



Study on Demarcation of Catchment Management Areas

Overlaying of Maps Report





- 1. Introduction**
- 2. Background**
- 3. Constraints analysis**
- 4. Catchment Management Areas (CMAs);
formulated options**
- 5. Final remarks**



I. INTRODUCTION



CURRENT WORK PHASE

- Deliverable 2 (D-2):
Overlaying of Maps Report

Phases	Months												
	1	2	3	4	5	6	7	8	9	10	11	12	
Phase 1 – Planning and data collection													
D-1: Inception Report													
Phase 2 – Mapping													
D-2: Overlaying of Maps Report													
D-3: Stakeholder Survey Templates Report													
Phase 3 - Discussion of catchment areas management approaches													
D-4: Consultation Report													
Phase 4 - Consolidated catchment management strategy													
D-5: Draft Final Report													
Phase 5 - Strategy presentation and validation													
D-6: Final Report													





MAIN CONCEPTS

- **Catchment Management Areas (CMAs):**
planning units for managing water resources at the lowest level. The CMAs might be defined upon different criteria considering the physical, administrative and political context;
- **Catchment Management Committees (CMCs):**
decentralised bodies, constituted by representatives of different stakeholders' groups, that will be responsible for local level planning, control and monitoring of the CMAs water resources;

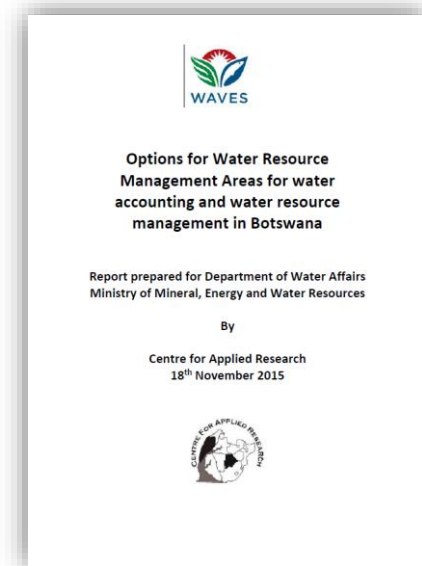
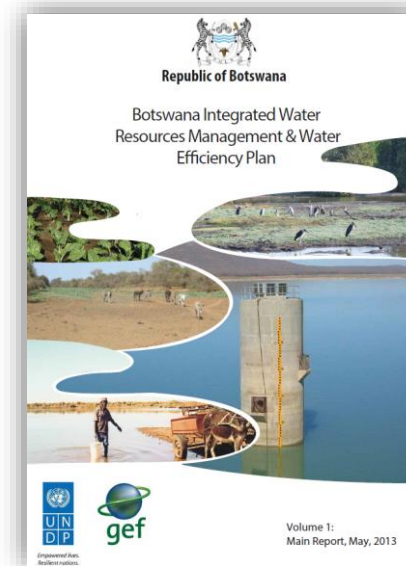


2. BACKGROUND

CONTEXTUAL BACKGROUND



- IWRM-WE (2013) Plan strategic area 5: implementation of a catchment management approach;
- In line with water sector reforms and water sector policy, including international;
- Currently there are no clearly set out CMAs;
- Initial works, such as: “Options for Water Resource Management Areas for Water Accounting and Water Resource Management in Botswana” (CAR, 2015).





3. CONSTRAINTS ANALYSIS

GIS ANALYSIS



- Demarcation of CMAs depends on different factors;
- The articulation and analysis of the different constraints was achieved through the implementations of GIS.

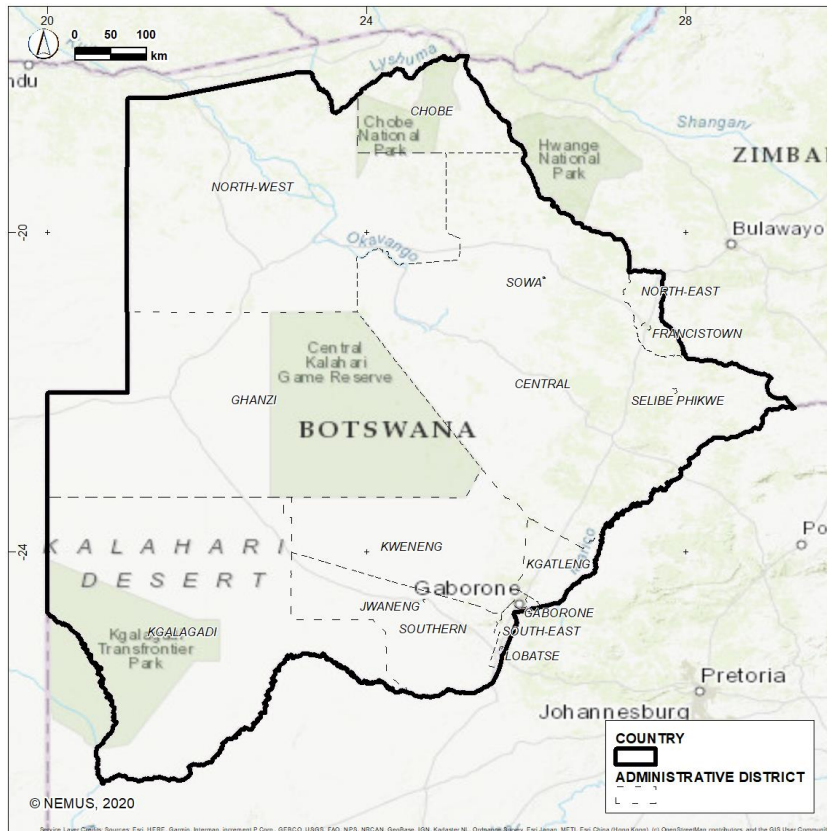
GIS data to the demarcation of CMAs

Subject	Coverage	Data source
Governance framework	Administrative regions	GADM (2019)
	DWS regional offices	DWS (2015)
	Planning regions	NSP (2018)
	Agricultural districts	CAR (2015)
Water resources and water availability	WUC Management Centres	WUC (2016)
	Hydrological regions and transboundary catchments in HydroSHEDS, version 1.0	WWF (2019)
	Groundwater aquifer type and productivity	BGS (2019)

GOVERNANCE FRAMEWORK (1/2)

