Water Risk Filter

Country Overview - Togo

Water Indicators

Indicator	Value	Description	Source
Overall Basin Risk (score)	2.84	Overall Basin Risk (score)	
Overall Basin Risk (rank)	54	Overall Basin Risk (rank)	
Physical risk (score)	2.84	Physical risk (score)	
Physical risk (rank)	71	Physical risk (rank)	
Regulatory risk (score)	3.18	Regulatory risk (score)	
Regulatory risk (rank)	46	Regulatory risk (rank)	
Reputation risk (score)	2.49	Reputation risk (score)	
Reputation risk (rank)	116	Reputation risk (rank)	
1. Quantity - Scarcity (score)	2.34	1. Quantity - Scarcity (score)	
1. Quantity - Scarcity (rank)	85	1. Quantity - Scarcity (rank)	
2. Quantity - Flooding (score)	3.59	2. Quantity - Flooding (score)	
2. Quantity - Flooding (rank)	70	2. Quantity - Flooding (rank)	
3. Quality (score)	3.37	3. Quality (score)	
3. Quality (rank)	65	3. Quality (rank)	
4. Ecosystem Service Status (score)	2.91	4. Ecosystem Service Status (score)	
4. Ecosystem Service Status (rank)	58	4. Ecosystem Service Status (rank)	
5. Enabling Environment (Policy & Laws) (score)	2.10	5. Enabling Environment (Policy & Laws) (score)	
5. Enabling Environment (Policy & Laws) (rank)	124	5. Enabling Environment (Policy & Laws) (rank)	
6. Institutions and Governance (score)	3.75	6. Institutions and Governance (score)	
6. Institutions and Governance (rank)	34	6. Institutions and Governance (rank)	
7. Management Instruments (score)	3.04	7. Management Instruments (score)	
7. Management Instruments (rank)	73	7. Management Instruments (rank)	
8 - Infrastructure & Finance (score)	4.45	8 - Infrastructure & Finance (score)	
8 - Infrastructure & Finance (rank)	23	8 - Infrastructure & Finance (rank)	
9. Cultural Diversity (score)	2.00	9. Cultural importance (score)	
9. Cultural Diversity (rank)	99	9. Cultural importance (rank)	
10. Biodiversity Importance (score)	3.43	10. Biodiversity importance (score)	

Indicator	Value	Description	Source
10. Biodiversity Importance (rank)	104	10. Biodiversity importance (rank)	
11. Media Scrutiny (score)	2.55	11. Media Scrutiny (score)	
11. Media Scrutiny (rank)	101	11. Media Scrutiny (rank)	
12. Conflict (score)	2.33	12. Conflict (score)	
12. Conflict (rank)	120	12. Conflict (rank)	
1.0 - Aridity (score)	1.64	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)	78	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)	1.00	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)	166	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)	1.01	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.

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Indicator	Value	Description	Source
1.2 - Baseline Water Stress (rank)	156	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)	2.98	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)	85	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)	1.77	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)	116	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)	4.68	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)	19	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)	3.02	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)	60	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)	3.71	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)	68	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)	1.38	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)	169	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)	3.37	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)	65	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)	3.22	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)	44	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)	1.92	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)	97	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)	3.57	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)	49	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)	123	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)	2.00	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)	117	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)	67	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)	46	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)	3.00	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)	68	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)	4.00	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)	13	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)	49	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)	3.00	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)	59	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)	3.25	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)	99	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)	26	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)	21	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)	4.00	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)	23	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)	2.00	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)	99	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)	2.82	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)	145	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)	4.05	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)	52	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)	3.00	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)	90	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)	2.00	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)	93	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)	3.00	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)	74	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)	1.65	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)	159	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 (#)	7606374	Population, total	The World Bank 2018, Data , hompage accessed 20/04/2018
GDP (current US$)	4399995987	GDP (current US$)	The World Bank 2018, Data , hompage accessed 20/04/2018
EPI 2018 score (0-100)	41.78	Environmental Performance Index	
WGI -Voice and Accountability (0-100)	38.57	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

Country Overview - Togo

Indicator	Value	Description	Source
WGI -Political stability no violence (0-100)	32.02	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)	12.98	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)	22.60	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)	27.88	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)	28.37	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)	0.12	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)	157	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)	142	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)	142	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)	142	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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Country Overview - Togo

Indicator	Value	Description	Source
Baseline Water Stress (BWS) - 2030 BAU (increasing rank describes lower risk)	143	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)	143	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)	143	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)	140	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)	139	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)	145	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.

