

Basin Risk Indicators - Descriptions, Sources and Links

Risk type	Risk category	#	Risk indicator	Description	Source	Link
Physical Risk	1. Quantity - Scarcity	1.0	Aridity	Aridity index calculated for the ENA represents the soil surface dynamics determined from the potential evapotranspiration (PET) and the actual evapotranspiration (ET).	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages.	http://documentacion.ideam.gov.co/opendata/bvirtual/023080/023080.html
		1.1	Annual water depletion	The parameter relates actual available water to total water consumption and is calculated as (actual available water – total water consumption)/actual available water * 100. The parameter ranges between 0 (high water depletion) and 100 (low water depletion). If water consumption is higher than actual available water the parameter was set to zero. Spatial level: River basin, Unit: %.	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages.	http://documentacion.ideam.gov.co/opendata/bvirtual/023080/023080.html
		1.2	Number of months with severe scarcity	The parameter relates monthly actual available water to monthly water consumption, and it is calculated for each month of the year as follows: $\frac{(\text{actual available water} - \text{total water consumption})}{\text{actual available water}} * 100$ <p>The indicator presents the number of months per year when net water depletion exceeds <60%.</p>	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages.	http://visor.ideam.gov.co:8530/geovisor/#/profiles/3
		1.3	Maximum depletion	The parameter relates monthly actual available water to monthly water consumption, and it is calculated for each month of the year as follows: $\frac{(\text{actual available water} - \text{total water consumption})}{\text{actual available water}} * 100$ <p>The indicator presents the net water depletion in the month in which net water depletion is the highest in the river basin.</p>	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages.	http://visor.ideam.gov.co:8530/geovisor/#/profiles/3
		1.4	Forecasted impact of climate change	This indicator shows the environmental vulnerability of the territory to climate change for a critical scenario in the period between 2071 - 2100, where the temperature is expected to increase by 3.2 °C. The Index is developed for the Second National Communication to United Nations Framework Convention on Climate Change and the define vulnerability like this: $\text{Vulnerability} = [\text{Potential negative impacts}] - [(\text{Potential negative impacts}) * \text{adaptability}]$	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages.	http://www.siac.gov.co/Catalogo_mapas.html
		1.5	Occurrence of droughts (1950 - 2010)	In Colombia, the warm phase of El Niño Southern Oscillation (El Niño) has a great influence in extreme hydrological events like droughts. This indicator is constructed based on the data of average anomalies on river flows for the months December-January-February, for El Niño years between 1950 and 2010 calculated in the ENA.	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages.	http://www.siac.gov.co/Catalogo_mapas.html . Found as: "Anomalías promedio en caudales bajo eventos el niño. IDEAM 2010")
		1.6	Projected	See Global documentation on Indicators, Sources and Description		

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			change in Drought Occurrence			
	2. Quantity - Flooding	2.1	Occurrence of floods	<p>In Colombia, the cold phase of El Niño Southern Oscillation (La Niña) has a great influence in extreme hydrological events like floods, especially in the quart of September-October-November where the wettest conditions occur in much of the country.</p> <p>This indicator is constructed based on the data of average anomalies on river flows for the months September-October-November, for La Niña years between 1950 and 2010 calculated in the ENA this way:</p> $\text{Streamflow Anomalies} = \frac{(Q_{\text{Average La Niña month } i} - Q_{\text{Average Normal month } i})}{Q_{\text{Average Normal month } i}} * 100$	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages.	http://www.siac.gov.co/Catalogo_mapas.html Found as: "Anomalías promedio en caudales bajo eventos el niña. IDEAM 2010"
		2.2	Projected change in occurrence of floods	See Global documentation on Indicators, Sources and Description		
	3. Quality	3.1	Water quality index	Water Quality Potential Alteration Index (IACAL in spanish) of the ENA is a pressure reference on water quality conditions in the country's surface water systems, based on representative variables such as: Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Total Nitrogen (NT) and Total Phosphorus (PT).	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages..	http://documentacion.ideam.gov.co/opendata/biblioteca/biblioteca/023080/023080.html
		3.1.1	<i>Nitrogen loading</i>	See Global documentation on Indicators, Sources and Description		
		3.1.2	<i>Phosphorus loading</i>	See Global documentation on Indicators, Sources and Description		
		3.1.3	<i>Pesticide loading</i>	See Global documentation on Indicators, Sources and Description		
		3.1.4	<i>Soil salination</i>	See Global documentation on Indicators, Sources and Description		
		3.1.5	<i>Organic loading</i>	See Global documentation on Indicators, Sources and Description		
		3.1.6	<i>Sediment loading</i>	See Global documentation on Indicators, Sources and Description		
		3.1.7	<i>Mercury loading</i>	See Global documentation on Indicators, Sources and Description		
		3.1.8	<i>Potential Acidification</i>	See Global documentation on Indicators, Sources and Description		
		3.1.9	<i>Thermal alteration</i>	See Global documentation on Indicators, Sources and Description		
	4. Ecosystem Service Status	4.1	Threat to freshwater biodiversity threat around the facility	This indicator reveals the amount of freshwater biodiversity in relation to the percentage of area of freshwater ecosystems existing in each Hydrographic Subzone	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages.	http://www.siac.gov.co/Catalogo_mapas.html (Found as: "Humedales 2010" and "Sitios RAMSAR")

