

NIGERIA



General

Nigeria – officially The Federal Republic of Nigeria - is bordering Benin in the West, Chad and Cameroon in the East, and Niger in the North. Its coast in the South lies on the Gulf of Guinea in the Atlantic Ocean. The area of the country is 92.4 Mha (million hectares) with, in 2024, a population of 233 million, or 2.5 persons per ha (Wikipedia and United Nations, 2024).

Climate and geography

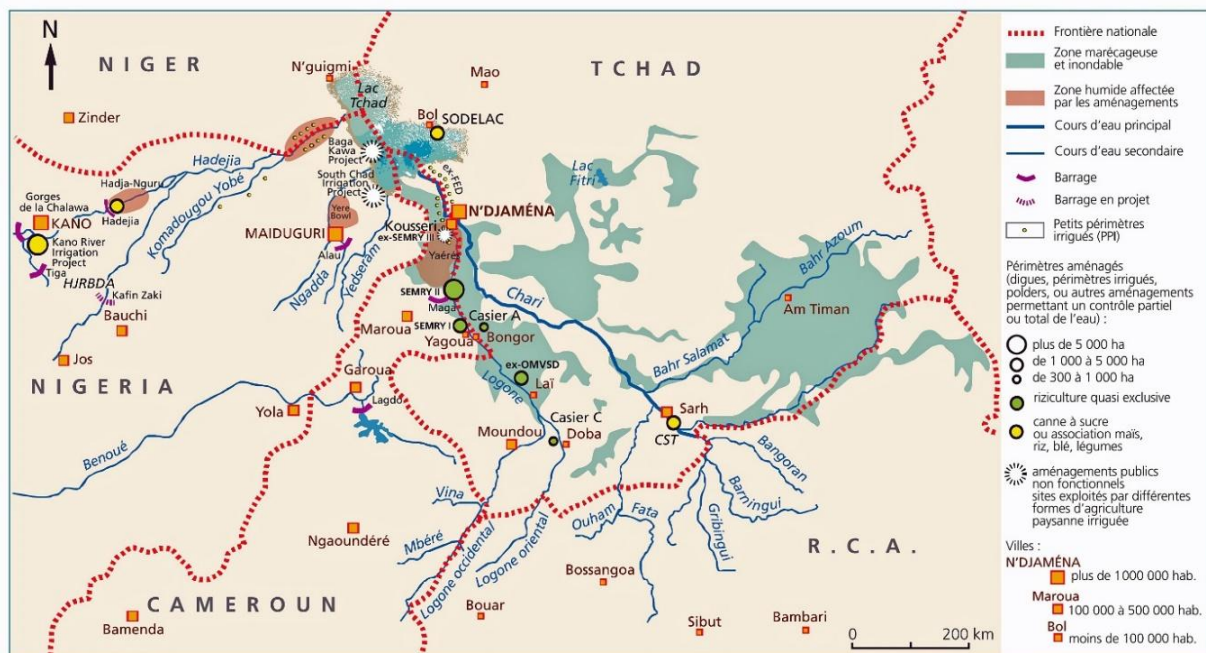
Source: esri

In the savannah, which covers most of the country the rainfall is between 500 and 1,500 mm/year. In the Sahel region, rain is less than 500 mm/year and the Sahara Desert is encroaching. The far South of Nigeria has a tropical rainforest climate, where annual rainfall is 1,500 to 2,000 mm/year (source: Wikipedia).

Nigeria has a varied landscape. The most expansive topographical region is that of the valleys of the Niger and Benue rivers, which converge and discharge into the Niger Delta. This is one of the world's largest river deltas. Coastal plains are found in the Southwest and the Southeast. This forest zone's most southerly portion is defined as *salt water swamp*, also known as a mangrove swamp because of the large amount of mangroves in the area. North of this is fresh water swamp. The area near the border with Cameroon close to the coast is rich rainforest and part of the Cross-Sanaga-Bioko coastal forests ecoregion. The area of southern Nigeria between the Niger and the Cross Rivers has lost most of its forest because of development and harvesting by increased population, with it being replaced by grassland (source: Wikipedia).

Sylla (1994) describes that around 1960 rice was introduced in the Niger Delta in the zone of the freshwater swamps. General flood protection and drainage are required to attain reasonable rice yields.

