

FRENCH GUIANA



General

French Guiana is an overseas region of France on the northeast coast of South America, mainly covered with tropical rainforest. The country borders Surinam in the West, the Atlantic Ocean in the North and the East and Brazil in the East and the South. French Guiana has an area of 8.35 Mha (million hectares) with in 2020 a population of 299,000, or 0.036 persons per ha (Wikipedia and United Nations, 2019).

Climate and geography

Source: esri

Located within six degrees of the Equator and rising only to modest elevations, French Guiana is hot and very humid all year round. In most parts, rainfall is always very heavy from December to June or July. During this period each month over 330 mm can be expected. Between August and November the eastern half of the country has a 'dry' season with as little as 30 mm in September and October in many areas, causing eastern French Guiana to have a tropical monsoon climate. The west Saint-Laurent-du-Maroni has a tropical rainforest climate (source: Wikipedia).

Rostain (2010) describes that ancient raised fields are known from various parts of South America, especially around the periphery of the Amazon rainforest. These raised fields had two main functions: to secure a dry location for cultivation and to concentrate fertile material. Most of these earthworks date back to the first millennium, but some were made as early as 1000 BC and used until the European conquest in the 18th century and even beyond. They are located in savannas or Andean valleys, generally in flooded areas. The main reason for building raised fields was to control excess water for agricultural purposes. He also describes that most of the earthworks were associated with Arauquinoid sites in Guyana, Suriname, and French Guiana (Rostain, 1994). Along the Guianas coast, Arauquinoid culture spread from the middle Orinoco to the coast of the Guianas (Rostain and Versteeg, 2004). The first Arauquinoid raised fields were made from 650, but they became common and spread almost everywhere along the coast up to Cayenne Island between 1000 and 1450. Arauquinoid groups belong to a cultural continuum settled between Cayenne Island and Berbice River in eastern Guyana. They erected thousands of raised fields of various shapes, dug canals, ditches and pathways, and built artificial mounds to establish their villages (Figure 1). All these earthworks changed the coastal flooded savannas and their ecology. This represented a territory of approximately 600 km in length where the raised field technique was intensively used.



Figure 1. Raised-field complex of Piliwa near Awala, western French Guiana, showing the mound distribution in a grid (Rostain, 2010)

The raised fields surrounded by ditches were classified on the basis of their size, shape and topographical location (Figure 2) (Rostain, 2008). The last criterion is indicative of differences of adaptation to the hydrographical conditions and to the nature of the soil. Rostain (2010) distinguishes four types of raised fields:

