



**POTENTIAL USE OF SPACE TECHNOLOGY TO
SUPPORT DISASTER MANAGEMENT IN AFRICA.**

**HYDRO-NIGER PROJECT OF TELEMETRIC DATA
COLLECTION IN THE REGIONAL BASIN OF NIGER
FOR FLOOD FORECASTING AND MUTUAL USE OF
THE RESOURCES IN THE CATCHMENT OF THE SUB-
REGIONAL BASIN OF WEST AND CENTRAL AFRICA**

BY

**MR JOHN SHAMONDA
FEDERAL MINISTRY OF WATER RESOURCES
NIGERIA**

INTRODUCTION

The Niger Basin Authority (NBA) started originally as the River Niger Commission when it was created in 1964. It existed under the name for about 17 years after which the name was changed to the NBA on 1st January, 1980 at a meeting held in Faranah, Republic of guinea. The headquarter is at Niamey, Niger republic.

•The NBA comprises of 9 member states: Benin, Burkina Faso, Cameroon, Cote D'Ivoire, Guinea, Mali, Niger, Nigeria and Chad. These states are a mixture of French and English speaking Countries thus the official language of the organization are English and French

AREAL EXTENT

- **Physically, the Niger River Basin covers a good part of west Africa and part of Central Africa. Theoretically the basin covers an area 2,288,000km² . However, its active catchment area cover 1,471,000km² shared in the proportion shown in Table 1 below.**

AIM AND OBJECTIVES OF THE NBA

•To promote co-operation among the member countries and seeks integrated development of its resources notably in the fields of energy, water resources, agriculture, forestry, exploitation, transport, communication and industry.

•**The objectives are:**

•to harmonize and co-ordinate national policies for the development of the resources of the basin.

•to plan the development of the basin by preparing and executing an “Integrated Development Plan” of the basin.

•to design, realize, exploit and maintain common works and projects

•POPULATION WITHIN THE REGIONAL CATCHMENT BASIN

•The population of the people living in the basin is about 84 million and is distributed as shown in Table I below:

•Country	Basin Population	Proportion of Active Basin (%)	GNP(\$)
•Benin	1,950,500	2.5	360
•Burkina Faso	2,100,500	3.9	190
•Cameroon	2,100,500	4.4	970
•Cote D'Ivoire	800,000	1.2	740
•Guinea	2,500,000	4.6	
•Mali	4,000,000	30.3	210
•Niger	2,700,000	23.8	260
•Nigeria	67,000,000	28.3	370
•Chad	80,000	1.0	150

TECHNICAL ACTIVITIES OF THE NBA USING HYDRO-NIGER PROJECT

With the establishment of the Hydro-Niger Project and real time hydrological forecasting system in the basin all the NBA member Countries are assisted in their drought and flood control activities, secure hydro-agricultural and hydro-electrical infrastructure as well as the improvement of river navigation. The implementation of this activity has been in phases.

HYDRO-NIGER PROJECT RESOURCES

At present the Hydroniger operational resource include:

- an operational network of hydrological stations connected by satellite
- a computerized centre for data collection, processing and dissemination
- a hydrological data management system, entirely operational,
- a specialised infrastructure to carry out its function effectively, including support to the national centres in each of the riparian Countries.

•EQUIPMENT

•Specifically, the project equipment consist of :

	65 data collection platform	
•	Benin	2
•S	Burkina Faso	1
•S	Cameroon	4
•S	Cote D'Ivoire	2
•S	Guinea	7
•S	Mali	22
•S	Niger	9
•S	Nigeria	18

•2 Argos Direct receiving stations (ADRS) in each of the Countries, called National Forecasting centres (NFCs)

• 1 ADRS at the Inter-state Forecasting Centre (IFC), Niamey, Niger Republic.

The Argos Satellite System:

This consists of 2 satellite in the TIROS-N series belonging to NOAA (National Oceanic and Atmospheric Administration) of the USA. The satellite are polar-orbiting at an altitude of about 850km above the earth. Each satellite revolves around the earth 14 times a day at an average of 102 minutes interval. Our basin is about 4,500km wide and our receiving stations can receive, theoretically between 3 and 14 if these satellite transmissions per day. Actual receptions are however 6-8 per day. Additional characteristics are as follows:

Satellite Technical Details:

Name of Satellite	-	NOAA 9, NOAA 6
Satellite Receiving System	-	Argos
No of Satellites	-	2
Orbit Altitude	-	800 km
Orbiting time	-	102 Minutes
Reception Time During Orbit over basin	-	12.5 minutes
Look Down Range of Satellite	-	5000 km
Polar Circumference of Earth	-	40,000 km
Operating Transmission frequency of satellite	-	NOAA-137.77MHz NOAA- 136.77MHz

MATHEMATICAL MODEL FOR HYDROLOGICAL FORECASTING:

The project utilises 3 models for its work. These are:-

Computerized Forecasting System (CFS)

This model covers the entire basin and utilises 4 modelling methods.

The Floods propagation Model

This model covers only the Inland Delta of the Niger River in Mali. It will be extended to the whole basin later.

•CONCLUSION:

- It is to be noted that apart from the benefits derived from the telemetric data system and forecasting facilities of the Hydro - Niger Project for development and management of the water resources in the regional basin and for mitigation of hazards, the real - time data collected are also used in the WMO - Assisted World Hydrological Cycle Observing System (WHYCOS) launched in the region in Nov. 1999 under Hydrological Cycle Observing System of West and Central Africa (HYCOS - WCA) but tagged HYCOS - AOC in French Acronyms.
- The facilities of the Hydro - Niger Project is also used in the recently launched Global Environment Facility (GEF) project, the project that seek to address the degradation trends in the use of land and water resources in the region.
- At the meeting of the summit of the Heads of states of the member states of the regional co-operation, Cameroon and Nigeria have agreed to improve on the data collection platforms and also increase the network density.
- The new system is to use the Meteosat satellite instead of the existing Argos system.