



University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE
INTEGRATION AND APPLICATION NETWORK



LOWER KAFUE RIVER BASIN



2019
REPORT CARD
ZAMBIA



The Lower Kafue sub catchment lying between Itezhi tezhi dam and the confluence of the Kafue with the Zambezi river at Chiawa, Chirundu District is a very important river reach providing livelihoods to a wide range of sectors. Lusaka the capital of Zambia is part of the sub catchment which also comprise part of the Kafue National Park, Kafue Flats, hydropower stations and two Ramsar sites (Lochinvar and Blue Lagoon wetlands). The sub catchment also supports huge irrigation schemes owned by Zambia Sugar and its out growers as well as many other industries and business deriving ecosystem services. The area is also home to millions of indigenous people involved in crop and livestock farming located along the Kafue river basin. The sub catchment is home to about 5-6 million people all deriving ecosystem services each day.

The sub catchment also faces numerous threats, risks and negative impacts due to pressure exerted by the huge population of people as they exploit various natural resources and ecosystem services. Some of the negative impacts include poaching, encroachment into the game management areas, deforestation, inequitable water allocation, disease burden amongst many others. These impacts have negatively affected the health of the lower Kafue basin in some cases. To ensure a health Lower Kafue sub catchment, catchment protection and restoration interventions must be implemented and periodic monitoring of progress of these interventions is imperative to ensure sustainable water resources and environmental management.

The Lower Kafue river basin health report card provides an opportunity for river health monitoring in order to enhance catchment protection and sustainable resource use. Implementation and launching of the health report card is a key step toward fulfillment of WARMA's mandate to ensure implementation of meaningful catchment protection and restoration interventions in line with the water resources management Act no. 21 of 2011.

Eng. Kenneth Nyundu
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KAFUE RIVER BASIN: OVERVIEW

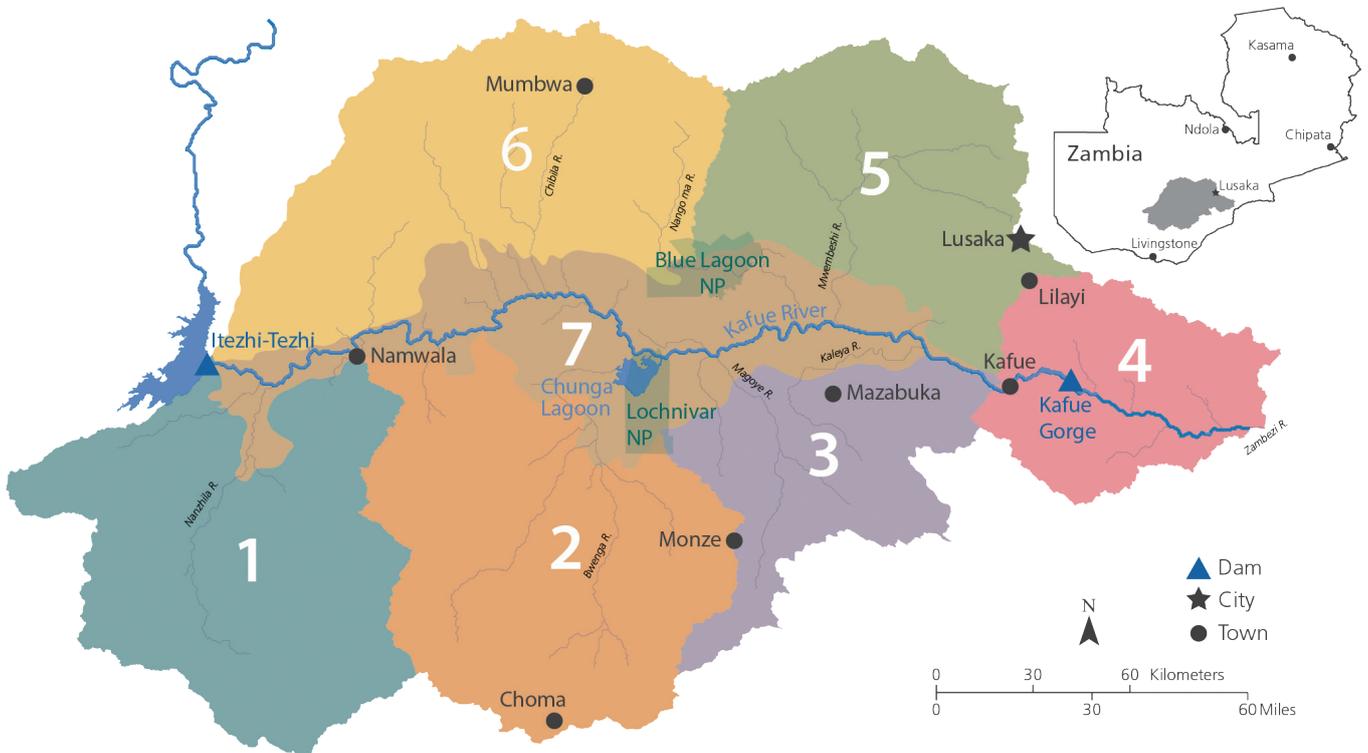
The Kafue River is the longest tributary of the Zambezi, and its catchment is entirely located within Zambia (1,576 km in length; catchment area of 156,000km²). The topography of the headwater area of the Kafue River is gently undulating, with many dambos. The water bodies found in the basin include the Kafue River, its tributaries, reservoirs and the Kafue Flats wetland. The natural flow regime of the Kafue River, especially the Kafue Flats area, is regulated by two major dams that have been built for hydropower generation. Estimates from the wet season suggest that 75 per cent of the water flowing in the river's main channel (as it exits the Flats) flows into the highly productive floodplain. This exchange between the floodplain and river plays an important role in supporting the wildlife, fish and birds that depend on the floodplain for part of their life cycle, as well as the nutrient and carbon export to the river's main channel and out of the wetland.

