SNOW SURVEYS IN WEST PAKISTAN WATER RESOURCES DEVELOPMENT

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INTRODUCTION

A program of snow surveys was planned and organized in 1960 for the nine hundred square mile Kunhar River catchment of the Western Himalayas. Harza Engineering Company International was assigned responsibility for the program by the Water and Power Development Authority of West Pakistan. The Authority, commonly referred to as WAPDA, is a governmental agency which was formed to plan and implement the development of water resources for all of West Pakistan. A measure of the magnitude of the program can be obtained from the fact that the Irrigation Department has developed irrigation in West Pakistan for about twenty-five million acres. There, it is easy to realize that an organization which deals with the water resources affects every member of the forty million person community.

SCOPE OF SURVEYS

The immediate objectives of the snow surveys are limited to developing data for use in operating a system of reservoirs and power installations in the Kunhar Valley and training Pakistani engineers in the techniques of collecting and analyzing snow survey data. However, if the program is a success in this small catchment, it may well be extended to permit forecasts of runoff for much greater downstream areas.

Fuller utilization and control of water resources in West Pakistan will result from the construction of the gigantic Indus Basin Settlement Program. [2] The implementation of this program has been entrusted to WAPDA. The program results from the fact that in 1947 the sub-continent was divided into two nations based upon areas occupied by religious groups. Unfortunately, the disposition of these groups had no relationship to geography.

On of the most seriously affected areas was the land of the five rivers, the famous Punjab. The eastern portion of the Punjab plain was peopled by Sikhs and Hindus who opted to join India. The western Punjab was peopled primarily by Muslims and it became a part of West Pakistan.

The irrigation system was intersected by the new national boundary with control works and river headwaters lying in India and the commanded irrigation areas being in Pakistan.

Following partition it became apparent that more autonomy was required by each nation in planning its river development programs and in executing the operation of the projects. An agreement was finally reached after years of negotitations carried on through the good offices of the World Bank. India will eventually be entitled to the full flow of the three eastern rivers; Beas, Sutlej and Ravi while Pakistan is to integrate the larger Jhelum and Chenab Rivers with the Indus River. By a complex of canals and barrages, areas formerly watered by the eastern rivers will be served from the western rivers. To assure water availability for the necessary transfers, two dams creating reservoirs of about five million acre feet capacity each are included in the works to be provided. The first of these dams to be constructed by Pakistan is Mangla. When completed, it will dam the Jhelum river just before it leaves the foothills of the Himalayas and starts its traverse of the Punjab plains. The second dam will be on the Indus River, to the northwest of Rawalpindi. Tributary to the Jhelum, some thirty miles upstream from Mangla, is the Kunhar River which contributes about ten percent of the Mangla runoff.

The Kunhar Basin has been investigated by Chas. T. Main, Consulting Engineers, for power development. Included in their recommendations were the establishment of snow surveys for forecasting of runoff. Although the Kunhar power development has been deferred in favor of alternative sources of power, the establishment of snow surveys at the present time was approved. Current establishment of the snow survey program serves two purposes, (a) to have a number of years of data available at the future date when the Junka development may be undertaken, and (b) to test the usefulness of snow surveys in the Indus Basin area in West Pakistan.

Adjacent and parallel to the Kunhar is the Kishanganga River which probably contributes another ten to fifteen percent of the Mangla supply. It is probable that snow conditions in the Kishanganga Valley are not too different from those in the Kunhar. The rest of the Mangla catchment lies in Indian held territory.

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[2] See "Engineering News Record", February 9, 1961.