

## Basin Report:

Questionnaire + Addendum

To review case study basins

with regard to their water governance regime, context and  
performance

## Bhutan

Case study from the BRAHMATWINN project

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## About this questionnaire

### 1. Introduction

This questionnaire was developed within the consortium of the **Twin2Go** EC-project based on research case studies from numerous macro-scale river basins. The aim of the questionnaire is to investigate and document professional know-how about the process of implementing integrated water resources management (IWRM) in river basins studied in various EC-projects of the 6<sup>th</sup> EC Framework Program (FP6), a worldwide perspective with respect to impacts of climate change.

The Upper Brahmaputra River Basin (UBRB) was one of the twinning basins in the **BRAHMATWINN** EC-project has been identified as a representative case study for further investigation in the Himalaya mountain region and became part of the **Twin2Go** EC-project. The results achieved by discussing and filling in this questionnaire therefore are not only of regional relevance but will also contribute to better understand the challenges and constraints for implementing IWRM as defined by the GWP in a global perspective.

The **Twin2Go** questionnaire is based on the case study results provided by the BRAHMATWINN EC-project and complement them with information about the basins' water governance regime, its context and performance. An explanation of the indicators, the scoring system applied and potential data sources is provided in the guidance document associated with the questionnaire.

### 2. Objectives

The objectives of the questionnaire are threefold:

- (i) To provide a comprehensive professional expert assessment of the status of IWRM implementation by local actors (LA) in the UBRB.
- (ii) To quantify the **Twin2Go** indicators related to issues of the basins' water governance regime, its context and performance and to specify the reasons identified by the LA for the applied indicator scoring.
- (iii) Evaluate the usefulness of the indicators identified by **Twin2Go** and specify complement ones that add to the basin assessment both in a regional and generic perspective.

### 3. How to fill in the questionnaire

The questionnaire has been worked out during a two day workshop that took place between June 3<sup>rd</sup> and 4<sup>th</sup>, 2010 in Guwahati, Assam, NE-India by invited professional experts. The process of filling in the questionnaire was a group effort and at the end of the workshop we had final questionnaires filled in jointly by the national experts groups from Nepal, Bhutan and NE-India.

Filling of the indicator table followed the following procedure:

- (i) Each participant of the workshop should read through the indicator description of the guiding document carefully and understand their meaning for the IWRM implementation assessment. This will provide sufficient information about the indicator meaning and will support the respective national group efforts to complete the questionnaire during the workshop.
- (ii) Assign a score to each of the indicators as described in the guiding document, i.e. "B". In the case of numerical indicators like indices, you should add the numerical value in brackets after the score, e.g. "B (0.178)" or "C (12,534)".

- (iii) The reasons for the scoring have to be explained in brief in the column “comments” and should be both comprehensive and descriptive for evaluation purposes. This column can also be used to specify if the given scoring was controversially discussed, to document data sources required or missing or to add further information that you find relevant for a better understanding of the topic addressed.
- (iv) Based on the preliminary synthesis results and discussion during the Twin2Go synthesis workshop (Stockholm, 01-02/09/10) an addendum was made with some additional parameters. This addendum has been filled by the same experts.

***The resulting data will be post-processed and added to the Twin2Go database. Should you feel these scores do not reflect the situation of the basin accurately, or want to contest any of the information included, you may contact the project organisers.***

***Contact information as well as additional information regarding the project and the results can be found on [www.twin2go.eu](http://www.twin2go.eu).***

***Names of participating experts have been removed for confidentiality purposes.***

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## A) Water governance regime

