

RIVER BASIN

BEAS

[INDIA]

SCHEDULE A
ASSESSMENT OF RIVER BASINS (RBs) IN SOUTH ASIA

Sr. No.	Details	Response
1	Physical Features - General Information	
1.1	Name of River basin (also indicate regional names);	Bias, also spelled as Byas , Ancient (Greek) :Hyphasis , Sanskrit :Vipasa (Source: http://www.britannica.com/eb/article-9013950/Beas-River)
1.2	Relief Map and Index Map of RB with Country/ State/ Province boundary marked to be attached.	Refer Annexure 1
1.3	Geographical location of the place of origin (Country/District. Please indicate on relief and Index Map)	It rises at an elevation of 14,308 feet (4,361 m) in the Rohtang Pass in the Punjab Himalayas, in central Himachal Pradesh. (www.britannica.com) from the Solang Nallah. At the head of the Solang Nallah is the Beas Kund Plain. Prominent, is the Hanuman Tibba massif at nearly 20,000 feet, it's 8 km long glacier giving birth to the main stream of the Beas. (Source: http://www.geocities.com/Yosemite/5112/kulu.html) From there it flows south through the Kulu valley, receiving tributaries from the flanking mountains, and then turns west.
1.4	Area (in Sq. Kms.),	12560 Sq km (Source: Bhakra Beas Management Board)
1.5	Population (in Millions); Name of population centers/ Cites (duly marked on the map: refer 1.2) having Population -	
	(a) More than 0.5 Million - 1 Million	
	(b) More than 1 Million – 10 Million	
	(c) More than 10 Million	

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1.6	Approximate areas of upper regime, middle regime and lower regime;	Punjab Himalayas, Himachal Pradesh, Punjab Plains
1.7	Country and States (Province) in which the basin lies (indicate % area covered);	It rises at an elevation of 14,308 feet (4,361 m) in the Rohtang Pass in the Punjab Himalayas, in central Himachal Pradesh. From there it flows south through the Kulu valley, receiving tributaries from the flanking mountains, and then turns west to flow past Mandi into the Kangra valley. After crossing the valley, the Beas enters Punjab state and veers south and then southwest to its confluence with the Sutlej River at Harike after a course of about 290 miles (470 km). The Beas River was the approximate eastern limit of Alexander the Great's invasion of India in 326 BC. (Source: http://www.britannica.com/eb/article-9013950/Beas-River)
2	Hydrological and Land use Features:	
2.1	Average annual rainfall (in mm); regions receiving high, medium or low rains);	Snowfall in upper reaches: 1270 mm and rainfall 550 mm , Chamba Valley: 1600 mm, Punjab Plains: 459.5 mm (http://punjabgovt.nic.in/ECONOMY/BasicStatistics.htm) (Source: Hydrological Modeling of Beas Basin,R. HRISHIKESH MAHADEV, http://www.iirsnrnsa.gov.in/student_thesis/mtech/2002_2004/4798.pdf)
2.2	Maximum-minimum temperatures in Degree Centigrade	Sub Zero Temperature at Rohtang pass, while temperatures reaching as high as 48 degrees in Punjab
2.3	Average annual yield (discharge) of water in Cubic Meter and the average yield for last past five years	Based on 1921-45 flow series the average flow of Ravi at Madhopur and Beas at Mandi Plain are estimated to be 18.98 MAF . (Source: Water Resources Ministry, GOI) http://wrmin.nic.in/cooperation/rvbtribunal.htm)
2.4	Major tributaries	Solang Nala, and various glaciers and rivers like Parbati, Thirthan, Sainj Khad, Bakhli Khad (Source: Hydrological Modeling of Beas Basin,R. HRISHIKESH MAHADEV, http://www.iirsnrnsa.gov.in/student_thesis/mtech/2002_2004/4798.pdf)

