Water Risk Filter

Country Overview - Mauritania

Water Indicators

Indicator	Value	Description	Source
Overall Basin Risk (score)	2.91	Overall Basin Risk (score)	
Overall Basin Risk (rank)	44	Overall Basin Risk (rank)	
Physical risk (score)	3.38	Physical risk (score)	
Physical risk (rank)	8	Physical risk (rank)	
Regulatory risk (score)	2.97	Regulatory risk (score)	
Regulatory risk (rank)	70	Regulatory risk (rank)	
Reputation risk (score)	1.42	Reputation risk (score)	
Reputation risk (rank)	195	Reputation risk (rank)	
1. Quantity - Scarcity (score)	3.97	1. Quantity - Scarcity (score)	
1. Quantity - Scarcity (rank)	12	1. Quantity - Scarcity (rank)	
2. Quantity - Flooding (score)	2.17	2. Quantity - Flooding (score)	
2. Quantity - Flooding (rank)	153	2. Quantity - Flooding (rank)	
3. Quality (score)	4.74	3. Quality (score)	
3. Quality (rank)	2	3. Quality (rank)	
4. Ecosystem Service Status (score)	1.37	4. Ecosystem Service Status (score)	
4. Ecosystem Service Status (rank)	176	4. Ecosystem Service Status (rank)	
5. Enabling Environment (Policy & Laws) (score)	1.55	5. Enabling Environment (Policy & Laws) (score)	
5. Enabling Environment (Policy & Laws) (rank)	145	5. Enabling Environment (Policy & Laws) (rank)	
6. Institutions and Governance (score)	3.25	6. Institutions and Governance (score)	
6. Institutions and Governance (rank)	69	6. Institutions and Governance (rank)	
7. Management Instruments (score)	3.52	7. Management Instruments (score)	
7. Management Instruments (rank)	23	7. Management Instruments (rank)	
8 - Infrastructure & Finance (score)	4.35	8 - Infrastructure & Finance (score)	
8 - Infrastructure & Finance (rank)	34	8 - Infrastructure & Finance (rank)	
9. Cultural Diversity (score)	1.00	9. Cultural importance (score)	
9. Cultural Diversity (rank)	137	9. Cultural importance (rank)	
10. Biodiversity Importance (score)	1.52	10. Biodiversity importance (score)	

Water Risk Filter

Country Overview - Mauritania

Indicator	Value	Description	Source
10. Biodiversity Importance (rank)	192	10. Biodiversity importance (rank)	
11. Media Scrutiny (score)	1.00	11. Media Scrutiny (score)	
11. Media Scrutiny (rank)	195	11. Media Scrutiny (rank)	
12. Conflict (score)	2.21	12. Conflict (score)	
12. Conflict (rank)	127	12. Conflict (rank)	
1.0 - Aridity (score)	4.55	The aridity risk indicator is based on the Global Aridity Index (Global-Aridity) and Global Potential Evapo-Transpiration (Global-PET) Geospatial data sets by Trabucco and Zomer (2009). These data sets provide information about the potential availability of water in regions with low water demand, thus they are used in the Water Risk Filter 5.0 to better account for deserts and other arid areas in the risk assessment.	Trabucco, A., & Zomer, R. J. (2009). Global potential evapo-transpiration (Global-PET) and global aridity index (Global-Aridity) geo-database. CGIAR consortium for spatial information.
1.0 - Aridity (rank)	4	The aridity risk indicator is based on the Global Aridity Index (Global-Aridity) and Global Potential Evapo-Transpiration (Global-PET) Geospatial data sets by Trabucco and Zomer (2009). These data sets provide information about the potential availability of water in regions with low water demand, thus they are used in the Water Risk Filter 5.0 to better account for deserts and other arid areas in the risk assessment.	Trabucco, A., & Zomer, R. J. (2009). Global potential evapo-transpiration (Global-PET) and global aridity index (Global-Aridity) geo-database. CGIAR consortium for spatial information.
1.1 - Water Depletion (score)	2.81	The water depletion risk indicator is based on annual average monthly net water depletion from Brauman et al. (2016). Their analysis is based on model outputs from the newest version of the integrated water resources model WaterGAP3 which measures water depletion as the ratio of water consumption-to-availability.	Brauman, K. A., Richter, B. D., Postel, S., Malsy, M., & Flörke, M. (2016). Water depletion: An improved metric for incorporating seasonal and dry-year water scarcity into water risk assessments. Elem Sci Anth, 4.
1.1 - Water Depletion (rank)	64	The water depletion risk indicator is based on annual average monthly net water depletion from Brauman et al. (2016). Their analysis is based on model outputs from the newest version of the integrated water resources model WaterGAP3 which measures water depletion as the ratio of water consumption-to-availability.	Brauman, K. A., Richter, B. D., Postel, S., Malsy, M., & Flörke, M. (2016). Water depletion: An improved metric for incorporating seasonal and dry-year water scarcity into water risk assessments. Elem Sci Anth, 4.
1.2 - Baseline Water Stress (score)	3.81	World Resources Institute's Baseline Water Stress measures the ratio of total annual water withdrawals to total available annual renewable supply, accounting for upstream consumptive use. A higher percentage indicates more competition among users.	Hofste, R., Kuzma, S., Walker, S., ... & Sutanudjaja, E.H. (2019). Aqueduct 3.0: Updated decision relevant global water risk indicators. Technical note. Washington, DC: World Resources Institute.

Indicator	Value	Description	Source
1.2 - Baseline Water Stress (rank)	22	World Resources Institute's Baseline Water Stress measures the ratio of total annual water withdrawals to total available annual renewable supply, accounting for upstream consumptive use. A higher percentage indicates more competition among users.	Hofste, R., Kuzma, S., Walker, S., ... & Sutanudjaja, E.H. (2019). Aqueduct 3.0: Updated decision relevant global water risk indicators. Technical note. Washington, DC: World Resources Institute.
1.3 - Blue Water Scarcity (score)	4.94	The blue water scarcity risk indicator is based on Mekonnen and Hoekstra (2016) global assessment of blue water scarcity on a monthly basis and at high spatial resolution (grid cells of 30 × 30 arc min resolution). Blue water scarcity is calculated as the ratio of the blue water footprint in a grid cell to the total blue water availability in the cell. The time period analyzed in this study ranges from 1996 to 2005.	Mekonnen, M. M., & Hoekstra, A. Y. (2016). Four billion people facing severe water scarcity. Science advances, 2(2), e1500323.
1.3 - Blue Water Scarcity (rank)	11	The blue water scarcity risk indicator is based on Mekonnen and Hoekstra (2016) global assessment of blue water scarcity on a monthly basis and at high spatial resolution (grid cells of 30 × 30 arc min resolution). Blue water scarcity is calculated as the ratio of the blue water footprint in a grid cell to the total blue water availability in the cell. The time period analyzed in this study ranges from 1996 to 2005.	Mekonnen, M. M., & Hoekstra, A. Y. (2016). Four billion people facing severe water scarcity. Science advances, 2(2), e1500323.
1.4 - Projected Change in Water Discharge (by ~2050) (score)	1.94	This risk indicator is based on multi-model simulation that applies both global climate and hydrological models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). To estimate the change at 2°C of global warming above 1980-2010 levels, simulated annual water discharge was averaged over a 31-year period with 2°C mean warming. Results are expressed in terms of relative change (%) in probability between present day (1980-2010) conditions and 2°C scenarios by 2050.	Schewe, J., Heinke, J., Gerten, D., Haddeland, I., Arnell, N. W., Clark, D. B., ... & Gosling, S. N. (2014). Multimodel assessment of water scarcity under climate change. Proceedings of the National Academy of Sciences, 111(9), 3245-3250.
1.4 - Projected Change in Water Discharge (by ~2050) (rank)	99	This risk indicator is based on multi-model simulation that applies both global climate and hydrological models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). To estimate the change at 2°C of global warming above 1980-2010 levels, simulated annual water discharge was averaged over a 31-year period with 2°C mean warming. Results are expressed in terms of relative change (%) in probability between present day (1980-2010) conditions and 2°C scenarios by 2050.	Schewe, J., Heinke, J., Gerten, D., Haddeland, I., Arnell, N. W., Clark, D. B., ... & Gosling, S. N. (2014). Multimodel assessment of water scarcity under climate change. Proceedings of the National Academy of Sciences, 111(9), 3245-3250.

