GUINEA-BISSAU

Source: esri

General

Guinea-Bissau - officially the Republic of Guinea-Bissau – is bordered by Senegal in the North, Guinea in the East and the South and the Atlantic Ocean in the West. Its area is 3.6 Mha (million hectares) with in 2020 a population of 2.0 million, or 0.56 persons per ha (Wikipedia and United Nations, 2019).

Climate and geography

Guinea-Bissau is warm all year around and there is little temperature fluctuation (average 26.3 °C). The average annual rainfall is 2,020 mm, which almost entirely occurs during the rainy season between June and September/October. From December through April, the country experiences drought (source: Wikipedia).

Sylla (1994) describes that along the Geba River the tidal amplitude varies between 5,60 m in the mouth till 2,50 m about 100 km upstream. Sylla also describes that mangrove rice growing started in the middle of the 18th century in Guinea and Sierra Leone. Traditional systems are still the most widespread and they are applied, for example in Guinea-Bissau (bolanha system), Guinea, Senegal (diola system) and Sierra Leone. The bolanha and diola systems consist of small basins or strips of land that are surrounded by dikes. Within these polders the rice is cultivated on ridges. Timely drainage is required to flush the salts and acids that have accumulated in the polders during the dry season. The traditional systems of rice cultivation have functioned well until the persisting droughts started in 1969. The most affected zones are mainly in the northern, and drier part of coastal West Africa, including Guinea-Bissau, Gambia, Senegal and to a some extent Guinea.

Van Gent and Ukkerman (1993) state that in Guinea-Bissau since the beginning of the 20th century Balanta people have reclaimed mangrove swamps for rice cultivation. They show a schematic cross section of the landscape (Figure 1). They also give a detailed description of the different types of cultivation. In total about 100,000 ha of tidal foreland have been (semi-)impoldered for rice cultivation (Oosterbaan and Vos, 1980; Group Polder Development, 1982; Oosterbaan, 1983).

Traditional construction of a bolanha dike and drain by Balantas

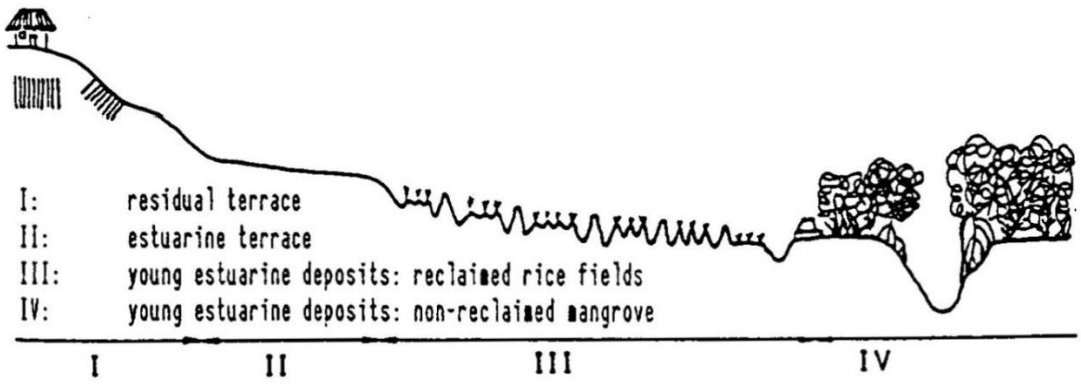

Figure 1. Schematic cross section of the landscape, showing the three major landscape elements (Van Gent and Ukkerman, 1993)

Oosterbaan (1983) describes that following an old tradition the people constructed dikes of 1.5 to 2.0 m high along tidal creeks so that the land behind the dikes was no longer inundated by sea water at high tide (Figure 2). Within the rice polders small bunds of 0.30 m high divide the polders into compartments of irregular shape and size (Figure 3). Excess rainwater is drained from the polders trough culverts, traditionally made of hollow trees and provided with a stop to prevent entry of saline water (Oosterbaan, 1983). Oosterbaan (1983) also describes that in the 1970s a program of casting dams across the smaller creeks has been introduced. In this way, the number and length of dikes could be considerably reduced (Figure 4). In the report of the Vakgroep Weg- en Waterbouwkunde en Irrigatie (1988) it is mentioned that in the 1960s in the coastal area forty of such dams have been made and that there were plans to make another forty. However, Oosterbaan mentions that this activity was not very successful for various reasons.

