Wise Groundwater Use for Agricultural Development

- Water consumption and groundwater use
- Looking at Selected areas
- Need for Monitoring
- Water Quality
- Public Engagement

Water Use and Demand

Table 4.1: Projected Water Demand for Namibia

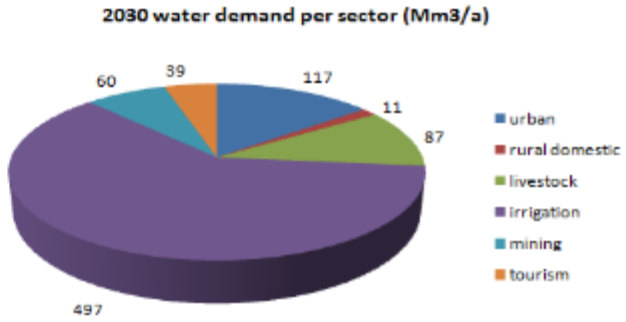
CONSUMER GROUP	DEMAND IN Mm^3/a				
	2008	2015	2020	2025	2030
Urban	66.0	80.0	91.1	103.5	117.2
Rural Domestic	10.3	10.6	10.9	11.1	11.4
Livestock	86.8	86.8	86.8	86.8	86.8
Irrigation	135.3	204.6	344.6	379.8	497.2
Mining	16.1	17.2	18.1	19.1	20.3
Tourism	19.6	27.5	31.9	35.2	38.9
TOTAL	334.1	426.7	583.4	635.6	771.7

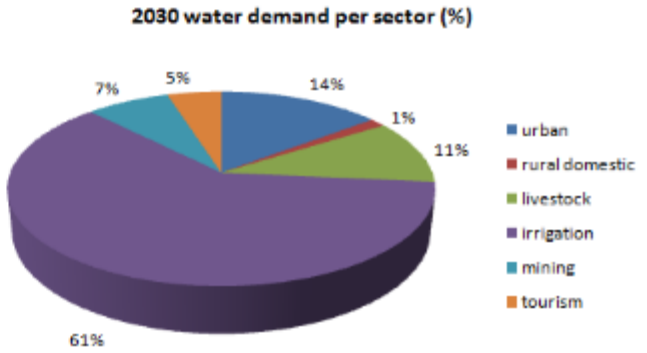
Agriculture Water Use

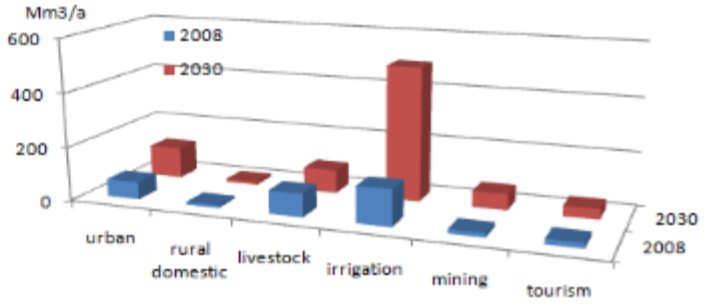
FUTURE WATER DEMAND IN NAMIBIA

2030 FORECASTED WATER DEMAND PER SECTOR

Sector	Demand (million cubic meters / year)	Demand (%)	Increase over 2008 (%)
Urban	117.2	15.2 %	+ 77.6 %
Rural domestic	11.4	1.4 %	+ 10.7 %
Livestock	86.8	11.2 %	nil
Irrigation	**497.2**	**64.4%**	**+267.5 %**
Mining	60.3	2.6 %	+ 274.5 %
Tourism	38.9	5.0 %	+ 98.5 %
Total	**811.7**	**(100.0 %)**	**+ 143.0 %**







Average Water Sectoral Consumption within Namibia

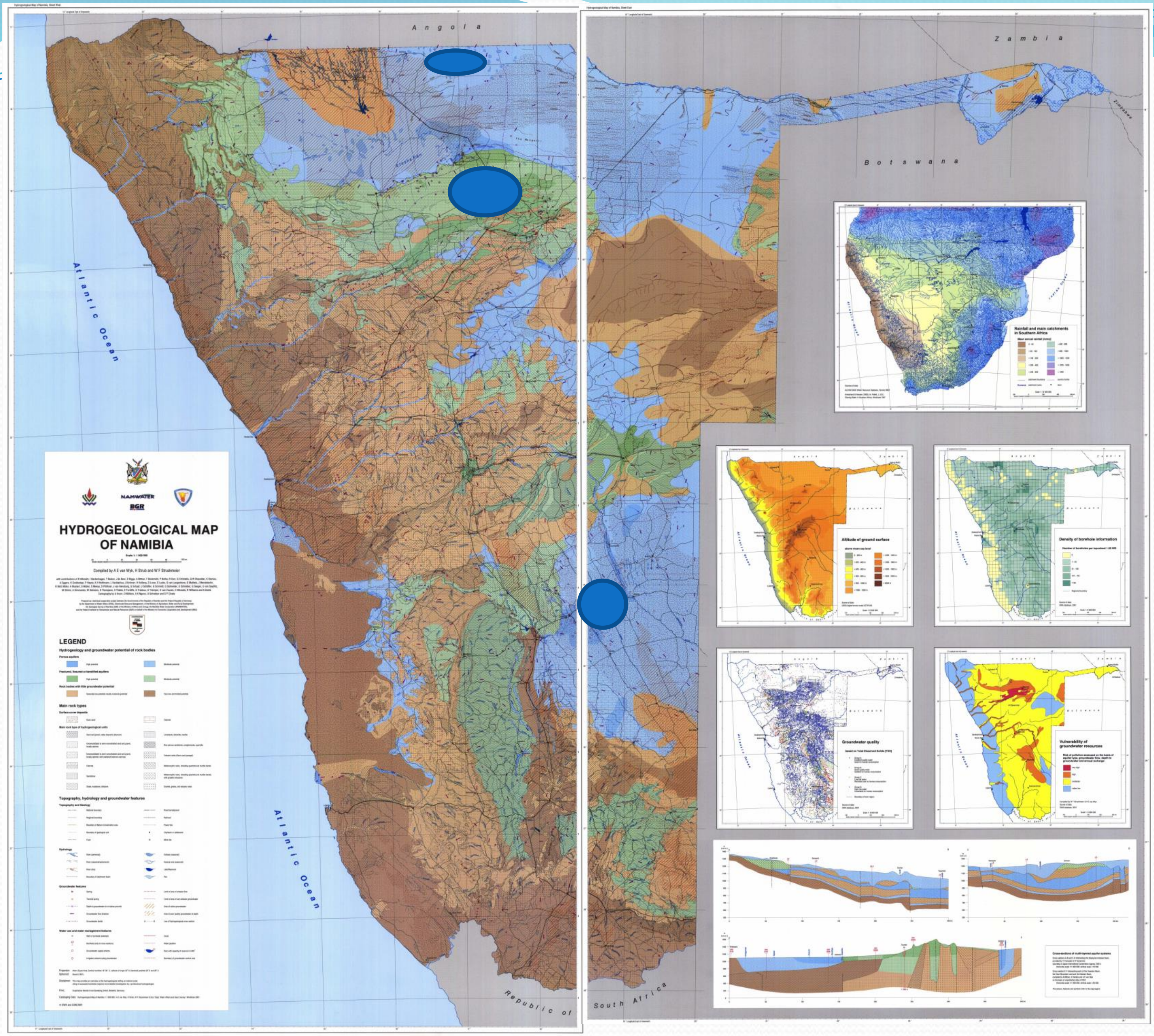
Agriculture Groundwater use 97 Mm³ 24 %

Stock watering 61 Mm³ Irrigation 36 Mm³

SECTOR	CONSUMPTN 2005 (Mm^3)	% TOTAL 2005	% of Gwater
Urban (all inclusive)	66.4	15	60
Rural	5.8	1.3	70
Agriculture (irrigation)	239.1	57	15
Agriculture (stock)	73.6	17	83
Mining	29.8	7	50
Tourism	2.7	0.7	55
Total	417.5	100	38