Indicator	Value	Description	Source
1.5 - Drought Frequency Probability (score)	4.76	This risk indicator is based on the Standardized Precipitation and Evaporation Index (SPEI). Vicente-Serrano et al. (2010) developed this multi-scalar drought index applying both precipitation and temperature data to detect, monitor and analyze different drought types and impacts in the context of global warming. The mathematical calculations used for SPEI are similar to the Standard Precipitation Index (SPI), but it has the advantage to include the role of evapotranspiration.	Vicente-Serrano, S. M., Beguería, S., & López-Moreno, J. I. (2010). A multiscalar drought index sensitive to global warming: the standardized precipitation evapotranspiration index. Journal of climate, 23(7), 1696-1718.
1.5 - Drought Frequency Probability (rank)	16	This risk indicator is based on the Standardized Precipitation and Evaporation Index (SPEI). Vicente-Serrano et al. (2010) developed this multi-scalar drought index applying both precipitation and temperature data to detect, monitor and analyze different drought types and impacts in the context of global warming. The mathematical calculations used for SPEI are similar to the Standard Precipitation Index (SPI), but it has the advantage to include the role of evapotranspiration.	Vicente-Serrano, S. M., Beguería, S., & López-Moreno, J. I. (2010). A multiscalar drought index sensitive to global warming: the standardized precipitation evapotranspiration index. Journal of climate, 23(7), 1696-1718.
1.6 - Projected Change in Drought Occurrence (by ~2050) (score)	3.10	This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP) . A drought threshold for pre-industrial conditions was calculated based on time-series averages. Results are expressed in terms of relative change (%) in probability between pre-industrial and 2°C scenarios.	Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development.
1.6 - Projected Change in Drought Occurrence (by ~2050) (rank)	53	This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP) . A drought threshold for pre-industrial conditions was calculated based on time-series averages. Results are expressed in terms of relative change (%) in probability between pre-industrial and 2°C scenarios.	Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development.
2.1 - Estimated Flood Occurrence (score)	2.15	This risk indicator is based on the recurrence of floods within the 34-year time frame period of 1985 to 2019. The occurrence of floods within a given location was estimated using data from Flood Observatory, University of Colorado. The Flood Observatory use data derived from a wide variety of news, governmental, instrumental, and remote sensing source.	Brakenridge, G. R. (2019). Global active archive of large flood events. Dartmouth Flood Observatory, University of Colorado.
2.1 - Estimated Flood Occurrence (rank)	153	This risk indicator is based on the recurrence of floods within the 34-year time frame period of 1985 to 2019. The occurrence of floods within a given location was estimated using data from Flood Observatory, University of Colorado. The Flood Observatory use data derived from a wide variety of news, governmental, instrumental, and remote sensing source.	Brakenridge, G. R. (2019). Global active archive of large flood events. Dartmouth Flood Observatory, University of Colorado.

Indicator	Value	Description	Source
2.2 - Projected Change in Flood Occurrence (by ~2050) (score)	2.58	This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). The magnitude of the flood event was defined based on 100-year return period for pre-industrial conditions. Results are expressed in terms of change (%) in probability between pre-industrial and 2°C scenarios.	Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development.
2.2 - Projected Change in Flood Occurrence (by ~2050) (rank)	76	This risk indicator is based on multi-model simulation that applies both global climate and drought models from the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). The magnitude of the flood event was defined based on 100-year return period for pre-industrial conditions. Results are expressed in terms of change (%) in probability between pre-industrial and 2°C scenarios.	Frieler, K., Lange, S., Piontek, F., Reyer, C. P., Schewe, J., Warszawski, L., ... & Geiger, T. (2017). Assessing the impacts of 1.5 C global warming–simulation protocol of the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP2b). Geoscientific Model Development.
3.1 - Surface Water Contamination Index (score)	4.74	The underlying data for this risk indicator is based on a broad suite of pollutants with well-documented direct or indirect negative effects on water security for both humans and freshwater biodiversity, compiled by Vörösmarty et al. (2010). The negative effects are specific to individual pollutants, ranging from impacts mediated by eutrophication such as algal blooms and oxygen depletion (e.g., caused by phosphorus and organic loading) to direct toxic effects (e.g., caused by pesticides, mercury). The overall Surface Water Contamination Index is calculated based on a range of key pollutants with different weightings according to the level of their negative effects on water security for both humans and freshwater biodiversity: soil salinization (8%), nitrogen (12%) and phosphorus (P, 13%) loading, mercury deposition (5%), pesticide loading (10%), sediment loading (17%), organic loading (as Biological Oxygen Demand, BOD; 15%), potential acidification (9%), and thermal alteration (11%).	Vörösmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Prusevich, A., Green, P., ... & Davies, P. M. (2010). Global threats to human water security and river biodiversity. Nature, 467(7315), 555.