Dam in a creek under construction

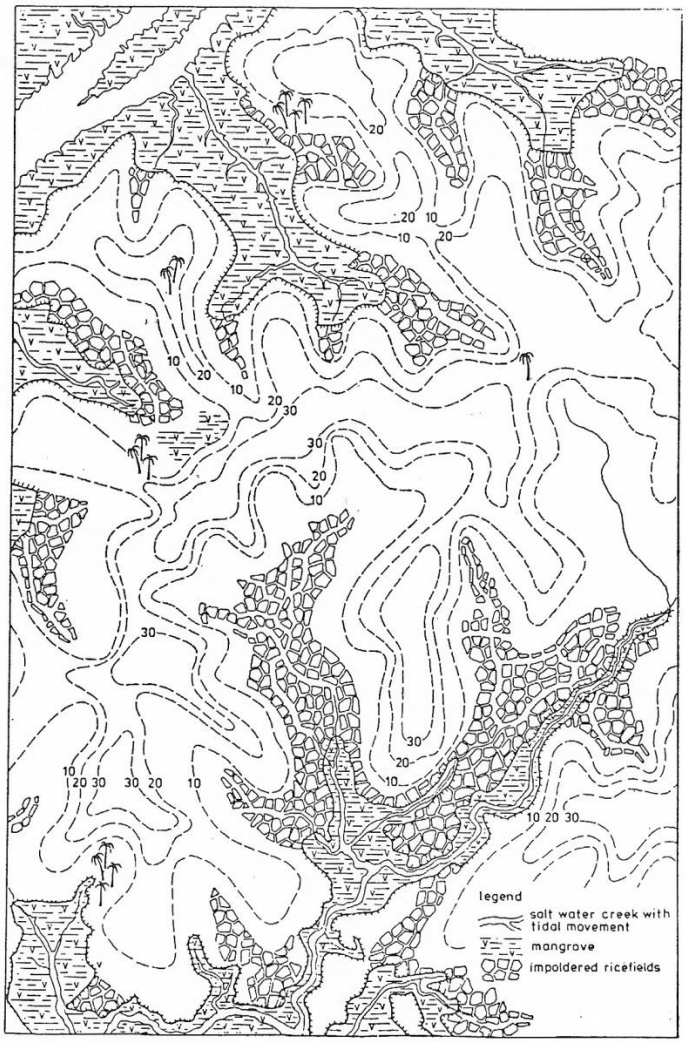

Figure 2. Detail of the coastal region (Oosterbaan, 1983)

Figure 3. Irregular size and shape of the rice polders, bolanha (source: Google Earth)

