PN-ACN-502
112272

PHASE II REPORT

DEVELOPMENT OF A PROJECT MANAGEMENT SYSTEM FOR THE PLANNING COMMISSION GOVERNMENT OF PAKISTAN

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December, 1975

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PREFACE

This report is submitted to the Planning Commission of the Government of Pakistan in accordance with contract AID/CM-otr-C-73-200, Work Order #11.

This report describes the activities and results of the Phase II effort undertaken by PCI (Practical Concepts Incorporated) to develop national-level planning, monitoring, and evaluation approaches that would close the implementation gap impeding development. The technical monitor for this activity was Mr. Namet Ilahi, Director of the Project Wing of the Planning Commission. Our PCI team is thankful to Mr. Ilahi and his Deputy, Mr. M. Akram Swati, for their graciousness and hospitality, as well as for their thoughtful technical direction and comments.

The value of the activities discussed in this report are dependent upon many individuals but most particularly upon the effort of the 28 individuals who worked with our PCI team for a period of approximately three months. These individuals, who are identified by name in Section II of this report, were the key to the success of our activities, and it is therefore fitting for us to thank the organizations that participated by seconding staff to this activity.

Our thanks also for the thoughtful assistance of Messrs. Joseph Wheeler, William Wolffer, William Thomas, and Masud Siddiqui of USAID/Pakistan. Their assistance was rendered on a non-intervention basis by which there was never any doubt that the GOP Planning Commission and not USAID was PCI's client.

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SECTION I

INTRODUCTION

In the Spring of 1974, the Planning Commission of the Government of Pakistan advised USAID/Pakistan of its interest in closing the "implementation gap" by improving the planning, monitoring, and mid-term evaluation processes. Based upon discussions between USAID and Planning Commission staff, and subsequently on discussions that involved the contractor, Practical Concepts Incorporated (PCI), the following three-phase program was outlined:

1. Initial discussions and need assessment,
2. Test and demonstration of concepts of potential relevance to the Government of Pakistan,
3. Implementation of recommended improvements.

Because there was a high degree of interest in Logical Framework concepts, originally developed by PCI and presented to GOP officials in 1971, the contractor chosen to perform the Phase I and Phase II activities was PCI. Based on a brief Phase I analysis in late 1974, PCI and the GOP agreed that a Phase II activity should be undertaken--to test and demonstrate certain key concepts upon which systematic improvements could be based. This report describes PCI's Phase II efforts to test, demonstrate, and refine the following concepts for applicability within the Pakistan context:

1. The Logical Framework approach to design clarification and evaluation,
2. Basic networking techniques to reflect logical interdependencies and clarify input-to-output linkages,
3. Cost and resource analysis and management,

4. Achievement and exception reporting,

5. Integration of concepts into a comprehensive project management system.

During the Phase II activities, the above were tested and refined on three case projects selected by the Planning Commission:

1. Simly Dam

2. University of Islamabad

3. Mustehkam Cement Expansion Project

These projects were analyzed and reformulated by staff from the GOP and government corporations. Thus, this report is based on evidence which was a product largely of the GOP effort. Independent conclusions reached by the three working groups, into which GOP participants were divided, are presented in Section IV of this report, as is PCI's analysis of the work activities.

SECTION II

SCOPE OF WORK

The scope of work for our activities under this contract includes the following:

1. The training of a cadre of GOP personnel, preferably from priority projects, in planning, monitoring, and evaluation concepts;

2. The application of these concepts to three "live" GOP projects;

3. The anlaysis of experience gained by the GOP participants to adapt these concepts or provide others as necessary to meet the need;

4. The development of a plan for implementing such improvements as had demonstrated their value in the GOP context, based on experience with these actual projects and upon review and analysis of related GOP activities.

Our original plan was to provide concentrated training to a group of approximately 30 participants for a period of one month, following which all project related participants would work at project sites to implement these concepts for the selected "case" projects. The overall period of performance was to be approximately three months, with the first month in training, and the last two months spent working in the organizations responsible for the case projects. This strategy required that the bulk of the trainees be members of the project teams or at least from the organizations responsible for the projects selected. However, in fact this did not turn out to be the case. The original criteria of selecting our participants based upon their relationship to those representative projects had to be abandoned. Rather the decision was made to select a more fully representative range of individuals to provide a cross-section of organizations, with a modest emphasis on obtaining participation of personnel working on the projects that were used as cases.