Indicator	Value	Description	Source
3.1 - Surface Water Contamination Index (rank)	2	The underlying data for this risk indicator is based on a broad suite of pollutants with well-documented direct or indirect negative effects on water security for both humans and freshwater biodiversity, compiled by Vörösmarty et al. (2010). The negative effects are specific to individual pollutants, ranging from impacts mediated by eutrophication such as algal blooms and oxygen depletion (e.g., caused by phosphorus and organic loading) to direct toxic effects (e.g., caused by pesticides, mercury). The overall Surface Water Contamination Index is calculated based on a range of key pollutants with different weightings according to the level of their negative effects on water security for both humans and freshwater biodiversity: soil salinization (8%), nitrogen (12%) and phosphorus (P, 13%) loading, mercury deposition (5%), pesticide loading (10%), sediment loading (17%), organic loading (as Biological Oxygen Demand, BOD; 15%), potential acidification (9%), and thermal alteration (11%).	Vörösmarty, C. J., McIntyre, P. B., Gessner, M. O., Dudgeon, D., Prusevich, A., Green, P., … & Davies, P. M. (2010). Global threats to human water security and river biodiversity. Nature, 467(7315), 555.
4.1 - Fragmentation Status of Rivers (score)	1.50	This risk indicator is based on the data set by Grill et al. (2019) mapping the world's free-flowing rivers. Grill et al. (2019) compiled a geometric network of the global river system and associated attributes, such as hydro-geometric properties, as well as pressure indicators to calculate an integrated connectivity status index (CSI). While only rivers with high levels of connectivity in their entire length are classified as free-flowing, rivers of CSI < 95% are considered as fragmented at a certain degree.	Grill, G., Lehner, B., Thieme, M., Geenen, B., Tickner, D., Antonelli, F., … & Macedo, H. E. (2019). Mapping the world's free-flowing rivers. Nature, 569(7755), 215.
4.1 - Fragmentation Status of Rivers (rank)	158	This risk indicator is based on the data set by Grill et al. (2019) mapping the world's free-flowing rivers. Grill et al. (2019) compiled a geometric network of the global river system and associated attributes, such as hydro-geometric properties, as well as pressure indicators to calculate an integrated connectivity status index (CSI). While only rivers with high levels of connectivity in their entire length are classified as free-flowing, rivers of CSI < 95% are considered as fragmented at a certain degree.	Grill, G., Lehner, B., Thieme, M., Geenen, B., Tickner, D., Antonelli, F., … & Macedo, H. E. (2019). Mapping the world's free-flowing rivers. Nature, 569(7755), 215.
4.2 - Catchment Ecosystem Services Degradation Level (tree cover loss) (score)	1.00	For this risk indicator, tree cover loss was applied as a proxy to represent catchment ecosystem services degradation since forests play an important role in terms of water regulation, supply and pollution control. The forest cover data is based on Hansen et al.'s global Landsat data at a 30-meter spatial resolution to characterize forest cover and change. The authors defined trees as vegetation taller than 5 meters in height, and forest cover loss as a stand-replacement disturbance, or a change from a forest to non-forest state, during the period 2000 – 2018.	Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A. A., Tyukavina, A., … & Kommareddy, A. (2013). High-resolution global maps of 21st-century forest cover change. science, 342(6160), 850-853.

Indicator	Value	Description	Source
4.2 - Catchment Ecosystem Services Degradation Level (tree cover loss) (rank)	164	For this risk indicator, tree cover loss was applied as a proxy to represent catchment ecosystem services degradation since forests play an important role in terms of water regulation, supply and pollution control. The forest cover data is based on Hansen et al.'s global Landsat data at a 30-meter spatial resolution to characterize forest cover and change. The authors defined trees as vegetation taller than 5 meters in height, and forest cover loss as a stand-replacement disturbance, or a change from a forest to non-forest state, during the period 2000 – 2018.	Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A. A., Tyukavina, A., ... & Kommareddy, A. (2013). High-resolution global maps of 21st-century forest cover change. science, 342(6160), 850-853.
4.3 - Projected Impacts on Freshwater Biodiversity (score)	1.48	The study by Tedesco et al. (2013) to project changes [% increase or decrease] in extinction rate by ~2090 of freshwater fish due to water availability loss from climate change is used as a proxy to estimate the projected impacts on freshwater biodiversity.	Tedesco, P. A., Oberdorff, T., Cornu, J. F., Beauchard, O., Brosse, S., Dürr, H. H., ... & Hugueny, B. (2013). A scenario for impacts of water availability loss due to climate change on riverine fish extinction rates. Journal of Applied Ecology, 50(5), 1105-1115.
4.3 - Projected Impacts on Freshwater Biodiversity (rank)	173	The study by Tedesco et al. (2013) to project changes [% increase or decrease] in extinction rate by ~2090 of freshwater fish due to water availability loss from climate change is used as a proxy to estimate the projected impacts on freshwater biodiversity.	Tedesco, P. A., Oberdorff, T., Cornu, J. F., Beauchard, O., Brosse, S., Dürr, H. H., ... & Hugueny, B. (2013). A scenario for impacts of water availability loss due to climate change on riverine fish extinction rates. Journal of Applied Ecology, 50(5), 1105-1115.
5.1 - Freshwater Policy Status (SDG 6.5.1) (score)	2.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "National Water Resources Policy" indicator, which corresponds to one of the three national level indicators under the Enabling Environment category.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
5.1 - Freshwater Policy Status (SDG 6.5.1) (rank)	118	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "National Water Resources Policy" indicator, which corresponds to one of the three national level indicators under the Enabling Environment category.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
5.2 - Freshwater Law Status (SDG 6.5.1) (score)	1.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation "National Water Resources Law(s)" indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.

Indicator	Value	Description	Source
5.2 - Freshwater Law Status (SDG 6.5.1) (rank)	149	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “National Water Resources Law(s)” indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
5.3 - Implementation Status of Water Management Plans (SDG 6.5.1) (score)	3.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “National IWRM plans” indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
5.3 - Implementation Status of Water Management Plans (SDG 6.5.1) (rank)	63	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “National IWRM plans” indicator, which corresponds to one of the three national level indicators under the Enabling Environment category. For SDG 6.5.1, enabling environment depicts the conditions that help to support the implementation of IWRM, which includes legal and strategic planning tools for IWRM.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
6.1 - Corruption Perceptions Index (score)	4.00	This risk Indicator is based on the latest Transparency International’s data: the Corruption Perceptions Index 2018. This index aggregates data from a number of different sources that provide perceptions of business people and country experts on the level of corruption in the public sector.	Transparency International (2019). Corruption Perceptions Index 2018. Berlin: Transparency International.
6.1 - Corruption Perceptions Index (rank)	42	This risk Indicator is based on the latest Transparency International’s data: the Corruption Perceptions Index 2018. This index aggregates data from a number of different sources that provide perceptions of business people and country experts on the level of corruption in the public sector.	Transparency International (2019). Corruption Perceptions Index 2018. Berlin: Transparency International.
6.2 - Freedom in the World Index (score)	4.00	This risk indicator is based on Freedom House (2019), an annual global report on political rights and civil liberties, composed of numerical ratings and descriptive texts for each country and a select group of territories. The 2019 edition involved more than 100 analysts and more than 30 advisers with global, regional, and issue-based expertise to covers developments in 195 countries and 14 territories from January 1, 2018, through December 31, 2018.	Freedom House (2019). Freedom in the world 2019. Washington, DC: Freedom House.

Indicator	Value	Description	Source
6.2 - Freedom in the World Index (rank)	49	This risk indicator is based on Freedom House (2019), an annual global report on political rights and civil liberties, composed of numerical ratings and descriptive texts for each country and a select group of territories. The 2019 edition involved more than 100 analysts and more than 30 advisers with global, regional, and issue-based expertise to covers developments in 195 countries and 14 territories from January 1, 2018, through December 31, 2018.	Freedom House (2019). Freedom in the world 2019. Washington, DC: Freedom House.
6.3 - Business Participation in Water Management (SDG 6.5.1) (score)	1.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “Business Participation in Water Resources Development, Management and Use” indicator, which corresponds to one of the six national level indicators under the Institutions and Participation category.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
6.3 - Business Participation in Water Management (SDG 6.5.1) (rank)	146	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “Business Participation in Water Resources Development, Management and Use” indicator, which corresponds to one of the six national level indicators under the Institutions and Participation category.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
7.1 - Management Instruments for Water Management (SDG 6.5.1) (score)	3.00	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “Sustainable and efficient water use management” indicator, which corresponds to one of the five national level indicators under the Management Instruments category. For SDG 6.5.1, management instruments refer to the tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
7.1 - Management Instruments for Water Management (SDG 6.5.1) (rank)	45	This risk indicator is based on SDG 6.5.1. Degree of IWRM Implementation “Sustainable and efficient water use management” indicator, which corresponds to one of the five national level indicators under the Management Instruments category. For SDG 6.5.1, management instruments refer to the tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.