The condition of the Kafue River declines below the Itezhi-tezhi Dam due to flow manipulations that reduce flooding of the Kafue Flats and creates abnormally high flows in the dry season. As the river flows east it is further impacted by agricultural and mining activities and artificial inundation of the Flats by the Kafue Gorge reservoir.

Runoff from the Kafue basin is highly modified by the operation of Itezhi-tezhi and Kafue Gorge Upper dams for hydropower production. The current operating conditions for the Itezhi-tezhi Dam provide for a minimum flow release of 25 m³/s, and an "ecological freshet" of 300 m³/s for a four-week period (typically March). This release has occurred fairly consistently over the past decade, except during low rainfall conditions. In terms of flood dynamics, the new rules were found to be an improvement, as a larger area is flooded in the wet season while on the other hand, a larger area falls dry in the dry season. However, the regime was still far from mimicking natural flows.

More than half the population of Zambia live within the Kafue River catchment area.

The area being assessed by this report card includes the river and sub-basins below Itezhi-tezhi Dam through the Kafue Flats to the Kafue Gorge Dam (herein called the Lower Kafue River Basin).



The Lower Kafue River flows west to east from the Itezhi-tezhi Dam to the Kafue Gorge Dam. White numbers represent reporting regions for the report card.

WHAT IS A **BASIN REPORT CARD**?

River basin report cards are assessment and communication products that compare ecological, social, and/or economic information against predefined goals or objectives.

Similar to school report cards, river basin report cards provide performance-driven numeric grades or letters that reflect the status of a river basin on a regular basis. They effectively integrate and synthesize large, and often complex, information into simple scores that can be communicated to decision-makers and the general public.

Report cards have been shown to be a powerful instrument to describe ecosystem status, increase public awareness, and inform and influence decision-makers to take action to improve or maintain the health of a river basin.

The process of developing report cards is highly participatory and includes the following five steps: i) identification of values and threats, ii) selection of indicators, iii) definition of thresholds, iv) calculation of scores, and v) communication of results.

The Lower Kafue River Basin Report Card was jointly developed by World Wide Fund for Nature - Zambia Programme Office, and specialists from World

Wildlife Fund-US, the University of Maryland Center for Environmental Science, and the Zambian Water Resources Management Authority (WARMA).

The Lower Kafue River Basin Report Card was created through a series of stakeholder workshops with representatives of Zambian government agencies, academic institutions, NGO representatives, community based organizations, and the private sector. During the stakeholder workshops, many indicators were selected to be included in the report card. After compiling the best available data, 16 indicators were assessed by comparing each indicator with its threshold and designating a report card grade.

The Lower Kafue River Basin was divided into 7 regions based on hydrological units delineated by WARMA. The assessment was then conducted for each indicator at the region level and entire basin level.

The Lower Kafue River Basin Report Card represents the first of its kind for the basin and can be updated and improved as needed to best represent the status of the basin.

This first report card will serve as baseline to measure change in the future in response to management actions, inform policy and planning within the basin. It will also be incorporated as part of the monitoring and evaluation framework for the basin.



DEVELOPING THE LOWER KAFUE RIVER BASIN REPORT CARD

Stakeholders throughout the Lower Kafue River Basin (39 representatives from 29 organizations) identified the most important values of the basin and determined key threats to these values during a workshop held on 5-7 March 2018 in Monze, Zambia. The values and threats were grouped into the following categories: Water Quality and Quantity; Management and Governance; Society and Culture; Human Health and Nutrition; Landscapes and Ecology; and Economy.

For each category, several indicators were identified that could be used to calculate the status of basin health. Unfortunately, data were not available for all proposed indicators as outlined in the table to the right.