No.	Indicator	Score	Comments
<b>I) Characteristics of environmental governance regimes</b>			
<b>a) Water policy, institutional &amp; legal framework (formal and informal)</b>			
1.	<b>Domestic water legislation (laws, by-laws, etc.) in place?</b>	D	<ul style="list-style-type: none"> <li>Bhutan Water Bill 2010 is under review and process is advanced</li> <li>IWRM principles are covered and with regional practices are considered</li> <li>Bhutan has a series of well implemented by-laws at Gewok/community – such to warrant A score</li> <li>THE FOLLOWING IS BASED UPON MINIMUM CHANGES DURING PASSAGE OF BILL. ALL RESPONSES ARE BASED UPON WHEN LAW EXISTS: <b>NO IMPLEMENTATION THUS HYPOTHETICAL CURRENTLY</b></li> </ul>
2.	<b>Domestic Water Law: Public character of water and legal status of water use rights</b>	A	<ul style="list-style-type: none"> <li>Public are trustee for water Res</li> <li>No private ownership of water</li> <li>Legal processes of conflict resolution</li> <li>Water priorities are laid out – Ecology is a strategic priority</li> </ul>
3.	<b>Domestic Water Law: Explicit recognition of traditional and indigenous water uses</b>	A	<ul style="list-style-type: none"> <li>Recognition of diversity of traditional law</li> <li>Where based on Equity &amp; Justice</li> </ul>
4.	<b>Domestic Water Law: On flow availability, third party rights and ecological requirements</b>	A	<ul style="list-style-type: none"> <li>Ecology is prioritised MEFC</li> <li>Water is state property so that rights extend across land ownership</li> </ul>

No.	Indicator	Score	Comments
5.	Integration of domestic water legislation	A	<ul style="list-style-type: none"> <li>• Domestic is integrated into the IWRM</li> <li>• Domestic water is a priority after ecology</li> <li>• Pollution and water quality are considered/fines are implemented</li> </ul>
6.	Multilevel structure of domestic water legislation and subsidiarity	A	<ul style="list-style-type: none"> <li>• Very clear administrative subsidiarity</li> <li>• Decision making is cross sectorial</li> </ul>
7.	Existence of formal domestic administrative structure for water governance	A	<ul style="list-style-type: none"> <li>• Extensive consultation and development of WUA will be implemented – community level.</li> </ul>
8.	National basin organisation or comparable arrangement	C	<ul style="list-style-type: none"> <li>• Not basin based/some too small – unclear the Organisation structure</li> <li>• National Agency - Nat Env Commissions – Water Dept.</li> <li>• <b>Much discussion</b></li> </ul>
9.	Formalised transboundary coordination organisation	D	<ul style="list-style-type: none"> <li>• If does exist should be part of NEC</li> <li>• So far no issues arisen</li> <li>• No specific organisation but is dealt within current water resource administration</li> <li>• <b>Much discussion</b></li> </ul>
10.	Formal institution (legislation) that prescribes the basin management principle	B	<ul style="list-style-type: none"> <li>• View country as a single basin due to size</li> <li>• No mentioned</li> <li>• NEC is tasked with this</li> <li>• HP is not mentioned specifically but is implicit</li> </ul>

No.	Indicator	Score	Comments
11.	Water (basin) strategies, programmes and plans	A	<ul style="list-style-type: none"> <li>• Wide availability of data</li> <li>• GNH (Gross Nat Happies) Commission overall endorse</li> <li>• NEC</li> <li>• Recognise potential for issues</li> <li>• <b>Much discussion</b></li> </ul>
12.	Financing mechanisms: Degree of investment from private sector/ public/ other sources (e.g. international)	B	<ul style="list-style-type: none"> <li>• Government funding (&amp; Doner) only</li> </ul>
13.	Economic instruments Is water for irrigation priced?	C	<ul style="list-style-type: none"> <li>• No price is charged</li> </ul>
14.	Economic instruments Is water for households priced in urban areas?	D	<ul style="list-style-type: none"> <li>• Price is too low</li> </ul>
15.	Economic instruments Is water for industry priced?	B	<ul style="list-style-type: none"> <li>• Price too low</li> </ul>
16.	Tradable permits related to water abstraction/use	C	<ul style="list-style-type: none"> <li>• No tradable permits</li> </ul>
17.	Polluter pays principle (related to water)	A	<ul style="list-style-type: none"> <li>• Specified in the Bill</li> </ul>
18.	Environmental subsidies (related to water )	A	<ul style="list-style-type: none"> <li>• Power saving etc</li> <li>• Eco-efficient sub</li> </ul>
19.	Payment for ecosystem services (related to water)	A	<ul style="list-style-type: none"> <li>• Mentioned in the Bill directly</li> </ul>
20.	Tradable permits (related to water quality, maximum, allowable loads etc.)	C	<ul style="list-style-type: none"> <li>• Not in the bill</li> </ul>
21.	Environmental tax (related to water)	C	<ul style="list-style-type: none"> <li>• Urban only not rural</li> </ul>