Indicator	Value	Description	Source
7.2 - Groundwater Monitoring Data Availability and Management (score)	5.00	This risk indicator is based on the data set by UN IGRAC (2019) to determine the level of availability of groundwater monitoring data at country level as groundwater management decisions rely strongly on data availability. The level of groundwater monitoring data availability for groundwater management is determined according to a combination of three criteria developed by WWF and IGRAC: 1) Status of country groundwater monitoring programme, 2) groundwater data availability for NGOs and 3) Public access to processed groundwater monitoring data.	UN IGRAC (2019). Global Groundwater Monitoring Network GGMN Portal. UN International Groundwater Resources Assessment Centre (IGRAC).
7.2 - Groundwater Monitoring Data Availability and Management (rank)	7	This risk indicator is based on the data set by UN IGRAC (2019) to determine the level of availability of groundwater monitoring data at country level as groundwater management decisions rely strongly on data availability. The level of groundwater monitoring data availability for groundwater management is determined according to a combination of three criteria developed by WWF and IGRAC: 1) Status of country groundwater monitoring programme, 2) groundwater data availability for NGOs and 3) Public access to processed groundwater monitoring data.	UN IGRAC (2019). Global Groundwater Monitoring Network GGMN Portal. UN International Groundwater Resources Assessment Centre (IGRAC).
7.3 - Density of Runoff Monitoring Stations (score)	4.45	The density of monitoring stations for water quantity was applied as proxy to develop this risk indicator. The Global Runoff Data Base was used to estimate the number of monitoring stations per 1000km2 of the main river system (data base access date: May 2018).	BfG (2019). Global Runoff Data Base. German Federal Institute of Hydrology (BfG).
7.3 - Density of Runoff Monitoring Stations (rank)	27	The density of monitoring stations for water quantity was applied as proxy to develop this risk indicator. The Global Runoff Data Base was used to estimate the number of monitoring stations per 1000km2 of the main river system (data base access date: May 2018).	BfG (2019). Global Runoff Data Base. German Federal Institute of Hydrology (BfG).
8.1 - Access to Safe Drinking Water (score)	4.00	This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017.	WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.
8.1 - Access to Safe Drinking Water (rank)	24	This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017.	WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.
8.2 - Access to Sanitation (score)	5.00	This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017.	WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.

Indicator	Value	Description	Source
8.2 - Access to Sanitation (rank)	17	This risk indicator is based on the Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (UNICEF/WHO) 2019 data. It provides estimates on the use of water, sanitation and hygiene by country for the period 2000-2017.	WHO & UNICEF (2019). Estimates on the use of water, sanitation and hygiene by country (2000-2017). Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.
8.3 - Financing for Water Resource Development and Management (SDG 6.5.1) (score)	3.00	This risk indicator is based on the average 'Financing' score of UN SDG 6.5.1. Degree of IWRM Implementation database. UN SDG 6.5.1 database contains a category on financing which assesses different aspects related to budgeting and financing made available and used for water resources development and management from various sources.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
8.3 - Financing for Water Resource Development and Management (SDG 6.5.1) (rank)	83	This risk indicator is based on the average 'Financing' score of UN SDG 6.5.1. Degree of IWRM Implementation database. UN SDG 6.5.1 database contains a category on financing which assesses different aspects related to budgeting and financing made available and used for water resources development and management from various sources.	UN Environment (2018). Progress on integrated water resources management. Global baseline for SDG 6 Indicator 6.5.1: degree of IWRM implementation.
9.1 - Cultural Diversity (score)	1.00	Water is a social and cultural good. The cultural diversity risk indicator was included in order to acknowledge that businesses face reputational risk due to the importance of freshwater for indigenous and traditional people in their daily life, religion and culture. This risk indicator is based on Oviedo and Larsen (2000) data set, which mapped the world's ethnolinguistic groups onto the WWF map of the world's ecoregions. This cross-mapping showed for the very first time the significant overlap that exists between the global geographic distribution of biodiversity and that of linguistic diversity.	Oviedo, G., Maffi, L., & Larsen, P. B. (2000). Indigenous and traditional peoples of the world and ecoregion conservation: An integrated approach to conserving the world's biological and cultural diversity. Gland: WWF (World Wide Fund for Nature) International.
9.1 - Cultural Diversity (rank)	137	Water is a social and cultural good. The cultural diversity risk indicator was included in order to acknowledge that businesses face reputational risk due to the importance of freshwater for indigenous and traditional people in their daily life, religion and culture. This risk indicator is based on Oviedo and Larsen (2000) data set, which mapped the world's ethnolinguistic groups onto the WWF map of the world's ecoregions. This cross-mapping showed for the very first time the significant overlap that exists between the global geographic distribution of biodiversity and that of linguistic diversity.	Oviedo, G., Maffi, L., & Larsen, P. B. (2000). Indigenous and traditional peoples of the world and ecoregion conservation: An integrated approach to conserving the world's biological and cultural diversity. Gland: WWF (World Wide Fund for Nature) International.
10.1 - Freshwater Endemism (score)	1.42	The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Companies operating in basins with higher number of endemic fish species are exposed to higher reputational risks.	WWF & TNC (2015). Freshwater Ecoregions of the World.

Indicator	Value	Description	Source
10.1 - Freshwater Endemism (rank)	189	The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Companies operating in basins with higher number of endemic fish species are exposed to higher reputational risks.	WWF & TNC (2015). Freshwater Ecoregions of the World.
10.2 - Freshwater Biodiversity Richness (score)	1.62	The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Count of fish species is used as a representation of freshwater biodiversity richness. Companies operating in basins with higher number of fish species are exposed to higher reputational risks.	WWF & TNC (2015). Freshwater Ecoregions of the World.
10.2 - Freshwater Biodiversity Richness (rank)	175	The underlying data set for this risk indicator comes from the Freshwater Ecoregions of the World (FEOW) 2015 data developed by WWF and TNC. Count of fish species is used as a representation of freshwater biodiversity richness. Companies operating in basins with higher number of fish species are exposed to higher reputational risks.	WWF & TNC (2015). Freshwater Ecoregions of the World.
11.1 - National Media Coverage (score)	1.00	This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware local residents typically are of water-related issues due to national media coverage. The status of the river basin (e.g., scarcity and pollution) is taken into account, as well as the importance of water for livelihoods (e.g., food and shelter).	WWF & Tecnoma (TYPSA Group)
11.1 - National Media Coverage (rank)	195	This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware local residents typically are of water-related issues due to national media coverage. The status of the river basin (e.g., scarcity and pollution) is taken into account, as well as the importance of water for livelihoods (e.g., food and shelter).	WWF & Tecnoma (TYPSA Group)
11.2 - Global Media Coverage (score)	1.00	This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware people are of water-related issues due to global media coverage. Familiarity to and media coverage of the region and regional water-related disasters are taken into account.	WWF & Tecnoma (TYPSA Group)
11.2 - Global Media Coverage (rank)	159	This risk indicator is based on joint qualitative research by WWF and Tecnoma (Typsa Group). It indicates how aware people are of water-related issues due to global media coverage. Familiarity to and media coverage of the region and regional water-related disasters are taken into account.	WWF & Tecnoma (TYPSA Group)