The indicators with sufficient data were related to water quality and quantity, human health and nutrition, management and governance, landscapes and ecology, and economy. No data were able to be sourced to represent social and cultural indicators. These indicators form the basis of the Lower Kafue River Basin Health Report Card.

A number of indicators also directly represent changes in climate such as the precipitation index, climate change preparedness, temperature, and soil moisture.

Category	Indicator	Included?
Water Quality & Quantity	Environmental flows	✓
	Precipitation Index	✓
	Streamflow Index	✓
	Water quality	✗
	Water availability stress	✗
	Groundwater levels	✗
Human Health & Nutrition	Disease burden	✓
	Severe malnutrition	✓
	Access to sanitation	✓
	Tick-borne disease outbreaks	✗
	Access to clean drinking water	✗
Management & Governance	Funding for water and fishery management	✓
	Poaching	✗
	Climate change preparedness	✗
	Monitoring of regulations	✗
Landscapes and Ecology	Temperature	✓
	Soil moisture	✓
	Wetland birds	✓
	Lechewe population	✓
	Vegetation health	✓
	Wetland and forest loss	✗
Economy	Crop Value	✓
	Fishery production	✓
	Hotel occupancy rates	✓
	Tourism employment	✗
	No. of livestock	✗
	Energy demand met	✗
Society & Culture	No. of fishers and pastoralists	✗
	Cultural events and traditional ceremonies	✗



INDICATORS AND METHODS USED TO ASSESS HEALTH



Water Quality & Quantity

Environmental flows: Flow of the Lower Kafue River between years 1977 and 2013 measured using Level and Q_{mean} against the target flow of 300 cumecs (March freshet). This Indicator was restricted to Region 7 (Kafue Flats).

Precipitation: Standardized Precipitation Index (SPI) was used to characterize meteorological drought on a range of timescales. SPI values from 2016-2018 were compared to 20 years of historical SPI values (1986-2006). This data was validated to observed rainfall data by the Zambian Meteorological Department.

Streamflow: A cumulative streamflow index representing the deficit of streamflow below a long-term average was used to assess streamflow. Streamflow index values sourced from the Variable Infiltration Capacity land surface model from 2016-2018 were compared to historical values (1986-2006).



Economy

Hotel occupancy rates: Hotel occupancy rates were assessed as the number of hotel clients between 2014-2017, as a percentage of total hotel beds available throughout that timeframe. Data was only available for Lusaka (Region 4 & 5), Mazabuka (Region 3, 4, & 7), Monze (Region 2, 3 & 7), and Choma (Region 2 & 3).

Fishery production: Annual fishery production data are available for Kafue Flats (Region 7) from 1974-2017. The average fishery production for the period 2015-2017 was compared against the 80th percentile of fishery production from 1974-2014.

Aquaculture production: Average aquaculture production for the period 2011-2013 was compared against the 80th percentile of aquaculture production from 2003-2010. Data was only available for Kafue Flats (Region 7).

Crop value: Annual crop value per region in 2018 as a percentage of maximum crop value between 2015-2017 for respective regions. Data were only available for 2015-2018.



Management & Governance

Funding for water and fishery management: Approved budget allocated for water and fisheries management, as a percentage of total budget requested, for the years 2013-2015. This was a national dataset and was therefore applied uniformly across all regions.



Landscapes & Ecology

Temperature: Surface temperature data from 2016-2018 was compared to 20 years of historical data (1986-2006). This data was acquired through remote sensing technologies and validated with observed data from the Zambian Meteorological Department.

Soil moisture: A soil moisture index representing daily average soil moisture as a function of historical simulations was used to assess soil moisture and water availability to crops. Soil moisture index values the Variable Infiltration Capacity land surface model from 2016-2018 were compared to historical values (1986-2006).

Wetland birds: The average abundance of seven wetland bird species between 2015-2018 was assessed as a percentage of historical wetland bird abundance (2001-2014). Wetland birds are restricted to the waterlogged environments found in the Kafue Flats, and hence a score was only possible for Region 7.

Lechwe population: Abundance of Lechwe (a water dependent type of antelope) in 2015 was assessed as a percentage of historical Lechwe abundance (1970-1975 average). Lechwe are restricted to the waterlogged environments found in the Kafue Flats, and hence a score was only possible for Region 7.

Vegetation health: The normalized difference vegetation index (NDVI) was used to assess vegetation health. NDVI is an analysis of remote sensing measurements for live green vegetation ranging from 0 (bare soil) - 1 (healthy vegetation). The average NDVI value between 2015-2018 for each region was assessed against a scale of minimum and maximum NDVI values from 2003 - 2014.