Based upon the revised composition of the participants and upon their assignment to work full-time with the PCI team over a period of three months, the Phase II activities were modified as follows:

1. The trainees were charged not just with testing and demonstrating the concepts, but also with analysis of these concepts to develop recommendations as to whether and how improvements should be made.

2. Following the initial four-week period of classroom and seminar, work, the trainees were divided into three relatively autonomous groups, one group for each of the three "case" projects--a project to expand cement production of Mustehkam Cement Ltd, the Construction of Simly Dam, and the project to develop the University of Islamabad.

3. Each of these groups was charged with analyzing the projects in-depth, recommending improvements in monitoring of these projects, presenting those recommendations to management within the implementing organization, and analyzing the experience so gained.

4. The group's objectives were defined and then each group was encouraged to develop its own plan for meeting those objectives. PCI staff moderated and assisted the groups, and were available to help resolve conceptual issues. The group defined its own leadership as well as its own schedule for meeting objectives.

The specific individuals involved in these Phase II activities and their titles and home organizations are shown for each working group in Table II-1.

Supplementing our work with the trainees, PCI staff made several presentations at the request of the Planning Commission. In addition to the opening day presentation, which was well attended but formal in nature, PCI held two seminars for high level personnel, at which the results of activities to date were presented. The first was held on July 21, 1975 and consisted of a half day presentation of the problems the participants had raised and explanations as to how the PMS concepts addressed those key problems. The attendees at this July 21st seminar are identified in Table II-2. Following the seminar, the attendee

TABLE II-1

LIST OF THE PARTICIPANTS, TITLES, AND ORGANIZATIONS

MUSTEHKAM CEMENT EXPANSION PROJECT

Mr. Behram Rafi	Plant Engineer National Refinery Ltd.
Mr. Shafi Ullah Baig	Deputy Manager (Planning) Pakistan Steel Mills Corporation Ltd.
Mr. Maqbool Ahmad Shahin	Assistant Works Manager Pakistan Ordinance Factories, Wah.
Mr. Nasir Ahmad Khan	Research Officer Planning Commission
Mr. Rai Naimat Ali	Research Officer Planning & Development Dept. Government of Punjab, Lahore
Mr. Mohammad Wasim Akhtar	Deputy Manager (Evaluation) Pakistan Industrial Development Corp.
Mr. Muhammad Yousaf Chaudry	Staff Officer II (Designs) Ministry of Defense
Mr. Shahid Jalal	Manager of Finance National Fertilizer Corporation, Lahore
Mr. Mujahid Eshai	Manager of Finance Pakistan Engineering Company Ltd.
Mr. Tila Mohammad	Progress Officer Planning Commission

SIMLY DAM PROJECT

Mr. R. R. Pervez	Deputy Director, Programming & Evaluation Capital Development Authority
Mr. R. D. Malik	Principal Engineer Pakistan Atomic Engery Commission
Mr. Iqbal Ali Shah	Assistant Engineer Sarhad Development Authority, Peshawar
Mr. Ghulam Samdani	Assistant Engineer Pakistan Atomic Energy Commission
Mr. Sher Akbar	Progress Officer (Engineering) Planning Commission

TABLE II-1 (CONTINUED)

Mr. Inayatullah	Assistant Director (Evaluation) Capital Development Authority
Mr. Nasim Raza Naqvi	Research Officer, Defense Science & Tech. Org Ministry of Defense
Mr. Riaz-uddin Khilji	Progress Officer Planning Commission
Mr. K. Q. Pal	Chief of Agriculture Section Planning & Development Dept. Government of Punjab, Lahore
Mr. Fayyaz-ur-Rehman	Deputy Director (Industry) Federally Administered Tribal Areas Developme Corporation, Peshawar

UNIVERSITY OF ISLAMABAD PROJECT

Mr. Ali Jafar Zaidi	Planning & Development Officer University of Islamabad
Mr. Shaikh Parwez Nusrat	Senior Research Officer Ministry of Defense
Mr. Ejaz Ahmed	Assistant Executive Engineer University of Islamabad
Mr. Kifayatullah	Assistant Chief Ministry of Production
Miss Zareen Bano	Assistant Chief, Appraisal & Evaluation Sect Planning & Development Dept., Punjab
Mr. Abdul Qayyum	Assistant Chief Planning Commission
Mr. Mohammad Shahbaz	Progress Officer Planning Commission
Mr. Naqi Mohsin	Divisional Accounts Officer Ministry of Railways