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Indicator	Value	Description	Source
12.1 - Conflict News Events (RepRisk) (score)	2.00	This risk indicator is based on 2018 data collected by RepRisk on counts and registers of documented negative incidents, criticism and controversies that can affect a company's reputational risk. These negative news events are labelled per country and industry class.	RepRisk & WWF (2019). Due diligence database on ESG and business conduct risks. RepRisk.
12.1 - Conflict News Events (RepRisk) (rank)	122	This risk indicator is based on 2018 data collected by RepRisk on counts and registers of documented negative incidents, criticism and controversies that can affect a company's reputational risk. These negative news events are labelled per country and industry class.	RepRisk & WWF (2019). Due diligence database on ESG and business conduct risks. RepRisk.
12.2 - Hydro-political Risk (score)	2.42	This risk indicator is based on the assessment of hydro-political risk by Farinosi et al. (2018). More specifically, it is based on the results of spatial modelling by Farinosi et al. (2018) that determined the main parameters affecting water cross-border conflicts and calculated the likelihood of hydro-political issues.	Farinosi, F., Giupponi, C., Reynaud, A., Ceccherini, G., Carmona-Moreno, C., De Roo, A., ... & Bidoglio, G. (2018). An innovative approach to the assessment of hydro-political risk: A spatially explicit, data driven indicator of hydro-political issues. Global environmental change, 52, 286-313.
12.2 - Hydro-political Risk (rank)	86	This risk indicator is based on the assessment of hydro-political risk by Farinosi et al. (2018). More specifically, it is based on the results of spatial modelling by Farinosi et al. (2018) that determined the main parameters affecting water cross-border conflicts and calculated the likelihood of hydro-political issues.	Farinosi, F., Giupponi, C., Reynaud, A., Ceccherini, G., Carmona-Moreno, C., De Roo, A., ... & Bidoglio, G. (2018). An innovative approach to the assessment of hydro-political risk: A spatially explicit, data driven indicator of hydro-political issues. Global environmental change, 52, 286-313.
Population, total (#)	4301018	Population, total	The World Bank 2018, Data , hompage accessed 20/04/2018
GDP (current US$)	4739298730	GDP (current US$)	The World Bank 2018, Data , hompage accessed 20/04/2018
EPI 2018 score (0-100)	39.24	Environmental Performance Index	
WGI -Voice and Accountability (0-100)	20.95	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132

Indicator	Value	Description	Source
WGI -Political stability no violence (0-100)	24.63	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132
WGI - Government Effectiveness (0-100)	21.15	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132
WGI - Regulatory Quality (0-100)	24.04	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132
WGI - Rule of Law (0-100)	23.08	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132
WGI - Control of Corruption (0-100)	21.63	Water Governance Indicator	Kaufmann, Daniel and Kraay, Aart and Mastruzzi, Massimo, The Worldwide Governance Indicators: Methodology and Analytical Issues (September 2010). World Bank Policy Research Working Paper No. 5430. Available at SSRN: https://ssrn.com/abstract=1682132

Indicator	Value	Description	Source
WRI BWS all industries (0-5)	0.60	WRI Baseline Water Stress (BWS)	Gassert, F., P. Reig, T. Luo, and A. Maddocks. 2013. "Aqueduct country and river basin rankings: a weighted aggregation of spatially distinct hydrological indicators." Working paper. Washington, DC: World Resources Institute, December 2013. Available online at http://wri.org/publication/aqueduct-country-river-basin-rankings.
WRI BWS Ranking (1=very high)	128	WRI Baseline Water Stress (BWS)	Gassert, F., P. Reig, T. Luo, and A. Maddocks. 2013. "Aqueduct country and river basin rankings: a weighted aggregation of spatially distinct hydrological indicators." Working paper. Washington, DC: World Resources Institute, December 2013. Available online at http://wri.org/publication/aqueduct-country-river-basin-rankings.
Baseline Water Stress (BWS) - 2020 BAU (1=very high)	117	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2020 Optimistic (increasing rank describes lower risk)	112	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2020 Pessimistic (increasing rank describes lower risk)	118	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.

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Indicator	Value	Description	Source
Baseline Water Stress (BWS) - 2030 BAU (increasing rank describes lower risk)	111	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2030 Optimistic (increasing rank describes lower risk)	104	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2030 Pessimistic (increasing rank describes lower risk)	110	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2040 BAU (increasing rank describes lower risk)	101	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2040 Optimistic (increasing rank describes lower risk)	108	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.
Baseline Water Stress (BWS) - 2040 Pessimistic (increasing rank describes lower risk)	102	WRI country ranking	Luo, T., R. Young, and P. Reig. 2015. "Aqueduct projected water stress rankings." Technical note. Washington, DC: World Resources Institute, August 215. Available online at http://www.wri.org/publication/aqueduct-projected-water-stress-country-rankings.

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Indicator	Value	Description	Source
Total water footprint of national consumption (m3/a/cap)	2565.06	WFN Water Footprint Data	Mekonnen, M.M. and Hoekstra, A.Y. (2011) National water footprint accounts: The green, blue and grey water footprint of production and consumption, Value of Water Research Report Series No. 50, UNESCO-IHE, Delft, the Netherlands.http://www.waterfootprint.org/Reports/Report50-NationalWaterFootprints-Vol1.pdf
Ratio external / total water footprint (%)	45.09	WFN Water Footprint Data	Mekonnen, M.M. and Hoekstra, A.Y. (2011) National water footprint accounts: The green, blue and grey water footprint of production and consumption, Value of Water Research Report Series No. 50, UNESCO-IHE, Delft, the Netherlands.http://www.waterfootprint.org/Reports/Report50-NationalWaterFootprints-Vol1.pdf
Area equipped for full control irrigation: total (1000 ha)	45.01	Aquastat - Irrigation	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Area equipped for irrigation: total (1000 ha)	45.01	Aquastat - Irrigation	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
% of the area equipped for irrigation actually irrigated (%)	50.74	Aquastat - Irrigation	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Electricity production from hydroelectric sources (% of total)	0.00	World Development Indicators	The World Bank 2018, Data , hompage accessed 20/04/2018
Total internal renewable water resources (IRWR) (10^9 m3/year)	0.40	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Total internal renewable water resources (IRWR) (10^9 m3/year)	11.00	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Water resources: total external renewable (10^9 m3/year)	0.40	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13

Water Risk Filter

Country Overview - Mauritania

Indicator	Value	Description	Source
Total renewable water resources (10^9 m3/year)	11.40	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Dependency ratio (%)	96.49	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Total renewable water resources per capita (m3/inhab/year)	2802.00	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
World happiness [0-8]	4.36	WorldHappinessReport.org	World Happiness Report, homepage accessed 20/04/2018

Country Aspects

1. PHYSICAL ASPECTS

1.1. WATER RESOURCES

1.1.1. WATER RESOURCES

The total renewable surface water resources are estimated to be 11.1km3/year, of which the Senegal River and its tributaries constitute the main part (these form the border between Mauritania and Senegal); and the dam reservoirs scattered in the southern and central regions. Of the total (11.1km3/year), only 0.1km3 is generated within the country.