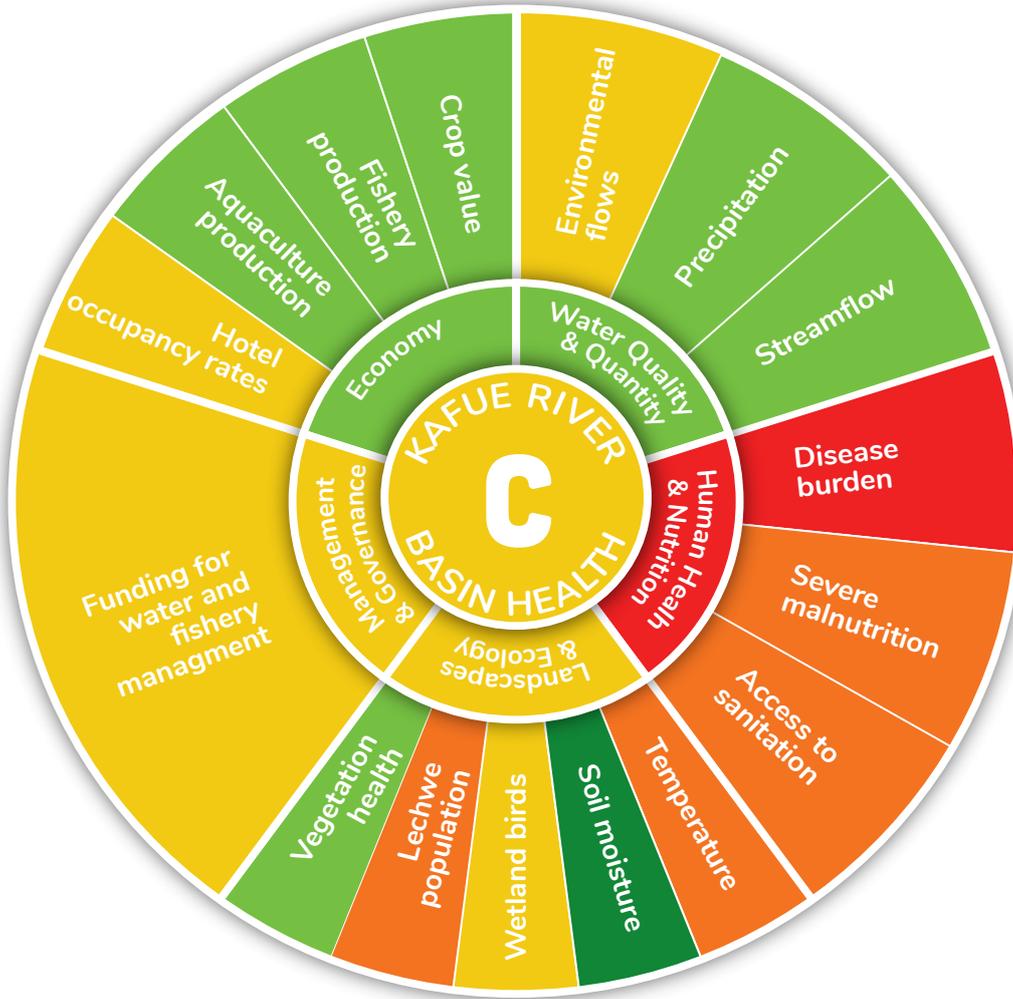
Human Health & Nutrition

Disease burden: The combined incidence of Bilharzia, diarrhea (non-bloody), and dysentery cases were assessed for each region between 2015-2017 as a percentage of the lower 20th percentile of historical cases (1999-2014).

Severe malnutrition: The number of cases of severe malnutrition for the period 2015-2017 as a percentage of historical cases (1994-2014).

Access to sanitation: The percentage of population with access to a centralized sewage system, septic system or flushing toilets and latrines. Access of 100% was assigned a report card score of A+, whereas access <80% was a Fail (F), based on NWASCO 2018 guidelines.