No.	Indicator	Score	Comments
22.	<b>Presence of substituting informal institutions for management of water</b>	A	<ul style="list-style-type: none"> <li>No provision</li> </ul> <p><i>Land Act 1978 and Forest and Nature Conservation Act 1995 have been responsible for the disappearance of some of the local resource management institutions as these were either over-ruled by the provisions of the acts, or just were overlooked while enacting these acts (Wangchuk)</i></p>
23.	<b>Presence of complementary informal institutions for water management</b>	A	<ul style="list-style-type: none"> <li>E.g. WUC</li> </ul> <p><i>some of the local resource management institutions have been incorporated into laws and by-laws, and have been adopted as effective resource management strategies (Wangchuk).</i></p>
<i>23.a</i>	<i>Case-specific indicator(s)...</i>	-	
<b>b) Formalisation of IWRM principles &amp; Millennium Development Goals</b>			
24.	<b>Formalised IWRM principles</b>	A	<ul style="list-style-type: none"> <li>See above</li> </ul>
25.	<b>State of implementation of IWRM principles</b>	A	<ul style="list-style-type: none"> <li>As above</li> </ul>
26.	<b>Capacity to implement IWRM</b>	B	<ul style="list-style-type: none"> <li>Institutional reform</li> <li>Mainstreaming</li> <li>Budget for CB</li> </ul>
27.	<b>Is universal and non-discriminatory access to safe drinking water and sanitation a goal?</b>	A	<ul style="list-style-type: none"> <li>Mentioned specifically in the bill</li> <li>Aim to beyond MGD</li> </ul>
28.	<b>Integration of wetlands in IWRM and IRBM*</b>	A	<ul style="list-style-type: none"> <li>Direct mention in bill</li> <li>Although Not RAMSAR</li> <li>Water site are often held as sacred</li> </ul>
<i>28.a</i>	<i>Case-specific indicator(s)...</i>		
<b>c) Decision making regarding uncertainties</b>			

No.	Indicator	Score	Comments
29.	General practices for dealing with uncertainties	B	<ul style="list-style-type: none"> <li>Stream flow discussions</li> <li>GLOF</li> </ul>
30.	Dealing with uncertainties: Reversible and flexible options	B	<ul style="list-style-type: none"> <li>E.g change in policy to GLOF from blasting to weir release</li> </ul>
31.	Dealing with uncertainties: Safety margins	A	<ul style="list-style-type: none"> <li>Contingency planning is standard in water resource policy</li> </ul>
32.	Are scenarios used for decision making?	B	<ul style="list-style-type: none"> <li>No recollection of scenarios being used</li> </ul>
33.	Climate risks: Climate variability and change	C	<ul style="list-style-type: none"> <li>Sometimes used in Hydropower etc</li> </ul>
33.a	<i>Case-specific indicator(s)...</i>		
<b>II) Actor networks with emphasis on the role and interactions of state and non-state actors and power relationships</b>			
<b>a) Cooperation and coordination structures</b>			
34.	Vertical coordination (governmental)	A	<ul style="list-style-type: none"> <li>Subsidiary will be well established</li> </ul>
35.	Horizontal coordination (governmental)	C	<ul style="list-style-type: none"> <li>Drinking Water Rural is under MoHealth – MoWHS rund urban. No coordination</li> </ul>
36.	Role of local governments	A	<ul style="list-style-type: none"> <li>Effective 2 way representation</li> </ul>
36.a	<i>Case-specific indicator(s)...</i>		
<b>b) Information sharing via formal rules, dependency relationships etc.</b>			
37.	Kinds of knowledge included => Role of experts/ science, local/traditional knowledge	A	<ul style="list-style-type: none"> <li>Use of external consultants</li> <li>Consultation does occur</li> </ul>
38.	Access to information => about expert knowledge and management plans	B	<ul style="list-style-type: none"> <li>There is a cost for access to information/database</li> <li>Access will be open via constitution</li> </ul>
38.a	<i>Case-specific indicator(s)...</i>		