The country also contains significant groundwater resources, although these are characterized by large geographical disparities. The context is favourable in the southwest, south and southeast (large continuous sheets of Tarzi and Taoudenni in sedimentary formations, layers of the river valley; high flow-time) and less favourable in the rest of the country (discontinuous layers). Renewable water resources are estimated to be around 0.3km3/year.

The total capacity of dams is estimated to be about 0.9km3, of which 0.5km3 are for the Foum Gleita dam.

In Mauritania, water resources are mainly surface water. The surface waters are estimated to be 7.1km3, and 54 per cent of them are used (3.75km3). Given the very limited role of undergroundwater resources, this figure can also be taken to represent the overall rate of mobilization. Out of the 3.75km3 mobilized, Mauritania uses only 1.3km3, meaning a rate of use of 17.5 per cent (United Nations Economic Commission For Africa (ECA), 2005a).

Mauritania's comfortable position with regard to water resources is only relative; the country possesses, in the River Senegal, the possibility of extracting sufficient water to meet its needs for a few decades to come, but the geographic situation of this resource makes it difficult for the water to be distributed across the regions (ECA, 2005a).

Moreover, most of Mauritania is situated in an arid zone, which means that actions must be taken to manage water demand, but the context is not conducive to such actions: the management structures are fragile and the responsibilities of the bodies in charge of managing water have been diluted (ECA, 2005a).

Mauritania is heavily dependent on outside sources (96 per cent): this dependence on outside sources for its water resources is measured in relation to its water potential (ECA, 2005a).

According to ECA (2005b), the volume of water generated by precipitation (92mm) is evaluated in Mauritania to 94 Mm3. But taking into account the aridity of the climate, the water flow is very low: the volume of surface water is estimated at only 100 mm3. The Senegal River, which rises outside Mauritania, contributes 7,000 million m3 to the renewable water resources of Mauritania.

Apart from the Senegal River, six rivers, draining watersheds of 2,000 to 8,000km2, are identified. The only information mentioned in the national report is that of "the dams feeding groundwater sheets". The same source, probably to emphasize the performances of these dams, states that the Amder dam stored 160,000 m3 during the winter of 1986, which indicates that, apart from the Senegal River, there is a modest contribution from other rivers. Concerning groundwater, ten sheets are identified; four of which belong to the Senegalo-Mauritanian basin, and six to the basin of Taoudéni. The national report of Mauritania indicates that the groundwater potential of water is estimated at 50,000mm3, specifying however that "this potential is supposed nonrenewable" (ECA, 2005b).

According to ECA (2005b), in Mauritania water resources are primarily surface ones. Surface water, evaluated to be 7.1km3 is used to 54 per cent (3.75km3). Taking into account the small contribution of the groundwater (0.3km3), this rate could be considered as the rate of total mobilization. Of the 3.75km3 mobilized Mauritania uses only 1.3km3, a utilisation ratio of 17.5 per cent. No evaluation is made for water resources mobilization in the long-term, but it appears that in 2025 the country will have largely sufficient water resources to meet its needs.

Non-renewable water resources

According to ECA (2005b), the national report of Mauritania indicates the existence of 10 groundwater sites with a great disparity in water potential according to the geographical situation: the southwest, the south and southeast contain water reserves estimated at 50km3, but this potential is assumed to be "non-renewable".

In 2000, water withdrawals were estimated to be 1.698 billion m3, including 1.5 billion for agriculture (88 per cent), 150 million for domestic use (9 per cent) and 48 million for industry (3 per cent).

According to ECA (2005a), the arable land in Mauritania represents barely one per cent of the country's surface area, and the potentially irrigable area does not exceed 2,200km3, concentrated in the south of the country. The area currently irrigated amounts to 400km3. Flood recession cultivation is carried out over 250km3.

In Mauritania, industries consuming large amounts of water are relatively rare (the SNIM which exploits iron, the SOGEM soap factory, and the cement works) and do not have a great impact on water consumption. Water consumption in industry is estimated at four per cent of the total consumption (ECA, 2005a).

Fresh water produced by reused waste waterFresh water produced by reused waste water

Mauritania has only one waste water treatment plant, with a capacity of 2,000 m3/day, whose treated water "is used only for public gardens irrigation and for some public works water supply" (ECA, 2005b).Mauritania has only one waste water treatment plant, with a capacity of 2,000 m3/day, whose treated water "is used only for public gardens irrigation and for some public works water supply" (ECA, 2005b).

Water and food productionWater and food production

Availability of water makes it possible to promote rice culture. Since 1997, 77 per cent of rice cultivation's water requirements have been met entirely by irrigation. But one expects that with improved agricultural production, and the availability of water for irrigation, Mauritania will be able to satisfy its basic food needs (ECA, 2005b).Availability of water makes it possible to promote rice culture. Since 1997, 77 per cent of rice cultivation's water requirements have been met entirely by irrigation. But one expects that with improved agricultural production, and the availability of water for irrigation, Mauritania will be able to satisfy its basic food needs (ECA, 2005b).

AgricultureAgriculture

Arable lands in Mauritania represent hardly one per cent of the country's area; and irrigable land potential does not exceed 2,200km3, concentrated in the southern part of the country. A programme of realization of irrigated perimeters was initiated by the government over the two last decades; at the moment the area of the irrigated perimeters is evaluated at 400km3. The area of cultures irrigated by tails of floods is evaluated at 250km3 (ECA, 2005b).Arable lands in Mauritania represent hardly one per cent of the country's area; and irrigable land potential does not exceed 2,200km3, concentrated in the southern part of the country. A programme of realization of irrigated perimeters was initiated by the government over the two last decades; at the moment the area of the irrigated perimeters is evaluated at 400km3. The area of cultures irrigated by tails of floods is evaluated at 250km3 (ECA, 2005b).

IndustryIndustry

Large industries consuming much water are relatively rare in Mauritania, being limited primarily to the company SNIM (which exploits iron), with the SOGEM soap factory, cement factories, and small production facilities without much impact on water consumption. Water consumption by industries is estimated at four per cent of total consumption (ECA, 2005b).Large industries consuming much water are relatively rare in Mauritania, being limited primarily to the company SNIM (which exploits iron), with the SOGEM soap factory, cement factories, and small production facilities without much impact on water consumption. Water consumption by industries is estimated at four per cent of total consumption (ECA, 2005b).

The choice of flood irrigation could have a negative impact on the environment by: i) representing a waste of water; ii) accelerating land degradation (decreased fertility and salinization of the soil surface, which increase the water level). These phenomena are amplified by deficiencies in drainage. Successive droughts have greatly altered the natural environment in the valley: i) accelerating the development plan's implementation; ii) decreasing population and herds in northern areas; iii) affecting natural resources, either directly or through people, whose pressure on resources concerns surface water and groundwater, wood products (firewood, charcoal), pastures and cropland.The choice of flood irrigation could have a negative impact on the environment by: i) representing a waste of water; ii) accelerating land degradation (decreased fertility and salinization of the soil surface, which increase the water level). These phenomena are amplified by deficiencies in drainage. Successive droughts have greatly altered the natural environment in the valley: i) accelerating the development plan's implementation; ii) decreasing population and herds in northern areas; iii) affecting natural resources, either directly or through people, whose pressure on resources concerns surface water and groundwater, wood products (firewood, charcoal), pastures and cropland.