STATUS OF THE LOWER KAFUE RIVER BASIN

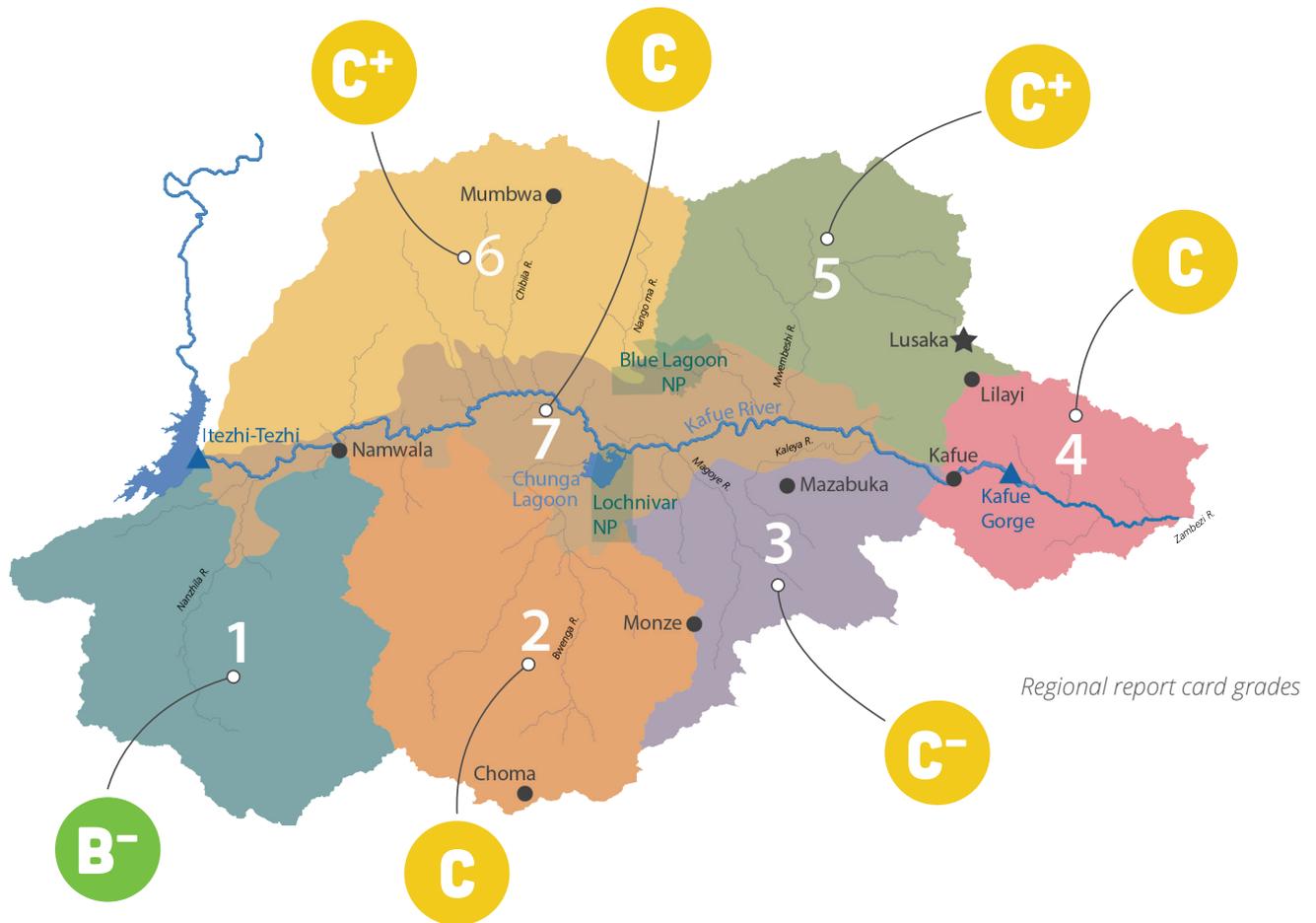


Overall results for the Lower Kafue River Basin, indicator categories, and individual categories.

What do the grades mean?

A	80–100%	Excellent	$A^+ \geq 95\%$ $A^- \leq 85\%$	All indicators meet objectives. Indicators in these locations tend to be very good, most often leading to preferred conditions.
B	60 – <80%	Good	$B^+ \geq 75\%$ $B^- \leq 65\%$	Most indicators meet objectives. Indicators in these locations tend to be good, often leading to acceptable conditions.
C	40 – <60%	Moderate	$C^+ \geq 55\%$ $C^- \leq 45\%$	There is a mix of some indicators that meet objectives, and others that do not. Indicators in these locations tend to be fair, leading to sufficient conditions.
D	20 – <40%	Poor	$D^+ \geq 35\%$ $D^- \leq 25\%$	Some or few indicators meet objectives. Indicators in these locations tend to be poor, often leading to degraded conditions.
F	<20%	Fail		Very few or no indicators meet objectives. Indicators in these locations tend to be very poor, most often leading to unacceptable conditions.

REGIONAL GRADES RANGE FROM B⁻ TO C⁻



Overall, the Lower Kafue Basin scored a C. This means that some of the indicators meet objectives but others do not. The indicator categories that performed best were Economy and Water Quality & Quantity. Indicators within these categories demonstrated good condition for precipitation and corresponding streamflow within the basin, resulting in overall good crop value, and fishery and aquaculture production. However, condition of these indicators did vary amongst individual sub-basins as shown on page 8.

Management and Governance was in moderate condition, however this was limited to one indicator and results were not able to be differentiated amongst regions. Suitable data and/or thresholds were not able to be sourced for the other indicators suggested for this category which included poaching, climate change preparedness, and monitoring of regulations.

