

PHILIPPINES



Source: esri

General

The Philippines - officially the Republic of the Philippines - is a archipelagic country in Southeast Asia. Situated in the western Pacific Ocean, it consists of about 7,640 islands that are categorized broadly under three main geographical divisions from North to South: Luzon, Visayas and Mindanao. Bounded by the South China Sea on the West, the Philippine Sea on the East and the Celebes Sea on the Southwest, the Philippines shares maritime borders with Taiwan in the North, Vietnam in the West, Palau in the East and Malaysia and Indonesia in the South. The area of the Philippines is 34.3 Mha (million hectares) with, in 2022, a population of 116 million, or 3.4 persons per ha (Wikipedia and United Nations, 2022).

Climate and geography

The Philippines has a tropical maritime climate that is usually hot and humid. There are three seasons: the hot dry season or summer from March to May (*tag-init* or *tag-araw*); the rainy season from June to November (*tag-ulan*); the cool dry season from December to February (*tag-lamig*). The southwest monsoon (from May to October) is known as the *Habagat*, and the dry winds of the northeast monsoon (from November to April), the *Amihan*. Temperatures usually range from 21 °C to 32 °C although it can get cooler or hotter depending on the season. The coolest month is January; the warmest is May. The average yearly temperature is around 26.6 °C. In considering temperature, location in terms of latitude and longitude is not a significant factor. Whether in the extreme North, South, East or West of the country, temperatures at sea level tend to be in the same range. Altitude usually has more of an impact. Sitting astride the typhoon belt, most of the islands experience annual torrential rains and thunderstorms from July to October, with around nineteen typhoons entering the Philippines area of responsibility in a typical year and eight or nine making landfall. Annual rainfall measures 5,000 mm in the mountainous east coast section but less than 1,000 mm in some of the sheltered valleys (source: Wikipedia).

The Philippines location on the Pacific Ring of Fire and close to the equator makes the Philippines prone to earthquakes and typhoons, but also endows it with abundant natural resources. The Benham Plateau in the east in the Philippine Sea is an undersea region active in tectonic subduction. Around 20 earthquakes are registered daily, though most are too weak to be felt. The last major earthquake was the 1990 Luzon earthquake. There are many active volcanoes such as the Mayon Volcano, Mount Pinatubo, and Taal Volcano. The eruption of Mount Pinatubo in June 1991 produced the second largest terrestrial eruption of the 20th century (source: Wikipedia).

The longest river is the Cagayan River in northern Luzon, measuring about 520 km. Manila Bay, upon the shore of which the capital city of Manila lies, is connected to Laguna de Bay, the largest lake in the Philippines, by the Pasig River.

Existing polders

The Group Polder Development (1982) describes two areas where polders are located:

- *Cotabato Development Area*. A considerable wide area in Cotabato River Basin is flood prone. In this area polders are located;
- *Polders in the delta of the Pampanga River*. In this area about 40,000 ha is submerged during high tides. In this area there are many endiked fishponds.

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

Proposed polders

No proposed polders have been identified.

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

The location of the polders in Philippines is shown in Figure 1.



Figure 1. Location of the polders in the Philippines (source: esri – Batavialand)

The pictures by Prof. Adriaan Volker are shown in Table II. The pictures by Prof. Bart Schultz are shown in Table III.

References

- Group Polder Development, Department of Civil Engineering, Delft University of Technology, 1982. *Polders of the World. Compendium of polder projects*. Delft, the Netherlands
- Kampen, J., and G. Levine. 1970. Water losses and water balance studies in Philippine lowland rice irrigation. *The Philippine Agriculturist*. 283-301.
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- Siringan, F. and K. Rodolfo. 2001. *Net sea level change in the Pampanga Delta Region: causes and consequences*. A Research Proposal to Department of Agriculture-Bureau of Agricultural Research.
- United Nations, Department of Economic and Social Affairs, Population Division. 2022. *World population prospects, medium prognosis. The 2022 revision*. New York, USA.