Irrigated agriculture has, moreover, led to the development of diseases in the river valley where malaria and schistosomiasis are endemic. Since 1991, a national programme to fight against dracunculiasis (Guinea worm) has been implemented and its impact on reducing the number of patients and endemic villages has been remarkable. Indeed the number of people affected decreased from 10,000 in 1991 to 562 in 1996. Seven villages have been affected (among them, Gorgol and Brakna), Trarza being free of the disease.Irrigated agriculture has, moreover, led to the development of diseases in the river valley where malaria and schistosomiasis are endemic. Since 1991, a national programme to fight against dracunculiasis (Guinea worm) has been implemented and its impact on reducing the number of patients and endemic villages has been remarkable. Indeed the number of people affected decreased from 10,000 in 1991 to 562 in 1996. Seven villages have been affected (among them, Gorgol and Brakna), Trarza being free of the disease.

Irrigation policy has three objectives:Irrigation policy has three objectives:

-Ensuring the sustainability of areas managed to increase production, income and employment and thus contribute to improved food security.-Ensuring the sustainability of areas managed to increase production, income and employment and thus contribute to improved food security.

-Valuing water, increasing the value of crops (fruits, vegetables and fodder), by crop intensification through both higher rates of land use and improvement of productivity, mainly through the use of efficient technologies, and finally by integrating agriculture and livestock, by valuing animal and vegetal by-products.-Valuing water, increasing the value of crops (fruits, vegetables and fodder), by crop intensification through both higher rates of land use and improvement of productivity, mainly through the use of efficient technologies, and finally by integrating agriculture and livestock, by valuing animal and vegetal by-products.

-Improving resources management and conservation.-Improving resources management and conservation.

<h3>1.1.2.WATER USE1.1.2.WATER USE<h3>1.2.WATER QUALITY, ECOSYSTEMS AND HUMAN HEALTH1.2.WATER QUALITY, ECOSYSTEMS AND HUMAN HEALTH

2. GOVERNANCE ASPECTS

2.1.WATER INSTITUTIONS

The most active agencies in managing water and land are:

-The Ministry of Water and Energy (MHE) to which are attached: i) the Department of Water and Sanitation (DHA), which installs wells and boreholes, and is responsible for water distribution in secondary centres in rural areas; ii) the National Society of Water and Power (SONELEC), which is a public-owned service in charge of production, transmission and distribution of water and electricity in large urban centres; iii) the Organization for Development of the Senegal River (OMVS-Mauritania); iv) the Agency for Drinking Water and Sanitation (AWSA); and v) the National Water

Resources Centre (CNRE).
-The Ministry of Rural Development and Environment (MDRE) with: the Department of Environment and Rural Development (DEAR); the Management of Agro-Resources Development (DRAP), and the Program for Integrated Development of Irrigated Agriculture in Mauritania (PDIAIM) whose objectives are: a) sustainably increasing agricultural added value and income in rural areas; b) improving food security and poverty reduction. It consists of two phases: firstly, a phase of achievements consolidation, development of road infrastructure and development projects including new techniques and new crops; and, secondly, a phase of facilities extension.
-The National Society for Rural Development (SONADER) is a public industrial and commercial entity created in 1979 to promote the development of irrigated agriculture in river valleys. As part of the reforms resulting from the adjustment programme in the agricultural sector (PASA), SONADER disengaged business credit, marketing and production of hydro-agricultural works. Its activities on behalf of the State were refocused around the following tasks: i) project management support of public irrigation schemes; ii) supporting the management of community infrastructure, including the transfer of management functions for organizations' users; and iii) rural council and training.

2.2. WATER MANAGEMENT

The government has demonstrated its commitment to sector reform in the policy statement for the development of the water and energy sectors of 23 September 1998. As the owner of water infrastructure, the MHE has entrusted the management of water supply networks in rural and semi-urban areas to an independent body, established at the initiative of the civil society AWSA. Water resources management is, in turn, entrusted to a public administrative institution: the CNRE. All the mechanisms of delegation and contracts are governed by these two agencies to ensure the inclusion of national objectives in the fight against poverty (universal access to basic services) and respect for competition. Municipalities are responsible for monitoring that network operators meet the specifications set by the AWSA.
Concerning the management of irrigated areas, reforms under the Structural Adjustment Programme of the agricultural sector (PASA) in 1988 resulted in: i) the withdrawal of SONADER management cooperative schemes and large schemes (in progress), as well as functions of input supply and agricultural equipment, maintenance of pump sets and rice processing; ii) the establishment of a mutual structure of agricultural credit (UNCACEM); iii) withdrawal of public sector marketing of rice; and iv) the initiation of land reform. Other reforms since 1999 as part of the Letter of Development Policy of Irrigated Agriculture (LPDAI) required the following principles: i) priority to the rehabilitation of existing schemes; ii) establishing minimum standards for facilities; and iii) setting up an incentive mechanism for the implementation of standards for schemes to be rehabilitated, with the help of the state. This funding mechanism has been described in a manual aid management incentive that currently sets the amount to 70 per cent of investment costs for cooperative schemes. The facility was completed in the PDIAIM, by making available to the UNCACEM a line of refundable credit to finance long-term (eight years) rehabilitation projects of individual producers or cooperatives.
According to UNEP (2010), Mauritania is covered by desert and subject to frequent drought, thus water sources are naturally scarce. Both urban and rural populations suffer from poor access to improved drinking water, with 30 per cent having access in 1990 and 49 per cent in 2008. Access to sanitation is extremely low, with half of the urban population and only nine per cent of rural people served in 2008.
According to ECA (2005b), droughts have severely affected Mauritania, like all Sahel countries, during the three last decades. Though rare, floods can cause serious damage due to urbanization not adapted to hydraulic conditions.
Water supply
The water supply of cities in Mauritania is not satisfactory. Nouakchott, the capital, which is supposed to be the best equipped city, has a rate of connection to the drinking water network which does not exceed 32 per cent, and the rest of the population is supplied with fountains. To definitively solve the problem of water supply in Nouakchott, the project of Aftout Essahli aims to transport water from the Senegal River. This project, whose studies have been completed, is currently in the launch phase. It will make it possible to carry 40,000 m3 per day to Nouakchott. This volume will increase to 100,000 m3 in the medium-term, then to 226,000 m3 in 2030 (ECA, 2005b).
SanitationSanitation
According to ECA (2005b), in Mauritania sanitation remains marked by an absence of suitable collective networks. It is limited in the majority of cases to septic pits or public latrines. Only the capital Nouakchott has equipment for sanitation, limited to some residential districts of the city. It has:According to ECA (2005b), in Mauritania sanitation remains marked by an absence of suitable collective networks. It is limited in the majority of cases to septic pits or public latrines. Only the capital Nouakchott has equipment for sanitation, limited to some residential districts of the city. It has:
-A treatment and purification plant with a 2,000m3/day capacity.-A treatment and purification plant with a 2,000m3/day capacity.
-A collecting network of 70km, but this network is very old, which results in numerous breakages causing serious leakage.-A collecting network of 70km, but this network is very old, which results in numerous breakages causing serious leakage.
Governance of waterGovernance of water
In Mauritania a water code is in preparation to supplement and adapt the legal framework behind the reform of the water sector. This reform consists of the introduction of a new institutional framework "likely to give more relevance to actions to be carried out in the sector, to release the State from the weight of the daily management of questions related to hydraulics and to involve the private sector" (ECA, 2005b).In Mauritania a water code is in preparation to supplement and adapt the legal framework behind the reform of the water sector. This reform consists of the introduction of a new institutional framework "likely to give more relevance to actions to be carried out in the sector, to release the State from the weight of the daily management of questions

related to hydraulics and to involve the private sector" (ECA, 2005b).