2.5	Percentage shares of major water uses & Surface and groundwater abstraction in percentages-Convert intoTable (a.) Agriculture,	D N A
	(b.) Industries,	
	(c). Domestic,	
	(d). urban,	
	e). environmental flows.	
2.6	Major cropping pattern	Upper reaches: Apple Orchards, Mandi Valley: Potatoes, Maize , Wheat, Paddy, Millet, Tea (Mandi) (Source :Cropping Pattern (Agricultural and Horticultural) in Different Zones, their Average Yields in Comparison to National Average/ Critical Gaps/Reasons Identified and Yield Potential, P. Das http://agricoop.nic.in/Farm%20Mech.%20PDF/05024-02.pdf) Punjab: Dominated by wheat rice rotation
2.7	Cultivable area under irrigation	Note: For details please refer to Bhakra Beas Management Board: http://bbmb.gov.in
2.8	Cultivable area not under irrigation	D N A
2.9	State other Water Uses- eg. Navigation, power, recreation etc.	A diversion dam, Pondoh, 140 km upstream of Pong on Beas, enables diversion of water from Beas to Bhakra reservoir and generates 165 MW of power. (Source: National Water Development Agency)
3	Ecosystem Features	
3.1	Agro-climatic zones	
3.2	Major sub ecosystems (zoogeographical zones)	Upper reaches: Alpine Landscape, Hilly Himalayan Ranges, Fertile alluvial plains of Himachal and Punjab

3.3	Major soil types	Glacier and Snow Cap soils in upper reaches, a combination of shallow black, brown and alluvial soils in Kangra and Kullu, moist Udalfs soil in Mandi (source: http://planningcommission.nic.in/plans/stateplan/sdr_hp/sdr_hpch2.pdf). Punjab: Predominantly Loamy and floodplain (Bet or Khadar) soils
3.4	National parks/sanctuaries, lakes, wetlands, etc.	Fully 1800 square kilometers of land in the Upper Beas is designated as Reserved or Protected forest (http://www.geocities.com/Yosemite/5112/kulu.html)
3.5	Brief information about the delta region of the basin (area, location, major urban centers in the delta, etc.)	The river does not form a delta, but meets river Sutluj upstream of the Harike dam.
4	Water Quality	
4.1	Prevailing water quality standards (e.g. Class I, II, III.etc, indicating permitted uses)	Himachal: in Manali: Water Quality : Good (source: http://www.cwra.org/Publications/CWRA_-_CWR_Journals/CWRA_-_Journal_Abstracts/CWRA_-_Journal_Volume_27_Issue/Paper1Kirch.pdf , Impact of Tourism and Urbanization on Water Supply and Water Quality in Manali, Northern India, Anke Kirch) Punjab: The quality of river Beas on entering the Punjab State is generally 'A' category. It falls to 'D' category immediately after it receives the industrial and domestic waste of Mukerian and Goindwal Industrial Complex. Water quality is lowered mainly due to high count of coliform. (Source: http://www.punjabenvironment.com/water_quality.htm . Environmental Information Systems, India)
4.2	Stretches (along the River) in Kms. with water quality classes indicated (may be marked on the map)	Up stream Himachal: Grade I, Himachal Mandi valley: Grade II, Kulu Valley: Grade A for all except TSS and E coli (source: CPCB http://www.cpcb.nic.in/Watdata2002/induscri.htm) Punjab: Grade D
4.3	Sources of Pollution, with data indicating quantum and/or severity.	8 Municipal committees in Punjab directly dump their sewage in Beas (Source: Punjab State Council for Science and Technology) also industrial Pollution Problem in Punjab

4.4	Prevailing abatement techniques e.g: ETP, STP, legislation,etc.	Data not found
5	Current status of the resource development & potential for development	
5.1	Water availability: a. Per capita water availability (in lpcd)	D N A
	b. Per hectare water availability (in Cubic meters for cultivable command area):	D N A
	c. Availability of environmental flows (Current reserve, if any):	none
	d. Availability of ground water/ Average annual ground water abstraction/recharge.	D N A
5.2	Structures: a. Major dams/barrages (with utilization categories): http://wrmin.nic.in/cooperation/rvb_sribunal.htm	The Beas Project, comprising two units namely, Unit-I – BSL Project and Unit-II – Beas Dam, is a part of the Master plan for the utilisation of the waters of the three eastern rivers viz. the Satluj, the Beas and the Ravi for irrigation and power-generation in an integrated manner. (Source: Bhakra Beas Management Board) Beas Project: Comprising two units – Unit I, the Beas-Sutlej Link Project and Unit-II, the Beas Dam at Pong: Unit I, the BSL Project:-
	b. Proposed dams:	A Proposed project is a 192 MW hydro electric project on Allain and Duhangan rivers, that are tributaries of Beas river, which in turn is a tributary of the Indus river. There are to be two dam structures on the Allain and Duhangan streams, water from Duhangan stream is to be totally diverted to the Allain river and both are then to pass through underground tunnels and power house. The water from the power house would return to the Allain stream.(source: http://www.irn.org/pdf/india/040109duhangan_crit.pdf)