Bart Schultz

Lelystad, October 2023

Table I. General characteristics of existing polders in Philippines

Name	Reclamation	Area in ha	Type *)	Latitudes	Longitudes	Elevation in m+MSL	Land use
Cotabato Development Area			RLL	7° 14' N	124° 13' E	4	Rural area
Polders in the delta of the Pampanga River			RLL	14° 51' N	120° 39' E	1	Agriculture
Total							

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

Table II. Pictures on polders and lowlands in the Philippines by Prof. Adriaan Volker













			
<p>A2 062/I.2.62 Hydraulic model of the Pampanga Delta for testing the effects of endiking of depressions at the high water levels</p>	<p>A5 002/I.5.2 Prof. Adriaan Volker during a meeting, presumably in the Philippines</p>	<p>A5 003/I.5.3 Prof. Adriaan Volker during a meeting, presumably in the Philippines</p>	<p>A5 004/I.5.4 Presumably model research in relation to the Pampanga Delta</p>
			
<p>A5 005/I.5.5 Presumably model research in relation to the Pampanga Delta</p>	<p>A5 006/I.5.6 Presumably model research in relation to the Pampanga Delta</p>	<p>A5 007/I.5.7 Lowland area</p>	<p>A5 008/I.5.8 Lowland area</p>
			
<p>A5 009/I.5.9 Lowland area</p>	<p>A5 010/I.5.10 Lowland area</p>	<p>A5 011/I.5.11 Lowland area</p>	<p>A5 012/I.5.12 Lowland area</p>

Table II. Pictures on polders and lowlands in the Philippines by Prof. Adriaan Volker (continued)


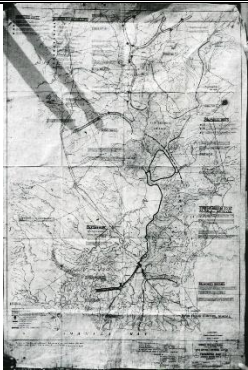

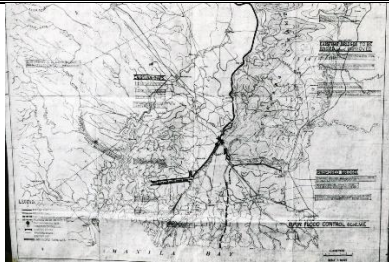
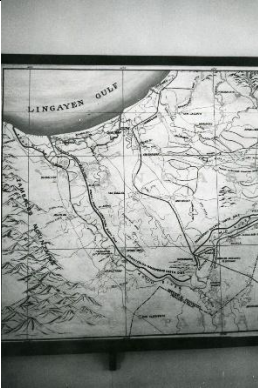
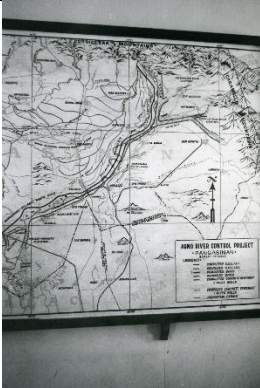

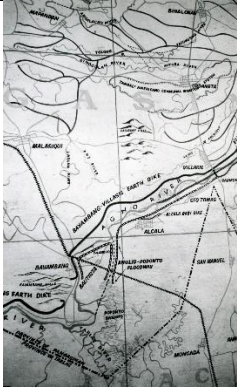
			
<p>A5 013/I.5.13 Maquette of the Candaba Swamp</p>	<p>A5 014/I.5.14 Map of the San Antonio Swamp</p>	<p>A5 015/I.5.15 Map of the San Antonio Swamp</p>	<p>A5 016/I.5.16 Map of the San Antonio Swamp</p>
			
<p>A5 017/I.5.17 Area near the Gulf of Lingayen</p>	<p>A5 018/I.5.18 Area near the Gulf of Lingayen</p>	<p>A5 019/I.5.19 Area near the Gulf of Lingayen</p>	<p>A5 020/I.5.20 Area near the Gulf of Lingayen</p>

Table II. Pictures on polders and lowlands in the Philippines by Prof. Adriaan Volker (continued)



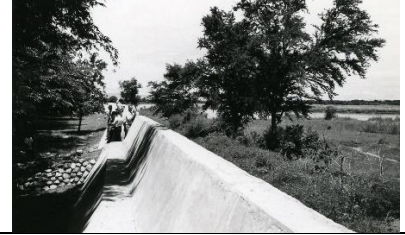









			
<p>A5 021/I.5.21 Area near the Gulf of Lingayen</p>	<p>A5 022/I.5.22 Area near the Gulf of Lingayen</p>	<p>A5 023/I.5.23 Area near the Gulf of Lingayen</p>	<p>A5 024/I.5.24 Area near the Gulf of Lingayen</p>
			