Present use (million cubic meters / year)	Installed capacity (million cubic meters / year)	Sustainable potential (million cubic meters / year)
90	95	360

2012

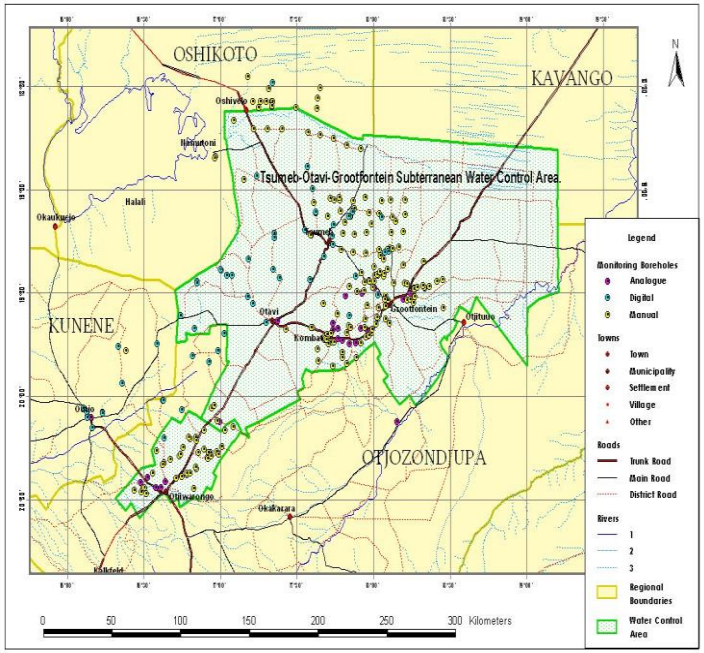


HYDROGEOLOGICAL MAP OF NAMIBIA
NAMWATER
BGR
LEGEND
Angola
Zambia
Botswana
Atlantic Ocean
Atlantic Ocean
Republic of
South Africa

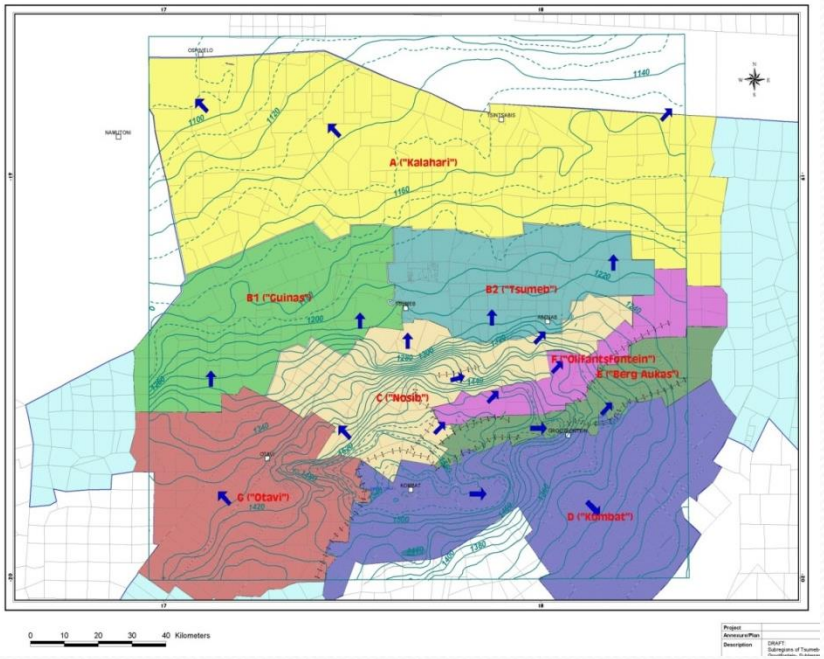
Scientific and Technical Knowledge for Effective Groundwater Governance

Generally sufficient technical capacity within the SADC Region – if correct use is made of the private sector working together with the Governmental Technical Departments

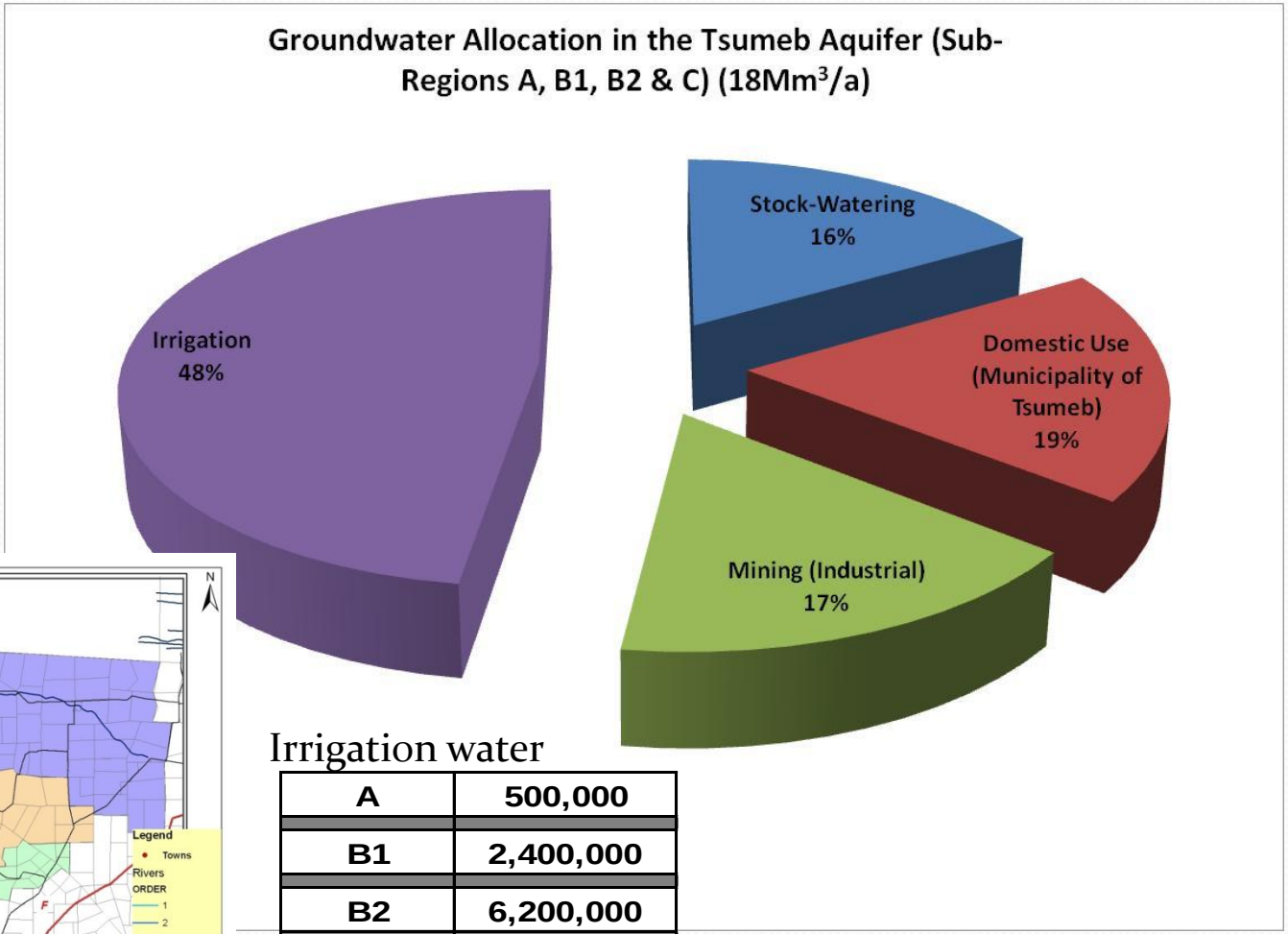
Study area with Groundwater Monitoring Points

