

Basin Report:

Questionnaire + Addendum

To review case study basins

with regard to their water governance regime, context and
performance

Assam, India

Case study from the BRAHMATWINN project

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 6th 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 3rd and 4th, 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.

Names of participating experts have been removed for confidentiality purposes.

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A) Water governance regime

No.	Indicator	Score	Comments
I) Characteristics of environmental governance regimes			
a) Water policy, institutional & legal framework (formal and informal)			
1.	Domestic water legislation (laws, by-laws, etc.) in place?	B	<p>National Water Policy since 2002 (implemented for less than 10 years)</p> <p><i>India is the pioneering nation in South Asia to adopt first National Water Policy in 1987. It was revised in 2002 (improved institutional framework to improve performance with reformulation). This document contains many references to water use efficiency and integrated watershed development but no reference to climate change and adaptation (Mirza 2007).</i></p> <ul style="list-style-type: none"> • <i>Legislature: National Water Policy, The Environmental Protection Act, The River Boards Act, The Inter-State Water Disputes Act.</i> • <i>Regulatory Agencies: Ministry of Water Resources, National Water Resources Council, National Water Board, River Boards; Furthermore the main acts under which India's water is governed are: 1) The Environmental Protection Act (1986) 2) The River Boards Act (1956) 3) The Inter-State Water Disputes Act (1956); India does not have any separate and exclusive water law</i>
2.	Domestic Water Law: Public character of water and legal status of water use rights	E	<p>Domestic water legislation is awaited.</p> <p>Policy was drafted and is under consideration.</p>
3.	Domestic Water Law: Explicit recognition of traditional and indigenous water uses	C	
4.	Domestic Water Law: On flow availability, third party rights and ecological requirements	E	Since no domestic water law is in force yet score is not possible.
5.	Integration of domestic water legislation	C	
6.	Multilevel structure of domestic water legislation and subsidiarity	A	

No.	Indicator	Score	Comments
7.	Existence of formal domestic administrative structure for water governance	B	APEX authority for water authorities is not in place.
8.	National basin organisation or comparable arrangement	D	No appropriate mechanism for defining the national part of the basin is in place.
9.	Formalised transboundary coordination organisation	D	There is imperative need to force transboundary cooperation.
10.	Formal institution (legislation) that prescribes the basin management principle	D	Formal institution is under consideration
11.	Water (basin) strategies, programmes and plans	C	Draft is prepared and under consideration under government level.
12.	Financing mechanisms: Degree of investment from private sector/ public/ other sources (e.g. international)	B	about 90% from government source
13.	Economic instruments Is water for irrigation priced?	B	Charge is in place but to low.
14.	Economic instruments Is water for households priced in urban areas?	B	Prices are to low
15.	Economic instruments Is water for industry priced?	B	Price to low
16.	Tradable permits related to water abstraction/use	C	
17.	Polluter pays principle (related to water)	B	
18.	Environmental subsidies (related to water)	C	
19.	Payment for ecosystem services (related to water)	C	
20.	Tradable permits (related to water quality, maximum, allowable loads etc.)	C	

No.	Indicator	Score	Comments
21.	Environmental tax (related to water)	C	While there are no genuine Pigouvian taxes in India at present, there is considerable potential for introducing them particularly for industrial pollution (water and air), as well as transport-related pollution (Shreekant 2008).
22.	Presence of substituting informal institutions for management of water	C	
23.	Presence of complementary informal institutions for water management	C	e.g. water user associations (WUAs) and stakeholder-based basin organizations—being more accessible and responsive—could ensure accountability and dispute-resolution quickly; informal institutions remain largely independent of formal water institutions and operate only at the periphery of the formal water sector, they can still provide very valuable insights for designing the kind of institutional mechanisms that are needed for filling the organizational vacuum existing at lower echelons of water management., working good on local level
23.a	<i>Case-specific indicator(s)...</i>		<p>Prioritisation of water user</p> <p>(1) drinking water (2) irrigation (3) navigation (4) industry (5) hydropower</p> <p>drinking water, irrigation, hydropower, ecology, agro-industries and non-agricultural industries, navigation and other uses (National Water Policy 2002: §5).</p> <p>Overexploitation of groundwater resource Environmental water quality indicator and human pollution indicator Integration of NGOs</p>
b) Formalisation of IWRM principles & Millennium Development Goals			
24.	Formalised IWRM principles	A	Only in planning but missing legislation
25.	State of implementation of IWRM principles	C	
26.	Capacity to implement IWRM	C	