TABLE II-2

ATTENDEES AT THE JULY 21, 1974 SEMINAR

NAME	POSITION
Mr. Namet Ilahi	Joint Secretary, Planning Commission
Mr. M. Akram Swati	Deputy Chief, Planning Commission
Mr. Hasan Zaheer	Additional Secretary, Ministry of Railways
Mr. Fazal Muqeem Khan	Secretary of Defense
Mr. Joseph Wheeler	Director, USAID
Mr. William Wolffer	Deputy Director, USAID
Mr. Masud A. Siddiqui	Program Officer, USAID
Mr. K. U. Faruqui	Joint Secretary, Ministry of Industries
Mr. Hasan Nawck	Joint Secretary, Ministry of Communications
Dr. M. Jaqoob Bhatti	Additional Secretary, Ministry of Food & Agriculture
Dr. Moin Baqai	Chief Economist, Planning Division
Mr. H. N. Akhtar	Finance Director, Pakistan Steel Mills Corporation
Mr. U. A. Isani	Joint Secretary, Ministry of Education
Mr. Masood Nab Nur	Additional Secretary, Ministry of Information & Broadcasting
Mr. B. Zahidi	Additional Secretary, Ministry of Communications
Mr. Faved A. Khan	Executive Director, FATADC
Mr. I. A. Imtiazi	Chairman P & D, Board Lhr.

visited with the individual work groups to examine their work products and question them further on the nature and value of the activities undertaken.

The concepts and conclusions of the three working groups were formally presented during a two-day seminar held on August 1 and 2, 1975. The attendees of that seminar are identified in Table II-3. Each of the three working groups presented their work products and their conclusions regarding application of the concepts that they had used. These sessions were supplemented by PCI lecturers and by open discussions that included the attendees, workshop participants, and PCI staff.

The analysis, recommendations, and plans presented in this report are to a large extent joint products developed by GOP personnel with PCI assistance.

TABLE II-3

ATTENDEES AT THE AUGUST 1-2, 1975 SEMINAR

NAME	POSITION
Mr. Sajjad Ahmad Bhutta	Managing Director, REPCO
Mr. Mohammad Athar Zaka	Joint Secretary, Production Division
Mr. Fakir Syed Aijazuddin	General Manager (Finance), National Fertilizer Corporation Ltd., Lahore
Mr. Ali Hashim	General Manager (EDP), Pakistan Steel Mill Corporation
Mr. Ifithkar Ahmad Khan	Deputy Secretary, Ministry of Railways
Lt. Col. Daulat Zar (Retd.)	Project Director, University of Islamabad
Mr. Salim A. Jilani	Joint Secretary, Defense Division
Mr. Ahmad Rafi	Joint Secretary (Development), Ministry of Finance
Mr. Asif Rahim	Additional Chief Secretary (Development), Punjab
Dr. M. S. Bokhari	Director of Labs, Defense Services & Technology Organization
Mr. Ejaz Ahmad Faruqui	Joint Secretary, Ministry of Information & Broadcasting
Dr. Tahir Husain	Joint Educational Advisor/Joint Secretary, Ministry of Education
Mr. Mohammad Ahmad	Principal Engineer, Chashma Nuclear Project, Pakistan Atomic Energy Commission
Mr. Hasan Nawab	Joint Secretary, Ministry of Communications
Mr. S. Sarfaraz Ali	Deputy Secretary, Industries Division
Mr. Zafar Hasan Mahmood	OSD (Development), Finance Division
Dr. Firoza Ahmed	Joint Secretary, Ministry of Health & Social Welfare
Mr. G. M. Minhas	Managing Director, Mustehkam Cement Factory

SECTION III

SUMMARY

A. Summary of Conclusions

Both the GOP participants and our PCI analysts conclude that:

1. There is an implementation gap, in that projects differ in fact from statements in the project documentation.

2. The gap is exaggerated or perhaps caused by ambiguities in objectives and a lack of candor in addressing problems.

3. That gap can be closed by improving the planning, monitoring, evaluation, and follow-up processes.

4. The Logical Framework approach, already proven of value in scores of countries and adopted worldwide by AID, is a useful tool for facilitating planning, monitoring, and evaluation and has great relevance to Pakistani projects and needs.