Lemoalle and Magrin (2014) describe the situation around Lake Chad in the dry North-east corner of the country, which Nigeria shares with Niger, Chad and Cameroon. They also show the irrigation schemes in the Lake Chad Basin (Figure 1). Part of these schemes are polders in the flood prone areas and around Lake Chad.



Existing polders

The Group Polder Development (1982) collected data on 12 (potential) polders in Nigeria. These are listed underneath.

Baga Polder (20,000 ha). The Baga Polder is located in the Northeast corner of Nigeria near Lake Chad (Figure 2). The soils are mainly light textured. The 32 km long dike was completed in 1980 and the agricultural development started late 1981 (Okafor, 1984). Besides the dike, other main features are an intake canal and two supply pumping stations. Excess water is removed from the polder by a network of open drains and a drainage pumping station.

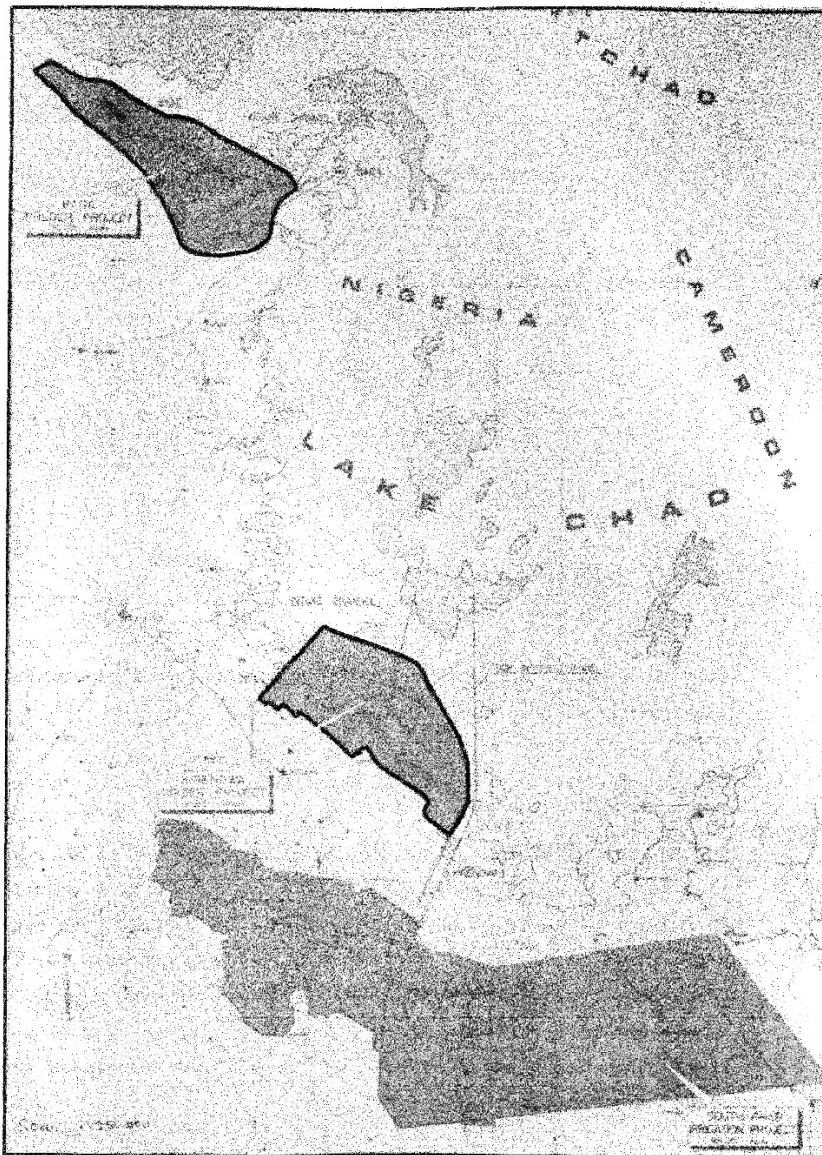


Figure 2. Baga Polder and Kirinowa Polder near Lake Chad (Group Polder Development, 1982)

Hadejia Valley Irrigation and Drainage Scheme (12,500 ha). Brouwer (1983) gives details about the scheme (Figure 3). The area is provided with an irrigation system and dikes for flood protection. During the dry season the drainage water is collected in a network of tertiary, secondary and main drains and released through an outlet sluice to the Hadejia River. During the flood season the drainage water is released to an existing lake within the protected area that functions as a drainage buffer (Figure 4). The excess water from the drainage buffer can be released through an outlet sluice to the downstream floodplain, or when possible to the river. In total around 20,000 ha has been identified as suitable for agricultural development, provided that there will be flood protection.