Landscapes and Ecology was also in moderate condition for the Lower Kafue River Basin, but indicators within this with category showed variable results ranging from excellent for Soil Moisture, to poor for Lechwe Population and air temperature.

The poorest performing category was Human Health & Nutrition based on poor access to sanitation, severe malnutrition, and a failing condition for disease burden.

Regionally, grades did not show a great deal of variability, though a trend was evident from west to east, particularly south of the Kafue River where grades were highest in the west (Region 1 - Nanzhila) and lowest in the east (Region 3 - Magoye). Notable results include consistently failing results for Disease Burden across all regions, poor results for Temperature in all regions (except region 4 - moderate), and variable rates of precipitation and crop value across the regions.

Region 1 (Nanzhila) received the highest grade due to excellent scores for streamflow, soil moisture and crop value. Regions 5 (Mwembeshi) and 6 (Nangoma) both received a C+ due to good to excellent scores for streamflow and soil moisture, but were differentiated from other regions due to good scores for Access to Sanitation and Tourist Occupancy Rates in Region 5 (closest to the capital Lusaka), and excellent precipitation in Region 6, the most northerly of the regions. Regions 2, 3 and 4 (located in the south-east) all showed poor precipitation scores.

Region 7 (Kafue Flats) received a moderate score of C and was the most data rich region examined with data available for all 16 indicators. These indicators suggest that the Lechwe population is in decline, while crop value is excellent within the region.

REPORT CARD SCORES AND ASSIGNED GRADES

Category	Indicator name	Region							Indicator score and grade*	Category score and grade	Basin score and grade
		1	2	3	4	5	6	7			
Water Quality & Quantity	Environmental flows							43	43 C-	62 B-	49 C
	Precipitation Index	75	56	50	53	67	100	67	70 B		
	Streamflow Index	85	62	65	76	91	62	71	73 B		
Human Health & Nutrition	Disease burden	0	0	0	0	0	0	0	0 F	15 F	
	Severe malnutrition	44	52	0	0	0	21	0	21 D-		
	Access to sanitation	7	21	19	37	82	0	15	23 D-		
Landscapes & Ecology	Temperature	29	25	39	56	32	38	28	33 D-	52 C	
	Soil moisture	91	94	79	74	94	74	94	87 A		
	Wetland bird population							50	50 C		
	Lechwe population							30	30 D		
	Vegetation health	76	63	48	64	63	51	51	60 B-		
Management & Governance	Funding for water management	52	52	52	52	52	52	52	52 C	51 C	
Economy	Tourist occupancy rates		46	45	58	76		45	54	67 C+	
	Fishery production							72	72		
	Aquaculture production							61	61		
	Crop value	100	72	63	40	46	100	100	79 B+		
Regional score and grade**		63 B-	51 C	45 C-	48 C	56 C+	59 C+	48 C			

* Overall indicator scores are area weighted averages, based on the size of the regions

** Overall regional scores are calculated as the average of the average category scores

Grey fill indicates data not available and/or indicator not relevant to that region

REGIONAL FINDINGS

REGION 1 - NANZHILA

B-

This region had the highest score of any of the reporting regions. The main human activities in this region include tourism, livestock herding, subsistence agriculture and fishing. Access to sanitation has the lowest score across indicators and crop value has the highest. Vegetation health strongly correlates with the soil moisture in this region. Being a largely rural sub-basin, most of the indicators point towards limited human impact on the health of the river.

REGION 2 - BWENGWA

C

Region 2 scored an average C, and is home to the provincial capital of Choma. With part of Monze, this region has a combination of urban and rural activities, including both commercial and subsistence agriculture. Bwengwa is one of the drier regions in terms of precipitation index, and has average scores for tourist occupancy rates and severe malnutrition. Access to sanitation is poor in this region.

REGION 3 - MAGOYE

C-

The Magoye region had the lowest average score of C-. This could be due to the increased human activities within this region, including the town of Mazabuka which is a hub of economic activity. Magoye had the lowest vegetation health, corresponding with land cleared for agriculture and other human related activities. In 2019, the alarming rate of degradation in the Magoye region was confirmed, as a result of sand mining and pollution from molasses discharge.

REGION 4 - KAFUE

C

The eastern most region, Kafue, has an average score of C. The activities in this region are mainly human driven with economic hubs such as the town of Kafue. Kafue is also a fairly industrial town with very close proximity to the main stem of the Kafue River. The tourist occupancy rate of Kafue region is second highest, indicative of the higher economic activity as well as proximity to the national capital city. Agricultural activity is limited in the region and this is exemplified by it having the lowest crop value score.

