RIVER BASIN

RUSHIKULYA

[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 used in different countries, states along its course);	Rushikulya
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)	It originates from Digi village on eastern slope of Eastern Ghats in the undivided Phulbani district at an elevation of about 1000 m. (Source:NWDA:http://nwda.gov.in/writereaddata/sublink2images/104.pdf)
1.4	Area (in Sq. Kms.),	The catchment area of the Rushikulya basin is **8024 km^2,** which lies in Phulbani (1068 km^2), Puri (179 $km^{2)}$ and Ganjam (6777 km^2) districts of Orissa. (Source: NWDA)
1.5	Population (in Millions); Name of population centers/ Cites (duely marked on the map: refer 1.2) having Population -	Population (2001): 29,42,901, Density: 328 / Sqkm (source:http://www.orissawater.com/BasinMaps/IndexofBasins.htm)

	(a) More than 0.5 Million - 1 Million	
	(b) More than 1 Million – 10 Million	
	(c) More than 10 Million	
1.6	Approximate areas of upper regime, middle regime and lower regime;	Physiographically, the basin can be divided into six zones: uplands, medium lands, low lands, hill tops and hill slopes, river banks and coastal plains. The table land of the west is the continuation of the Eastern Ghat range. (Source: NWDA:http://nwda.gov.in/writereaddata/sublink2images/104.pdf)
1.7	Country and States (Province) in which the basin lies (indicate % area covered);	The river lies in the state of Orissa in India
2	**Hydrological and Land use Features:**	
2.1	Average annual rainfall (in mm); (	Annual Rainfall: Max:2553 mm, Min:257 mm(source: Orissa water.com)
2.2	Maximum-minimum temperatures in Degree Centigrade	D N A
2.3	Average annual yield (discharge) of water in Cubic Meter and the average yield for last past five years	Water resources of the basin are estimated at 2782 MCM (at 75% dependability) and at an average of 3949 MCM. (source: www.orissawater.org, Government of Orissa Water Resources Ministry website, Orissa State Water Plan, 2004)
2.4	Major tributaries	The important tributaries are Padma, Badanadi, Baghua and Goraharah. (Source: NWDA)
2.5	Percentage shares of major water uses & Surface and groundwater abstraction in percentages-Convert intoTable (a.) Agriculture,	

	(b.) Industries,	Industrial Water Demand in 2001:48.60 Million Cubic meters/ year. By 2051, the demand will grow to 96.90 Million Cubic Meters / year. Note: Water Resources Department is engaged in making an Integrated State Water Plan and Rushikulya will be one of the rivers where water will be reserved for industries. (Source: Orissa's Water Resources: State of Orissa's Environment).
	(c). Domestic,	
	(d). urban,	
	e). environmental flows.	
2.6	Major cropping pattern	The main forest products are timber, bamboo, myrabalam, tamarind, sal, mahua, resin, kendu leaf, siali leaf, sal leaf & neem & karanj seeds. Major crops are paddy, ragi, moong, biri, til , groundnut , horse gram, sugarcane and chilly.(SOurce: orissagov.nic.in/panchayat/Cha1_gan.pdf). Suggested Cropping pattern as per the NWDA is: 66% paddy, 6%fodder, 6% pulses, 6% Groundnut (Kharif) and 18% paddy, 12% groundnut, 12% pulses, 6% perennials, 6% vegetables, 6% Oil seeds (Rabi)
2.7	Cultivable area under irrigation	Under the command Area Development project, the cultivable command area for Rushikulya is 61300 Hectares. With field channles: 10885 and field drains: 1883 hectares(Source:http:// www.orissawater.com/CADA/CADAMain.htm)
2.8	Cultivable area not under irrigation	
2.9	State other Water Uses- eg. Navigation, power, recreation etc.	

3	**Ecosystem Features**	
3.1	Agro-climatic zones	
3.2	Major sub ecosystems (zoogeographical zones)	
3.3	Major soil types	
3.4	National parks/sanctuaries, lakes, wetlands, etc.	Forest:349 ThHa (source: www.orissawater.com) Note: At the mouth of river Rushikulya, Oliver Ridley Turtles have been nesting since March 1994. Unfortunately, however, several thousand turtles die every year as a result of the illegal trawling activities of fishing tawlers and gill netters.Nesting-beach faces an additional threat from the proposed Crude Oil Terminal project of Bharat Petroleum Corporation Limited at Kantiagada village. If this project becomes a reality the Rushikuya turtle mass-nesting site will be lost forever.The nesting beach is only one kilometer from the Madras- Calcutta National Highway Number 5 and extends from village Pururnbandha to Kantia gada(Source:http://www.wildlifetrustofindia.org/html/news/2003/030310_olive_riddley.htm) (http://www.atree.org/kachhapa4.pdf)
3.5	Brief information about the delta region of the basin (area, location, major urban centers in the delta, etc.)	Note:River Rushikulya has no delta at its mouth. (Source:http://www.orissa.gov.in/topography/topography.htm) Rushikulya estuary area is rich in biodiversity , but is facing polluiton problems from Mercury effluemts from chlor Alkali companies on its banks. (Source:Brain AChE activity studies in some fish species collected from a mercury contaminated estuary)
4	**Water Quality**	