No.	Indicator	Score	Comments
27.	Is universal and non-discriminatory access to safe drinking water and sanitation a goal?	A	
28.	Integration of wetlands in IWRM and IRBM*	B	APEX authority is in the process of implementation. <i>Assam government brought in a legislation to protect and conserve 4 water bodies near Guwahati. Guwahati Water-bodies (Preservation and Conservation) Act 2008 intends to save them from disappearing and proposes to ease the acute water-logging and artificial floods (newspaper article), e.g Deepor beel as RAMSAR site</i>
28.a	Case-specific indicator(s)...		
c) Decision making regarding uncertainties			
29.	General practices for dealing with uncertainties	C	
30.	Dealing with uncertainties: Reversible and flexible options	C	Not relevant in the present context
31.	Dealing with uncertainties: Safety margins	C	
32.	Are scenarios used for decision making?	C	
33.	Climate risks: Climate variability and change	C	
33.a	Case-specific indicator(s)...		
II) Actor networks with emphasis on the role and interactions of state and non-state actors and power relationships			
a) Cooperation and coordination structures			
34.	Vertical coordination (governmental)	D	

No.	Indicator	Score	Comments
35.	Horizontal coordination (governmental)	E	<i>A number of institutions are responsible to run water sector activities. In most of the cases, the functional responsibilities are un-coordinated or poorly coordinated. In India, Ministry of Water Resources, Central Water Commission, Central Ground Water Board; ICAR and Planning Commission look after water sector activities. Ministry of Environment and Forest does not have any explicit role for water sector except for water quality monitoring and EIA approval (Mirza 2007).</i>
36.	Role of local governments	C	<i>Local governments such as municipalities and panchayat unions also play an important role in drinking water supply as do the user and stakeholder groups in the irrigation sector. (Saleth 2005); Panchayats in rural areas and Municipalities in urban areas</i>
36.a	<i>Case-specific indicator(s)...</i>		
b) Information sharing via formal rules, dependency relationships etc.			
37.	Kinds of knowledge included => Role of experts/ science, local/traditional knowledge	A	In a very limited manner
38.	Access to information => about expert knowledge and management plans	C	
38.a	<i>Case-specific indicator(s)...</i>		
III) Multi-level interactions across administrative boundaries and vertical integration across levels and horizontal integration across sectors			
a) Centralisation			
39.	One level one actor?	C	
40.	Degree of centralisation	A	
41.	Technical capacity and economies of scale	B	
42.	Legal obligations and responsibility	B	
42.a	<i>Case-specific indicator(s)...</i>		

B) Context

No.	Indicator	Score	Comments
I) Societal dimension			
43.	Proportion of the population living in rural areas	71,30 % 87% 75%	India, 808 840 000 (http://esa.un.org/unup/p2k0data.asp) (2005) Assam Nagaland
44.	State of societal development	C D C	India, Medium high development for all (http://hdr.undp.org/en/statistics/) (2009) Assam Nagaland
45.	Social sustainability (Gini Index)	B B B	India, 36,8 (http://hdr.undp.org/en/media/HDR_2009_EN_Complete.pdf) (2009) Assam Nagaland
46.	Economic sustainability (e.g. GDP)	D E D	India, 2,126 PPP (707 \$) (http://siteresources.worldbank.org/ICPINT/Resources/icp-final-tables.pdf) (2005) Assam Nagaland
47.	Effectiveness of formal institutions	D E E	India, 3,4 (http://www.transparency.org/policy_research/surveys_indices/cpi/2009/cpi_2009_table) (2009) Assam Nagaland

No.	Indicator	Score	Comments
48.	Trustworthiness of economic institutional setting - degree of risk for foreign direct investment	C	India, http://www.guardian.co.uk/business/2009/may/22/recession-government-borrowing#zoomed-picture (2009)
		C	Assam
		D	Nagaland
49.	Presence of avenues of dissent – press freedom, freedom of speech	C	India, 29,33 http://en.rsf.org/press-freedom-index-2009.1001.html (2009)
		C	Assam
		C	Nagaland
49.a	<i>Case-specific indicator(s)...</i>		

II) Good Governance Principles at the national level – legal basis at the national level			
50.	Participatory regarding decision making in the water sector	B	Some laws are in place but not implemented effectively
51.	Transparency regarding water allocation	A	
52.	Effectiveness and efficiency regarding decision making in the water sector	B	
53.	Equitable and inclusive	A	Scope of improvement for equitable access
54.	Predictability – with regard to IWRM and climate change	B	Process is on integrating CC into IWR
54.a	<i>Case-specific indicator(s)...</i>		
III) Environmental dimension			
55.	Köppen-Geiger climate classification (river basin)	Cwa	Cwa: Temperate – dry winter – hot summer http://hal.archives-ouvertes.fr/docs/00/30/50/98/PDF/hess-11-1633-2007.pdf (2007)
56.	Climate Moisture Index	H	0,25 -1 humid
57.	Climate Moisture Index Coefficient of Variation	A	0 – 0,25 (low variability) http://atlas.gwsp.org (2008)
58.	Per Capita Equivalent of TARWR	D C	India: 1 750 m ³ /yr (http://www.greenfacts.org/en/water-resources/figtableboxes/3.htm) (per capita 2005) Assam