5. Basic networking approaches, derivative of PERT-type systems, when used in conjunction with the Logical Framework, can force project personnel to clarify their resource needs as well as the logical interdependencies within and among projects and programs.

6. Episodic exception/achievement reporting (reports describing actual results or failures regarding certain key project events) is in every way to be preferred to periodic discursive reporting.

7. Resource management techniques are necessary in order to provide accurate estimates, proper allocations, and effective control of project resources.

8. The above concepts--the Logical Framework, networking, achievement/exception reporting, and resource management--can be integrated to create a project management system that has great potential value to GOP ministries and corporations.

B. Summary of Recommendations

PCI recommends that:

1. The Planning Commission establish, as a policy objective, a Project Management System (PMS) within government ministries and corporations, consistent with the concepts noted in the above conclusions.

2. The functional adoption of the PMS requirements precede its formal adoption. That is, implementation of the PMS should proceed on an organization-by-organization, project-by-project basis, and successful implementation in a number of organizations should precede formal change in the current Planning Commission pro formas.

3. The Planning Commission itself adopt for its internal workings, to the extent practical, the PMS system concepts.

4. The Planning Commission establish within the Project Wing a PMS cell that is responsible for providing training and technical assistance to organizations wishing to adopt PMS concepts, as well as retaining responsibility for the ultimate policy objective of comprehensive use of these concepts.

C. Next Steps

The next steps required to implement the PMS (the schedule is discussed in Section VIII) are:

1. The Project Wing immediately establish a staff of six skilled analysts to accept responsibility for the PMS function as outlined in the preceding recommendations.

2. The staff of six be supplemented by individuals from other organizations so that there is a continuing and immediate capability for providing technical assistance to organizations interested in adopting PMS concepts.

3. Based upon Planning Commission discussions with organizations that have participated in the Phase II activities (and other organizations as appropriate), select two such organizations for immediate full-scale implementation of PMS concepts.

4. PMS concepts immediately be built into all feasibility studies where the result of those feasibility studies would be a major federal project.

5. The Planning Commission obtain additional technical assistance to (1) train trainers and analysts who will be supporting system development in the cooperating organizations and (2) to develop training materials and programs for general use as well as Planning Commission use. (Details of these training programs are presented in Section IX of this report.)

6. The Planning Commission undertake a study of alternative mechanisms for automating a PMS data base, but without committing to any single approach until experience has been gained operating the system. (Automation decisions should be made about six months after start of implementation.)

SECTION IV

RESULTS OF SEMINAR ACTIVITIES

This section contains a description of work activities; the participants' response, conclusions, and recommendations; and PCI's conclusions for each of the three workgroups:

1. Mustehkam Cement
2. Simly Dam
3. University of Islamabad

A. Description of Work Activities

1. Mustehkam Cement Project (Group C)

After the initial formal training period of three weeks, Group C developed a PMS for the Mustehkam Cement Expansion Project (project execution is due to begin in September or October of 1975) over a period of approximately two and a half months. For the first two weeks the group worked without any direct contact with the Mustehkam Cement Limited (MCL) project people although MCL was urged to send a representative(s) to join our participants. During this period, the participants developed a Master LogFrame based on the information available in the Project's PC-I. The group decided to begin developing Output LogFrames prior to project involvement, since it had good technical balance among its members, including three engineers, two accounts, two economists, and three evaluation and planning officers. The participants divided themselves into five work groups to accomplish this task. After completing the Master LogFrame and the Output LogFrames, the work groups constructed output-level networks (i.e., Level 3). This was all completed without project involvement.

Finally, in the third week, an appointment was made for the group to visit the existing MCL factory in Hattar. A presentation on the Logical Framework was given to the General Manager (Mr. Qureshi), the Chief Engineer (Mr. Baig), the Mechanical Engineer (Mr. Saeed), and the Administrative Officer (Mr. Sheikh). These four individuals will also serve as the key personnel responsible for the Expansion Project's execution.

While reviewing the LogFrames with project management, the participants quickly judged that the interest of this level of management was not being captured. They temporarily left the LogFrames aside and explained all of the Level 3 Networks. Project management was very keen on the networks and provided a great deal of documentation as well as explanation that was most constructive in critiquing the participants' early products. The LogFrames were of interest to project management as they clarified the interrelationship between networks and supported the networks with targets and "assumptions."