	c. Live storage of major dams:	Unit-I, the Beas–Satluj Link, is essentially a power project and diverts 4711 million cum (3.82 MAF) of Beas waters at Pandoh, into the Satluj over 1000-foot drop. The Dehar Power House at this point has an installed capacity of 990 MW, the tail race waters then flows down the satluj and is stored in Bhakra's Gobindsagar Reservoir. The diversion from Pandoh to Dehar is through a 38 km long water conductor system comprising an open channel and two tunnels with a combined length of over 25 km. The total catchement area of Beas and Satluj is 12560 km ² and 56860 km ² respectively. Unit-II of the Beas Project is the Pong Dam on the Beas, just before it enters the plains at Talwara, with a gross storage of 8572 million cum (6.95 MAF) behind a 435 feet earth-core gravel shell dam. The power plant at the base of the dam had an installed capacity of 360 MW.
	d. Live storage through proposed dams:	Allain Duhangan Project (source: http://www.irn.org/pdf/india/040109duhangan_crit.pdf)
	e. Inter basin transfer systems:	Satluj-Beas link is conctructed and managed by the Bhakra Beas Management Board. Details:Pandoh Dam: An earth-cum-rock fill type 76.25 m (250 ft) high diversion dam at Pandoh. Pandoh Dam – Top View
	f. Any Other:	D N A
5.3	Command area of major dams	D N A
5.4	Agencies functioning in the basins: a. Public agencies/ CSOs which construct/ implement the infrastructures projects: b. Private agencies/ CSOs involved in infrastructure development	Bhakra Beas Management Board (BBMB) manages water alloctaions, dam operation and management in the Sutluj Beas Basin. The agency concerned with construction work is: 'Beas Construction Board' (Source: http://bbmb.gov.in/english/menu2.asp)
6	Existence of National/State/Provincial Laws or Notifications relating to water- Management / use/development/opportunity for private sector participation or for privatization of	National Water Policy- India (2002), Ravi-Beas Waters Tribunal for distributing waters between Punjab, Haryana and Rajasthan

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	water resources	
7	Key Issues:	Water Allocation problems between Haryana and Rajasthan, Industrial and city pollution in Punjab, Sedimentation in Himachal Pradesh (Source: http://wrmin.nic.in/cooperation/rvbtribunal.htm), Erosion and landslides in Manali Valley by Beas. Eating away of Forest Tracts.
8	Enabling instruments- Law/ Policy/ Economic & Financial Measures for introducing IWRM in the basin	Bhakra Beas Management Board has the potential of integrating aspects like land use, environmental protection, equity, etc.

SCHEDULE B
ASSESSMENT OF RIVER BASINS (RBs) IN SOUTH ASIA

Sr. No.	Details	Response
1	Legal / Political Mandate	
1.1	Is there any RBO? If yes, Give Name.	Though it is not a legally constituted RBO, but the Bhakra Beas Management Board manages dams in the Beas- Sutluj basins, water allocations and Hydropower production (Source: www.bbmb.gov.in)
1.2	How has it been constituted? (Statutory/ Voluntary/ Any other form).	Statutory
1.3	State objectives and organizational structure of the RBO in outline & enclose brochures	<p>Functions of BBMB Administration, Operation & Maintenance of Bhakra-Nangal Project, Beas Project Unit-I (Beas Satluj Link Project) and Beas Project Unit- II (Pong Dam) in Northern India. The regulation of supply of water from Satluj, Ravi and Beas to the States of Punjab, Haryana and Rajasthan. The regulation and supply of power generated from Bhakra-Nangal and Beas Projects.</p> <p>Providing and performing engineering & related technical and consultancy services in the various fields of hydroelectric power projects and irrigation projects and to carry on all kinds of business related thereto, either independently or as a Joint Venture with any Central/State/Public Sector Undertaking(s) or establishment(s) under the administrative control of Ministry of Power. Joint venture with any other agency/organization will be subject to the approval of the Central Govt.</p>