4.1	Prevailing water quality standards (e.g. Class I, II, III.etc, indicating permitted uses)	Downstream and upstream of Ganjam District, the river belongs to Class D , indicating that it is highly polluted. (Source:http://www.envfor.nic.in/cpcb/rwq/9495/rwq_rsk.html, 1994 data)
4.2	Stretches (along the River) in Kms. with water quality classes indicated (may be marked on the map)	'The impact of the effluent discharged from a chloralkali factory, on the water quality of the Rushikulya river estuary, was studied. The effluent was found to be significantly deteriorating the physico-chemical status and aesthetic characteristics of the estuarine water. Out of the several characteristics studied, the levels of BOD, COD and mercury, and to some extent the nutrients, were found to be alarming warranting immediate attention. The effluent was not fit for being discharged as such. The estuarine water was completely unfit for supporting aquatic life.'(**Source:** Shaw BP, Sahu A, Panigrahi AK (Lab Env Toxico, Berhampur Univ, Berhampur 760007). Water quality of the Rushikulya river estuary in relation to waste water discharge from a chloralkali plant. Polln Res, 10 (3) (1991), 139-149 [35 Ref].)
4.3	Sources of Pollution, with data indicating quantum and/or severity.	Domestic sewage and more importantly, effleunest discharged by the chlor alkali industries situated at the eustuary, leading to Hg contamination
4.4	Prevailing abatement techniques e.g: ETP, STP, legislation,etc.	
5	**Current status of the resource development & potential for development**	
5.1	Water availability: a. Per capita water availability (in lpcd)	Per capita water availability: (dependible) 945.33 Cubic meters/ year.(Source:State of Orissa Environment : Water Resources. Orissa Pollution Control Board. (http://www.ospcboard.org/stateEnv2006.htm) *Note: Future*

		projections (next 50 years) for Rushikulya indicate that per capita water availability will fall to 714 cum, making it a scarce basin.
	b. Per hectare water availability (in Cubic meters for cultivable command area):	Note: Though data pertaining only to Rushiklya could not be obtined, we found the folowing: E flowing rivers:Mahanadi to Pennar(Rushikulya, Bahuda, Vamsadhara, Nagawali, Sarda, Tandara, Eluru), Catchment Area in Million Hectares: 8.66 . Annual Water availability: 22.52 (BCM) Live storage capcitiies of large dams completed till 1995: 1.63 BCM Per capita water availability in Cubic meters: 953 Cubic meters
	c. Availability of environmental flows (Current reserve, if any):	D N A
	d. Availability of ground water/ Average annual ground water abstraction/recharge.	Central Groundwater Board has completed a study on groundwater and surface water use for Rushikulya Irrigation Command, Orissa. (Source: http://cgwb.gov.in/GroundWater/conjunctive_use.htm)
5.2	Structures: a. Major dams/barrages (with utilization categories):	Sorada,Bhanjanagar
	b. Proposed dams:	D N A
	c. Live storage of major dams:	D N A
	d. Live storage through proposed dams:	D N A

	e. Inter basin transfer systems:	The Mahanadi - Godavari link proposes inter-connecting of the proposed Manibhadra reservoir on Mahanadi with the Godavari river upstream of Dowlaiswaram barrage. The link canal passes through various minor river basins lying between Mahanadi and Godavari viz., (i) Basin area covered by the streams between Mahanadi and Rushikulya, (Source:nwda.gov.in/writereaddata/sublink2images/103.pdf)
	f. Any Other:	
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	Department of water resources, Government of Orissa Water Resources Ministry has completed a study on conjunctive use of ground water and surface water in the Rushikulya command area. (Source:http://wrmin.nic.in/publication/ar2004/ar2003-04.pdf)
6	Existence of National/State/Provincial Laws or Notifications relating to water- Management / use/development/opportunity for private sector participation or for privatization of water resources	Pani Panchayat Act (2002)http://www.orissawater.com/PaniPanchayat/paniact.htm for farmers participation in irrigation management Note: TaraTarini Temple(22kms from Jagnath pur) Board has a plan for water sports in the Rushikulya river near the temple premises (source:http://taratarini.nic.in/tt/plan.htm)

7	Key Issues:	1. Flood Management as Orissa faces serious floods nearly every year. On the State water resources website(www.orissawater.com, info available on flood management, flood control measures, reservoir levels, etc) 2.Pollution of the Rushikulya river due to industrial effluents containing harmful elements like Mercury 3.Protest against Pipalpanka Dam in the Gnajam District for TISCO. (http://www.dams.org/kbase/submissions/showsub.php?rec=SOC023)
8	Enabling instruments- Law/ Policy/ Economic & Financial Measures for introducing IWRM in the basin	It is interesting to note that RIBASIM model for River basin simulation has been used for the Rushikulya river. Used by: (Source:http://www.wldelft.nl/soft/ribasim/int/index.html). Orissa Draft State Water Policy (2004) has been prepared which directs the preparation of Multipurpose river basin plans. This river basin planning will be instrumental for IWRM. Source Orissa Integrated Irrigated Agriculture and Water Management Project (OIIWMP) for Baitarani, Brahmani, Budhabalanga & Subarnarekha Basin have been submitted to MOWR for necessary clearance. Total Cost: Rs. 1150 Crores (Source: Orissa Irrigation Department)

SCHEDULE B
ASSESSMENT OF RIVER BASINS ORGANISATIONS (RBOs) IN SOUTH ASIA
nil

SCHEDULE C

ASSESSMENT OF RIVER BASINS ORGANISATIONS (RBOs) IN SOUTH ASIA

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