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WATER RESOURCES SURVEY
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Not Abstracted

REPORT OF PROGRESS

NUMBER 43

FOR PERIOD

JANUARY 1, 1967 THROUGH JUNE 30, 1967

Prepared by

UNITED STATES BUREAU OF RECLAMATION

for

BUREAU OF PUBLIC WORKS - GOVERNMENT OF THE PHILIPPINES

and

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

M. G. Barclay
M. G. BARCLAY
Project Engineer

PROGRESS REPORT

JANUARY-JUNE 1967

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SECTION I

PROJECT DESCRIPTION

Establishment of the Water Resources Survey Project was d on an Agreement of November 2, 1962 between the Agency for International Development and the United States Bureau of Reclamation. That agreement sets forth the general purpose and scope of the program. The wide scale objective of the project is to assist the Philippine Government, through its Bureau of Public Works, in undertaking surveys, investigations and studies which are required to formulate comprehensive plans and programs for multipurpose water resource developments. Areas initially selected for investigation in the Philippines were seven major river basins which included Cagayan, Pampanga, Agno and Bicol basins on Luzon Island; Cotabato and Agusan basins on Mindanao Island; and the Ilog-Hilabangan basin on Negros Island.

In order to carry out this initial program of investigation, the Bureau of Reclamation assigned an eight-man team. The Project Engineer, who was responsible for overall direction of the work arrived in Manila in April 1963, and other members of the team arrived thereafter. This team, working through and in cooperation with the Bureau of Public Works of the Philippine Government carried its work forward through 1966, but phasing out, and reduction in personnel began in January 1965.

In accordance with this program, preliminary investigations have been made and program type reports have been prepared for the Cagayan, Bicol, Cotabato, Agusan and Ilog-Hilabangan River Basins. Because of lack of essential basic data, including such important items as reliable topographic maps of dams and reservoir sites, and streamflow records, it was necessary that these investigations and reports be limited to basin inventories which called attention to potential dams and reservoir sites that should be examined further for irrigation, hydro-electric power and other purposes, and outlined lands which might be suitable for irrigation development. In addition to presenting a brief resumé of the kind and extent of development which might be achieved, these program reports outlined a program of future investigations which are necessary to make a more precise evaluation of the land and water resources of the basins, thereby making formulation of sound plans for comprehensive multi-purpose development possible. In order that further investigations may be carried out in an orderly manner, a specific program for stream gaging, groundwater exploration and mapping has been outlined for each basin, so that, if carried out, basic data will become available for use in future planning.

In addition to the inventory and program type of investigations described above, the Pampanga and Agno were combined into a

single study designated as the "Central Luzon Basin Investigation". The investigation for this area was a detailed reconnaissance in which a careful analysis was made of the needs of the basin with respect to water resource development, and a comprehensive basin-wide plan of development was formulated, involving some eleven projects. Work consisted of collection and analysis of basic data, including preliminary water supply studies for irrigation and other purposes, and mapping of ten reservoir sites, largely by aerial cartographic methods through a contract with Aero Service Corporation (formerly Fairchild Aerial Surveys).

Also, as part of the Central Luzon Basin investigation, the Upper Pampanga River Project was selected for detailed feasibility study. This project was studied in sufficient detail to formulate a plan involving the multi-purpose Pantabangan Reservoir and other project features so as to provide year-round irrigation for 81,000 hectares, hydro-electric power, flood control and municipal and industrial water supply.

Further details relating to the objectives of the project are given in Progress Report Number 23 for April 1965.

SECTION II

PROJECT HISTORY

Events and agreements which led up to the project initiation are discussed in detail in Progress Report Number 23, for April 1965. The history of key actions concerning investigations, reports, and the Aerial Mapping Contract is briefly discussed below.

By the close of 1966, work had progressed on the investigations undertaken by the initial Bureau of Reclamation team to the extent that a feasibility report on the Upper Pampanga River Project had been published and distributed to the Philippine Government, and others. Also, the first drafts of the program reports on the Cagayan, Bicol, Agusan, and Cotabato and the comprehensive reconnaissance basin-wide report on the Central Luzon Basin had been completed and reviewed by the Philippine Government. Final editing and publishing were the remaining actions required on these reports. For the Ilog-Hilabangan Basin, the first draft of the report was completed and was ready for submittal to the Philippine Government for review and comment by the end of December 1966. Remaining action on this report was editing, so as to reflect views of the Philippine Government and completion of publication.

Other work initiated under the Water Resources Survey was the installation of many additional stream gaging stations throughout the islands by the Hydrology Division of the Bureau of Public Works, so as to obtain the basic streamflow records which are essential for planning and operating water resource development projects. By the close of 1966, installation of new hydrographic stations had progressed satisfactorily and was nearing completion.