Water Risk Filter

Country Overview - Togo

Indicator	Value	Description	Source
Total water footprint of national consumption (m3/a/cap)	990.10	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 (%)	12.22	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)	2.30	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)	7.30	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 (%)	85.58	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)	84.51	World Development Indicators	The World Bank 2018, Data , hompage accessed 20/04/2018
Total internal renewable water resources (IRWR) (10^9 m3/year)	11.50	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)	3.20	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)	11.50	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13

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Indicator	Value	Description	Source
Total renewable water resources (10^9 m3/year)	14.70	Aquastat - Water Ressources	FAO. 2016. AQUASTAT website. Food and Agriculture Organization of the United Nations (FAO). Website accessed on 2018/04/13
Dependency ratio (%)	21.77	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)	2012.00	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]	4.00	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 water system of Togo consists of three main basins, namely:
-the Volta basin, which drains 26,700km2 around the major rivers (Oti, Kara, Mo) to the northwest;
-the Mono basin, which drains 21,300km2 around the major rivers (Mono, Anié, Amu) to the southeast;
-the Togo Lake and its major rivers the Zio and Haho, which drains 8,000km2.
Two major hydro-geological formations share groundwater: the base (covering 94 per cent of the country) and the coastal sedimentary basin. The base is composed of granite-gneissic rocks and ancient sedimentary rocks (hardened) constituting discontinuous aquifers through fractures or alteration zones. The coastal sedimentary basin includes a multilayer system. Overexploited coastal aquifers become irreversibly salty by sea water intrusion, which is already the case in the aquifer around Lomé.
The internal renewable water resources are estimated to be 11.5km3/year, of which 10.8km3/year is surface water and 5.7km3/year is groundwater; 5.0km3/year is considered to be overlap between surface water and groundwater.
Rainwater resources from Togo are significant although they are unevenly distributed in time and space. The presence of the Togo Mountains, crossing Togo from side to side from northeast to southwest, provides an annual rainfall of 1,500mm at the centre of the chain and 1,000 mm at other points. In total, the rainwater volume is estimated to be 70km3 per year for the whole country, or 1.2 million m3/km2/year (PNUD, 2005).
An important part of this resource is used for biomass production (vegetation and agriculture) and some is taken up by direct evaporation or evapotranspiration. The rest seeps into aquifers or runs off the soil surface and is concentrated in the river system (PNUD, 2005).
On most of the territory, due to unfavourable geology, the groundwater resources, concentrated in fracture zones and rock weathering, are relatively scarce. However, they are most often present in sufficient quantities to supply drinking water to rural populations and secondary centres. In the coastal zone, where water demand is high, geology is more favourable: storage of water in underground aquifers is more abundant and more continuous. Across the country, the estimated annual renewable groundwater resources are 5-9km3 (PNUD, 2005).
Surface water resources of about 10km3 per year are not insignificant. Geographically, they are divided between three basins: the north basin of the Volta (47 per cent of territory and 60 per cent by surface water volume), the Mono basin (35 per cent of the territory and 34 per cent by volume), and the Togo Lake (14 per cent of the territory and 6 per cent by volume). However, the distribution of flow is, like the rain, unequal over time. The main rivers are perennial; however, the two most important, the Oti and Mono, are partially regulated, the first by the Kompienga dam in Burkina Faso and the second by a dam in Nangbéto Togolese territory; other potential sites for dams have been identified. In addition, a portion of runoff accumulates naturally in the shallows and in lagoons, and another part is retained by artificial dams (PNUD, 2005).
The sea water itself can become an exploitable resource for desalination. The rapid development of desalination technologies over the past decade has led to improvements in technology and a steady decline in production costs (investment and operating costs) to about US$1 per m3 (PNUD, 2005).

1.1.2. WATER USE

Water withdrawals were estimated to be 169 million m3 in 2002. The amount of water used in agriculture is 76 million m3 (45 per cent), comprising 46 million m3 for irrigation and 30 million m3 for livestock. Households consume 52 per cent and the mining industry 3 per cent.