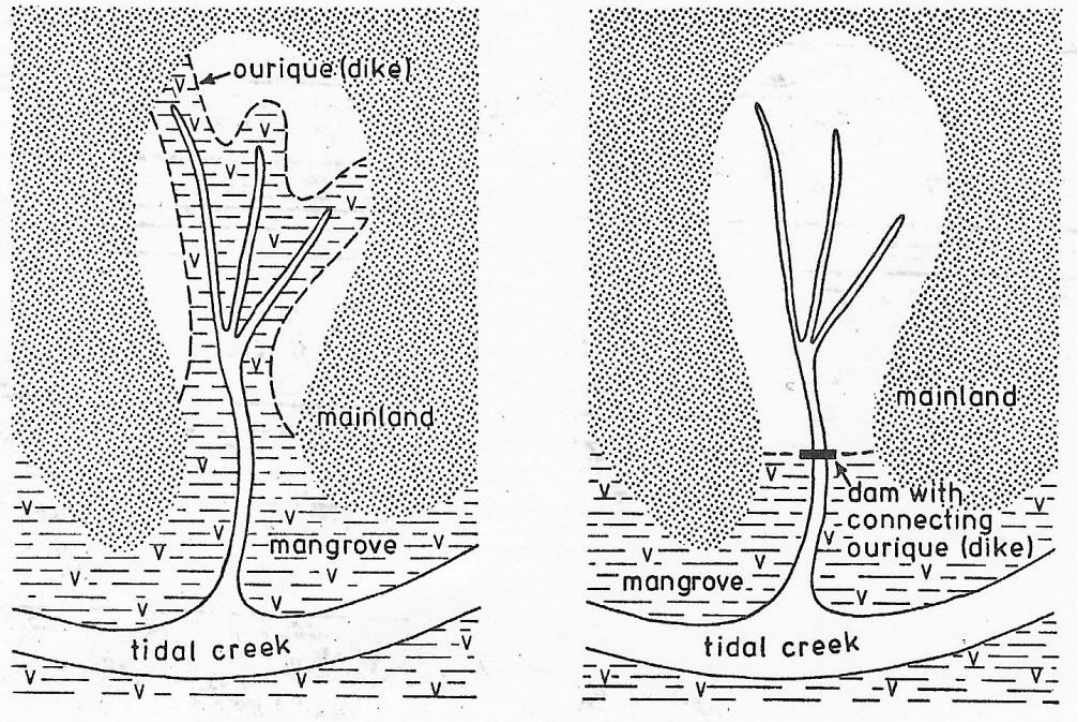

Figure 4. Polders with dikes (left) and dam (right)

The Vakgroep Weg- en Waterbouwkunde en Irrigatie (1988) also shows a schematic lay out of a bolanha system (Figure 5). They give a detailed description of the construction of the polders, including the construction of traditional dams in creeks made of rows of mangrove trunks filled with clay (Figure 6). In the 1950s this practice was changed and the dams were made from laterite that was excavated from the higher areas. In the 1970s concrete sluices were introduced for the drainage of excess water through the dams, or to let saline water in for flushing of acidity (Figure 7).

