referral procedures. The EMP also includes provisions for safe disposal of solid wastes, supply of liquefied petroleum gas cylinders and a community kitchen to prevent dependence on fuel wood, and bans poaching. Most of these are the specific responsibility of the contractors on behalf of the THDC, and as such have been included in the contract documents.³⁰¹

2.4 Mitigation measures introduced and Bank Supervision

308. **Compensation for loss of fuel wood and fodder.** The R&R Policy prescribes that each affected family, defined as those living in villages where the Project is formally acquiring *van panchayat* land,³⁰² will be paid 100 days of Minimum Agricultural Wage (MAW)³⁰³ per year for 5 years to compensate for the loss of fuel wood and fodder. Currently, the MAW for Uttarakhand is about Rs. 100 per day (adjusted annually), and the annual compensation will be about Rs. 10,000 which is sufficient if the SIA-estimates are correct (see below for a discussion of this). The Policy also states that THDC will provide access roads to the residual *van panchayat* and/or grazing land.

309. The status of disbursement of fuel and fodder compensation, based on the list finalized by the District Magistrate, is that THDC has so far disbursed two instalments of IN 10,000/- each totaling INR 9.2 million. The first instalment has been paid to 533 households and the 2nd instalment has been paid to 391 households.³⁰⁴

3. Panel's findings on issues of policy compliance and harm

310. The Panel wishes to highlight several key factors relevant to its findings on the issues noted above.

311. **Scarcity of resources and impacts, especially on women:** As indicated previously, it appears that the issue of fuel wood and fodder is a major concern in the Project area. The reason is twofold. Firstly, there is no alternative available to the use of fuel wood, and secondly, there is no proper market for fodder. Fodder availability is seasonal, with much less available in late winter and summer. Some storage is done, but efficient storage techniques are not available.

³⁰¹ EMP, Section 4.13, p. 50.

³⁰² According RAP, the total number is 1223. See RAP, p. 14, Footnote 2.

³⁰³ The MAW currently is INR 100 per day.

³⁰⁴ Aide-Memoire - Implementation Support Mission March 9-14, 2014, p. 6.

Thus the long hours spent in collection, and the need for a healthy *van panchayat* forest within reach.

312. As it is primarily the daily task of women to collect the heavy bundles of fuel wood and fodder, while also performing other tasks around the house and in the fields, it is an issue of primary importance to women in particular that this resource is available and accessible in relatively close proximity to them. As noted earlier, among their daily activities, women in the Project area devote a maximum number of hours to the collection of fodder and fuel wood, at 3.82 hours per day.³⁰⁵ There is limited scope for increasing fodder production on available land because most such land goes to agricultural rather than fodder production. New techniques of producing fodder on *van panchayat* lands, especially by using margins of roads and fields have started in the region, but have not yet been commonly adopted. In addition, the risk of drying up of water resources in some affected villages if it materializes (see discussion in Chapter 3) is likely to further add to women's burden, water collection being among their daily chores as well. Having to possibly walk further to access water becomes an additional negative impact.

313. **Adequacy of compensation.** It is the assessment of the Panel's expert that in real terms, the compensation amount will not fully cover the loss of either fodder or fuel wood. A small bale of grass, locally called a *poola*, is sold for INR 8-10. A single animal requires about 8-10 *poola* per day. Therefore, a household completely losing access to communal fodder sources would have to buy about INR 80 to 100 worth of grass a day for each animal, apart from the add on of oil, jaggery, pulses, salt and other elements that are routinely fed to an animal. So, the INR 100 per day covers only the costs of feeding one animal for one day. Besides, the compensation is only for 100 days a year, and depending on the type of animal, the number of animals per family, and local weather conditions, fodder may have to be foraged for longer periods.

314. The Panel notes, however, that the actual impact from the Project on *van panchayat* land will vary, and for most households this will be marginal. According to the RAP, villages affected by land acquisition will lose access to less than 2.5% of the area currently used for collection of grass and firewood. The impacts of fuel and fodder collection, however, will likely be significant for families that depend more heavily on forests. For families that have been relocated, e.g. from Haat, the distance to their *van panchayat* will also be increased. The adequacy of the annual lump sum of INR 10,000 depends on local conditions and will vary among households. For many, this is a net cash transfer, which explains the widespread grievances around distribution of this entitlement.

315. **Entitlement for fuel and fodder compensation.** The Panel heard many complaints about who will receive compensation for loss of fuel wood and fodder resources, which is also reflected in the complaints submitted to the GRC. Such complaints make up the highest share (45 cases in all) of all cases registered with the GRC over its 6 year period. At a village meeting at Pipalkoti,³⁰⁶ several people mentioned that the loss of *van panchayat* areas due to the Project would impact them, claiming that they had not been registered by THDC as entitled to compensation.

³⁰⁵ RAP, Section 2.8.5, p. 35.

³⁰⁶ Meeting of IPN with villagers from different villages in Pipalkoti on May 26, 2013.

316. One issue is the definition of who constitutes an affected family entitled to fuel and fodder compensation. THDC has considered a separate kitchen as the indicator determining entitlement.³⁰⁷ This has caused discontentment among many families, as joint families are the norm, and further, as the families are usually quite poor, living together makes economic sense, especially in the absence of male heads of households. Although providing the same level of compensation to every 'kitchen' simplifies implementation, the actual fuel wood need and potential loss for a family ultimately depends on the number of persons and livestock. A household ('kitchen') with more than one woman would more likely have more than one animal, and hence the fodder need and potential loss is bigger. Some women who met the Panel team argued that each married couple should have been considered for the fuel wood and fodder compensation, rather than basing the entitlement on the existence of "kitchens."

317. People also mentioned, that this definition of a household meant that households which had internal conflicts and therefore had two kitchens operating, benefited more than households where there is no such problem. That some families benefit materially as a result of a family conflict is a socially uncomfortable reality that is difficult to convey as a grievance to Project authorities.

318. With respect to labor camps in particular, as already referred to above, Management states that the civil works contractor will be contractually obligated to undertake measures aimed at securing the safety of women living in villages around the labor camps and the contract document contains specific provisions (like fenced camps, no use of firewood, etc.) to prevent the labor force from accessing community forest lands. **However, the Panel finds that insufficient attention has been given to the issue of women's security as fences around the labor camps alone cannot be seen as an adequate mitigation measure.** A key issue going forward will be systematic and regular monitoring of the conditions of the camps, and to ensure that any breaches of agreements and standards are picked up early and not allowed to fester into serious conflict between the labor and villagers.