No.	Indicator	Score	Comments
<b>III) Multi-level interactions across administrative boundaries and vertical integration across levels and horizontal integration across sectors</b>			
<b>a) Centralisation</b>			
39.	One level one actor?	A	<ul style="list-style-type: none"> <li>Substantial participation is encouraged</li> </ul>
40.	Degree of centralisation	B	<ul style="list-style-type: none"> <li>Policy is made high up –imp is lower</li> <li>The aim is de-centralisation</li> <li>Local Government 2009 – plans and implementation are included</li> </ul>
41.	Technical capacity and economies of scale	B	<ul style="list-style-type: none"> <li>Capacity Building is a requirement to instigate policy formulation</li> </ul>
42.	Legal obligations and responsibility	B	<ul style="list-style-type: none"> <li>As local government act 2009</li> </ul>
42.a	<i>Case-specific indicator(s)...</i>		

## B) Context

No.	Indicator	Score	Comments
<b>I) Societal dimension</b>			
43.	Proportion of the population living in rural areas	69,07 %	440 000 (check national population and housing census 2005) ( <a href="http://esa.un.org/unup/p2k0data.asp">http://esa.un.org/unup/p2k0data.asp</a> ) (2005)
44.	State of societal development	C	Medium high development for all ( <a href="http://hdr.undp.org/en/statistics/">http://hdr.undp.org/en/statistics/</a> ) (2009)
45.	Social sustainability (Gini Index)	C	46,8 <a href="http://hdr.undp.org/en/media/HDR_2009_EN_Complete.pdf">http://hdr.undp.org/en/media/HDR_2009_EN_Complete.pdf</a> (2009)
46.	Economic sustainability (e.g. GDP)	D I	3,694 (1318 \$) ( <a href="http://siteresources.worldbank.org/ICPINT/Resources/icp-final-tables.pdf">http://siteresources.worldbank.org/ICPINT/Resources/icp-final-tables.pdf</a> ) (2005)
47.	Effectiveness of formal institutions	C	(corruption perception index) 5 <a href="http://www.transparency.org/policy_research/surveys_indices/cpi/2009/cpi_2009_table">http://www.transparency.org/policy_research/surveys_indices/cpi/2009/cpi_2009_table</a> (2009)
48.	Trustworthiness of economic institutional setting - degree of risk for foreign direct investment	n/a	<a href="http://www.guardian.co.uk/business/2009/may/22/recession-government-borrowing#zoomed-picture">http://www.guardian.co.uk/business/2009/may/22/recession-government-borrowing#zoomed-picture</a> (2009)
49.	Presence of avenues of dissent – press freedom, freedom of speech	C	15,75 medium (C) and low (D) press freedom (disputed by delegates – should be B) <a href="http://en.rsf.org/press-freedom-index-2009.1001.html">http://en.rsf.org/press-freedom-index-2009.1001.html</a> (2009)
49.a	Case-specific indicator(s)...		
<b>II) Good Governance Principles at the national level – legal basis at the national level</b>			
50.	Participatory regarding decision making in the water sector	A	<ul style="list-style-type: none"> <li>Specified in Water Bill.</li> </ul>