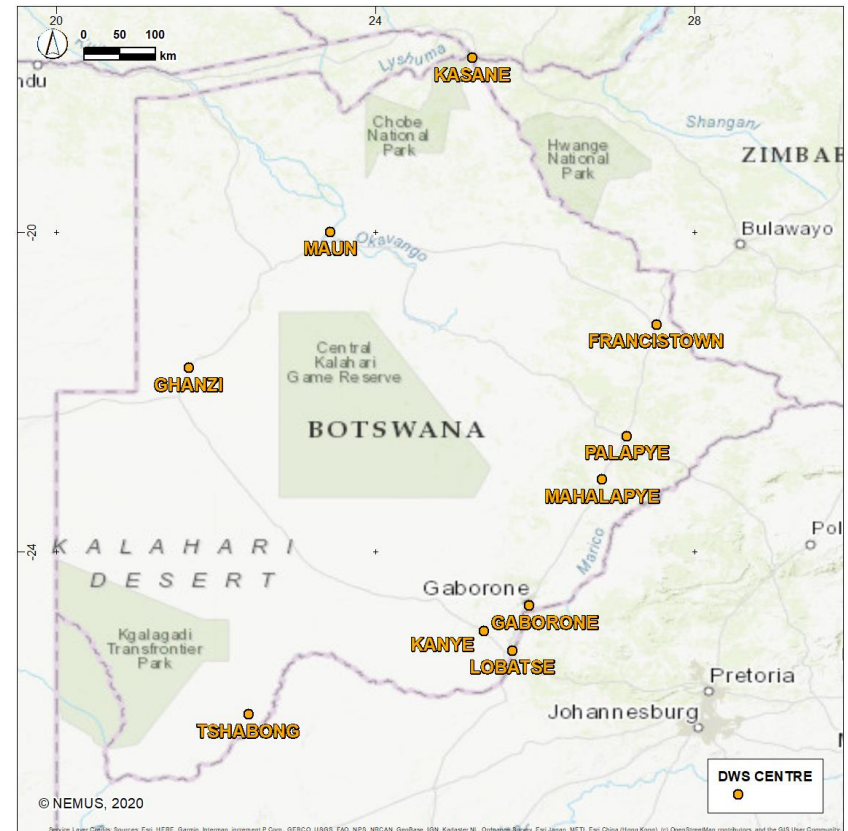


Administrative districts



Data source: GADM (2019)

DWS regional offices

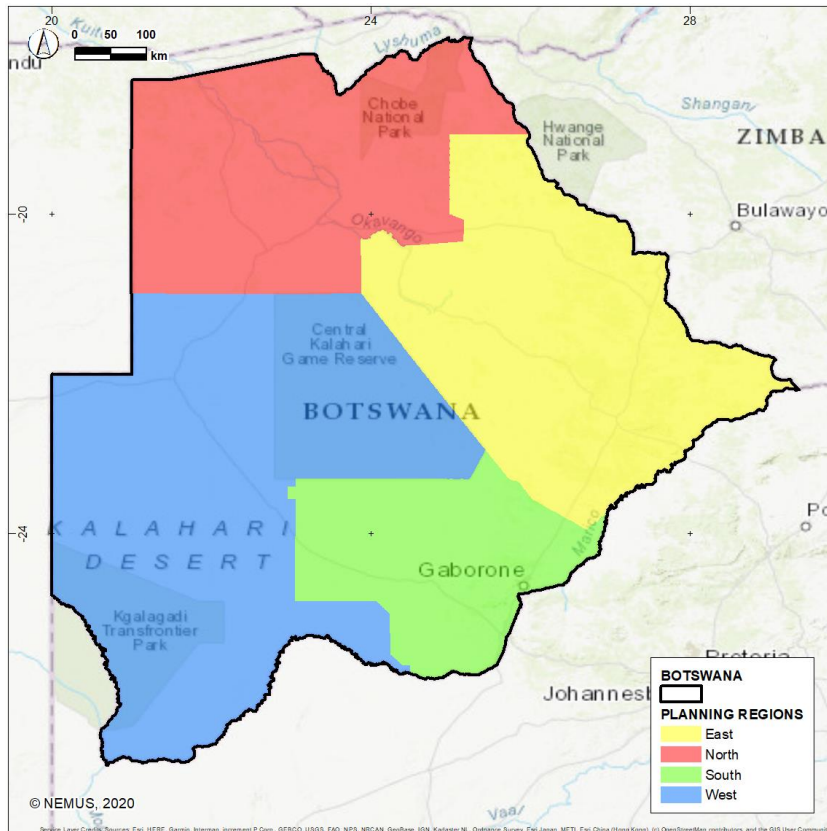


Data source: DWS (2015)

GOVERNANCE FRAMEWORK (2/2)

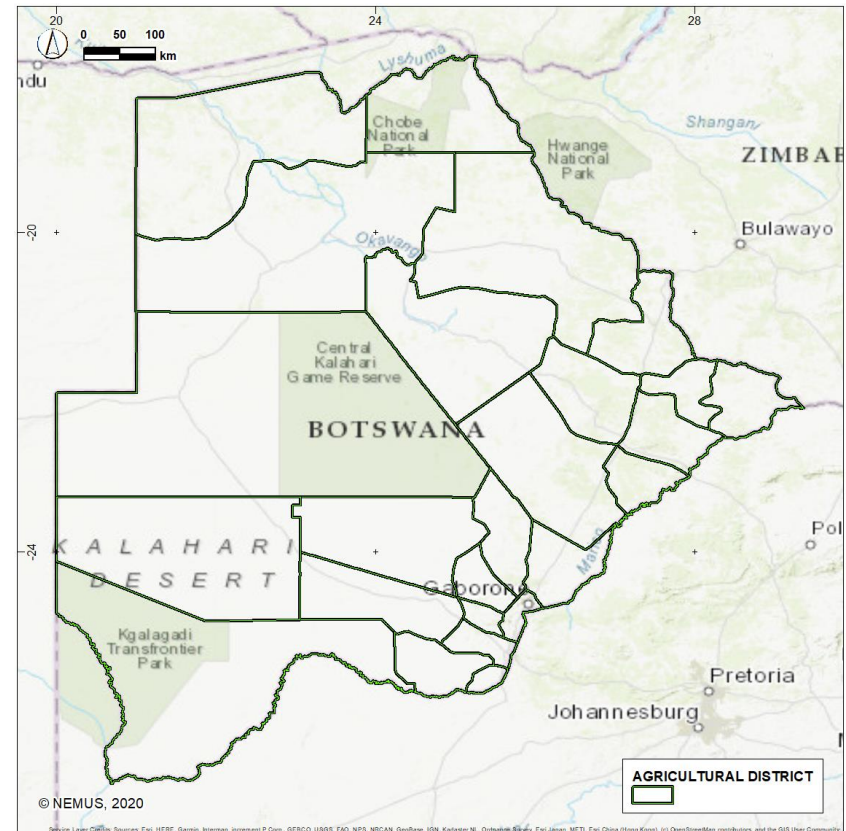


Planning regions (NSP, 2018)



Data source: NSP (2018)