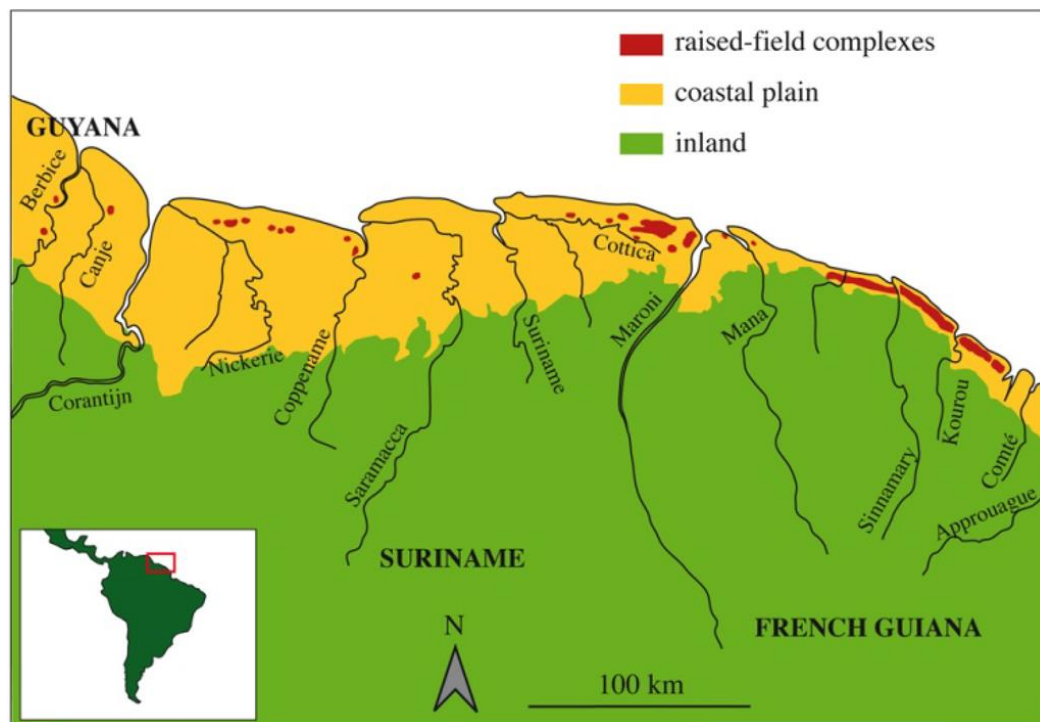


Figure 2. Map of the raised-field complexes of the Guianas coast (Rostain, 2010)

- *ridged fields in the three Guianas.* They were elongated and narrow, measuring between 1 and 3 m in width, 5 to 30 m in length and 30 to 80 cm in height. They took the shape of the slope between the sandy ridges and the swamp. Their distribution was related to the altitude and the water level;
- *large raised fields ranging in size from 2 to 5 m diameter and from 30 to 100 cm height.* These raised fields, generally round in shape, were found in eastern Suriname and around Kourou and Sinnamary, but they were more square or rectangular near Cayenne Island. On the eastern coast and in some areas of the western coast of Suriname, the regular raised fields were rounded-off rectangular or square shapes (Boomert, 1980). Their size ranged from 3 to 4 m wide, 4 to 30 m long and 50 to 100 cm high. These large raised fields were located in the most flooded areas and their sizes were smaller in the deepest swamps;
- *medium-sized raised fields.* These fields could be round, square or rectangular, and were only found in French Guiana. Their size ranged from 1.5 to 3 m diameter and 20 to 30 cm high. They occurred in large clusters. They were in open areas, but vegetation has grown on these areas since the Indians left, and today, they are sometimes under forest cover;
- *small, rounded raised fields.* These fields ranged in size from 50 to 100 cm in diameter and from 20 to 50 cm in height. They were only found in French Guiana. They covered the entire surface of the seasonally flooded savannas, which become completely dry in August.

Along the French Guiana coast, raised fields were generally arranged roughly in squares, and often, the largest were located in the deepest and wettest areas. The raised fields seem to have been organized by homogeneous areas, on average 0.5 ha each, placed side-by-side. The raised fields were made and disposed according to the differences of water level during the two annual seasons. In fact, water was the main physical constraint. The location of raised fields between the high and low areas in the landscape suggests a precise selection by the Indians. However, this was not always enough to prevent drowning of the raised fields. For that reason, it was necessary to surround some groups of raised fields by a belt ditch. In some cases, the checkerboard distribution of the ridged fields also

reflected the need to control the water level. In some areas, the whole surface of the lower area was covered by raised fields, and in other areas, only the edge of the sandy ridges had raised fields (Rostain, 2008).

Rostain (2010) also describes that a study of the raised fields emphasized local differences along the Guianas coast. From West to East six main categories of organization and types of raised fields were distinguished. In eastern Guyana, elongated raised fields were distributed perpendicularly to a river. In western Suriname, complexes were made of small groups of elongated raised fields. In eastern Suriname, up to the Mana River in French Guiana, parallel ridged fields were located in flooded depressions. Between the Iracoubo and Sinnamary rivers, savannas were covered by a large number of rounded medium-sized raised fields. Between the Sinnamary and Kourou rivers, rounded or square raised fields associated with ridged fields were located in the savannas and along the edge of the sandy ridges. Between the Kourou River and Cayenne Island, rounded or square raised fields covered the savannas like the area between the Iracoubo and Sinnamary rivers. These variations can represent cultural, chronological or technical differences.