319. **Panel findings.** The Panel acknowledges that it is difficult to devise a compensation modality that captures in a comprehensive manner actual losses for each individual household. As described above, the Panel also notes that the Project's impact on *van panchayat* lands in most cases is marginal from the perspective of the amount of land acquired, but impacts on individual families in some cases may be significant. Monetary compensation for the construction period seems to be a reasonable approach. **The Panel finds that the THDC R&R Policy covering access to livelihood sources, i.e. fuel and fodder, complies with the requirements of OP/BP 4.01 and OP/BP 4.12.**

320. The Panel also notes, however, that monetary compensation does not readily address the concern noted above about villages being further away from *van panchayats*, thereby making access to forests more difficult due to greater travel distance (in some cases two hours more), which in turn raises issues of additional workload and safety of women. The Panel acknowledges the gender analysis included as part of the SIA, and as required by OP 4.01. In the Panel's view, this Project is a good example of a project which requires a social assessment to identify differential impacts on women given that it changes access to resources for women in

³⁰⁷ RAP, Section 2.5.1, p. 17.

a fragile ecosystem and thus may have unanticipated impacts on women who use such resources for income or domestic purposes. The Panel observes that Project documents identify some of the differential impacts of the Project on women, and propose certain mitigation measures to address these impacts.

321. Going forward, the Panel notes the importance of monitoring/supervision and public consultation/information to ensure that Bank policy requirements with respect to livelihood restoration are being met, and that women are not disproportionately impacted by any possible changes to their *van panchayat* during Project implementation, in light of the heavy burden that women will face if access to forest and forage resources is made more difficult. The Panel notes Management efforts in the area of gender-responsive actions, as described, for instance, in the supervision mission of March 2014.³⁰⁸ The Panel notes the importance of continued attention to monitoring gender-differentiated impacts of the Project and the need to remedy potential negative impacts through regular supervision missions that should include gender expertise.

D. Complaints about local benefits sharing

322. This section examines the claim that the distribution of development benefits of the Project is skewed towards better-off households. This section also reviews the complaints heard during the Panel's field visit regarding the Project triggering inter-community tensions due to the sharing of local resources and public services, and that the mechanism for grievance redress is ineffective in resolving these conflicts.

1. Requesters' Claims and Management Response

323. The Requesters claim that no lessons have been learnt from dams built earlier, and that projects such as VPHEP transfer access to natural resources from the poor to the rich. The Requesters also assert that the local people have to bear the negative impact of such projects on the environment while the benefits of electricity are enjoyed in the urban centers. They further assert that there has not been any overall assessment of the impact of the Project on the local people.

324. **Management Response.** Management states that the Project design includes numerous benefits for communities in the Project area that exceed Bank and Indian statutory requirements.³⁰⁹ Management states that opportunities for economic development are limited in this remote part of India and local people have repeatedly expressed their support for the Project.³¹⁰ Management explains that two categories of local development funds will be available. The first is a dedicated fund amounting to INR310 million that will be used for the 18 Project affected villages. The second, as recommended by the National Hydro Power Policy (2008), is a Local Area Development Fund (LADF) which will receive an annual payment over the life of the Project equal to the revenue generated by the sale of one percent of the power generated by the Project.³¹¹

³⁰⁸ Aide-Memoire - Implementation Support Mission March 9-14, 2014.

³⁰⁹ Management Response, p. 18, para 65.

³¹⁰ Management Response, p. 41, section 25.

³¹¹ Management Response, p. 18-19, para 65.

325. Management further maintains that for the first category (INR 310 million) fund, investment plans will be prepared by the communities. Civil works will be carried out by contractors or by the *gram panchayats* with monitoring by the beneficiary communities. In addition, according to Management, to the extent possible, contracts for small civil works will be given to eligible Project affected people.³¹² Furthermore, THDC will also provide 100kWh of free electricity per month to Project affected households for a period of ten years.

326. In addition, Management states that THDC has adopted a Corporate Social Responsibility (CSR) Policy for the implementation of a community development scheme through the assistance of the Society for Empowerment and Welfare Activities (SEWA), an NGO created by THDC. The CSR scheme, according to Management, will finance community development in the vicinity of THDC's operating stations where construction has been completed and rehabilitation and resettlement issues have been addressed.³¹³ Management also states that THDC has already identified certain community development activities in the area, in consultation with the Project affected communities, and is implementing them through separate corporate funding.³¹⁴

327. Management mentions that with respect to benefits of the Project, media accounts have consistently shown support for VPHEP by people living in the Project area.³¹⁵ Management further maintains that since there are few economic opportunities in this remote mountain region other than those afforded by seasonal religious tourism, communities in the area have legitimate expectations of induced development from projects such as VPHEP.

328. Regarding grievances, Management refers to the establishment of a project-level GRC with representation of project affected people from each of the affected villages, the NGO that is assisting THDC with social outreach, and THDC's project-level social manager as secretary. According to Management, the GRC must process complaints within 15 days, and if the resolution proposed is not accepted by the aggrieved PAP, the case can be referred to the Commissioner for land acquisition/resettlement and rehabilitation (i.e. the District Magistrate). Management states that THDC maintains a register of complaints, a record of time required for their processing, and their resolution, and provides a copy of the resolution to the complainant.³¹⁶

³¹² Management Response, p. 18, para 65.

³¹³ PAD, p. 112, para 37.

³¹⁴ Management Response, p. 41, section 25.

³¹⁵ Management Response, p. 43, section 26.

³¹⁶ Management Response, p. 15, para 51.

2. Panel Observations and Analysis

2.1 Link between the Project and the harm

329. The Project area is remote and relatively sparsely populated, and is a remittance-based economy where local employment is a significant development constraint. The main issue of concern to the Requesters and other sections of the population, as evidenced from discussions during the Panel's field visits, is the extent to which the Project will provide employment and other benefits to the local area.

330. These discussions revealed that the Project has been presented by Project authorities as creating jobs locally, thus raising expectations in an area of high unemployment, with some 8000 educated unemployed as reported by villagers met. In reality, these high expectations for jobs are not likely to be met by the Project, possibly generating even greater demand for other benefits from the Project.

331. **Local resource sharing and conflicts.** Furthermore, while not stated in the Request, the Requesters and other villagers in the Project area raised with the Panel team several issues relating to the possibility that the Project may have become the source of conflict between those that are considered Project affected, and therefore stand to receive benefits from the Project, and those who believe they are experiencing the impacts of the Project but since they are not officially recognized as affected persons, do not qualify to receive benefits. In meetings with the visiting Panel team, some villagers who had resettled families living in close proximity to them, also complained of having to share their public services and natural resources with them without receiving any benefits in return. These villagers complained that grievances triggered by the allocation of Project-related benefits and resource sharing were not handled adequately.

332. In this context, villagers raised the issue of the functioning and effectiveness of the Project's GRC. While these villagers claimed they are in favor of the Project, they demanded more effective mechanisms to address grievances and simmering conflicts around potential impacts and benefits of the Project. The Panel also heard from a segment of population in the Project area that they do not have confidence in the proposed mitigation framework, and question the ability and capacity of the Project authorities to deliver. The Panel notes the need for improved consultations and communication regarding GRC for more visibility and wider acceptance amongst the community.

333. The management of conflict situations, especially between PAPs who have received compensation and benefits and non-beneficiaries, or, between relocated people and host communities, are critical to shaping public opinion about a development initiative such as VPHEP. The Panel team learned that a major issue, which has begun to create conflicts between various villages is the change in resource use patterns, and specifically access to fuelwood, fodder, and water.

