

OBSERVATOIRE DU SAHARA ET DU SAHEL
SAHARA AND SAHEL OBSERVATORY

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Strengthening Transboundary Water Resources Management in Africa

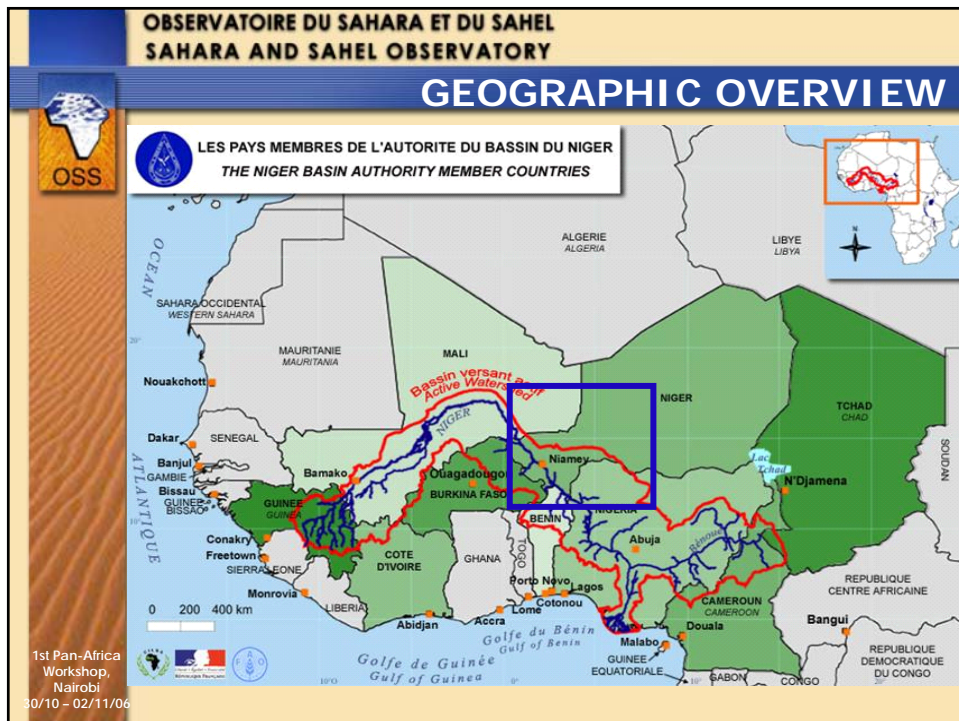
1st Pan-Africa Structured Learning Workshop
30 Oct to 02 Nov 2006, Nairobi

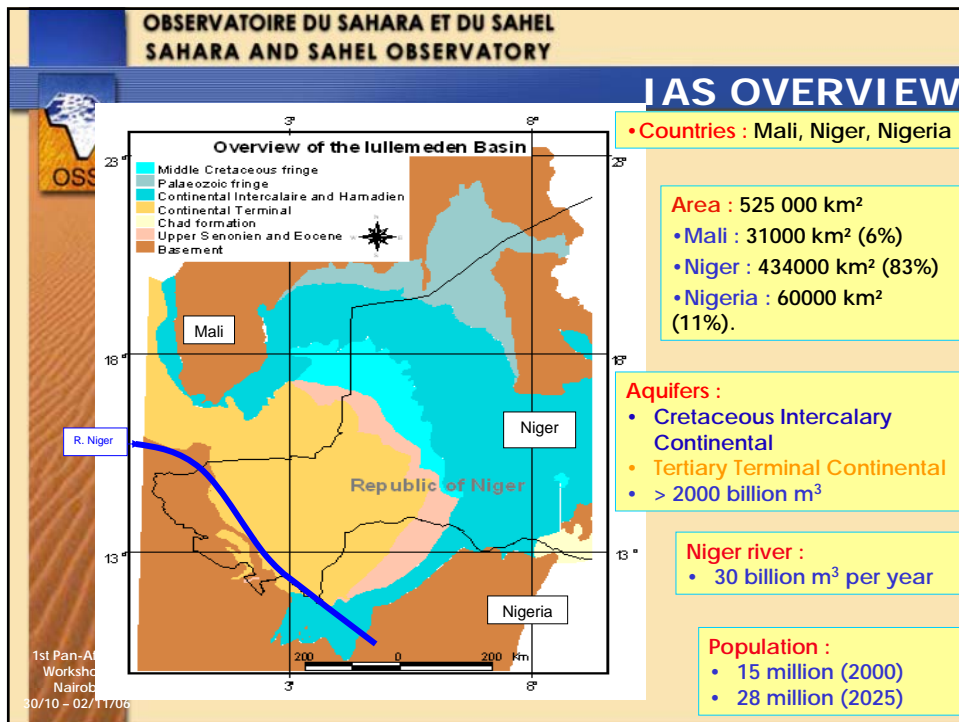
Transboundary Water Management in Iullemeden Aquifer System

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GEF IW WBI in2ent UNEP

Internationale Weiterbildung
und Entwicklung gGmbH Capacity Building
International, Germany