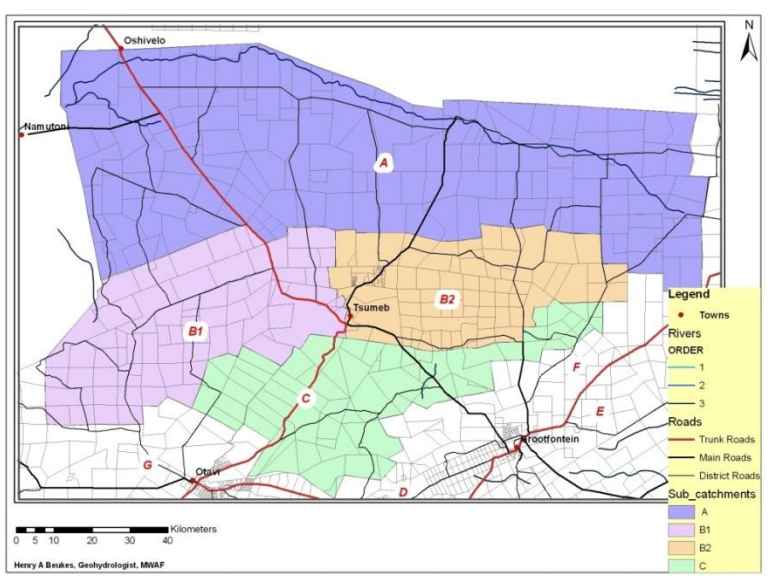


GOT Karstic Aquifer



Regulatory Instruments for Water Use



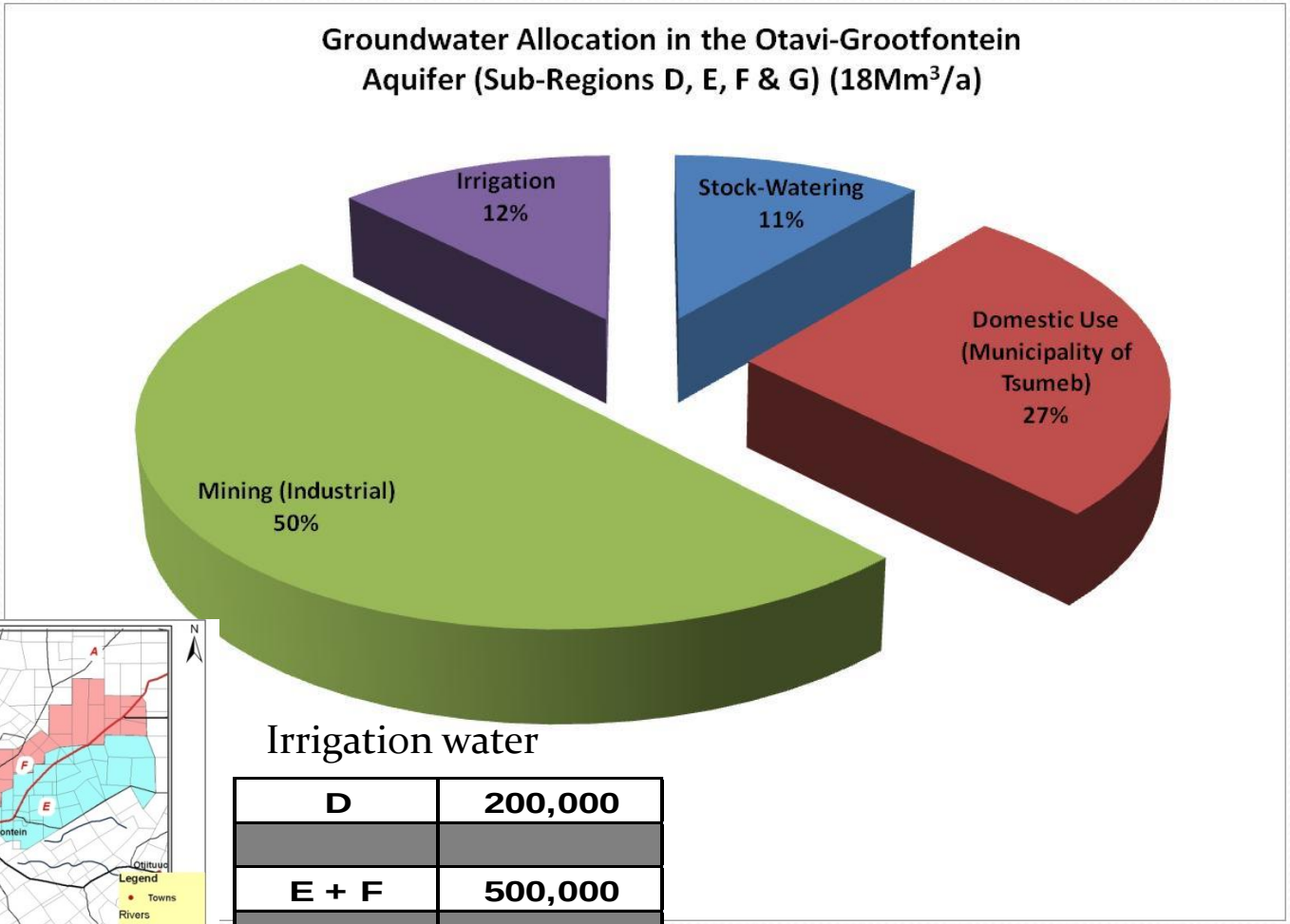


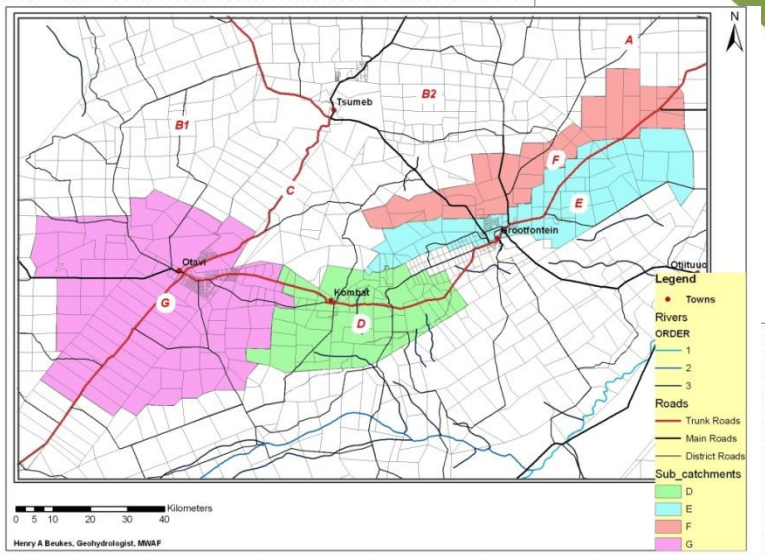
Irrigation water

A	500,000
B1	2,400,000
B2	6,200,000
C	500,000
Total	**9,600,000**

Groundwater Allocation

Regulatory Instruments for Water Use



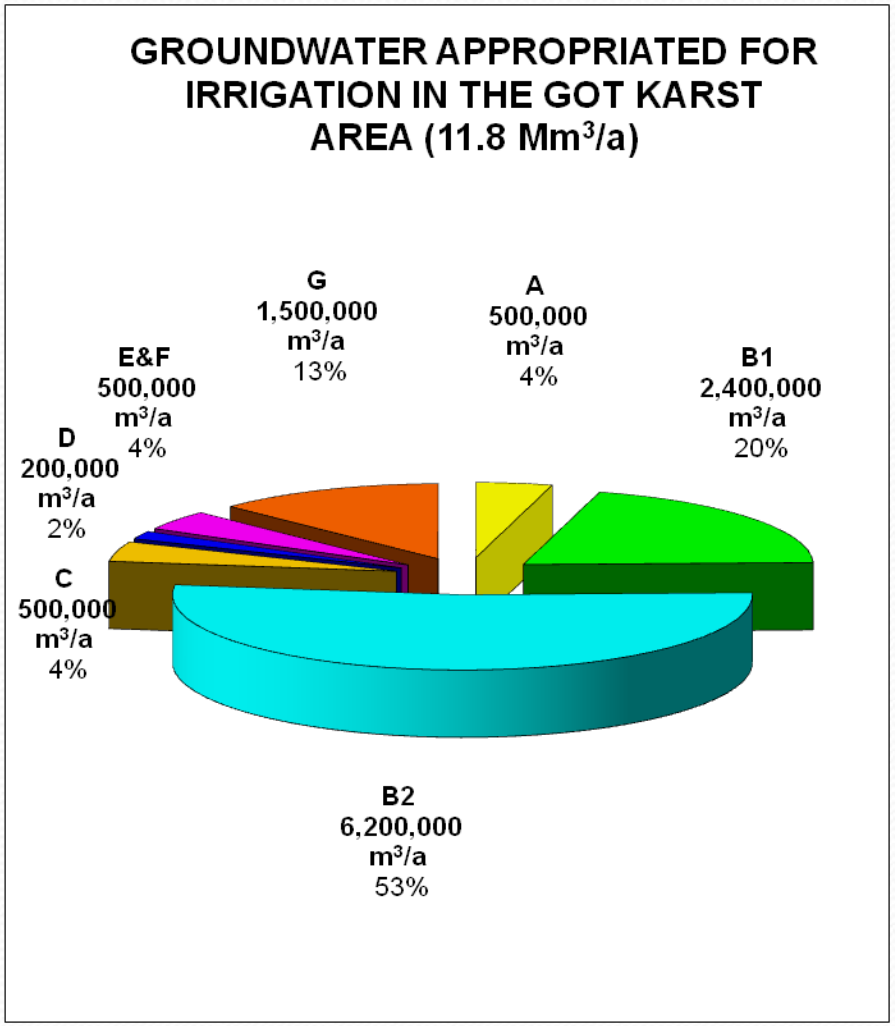


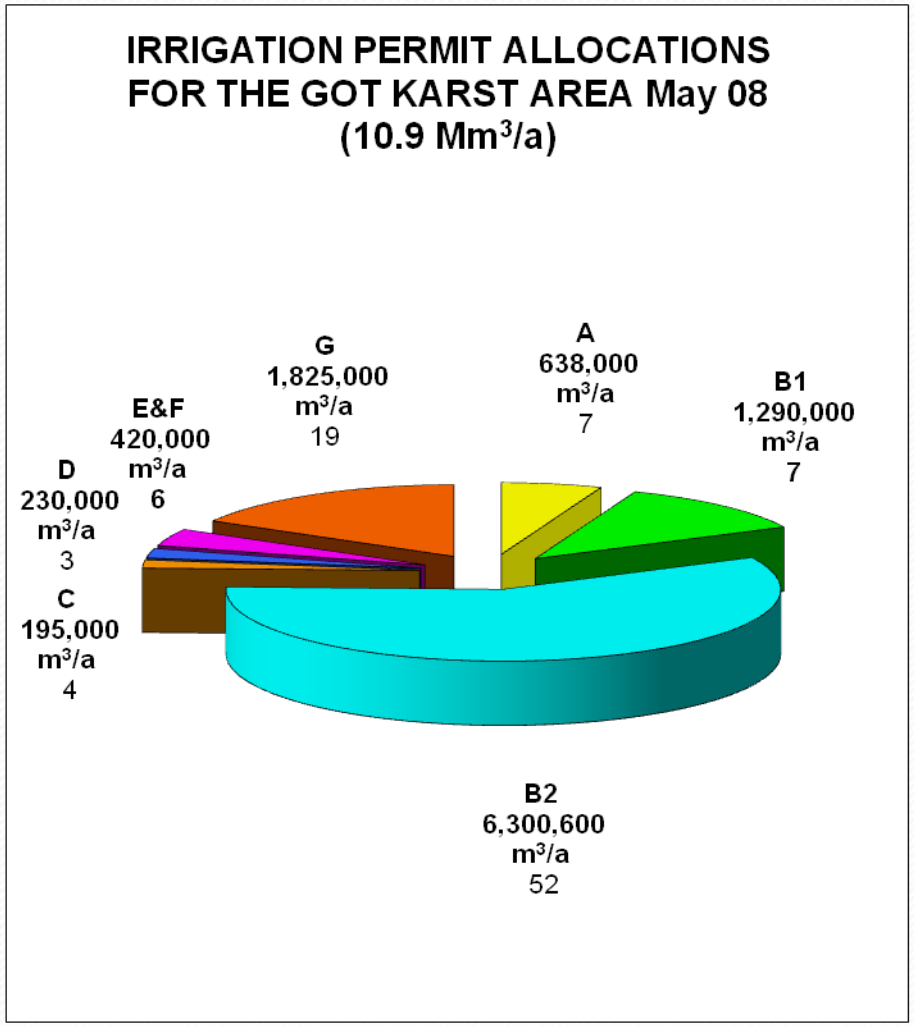
Irrigation water

D	200,000
E + F	500,000
G	1,500,000
Total	2,200,000

Groundwater Allocation

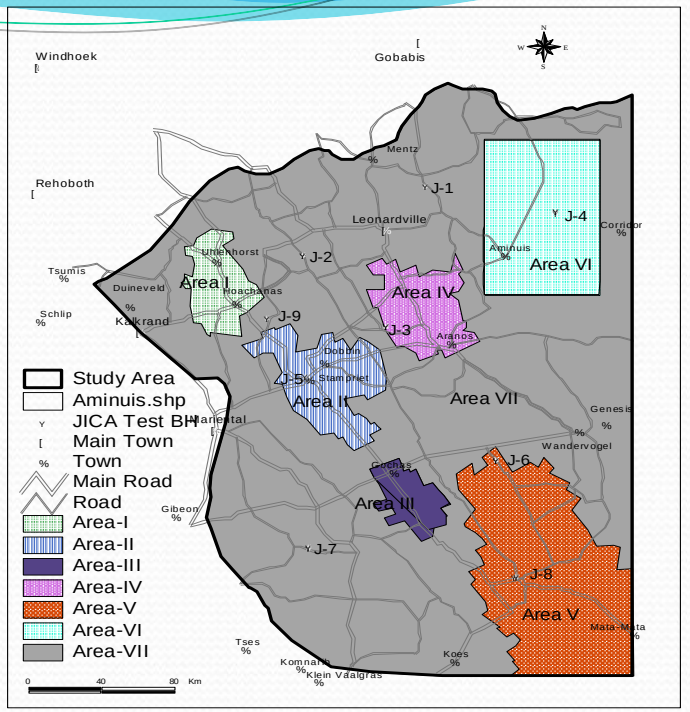
Regulatory Instruments for Water Use