334. The Panel team heard grievances from some residents of Gadora village related to sharing resources with families from Haat who had been resettled near their village.³¹⁷ Gadora is

³¹⁷ Relocation information taken from Aide-Memoire - Implementation Support Mission March 9-14, 2014.

close to Mayapur (to which 8 Haat families have relocated), Daswana (17 Haat households), and Eldana (28 Haat households). The Gadora residents said that their village has not been considered as an impacted village even though it is sharing its water with Eldana residents, and it is giving land to THDC to build a secondary school for residents of the area.

335. People of Gadora village also stated their apprehension to the visiting Panel team about women from the relocated Haat population (now settled in Eldana and Daswana) entering their *van panchayat*.³¹⁸ The Panel was told by villagers that with the relocation of Haat village to the left bank of the river, and with their *van panchayat* being on the right bank across the river, despite compensation being paid, it is likely that women will forage in nearby areas. There is a fear that this issue may be exacerbated by Project development and may pose a risk of conflict.³¹⁹ These Gadora residents stated that they should also receive some benefits under the R&R Policy as they are indirectly “hosting” the resettled households by sharing their resources with them.

336. As noted earlier, a GRC has been put in place by THDC to address complaints specifically related to the implementation of the R&R Policy. The GRC comprises representatives of the main stakeholders, i.e. THDC and 7 villagers representing the villages that have lost private land to the Project, and is chaired by a retired Chief Executive Officer of the District Council.³²⁰ The GRC, however, does not have members from host communities or other villages in the Project impacted area.

337. The majority of the complaints presented to the GRC address compensation for loss of land, fuel, fodder, and resettlement costs, including complaints that eligible households have been excluded from payment, that payment has not been fully distributed to eligible individuals, or confusion over land tracts to be acquired. Other complaints are related to income restoration, vocational training, job assistance, damage from road construction, distribution of scholarships, dust pollution to houses, fields and crops.

2.2 Relevant provisions in Bank policy

338. OP 4.01 states that the “*EA evaluates a project’s potential environmental risks and impacts in its area of influence, examines project alternatives; identifies way of improving project selection, siting, planning, design and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout*

³¹⁸ IPN discussion with stakeholders from Gadora, April 26, 2013

³¹⁹ The Panel was told that in the past, there was a conflict between the Haat and Pipalkoti villages over forest use, and in the 1980s when the Haat forests could not meet the needs of the village, women from Haat allegedly began encroaching on the Pipalkoti *van panchayat* area. The conflict escalated and went to Court in the early 1990s. The Panel was told that the case finally closed in 1999 in favor of Pipalkoti after being in court for about 6 years.

³²⁰ The GRC is meant to give decisions within a stipulated period of 15 days after hearing of a grievance. The final decision of the GRC is taken by the Chairman after consultation with other members of the GRC. If the resolution proposed is not accepted by the complainant, the case can be referred to the Chamoli District Magistrate who is the Commissioner for land acquisition/resettlement and rehabilitation. The Chairman is a retired Class-I officer. Other members are Head of THDC’s Social & Environment Department (Secretary of the GRC), a representative from the NGO working on R&R for the Project, and seven representatives from the villages affected by the acquisition of private land. See RAP, chapter 8, p. 130.

project implementation (emphasis added).”³²¹ The Policy adds that EA considers natural and social aspects in an integrated way.

339. The Bank has recently issued “*A Guide for Local Benefit Sharing in Hydropower Projects*,”³²² where local benefit sharing is defined as systematic efforts by project proponents to sustainably benefit local communities affected by hydropower investments. The guide elaborates on the approach, which is described as a “*supplement to the requirements of compensation and mitigation*,” and on factors necessary to ensure a well-designed benefit sharing program, which include: clear objectives, carefully defining the target population, designing benefit sharing mechanisms and identifying implementation arrangements.

340. OP 4.12 on Involuntary Resettlement requires the Bank to pay attention to host communities as well as displaced persons and their communities:

13. (a) Displaced persons and their communities, and any host communities receiving them, are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement. Appropriate and accessible grievance mechanisms are established for these groups.

(b) In new resettlement sites or host communities, infrastructure and public services are provided as necessary to improve, restore, or maintain accessibility and levels of service for the displaced persons and host communities. Alternative or similar resources are provided to compensate for the loss of access to community resources (such as fishing areas, grazing areas, fuel, or fodder).

341. It is noted that “*appropriate and accessible grievance mechanisms*” are established to serve both displaced persons, their communities and host communities as per 13 (a) above.

342. With respect to the integration of resettled communities with host populations, OP 4.12 (Annex A) provides measures that could mitigate the impact of resettlement on host communities. These measures include consultations, prompt payment to hosts for any land or assets provided to resettlers, arrangements for addressing any conflict that may arise between resettlers and host communities, and steps to augment services (e.g., education, water, health, and production services) in host communities to make them at least comparable to services available to resettlers.³²³

2.3 Assessment of the issues in Project documents

343. Relevant Project documents, such as the RAP and PAD, make ample references to the Project generating employment in the area, induced development benefits resulting from the Project, and income generation and skill enhancement opportunities offered through the Project. The VPHEP website states under “Project Benefits” that the Project will contribute to

³²¹ OP 4.01, para 2.

³²² Wang, Chaogang. *A Guide for Local Benefit Sharing in Hydropower Projects*, World Bank, Social Development Papers, Paper No. 128/June 2012.

³²³ OP 4.12, Annex A, para 16.

*“[i]ntegrated Development of Chamoli/Garhwal region in the areas of employment, communication, education, health, tourism, development of Flora & Fauna etc.”*³²⁴

344. The PAD states that “[e]mployment in the project will be provided subject to employment suitability and availability, and all adult PAPs will if they so choose [sic] be included in activities to assist income generation.”³²⁵ The PAD also states that the “most significant induced positive effect of the project” will be the creation of new job opportunities in the area as construction and “direct employment” are likely to trigger concomitant development in several “commercial sectors such as transportation, automobile, consumer durables; local small-scale commercial sectors dealing with daily consumer needs (non-perishable food items and perishable commodities such as vegetables, fruits and milk). Each of these will provide additional employment opportunities for local communities.”³²⁶

345. The PAD goes on to state that “[m]ajor cumulative effects of hydropower development in the Alaknanda basin include the creation of additional employment, including for local communities” apart from a percentage of Project revenue accruing to the state which “could be used to provide better access to social amenities.”³²⁷

346. The RAP, in contrast, states with reference to jobs, that the option of providing jobs with THDC is not considered as a rehabilitation option “[k]eeping in view that the Hydro projects are capital intensive with state of the art technology and therefore do not offer much employment opportunity, particularly in unskilled category.”³²⁸ Notwithstanding this, the RAP states “100% recruitment at the level of Workmen (Including technical & ministerial) ... will be done first from the land oustees & in case of non availability of suitable candidate among the land oustees, the recruitment will be done from other residents of Uttarakhand state, whose names are registered on live register of any Employment, Exchange located in the state subject to individual fulfilling the qualifications & job specification for the relevant posts.”³²⁹

347. The issue of benefits to the 18 Project affected villages accruing from the Project is discussed at length in the RAP. Project documents, such as the RAP and PAD, as stated earlier, mention two funds, which will be used to provide development benefits in the area. THDC is contracting Society for Empowerment and Welfare Activities (SEWA), to plan and implement community development works in the Project area under its Corporate Social Responsibility (CSR) initiative.