SHARED IAS ISSUES

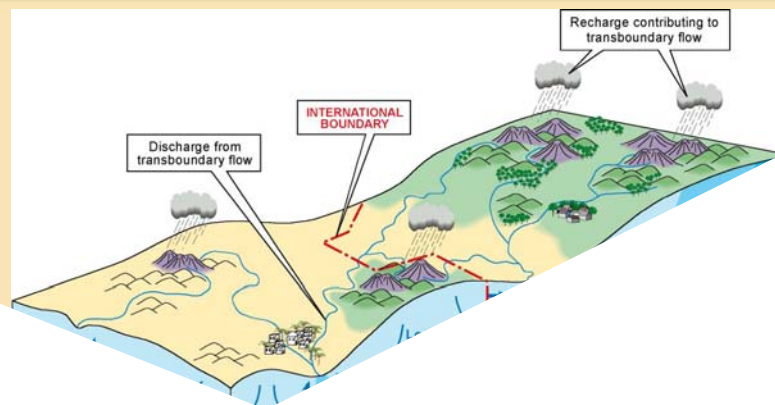
- Increased water demand because of growing population : 15 millions in 2000, double in 2025
 - Climatic Change/Variability → recurrent Droughts & Floods
 - Decreased groundwater recharge rate
 - Land degradation → Loss of 100 000 ha/year
 - Deforestation > 1 million ton firewood
 - Silting : river, lake, pools → flood
 - Lack of exchange information between countries sharing and exploiting the same resource
 - Lack of cooperation on aquifers although existing basins
- Authorities & Commissions in the region : NBA, LGA, etc...

→ Aquifers studied in the national boundary

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TRANSBOUNDARY AQUIFER ISSUES



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→ How to address these transboundary issues?

GENERAL OBJECTIVE MSP GEF/UNEP Project



Within the goal of sustainable :

- environmental protection and sub-regional and national development
- cooperative framework for joint management of risk and uncertainty

To establish the capacity to identify, reduce and mitigate transboundary risks from changing land and water use and from climatic change in the shared Iullemeden Aquifer System

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PROJECT OUTCOMES



- Joint mechanisms for identification of transboundary risk issues in the IAS;
- A joint development and conservation strategy for the IAS;
- A joint tripartite legal and institutional cooperative framework for the IAS;
- Joint programmes for awareness, participation and inter-governmental communication.