1.2. WATER QUALITY, ECOSYSTEMS AND HUMAN HEALTH

Surface waters have variable mineral content. With environmental degradation, they are now subject to constant pollution and contamination especially from agriculture (fertilizers, pesticides, etc.). Groundwater is generally of good quality especially regarding its bacteriological characteristics.
According to UNEP (2010), Togo struggles to provide adequate sanitation facilities to its population. In 2008, only 12 per cent of the nation's population had access to improved sanitation facilities, with a mere 3 per cent in rural areas, where 58 per cent of the population lives. Open defecation is practised by an estimated 3.55 million people in the country – over half the population. Given a current population of 6.7 million and an annual population growth rate of 2.48 per cent, the number of people living without access to essential services such as sanitation facilities is likely to grow faster than the infrastructure needed to service them.
Low sanitation access brings a host of negative health impacts. Torpid wastewater is a breeding ground for many communicable diseases. In 2008, 367 people died from cholera, and two years earlier an outbreak killed 1,159. Children are particularly vulnerable – in 2009, Togo's child mortality rate was 79 per 1000 births. Furthermore, the percentage of years of life lost attributable to communicable diseases in 2002 was 79 per cent in Togo, compared to 59 per cent for the rest of Africa. These high rates of communicable diseases are strongly linked to the nation's low access to sanitation facilities (UNEP, 2010).

2. GOVERNANCE ASPECTS

2.1. WATER INSTITUTIONS

The main institutions involved in the water sector are:
-Ministry of Agriculture, Animal Breeding and Fisheries (MAABF), with:
•Directorate of Development and Rural Infrastructure (DAER), responsible for the design, implementation and supervision of hydro-agricultural, pastoral and forestry sectors;
•Directorate of Livestock and Fisheries (DEP), which deals with the operation of water infrastructure for livestock and fisheries;
•the Regional Directorates of Agriculture, Livestock and Fisheries (DRAEP) which are the owners representatives for the organization, operation and management of hydro-agricultural infrastructure in the regions.
-Ministry of Commerce, Industry, Transport and Development:
•Directorate of Meteorology (DM);
-Ministry of Energy and Water Resources:
•Directorate of Water (DGH), which measures and controls the use of water resources;
•Division of Water and Energy (DHE).
-Ministry of Equipment, Mines, Posts and Telecommunications:
•Directorate General of Mines and Geology (DGMG), responsible for collecting information on groundwater resources for their evaluation and rational use.
-Ministry of Health:
•Directorate General of Health;
•Safety Division and Public Health Engineering.
-Ministry of Environment and Forest Resources:
•The Environment Directorate (ED).
Several institutions are involved in a more or less independent way and without consultation in the areas of rural development and water resources. This lack of coordination among many stakeholders, facilitated by the absence of a clear policy in this area, is emerging as one of the major constraints on the development of a national policy on water resources control.

2.2. WATER MANAGEMENT

Only the rice-growing areas of Mission Tove (247 ha farmed) are managed by irrigators. An elected committee is responsible for monitoring their activities and resolving potential problems on the perimeter. At the village level, committees have been established in order to monitor people's use of boreholes for water supply in rural areas. Their role was to collect fees, and maintain and repair facilities. However, most borehole pumps no longer work.
According to the Global Water Partnership (GWP, 2008), the West African sub-region is well advanced in Integrated Water Resources Management (IWRM) through a process that was initiated in 1998 (at the West African Conference on IWRM in Ouagadougou). However, some countries are lagging behind and need support. Building on outcomes of the UNEP-2005 IWRM Target, key international and regional partners agreed on a project that will support West African countries to implement better water resources management. The seven West African countries were Côte d'Ivoire, Gambia, Guinea-Bissau, Guinea, Liberia, Sierra Leone and Togo. For Togo, this work will focus on regional guidelines on development of IWRM roadmaps and plans as well as documentation of best practices and case studies (GWP, 2008).
According to UNEP (2008), the IWRM process has reached a stage where an institutional infrastructure is operational through the Water Resources Coordination Unit (WRCU) under the Economic Community of West African States (ECOWAS). As such, the WRCU has been put in charge of implementing the Regional Action Plan on IWRM in West Africa. Through capacity building and regional partnerships, this project will support the development of national IWRM roadmaps in Gambia, Guinea, Guinea Bissau and Sierra Leone, and the implementation of the national IWRM roadmaps leading to national IWRM plans in Liberia, Togo and Côte d'Ivoire. These will have a special focus on environmental aspects (UNEP, 2008).
According to MAABF (2011), the issue of water management remains a key hindrance to improving agricultural productivity. The extensive irrigation areas set up from the 1970s and 1980s onwards are now run-down; this is the effect of the long socio-political crisis on public finances and the long suspension of development cooperation.
In addition, the effects of climate change (e.g. late rains and pockets of drought) are now greatly disrupting crops that are heavily dependent on rainfall. It is therefore important to review water management, particularly on the small scale, in order to improve agricultural productivity. In Togo, considerable potential relating to lowlands (largely underused, cheaper and easier to develop) and irrigating downstream from existing reservoirs remains unexploited, due to a lack of development and support. An estimated 860km2 of land would be suitable for irrigation and a total of 1,850km2 of lowlands is usable, of which only 290km2 has actually been developed (MAABF, 2011).
The small-scale water management intervention strategy will be based on the principles of IWRM – that is, a participatory approach involving grassroots communities in all decisions relating to the location of sites, the type of facilities to be built and the management and maintenance of infrastructure (MAABF, 2011).
Water management is provided by Togolese Water (CDD). Part of the supply comes from the Volta region in Ghana; better management of water resources in this region could increase supply for the benefit of both countries.
At present, only one in two Togolese has access to improved water and one in three to improved sanitation. The urban sanitation programme will repair pumping stations, imrpove the drainage system and construct retention basins. The IDB also plans to finance up to 88 per cent (€9.2 million) a project to improve water supply in the Kara and Savannah areas.

