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IIMI THE INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE

INTER OFFICE MEMORANDUM

To: Program Staff

From: Hilmy Sally

Date: 13 July 1988

Copy to: R. Lenton
C. Abernethy
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Subject: First Meeting of the Study Advisory Committee, Kirindi Oya Simulation Model Study

Please find herewith a report on the above meeting held on 8 June 1988 in CEMAGREF-Lyon, France, which Daniel Berthery and I attended.

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Hilmy Sally
11 July 1988

KIRINDI OYA SIMULATION MODEL PROJECT

REPORT OF THE FIRST MEETING OF THE STUDY ADVISORY COMMITTEE (SAC)

The Study Advisory Committee (SAC) was set up to ensure the scientfifc quality of the work carried out under the IIMI-CEMAGREF collaborative project to establish a mathematical flow simulation model of the Kirindi Oya Right Bank Main Canal (RBMC). The SAC will evaluate the software developed with respect to IIMI's objectives in modeling irrigation systems, propose solutions to overcome technical difficulties that might arise, and provide advice on the development of practical recommendations for improved canal operations by using the calibrated model for simulation.

The first quaterly meeting of SAC was held on 8 June 1988 at CEMAGREF-Lyon, France. The participants were:

Messrs	Remy Pochat	Directeur Scientifique, ENGREF, Paris and Chairman, SAC
	Jean-Pierre Baume	Numerical Hydraulics Specialist, CEMAGREF, Montpellier
	Daniel Berthery	Project Supervisor, IIMI Headquarters, Sri Lanka
	Frederic Certain	Project Leader, CEMAGREF-Lyon
	Jean Cunge	International Expert in Computational Hydraulics, Laboratoire d'Hydraulique de France (LHF), Grenoble
	Jacques Gurgand	Charge de Mission, representing the French Ministry of Foreign Affairs, Paris
	Aguillar Martin	Systems Analysis Specialist, Laboratoire d'Automatique et d'Analyse de Systemes (LAAS), Toulouse
	Leopold Rieul	Head, Irrigation Division, CEMAGREF-Montpellier
	Hilmy Sally	Irrigation Management Specialist, IIMI Headquarters, Sri Lanka
	Jean Verdier	Resident Scientist Designate, IIMI, Morocco

The following members had indicated their inability to be present and were excused:

Prof. Wynn Walker	Head, Dept. of Agricultural Engineering, Utah State University (USU), Utah, USA
Mr Jean-Louis Millo	Deputy Director for Africa, CEFIGRE, Sophia-Antipolis, France

The meeting was chaired by Remy Pochat. He thanked the participants for having accepted to be part of the committee and for their presence at its first meeeting.

Daniel Berthery then presented an overview of the project, emphasizing the rationale for IIMI initiating research in this direction and the objectives of the present project. He retraced the history of the project over the past one and a half years, from site identification, submission of proposals for funding to the French Government, and the development of IIMI-CEMAGREF collaboration. At present, software development (of both the steady and unsteady flow models) was well underway, special attention being paid to the development of user-friendly interfaces. At the same time a topographical survey of Kirindi Oya RBMC had been carried out, and field measurements to calibrate the model had been performed. The cooperation received from the Sri Lanka Irrigation Department (ID), the agency responsible for managing the system, and its interest in utilizing the model to provide responses to some of the problems that it faces was highlighted. Though the calibration campaign had revealed certain anomalies in the topographical data it was hoped to rectify these soon.

Jacques Gurgand expressed satisfaction that the ID, a potential beneficiary of the project, was involved in its implementation. He hoped that the results of this project would be sufficiently important that other users, even in other countries, would eventually become interested in acquiring similar research and training tools. He therefore underlined the need to develop suitable user-friendly interfaces.

A brief discussion then ensued on possible situations where simulation/modeling could make a useful contribution. For example,

- water conveyance over relatively long distances in open canals/rivers
- relative scarcity of water, making water saving a primary consideration
- existence of real problems of management

Frederic Certain's presentation of the current status of the modeling project served to bring to light three points that required the attention of the SAC, namely (a) inconsistencies in canal topography, (b) modeling of regulators, and (c) modeling of offtakes.

(a) Topography : IIMI will proceed to establish the reduced levels of a sufficient number of fixed points (Temporary Bench Marks, TBM) along the length of the canal. This information will enable CEMAGREF to proceed with the model calibration based on interpretation of the observations of the canal water surface elevation made during the field measurement campaign of May 1988. The opinion of the committee was also sought regarding the number of small irregularities in the canal bed that had been identified in the course of the initial topographical survey of November 1987. It was thought that most of these irregularities would be insignificant but that a decision to disregard any point should be taken only taken after attempting to calibrate the model, i.e. adjusting the value of the friction coefficient whilst at the same time conserving the volumes of water being conveyed in the different reaches of the canal until there is reasonable agreement between the observed and computed water surface elevations. Any anomalies in topography will be verified on site and suitable modifications made to the

computational cross sections where necessary.

(b) Regulators : Frederic Certain described the modeling of the regulators. Each cross regulator, consists of a certain number of movable gates (2, 3, 4 or 5) and a pair of side check-walls that could also function as overflow weirs. The top level of these check-walls usually corresponds to the Full Supply Depth (FSD) at these locations. The user of the steady state model has the possibility of pre-setting all but one of the gate openings of a given regulator. The opening of this last gate will be calculated automatically by the model in order to satisfy the target offtake discharges and target water levels upstream of the regulator (usually FSD). The corresponding water surface elevation in the canal is also computed. Discussion then focused on the potential usefulness of the steady state model. The consensus was that the agency should not be given the impression that the steady state model was a 'black box' capable of producing operational decisions (gate settings etc) catering to any demand-supply situation. Instead this model should be looked upon more as a research and training tool for IIMI that was also capable of responding to certain concerns of the agency (e.g. verification of design hypotheses). It was further agreed that the unsteady state model that CEMAGREF would develop would not incorporate automatic optimisation of regulator operations. Nevertheless it was decided that it would be appropriate that Jean Cunge devote some time to problems associated with the regulator operations under unsteady flow conditions.

(c) Offtakes : The offtakes are typically made up of a gated sluice, a conduit passing through the main canal embankment, small stilling basin at the head of the secondary canal and a sharp-crested weir that helps maintain water depth in the basin and also serves as a discharge measuring device (if free-flow conditions prevail). The principal problems associated with the modeling of the offtakes are that the weirs are very often hydraulically submerged and that most of them have suffered extensive physical damage (holes or lowering of crest levels). At present the model imposes a certain water level downstream of the weir and supposes that the target discharges at all offtakes are satisfied. The corresponding sluice-gate opening is then automatically determined once the main canal water surface elevation is computed. The SAC sugested that two possibilities of modeling the offtakes be included -- the weirs could be considered as undamaged and unsubmerged, or else more representative couples of values for target discharges and water depths should be imposed downstream of the weirs, based on actual observations.

The SAC finally examined the provision of appropriate user-friendly interfaces to the software. Special attention was paid to the needs of different categories of users and the presentation of easily comprehensible visual information, e.g. synthesis and comparison of results, indices of performance etc. Jean Verdier undertook to take the leadership in investigating the availability of suitable software (especially graphics packages) capable of accomplishing some of these tasks.