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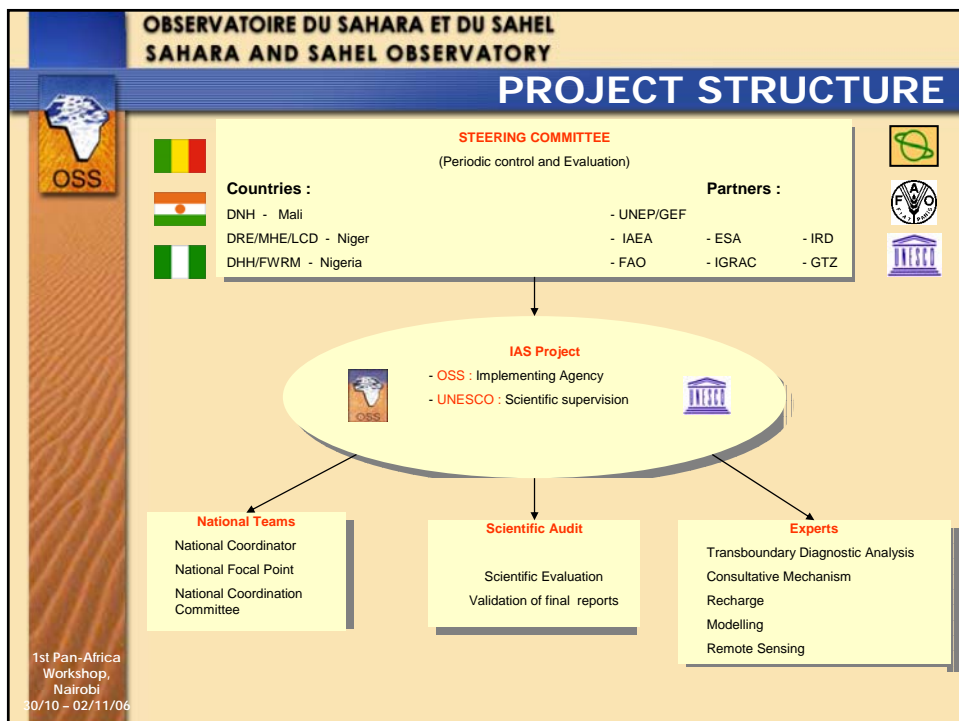
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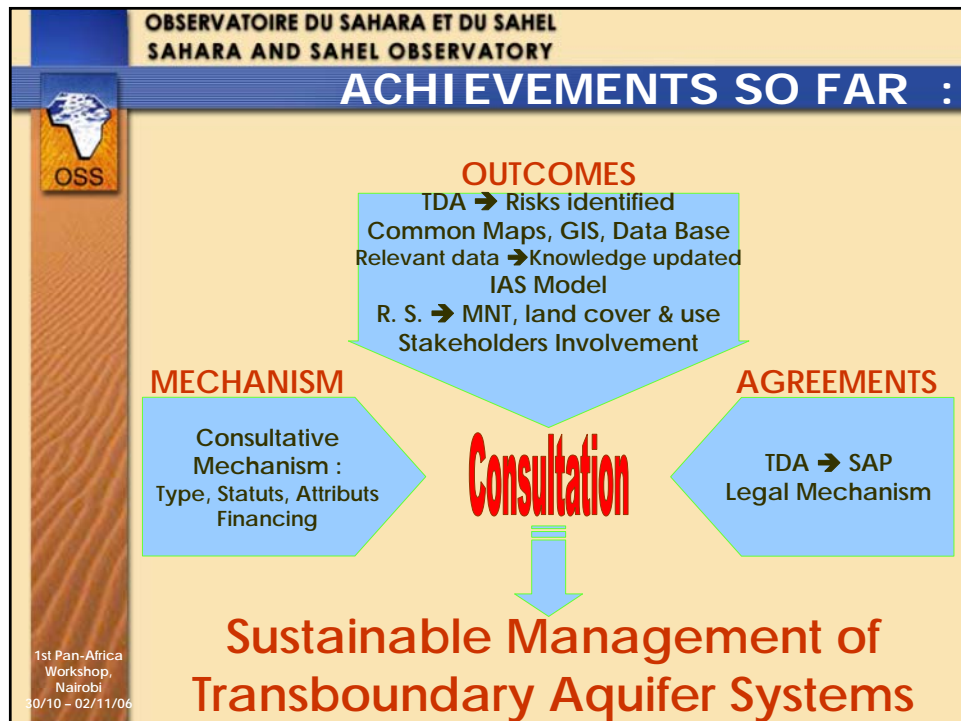
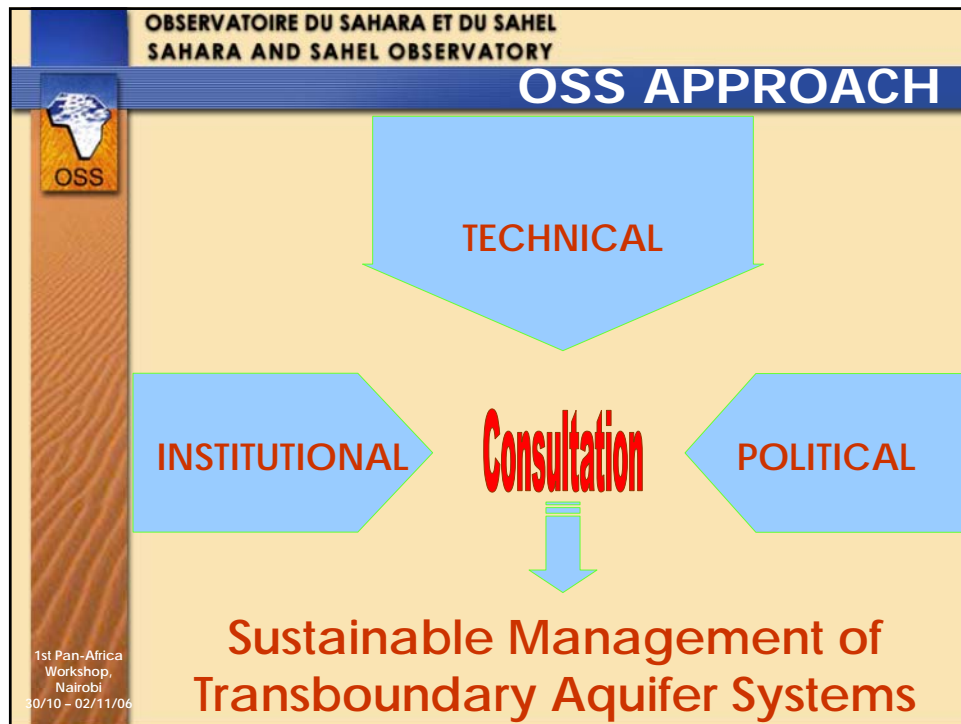
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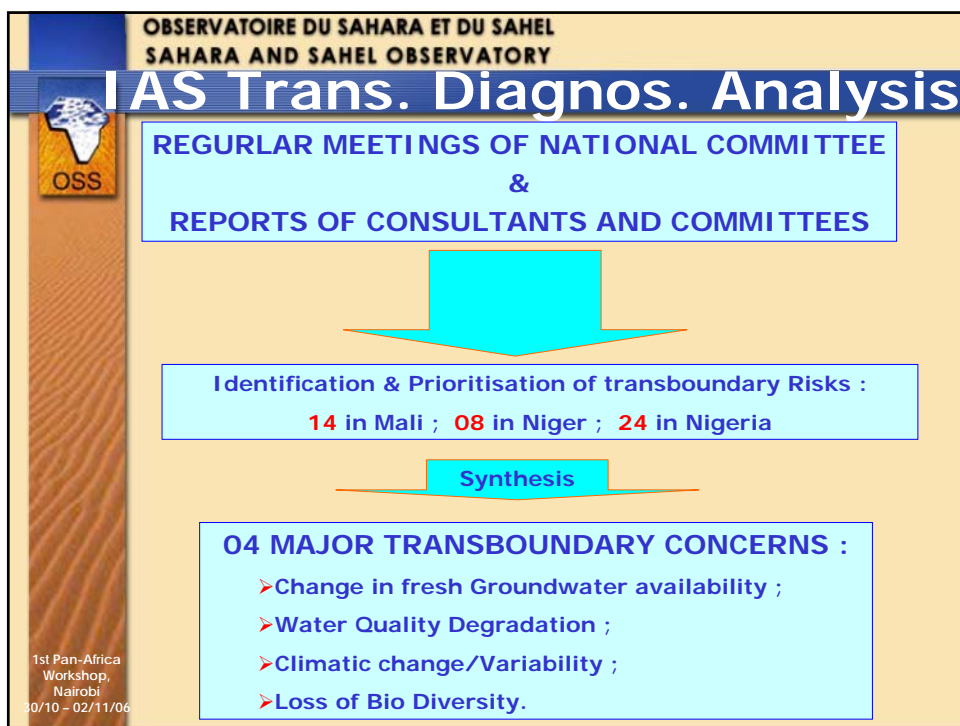
IAS PROJECT COMPONENTS