PRODUCTION FACTORS

Irrigation Areas



Statistics on Stampriet Abstraction

Water Usage

Area Nr	No of Irrigation farms	Total Farm Surface Area (ha)	Total Irrigation area (ha)	Average Irrigation Area (ha)	Irrigation Usage		
					m^3/year	%	m^3/ha/yr
I	22	173 929	22	1	224 840	3	10 220
II	38	285 716	412	10.84	5 334 341	78	12 947
III	6	112 403	11	1.83	112 420	2	10 220
IV	10	200 833	24	2.4	394 119	6	16 422
VII	83	4 719 973	77	0.92	810 712	12	10 598
Total	163	6 306 250	546	-	6 876 432	100	-
Average	-	-	-	3.35	-	-	12 594

According to the Groundwater Investigation over-utilised

Transboundary Cooperation Project

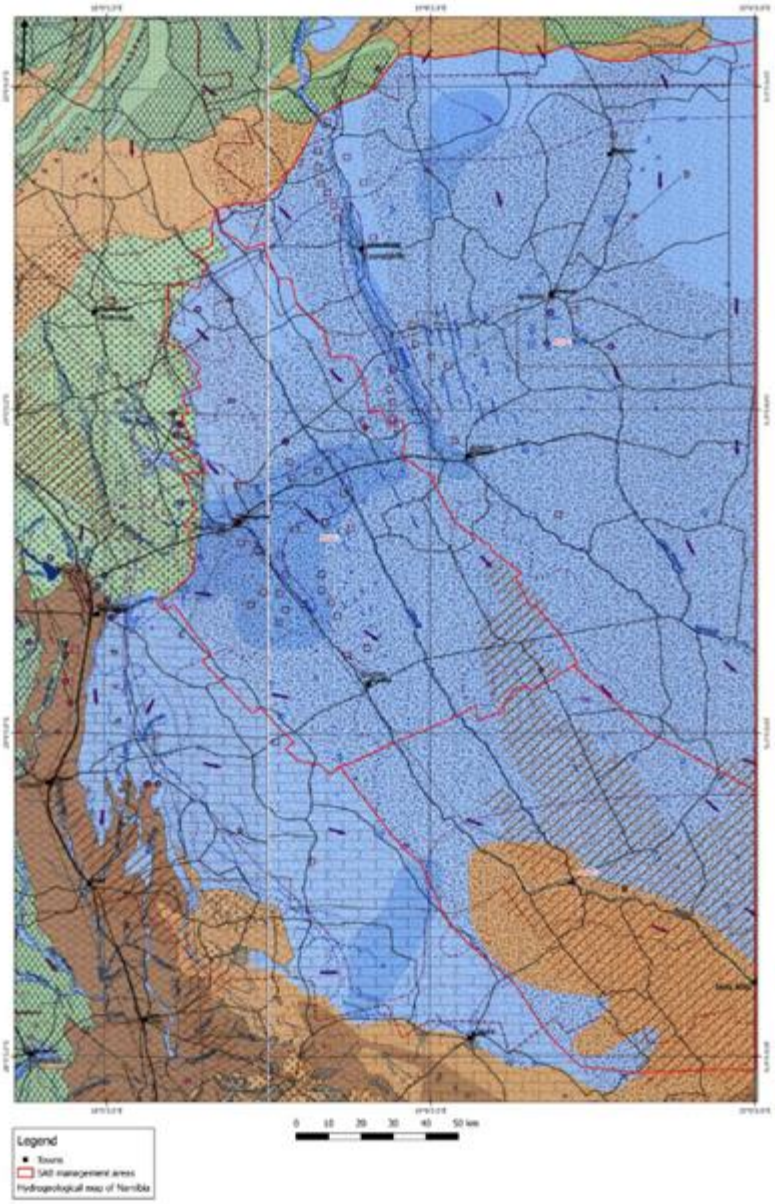
Table 4.4 | Estimated groundwater abstraction evolution from 2002 and 2015

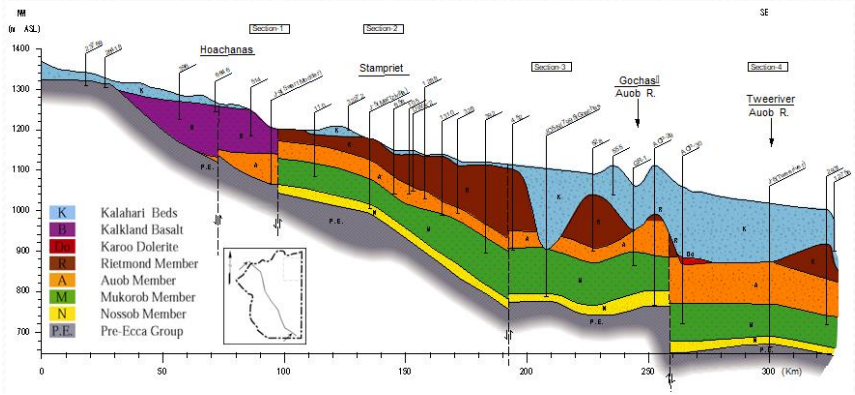
	2002*	2015
1) Domestic water use:		3 118 050
Public water supply	635 000	886 450
Commercial farms	1 594 000	2 000 000
Communal farms	127 000	131 600
2) Irrigation	6 876 000	9 545 000
3) Livestock	5 678 000	7 687 700
4) Tourism	4 000	15 645
Total water use per water type	14 914 000	20 366 695

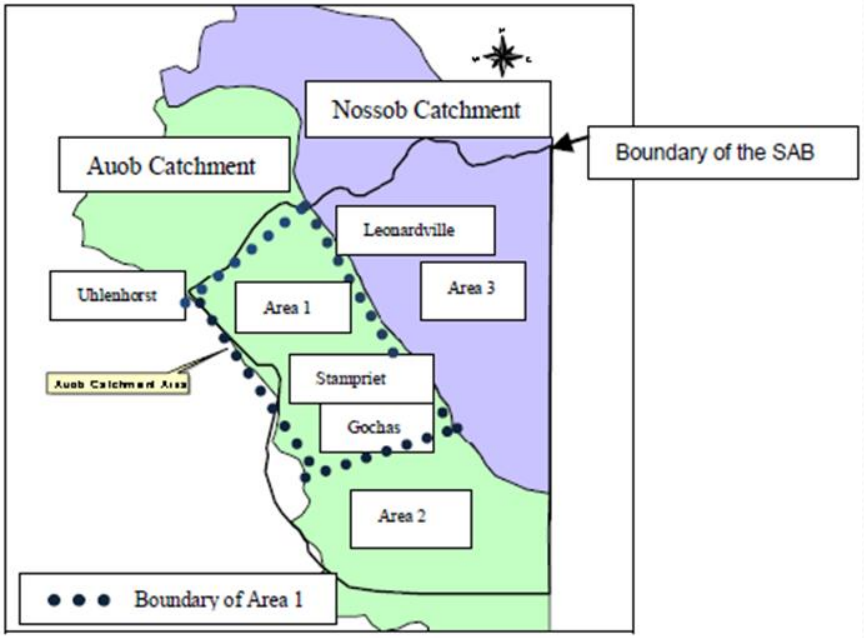
* Underestimated because of N/A data in Botswana and South Africa.