<p>A5 025/I.5.25 Prof. Adriaan Volker during a diner</p>	<p>D1 6 001/D.1.6.1 Map with project area in the San Antonio Swamp</p>	<p>D1 6 002/D.1.6.2 Map with proposal for dikes in the San Antonio Swamp</p>	<p>D1 6 003/D.1.6.3 Map with proposal for dikes in the San Antonio Swamp</p>
			
<p>D1 6 004/D.1.6.4 Model research, July 1963</p>	<p>D1 6 005/D.1.6.5 Model research, July 1963</p>	<p>D1 6 006/D.1.6.6 Small dike along a river</p>	<p>D1 6 007/D.1.6.7 Concrete dike protection</p>

Table II. Pictures on polders and lowlands in the Philippines by Prof. Adriaan Volker (continued)









			
<p>D1 6 008/D.1.6.8 Concrete dike protection</p>	<p>D1 6 009/D.1.6.9 Concrete dike protection</p>	<p>D1 6 010/D.1.6.10 Transplantation of rice</p>	<p>D1 6 011/D.1.6.11 Rice fields</p>
			
<p>D1 6 012/D.1.6.12 River in lowland area</p>	<p>D1 6 013/D.1.6.13 Rice fields</p>	<p>D1 6 014/D.1.6.14 Presumably sugarcane</p>	<p>D1 6 015/D.1.6.15 Rice fields</p>

Table III. Pictures on polders and lowlands in the Philippines by Prof. Bart Schultz



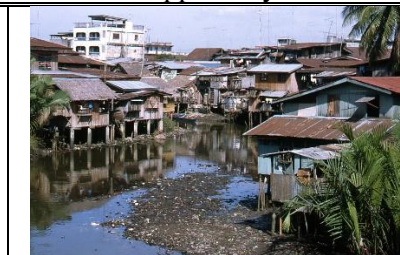















			
<p>D5 10 019/X-19 Urban canal in the centre of Cotabato City, Mindanao, 14 – 26/1 1994</p>	<p>D5 10 020/X-20 Boats at the river Rio Grande the Mindanao along which Cotabato City is located, 14 – 26/1 1994</p>	<p>D5 10 021/X-21 Creek through a housing area in Cotabato City, 14 – 26/1 1994</p>	<p>D5 10 022/X-22 Creek through a housing area in Cotabato City, 14 – 26/1 1994</p>
			
<p>D5 10 023/X-23 Pollution at the outlet of a sewer in Cotabato City, 14 – 26/1 1994</p>	<p>D5 10 024/X-24 Pollution at the outlet of a sewer in Cotabato City, 14 – 26/1 1994</p>	<p>D5 10 025/X-25 Lake in Cotabato City, Mindanao, 14 – 26/1 1994</p>	<p>D5 10 026/X-26 Mouth of the creek in Cotabato City in the river Rio Grande the Mindanao, 14 – 26/1 1994</p>
			
<p>D5 10 027/X-27 At the bank of the river Rio Grande the Mindanao, 14 – 26/1 1994</p>	<p>D5 10 028/X-28 Aerial picture Cotabato City, Mindanao, 14 – 26/1 1994</p>	<p>D5 10 029/X-29 Aerial picture Cotabato City, Mindanao, 14 – 26/1 1994</p>	<p>D5 10 030/X-30 Aerial picture Cotabato City, Mindanao, 14 – 26/1 1994</p>

Table III. Pictures on polders and lowlands in the Philippines by Prof. Bart Schultz (continued)

			
<p>D5 10 031/X-31 Staff gauge in Rio Grande the Mindanao, 14 - 26/1 1994</p>	<p>D5 10 032/X-32 Staff gauge in Rio Grande the Mindanao, 14 - 26/1 1994</p>	<p>D5 10 033/X-33 Aerial picture of the surroundings of Cotabato City, Mindanao, 14 - 26/1 1994</p>	<p>D5 10 034/X-34 Straightened section of Rio Grande the Mindanao between Cotabato City and the Sea, 14 - 26/1 1994</p>
			
<p>D5 10 035/X-35 Aerial picture of the surroundings of Cotabato City, Mindanao, 14 - 26/1 1994</p>	<p>D5 10 036/X-36 Aerial picture of the surroundings of Cotabato City, Mindanao, 14 - 26/1 1994</p>		