- Transboundary Diagnostic Analysis ;
- Strengthening the State of knowledge of IAS;
- Consultative Mechanism;
- Awareness, Participation, Capacity Building;

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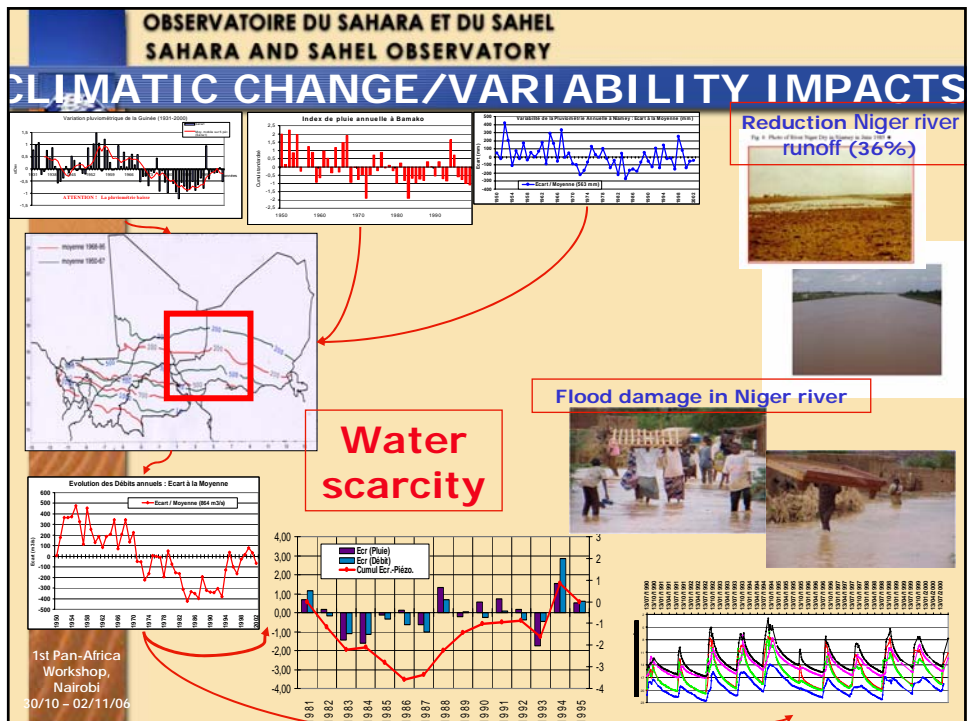
PARTIAL CAUSAL CHAIN ANALYSIS


IMMEDIATE CAUSES	TRANSBOUNDARY ISSUES	UNDERLYING CAUSES	IMPACTS	ROOT CAUSES
<ul style="list-style-type: none"> • Climatic changes, (reduced rainfall and runoff) • Frequent droughts • Reduced connexion between surface water and groundwater because of silting, sand dunes established 	Change in fresh Groundwater availability	<ul style="list-style-type: none"> • Increase in water demand (growth population, mining and agricultural activities) • Inadequate water infrastructure 	<ul style="list-style-type: none"> • Reduced groundwater recharge • Decline of artesian water pressure • Reduced renewable groundwater resource • Alternative water resources 	<ul style="list-style-type: none"> • Increasing population • Deficient political and legal practical framework • Inadequate basin awareness • Insufficient knowledge and participation in sustainable water resource management
High concentration of fluoride, nitrates	Groundwater quality degradation	<ul style="list-style-type: none"> • Pollution by urban, industrial and mining activities • Agricultural activities (pesticides, manures) • Land use and inadequate change in land use 	<ul style="list-style-type: none"> • Soil Salinisation • Less production in agriculture • Diseases • Alternative water resources 	<ul style="list-style-type: none"> • Lack of consultative mechanism in groundwater resources management although several Basin Authorities
Climatic change: droughts, desertification, establishment of sand dunes	Loss of Biodiversity and Biotic resources	<ul style="list-style-type: none"> • Deforestation (firewood) • Uncontrolled hunting activities • Clearing of land for agriculture • Migration of the population from deserted zone to wetlands • Land use and inadequate change in land use 	<ul style="list-style-type: none"> • Employment (firewood) • Reduced tourism • Increase water erosion 	<ul style="list-style-type: none"> • Deficiency in application of law • Lack of exchange of information

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TRANSBOUNDARY ISSUES & MANIFESTATIONS			
ENVIRONMENTAL ISSUES	EFFECTS & SYMPTOMS	TRANSBOUNDARY MANIFESTATIONS	STRATEGIC ACTIONS
Change in fresh Groundwater availability	<ul style="list-style-type: none"> • Increase of percentage of population without access of drinking water • Less agriculture (reduced area under irrigation) • Transfer water (big towns, mining areas) 	<ul style="list-style-type: none"> • Transboundary migration of the population increasing water demand in the new habitat • Increase potential conflicts between farmers and pastoralists using the same water point (well, dug well, boreholes) 	<ul style="list-style-type: none"> • Sustainable and jointly development of water resources • Operational consultative mechanism of water resource management (exchange data, groundwater exploitation modelling,) to alert water scarcity
Groundwater quality degradation	<ul style="list-style-type: none"> • Change option in water demand (fluoride) • Less production of agriculture • Sanitation issues (diseases) • More importation of food • Change option of water use 	<ul style="list-style-type: none"> • Transport pollutions with effects on human population, ecosystem. • Transport of diseases 	<ul style="list-style-type: none"> • Prevention and control of risk pollution • "Pollutant-Payer", taxes • Operational legal framework
Loss of Biodiversity and Biotic resources	<ul style="list-style-type: none"> • Reduced wildlife populations of flora and fauna • Reduced biological properties of the soil (fertilisation) • Increase of denuded areas and loss of wetlands • Increase of water erosion, and sand dunes establishment 	<ul style="list-style-type: none"> • Migration of fauna and flora to wetland and peaceful zones • Migration of the population including diseases migration, destruction of new humid habitat • Migration and increase potential conflicts between farmers and pastoralists 	<ul style="list-style-type: none"> • Strengthening public awareness in support of decision-making processes; • Environmental education for civil society • "Pollutant-Payer", taxes