Agricultural districts

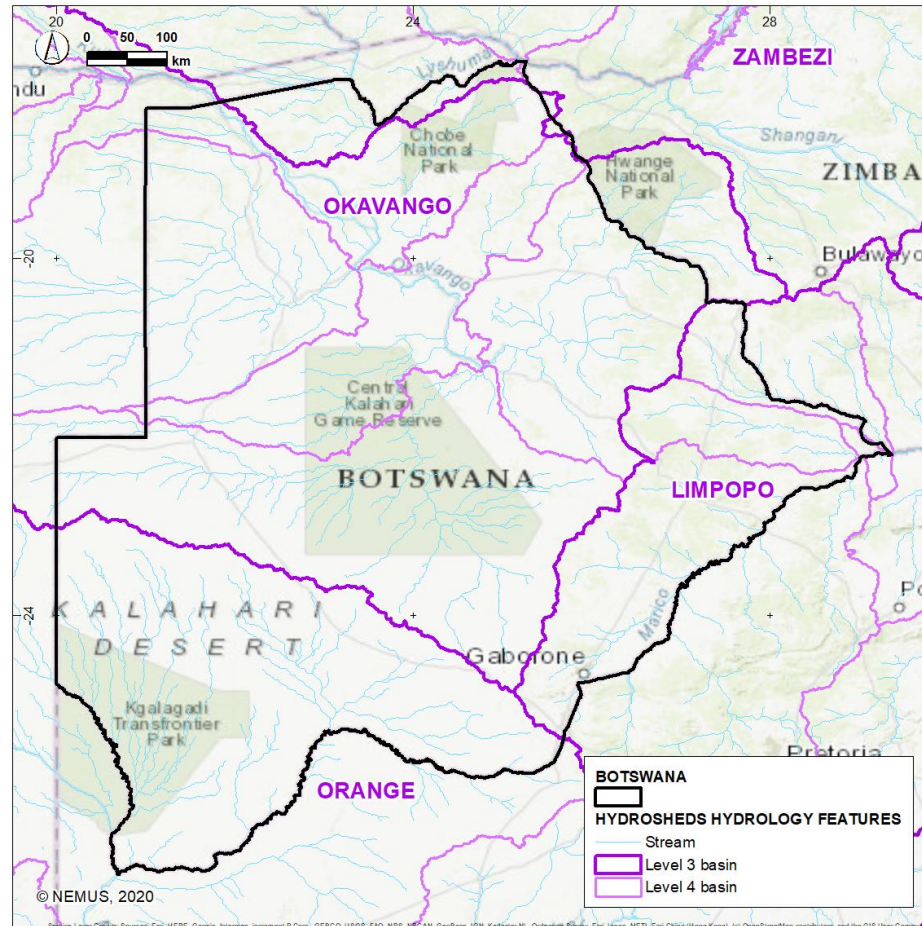


Data source: CAR (2015)

WATER RESOURCES AND WATER AVAILABILITY (1/2)



Hydrological regions and transboundary catchments

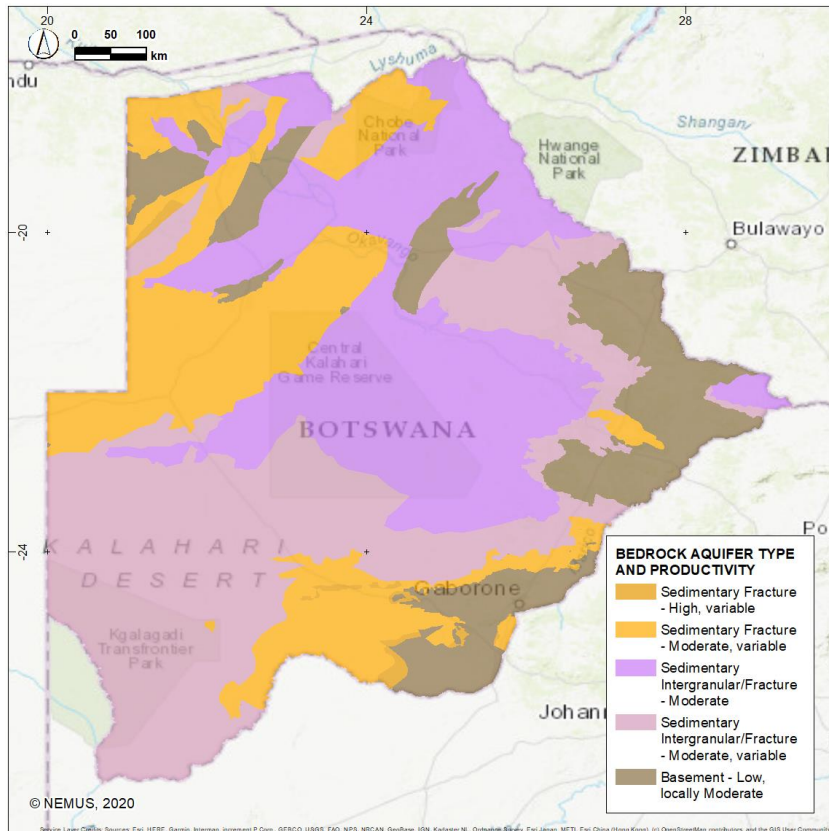


Data source: WWF (2019)

WATER RESOURCES AND WATER AVAILABILITY (2/2)



Groundwater



Data source: BGeolSurvey (2019)

WUC Management Centres



Data source: WUC (2016)