2.3. WATER POLICY AND LEGAL FRAMEWORK

In 1990, the National Water Committee (CNE) began to develop a water code with support from the Inter-State Committee for Hydraulic Studies (CIEH). An inter-ministerial steering committee has also been established to develop policies and strategies for IWRM.
Agricultural land reform was adopted in 1975. However, the legislation governing agricultural land

is still not operational. Similarly, an inter-ministerial committee to reflect on agricultural land policy was instituted. Finally, an environmental code developed in 1988 does not seem to be applied.
According to the Poverty Reduction Strategic Paper (2011), national water policy has been validated and adopted by the government. A draft water code and another on organization of public safe drinking water services and collective sanitation of domestic wastewaters have been adopted by the government and voted on by the national assembly. Likewise, a national IWRM action plan (PANGIRE) and a national water and sanitation sector action plan (PANSEA) have been completed and adopted. These will serve as frames of reference for planning activities in the water and sanitation sector. Within the sub-regional cooperation framework, a start has been made in Togo on the regional Improvement of Water Governance in the Volta Basin project (PAGEV) and on capacity building in techniques for using and measuring hydrological data (Volta Hydrological Cycle Observing System, or Volta-HYCOS).
National water policy is based on the recognition of the three dimensions of water: social, economic and environmental. These three dimensions are closely related, and water resources management aims to seek and maintain an appropriate balance between them (PNUD, 2005).
The basic needs of the population regarding drinking water, food security and sanitation are the basis for the social dimension of water policy (PNUD, 2005). Access to drinking water is recognized as a fundamental human right (United Nations, November 2002). This is to ensure that individuals have access to sufficient water quantity and quality to improve their living conditions and, more specifically, the health of the population, particularly that of women and children.
Regular checks of the water quality and potability will be carried out by the authorities. At all levels of resource management, the equity principle is applied: this aims to ensure equal access to water for all consumers, a fair distribution of resources, equity in the productive use of water and respect for the protection of water resources (PNUD, 2005).
The economic basis of water policy is based on two principles: water has an economic value, and supplying and maintaining it has a cost (PNUD, 2005). Because of its economic value, water can greatly help reduce poverty and promote activities which generate income. But water operations and management have a cost, which needs to be covered in order to develop sustainable water resources and maintain facilities. The total cost of water supply includes the cost of procurement itself (investment costs, operating expenses, and maintenance and resource management), opportunity costs, and external costs, including environmental factors (PNUD, 2005).
The real cost of water should entail pricing. Taking into account the cost of water also introduces the criterion of economic efficiency: it is likely to be used more effectively and less likely to be wasted (PNUD, 2005). User involvement ensures a share of capital and the total operating costs. This requirement, however, must be adapted to the financial capabilities of users, especially the poor.
The application of the economic imperative requires that any extraction of water, which is a national asset, could be subject to the payment of a fee. Similarly, the discharge of effluent, which reduces the value of the water it pollutes, should also be paid for. These charges provide essential funds for sustainable IWRM (PNUD, 2005).
For each sector and use a detailed assessment of the recovery potential needs to be made. This will establish the development costs and the expected benefits not only in terms of income for farmers, but also in terms of indirect benefits resulting from the impact on health, reducing water-borne diseases, reducing time spent fetching water, food security, improved living conditions, protecting the environment and so on (PNUD, 2005).
The basis of the environmental water policy meets the requirement of sustainable development: meeting current needs while not compromising the natural balance and the ability of future generations to meet their own needs. Water is an essential resource that must be protected, preserved and restored, taking into account environmental sustainability and ecological criteria (PNUD, 2005).