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IMMEDIATE CAUSE : CLIMATIC CHANGE

Development of sand dunes



Erosion and silting in Niger river



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UNDERLYING CAUSE : Water pollution









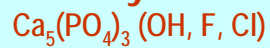
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IMMEDIATE CAUSE : FLUORIDE (6mg/l)

Bony Fluorosis

Apatite in Intercalary Continental aquifer:



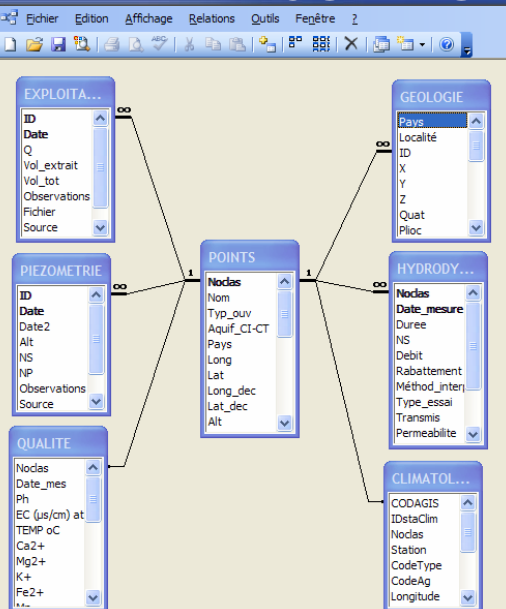
More than 300 victims mainly children incurably deformed