348. Project documents also note income restoration efforts by THDC, including assistance to affected villages to form cooperatives for small community infrastructure works. THDC is also helping project affected persons to receive vocational training in various trades such as motor mechanics, marketing, hospitality, hotel management. The company is collaborating with the Industrial Training Institute (ITI) at nearby Gopeshwar for training of youths from among the

³²⁴ VPHEP website http://thdc.gov.in/Projects/English/Scripts/Prj_CurrentStatus.aspx?vid=146, accessed May 28, 2014.

³²⁵ PAD, p. 106, para 23.

³²⁶ PAD, p. 128, para 91.

³²⁷ Ibid.

³²⁸ R&R Policy, chapter 1, p. 7, section 1.5.2.

³²⁹ R&R Policy, chapter 5, p. 42.

PAFs. Distribution of high-yield seeds and fruit saplings, and activities such as dairy development are also noted among income restoration measures. Introduction of a pension scheme for widows is also mentioned among THDC's plans.³³⁰

349. Other benefits which the Project is bringing to the area, according to Project documents, include the provision of 100 kWh of free electricity per month to affected households in the 18 Project affected villages for a period of 10 years,³³¹ and the State of Uttarakhand is to receive 12% of the power generated by the Project as a royalty for the use of the state's waters.³³²

350. In addition, THDC will hire an external agency to monitor the implementation of the RAP for the first two years of implementation, and a separate external agency will be hired to provide third party mid-term and end of Project evaluations of the R&R components.³³³ Monitoring indicators are also provided, and THDC has been preparing quarterly monitoring reports which provide facts and figures about the livelihood enhancement and restoration activities undertaken.³³⁴

351. **Local resource sharing and conflicts.** Table 6.3 of the RAP outlines the involvement of host populations in the planning and implementation stages of the Project. The Project NGO (currently SBMA) is assigned with managing consultations with host populations and providing them with information on an on-going basis.³³⁵ Also, the THDC R&R policy states that community development *"facilities will also be available to the host population and the neighboring community and facilitate socio economic development of the area."*³³⁶

352. The PAD and RAP³³⁷ describe the purpose and structure of the Project GRC. The PAD states that the GRC is in place and notes that THDC, in addition, has requested the state government to appoint a grievance Ombudsman as the final arbiter of grievances.³³⁸

3. The Panel's findings on issues of policy compliance and harm

353. Regarding employment generation by the Project, the Panel notes as above that some statements in publicly available/disseminated documents have raised expectations that are not likely to be met. The Panel notes that providing accurate information about the potential social and environmental benefits and impacts of a project to affected communities is a key premise of consultations with affected people under OP 4.01 and in ensuring long term support for the Project.

³³⁰ See project website <http://www.worldbank.org/en/news/feature/2014/04/17/vishnugad-pipalkoti-hydro-electric-project>

³³¹ RAP, section 4.8, p. 62.

³³² PAD, p. 78, para 3.

³³³ RAP, p. 133-139, sections 9.2.2-9.4.

³³⁴ VPHEP Social and Environment Department, "THDC Quarterly Reporting on R&R Activities towards VPHE Project" (April - June 2013), Table 10.

³³⁵ RAP, Table 6.3, p. 122.

³³⁶ RAP, Annex 8, section 2.16.4, p. 18.

³³⁷ RAP, p. 130.

³³⁸ PAD, Annex 12, Table-1, p. 143.

354. The PAD states that beneficial localized impacts of the Project will be *"in terms of schools, health centers, roads, and commercial establishments being set up near the project to cater to workers, project affected families and others living in the area."* In addition, the Panel notes the importance of the two development funds, THDC's CSR program, provision of 100 kWh of free electricity per month to affected households in the 18 Project affected villages for a period of 10 years and other measures as described above. According to the PAD, the National Hydropower Policy requires that 1% free power from the Project to be earmarked for a Local Area Development Fund, which will ensure a regular revenue stream for welfare schemes, creation of additional infrastructure and common facilities; and that the State government is also expected to contribute a matching 1% from the 12% free power that is provided to the home state.³³⁹

355. The Panel notes that THDC has made commendable efforts in livelihood restoration, and Bank Management has actively supported these efforts. In the Panel's view, these measures are aimed at benefitting local communities affected by hydropower investments, as recommended in *"A Guide for Local Benefit Sharing in Hydropower Projects"*. The Panel, however, notes the importance of close monitoring to ensure that these initiatives have a sustained positive impact in the local area. The Panel notes the need for clarity on the use of the 12% royalty payment to the State and of the 1% revenue generated under the National Hydropower Policy so that Project affected villages and others that are impacted will benefit from these initiatives that are aimed at financing developmental needs.

356. The Panel finds that important efforts are being made by Management to restore livelihoods of displaced people in accordance with the provisions of OP/BP 4.12 on Involuntary Resettlement.

357. Further, with regard to access to services and common resources in host communities, and the possibility of conflicts arising due to resource sharing, as noted above, residents of Gadora village stated that they should also receive some benefits under the R&R Policy as they are indirectly "hosting" the resettled households by sharing resources with them. The Panel is aware that Haat residents are not being resettled in Gadora village itself but are living in nearby settlements.

358. In this regard, **the Panel notes, to the extent that some villages, such as Gadora, are indirectly "hosting" resettled families by sharing their public services and natural resources with them, that as Project implementation makes progress, Management is responsive to the letter and spirit of OP 4.12, para 13 (b) which requires that infrastructure and public services are provided as necessary to new resettlement sites and host communities to improve, restore, or maintain accessibility and levels of service for the displaced persons and host communities.** The Panel further notes the importance of assessing the impact of the Project on host communities at the end of RAP implementation.³⁴⁰

359. The Panel also notes that there is a functioning grievance redress mechanism under the Project to which issues are being taken for resolution. Based on the foregoing, **the Panel finds**

³³⁹ PAD, p. 3, para 8.

³⁴⁰ RAP, Annex 10 A, p. 2.

that the requirement of OP/BP 4.12 on Involuntary Resettlement that an appropriate and accessible grievance mechanism be established has been met. Going forward, the Panel notes the importance of the Project GRC being made accessible to host communities so that their concerns can be heard and resolved whenever appropriate.