59.	Average water availability at the river basin level (1995)	A	1000 mm/yr http://www.env-edu.gr/Documents/World%20Water%20in%202025.pdf
60.	Annual renewable water supply per person by river basin (1995)	B	1700-4000 m ³ /person/yr http://earthtrends.wri.org/pdf_library/maps/2-4_m_WaterSupply1995.pdf
61.	Projected annual renewable water supply per person by river basin (2025)	B	1700-4000 m ³ /person/yr http://earthtrends.wri.org/pdf_library/maps/2-4_m_WaterSupply2025.pdf
62.	Relative Water Stress Index	B D	India, < 0,2 (low RWSI) http://wwdrii.sr.unh.edu/download.html (1995) Assam
63.	Climate Vulnerability Index	D	Medium high (44 – 51,9) http://ocwr.ouce.ox.ac.uk/research/wmpg/cvi/ (2008-2010)
64.	Degree to which water quality status restricts usability of users' types	B	
65.	Extent of flow and channel modification	B	
66.	Impact of land-use changes on hydrological processes	B	
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
I) Progress towards stated Goals			
68.	Progress towards sustainable access to safe drinking water (MDG drinking water target)	A	India, On track World Health Organization & UNICEF (2010): Progress on Sanitation and Drinking-water: 2010 Update. http://www.wssinfo.org/en/40_MDG2008.html
		B	Assam
69.	Proportion of population with access to improved drinking water	C	India
		D	89% http://mdgs.un.org/unsd/mdg/Data.aspx (2006) Assam
70.	Proportion of rural population with access to improved drinking water	C	India, 86% http://mdgs.un.org/unsd/mdg/Data.aspx (2006)
		D	Assam
71.	Progress towards sustainable access to basic sanitation (MDG sanitation target)	C	India, Not on track World Health Organization & UNICEF (2010): Progress on Sanitation and Drinking-water: 2010 Update. http://www.wssinfo.org/en/40_MDG2008.html
		B	Assam
72.	Proportion of population with access to improved sanitation facilities	E	28% (http://mdgs.un.org/unsd/mdg/Data.aspx) (2006)
73.	Proportion of rural population with access to improved sanitation facilities	E	18% (http://mdgs.un.org/unsd/mdg/Data.aspx) (2006)
73.a	<i>Case-specific indicator(s)...</i>		
II) Good governance principles as indicators for the process dimension			

No.	Indicator	Score	Comments
74.	Participatory regarding decision making in the water sector	D	Decision making is without any consultation with water users. Decisions are disseminated as facts.
75.	Transparency regarding water allocation	C	Water allocation schedules are not shared with water users and are not communicated either.
76.	Effectiveness and efficiency regarding decision making in the water sector	B	Goals are only partially achieved and not always efficient
77.	Equitable and inclusive	B C	For the national level Assam: No discrimination or exclusion of users
78.	Predictability – with regard to IWRM and climate change	B C	For the national level Assam:
78.a	<i>Case-specific indicator(s)...</i>		
III) Stakeholder participation			
79.	Deliberative engagement opportunities	B	The influences is quite strong
80.	Inclusiveness of stakeholder participation	C	
80.a	<i>Case-specific indicator(s)...</i>		
IV) Response to climate change			
81.	Strategy for adaptation to climate change in the water sector	C	Assam: In place with specific reference to water
82.	Availability of specific knowledge enabling adaptation	D	Output from the BRAHMATWINN project delivered downscaling
83.	Awareness of water managers regarding adaptation to climate change	C	

No.	Indicator	Score	Comments
84.	Coordinated implementation process regarding adaptation to climate change: Program / Plan of activities and measures	C	Assam
85.	Operational activities (measures)	D	Activities like 'living with floods' and disaster management cells are in place.
86.	Ways to deal with climate variability (floods and droughts)	B	
<i>86.a</i>	<i>Case-specific indicator(s)...</i>		

Addendum – Context

No.	Indicator	Score	Comments
I) Basin Characteristics			
67a	Sub-Basin Size		Federal state Assam as part of Brahmaputra: 78,550 km ²
67b	Transboundary		Upper Brahmaputra: Tibet, Bhutan, India

Addendum – Performance

No.	Indicator	Score	Comments
I) Environmental sustainability			
a) State of the water resources and the environment			
87	Aquatic biodiversity	A	Highly productive water bodies (in respect of aquatic flora and fauna) and high biodiversity
88	Invasive exotic species	C	Water Hyacinth invaded the region in later part of 19 th century gradually infested in most of the lentic water bodies and cause depletion of fish and other aquatic lives.
89	Surface and groundwater quality	B	Affected mainly surface water for release of solid and liquid wastes from the industries and municipal areas.
90	Groundwater use	B	
91	Water Exploitation Index (WEI)	A	Data not available for rating but observation is that no or limited water scarcity is there for improper management.
b) Management practices			

No.	Indicator	Score	Comments
92	Water allocated for aquatic ecosystem	A	
93	Water pollution incidents	C	
94	Water quality monitoring	B	Usually done by the Pollution Control Board
95	Hydrometeorological monitoring – levels	-	No clear knowledge on it
96	Level of understanding of groundwater resources	B	