According to ECA (2005b), the potential of Mauritania's water reserves is only relative: the country has in the Senegal River a possibility to extract sufficient water to meet its needs during the next few decades, but the geographical situation of water resources makes it difficult to supply all areas because of the very high costs of water transfer. The major part of the territory, being located in an arid region, requires water demand management to take account of water scarcity and a lack of means to allow necessary investments. But these actions do not find favourable conditions for their application because the structures of water management are fragile and responsibilities for this management are diluted.According to ECA (2005b), the potential of Mauritania's water reserves is only relative: the country has in the Senegal River a possibility to extract sufficient water to meet its needs during the next few decades, but the geographical situation of water resources makes it difficult to supply all areas because of the very high costs of water transfer. The major part of the territory, being located in an arid region, requires water demand management to take account of water scarcity and a lack of means to allow necessary investments. But these actions do not find favourable conditions for their application because the structures of water management are fragile and responsibilities for this management are diluted.

Water resources are largely sufficient, but they are not distributed in a balanced way on all the territory. To ensure this balance is very expensive for a country which does not have enough means; it cannot thus be ensured without external support. But there is work to be done on organisational and institutional aspects, as well as on reinforcement of capacities, because simply reinforcing investments is not sufficient (ECA, 2005b).Water resources are largely sufficient, but they are not distributed in a balanced way on all the territory. To ensure this balance is very expensive for a country which does not have enough means; it cannot thus be ensured without external support. But there is work to be done on organisational and institutional aspects, as well as on reinforcement of capacities, because simply reinforcing investments is not sufficient (ECA, 2005b).

The 1983 Land Law provides, through various laws (Ordinance No. 83,127 and Decree No. 84009 on the common land, and Decree on Land Code 90020), a procedure for land allocation in three stages: a) authorization to operate which, after five years of continuous land development, leads to b) a temporary grant on this land, which, after another five years, gives c) the final license which can be converted into land title after demarcation. The development must be integral and permanent in order to result, after these 10 years, into a property right that can freely be sold, traded or given away. The 1990 Decree was replaced in 2000 by Decree No. 2000,089, now the basic principles, but the procedures have been simplified and made more readily applicable to non-rice land. Traditional modes of tenure still largely predominate in the country. The mode of tenure is often indirect and covers various forms such as the right to use permanent or share cropping against payment in kind. This system favours the status quo and limits any innovation.The 1983 Land Law provides, through various laws (Ordinance No. 83,127 and Decree No. 84009 on the common land, and Decree on Land Code 90020), a procedure for land allocation in three stages: a) authorization to operate which, after five years of continuous land development, leads to b) a temporary grant on this land, which, after another five years, gives c) the final license which can be converted into land title after demarcation. The development must be integral and permanent in order to result, after these 10 years, into a property right that can freely be sold, traded or given away. The 1990 Decree was replaced in 2000 by Decree No. 2000,089, now the basic principles, but the procedures have been simplified and made more readily applicable to non-rice land. Traditional modes of tenure still largely predominate in the country. The mode of tenure is often indirect and covers various forms such as the right to use permanent or share cropping against payment in kind. This system favours the status quo and limits any innovation.

The laws specifically governing the water sector are:The laws specifically governing the water sector are:

-The Water Code (Ordinance No. 85-144 of July 4 1986) which defines the responsibility of the operator of irrigated areas in terms of rational use of water;-The Water Code (Ordinance No. 85-144 of July 4 1986) which defines the responsibility of the operator of irrigated areas in terms of rational use of water;

-Ordinance No. 87-289 of October 20 1986, which sets out new municipal powers, including the management of water infrastructure;-Ordinance No. 87-289 of October 20 1986, which sets out new municipal powers, including the management of water infrastructure;

-Decree 93-124 of 21 December 1993 defining the conditions for management and operation of concession facilities in drinking water;-Decree 93-124 of 21 December 1993 defining the conditions for management and operation of concession facilities in drinking water;

-Law No. 98-016 of 9 July 1998 on participatory management of the oases;-Law No. 98-016 of 9 July 1998 on participatory management of the oases;

-047-2002/PM Decree of 11 March 2002 laying down the powers of the MHE and the organization of the central administration of its department;-047-2002/PM Decree of 11 March 2002 laying down the powers of the MHE and the organization of the central administration of its department;

-Decree 2002-19 of 31 March 2002 in recognition of public AWSA and fixing its tax and customs;-Decree 2002-19 of 31 March 2002 in recognition of public AWSA and fixing its tax and customs;

-Decree 2002-20 of 31 March 2020 establishing fees for water withdrawal.-Decree 2002-20 of 31 March 2020 establishing fees for water withdrawal.

<h2>2.3.WATER POLICY AND LEGAL FRAMEWORK2.3.WATER POLICY AND LEGAL FRAMEWORK

3. GEOPOLITICAL ASPECTS

The Organization for Development of the Senegal River (OMVS), which includes Mali, Mauritania and Senegal, was established in 1972 and follows the Inter-State Committee for Development of the Senegal River Basin (1963-1968) and the United States along the Senegal River (ESRO) (1968-1972). Its mandate is to contribute to economic development of Member States for the rational exploitation of resources of the Senegal River basin.

According to ECA (2005a), the management of the waters of the Senegal River, which is the major water resource of Mauritania, is the responsibility of the Office for the Exploitation of the Senegal

River (Office de Mise en Valeur du Fleuve Sénégal: OMVS), which is a body set up by the countries which share the waters of the Senegal River (Senegal, Mauritania, Mali).

The Senegal River is divided into four hydraulic sectors starting from the hydrological control works at Bakel, upstream in Senegal. The management companies SOGED and SOGEM (subsidiaries of the OMVS) collect data every day on the level and rate of flow at two dams and 10 hydrological control works, and provide instructions for the operating of the works at Manantali (Mali) and Diama (Senegal) (ECA, 2005a).

The operation of the floodgates situated on the dykes along the river is also carried out by the OMVS at the request of the bodies in charge of irrigation of the countries concerned, which are the SONADER (in Mauritania) and the SAED (in Senegal) (ECA, 2005a).

4. SOURCES

FAO. 2005. Aquastat. Available at: http://www.fao.org/nr/water/aquastat/main/index.stm [accessed 26 February 2012]

United Nations Economic Commission For Africa (ECA Office for North Africa). 2005. Water Resources Development in North Africa. Summary of the Subregional Report. Available at: www.uneca.org/na/Water.pdf [accessed 26 February 2012]

UNEP. 2010. Africa Water Atlas. Division of Early Warning and Assessment (DEWA). United Nations Environment Programme (UNEP). Nairobi, Kenya

United Nations Economic Commission for Africa (ECA). 2005. Sub Regional Report on Water Resources Development in North Africa. Available at www.uneca.org/na/Events/Attachment16.pdf [accessed 26 February 2012]