Chapter 5: Conclusion

360. This VPHEP was conceived and is being implemented in a context where lack of adequate and sustainable power supply poses a major constraint for India's development. To achieve its goal of universal access to electricity, the GOI has embarked on an ambitious investment program whose aim is to double generation capacity by the end of the 12th Five-Year Plan (2012-2017) period. During this same period GOI aims to develop about 20,000 MW of hydropower capacity and to increase hydropower's share in the country's total installed generation capacity to 40%, up from the current 22%. Management states that if this does not happen India would most likely be compelled to accelerate the expansion of its coal-based generating capacity posing significant risks to the global environment. With almost 70 % of India's estimated hydropower potential being found in the Himalayan states, most notably Uttarakhand, this presents a major challenge as well as opportunity for the state. As India's newest Himalayan state, where only 18% of current hydropower potential of 18,000 MW has been exploited according to Management, accelerating hydropower development is also critical to Uttarakhand's economic growth.

361. In the above context, the main objective of the Project is to increase the supply of electricity to India's national grid through the addition of low carbon energy; the second objective is to strengthen the institutional capacity of the Borrower, THDC, with respect to the preparation and implementation of economically, environmentally and socially sustainable hydropower projects.

362. The Project is a run-of-the-river hydropower plant, which if considered alone is limited in scale and in its environmental and social footprint. Thus, the Bank's intent, in Management's words is as follows: *"by design the Bank's engagement in VPHEP was to assist the GOI in accessing best international practice in hydropower development."* Management states that its preparation of the Project *"incorporated broadly accepted best international practices in hydropower, beyond what is required by the Bank's safeguard policies and has in addition demonstrated a number of innovations in the technical, environmental and social aspects of hydropower."* Management Response refers to GOI's Green Tribunal judgment, which according to Management, *"recognized good practice and innovations championed in the course of Project preparation of VPHEP"* including those that *"minimize the disruption to people living in the Project area and to the natural environment."*

363. The Panel, in the main, concurs with this view of the good practices adopted in the Project, and the Panel's review has found that, for the most part, the Bank is not only in compliance with its policies and procedures, including the social and environmental safeguards, but has also introduced best practice when possible, except for some gaps which will be elaborated further below. Several significant factors of note, however pose unique challenges for the Project as it moves forward with implementation.

364. Firstly, the Alaknanda River, being a headstream tributary of the Ganga, along which several important pilgrimage sites are located, is a river of great spiritual and cultural significance for millions of Hindus. Thus, some of the Requesters maintain the position that they

“do not want our river to be diverted or controlled in any way” as the *“People of India derive satisfaction from knowing that River Ganga is flowing freely.”* VPHEP was planned and is being implemented in a context where there are ongoing national debates in civil society, the media as well as at the highest national levels, involving National Commissions and the Supreme Court, on the extent to which the headstreams and other tributary rivers of the Ganga Basin should be exploited to meet the pressing need for hydropower generation, while respecting the spiritual value that these rivers hold for millions of citizens as well as mitigating the resulting environmental impacts. The Project will be seen and judged in the context of this broader debate, and not simply on its own merits.

365. Secondly, this ongoing national debate became further intensified as a result of the cloudbursts of June 2013, which caused massive loss of lives as well as devastation to infrastructure and landscape, including damage to the Vishnuprayag HEP immediately upstream of VPHEP. Uttarakhand State is highly disaster prone due to extreme climates and a fragile ecosystem. The devastating impact of the June 2013 event accentuated the on-going concern for the cumulative effect of the cascade of existing and planned hydropower projects along the Alaknanda. The Expert Body appointed by MOEF to examine the extent to which existing and planned HEPs have contributed to environmental degradation has now recommended to halt the construction of 23 out of the 24 hydropower plants planned along the Alaknanda, placing existing ones under increased scrutiny.

366. Thirdly, the economy and livelihoods in the hill districts of Uttarakhand are also fragile, as they are dependent on seasonal tourism, mountain agriculture of limited productivity, and remittances from the large numbers of emigrating men, resulting in high percentages of female headed households. The advent of major development projects such as VPHEP in a context of significant livelihood challenges can result in unrealistic expectations of project benefits, the sharing of which often constitute issues for potential community conflicts, not to mention the impacts of an inflow of workers and service providers.

367. The above three key elements of the VPHEP national and local contexts are “moving targets” in that their magnitude, extent and nature continue to evolve. Against this background, the Panel notes that the consolidated EA/EMP commits the Project developer to an adaptive management approach, ensuring that any additional regulatory and corrective measures arising from the ongoing review of hydropower development in the country would be incorporated into the Project design. An adaptive management approach enables corrective actions to be undertaken, as Project implementation progresses, in response to issues that may not have been foreseen in the planning stage. It is the Panel’s view that such an approach is highly relevant for VPHEP. Accordingly, the Investigation Report has focused on issues which will require consistent and supportive monitoring and supervision by Management, to enhance the sustainability and viability of the Project.

368. It is also in this spirit that the Panel has chosen to include issues of concern raised by communities or the Panel’s experts during the course of the eligibility and investigation visits, indirectly related to, but not specifically cited in the initial Request for Inspection. These issues are being raised in the Report as concerns requiring Management’s attention in monitoring and supervision, rather than as compliance or non-compliance findings.

369. Regarding the potential cumulative impacts of the cascade of HEPs on the Alaknanda, the Panel notes the importance of Management's continued attention to additional environmental protection and mitigation measures based on the recommendations of the cumulative impact assessments, and conveying these to THDC. The Panel further recognizes the complexities of coordinated river management when multiple HEPs are present, and emphasizes the importance of a mechanism to coordinate river basin management in the Alaknanda.

370. With respect to transmission lines, the Panel cannot ascertain from its review of Project documents whether Management's advice to carry out an "*impact assessment*" for the VPHEP transmission line was undertaken. The Panel also notes in this regard the Asian Development Bank's multi-tranche Uttarakhand Power Sector Investment Program which is financing the construction of eight high voltage transmission lines and associated sub-stations. The Panel notes that Project documents do not address the issue of transmission lines in the context of the Project and emphasizes the need for a clarification of this issue.

371. In complex topographies, such as the Himalayas, and where baseline data is not readily available, more extensive efforts are required to pre-empt and if necessary mitigate local environmental impacts, especially when such impacts are detrimental to local livelihoods. The Panel found that the Bank did not identify detailed and adequate mitigation measures that could be operationalized if a water source is lost, in non-compliance with OP/BP 4.01. The Panel notes the importance of clarifying how alternative water sources will be provided in practical terms to villages for their domestic and irrigation needs.

372. With regard to the use of the TBM, the Panel recognizes the importance of adopting this technology to mitigate potential impacts but is also concerned regarding the possible generation of "slurry" waste which could contaminate groundwater if not disposed properly. The Panel has not been able to find sufficient information in Project documents about safe disposal of slurry and notes the importance of Management clarifying this issue.

373. The Panel notes that the risk of storm events and calamities especially on major structures is recognized as a high risk by the Project. The Panel finds that, in compliance with OP/BP 4.37, Management took adequate measures to ensure the preparation of relevant studies by THDC during Project design, appraisal and implementation stages to mitigate the risks raised in the Request. The Panel notes the importance of taking into account and addressing the potential risks raised in the Request in the studies to be prepared during Project implementation.