No.	Indicator	Score	Comments
51.	Transparency regarding water allocation	D	<ul style="list-style-type: none"> <li>Intention is to develop after the bill is law</li> </ul>
52.	Effectiveness and efficiency regarding decision making in the water sector	A	<ul style="list-style-type: none"> <li>Water bill is aiming at establishing an effective DS</li> </ul>
53.	Equitable and inclusive	A	<ul style="list-style-type: none"> <li>Water bill aims to be highly inclusive where based on equity &amp; justice</li> <li>All sectors have been consulted</li> </ul>
54.	Predictability – with regard to IWRM and climate change	B	<ul style="list-style-type: none"> <li>Climate Change is a new process in decision making and needs integration</li> </ul>
54.a	<i>Case-specific indicator(s)...</i>		
<b>III) Environmental dimension</b>			
55.	Köppen-Geiger climate classification (river basin)	Cwa-Cwb	Cwa: Temperate – dry winter – hot summer Cwb: Temperate – dry winter – warm summer (not clear) <a href="http://hal.archives-ouvertes.fr/docs/00/30/50/98/PDF/hess-11-1633-2007.pdf">http://hal.archives-ouvertes.fr/docs/00/30/50/98/PDF/hess-11-1633-2007.pdf</a> (2007)
56.	Climate Moisture Index	H	0,25 -1 humid, in Nepal partly sub humid and semi arid areas (2008)
57.	Climate Moisture Index Coefficient of Variation	A	0 – 0,25 (low variability) <a href="http://atlas.gwsp.org">http://atlas.gwsp.org</a> (2008)
58.	Per Capita Equivalent of TARWR	A	40 860 m3/yr <a href="http://www.greenfacts.org/en/water-resources/figtableboxes/3.htm">http://www.greenfacts.org/en/water-resources/figtableboxes/3.htm</a> (per capita 2005)
59.	Average water availability at the river basin level (1995)	A	1000 mm/yr <a href="http://www.env-edu.gr/Documents/World%20Water%20in%202025.pdf">http://www.env-edu.gr/Documents/World%20Water%20in%202025.pdf</a>
60.	Annual renewable water supply per person by river basin (1995)	B	<b>Should be A</b> 1700-4000 m3/person/yr <a href="http://earthtrends.wri.org/pdf_library/maps/2-4_m_WaterSupply1995.pdf">http://earthtrends.wri.org/pdf_library/maps/2-4_m_WaterSupply1995.pdf</a>
61.	Projected annual renewable water supply per person by river basin (2025)	B	1700-4000 m3/person/yr <a href="http://earthtrends.wri.org/pdf_library/maps/2-4_m_WaterSupply2025.pdf">http://earthtrends.wri.org/pdf_library/maps/2-4_m_WaterSupply2025.pdf</a> <b>Should be A</b>

No.	Indicator	Score	Comments
62.	Relative Water Stress Index	B	< 0,2 (low RWSI) <a href="http://wwdrii.sr.unh.edu/download.html">http://wwdrii.sr.unh.edu/download.html</a> (1995) Unclear in this context
63.	Climate Vulnerability Index	D	Medium high (44 – 51,9) <a href="http://ocwr.ouce.ox.ac.uk/research/wmpg/cvi/">http://ocwr.ouce.ox.ac.uk/research/wmpg/cvi/</a> (2008-2010) Unclear in this context
64.	Degree to which water quality status restricts usability of users' types	A	<ul style="list-style-type: none"> <li>Water quality is very good nationally</li> </ul>
65.	Extent of flow and channel modification	B	<ul style="list-style-type: none"> <li>Modifications are minor as opposed to major</li> <li>Minimal river training</li> </ul>
66.	Impact of land-use changes on hydrological processes	A	<ul style="list-style-type: none"> <li>Minimal modifications</li> </ul>
67.	Uncertainty associated to climate change predictions regarding precipitation for the basin	B	0,6- 0,8 (simulation 2050)
67.a	<i>Case-specific indicator(s)...</i>	-	