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		4.2	Vulnerability of water ecosystems	Index of Water Pressure to Ecosystems (IPHE for its acronym in Spanish) from ENA relates the green water footprint agricultural with the availability of green water. This relationship shows the competition for green water between land use linked to the agricultural sector and the protection areas associated with strategic ecosystems in the basins.	Institute of Hydrology, Meteorology and Environmental Studies - IDEAM. (2019). National Water Study 2014 (in Spanish). Bogotá, D. C. 496 pages.	http://documentacion.ideam.gov.co/op/enbiblio/bvirtual/023080/023080.html
		4.3	Projected impacts on freshwater biodiversity	See Global documentation on Indicators, Sources and Description		
Regulatory Risk	5. Enabling Environment (Policy & Laws)	5.1	Water strategy	This indicator takes into account whether the basin has implemented the Plans for Management of Watersheds (POMCA, for its acronym in Spanish). It is carried out a review of the POMCA elaborated by the Regional Autonomous Corporations for the basins of their jurisdiction.	Regional Autonomous Corporations websites (2019)	http://www.asocars.org/2015/index.php/las-car
		5.2	Freshwater Law Status (SDG 6.5.1)	See Global documentation on Indicators, Sources and Description		
		5.3	Enabling Environment	See Global documentation on Indicators, Sources and Description		
	6. Institutions and Governance	6.1	Corruption Index	See Global documentation on Indicators, Sources and Description		
		6.2	Freedom in the World Index	See Global documentation on Indicators, Sources and Description		
		6.3	Stakeholder platform	This indicator reveals the existence of a Watershed Council in the basin, based in the update of the POMCA when it corresponds. It is carried out a review of the POMCA elaborated by the Regional Autonomous Corporations for the basins of their jurisdiction.	Regional Autonomous Corporations websites (2019)	http://www.asocars.org/2015/index.php/las-car
	7. Management Instruments	7.1	Enforcement of water-related legal framework	See Global documentation on Indicators, Sources and Description		
		7.2	Groundwater Monitoring Data Availability and Management	See Global documentation on Indicators, Sources and Description		
		7.3	Density of runoff monitoring stations	See Global documentation on Indicators, Sources and Description		
	8. Infrastructure & Finance	8.1	Access to safe drinking water (% of	For this indicator, it is taken into account information of total aqueduct coverage in % at a municipal level. The information is carried at the Hydrographic Subzone level by a weighted spatial average in which the weighting is given by the area percentages of municipalities	SIGOT. Superintendent of Home Public Services, 2011.	http://sigotn.igac.gov.co/sigotn/frames_pagina.aspx

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			population)	located within the Hydrographic Subzone.		(Found as: "Cobertura total de acueducto")
		8.2	Access to improved sanitation (% of population)	For this indicator, it is taken into account information of total sanitation coverage in % at a municipal level. The information is carried at the Hydrographic Subzone level by a weighted spatial average in which the weighting is given by the area percentages of municipalities located within the Hydrographic Subzone.	SIGOT. Superintendent of Home Public Services, 2011.	http://sigotn.igac.gov.co/sigotn/frames_pagina.aspx
		8.3	Financing for Water Resource Development and Management (SDG 6.5.1)	See Global documentation on Indicators, Sources and Description		(Found as: "Cobertura total de alcantarillado")
Reputational Risk	9. Cultural importance	9.1	Cultural/religious water role	It is considered that collective territories give a high importance in their culture and religion to water sources. Thereby, this indicator takes into account information from indigenous reservations and African-American communities as places where the water is considered very important.	Geographic Information System for Planning and Territorial Order (SIGOT in Spanish). Agustín Codazzi Geographic Institute, 2015.	http://sigotn.igac.gov.co/sigotn/frames_pagina.aspx (Found as "Resguardos Indígenas" and "Tierras de Comunidades Negras")
	10. Biodiversity importance	10.1	Freshwater Endemism	See Global documentation on Indicators, Sources and Description		
		10.2	Catchment biodiversity richness	See Global documentation on Indicators, Sources and Description		
	11. Media Scrutiny	11.1	National media coverage	This indicator reveals the possible number of water-related problems in the basin, according to the media. It is performed a search in Google News for Colombia with the following search command in Spanish for each department: Water + issue + department_name The data found as amount of news is brought at the Hydrographic Subzone level by a weighted spatial average.	Google News Colombia.	https://news.google.com/
		11.2	Global media coverage	See Global documentation on Indicators, Sources and Description		

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	12. Trust & Conflict	12.1	Conflict News Events (RepRisk)	See Global documentation on Indicators, Sources and Description		
		12.1.1	Water Scarcity	See Global documentation on Indicators, Sources and Description		
		12.1.2	Local Pollution	See Global documentation on Indicators, Sources and Description		
		12.1.3	Overuse and wasting of resources	See Global documentation on Indicators, Sources and Description		
		12.1.4	Impact on community	See Global documentation on Indicators, Sources and Description		
		12.1.5	Impact on ecosystem landscape	See Global documentation on Indicators, Sources and Description		
		12.2	Hydro-political Risk	See Global documentation on Indicators, Sources and Description		