REGION 5 - MWEMBESHI

C+

Mwembeshi region is one of two that had the highest average score. Some of the indicators improving the average for the region were access to sanitation and tourist occupancy rates. The capital city of Lusaka is partly within this region which explains the high scores of the aforementioned indicators. The main human activities include subsistence and commercial farming, market driven and industrial activities, and urban centers with associated activities.

REGION 6 - NANGOMA

C+

The Nangoma region also has an average score of C+ which was the highest. One of the indicators driving up the average of the region was precipitation index which was at 100%. Nangoma is a region that is largely rural with spotted urban centers and economic activities involving commercial and subsistence farming and wildlife economy. Crop value indicator is 100% which tallies with the amount of agricultural activity as well as precipitation in the region.

REGION 7 - KAFUE FLATS

C

The Kafue Flats are considered the blue heart of the entire lower Kafue. The Flats run across the entire basin cutting across all region and running along the river's main stem. The Flats is the only region that had data available, and hence a score, for environmental flows, wetland bird population, fishery production, and aquaculture production. The ecological integrity of the Flats has a big impact on the health of the lower Kafue basin. The lechwe population is fast declining and is impacted by human activities such as poaching and changes in hydrology that has impacted habitat which are likely impacting wetland bird populations as well. The fishery is still very productive with a B, however environmental flows are not consistently meeting their required levels.

CONCLUSIONS

Following a methodology and approach that has been used in several other basins around the world, the Lower Kafue River Basin Report Card has been developed for the first time to assess the current status of the basin and to develop recommendations for improving its health; as well as supporting implementation of the Lower Kafue Catchment Management Plan.

Indicators were selected based on the most important issues within the Kafue River Basin and data availability, and results provide a baseline for measuring basin health into the future as well as the effects of any measures taken to improve or maintain basin Health. Hence, the Lower Kafue River Basin Report Card has relevance to policy actions at local, regional and national levels.

The Kafue River Basin has been evaluated in this assessment as “moderate” health or ‘C’. The results indicate parts of the basin are in relatively good health, particularly Region I. However, the results indicate urgent management interventions are required to address the following findings:

- Insufficient water quality data across all regions
- Elevated disease burden in all regions
- Widespread severe malnutrition, particularly problematic in Regions 3-7
- Insufficient access to sanitation in all regions, except Region 5
- Elevated temperatures across the basin which are linked to climate change impacts and the need for clear nature-based adaptation strategies
- Decreased populations of wetland birds and lechwe in the Kafue Flats
- Moderate funding being made available for water and fishery management
- Insufficient data available for a number of indicators including wetland birds, lechwe, fishery production and aquaculture production outside of the Kafue Flats region



WARMA STRATEGIC ACTIONS

1. To safeguard and restore the endemic keystone species, Kafue Lechwe, the underlying factors of poaching, habitat degradation and changes in hydrology need to be addressed. Strengthening community based natural resource management initiatives and efforts to curb alien invasive species, such as Mimosa Pigra, are key.
2. Implementation of existing policy frameworks such as Water Resource Protected Areas to identify critical areas for protection through collective and concerted catchment protection interventions such as afforestation and reforestation is critical to arrest the ongoing degradation of sub-catchments and enhancing security of water supply.
3. Funding on water resources governance should increase as this clearly has an impact on the mandated institutions' capacity for effective regulation, management and service delivery. In addition to this, innovative partnerships should be fostered with non-traditional partners and through initiatives such as WWF's Bankable Water Solutions, to access additional resourcing for projects where government funding is inadequate.
4. A comprehensive hydrogeological assessment of the catchment is still needed to map and quantify both surface and groundwater in the catchment to create an accurate picture of water availability and inform water auditing. The Lower Kafue basin's complicated hydrological system has contributed to this being a longstanding information gap.
5. Although environmental flows have been variously implemented in the Lower Kafue sub-basin, several literature references generally point to the inadequacy of the 300m³/s freshet. With the beginning of operations at the Itezhi-tezhi hydropower scheme, the sub-daily flow regime has also been further compromised. There is therefore, need for a comprehensive environmental flows assessment on the Kafue River that will in turn inform the regime of release of the environmental reserve, inform water allocation to the different sectors and general flow management across the entire sub-basin.
6. The private sector has a very important role to play in improving the management of water resources in the Lower Kafue through water stewardship practices that include the use of tools like the Water Risk Filter and uptake of international standards like the Alliance for Water Stewardship. Private sector actors can:
 - i. support focused data collection of parameters, such as water quality and quantities;
 - ii. self-organize and hold each other accountable through sustainable production systems through private sector platforms, like Kafue Flats Joint Action Group (KFJAG), to support and complement government efforts;
 - iii. invest in the basin's natural infrastructure, not only to derive a positive return on investment through bankable projects, but as well to have a positive impact on water security, the ecosystem and local livelihoods.
7. In order to address human nutrition issues in the basin, climate smart agriculture solutions and innovations are required as well as investments in simple water harvesting infrastructure. The lower Kafue basin is prone to dry spells, which in turn create a negative impact on food security and nutrition in the basin. Scaling up conservation agricultural practices and efforts can help to address human nutritional issues and ensure food security and overall contribute to the attainment of SDG 2.
8. Citizen science can help bridge the monitoring information gap and supplement data collection by mandated institutions as well as increase grassroots involvement in water resources governance. The Water Users Associations being set up by WARMA can be the platform for coordinating communities' active engagement in citizen science.
9. As WARMA, intend to broker and foster innovative partnerships with civil society, the private sector, communities and educational institutions to engage in climate change mitigation and adaption projects e.g. general catchment protection initiatives prioritizing Magoye and Kaleya Rivers, ecosystem based adaption, and payment for ecosystems services schemes.
10. The Basin Health Report Card process should be repeated every three to four years in order to monitor and evaluate effectiveness of the implementation off management interventions under the Lower Kafue Catchment Management Plan. Robust data collection in between report cards will help improve the quality of each subsequent report.