## C) Performance

No.	Indicator	Score	Comments
<b>I) Progress towards stated Goals</b>			
68.	Progress towards sustainable access to safe drinking water (MDG drinking water target)	A	On track <b>(already exceeding)</b> World Health Organization & UNICEF (2010): Progress on Sanitation and Drinking-water: 2010 Update. <a href="http://www.wssinfo.org/en/40_MDG2008.html">http://www.wssinfo.org/en/40_MDG2008.html</a>
69.	Proportion of population with access to improved drinking water	C	81% <b>(~90% - 2010)</b> <a href="http://mdgs.un.org/unsd/mdg/Data.aspx">http://mdgs.un.org/unsd/mdg/Data.aspx</a> (2006)
70.	Proportion of rural population with access to improved drinking water	C	79% <b>(88% - 2010)</b> <a href="http://mdgs.un.org/unsd/mdg/Data.aspx">http://mdgs.un.org/unsd/mdg/Data.aspx</a> (2006)
71.	Progress towards sustainable access to basic sanitation (MDG sanitation target)	C	Not on track World Health Organization & UNICEF (2010): Progress on Sanitation and Drinking-water: 2010 <b>National figures dispute this – suggest A</b> Update. <a href="http://www.wssinfo.org/en/40_MDG2008.html">http://www.wssinfo.org/en/40_MDG2008.html</a>
72.	Proportion of population with access to improved sanitation facilities	D (50-75)	52% <b>National figures dispute this – suggest C</b> <a href="http://mdgs.un.org/unsd/mdg/Data.aspx">http://mdgs.un.org/unsd/mdg/Data.aspx</a> (2006)
73.	Proportion of rural population with access to improved sanitation facilities	D (50-75)	50% <b>National figures dispute this – suggest C</b> <a href="http://mdgs.un.org/unsd/mdg/Data.aspx">http://mdgs.un.org/unsd/mdg/Data.aspx</a> (2006)
73.a	<i>Case-specific indicator(s)...</i>		
<b>II) Good governance principles as indicators for the process dimension</b>			

No.	Indicator	Score	Comments
74.	<b>Participatory regarding decision making in the water sector</b>	A	There is no discrimination based on gender for decision making and planning on water resources. In fact there are already growing numbers of women in the rural areas coming out to plan and make decisions on their water - irrigation and drinking.
75.	<b>Transparency regarding water allocation</b>	A	Water allocation principles and priority is already drawn. In order of priority following are the order: (1) Drinking and sanitation (2) Agriculture (3) Hydropower (4) Industries; and in all decisions of allocation, the water for environment will always be the guiding principle. We have also had consultation meeting with all representatives of the 20 districts in Bhutan in formulating the upcoming Water Act. The corner stone of this legislation is equity and fair. We have mentioned even the age old customary and traditional practices not bound by this principle of equity and fair will be scrapped. We have also set up a transparent institutional stakeholder for ease of allocation and guidance.
76.	<b>Effectiveness and efficiency regarding decision making in the water sector</b>	(probably A) <i>Cannot be answered at the moment</i>	Given the above scenario, the process of decision making should come out as effective and efficient. This will of course only be able ascertained on implementation on the regulations pursuant to the Water Act.
77.	<b>Equitable and inclusive</b>	A	It is geared towards being inclusive and equitable.
78.	<b>Predictability – with regard to IWRM and climate change</b>	(probably A-B) <i>Cannot be answered at the moment</i>	There will be well-defined rights and duties of the executing agencies on water, e.g ministries and agencies have been identified with their mandates on water as well as the mechanisms for enforcing them, and settling disputes. It broadly encompasses the impacts from Climate Change and the adaptation measures that should be in place to cushion against the vagaries of climate change impacts if it should occur.  The implementation of IWRM holistic principles will be encouraged, and whereby applicable the best practices from around the world will be replicated in the Bhutanese context.
78.a	<b>Case-specific indicator(s)...</b>	NA	

