

Annexes

Annex I. List of contributing authors and organisations

Name	Institution affiliation	Country	Field of work
Dr. Ronaldo Borges Barthem (Coordinator of region 40b-Amazon)	The State of Pará Emílio Goeldi Museum (MPEG)	Brazil	Freshwater fish ecology and fisheries
Dr. Efreem Jorge G. Ferreira	The National Institute for Research in the Amazon (INPA)	Brazil	Fish ecology and fishery resources
Dr. Ima Célia Guimarães Vieira	The State of Pará Emílio Goeldi Museum (MPEG)	Brazil	Plant ecology
Dr. José Augusto Martins Corrêa	Federal University of Pará (UFPA)	Brazil	Environmental geochemistry and sedimentology
Dr. José Francisco da F. Ramos	Federal University of Pará (UFPA)	Brazil	Environmental geochemistry
Dr. Marcia Marques	GIWA	Brazil	Water resources pollution and modelling and impact evaluation
Dr. Maria Thereza Prost	The State of Pará Emílio Goeldi Museum (MPEG)	Brazil	Coastal geomorphology
Dr. Mauro César Lambert de B. Ribeiro	Brazilian Institute of Geography and Statistics (IBGE)	Brazil	Fish ecology, fisheries ecology, analysis of environmental impacts in aquatic ecosystems
Dr. Remigio H. Galárraga-Sánchez		Ecuador	Hydrology, water resources and global changes
Dr. Ricardo de O. Figueiredo	Federal University of Pará (UFPA)	Brazil	Biogeochemistry of river basins, river hydrogeochemistry, nutrients cycling in terrestrial and Amazon ecosystems
Dr. Roberto Araujo Santos	The State of Pará Emílio Goeldi Museum (MPEG)	Brazil	Anthropology, social dynamics in the Brazilian Amazon region and boundaries
Dr. Tatiana Deane de Abreu Sá	Brazilian Agricultural Research Corporation (EMBRAPA)	Brazil	Plant biophysics
Dr. Vandick da Silva Batista	Amazonas University (UA)	Brazil	Evaluation and management of fishery resources
MSc. Aline Lima	The Pará State Secretariat for Science, Technology and Environment (SECTAM)	Brazil	Management of hydrographic resources
MSc. Jorge Luis Gavina Pereira	The State of Pará Emílio Goeldi Museum (MPEG)	Brazil	Remote sensing and geoprocessing
MSc. Juan Carlos Alonso	The Amazon Institute of Scientific Research (SINCHI)	Colombia	Evaluation and management of fishery resources and aquaculture
MSc. Luciano Fogaça de Assis Montag (Core team of region 40b-Amazon)	The State of Pará Emílio Goeldi Museum (MPEG)	Brazil	Freshwater fish ecology
MSc. Maria Emilia Sales	The State of Pará Emílio Goeldi Museum (MPEG)	Brazil	Biogeochemistry of estuaries and mangroves
MSc. Mauro Luis Ruffino	Pró-Várzea/Brazilian Institute of Environment (IBAMA)	Brazil	Evaluation and management of fishery resources
MSc. Patricia Charvet-Almeida (Core team of region 40b-Amazon)	Federal University of Paraíba (UFPB)	Brazil	Biology, ecology and conservation of sharks and rays

Annex II. Detailed scoring tables

I: Freshwater shortage

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
1. Modification of stream flow	0	60	Freshwater shortage	0.1
2. Pollution of existing supplies	1	10		
3. Changes in the water table	0	30		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small Very large	0	33.3
Degree of impact (cost, output changes etc.)	Minimum Severe	0	33.3
Frequency/Duration	Occasion/Short Continuous	1	33.3
Weight average score for Economic impacts		0.33	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small Very large	0	33.3
Degree of severity	Minimum Severe	0	33.3
Frequency/Duration	Occasion/Short Continuous	1	33.3
Weight average score for Health impacts		0.33	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small Very large	0	33.3
Degree of severity	Minimum Severe	0	33.3
Frequency/Duration	Occasion/Short Continuous	1	33.3
Weight average score for Other social and community impacts		0.33	