Ditches were made to improve water control. Belt ditches were small and curved waterlines of 1–2 m in width, perpendicular to the direction in which the water naturally flowed. They enclosed some groups of raised fields. They were relatively narrow at their extremities and generally formed a pond at the centre. These ditches functioned to prevent too much water near the raised fields during the rainy season. They also most likely served as water reserves during the dry season.

Canals were straight and regular ditches, larger than the belt ditches, located near the raised fields. They measured about 2 m wide and they could have a length of 150 m. They were used for the drainage of excessive water and, perhaps, as water tanks or fishponds. Some of them were exceptionally long and could serve for canoe travel. For example, there were two long canals near the Mana River (Cornette, 1987). One of them measured about 2 km long, 3 m deep, 4 m wide at the bottom and 21 m wide at the top. The modern Cariban-speaking Kali'na Indians of the Awala village mentioned that these canals served in the past to connect the settlements of the lower Mana River.

Ponds were sometimes dug near a sand ridge or in the middle of a swamp. They were generally rounded or irregular in shape, and their diameter did not exceed 10 m. It is probable that they were used as water tanks and fishponds.

At about 300 a Barranoid group raised two mounds. From 650, Arauquinoid communities built new mounds. At 200 to 320 m in diameter, 2.5 m high, and with a raised area estimated at 4 ha. Their territory extended to cover a region some 210 km long and 25 km wide.

Four causeways have been found on the French Guiana coast, but it is not clear whether they were pre-Columbian. They were oriented in a North-South direction and they generally did cut through the swamps, connecting two West-East sand ridges or one sand ridge to the shore. West of the Kourou River, there were three causeways of 330 to 620 m in length and 5 m in maximum width. It is probable that these causeways were used to easily reach the shore from inland. In the Corosony North site, west of Sinnamary River, another raised pathway 400 m long and 5 - 8 m wide connected two sand ridges. Two canals, which form the banks of this pathway, were dug in order to rise above the water level.

Rostain further describes that along the Guianas coast, extensive colonial earthworks were built to improve cultivating conditions. The most impressive constructions made by Europeans were the polders. Dutchmen drained thousands of hectares in Suriname. Polders were never so extensive in French Guiana, where most of them were built in the lower Approuague basin during the 18th century. Europeans dug long canals for circulation, like the Leroy canal near Kourou or Torcy canal in the lower Approuague.

The Creoles made agricultural boards that were large, rectangular and low flat mounds on dry sandy formations. These raised areas are virtually never found in flooded savannas and they are smaller than the pre-Columbian ones. In the dry areas, Creoles also did dig square ditches to protect their houses from flooding and their cattle (Rostain, 1991).

Existing polders

In 1769, under the influence of the civil engineer Samuel Guisan - who had witnessed the

construction of polders in Suriname - slaves began building polders east of Cayenne Island. These polders are located between the Oyapock River and Cayenne Island. A few were made west of Cayenne. Only a few polders are still in use for rice cultivation in the Nickerie district of western Suriname and at Mana, in the far west of French Guiana. Brunier *et al.* (2015) studied rice polders close to Mana. The polders cover 50,000 ha, in 200 x 600 m compartments flanked by earth dikes and canals. They were built in the muddy coastal plain in the 1980s. However, they mentioned that rapid erosion was taking place.

The Group Polder Development (1982) mentions that there is a polder of 360 ha, called Polder Marie-Anne, situated near the Mahary River (Figure 3).