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COMMON DATABASE

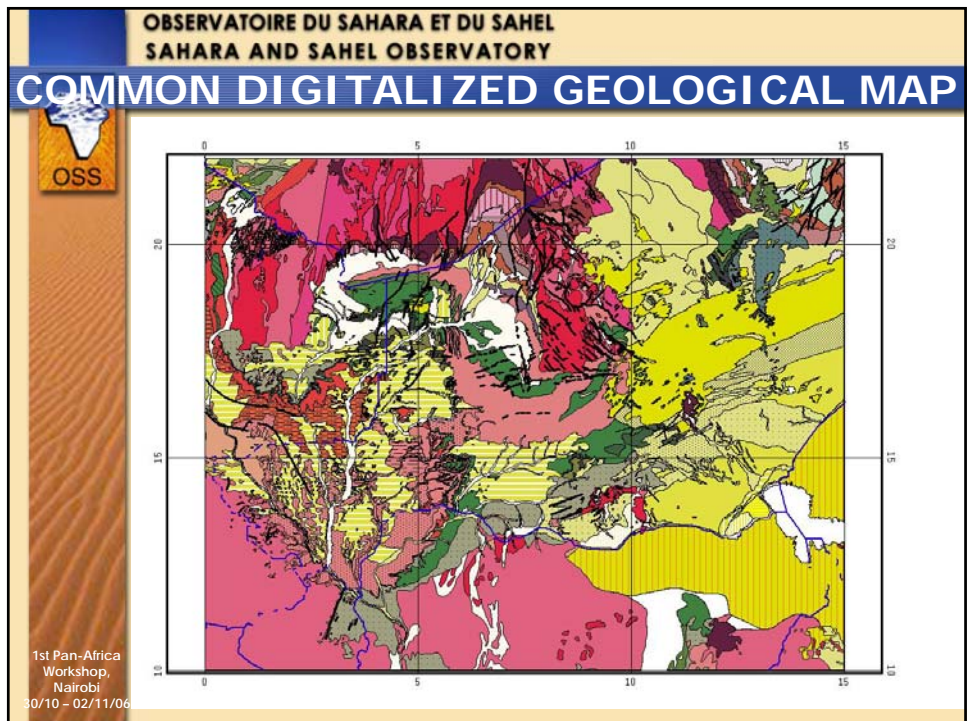


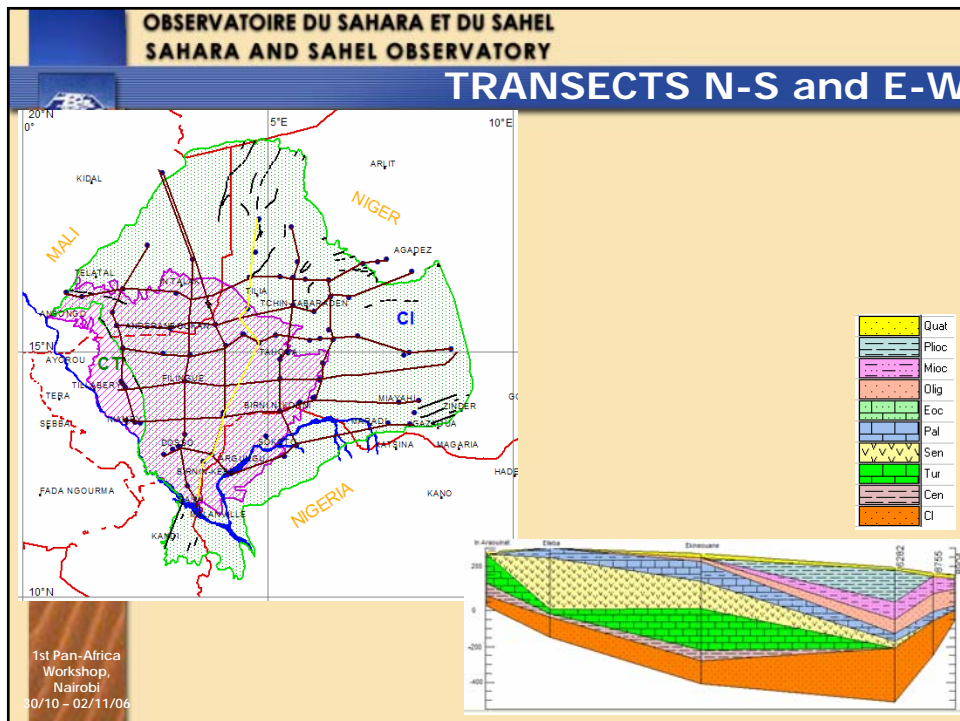
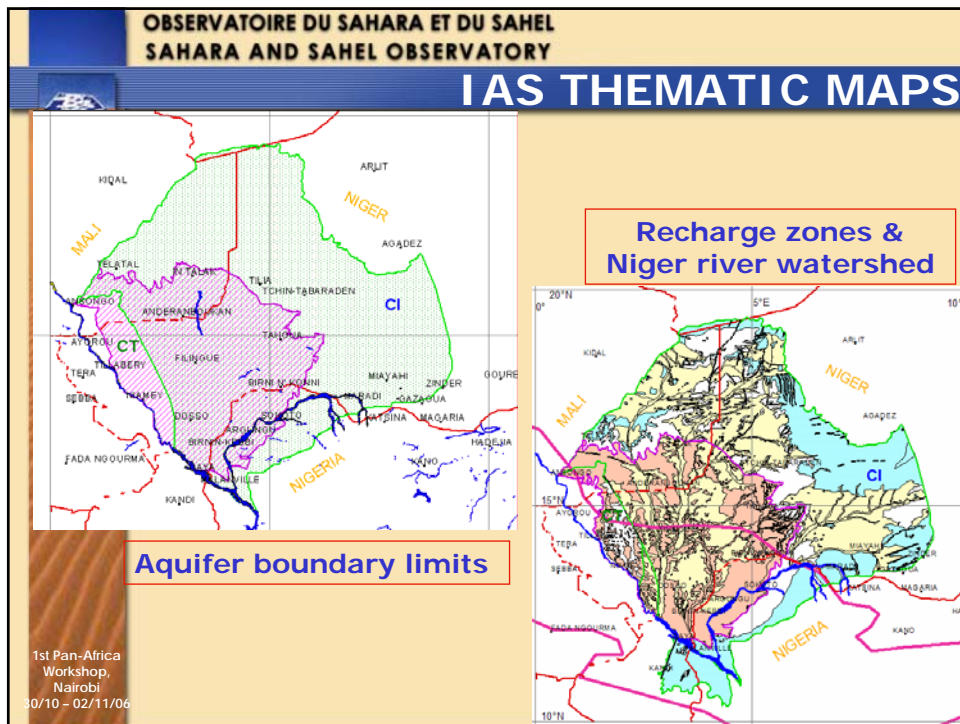
21000 water points
recorded