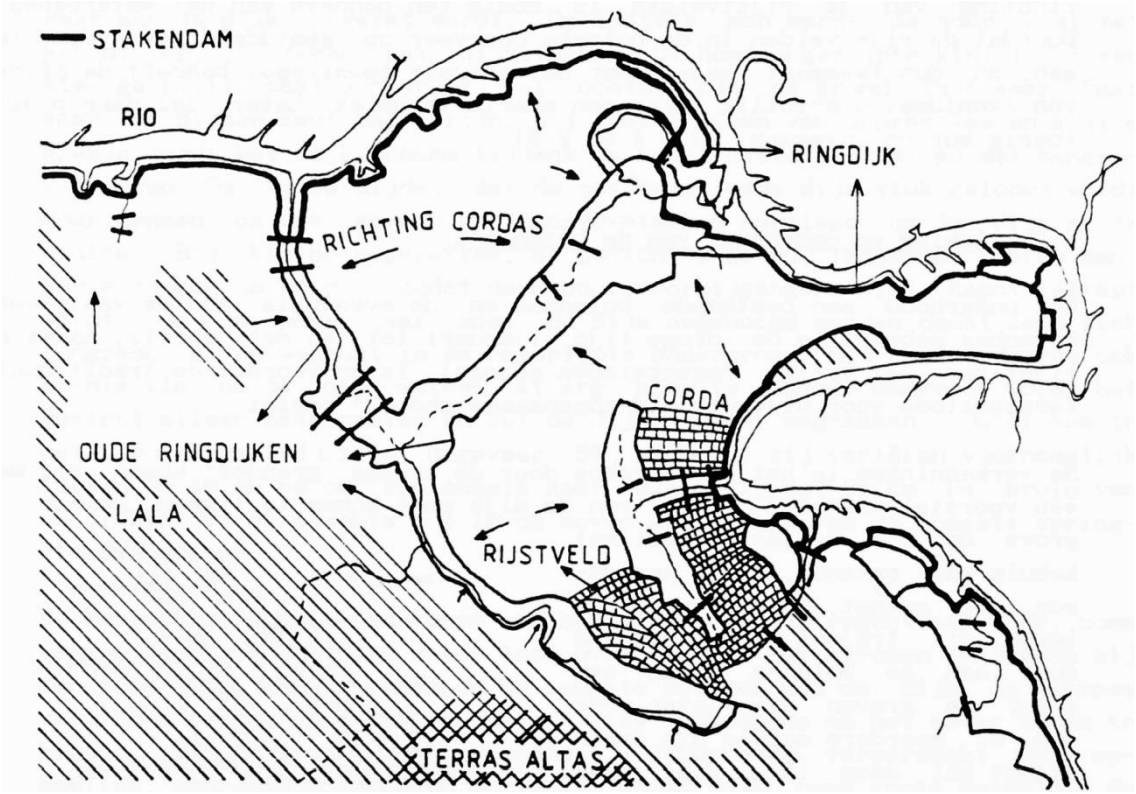

Figure 5. Schematic view of a bolanha system with dams in the creeks (Vakgroep Weg- en Waterbouwkunde en Irrigatie, 1988)

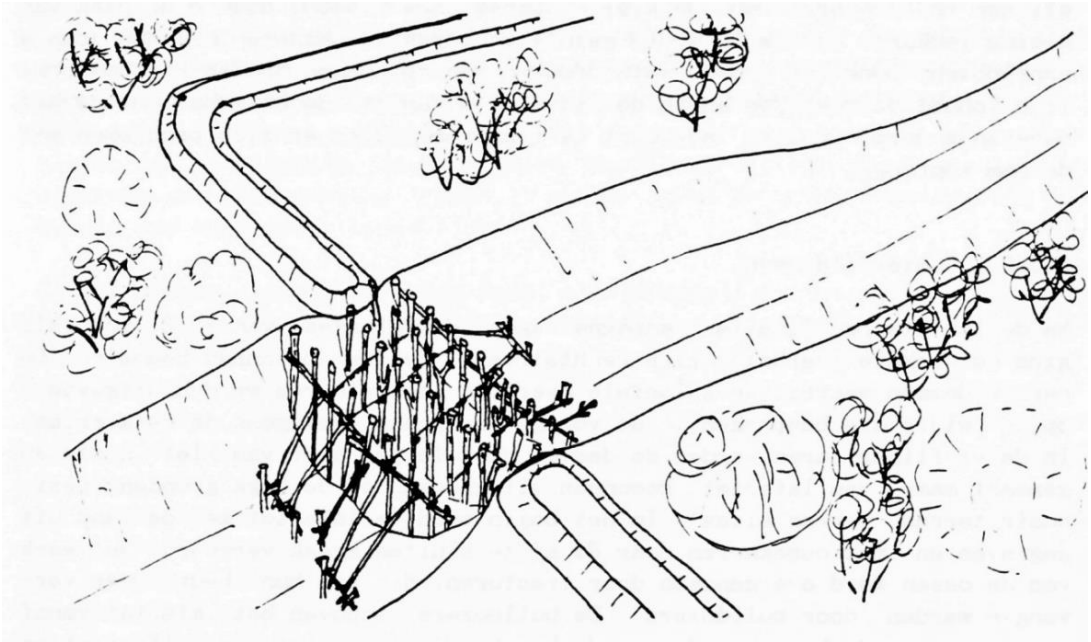

Figure 6. Schematic view of a traditional dam in a creek made by mangrove trunks (Vakgroep Weg- en Waterbouwkunde en Irrigatie, 1988)

Drainage of the polders is necessary to prevent excessive accumulation of water in the fields and to control sulphate acidity Oosterbaan (1983). Oosterbaan also describes that the drainage must be limited to surface drainage and that detention of water in the polders plays a primary role, firstly to prevent extremely high discharges and secondly to store water during periods of high tide. Excess water is discharged through outlet gates in accordance to hydrological and agricultural needs (Figure 8).