374. The Panel finds that the proposed increased e-flow to 15.65 cumecs will mitigate adverse impacts on aquatic life and fish in the approximately 18 km stretch of the Project where water is diverted into tunnels. The Panel notes, however, that an important issue related to sediment movement is that of mass wasting and bedload movement from extreme weather events. The Panel recognizes that Management advised Project authorities of the need to specifically study bedload movement soon after the Bank's engagement in the Project, but found that such an analysis is lacking. The Panel's expert believes it may be necessary to study this aspect to ensure such bedload could be safely passed downstream without damage to the Project and the surrounding areas.

375. With regards to livelihoods of Project affected communities, the Panel acknowledges the efforts undertaken by Management to resolve the Hatsari issue, and expects that a sustainable and mutually acceptable solution for the remaining families will be found. Nonetheless, the Panel finds that the Project RAP did not initially adequately assess the Hatsari situation in non-compliance with Bank Policy OP/BP 4.12 on Involuntary Resettlement. Regarding Haat, the Panel understands that livelihood restoration efforts are being carried out by THDC and supported by Management. The Panel notes the importance of the need to closely monitor and examine, as part of RAP implementation and supervision, the impact of these efforts which are aimed at improving the affected population's socio-economic status.

376. Regarding gender issues, the Panel appreciates Management's emphasis during supervision to ensure that Bank policy requirements with respect to livelihood restoration are met and that women are not disproportionately impacted by any potential changes to their *van panchayat* in light of the heavy burden women are likely to face if access to forest and forage resources becomes more difficult. An important consideration going forward, therefore, relates to closely monitoring the differential risks facing women in the Project area, possibly through supervision missions which should include appropriate gender expertise.

377. Furthermore, the Panel notes the importance of careful and appropriate supervision by Management to help ensure that information about benefits and their distribution is accurately provided to communities in the Project area. The Panel notes the need for clarity on the use of the 12% royalty payment to the State and of the 1% revenue generated under the National Hydro Benefit Sharing Policy so that Project affected villages and others that are impacted will benefit. With respect to the issue of access to services and common resources in host communities, and the possibility of conflicts arising due to resource sharing, the Panel notes the importance of ensuring that displaced persons and host communities are provided infrastructure and public services as necessary to improve, restore, or maintain accessibility and levels of service.

378. Overall, the Panel recognizes that Management has undertaken significant actions since its involvement in the Project and for the most part has found that the Project has remained in compliance with Bank policies and procedures, apart from some gaps as outlined above. In addition, the Panel has indicated the need for close supervision and monitoring on some issues going forward. Further, in light of the cascade of hydropower projects and their impact on the people and fragile Himalayan environment, on a river which holds particular significance, and which is the subject of ongoing national debates, the Panel encourages Management to actively seek measures for closer coordination of projects across the Alaknanda Basin, possibly through a mechanism to coordinate river basin management.

Annex A:
Table of Findings and Key Observations

Issue	Panel Findings & Key Observations
1: Regional and cumulative impacts - assessment of cumulative environmental and cultural impacts	<p>The Panel considers that the VPHEP is closely linked, together with other hydro projects already constructed or planned, to cumulative impacts in the Alaknanda River.</p> <p>The Panel finds that Management complied with the provisions of OP/BP 4.01 by ensuring the preparation of a cumulative impact assessment for the Project and by incorporating the recommended increased minimum environmental flow into the Project to mitigate cultural, religious, and biodiversity impacts. The Panel notes that despite increasing the minimum environmental flow for the Project, the extent to which the cumulative impact assessments influenced other aspects of Project design is not clear.</p> <p>The Panel recognizes Management’s statement indicating that additional environmental protection measures based on the recommendations of the cumulative impact assessments will be conveyed to THDC moving forward. The Panel notes the importance of Management’s close monitoring of the implementation of these recommendations, within the context of the Project’s adaptive management approach, to ensure continued sustainability and viability of the Project. In addition, taking into account the on-going broader debate in India regarding cumulative impacts of hydropower development in the Alaknanda and Bhagirathi river basins, the Panel notes the importance for the Project of adopting and implementing relevant recommendations which may result from this process.</p> <p>The Panel recognizes the complexities of coordinated river basin management when multiple HEPs are present, and emphasizes the importance of a mechanism to coordinate river basin management in the Alaknanda.</p> <p>With respect to transmission lines, the Panel understands that the Asian Development Bank is financing an integrated power transmission system under its multi-tranche Uttarakhand Power Sector Investment Program. The Panel notes that Project documents do not address the proposed 30 km transmission line which will evacuate power from the Project to the Kuwari Pass pooling station, and also the wider proposed power transmission system in the area. The Panel emphasizes the need for a clarification of both these issues.</p>

<p>2: Local Impacts - The risk to village water sources from blasting and tunneling</p>	<p>The Panel finds that Management complied with OP/BP 4.01 by undertaking baseline studies to document village water sources along the tunnel alignment routes and ensuring that THDC commits to provide alternative water sources in the event that an existing source is lost. However, the Panel finds that the Bank did not identify detailed and adequate mitigation measures that could be operationalized if a water source is lost, in non-compliance with OP/BP 4.01.</p> <p>The Panel notes the importance of clarifying how alternative water sources will be provided in practical terms to villages for their domestic and irrigation needs, in case the risks materialize during Project implementation.</p>
<p>3: Local Impacts - Risk relating to structures, landslides and earthquakes</p>	<p>Given that conventional blasting has occurred, and is still planned near residential areas, it is essential to ensure that proper steps are taken to avoid, minimize and/or compensate for any harm that may arise.</p> <p>Regarding the possible generation of “slurry” as opposed to “muck” by the use of the TBM, the Panel could not find any mention of this issue in the PAD, EA, or EMP and has not been able to find sufficient information to satisfy itself that the Project will be able to appropriately dispose of such slurry, since the existing muck disposal plan and corresponding documents do not cover slurry disposal. The Panel notes the importance of Management clarifying the issue of slurry disposal.</p> <p>The Panel notes the steps taken to use TBM technology to reduce harms from vibrations. The Panel also notes the provision in the Project of an insurance scheme to cover potential losses for structures falling within a 500m corridor along the tunnels. The Panel finds that these measures comply with Bank Policy OP/BP 4.01 as a step to reduce or mitigate potential harm.</p> <p>The Panel finds that, in compliance with OP/BP 4.37, Management took adequate measures to ensure the preparation of relevant studies by THDC during Project design, appraisal and implementation stages to mitigate the risks raised in the Request related to earthquakes, landslides and extreme weather events. The Panel notes the importance of taking into account and addressing the potential risks raised in the Request in the studies to be prepared during Project implementation.</p>