4. CATCHMENT MANAGEMENT AREAS (CMAs); FORMULATED OPTIONS



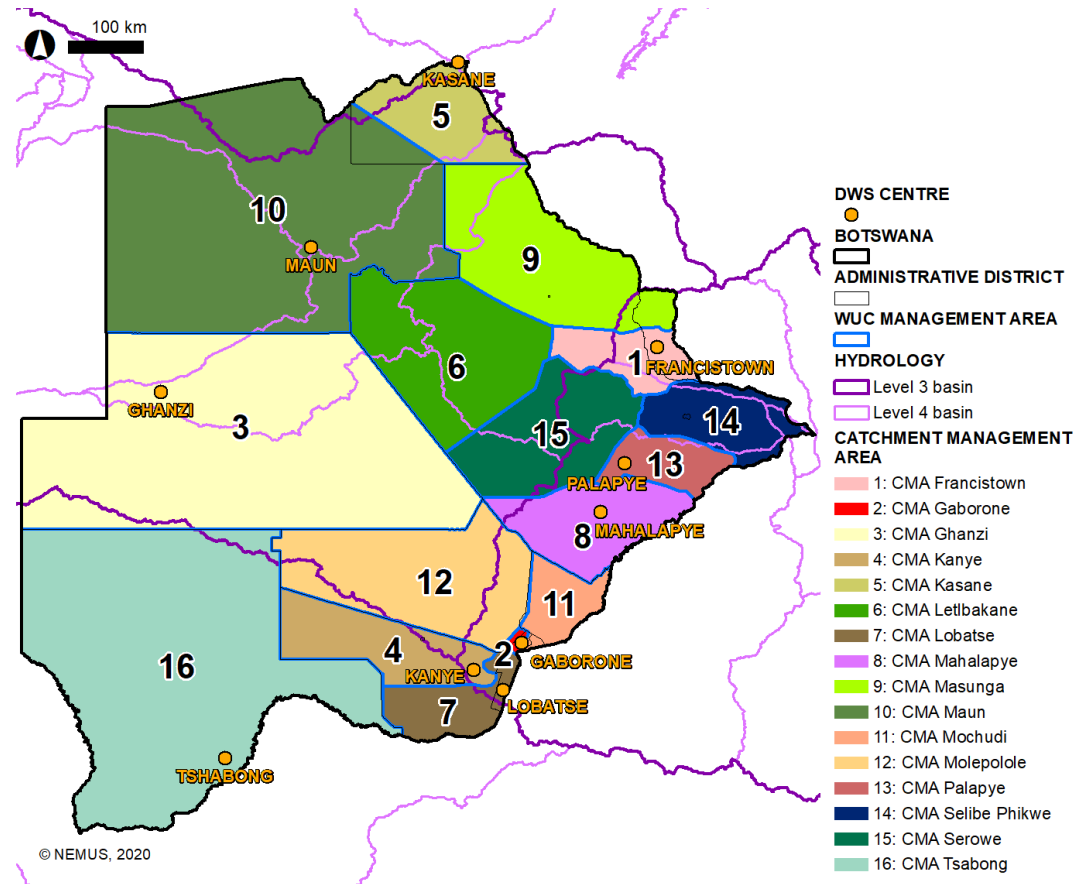
DEMARCATIION OF CMAs

- The formulated options result from overlaying the constraints analyzed according to different merging criteria;
- 7 options formulated (1 option consists on the current situation, each of the other 6 options correspond to merging a different combination of constraints):
 - Option 1 – Current zones
 - Option 2 – Merge DWS/WUC current zones;
 - Option 3 – Merge DWS/WUC/ Administrative districts;
 - Option 4 – Merge DWS/ River basins;
 - Option 5 – Merge DWS/ WUC/ River basins/ Aquifers;
 - Option 6 – Merge River basins/ Administrative districts;
 - Option 7 – Merge Planning regions/ DWS.



OPTION 1 – CURRENT ZONES

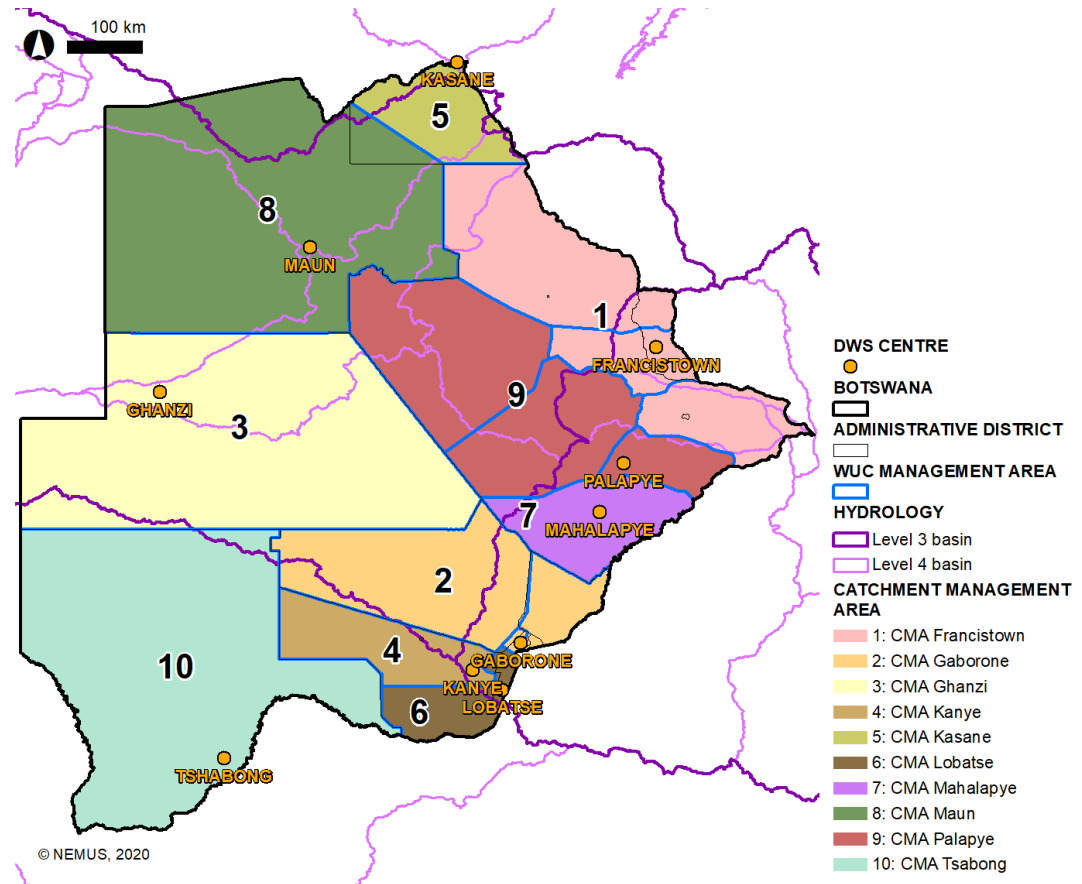
- Business-as-usual governance system;
- 10 DWS;
16 WUC management zones;
- Limits the implementation of an integrated water management scheme.





OPTION 2 – DWS/ WUC AGGREGATE CMAs

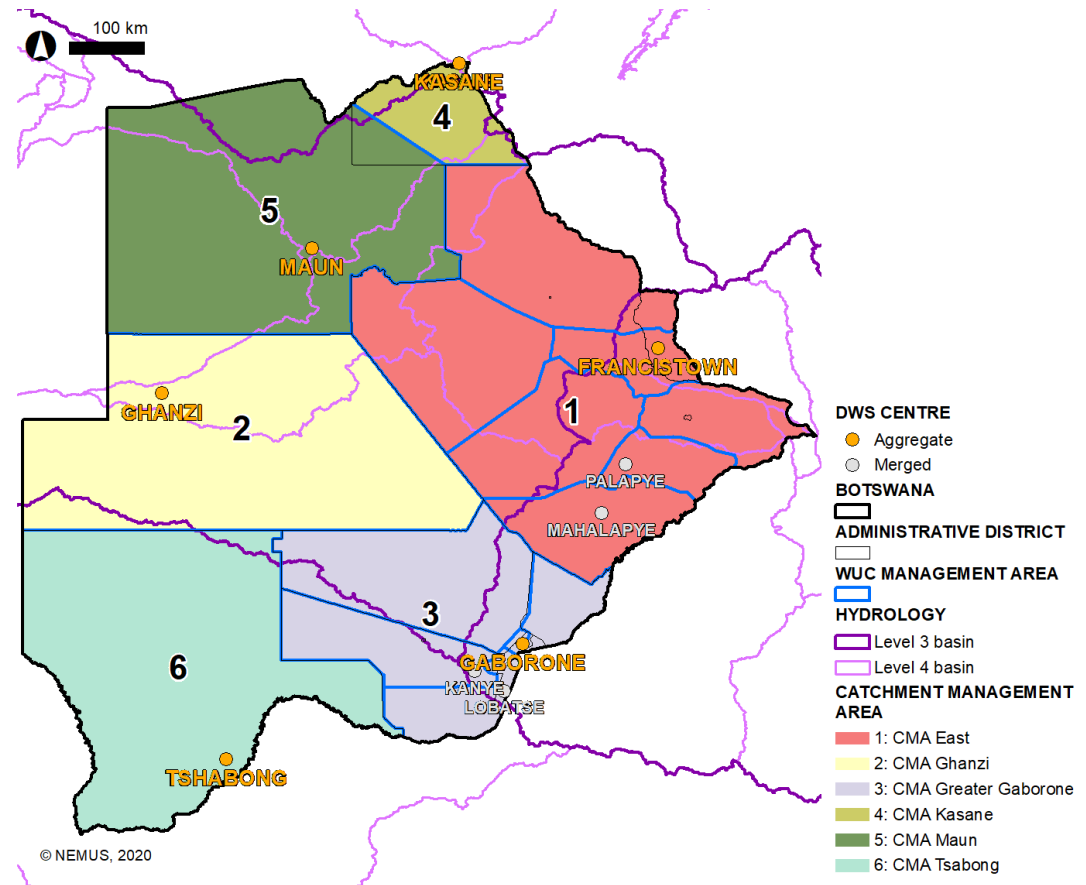
- Aggregation of DWS and WUC management zones;
- More adequate number of CMAs;
- No consideration of hydrological characteristics, neither land-use governance schemes (such as administrative regions).