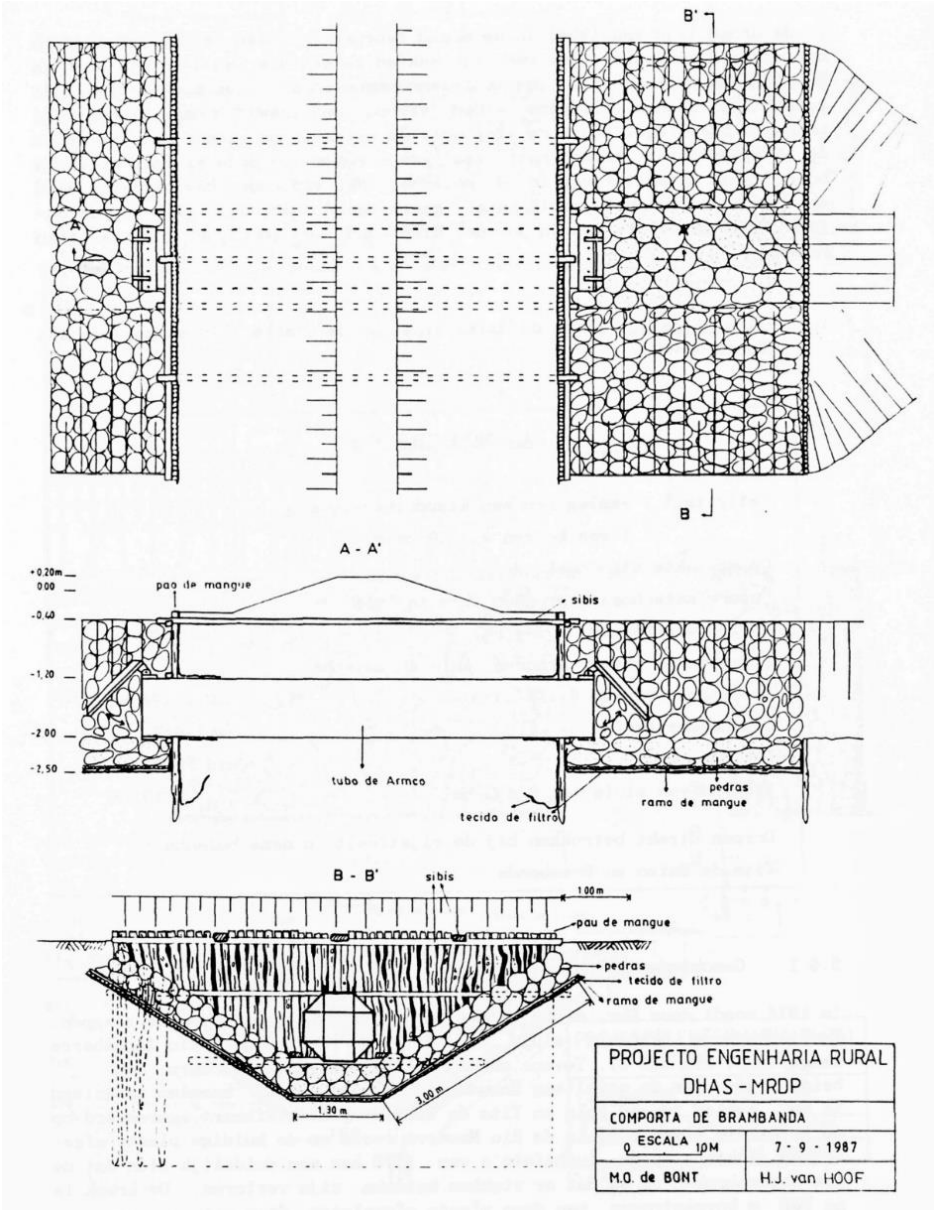

Figure 7. Flapgate sluice situated in Brambanda
(Vakgroep Weg- en Waterbouwkunde en Irrigatie, 1988)

Existing polders

Oosterbaan (1983) presents soil data from four polders: Comura, Pefiné, Bissauzinho and Bissa-Tor. The first three were recent polders and the last one an ancient polder.