<p>4. Local Impacts - Risk to aquatic life and ecology from altered flow and sediment release</p>	<p>The Panel notes and commends Management for advising Project authorities of the need to specifically study the issue of bedload soon after the Bank's engagement in the Project, but found that the analysis is lacking. The Panel's expert believes it may be necessary to study this to ensure such bedload movement could be safely passed downstream without damage to the Project and the surrounding areas.</p> <p>The Panel finds that in light of the proposed increased e-flow figure of 15.65 cumecs, the Project is not expected to have an adverse impact on aquatic life and fish populations in the 18 km stretch of the river where the water is diverted into tunnels by the Project. The Panel finds the Project to be in compliance with OP/BP 4.01 with respect to the Requesters' claim about the Project's impacts on fish and aquatic fauna.</p>
<p>5. Local Impacts - Resettlement and livelihoods restoration (Haat & Hatsari)</p>	<p>The Panel notes the substantial steps taken under the Project to identify and address the resettlement needs of displaced families from Haat village under the THDC R&R Policy. At the same time, the resettlement approach for Haat village implies, for most households, reduced land holdings and a need to develop new sources of income and food. This suggests a risk that vulnerable households may not succeed in restoring their pre-Project livelihoods. The Panel understands that livelihood restoration efforts are being carried out by THDC and supported by Management. The Panel notes the importance of the need to closely monitor and examine, as part of RAP implementation and supervision, the impact of these efforts which are aimed at improving the socio-economic status of the affected population.</p> <p>The Panel understands that resettlement and rehabilitation efforts are underway and almost half of the eligible families have already received their R&R assistance. With respect to Hatsari, however, which had 13 families residing, the Panel finds that the Project RAP did not adequately assess the Hatsari situation in non-compliance with OP/BP 4.12 on Involuntary Resettlement. The Panel notes that 2 families from Hatsari have accepted the Haat package and 2 non-resident families have agreed to sell their land to THDC. Negotiations are still continuing with the remaining 6 Hatsari families that reside in the village.</p>

<p>6. Local Impacts - Gender-related livelihood and security issues</p>	<p>The Panel finds that the THDC R&R Policy covering access to livelihood sources, i.e. fuel and fodder, complies with the requirements of OP/BP 4.01 and OP/BP 4.12. Going forward, the Panel notes the need for monitoring/supervision and public consultation/information to ensure that Bank policy requirements with respect to livelihood restoration are being met, and that women are not disproportionately impacted by any possible changes to their <i>van panchayat</i> during Project implementation, in light of the heavy burden that women will face if access to forest and forage resources is made more difficult.</p> <p>However, the Panel finds that insufficient attention has been given to the issue of women’s security as fences around the labor camps alone cannot be seen as an adequate mitigation measure. A key issue in the future will be systematic and regular monitoring of the conditions of the labor camps, and to ensure that any breaches of agreements and standards with respect to women’s security are picked up early and not allowed to fester into serious conflict between the labor and villagers.</p> <p>The Panel notes the importance of continued attention to monitoring gender-differentiated impacts of the Project and the need to remedy potential negative impacts through regular supervision missions that should include gender expertise.</p>
<p>7. Local Benefit Sharing and inadequate handling of grievances</p>	<p>The Panel finds that important efforts are being made by Management to restore livelihoods of displaced people in accordance with the provisions of OP/BP 4.12 on Involuntary Resettlement.</p> <p>The Panel notes the importance of close monitoring to ensure that these initiatives have a sustained positive impact in the local area. The Panel notes the need for clarity on the use of the 12% royalty payment to the State and of the 1% revenue generated under the National Hydropower Policy so that Project affected villages and others that are impacted will benefit from these initiatives that are aimed at financing developmental needs.</p> <p>With respect to the issue of access to services and common resources in host communities, and the possibility of conflicts arising due to resource sharing, the Panel notes, to the extent that some villages, such as Gadora, are indirectly “hosting” resettled families by sharing their public services and natural resources with them, that as Project implementation makes progress, Management is responsive to the letter and spirit of OP 4.12, para 13 (b) which requires that infrastructure and public services are provided as necessary to new resettlement sites and host communities to improve, restore, or</p>

	<p>maintain accessibility and levels of service for the displaced persons and host communities. The Panel further notes the importance of assessing the impact of the Project on host communities at the end of RAP implementation.</p> <p>The Panel also notes that there is a functioning grievance redress mechanism under the Project to which issues are being taken for resolution. Based on the foregoing, the Panel finds that the requirement of OP/BP 4.12 on Involuntary Resettlement that an appropriate and accessible grievance mechanism be established has been met. The Panel notes the importance of the Project GRC being made accessible to host communities so that their concerns can be heard and resolved whenever appropriate.</p>
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Annex B:

Brief Biography of Panel Consultants

Malavika Chauhan is the Executive Director of the Himmotthan Society, an organization working on issues of rural development and natural resource management in the Himalayan states of Uttarakhand and Himachal Pradesh in northern India on issues including water management, irrigation systems, natural resources and livelihoods. She has been working in environmental management for over 25 years, and has an MPhil and a doctorate in Aquatic Ecology. She has worked with WWF, Wetlands International–South Asia and the Institute for Economic Growth, Delhi. She was a DST Young Scientist, a GEF fellow to the East Anglia University, U.K. in Environmental Economics, a Fulbright scholar with the USGS-NWRC at Lafayette, Louisiana and an SRTT fellow at the Institute of Social and Economic Growth, Bangalore, India. Her work experience ranges from restoration ecology and environmental economics to resource management. She has consulted extensively, including for the WB (Yemen), ADB (Sundarbans) and WWF (India). Along with numerous peer reviewed publications including papers and book chapters, she writes popular articles and also works on policy related issues.

Dipak Gyawali is Academician of the Nepal Academy of Science and Technology. By profession, he is a hydroelectric power engineer (Moskovsky Energeticheskyy Institute, USSR, 1979) as well as a political economist studying resource use (Energy and Resources Group, University of California, Berkeley, 1986). In 2002/2003 he served as Nepal's Minister of Water Resources responsible for power, irrigation and flood control. He chairs *Interdisciplinary Analysts*, a research firm specializing in quantitative social science as well as the newly founded liberal arts college, the *Nepal School of Social Sciences and Humanities*. He also directs research at the non-profit Nepal Water Conservation Foundation on alternative local water management.

Dipek was also a UNESCO/UNU-IAS Visiting Professor of Water and Cultural Diversity at the United Nations University in Yokohama, Japan in 2010; and has been guest editor of the online journal *Water Alternatives* for its special issue on World Commission on Dams + Ten Years as well as a forthcoming issue on water-energy-food nexus. He was a member of the panel of experts of the Mekong River Commission reviewing its Basin Development Plan, and currently serves on the Steering Committee of the Mekong Program on Water Environment and Resilience (MPower), actively involved in promoting a Mekong-Ganga Dialogue between South Asia and South-East Asia.

Anubrotto Kumar (Dunu) Roy is a chemical engineer with four decades of experience in rural and urban development, with specific focus on environmental issues. He has worked extensively in the field of environmental planning, research and education. He has been associated with Frea India in Bombay, Shahdol Group in Madhya Pradesh, People's Science Institute in Dehradun, and the World Wide Fund for Nature in Delhi. Currently he is working with the Hazards Centre in Delhi, a technical support group that provides services to community organizations. He also does consultancy work with the World Bank, Uttar Pradesh Government, Delhi Government, and several firms and international agencies.