OPTION 3 – ADMINISTRATIVE CMAs

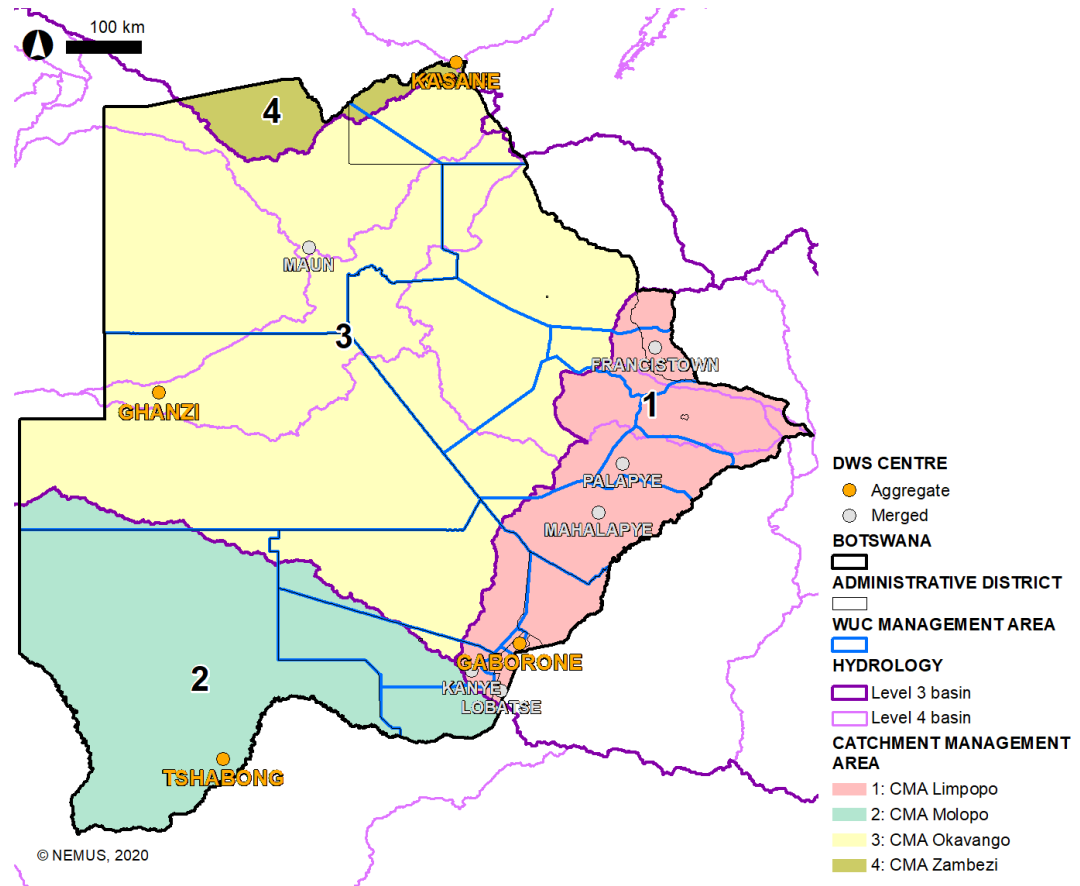
- Integrates both DWS and WUC management zones with administrative districts;
- Administrative regions constitute a well-established institutional framework;
- Decisions between water sector and administrative governance better aligned;
- Does not account with hydrologic characteristics;





OPTION 4 – RIVER BASINS CMAs

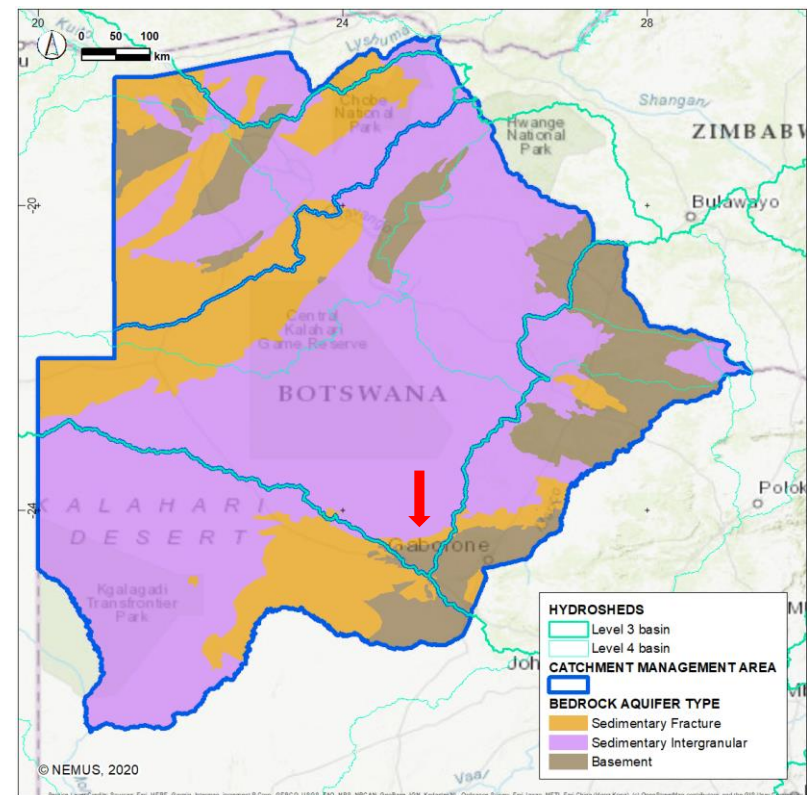
- Articulation of DWS centres with hydrological features;
- Clearly attribution of one river basin to DWS centres;
- Allows for improved integrated water resources management;
- Implies DWS restructuring;
- Mismatch between WUC management zones and CMA might difficult water accounting.