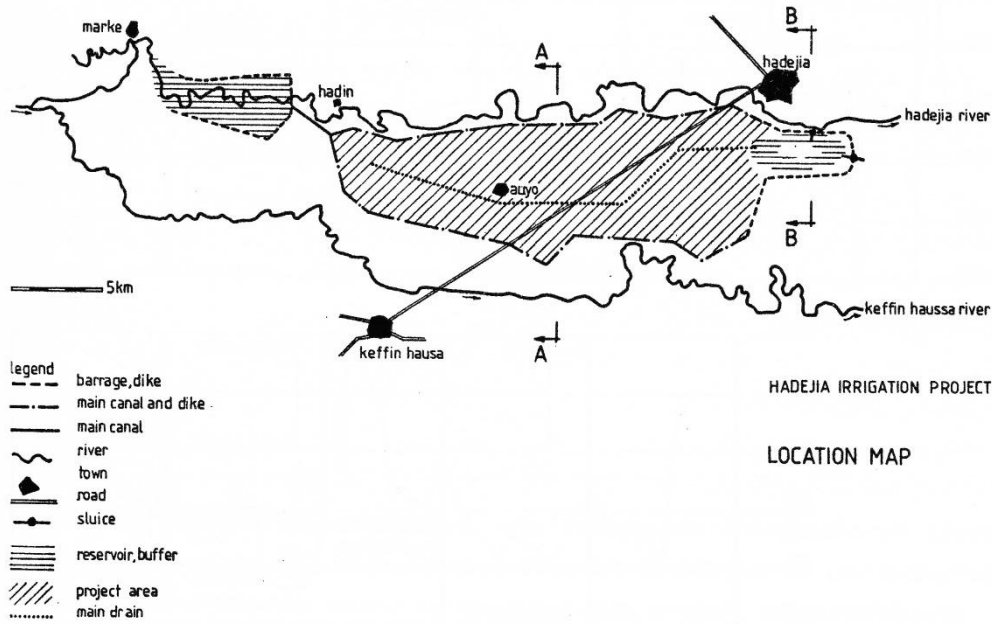


Figure 3. General lay out of Hedejia Valley Irrigation and Drainage Scheme (Brouwer, 1983)