No.	Indicator	Score	Comments
<b>III) Stakeholder participation</b>			
79.	Deliberative engagement opportunities	A	<ul style="list-style-type: none"> <li>• Forest and nature conservation act (2002)</li> <li>• Land act (2007)</li> </ul>
80.	Inclusiveness of stakeholder participation	A	<ul style="list-style-type: none"> <li>• Forest and nature conservation act (2002)</li> <li>• Land act (2007)</li> </ul>
80.a	<i>Case-specific indicator(s)...</i>		
<b>IV) Response to climate change</b>			
81.	Strategy for adaptation to climate change in the water sector	B	<p>(B) Adaptation strategy is adopted (on the national scale), and water is explicitly mentioned</p> <p><i>NAPA project will help the government formulate specific plans and strategies in order to enable Bhutan to adapt to climate change, starts 2006; The NAPA findings are aimed at addressing the immediate threats of climate change by putting in place long term preventive measures</i></p>
82.	Availability of specific knowledge enabling adaptation	NA	<ul style="list-style-type: none"> <li>• Basins and sub-basins are not a unit of administration within the bill but maybe in future</li> </ul>
83.	Awareness of water managers regarding adaptation to climate change	B	<ul style="list-style-type: none"> <li>• <b>At a national scale</b></li> </ul>
84.	Coordinated implementation process regarding adaptation to climate change: Program / Plan of activities and measures	A	(A) National water sector adaptation programme under implementation (donor funded initiatives, nationally owned programmes, etc.)
85.	Operational activities (measures)	B	<ul style="list-style-type: none"> <li>• Related to GLOF/early warning/awareness</li> <li>• Only GLOF – not agricultural sector</li> </ul>
86.	Ways to deal with climate variability (floods and droughts)	A	<ul style="list-style-type: none"> <li>• Thought lacking resourcing &amp; Technology</li> </ul>
86.a	<i>Case-specific indicator(s)...</i>		

## Addendum – Context

No.	Indicator	Score	Comments
<b>I) Basin Characteristics</b>			
67a	Sub-Basin Size		Entire area of Bhutan (38,816 km <sup>2</sup> ) is part of the Brahmaputra Basin, Focus on Wang Chu (tributary of Brahmaputra) size in Bhutan: 4,687 km <sup>2</sup>
67b	Transboundary		Wang Chu Yes (Bhutan-India)

## Addendum – Performance

No.	Indicator	Score	Comments
<b>I) Environmental sustainability</b>			
<b>a) State of the water resources and the environment</b>			
87	Aquatic biodiversity	B	The exploration of aquatic biodiversity is not done comprehensively. From the sporadic studies conducted by National Environment Commission, the abundance and richness of biodiversity was observed as High.
88	Invasive exotic species	B	Except for the brown trout, the invasive species are not that well known.
89	Surface and groundwater quality	B	Surface water is mostly Class A quality, exploration of groundwater is still in its infancy.
90	Groundwater use	B	Due to abundance of surface water, ground water use is almost nil.
91	Water Exploitation Index (WEI)	A	Almost no water scarcity
<b>b) Management practices</b>			

No.	Indicator	Score	Comments
92	Water allocated for aquatic ecosystem	A	Usually, all hydropower projects are run-of-river scheme and we are in the process of developing a mandatory minimum ecological flow requirement for downstream aquatic sustainability
93	Water pollution incidents	C	Never observed at a scale that is a public nuisance or fatal
94	Water quality monitoring	B	We are gearing up for regular and more comprehensive monitoring
95	Hydrometeorological monitoring – levels	B	
96	Level of understanding of groundwater resources	C	