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Ground-Water Conditions in the Plaine Des Moustiques, Haiti

By

George C. Taylor, Jr.

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Rémy C. Lemoine

GROUND-WATER CONDITIONS

in the

PLAINE DES MOUSTIQUES, HAITI

By

George C. Carroll Taylor, Jr., 1915-
U. S. Geological Survey

and

Rémy C. Lemoine
SCIPA

INTRODUCTION

The Plaine des Moustiques lies on the north coast of Haiti about 12 kilometers west-southwest of Port-de-Paix. During January 1949 the writers made a brief geologic study to determine the availability of ground water in the plain for irrigation. At present irrigation is practiced by diversions from the Rivière des Moustiques. However, the dry-season flow of this stream is generally inadequate for irrigation or is sufficient to cover only a small part of the Irrigable area of the plain. According to Lieurance [1/] there is a total of about 1,120 hectares of irrigable land in the plain.

TOPOGRAPHY AND DRAINAGE

The Plaine des Moustiques is a small alluvial plain of irregular outline with a maximum length of about 5 kilometers and a width of about 3 kilometers. (See map). The plain is almost completely surrounded by low hills which range from about 50 to 200 meters above sea level. The plain drains north to the sea through a gap one kilometer wide in the coastal hills. The plain rises from sea level at Baie des Moustiques to elevations of about 20 meters along its southern margin. Near the western side of the plain a narrow swampy slough extends about 3 kilometers inland

1/ Lieurance, R.S., Report on investigation of lower Trois Rivières and Vallée des Moustiques Irrigation Project, Manuscript Report to T.H. Hawthorne, Director of Irrigation, March 15, 1926.

from Cabaret. This slough is generally less than 5 meters above sea level.

The Plaine des Moustiques is drained by the Rivière des Moustiques and a number of small tributaries most of which rise in the hills adjacent to the plain. The Rivière des Moustiques rises in the Montagnes du Nord Ouest a considerable distance to the south of the plain. In its upper and middle course the stream is perennial. In its lower course the stream is intermittent during dry and normal years and may carry no water for prolonged periods in the dry seasons. Apparently most of the low-water flow seeps underground in permeable rocks before reaching the plain. However, during wet years the stream carries a small dry-season flow even as far downstream as the plain.

GEOLOGY

Miocene sediments form the surface rocks of most of the hills surrounding the Plaine des Moustiques and underlie the Recent alluvial deposits of the plain. The Miocene rocks are capped by Pleistocene marine or littoral deposits in the coastal hills.

In and adjacent to the plain the Miocene rocks are predominantly soft shales or claystones intercalated with some thin beds of siltstone, sandstone and limestone. These sediments dip gently northward generally at angles of less than 15 degrees. Among these rocks the shales and siltstones are too tight and impervious to yield much water to wells even where present in the zone of satura-

tion. The sandstones and limestones are moderately pervious but are evidently too thin and discontinuous to form important aquifers.

Resting unconformably on the Miocene sediments of the coastal hills are massive porous coralline limestones and limestone conglomerates of Pleistocene age. The porous limestones are moderately to highly permeable and if present in the zone of saturation would probably yield considerable water to wells. However, in the region of the Plaine des Moustiques these rocks are high above the zone of saturation. Moreover, they are completely dissected and are therefore probably rather thoroughly drained.

The Plaine des Moustiques is directly underlain by unconsolidated Recent alluvium which in turn rests on Miocene sediments. The physical character and thickness of the alluvium can only be judged by geologic inference because data from wells are not available. Most of the alluvium in the plain was derived from erosion of Miocene sediments in the hills to the south by the Rivière des Moustiques and its tributaries. The resulting detrital materials were deposited in the plain by these streams as an alluvial fill. Because of the lithologic character of the Miocene sediments it is inferred that the alluvium of the plain is largely impermeable clay or silt and that beds of permeable coarse sand and gravel may be present only to limited extent. Moreover, the configuration of the physiographic basin in which the alluvium was deposited suggests that the alluvial fill may be quite thin. Because of these conditions it is probable that the alluvium of the plain is too imper-

meable and is generally too thin to contain productive water-bearing beds. Wells put down in the alluvium would probably yield only small quantities of water which may have poor chemical quality.

GROUND WATER

Such ground water as may be present in the Plaine des Moustiques occurs principally in the Recent alluvium. This water is probably derived from the direct infiltration of rainfall and from infiltration of the Rivière des Moustiques and its tributaries. The annual rainfall in the vicinity of the plain is of the order of 1,250 millimeters which is more than sufficient to sustain a ground-water body of considerable importance in the alluvium. However, owing to the low permeability of the alluvium relatively little water from rainfall or from streams may seep underground to be stored as ground water.

Apparently little attempt has been made to develop ground water in the plain even for domestic or stock purposes. Well No. 1, now caved or filled, was reportedly dug to a depth of about 25 meters. The water was used by the inhabitants of the vicinity for washing and cleaning but was too brackish to be used for drinking. No other domestic wells were observed in the plain.

In or near Cabaret a well was reportedly drilled to a depth of about 180 meters in the Miocene sediments. It is reported that the well ended in claystone or shale and failed to encounter productive water-bearing strata.

CONCLUSIONS

Irrigation from Ground Water

The geologic studies made during the present reconnaissance indicate that ground water is probably not available in sufficient quantity in the Plaine des Moustiques to be developed for irrigation. Water for domestic or stock purposes could be obtained from shallow wells in the Recent alluvium. However, the water might possibly be of such poor chemical quality as to be unusable.

Possibilities for Surface-Water Irrigation

As an alternative to ground water it is believed that attention should be given to the possibilities of constructing dams to store water from the wet-season run-off of the Rivière des Moustiques and its tributaries. In the belt of Miocene shale hills to the south of the plain, good sites could probably be found for the construction of earth-fill storage dams. Because of flood conditions it is possible that such a dam located on the Rivière des Moustiques might require a spillway of excessive size. In this event it might be more feasible to divert water from the stream through short canals into smaller storage reservoirs located in the tributaries.

As a step toward bringing the Plaine des Moustiques into agricultural production through effective irrigation, an engineering study of the possibilities of storage of the wet-season run-off of the Rivière des Moustiques and its tributaries would appear to be fully justified and quite desirable.

Port-au-Prince, Haïti
February 2, 1949.

CCT/gc