OPTION 5 – WATER SECTOR AGGREGATE CMAs



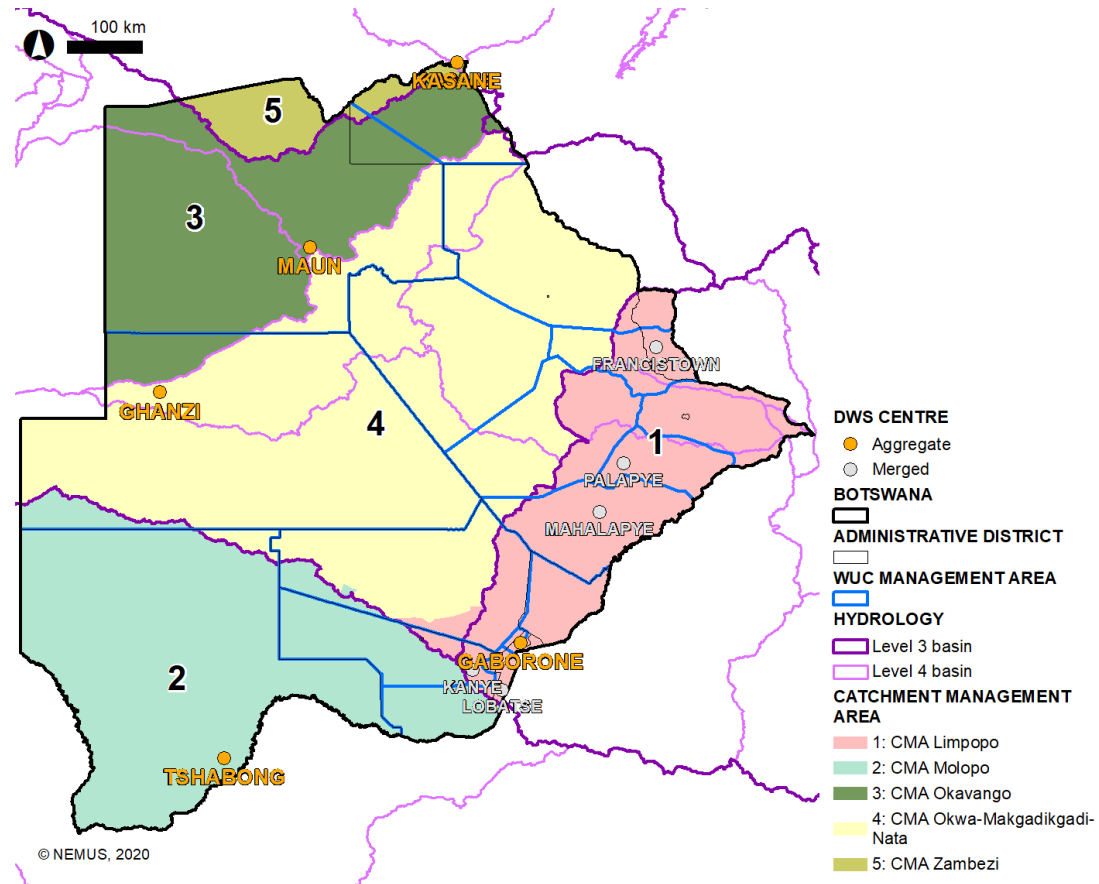
- Merging DWS centres and also WUC management zones according to river basins boundaries;
- To improve the adaptability of water resources management, the Okavango river basin is disaggregated into: the Okwa-Makgadikgadi-Nata CMA, and the Okavango CMA;
- As groundwater plays an important role, the Okwa-Makgadikgadi-Nata southern boundaries were aligned aquifer type.



OPTION 5 – WATER SECTOR AGGREGATE CMAs



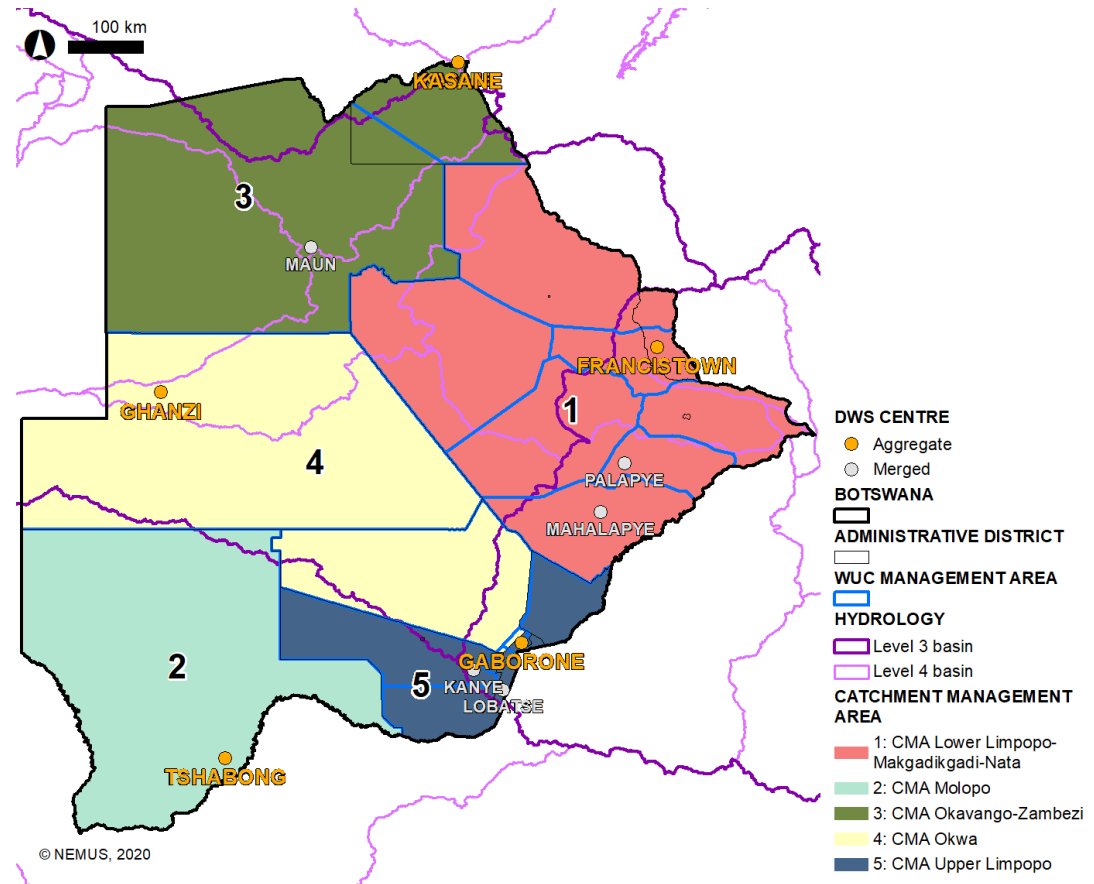
- Facilitates integrated water resources management, including water accounting;
- Restructuring both DWS and WUC might bring additional constraints.