Cultivation of rice in rows in a bolanha

Rice harvest in a bolanha - picture Pierre Campredon

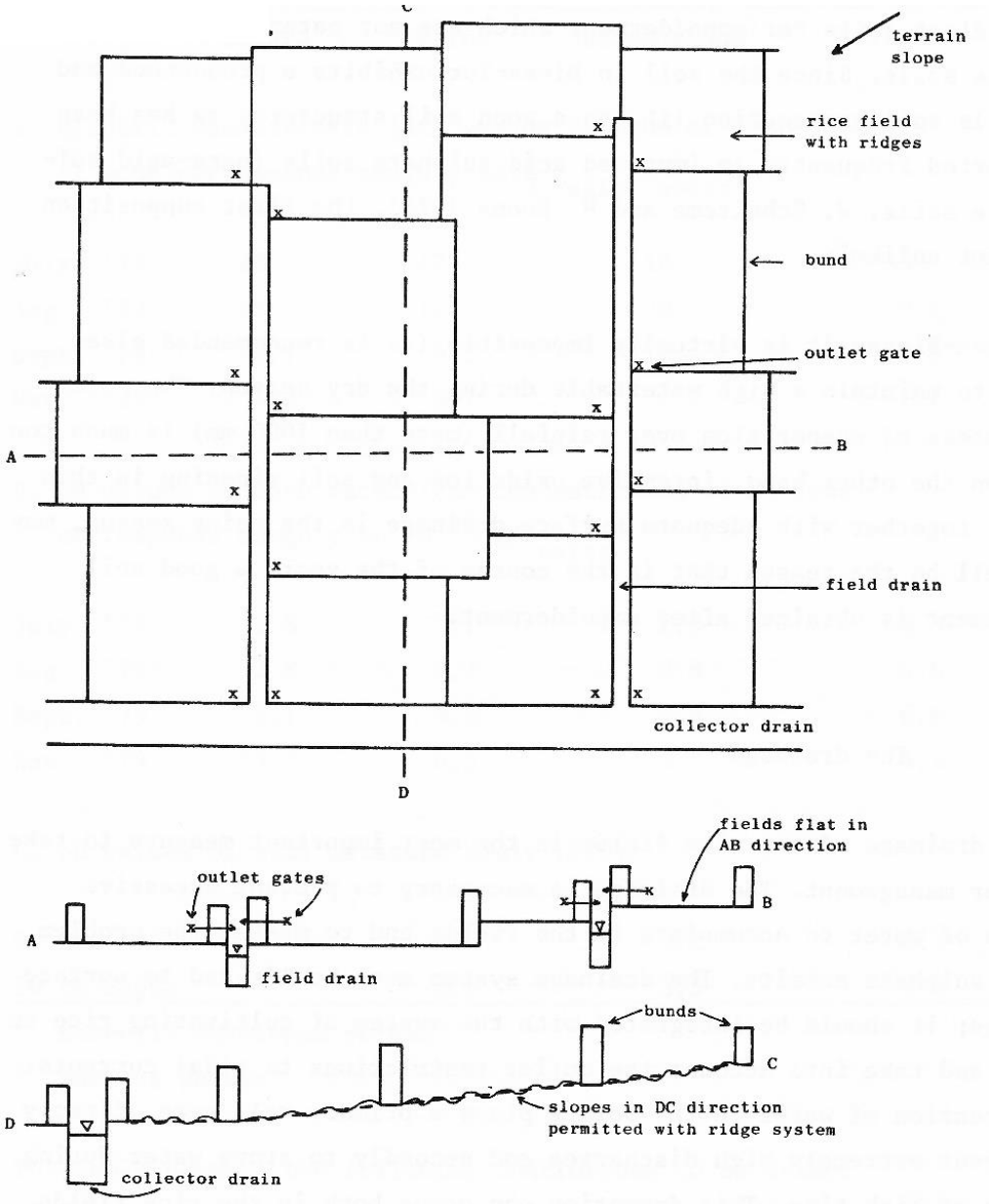

Figure 8. Model of a surface drainage system (schematic drawing, not to scale) (Oosterbaan, 1983)

Proposed polders

No proposed polder could be identified.

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Table I. General characteristics of existing polders in Guinea-Bissau

Name	Reclamation	Area in ha	Type *)	Latitudes	Longitudes	Elevation in m+MSL	Land use
							Agriculture, rice
Bissa-Tor			LGS	11° N	16° W		Agriculture, rice
Comura			LGS	11° N	16° W		Agriculture, rice
Pefiné			LGS	11° N	16° W		Agriculture, rice
Bissauzinho			LGS	11° N	16° W		Agriculture, rice
Total		100,000					

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