Annex C: About the Panel

The Inspection Panel was created in September 1993 by the Board of Executive Directors of the World Bank to serve as an independent mechanism to ensure accountability in Bank operations with respect to its policies and procedures. The Inspection Panel is an instrument for groups of two or more private citizens who believe that they or their interests have been or could be harmed by Bank-financed activities to present their concerns through a Request for Inspection. In short, the Panel provides a link between the Bank and the people who are likely to be affected by the projects it finances.

Members of the Panel are selected “*on the basis of their ability to deal thoroughly and fairly with the request brought to them, their integrity and their independence from the Bank’s Management, and their exposure to developmental issues and to living conditions in developing countries.*”³⁴¹ The three-member Panel is empowered, subject to Board approval, to investigate problems that are alleged to have arisen as a result of the Bank having failed to comply with its own operating policies and procedures.

Processing Requests

After the Panel receives a Request for Inspection it is processed as follows:

- The Panel decides whether the Request is *prima facie* not barred from Panel consideration.
- The Panel registers the Request—a purely administrative procedure.
- The Panel sends the Request to Bank Management, which has 21 working days to respond to the allegations of the Requesters.
- The Panel then conducts a short 21 working-day assessment to determine the eligibility of the Requesters and the Request.
- If the Panel recommends an investigation, and the Board approves it, the Panel undertakes a full investigation, which is not time-bound.
- If the Panel does not recommend an investigation, the Board of Executive Directors may still instruct the Panel to conduct an investigation if warranted.
- Three days after the Board decides on whether or not an investigation should be carried out, the Panel’s Report (including the Request for Inspection and Management’s Response) is publicly available through the Panel’s website and Secretariat, the Bank’s Info Shop and the respective Bank Country Office.
- When the Panel completes an investigation, it sends its findings and conclusions on the matters alleged in the Request for Inspection to the Board as well as to Bank Management.
- The Bank Management then has six weeks to submit its recommendations to the Board on what actions the Bank would take in response to the Panel’s findings and conclusions.
- The Board then takes the final decision on what should be done based on the Panel’s findings and the Bank Management’s recommendations.
- Three days after the Board’s decision, the Panel’s Report and Management’s Recommendation are made publicly available through the Panel’s website and Secretariat, the Bank’s Project website, the Bank’s Info Shop and the respective Bank Country Office.

³⁴¹IBRD Resolution No. 93-10; International Development Association (IDA) Resolution No. 93-6.

INDIA

VISHNUGAD-PIPALKOTI HYDRO ELECTRIC PROJECT (VPHEP)

UTTARAKHAND STATE, CHAMOLI DISTRICT

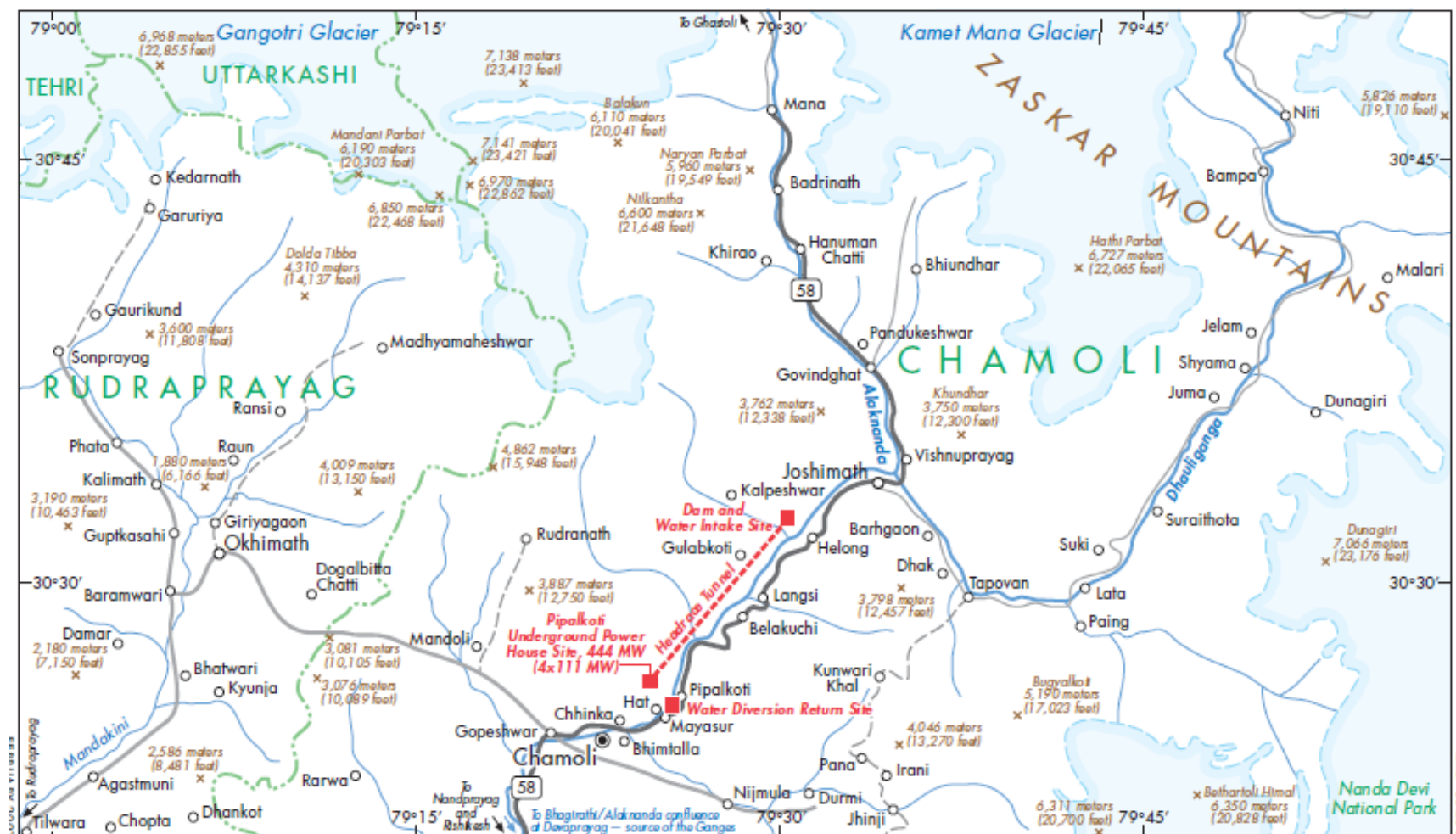
PROJECT COMPONENTS

58 NATIONAL HIGHWAY
MAIN ROADS
OTHER ROADS
TREKKING ROUTES

DISTRICT BOUNDARIES
RIVERS AND STREAMS
GLACIERS
SPOT ELEVATIONS

0 10 20 Kilometers

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Map 3: VPHEP Uttarakhand State, Chamoli District