II: Pollution

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
4. Microbiological	0	10	Pollution	0.95
5. Eutrophication	0	10		
6. Chemical	2	20		
7. Suspended solids	2	15		
8. Solid wastes	1	5		
9. Thermal	1	5		
10. Radionuclide	0	20		
11. Spills	1	15		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small Very large	1	33.3
Degree of impact (cost, output changes etc.)	Minimum Severe	1	33.3
Frequency/Duration	Occasion/Short Continuous	3	33.3
Weight average score for Economic impacts		1.67	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small Very large	2	33.3
Degree of severity	Minimum Severe	2	33.3
Frequency/Duration	Occasion/Short Continuous	3	33.3
Weight average score for Health impacts		2.33	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small Very large	2	33.3
Degree of severity	Minimum Severe	2	33.3
Frequency/Duration	Occasion/Short Continuous	3	33.3
Weight average score for Other social and community impacts		1.67	

III: Habitat and community modification

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
12. Loss of ecosystems	1	60	Habitat and community modification	1
13. Modification of ecosystems or ecotones, including community structure and/or species composition	1	40		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small Very large	2	33.3
Degree of impact (cost, output changes etc.)	Minimum Severe	2	33.3
Frequency/Duration	Occasion/Short Continuous	3	33.3
Weight average score for Economic impacts		2.33	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small Very large	1	33.3
Degree of severity	Minimum Severe	2	33.3
Frequency/Duration	Occasion/Short Continuous	2	33.3
Weight average score for Health impacts		1.67	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small Very large	1	33.3
Degree of severity	Minimum Severe	2	33.3
Frequency/Duration	Occasion/Short Continuous	2	33.3
Weight average score for Other social and community impacts		1.67	



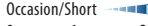


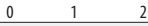

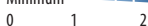
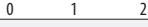
IV: Unsustainable exploitation of fish and other living resources

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
14. Overexploitation	2	10	Unsustainable exploitation of fish	0.6
15. Excessive by-catch and discards	1	10		
16. Destructive fishing practices	0	20		
17. Decreased viability of stock through pollution and disease	0	30		
18. Impact on biological and genetic diversity	1	30		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small Very large	0	33.3
Degree of impact (cost, output changes etc.)	Minimum Severe	0	33.3
Frequency/Duration	Occasion/Short Continuous	0	33.3
Weight average score for Economic impacts		0	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small Very large	0	33.3
Degree of severity	Minimum Severe	0	33.3
Frequency/Duration	Occasion/Short Continuous	0	33.3
Weight average score for Health impacts		0	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small Very large	0	33.3
Degree of severity	Minimum Severe	0	33.3
Frequency/Duration	Occasion/Short Continuous	0	33.3
Weight average score for Other social and community impacts		0	

V: Global change

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
19. Changes in the hydrological cycle	2	40	Global change	0.8
20. Sea level change	0	20		
21. Increase dUV-B radiation as a result of ozone depletion	0	20		
22. Changes in ocean CO ₂ source/sink function	0	30		

Criteria for Economic impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large 0 1 2 3	0	33.3
Degree of impact (cost, output changes etc.)	Minimum  Severe 0 1 2 3	0	33.3
Frequency/Duration	Occasion/Short  Continuous 0 1 2 3	0	33.3
Weight average score for Economic impacts		0	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large 0 1 2 3	0	33.3
Degree of severity	Minimum  Severe 0 1 2 3	0	33.3
Frequency/Duration	Occasion/Short  Continuous 0 1 2 3	0	33.3
Weight average score for Health impacts		0	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large 0 1 2 3	0	33.3
Degree of severity	Minimum  Severe 0 1 2 3	0	33.3
Frequency/Duration	Occasion/Short  Continuous 0 1 2 3	0	33.3
Weight average score for Other social and community impacts		0	