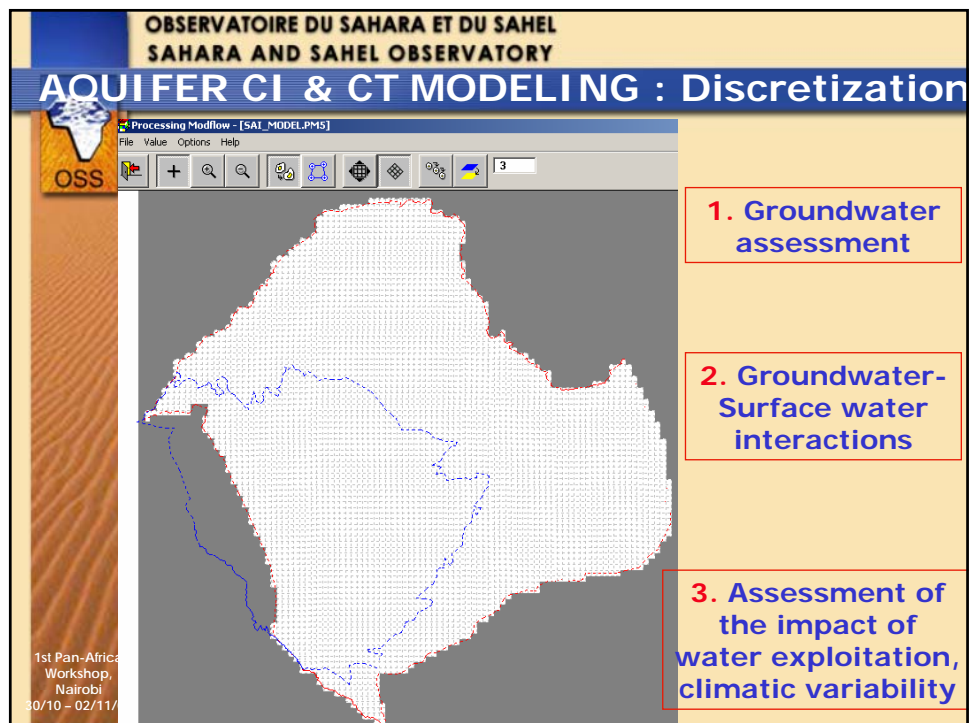
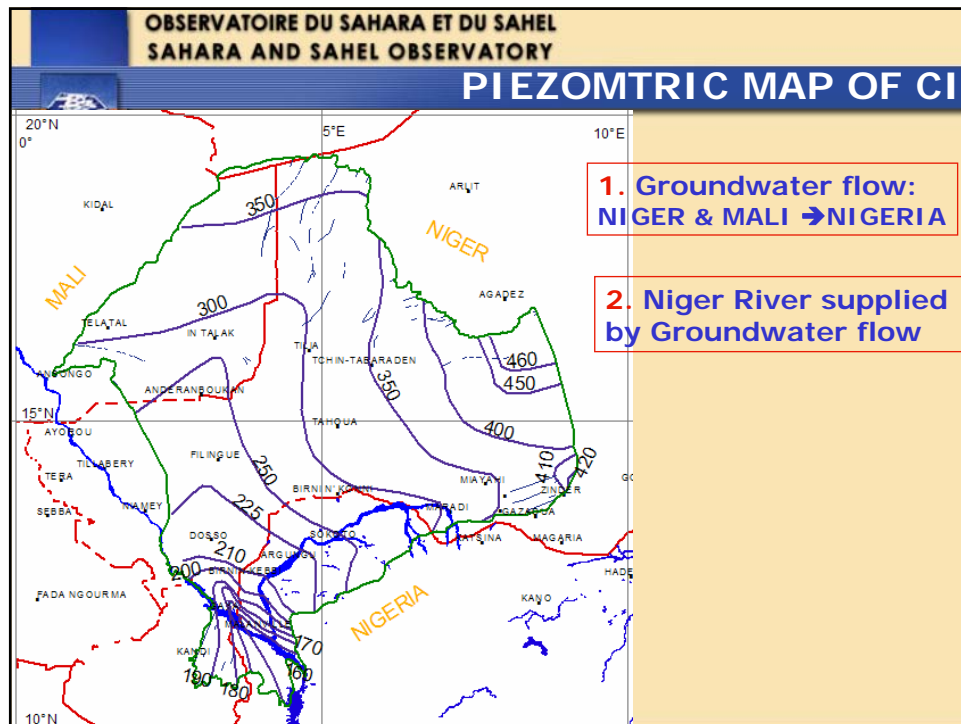
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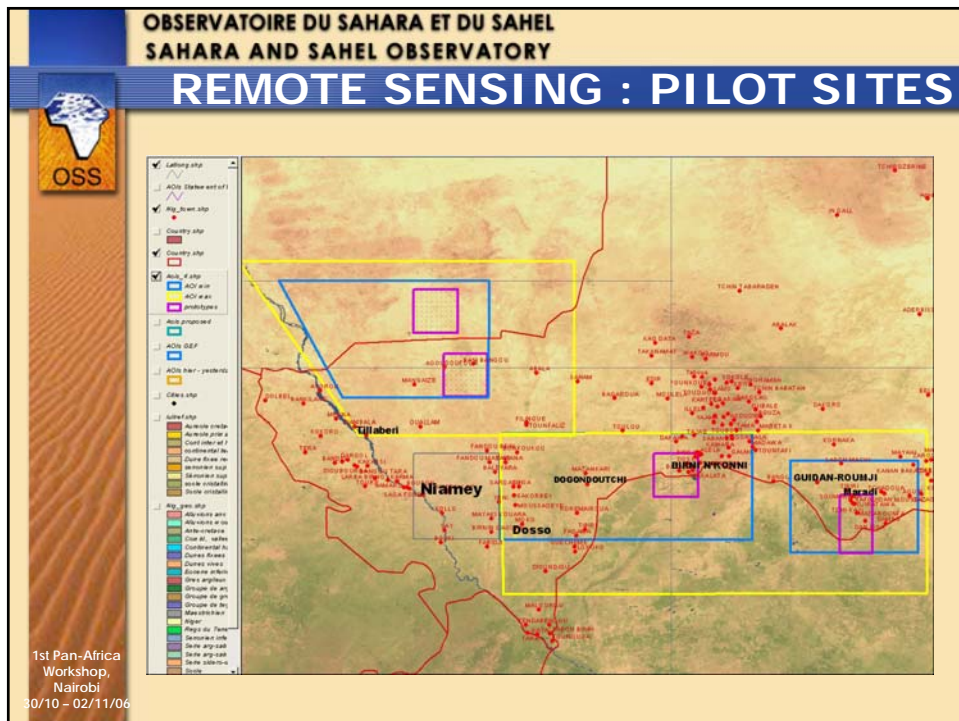
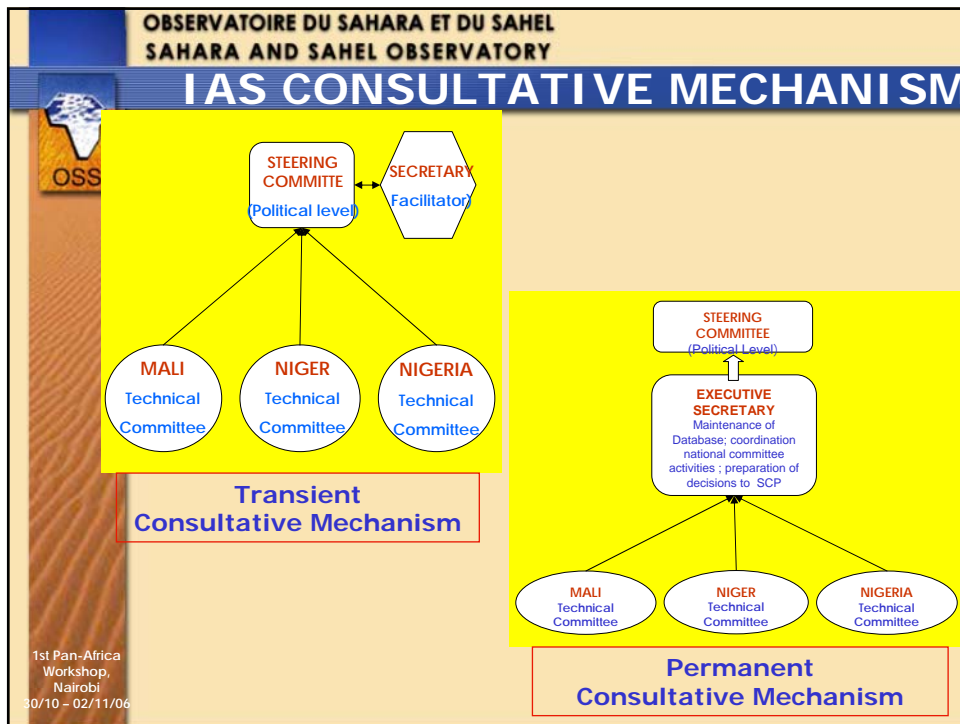
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IAS DATA BASE : 21000 WATER POINTS								
Noclas	Nom	Pays	Aquif_CI-CT	Long_dec	Lat_dec	Alt	Prof	
342084	FIRORE PEULH	Ni	Quat	3.572199	12.591627	202	7.85	
342085	KOURIKOURI PEULH	Ni	CT	3.608308	12.615237	214	17.05	
342086	BOUNDOU DOKI	Ni	CT	3.424981	12.605501	192	23.75	
342087	SABON RIJIA ALLAKIRE	Ni	Quat	3.556925	12.623576	214	5.75	
342088	DAFAM	Ni	Quat	3.536099	12.505521	202	5.15	
342089	LILIDE	Ni	CT	3.57636	12.516623	174	13.3	
342090	KAGO	Ni	Quat	3.602753	12.627743	207	6.7	
342091	TOUNGA II	Ni	CT	3.444409	12.40274	225	13.95	
342092	TOUNGA FOGA	Ni	CT	3.440258	12.427742	230	18	
342093	ANGOAL DOKA ROUGA	Ni	CT	3.52637	12.48052	216	8.57	
342094	MAKANI I	Ni	Quat	3.555533	12.463847	186	7	
342095	MAKANI II	Ni	Quat	3.555523	12.472187	180	6.95	
342097	TAKALAHIA	Ni	CI	3.522202	12.397185	166	100	
343004	TOMBO BERI	Ni	CT	3.423595	11.98052	210	44.9	
343005	TANDA	Ni	CT	3.329136	11.991611	210	11.9	
343006	SABON BIRNI	Ni	CT	3.591649	11.888846	192.5	14.4	
343008	LADAN KOARA	Ni	CT	3.352754	12.166623	271	36.53	
343014	SABON BIRNI	Ni	CT	3.591649	11.888846	170	19.2	
343017	GARIN MAHALBA	Ni	CT	3.408296	12.083296	225	39.75	
343018	TOKOYE BANGOU NORD	Ni	CT	3.299973	12.149952	243	16.5	
343020	TARA PROJET	Ni	CT	3.333315	11.899961	168	19	
343023	TANDA	Ni	Palz	3.316644	11.991618	214	71	