Suggested Boundaries for Area 1

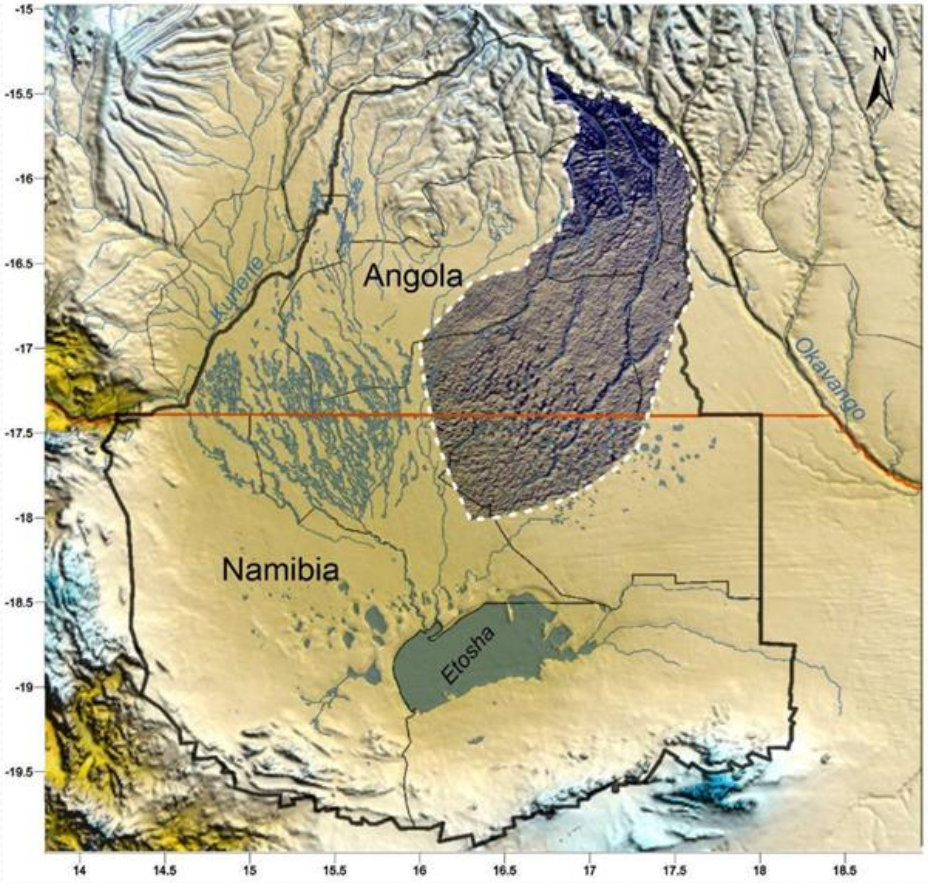
Maps of boundaries of Area 1 and farms

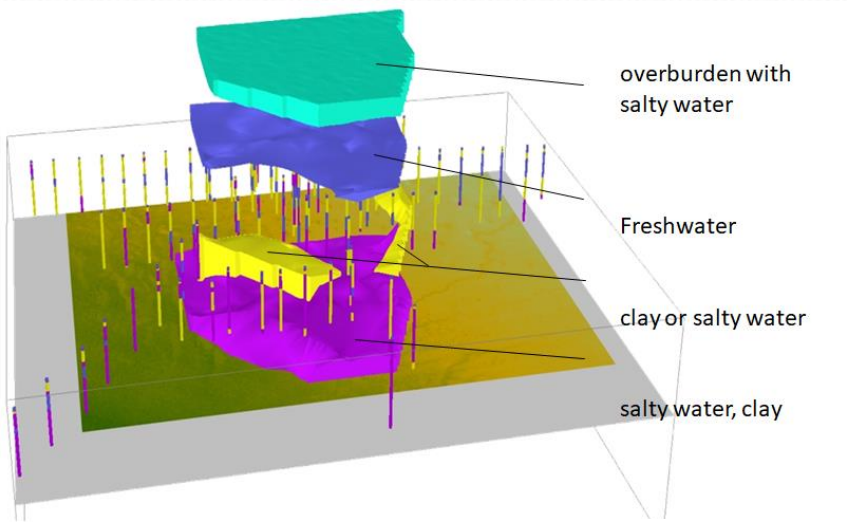


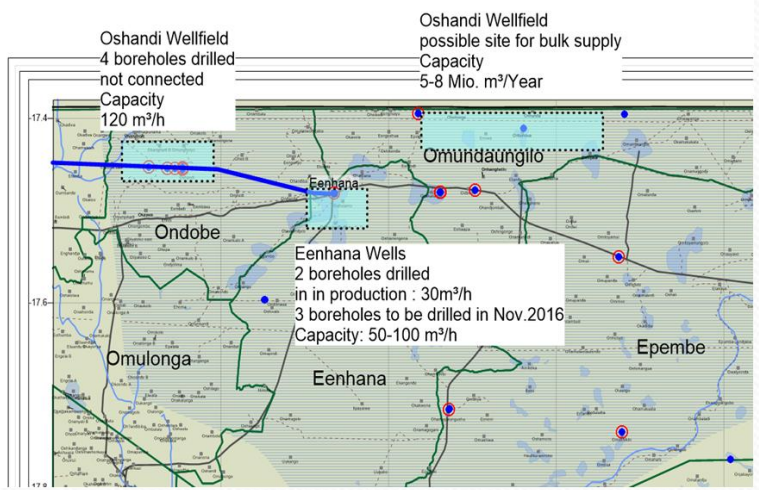




Ohangwena 2 Aquifer

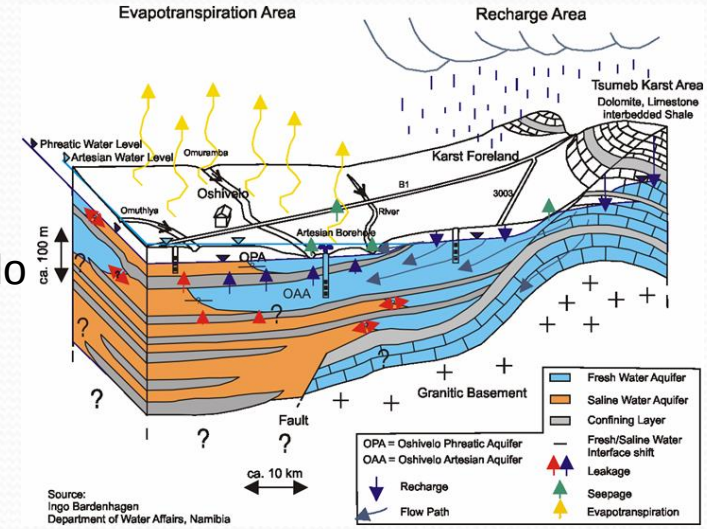


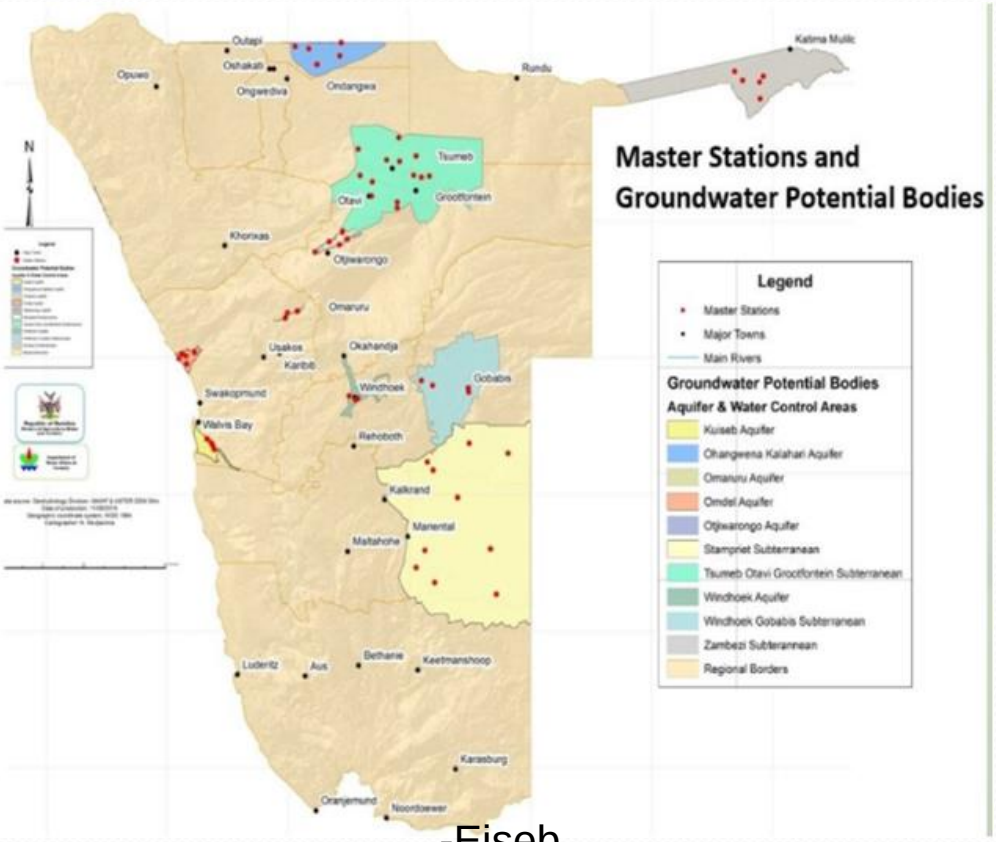


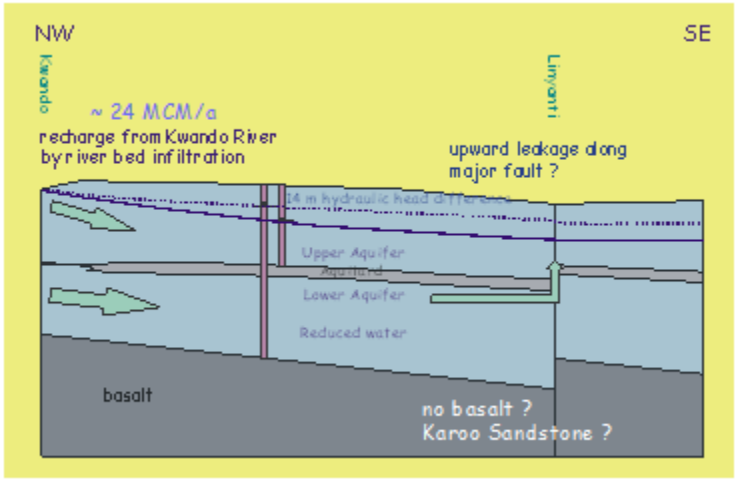


Other Areas of Potential

Oshivello Aquifer



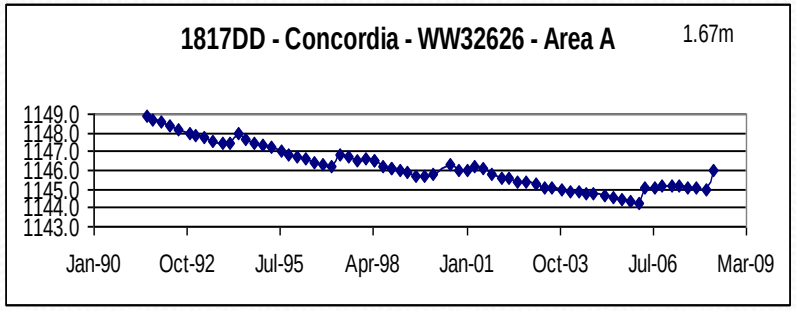


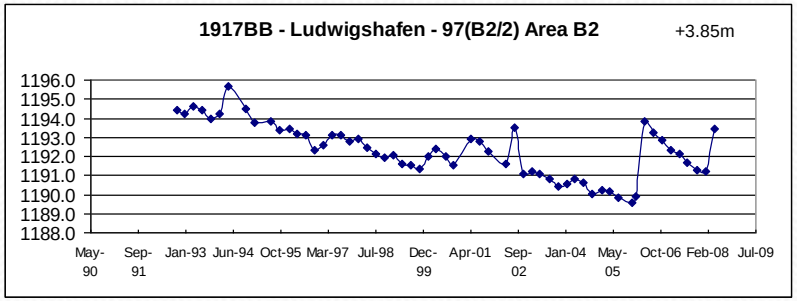


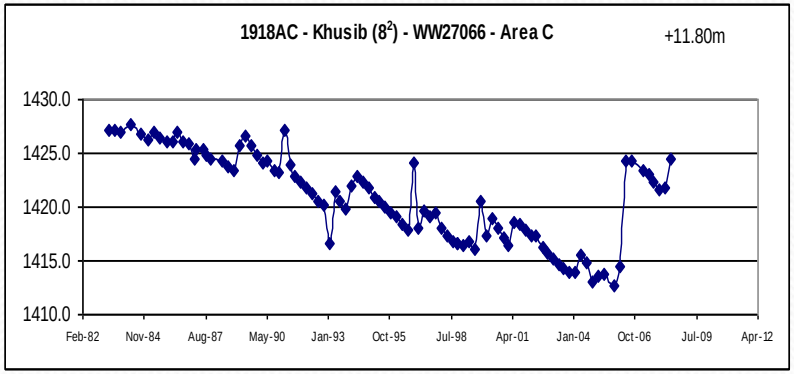
Lower Caprivi Aquifer

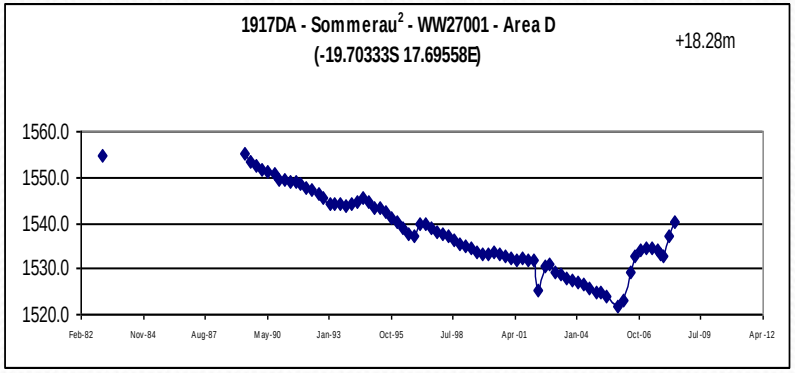
-Eiseb
-Hochfeld Summerdown
-Malathohe

The Importance of monitoring

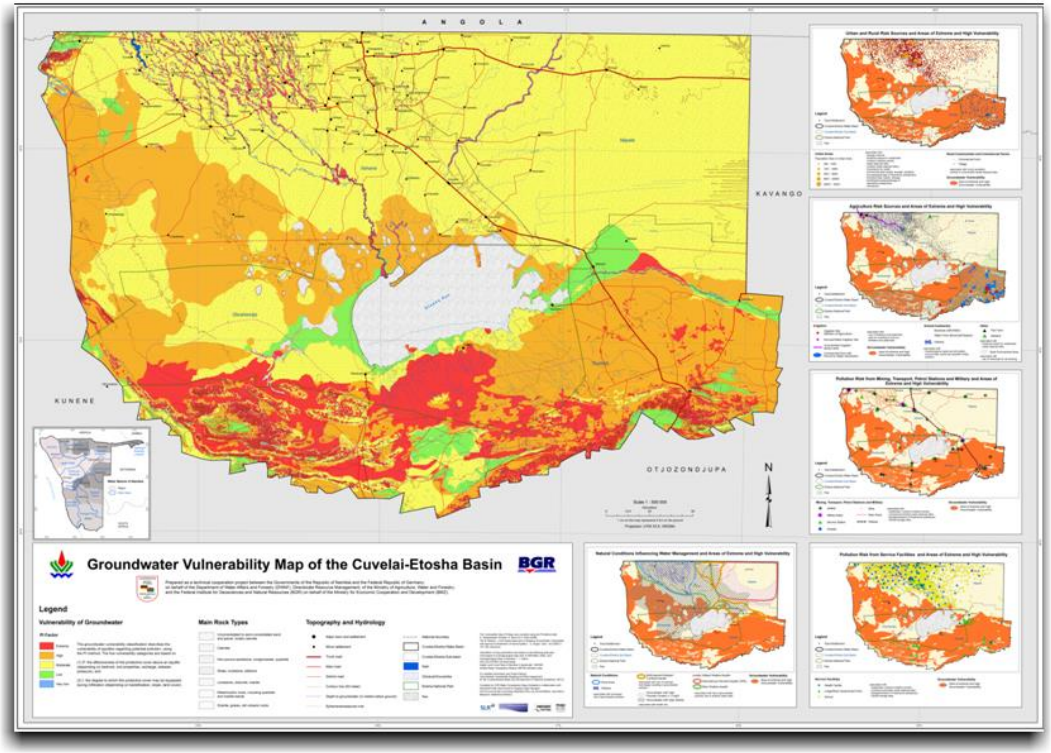


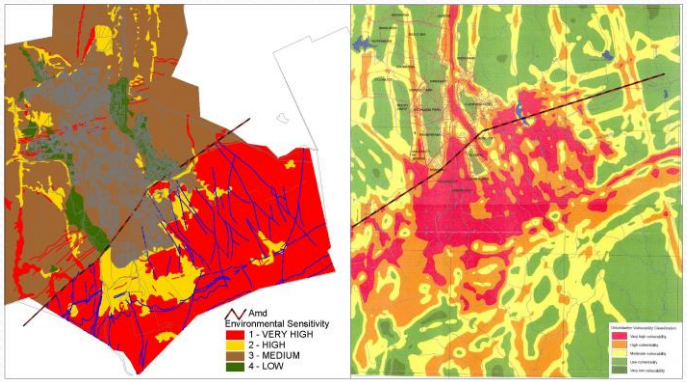


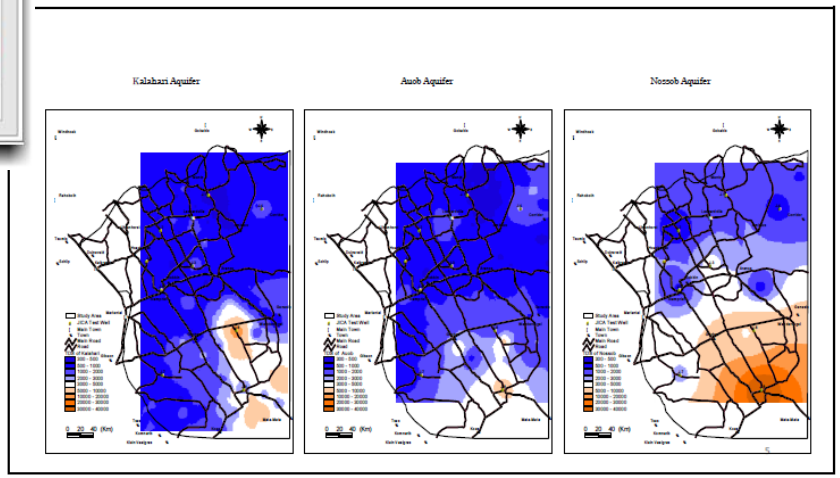