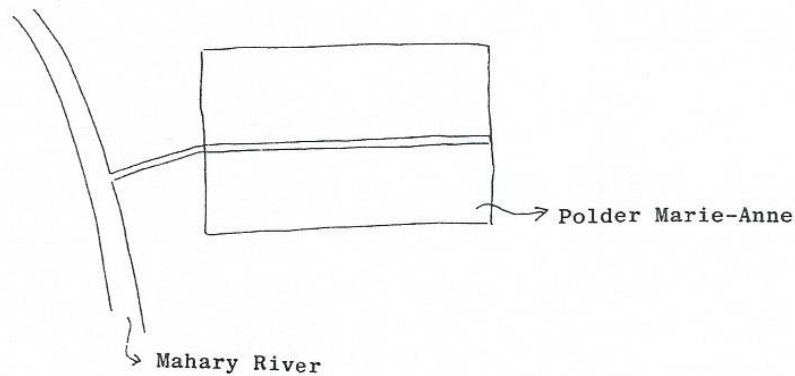


Figure 3. Polder Marie-Anne near Mahary River (Group Polder Development, 1982)

General characteristics of the polders in French Guiana are shown in Table I.

Proposed polders

According to the Group Polder Development (1982) a polder near Kaw and Cayenne of some 10,000 ha was planned for mechanised rice cultivation (Figure 4). A check on Google Earth shows that this polder probably was not constructed.

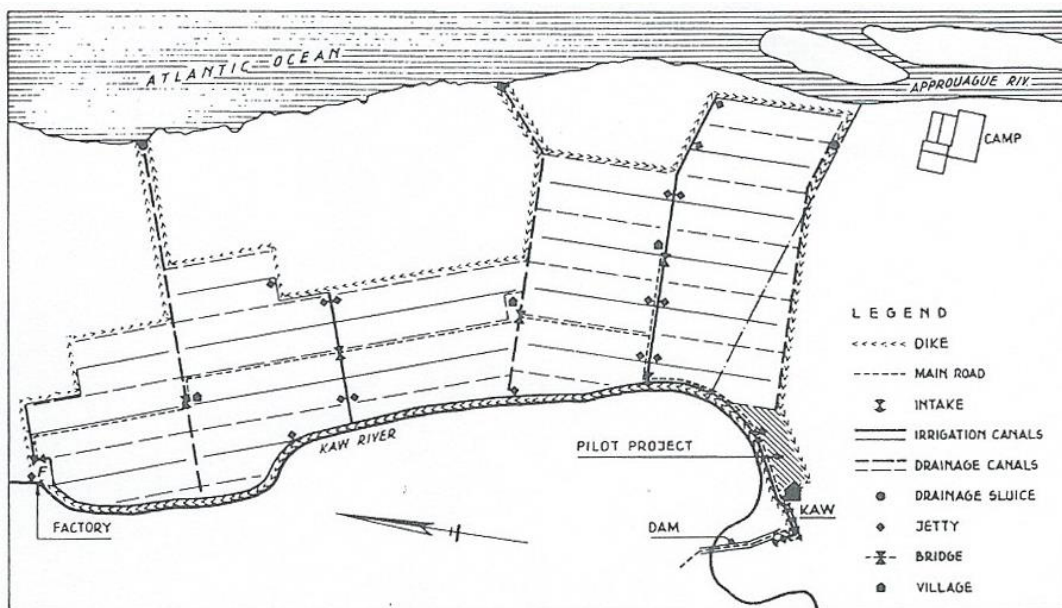


Figure 4. Planned rice polder near Kaw and Cayenne (Group Polder Development, 1982)

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Table I. General characteristics of existing polders in French Guiana

Name	Reclamation	Area in ha	Type *)	Latitudes	Longitudes	Elevation in m+MSL	Land use
<i>Existing polders</i>							
Polders near Mana	1769	50,000	RLL	5° 39' N	53° 45' W	0	Rice
Polder Marie-Anne		360	RLL				Agriculture
Sub-total		50,360					
<i>Projected polders</i>							
Polder near Kaw and Cayenne		10,000					
Sub-total		10,000					
Total		60,360					

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