Also, an extensive mapping program by means of aerial photogrammetry (through a Contract with Aero Service Corporation) was initiated early in 1964 for the purpose of obtaining topographic maps of ten reservoir sites in the Central Luzon Basin and photomosaic maps of the flood plains of seven river basins areas (named earlier). The mapping program was continued throughout 1964, 1965, and 1966, and although not completed by the close of 1966, substantial progress had been made. All mosaic maps of the seven river basins had been accepted except for two sheets of the Cagayan basin. However, only part of the required number of prints had been furnished by the contractor, and a substantial number of additional prints remained to be delivered in accordance with terms of the contract. With respect to topographic maps of the reservoir sites, only the topographic map of the Puncan Reservoir Site had been accepted and delivery completed by the close of December 1966.

Compilation of the original manuscripts had been completed for all other reservoir sites by the end of 1966. However, field checking, correction and acceptance of the numerous sheets of the topographic maps of all other reservoir sites remained to be done after January 1, 1967.

Mr. Donald R. Burnett, Project Engineer for the Bureau of Reclamation, who directed the original phase of work of the Water Resources Team as related above, retired at the end of December 1966. Because the Philippine Government indicated its interest in continuing its program of water resource investigation and development planning, the agreement between the United States Bureau of Reclamation and the Agency for International Development was extended in order to provide continuing assistance in this work. Under this extended agreement, provision has been made for the Bureau of Reclamation to provide a Project Engineer and a Hydrologist who are providing advice and assisting the Philippine Government in carrying the Water Resources Survey forward.

In order that there would be continuity in the operations of the Bureau of Reclamation, M. G. Barclay, the designated Project Engineer, reported for temporary duty at Manila, November 17, 1966 and remained until December 15, 1966. During this period, past work and the proposed future program were reviewed

with Mr. Burnett. Also on December 5, 1966, Mr. E. A. Bay reported for duty as Hydrologist. On March 21, 1967, Mr. Barclay returned to the Philippines to assume his duties as Project Engineer, to work with the Government of the Philippines in continuing its program of water resource investigation and development planning.

SECTION III

PROGRESS - ENGINEERING

(January-June 1967)

During the first six months of 1967, work was continued in checking and proofreading revised manuscripts of all reports, which had not been completed. By the end of June, the program type basin reports on Cagayan and Cotabato River Basins were published and distribution had been made. Printing of the Agusan report by the Regional Service Center of U. S. Information Service was completed but not distributed. Also by June 30, final proof copies of the Central Luzon Basin Report were checked and proofread and turned over to USAID for final reproduction by the Regional Service Center. The Bicol River Basin program report was turned over to USAID and Regional Service Center in the latter part of June for final printing. Galley proofs of the Ilog-Hilabangan Basin Report were in process of preparation and editing.

During the first six months of 1967, the Aero Service Corporation continued with its mapping contract, carried out largely by aerial-cartopographic methods. Under the terms of the contract, horizontal and vertical control for this mapping were provided by the Philippine Government. Various items of work accomplished

during the six-month reporting period are summarized below:

Watershed Mosaic Maps

Area W-1. Pampanga Watershed

All sheets for this watershed were accepted prior to January 1, 1967, with respect to plotting. Delivery of the required number of prints was completed for this watershed.

Area W-2. Agno Watershed

Plotting of control for all 41 sheets was accepted for this watershed prior to January 1, 1967. Full delivery was received of all required prints for 16 sheets. Additional prints of the other sheets remain to be delivered.

Area W-3. Cagayan Watershed

Of the 91 sheets for this watershed, 83 had been accepted with respect to plotting by the close of 1966. In this reporting period, 6 additional sheets were accepted leaving only 2 sheets remaining to be accepted. One print each of the 89 accepted sheets has been received but 7 additional copies of each remain to be delivered.

Area W-4. Cotabato Watershed

All 85 sheets of this watershed were accepted with respect to plotting of control prior to January 1, 1967. In February and March, delivery was completed for all copies of 73 sheets. One

copy each of the other 12 sheets remained to be delivered after July 1, 1967.

Area W-5. Agusan Watershed

Plotting of control was accepted for all 78 sheets prior to January 1, 1967. Delivery of the required number of prints was completed in February 1967.

Area W-6. Bicol Watershed

Plotting of control for all sheets was checked and accepted prior to January 1, 1967, but only one print for each was received and no additional prints were received in the period covered by this report.

Area W-7. Ilog-Hilabangan Watershed

All sheets for this watershed were accepted--and the required number of prints received--prior to January 1, 1967.

Topographic Mapping of Reservoir Sites

Topographic mapping of the reservoir sites was in various stages of completion at the close of 1966. The status of work:

R1 - Pantabangan Reservoir Site

By close of 1966, 38 of the 39 topographic sheets had been inspected and accepted. Sheet 18, the one unaccepted sheet, was not corrected in the period covered by this report. Also, the required number of positive transparencies remain to be

delivered after July 1, 1967.