3. GEOPOLITICAL ASPECTS

Efforts are being made by Togo to achieve the joint management of international waters with neighbouring countries. Togo and Benin signed an agreement signed in Cotonou on 27 July 1968 on a common structure for electricity production, importation and distribution between the two countries. Subsequently, as a result of this, the two countries have begun a joint hydro-agricultural development project around the Mono River. A draft integrated management of the Volta river basin is under consideration.
The hydrographical basin of the Volta River covers a surface area of about 414,000km2, and encompasses six West African countries: Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo. Total basin population is currently estimated at 14 million inhabitants, but the region is under high demographic pressure, with a growth rate estimated at 2.9 per cent per year. The extremely low incomes of much of the population result in overexploitation of the natural resources of the basin, seriously affecting the sustainable development of the region (GCI, 2002).
Of all the basin's natural resources, water resources constitute the main pillar around which the development of the diverse sectors of the countries' economies should be built. Unfortunately this also means that water is the element around which there are potential conflicts between different states and stakeholders (GCI, 2002).
The basin rainfall varies from north to south between 400mm in the north of Burkina Faso to 1,800mm in the coastal zone. The annual average evapotranspiration varies from 2,500mm in the north of the basin to 1,800mm in the coastal zone. The main waterways are the Mouhoun (Black Volta), the Nakambé (White Volta), the Nazinon (Red Volta), the Sourou, the Sissili, the Oti and the Pendjari (GCI, 2002).
The most significant water-consuming towns of the basin are Bobo-Dioulasso and Ouagadougou in Burkina Faso, Bolgatanga, Tamalé and Kumassi in Ghana, Natitingou in Benin and Sokodé in Togo. Their safe water supply is generally secured from a combination of surface and underground water resources (GCI, 2002).
Following the successive dry periods of the last decades, coupled with the increasing demographic pressure, a number of ecological balances are threatened. The impact of the combination of climate factors and increased population on the exploitation of the basin waters can be seen in:

•Diminution of water resources following climate change and the increase of demand;
•Damage to water resource quality by the increased use of chemical products (pesticides, chemical fertilizers, etc.);
•Drying up of wet zones;
•Silting up and sandbanking of water courses due to the acceleration of different types of erosion;
•Disappearance of some plant and animal species in some zones and the appearance of non-native species around water projects and waterways;
•Deforestation, bringing about damage to soil and a loss of biodiversity. (GCI, 2002)
The main problems related to water resources within the basin and to which special attention should be paid in view of their direct and indirect impacts are:
•Quantitative reduction in water resources owing to the rain shortages occurring over the last three decades. These also have repercussions on the optimum filling of the reservoirs in the basin and jeopardize the original objectives of these works (electricity production, drinking water supply, irrigation, etc.);
•Change of the hydrological regime of the basin waterways after the construction of big infrastructure projects, that can be sources of floods, water logging and water-borne diseases;
•Proliferation of aquatic plants at the site of large hydro projects that affect all waterways of the basin;
•Pollution of water by household waste, mainly resulting from the accelerated and uncontrolled development of the cities of the basin;
•Non-existence of appropriate legal and institutional agreements and mechanisms for the management of shared water resources or water-related conflict prevention/resolution;
•Lack of involvement of civil society in the vital decision-making process related to water. (GCI, 2002)
If the observed climate trends continue, the socioeconomic characteristics of the basin (high population growth, strong pressure on natural resources and poverty) could turn the above-identified problems into serious conflicts between the countries that share the basin water resources (GCI, 2002).
The decreasing availability of freshwater in the basin is already a major issue between Burkina Faso and Ghana, which together occupy more than 80 per cent of the basin, and, to a lesser degree, between Burkina Faso and Togo (GCI, 2002).
Following the record low rainfall in the basin in 1997, the absence of an appropriate framework for coordination and cooperation between the states led directly to conflicting relations between up- and downstream countries, fostering mutual suspicion and inaccurate reports of the activities of different riparian states (GCI, 2002).
The main solution to potential conflicts resides in the capacity of the countries to set up the appropriate mechanisms and frameworks to acquire greater knowledge of environmental problems and the necessary tools for a mutually advantageous joint management of water resources (GCI, 2002).

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