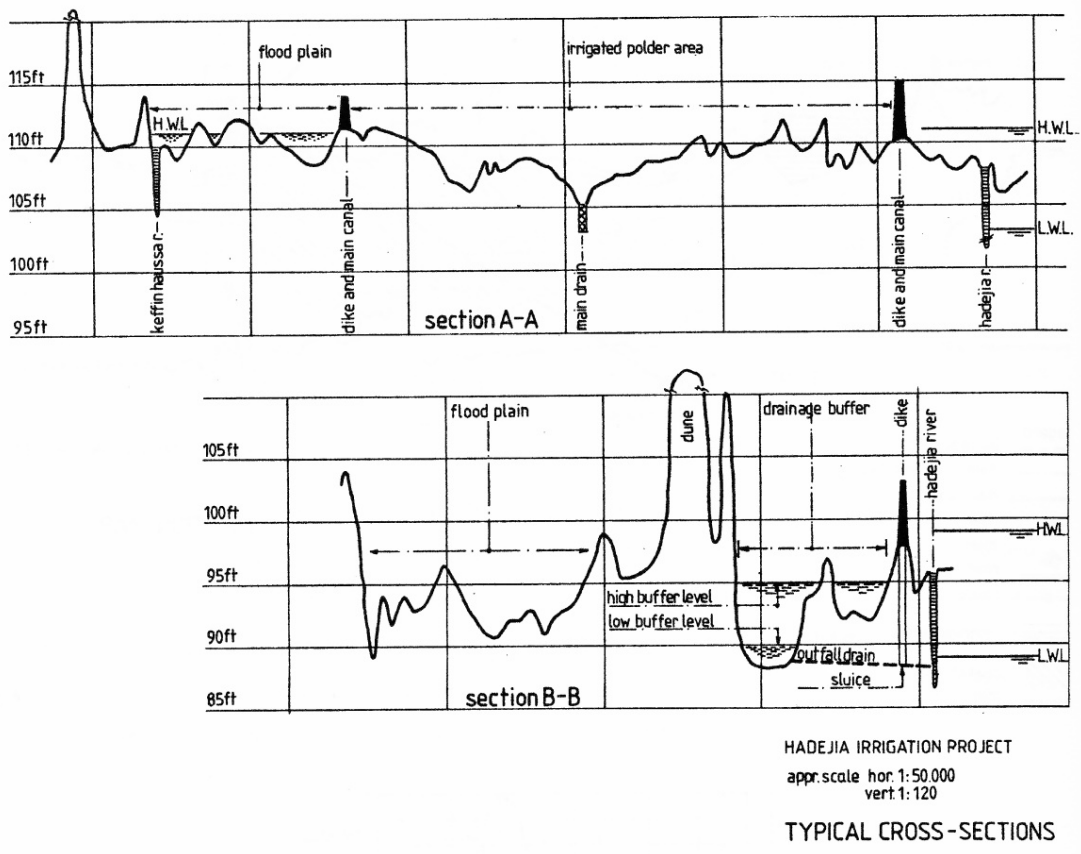


Figure 4. Typical cross-sections of Hedejia Valley Irrigation and Drainage Scheme with the drainage buffer (Brouwer, 1983)

Rice polders in the Niger Delta. Three rice polders exist in the Niger Delta, being: Peremabiri Pilot Polder, Opuama River Polder and Otuokpoti Village Rice Polder. The Peremabiri Pilot Polder was constructed in 1963. It has an area of 24 ha. The main objective was to carry out experiments on the

cultivation of rice and other crops as well as to introduce mechanized farming. The Opuama River Polder is a 106 ha rice polder, and the Otuokpoti Village Rice Polder is a 100 ha rice polder.

Kirinowa Polder (20,000 ha). The Group Polder Development (1982) also stated that the proposal for the Kirinowa Polder was rather similar to the Baga Polder, located South-east of Baga (Figure 2), that feasibility and design work had been completed and that construction work was to commence in 1982.

Zauro Pilot Polder. In the northern part of Birnin Kebbi in Kebbi State a pilot polder covering 100 ha was inaugurated in 1982 (Idah *et al.*, 2009). This is a pilot for the proposed Zauro Polder Irrigation Project of 10,000 ha along the Rima and Niger Rivers. The actual start of the whole polder has several times been proposed, but has so far not been implemented.

General characteristics of the polders in Nigeria are shown in Table I.

Proposed polders

Following the Peremabiri Pilot Polder plans have been made to enlarge the polder to 1,250 ha (Figure 5). However, at Google Earth it can be observed that the polder most probably has not been constructed, but that the area has been abandoned.

