

INTRODUCTION.

The type of study reported in this text differs so markedly from those normally undertaken by D.T.A. students of the Imperial College of Tropical Agriculture that some measure of explanation is required. This work was undertaken to meet a request that the writer should be permitted to obtain as much experience as possible with the practical aspects of irrigation and water distribution.

At the New College Farm, I.C.T.A., irrigation water is required for two quite different purposes in two separate locations.

In the south-west corner of the Farm water is required for experimental rice cultivation and is normally applied by means of a gravity flow from a canal which is connected through a 9" pipe to the San Juan River. The head of water available for irrigation is small, and is obtained by damming the Martin canal at a point adjacent to the rice lands. Distribution of the water through the irrigated area is effected through open channels.

In the south-east corner of the Farm, water is required for the irrigation of vegetable crops grown during the dry season. Water is obtained by pumping from the ^{St. Joseph} San Juan River and is distributed through a typical overhead irrigation system consisting of quick-coupled aluminium lines and pressure operated sprinkler heads.

When the work reported in this paper was started, the water supply to the rice area was unsatisfactory, largely owing to deficiencies of the dam used to maintain the required head in the Martin Canal. The volume of water passing through the Martin Canal was not known and no information was available about the amount of water used in the experimental rice land or the amount which was available for the use of vegetable growers in the "bamboo grove" area, south of the Farm. Part I of this paper is an account of how the dam was modified to rectify these deficiencies and how the appropriate water measurements were made.

No outstanding problems of distribution were associated with the overhead irrigation system but an investigation was required into the possibilities of using some form of surface irrigation in its place.

The sprinkler equipment now in operation is still giving satisfactory service, but will require renewal in the not too distant future unless some alternative system of water distribution is adopted. The trials reported in Part II of this paper were undertaken to show whether surface irrigation held possibilities in the area.

Water for the irrigation of rice on Field 6A of the New College Farm is obtained from above a weir on the San Juan River which flows in a southerly direction along the entire western boundary of the farm. The water is tapped through a nine inch pipe into a part of the Martin Canal which runs inside the farm boundary almost exactly parallel to the San Juan River, the quantity of water fed into the canal being regulated by an oval-shaped cast iron control gate placed at the canal end of the pipe. About 900 yards downstream from the control gate was the concrete weir dam built in December 1955. From the dam an earth channel carries irrigation water to Field 6A.

Field 6A is a roughly rectangular field, 3.6 acres in extent, the long sides of which run in a north-south direction (see Appendix). The northern half of the field is divided into twelve parallel strips 21 feet wide by a series of double bunds. Running between each double bund is a water channel 2 feet across. Each strip is therefore served by two water channels, one on each side; one channel allows water into the strip and the other drains water away into a main drainage outlet which runs the whole length of the western side.

The southern portion of the field is approximately 1.2 acres, and is divided equally into eastern and western halves by a bund running from north to south. On the north-eastern corner of this field the source of the main irrigation channel water is intercepted by two take-out boxes, one to control the water entering the eastern plot and the other that entering the western plot. Independent outlets to the main drainage ditch are provided for both eastern and western portions.

The important feature in the system of irrigation is the fact that water control revolves around the existence of independent drainage