R2 - Puncan Reservoir Site

All topographic sheets of the Puncan Reservoir Site were checked and accepted before the close of 1966 and the required number of positive transparencies had been delivered. This completed delivery of material for this site except for photographic negatives.

R3 - San Roque Reservoir Site

All sheets of reservoir topography for this site had been compiled and submitted for checking prior to close of 1966. These sheets were reviewed for accuracy and returned to Aero Service Corporation for correction on June 16, 1967. Therefore, mapping of this reservoir site could not be considered as complete by the close of June 1967.

R4 - Tayum Reservoir Site

All compilation of topography for the Tayum Reservoir Site had been completed by the close of 1966 and it had been resubmitted for review. The topography of all sheets for this site were accepted in March 1967. Materials remaining to be delivered at the close of June 1966 were reproducible transparencies.

R5 - San Nicolas Reservoir Site

By the close of 1966 all sheets for this reservoir site had

been submitted by Aero Service Corporation for checking. All sheets for this reservoir site were accepted during this reporting period. At the close of June the Contractor was making minor editorial revisions as recommended by the Project Engineer (as designated representative of the Contracting Officer).

R6 - Sapinit Reservoir Site

The status of topographic mapping of this reservoir site during the reporting period is identical to that of the San Nicolas Site, discussed above.

R7 - Balog-Balog Reservoir Site

By the close of 1966 all sheets for this reservoir site had been compiled and submitted for checking. By the close of June, 9 sheets had been accepted and the remaining 10 were being corrected by Aero Service Corporation.

R8 - Kalaanan Reservoir Site

At the close of 1966 the topographic sheets for this reservoir site had been submitted to the Contracting Officer's representative for checking and review. All sheets for this site were accepted by July 1, 1967. However, the required number of reproducible transparencies had not been supplied by the Contractor.

R9 - Ligaya Reservoir Site

The initial compilation for this site had been completed and

re-submitted to the Contracting Officer's representative for review by the close of 1966. By June 19, 1967 all sheets for this reservoir were accepted. Reproducible transparencies remained to be delivered.

R10 - Papaya Reservoir Site

The history of topographic mapping of this reservoir site is identical to that for the Ligaya Site, discussed above.

The Division of Hydrology of the Bureau of Public Works continued with its programs for collecting streamflow and meteorological data. In the period of January-April 1967, nineteen (19) stream gaging stations were installed, using water stage recorders and other equipment supplied by USAID in connection with the Water Resources Survey Project. By July 1, 1967 the Division of Hydrology was maintaining and operating a total of 438 stream gaging stations, of which 206 were in support of the Water Resources Survey Project. The Division of Hydrology also continued with extensive ground water investigations, most of it with equipment and advice provided in connection with the Water Resources Survey Project.

Since January 1, 1967 the BUREC team has endeavored to direct its main efforts toward working with Philippine engineers,

technicians and administrators in all phases of water resource planning. Much of this has been in the field of training (such as collection of basic data and its evaluation, water supply studies, surveys, etc.). An effort has been made to set up a program of bringing together, classifying and filing all sorts of technical data, which are presently scattered throughout the Philippines in many organizations. Also, attention has been given to improving the organizational structure and capability of a group which would be more effective in water resource planning, and development. In this connection, attention has also been given to establishing and training a group who would be able to classify lands for irrigation.

Other consultation provided has been in connection with operating projects where water management is a problem. Discussions have been held with officials of the Philippine Government concerning types of water measuring devices that may be installed to help bring about better and more equitable delivery of water within project areas.

The Bureau team has also participated in meetings and field trips with representatives of the Philippine Government, and others, for the purpose of considering various potential water resource developments and research related to irrigated agriculture.

On the basis of findings developed in the Central Luzon

investigations, the Government of the Philippines has selected Balog-Balog and Balintingon Projects for feasibility study. Detailed investigations of these two projects were initiated in the latter part of 1966, and has been continued.

For the Balog-Balog project, detailed water supply studies were initiated after January 1967 and were carried forward. Also other necessary studies for this project were carried forward, including reservoir capacity determinations.

On the Balintingon Project, field work of the surface geologic investigation of the dam and reservoir site was completed during the first half of the year. Core drilling of the damsite was about half completed, when work was suspended because of inaccessibility during the rainy season. Work was also done on mapping the dam and reservoir site, and water supply studies of the project were initiated.

SECTION IV

PROGRESS - CONSTRUCTION

None; the project's functions are in the area of investigation and planning.

SECTION V

PROGRESS - PROCUREMENT

The Water Resources Survey Team does not have procurement authority. Supplies and services are furnished by the Bureau of Public Works, the Agency for International Development, and the offices of the Commissioner and Chief Engineer of the Bureau of Reclamation.