Comparative environmental and socio-economic impacts of each GIWA concern

Types of impacts									
Concern	Environmental score		Economic score		Human health score		Social and community score		Overall score
	Present (a)	Future (b)	Present (c)	Future (d)	Present (e)	Future (f)	Present (g)	Future (h)	
Freshwater shortage	0.10	0.20	0.33	0.33	0.33	0.33	0.33	0.33	0.29
Pollution	0.95	1.40	1.67	2.00	1.67	2.00	1.67	2.00	1.67
Habitat and community modification	1.00	2.00	2.33	2.33	1.67	2.33	1.67	2.33	1.92
Unsustainable exploitation of fish and other living resources	0.60	1.00	0.00	1.00	0.00	0.00	0.00	1.00	0.45
Global change	0.80	1.00	0.33	1.33	0.33	1.33	0.33	1.33	0.85

If the results in this table were not giving a clear prioritisation, the scores were weighted by assigning different relative importance to present/future and environmental/socio-economic impacts in the following way:

Weight averaged environmental and socio-economic impacts of each GIWA concern

Present (%) (i)	Future (%) (j)	Total (%)
66	34	100

Environmental (k)	Economic (l)	Health (m)	Other social and community impacts (n)	Total (%)
50	17	17	17	100

Types of impacts						
Concern	Time weight averaged Environmental score (o)	Time weight averaged Economic score (p)	Time weight averaged Human health score (q)	Time weight averaged Social and community score (r)	Time weight averaged overall score	Rank
	$(a) \times (i) + (b) \times (j)$	$(c) \times (i) + (d) \times (j)$	$(e) \times (i) + (f) \times (j)$	$(g) \times (i) + (h) \times (j)$	$(o) \times (k) + (p) \times (l) + (q) \times (m) + (r) \times (n)$	
Freshwater shortage	0.13	0.33	0.33	0.33	0.23	5
Pollution	1.10	1.78	1.78	1.78	1.44	2
Habitat and community modification	1.34	2.11	1.89	1.89	1.65	1
Unsustainable exploitation of fish and other living resources	0.74	0.34	0.00	0.34	0.48	4
Global change	0.87	0.67	0.67	0.67	0.77	3

Annex III.

List of important water-related programmes in the region

Hydrology and Geochemistry of the Amazon Basin, HiBAm

An international research project (Brazil, Ecuador, Bolivia and France) for the hydrology and geochemistry study of the Amazon basin. <http://www.unb.br/ig/hibam/hibam.htm>

Large Scale Biosphere-Atmosphere Experiment in Amazonia, LBA

An international research initiative led by Brazil. LBA is designed to create the new knowledge needed to understand the climatological, ecological, biogeochemical, and hydrological functioning of Amazonia, the impact of land use change on these functions, and the interactions between Amazonia and the Earth system. The site can also be accessed in North America at the Oak Ridge National Laboratory, Tennessee, USA or in Europe at the Postdam Institute for Climate Impact Research, Potsdam, Germany. http://daac.ornl.gov/lba_cptec/lba/indexi.html

Annex IV.

List of conventions and specific laws that affect water use in the region

Amazon Cooperation Treaty, ACT

Signed in July 1978, the Amazon Cooperation Treaty is a relevant multi-lateral agreement for the promotion of cooperation between the Amazon countries - Brazil, Bolivia, Colombia, Ecuador, Guyana, Peru, Surinam and Venezuela - in favour of sustainable development in the region. In 1995, at a meeting in Lima in order to reinforce the Treaty from an organisational point of view, the foreign ministers of the eight countries decided to create a Permanent Secretariat for the Amazon Cooperation Treaty to be based in Brasilia, re-stating the importance of the Amazon as an essential source of raw materials for the food, chemicals and pharmaceuticals industries, recommending the formulation of plans and strategies for environmental conservation and the promotion of the region's sustainable development. They also stressed the importance of the conservation of the environment and of the promotion of sustainable development in the region.

The Lima meeting was a decisive step towards consolidating the objectives of this political and diplomatic forum. In the light of the undertakings signed at Rio-92, it was recommended that the participating countries should increase cooperation centred on research and management in the areas of biological diversity, water and hydro-biological resources, transport, communications, indigenous peoples, tourism, education and culture.

<http://www.mre.gov.br/cdbrasil/itamaraty/web/ingles/relex/mre/orgreg/tcoopam/index.htm>