Water Quality







IWRM in Practice

- The need to monitor is to know
- Meeting with various representatives from key stakeholders concerning organization structures
- existing systems– GROWAS 2, HYDSTRA, NA-MIS
- IWRM-WIS close to data providers

	MAWLR DWA					
	DRM	DWSSC	WBM	NamWater	NMS	Other Stakeholder
Main Role	Provision of Water Resource Management and Issue of Permits	Provision of Water Supply and Sanitation Coordination Particularly to Rural Communities	Provide support to National BMCs and International Basin Organisations	Bulk Water Supply Services Provider	Provision of Weather and Climate Services/ Information	MEFT (National Parks), Mines/ Geological Survey, NAU (Agricultural Irrigation Schemes), Cities/Towns, SASSCAL (Rainfall data) and NSA
Monitoring Responsibilities	Collection, Storage and Analysis of National Monitoring Data, Issue of Permits and Coordination of Monitoring Data Collected by Others	Collection of National Monitoring Data initially from the Kavango Regions	Development and Management of Proposed IWRM WIS and support to All Stakeholders	Collection of Production Data and Groundwater Monitoring Data at Selected Pilot NamWater Schemes. Sector Laboratory Services.	Collection, Storage and Analysis of National Climate Data for All Stakeholders	Collection of Monitoring and Production Data at Irrigation Schemes, Cities/Towns, Mines and National Parks

Key:

Key Data Monitoring Stakeholders | IWRM Coordinator

OtherEnd Users | outside of | Proposed Monitoring Modernization (in Red)

Water is Life