SECTION VI

SUMMARY DATA

Financial data are not maintained by the Water Resources Survey Team, which is serviced by the USAID, the Bureau of Public Works of the Government of the Philippines, and the Stateside offices of the U. S. Bureau of Reclamation.

SECTION VII

PERSONNEL

Bureau of Reclamation

On duty as of June 30, 1967:

Project Engineer - M. G. Barclay

Hydrologist - Earl M. Bay

Bureau of Public Works

The Bureau of Public Works assigns engineers, engineering aides, typists, drivers and janitors as required to staff and work with the Water Resources Survey Team.

SECTION VIII

ENVIRONMENTAL WORK CONDITIONS

For the Water Resources Survey personnel, the Bureau of Public Works provides a well-equipped, air-conditioned office. Housing in Manila is adequate. Health conditions are reasonably good. Vaccinations and medical advice are available.

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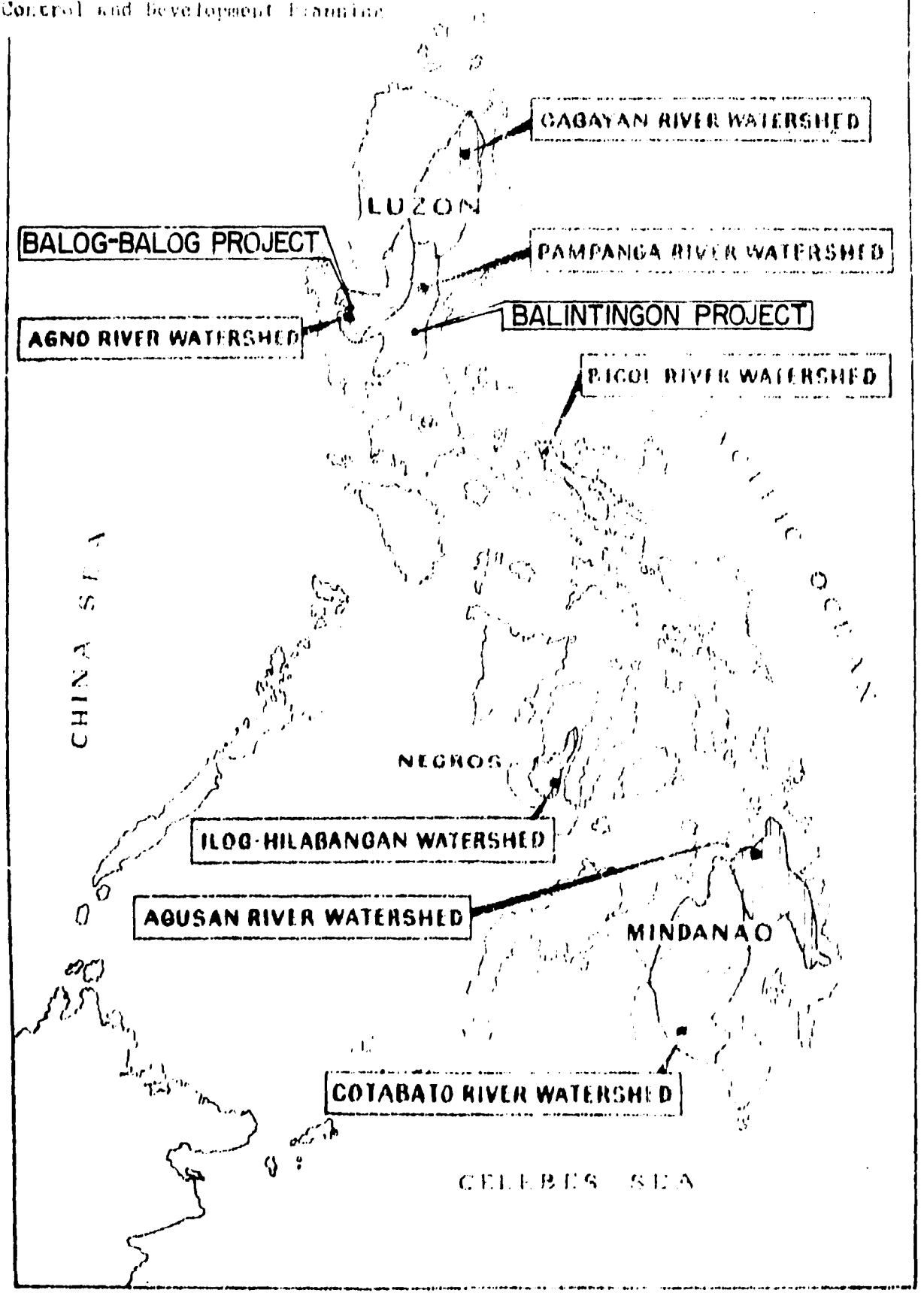
STUDY AREAS
for
Control and Development Planning