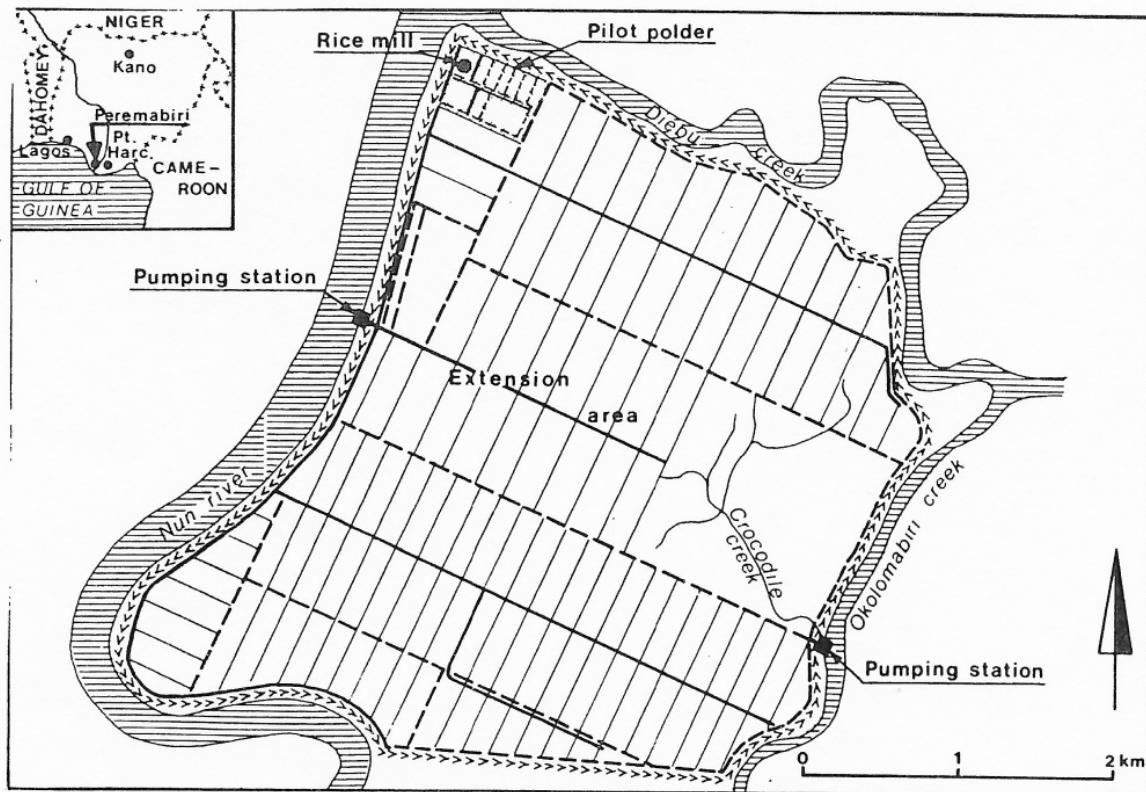


Figure 5. Peremabiri Rice Polder (Group Polder Development, 1982)

South Chad Irrigation Project. This area is mentioned by Lemoalle and Magrin (2014). They state that this polder together with the Baga Polder would cover almost 200,000 ha. However, it looks like that only the Baga Polder has been made.

According to the Group Polder Development (1982) in addition some 16 village rice polders were proposed, or under construction, including: Anyama Village Rice Polder, Ogobiri Village Rice Polder, Ondewari Village Rice Polder, Ighumatoru Village Rice Polder and Isampou Polder.

Kainji Lake Basin. Because of the construction of the Kainji dam opportunities have been created for agricultural development in the Kainji Lake Basin. Nearly 19,000 ha of land between the high lake level, emerging when the lake level is lowered have been identified to be fit for agricultural exploitation.

Location of the polders in Nigeria as shown on the World polder map

The location of the polders in Nigeria is shown in Figure 6.



Figure 6. Location of the polders in Nigeria (source: esri – Batavialand)

References

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Notes

- Banana Island is a landfill of 163 ha, which was reclaimed in 2004;
- Lagos Island (-0.2 m) might be a polder;
- The paper Performance of some elite spring wheat genotypes under irrigation at Kirinowa, Borno State, Nigeria by A.T.S. Bibinu and K.W. Gwadi, Journal of Biology, Agriculture and Healthcare Vol.4, No.2, 2014 doesn't contain relevant information on polders;
- In Centre for Civil Engineering Research and Codes (CUR) and Ministry of Transport, Public Works and Water management, 1993. *Hydrology and water management of deltaic areas*. CUR report 93-5. Gouda, the Netherlands. there is no reference to polders in the Niger Delta.

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Lelystad, September 2024

Table I. General characteristics of existing and proposed polders in Nigeria

Name	Reclamation	Area in ha	Type *)	Latitudes	Longitudes	Elevation in m+MSL	Land use
<i>Existing polders</i>							
Peremabiri Pilot Polder	1963	24	RLL	4° 38' N	6° 05' E	4	Rice
Baga Polder	1982	20,000	RLL	13° 07' N	13° 52' E	283	Agriculture
Zauro Pilot Polder	1982	100	RLL	12° 28' N	4° 11' E	199	
Hadejia Valley Irrigation and Drainage Scheme		12,500	RLL	12° 26' N	10° 02' E	357	Various crops
Kirinowa Polder		20,000	RLL	12° 20' N	13° 52' E	289	
Opuama River Polder		106	RLL	5° 54' N	5° 04' E	11	Rice
Otuokpot Village Rice Polder		100	RLL	4° 49' N	6° 16' E	14	Rice
Sub-total		52,830					
<i>Proposed polders</i>							
Anyama Village Rice Polder		100	RLL				
Ighumatoru Village Rice Polder		100	RLL				
Isampou Polder		10,100	RLL				
Kainji Lake Basin			RLL				
Ogobiri Village Rice Polder		100	RLL				
Ondewari Village Rice Polder		100	RLL				
Peremabiri Rice Polder			RLL				
Zauro Polder		10,000	RLL				
Sub-total		20,500					
Total		83,330					

*) RLL = reclaimed low-lying land; LGS = land gained on the sea; DL = drained lake