		<p>Additional Functions Envisaged</p> <p>Construction of new Hydro Projects within and outside BBMB System</p> <p>Construction of Hydrel Projects at Thablan, Saunda and Chanarthal on Bhakra Main Line (BML) with an aggregate capacity of 19MW.</p>
1.4	Functioning level of the RBO	<p>functioning level of the RBO Sapr two basins of Sutluj and Beas and it works on water and power allocations between staes of himacha,. Punjab, Haryana, Rajasthan and Delhi</p> <p>1. BBMB does not have the responsibility to manage IWRM, but as it works closely with irrigation magaemnt and interstate water allocation, it indicates teh potential to ork with IWRM approach</p> <p>2. Data Dissemination is restricted to its website that provides informationnon new and planed projects</p>
1.5	What are the major activities carried out by the RBO since inception?	<p>On Reorganisation of the erstwhile state of Punjab on 1st November, 1966, Bhakra Management Board (BMB) was constituted under section 79 of the Punjab Reorganisation Act, 1966 for the administration, maintenance and operation of Bhakra Nangal Project w.e.f. 1st October 1967. The Beas Project Works, on completion, were transferred by Government of India from Beas Construction Board (BCB) to Bhakra Management Board as per Section 80 of the Punjab Reorganisation Act, 1966 and the Bhakra Management Board was renamed as Bhakra Beas Management Board (BBMB) w.e.f. 15th May 1976. Since it inception, it has worked on hydro mpower production and distribution, water distribution and Managing Bhakra nangal and Beas Projects</p>
1.6	What are the proposed activities of the RBO?	

1.7	Details of Contact person/s (Name, designation and contact address, & emails).	
1.8	Presence of a regulatory framework wherein national or regional supra basin authority regulates the functioning of the RBO	
1.9	Legal mandate wherein stakeholders can appeal for redress and conflict resolution	
1.10	Does the RBO have an appellate authority?	
1.11	Is the RBO an autonomous body?	BBMB is an autonomous body
1.12	Is it regulated by a supra basin authority,	No
1.13	Is the RBO authorized to raise capital for management and/or implementation in open market?	D N A
1.14	Does the RBO receive direct budgetary grants? (From Govt./ Statutory Bodies/ Public donations/ Any Other Agencies.)	D N A
1.15	Nature of mandate for delegation of powers and/or functions (within RBO's constitution) to the lowest possible scales so as to encourage stakeholder participation. (Kindly elaborate the mode of delegation).	D N A
1.16	Policy of the RBO on – (i) Water allocation between users/sectors/sub-basins; and	
	(ii) Procedures and processes for determining the above.	D N A

1.17	Presence of Trans-boundary Water Agreement or Treaty in case of a trans-boundary basin, (and a common RBO representing the countries/provinces) (eg. Indus Treaty in case of River Indus flowing through India and Pakistan) (Kindly indicate the agreement/ treaty. Also, indicate RBOs are representing Trans boundary Basins.)	Ravi Beas Tribunal (Interstate Water Distribution)
1.18	Presence of a 'Tribunal' appointed in case of intra basin or inter basin disputes (eg. Krishna Water Disputes Award Tribunal established between states of Maharashtra, Karnataka, and Andhra Pradesh); (Kindly indicate name & nature of tribunal).	Ravi Beas Tribunal
1.19	Is the RBO responsible for preparing Basin Management Plan. If yes, please enclose a copy	No
2	Processes of community/stakeholder participation in the functioning of the RBO	
2.1	Are the stakeholders from the basin included in the governing body of the RBO ?	No
2.2	Elaborate the nature and frequency of public consultation initiated by the RBO (for example: Annual Public hearings, representations from individuals/public,etc.)	Information published on the website is the only effort of communication
2.3	Elaborate efforts at outreach/communication by the RBO.	D N A
2.4	Elaborate efforts made for creation of participatory platforms at minor/major tributary or watershed levels for encouraging	none

	participation .	
2.5	Interaction of the RBO with organizations working in water management at different watershed/ micro basin, sub-basin or basin level (eg. Interaction of RBO with Water User Groups).	D N A
2.6	Stakeholder participation sought by the RBO for preparing Basin Management Plan	D N A
3	Conflict resolution and negotiations	
3.1	Involvement of the RBO in negotiations between stakeholders at various levels through an appellate authority mentioned above;	D N A
3.2	Negotiation and participation encouraged at mini/micro basins for consensus building and/ or conflict management.	D N A

SCHEDULE C
ASSESSMENT OF RIVER BASINS (RBs) IN SOUTH ASIA
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