343024	TANDA	Ni	CT	3.316644	11.991618	212	41	
343025	TANDA	Ni	CT	3.316644	11.991618	212	47	
343026	TANDA	Ni	CT	3.316644	11.991618	214	47	
343028	TARA	Ni	CT	3.333315	11.899961	168	29.03	
343032	GATAWANI BERI	Ni	CT	3.561087	11.788852	239	10.3	
343034	LADAN KOARA	Ni	CT	3.352754	12.166623	272	37.3	
343035	SABON BIRNI	Ni	CT	3.591649	11.888846	207	21.35	

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CHALLENGES


- Quantification and Analysis of Transboundary risks in IAS
- Addressing lack of data/information : A need for country capacity building ;
- Rational management of surface water and groundwater ; and
- institutional anchoring of the tripartite consultative mechanism for cooperation and coordination.



LESSONS LEARNT

- Efforts of only one country could not identify and reduce transboundary risks → Basin awareness ;
- Transboundary aquifers need dependent investment strategies compared with transboundary surface water → Better knowledge of groundwater flow patterns;
- Appropriate legal & institutional Consultative Mechanism of transboundary aquifer Systems;

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LESSONS LEARNT

- Need for countries Capacity Building to “speak” same technical language and get the same vision of the transboundary issues;
- Need of involvement of appropriate stakeholders : transboundary groundwater crises have many faces;

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THANKS








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