OPTION 6 – RIVER BASINS/ ADMINISTRATIVE CMAs



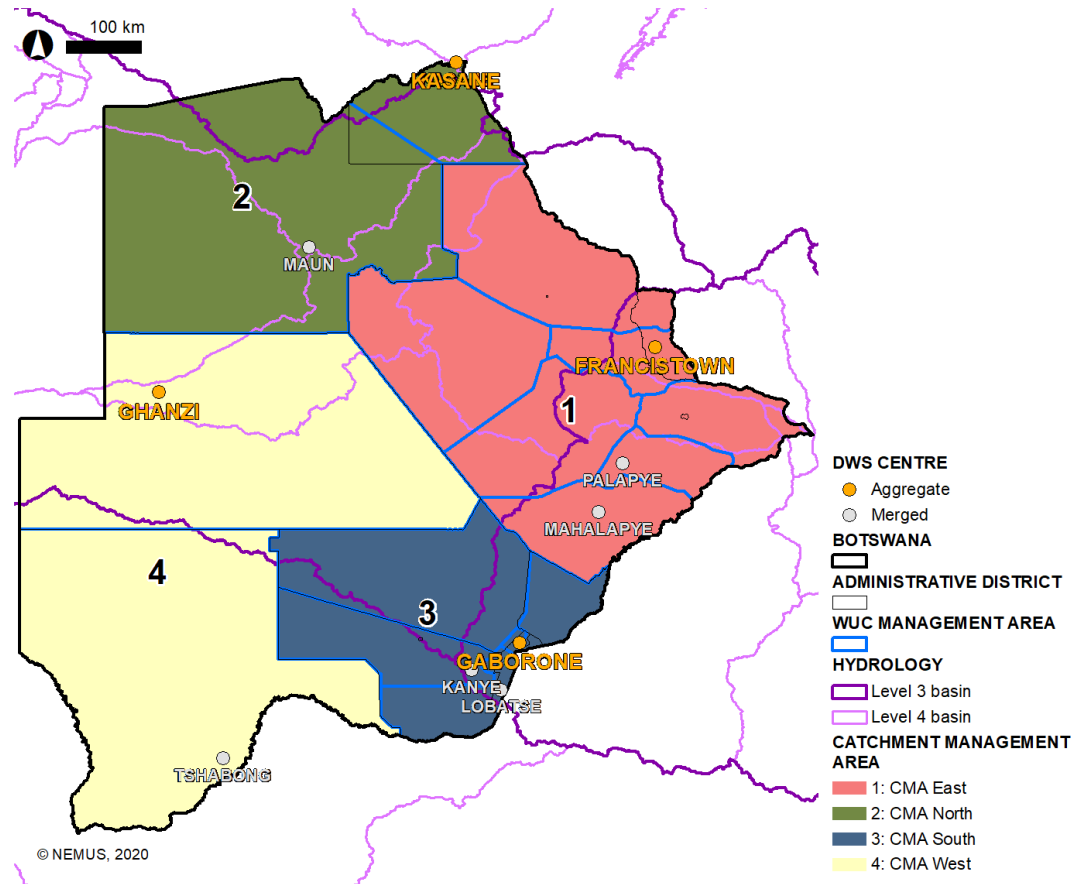
- Articulation of administrative districts with hydrological features;
- Improved integrated water resources management;
- Management strengthened by the existing institutional setting;
- Implies the integration of different transboundary basins and aquifer types within the same CMA.





OPTION 7 – PLANNING REGIONS CMAs

- CMAs in line with future planning regions;
- Contribute for the vision 2036 land management arrangements;
- Implies DWS and WUC restructuring;
- Does not consider hydrological relations with the territory.





5. FINAL REMARKS



CONCLUDING REMARKS (1/3)

- CMAs based on the **existing water sector management areas** boundaries
 - Option 1 – certain disconnection Botswana hydrological characteristics;
- **Aggregation of DWS and WUC zones** into CMAs - Option 2 – same disconnection with water systems, but improved water management;
- CMAs based on **Administrative districts**
 - Option 3 – reflects the institutional management system, still no relation with hydrological characteristics;





CONCLUDING REMARKS (2/3)

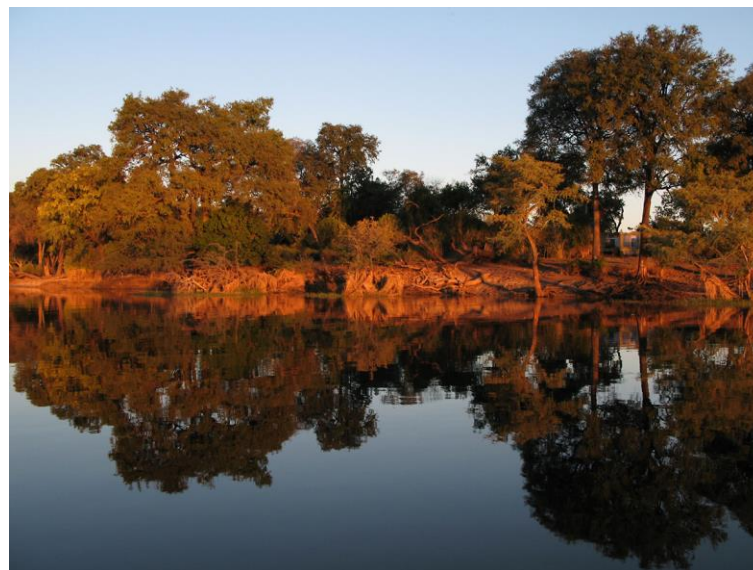
- CMAs align with **river basins** – Option 4 – promotes integrated water resources management but with few linkages with water sector institutions;
- **Alignment of DWS and WUC zones with hydrological and hydrogeological characteristics** into CMAs - Option 5 – both water institutional and hydrologic and hydrogeological framework are considered;
- CMAs based on both **Administrative districts and river basins** – Option 6 – might ease practical integrated water resources management;