COMMUNITY MOBILIZATION AND INFORMATION SHARING IN SELECTED DISTRICTS OF LOWER KAFUE BASIN

In order to raise awareness on the Basin Health Report Card process, and disseminate information about the findings, Water Resources Management Authority (WARMA) and WWF Zambia collaborated with a local civil society organization, Peoples' Action Forum (PAF), to engage communities in selected districts: Monze (located in Region 2), Mazabuka (located in Region 3), Kafue (located in Region 5), Mumbwa (located in Region 6) and Namwala (located in Region 7), as these are dependent on the Lower Kafue River.

The core objectives for conducting community mobilization and information dissemination were to:

1. Compare the findings of the Basin Health Report Card with indigenous knowledge with specific focus on the change and status of indicators monitored over time.
2. Assess the level of understanding of the communities on the drivers that lead to water resources degradation in the Lower Kafue sub-basin
3. Lobby and advocate for community action as well as participation in addressing the drivers leading to the degradation of the Lower Kafue basin.
4. Prepare communities for further engagement in water resources management through government mandated structures.
5. Prepare communities for the launch of the Basin Health Report Card for the Lower Kafue basin.

The primary target groups were traditional leaders and the local community members who are the immediate owners of the water resources, as well as the direct beneficiaries. PAF and WARMA, with support from WWF Zambia, paid courtesy calls to district governance officers including District Commissioners, Council Chairpersons and Chiefs. The opportunity was used to visit key stakeholders including the Department of National Parks and Wildlife, Department of Fisheries, Forestry Department, Chiefs Affairs, Community Development Departments, District Health, the Council Chairperson for each of the aforementioned districts.

During the meetings, it was encouraging to learn that community members were familiar and conversant with the indicators that were monitored during the Basin Health Report Card creation process, thus validating the values communicated through stakeholders.

The process resulted in community members, as well as their traditional and political leaders, articulating some of the drivers that lead to degradation, which included poverty and limited skills. Community members were given a platform to suggest possible interventions to mitigate negative activities such as deforestation, poaching, unsustainable fishing, charcoal burning and water pollution. It was also encouraging to learn that community members were willing to engage in new livelihood activities such as beekeeping, gardening, fruit tree planting, chicken rearing, goat keeping, pig keeping and aquaculture.

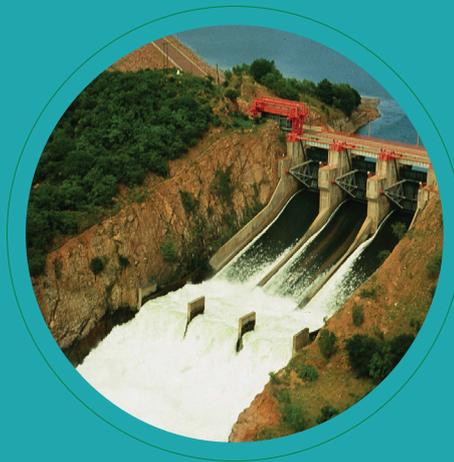
Information contained in the Basin Health Report Card is enabling them to participate and take ownership in managing water resources and recommending better ways of managing these resources. It will also give a voice to community members to speak and recommend workable ways of managing these indicators to policy and decision makers, through the Basin Health Report Card.



The Lower Kafue Sub Catchment Manager from WARMA, Mr. Chipo Gift Mubambe on the left, enlightening Chief Mukobela of Namwala District on the Basin Health Report Card process at his palace before meeting his community leadership team and community members.



People's Action Forum's Project Manager, Ms Janet Nyoni assessing the level of understanding of the community leadership team and the community members on the drivers that lead to natural resources degradation in the Lower Kafue River sub-basin.



ACKNOWLEDGMENTS

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