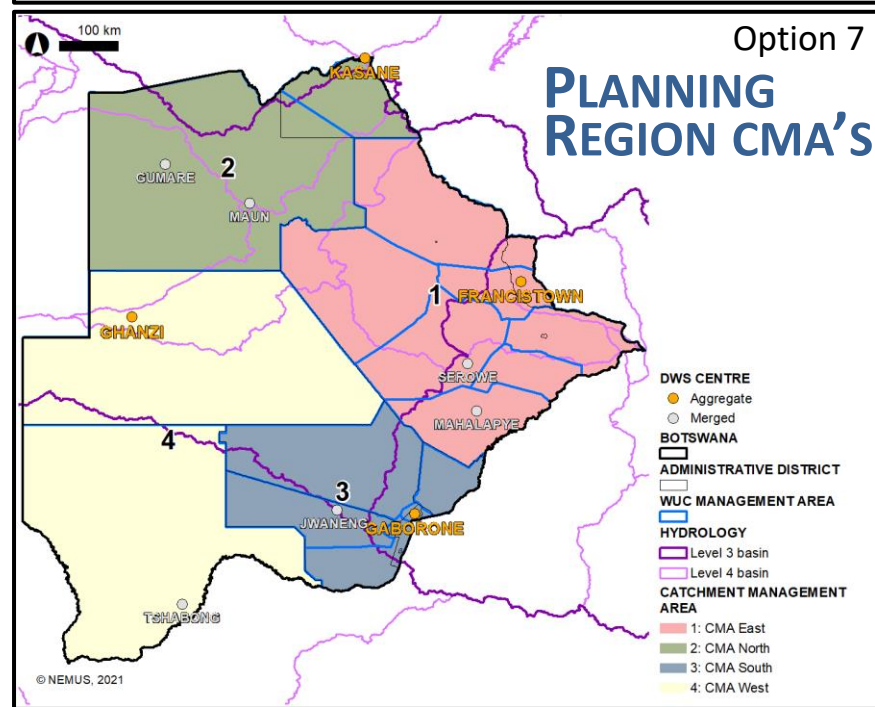
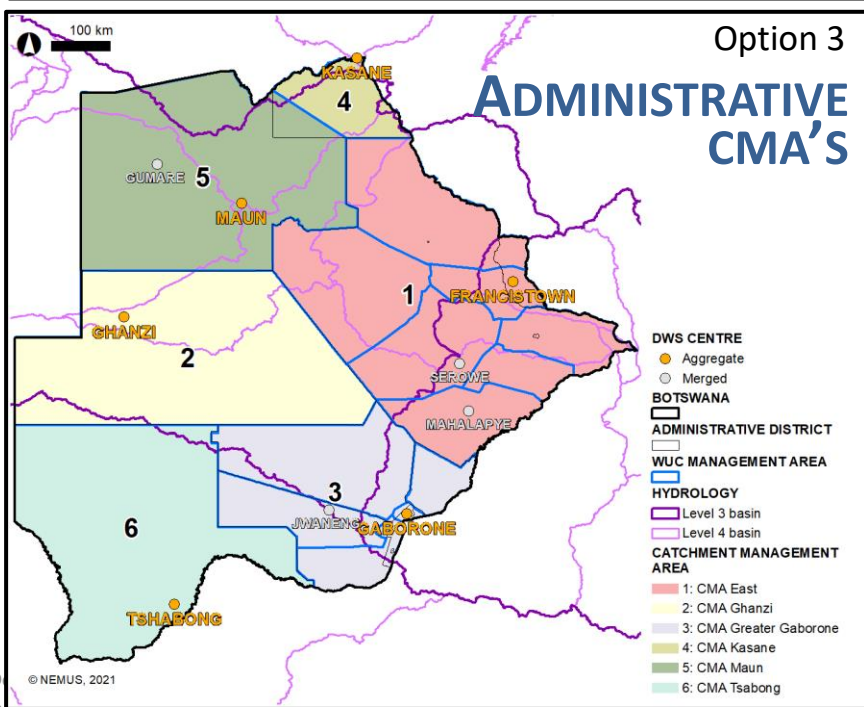
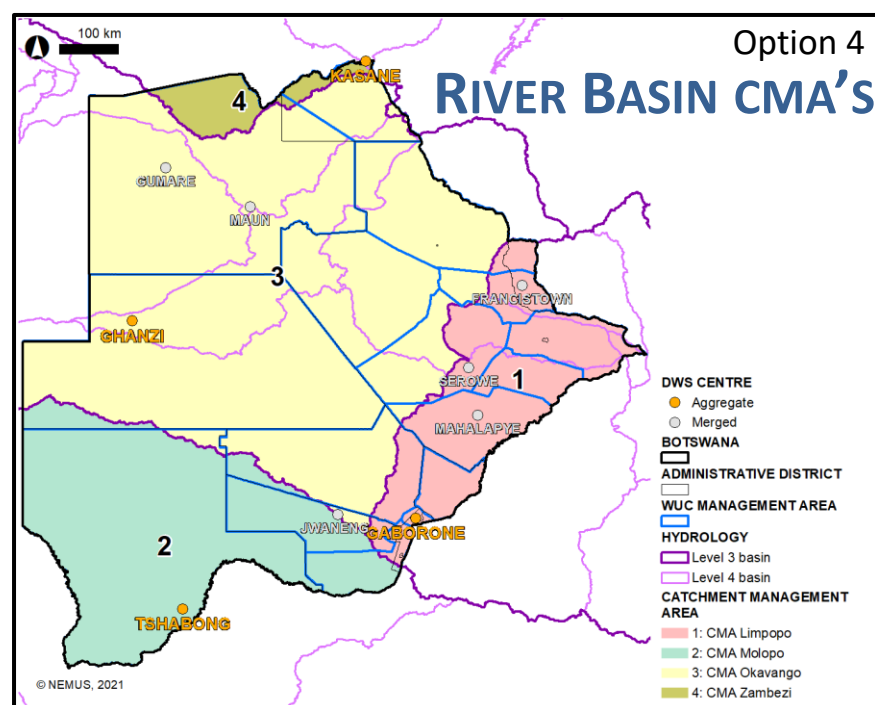
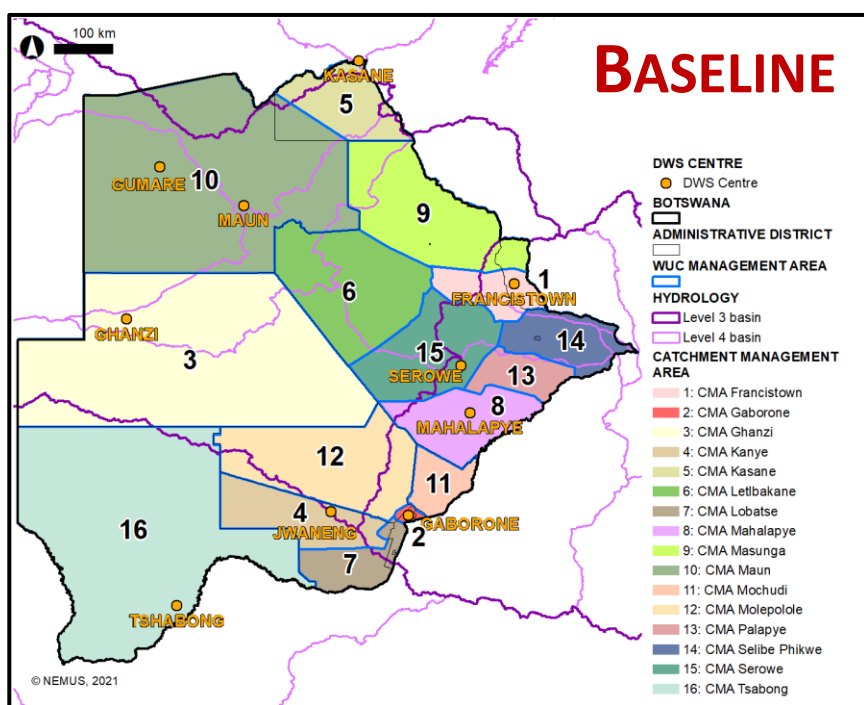




CONCLUDING REMARKS (3/3)

- CMAs based on National Spatial Plan (2018) **planning regions basins** – Option 7 – considers future changes in the land-use management scheme, but does not bring additional relations with hydrologic and hydrogeological characteristics;
- **DWS has now chosen 3 different options to be discussed at regional and Kgotla levels**, namely:
 - Option 3: Administrative CMA's
 - Option 4: River Basin CMA's
 - Option 7: Planning Region CMA's





Thank you

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ACRONYMS



CMA	Catchment Management Area
DWS	Department of Water and Sanitation
IWRM-WE	Integrated Water Resources Management and Water Efficiency
WUC	Water Utilities Corporation