Upon returning from the site visit, the participants revised the networks and LogFrames and developed a Master Network for the Project Manager (Mr. Qureshi). Having completed these tasks, the group returned to MCL for further critiquing of their products. This process (cycle) was thereafter repeated twice. During the last site visit, the participants realized that there was a critical component of the project management system that had been neglected: Mr. Baig (the Chief Engineer) will be providing a functional bridge between the Project Manager and the "Field Operators" (i.e., subordinate engineers and erection staff), serving as the "foreman" of the project's execution. Therefore, the participants found it necessary to develop a special network for Mr. Baig (i.e., Level 2.5).

During the site visit which followed the preparation of the "Baig" network, all products were once again scrutinized and minor adjustments made. The participants who were engineers were particularly concerned about the activity times being supplied to the group by the Project Engineers. The engineer participants felt that the times were adjusted to meet schedule targets imposed on the project execution staff by higher management and were not necessarily realistic time estimates. The specifics were discussed, but no conclusions were drawn. During this same meeting, the participants discussed with project management the prevailing reporting system and some alternatives which they were considering, i.e., episodic exception and achievement reporting. It was decided that both issues, time estimates and reporting, should be raised in a meeting with Mr. Minhas, the Managing Director (M.D.).

In preparation for the group's scheduled visit with the M.D., a reporting structure and a reporting format for exception reports were developed. The group met with Mr. Minhas and gave him an informal, yet comprehensive presentation on the concepts. Thereafter, the M.D. reviewed the networks and LogFrames with the group. He was very supportive of the system which was being developed, including exception reporting. The M.D. requested that the group further develop the exception report format to cover in greater detail the impact on resource allocation of schedule delays. In addition, he invited the group to meet once again with him and the project management staff at MCL.

Anticipating the next site visit, with the M.D., the group further developed the reporting system as well as a Level 1 Network for the M.D. In

addition, during the interlude between visits, the group subdivided itself into four work groups to begin applying the basic PMS concepts/techniques to projects of personal concern and applicability to several of the participants. The work groups all prepared Master LogFrames for the projects and some went as far as developing Output LogFrames and even networks. However, only one work group made a project site visit.

Also during this hiatus, the group began analyzing the resource management component of project management. The participants developed a "work breakdown" in which discrete "end-items" were identified. These cells were broken down to a level of detail which the participants judged to be sufficient to accurately monitor project costs without technically or financially overburdening the project. The group proceeded to code the activities and events of the different levels of networks. The coding system synchronized scheduling and cost determinants of the activities.

After discussing reporting with one of the attendees of the July 21st seminar, the General Manager of Finance for Karachi Steel Mills, the group redefined the reporting system that they recommended. The system includes both episodic achievement reporting and exception reporting. A new set of formats and a revised reporting structure were developed. (Refer to Appendix A.)

The group met with the M.D. and the other members of MCL project management a week and a half before the end of the training seminar. The M.D. committed himself and his staff to utilizing the system that Group C developed and assured the group that a colleague (the M.D. of the Javedam Cement Expansion Projec he brought to the meeting would also employ the system. In order to ensure that someone from MCL would be able to upgrade the networks as modifications

are made during project execution, the M.D. deputed the Chief Engineer to spend two to three days with the group in Islamabad learning the networking technique and further refining the networks. The participants took pleasure in transferring the responsibility for further development of a PMS for MCL to the M.D. at the end of the August 1st seminar.

2. The Simly Dam Project (Group D)

The Simly Dam workshop group had no members who were directly related to the project. Two group members, Mr. Pervez and Mr. Inayatullah, belong to the planning and evaluation cell of the CDA, the organization in which resides responsibility for the Simly Dam project.

The group started its work by developing an initial Master LogFrame and Output LogFrames, using for its information only the PC-I and a few other very brief documents. A Master Network was then developed, using only this limited supply of information. The Simly Dam project was first planned in 1962, and the initial completion date was 1972. However, much of the work is still unfinished due to many delays, and it will be several more years until construction is finally completed. Although part of the project work is now history, the group first developed the design as if the project had not yet been implemented. This allowed them to independently conceptualize their ideas as to the logical sequence of activities. Once the initial PMS documents were prepared, the group sought more detailed information from project personnel. With this information, Output Networks were prepared that traced the history of the project. The Output Networks were not at the level of detail needed for project management monitoring of activities and, therefore, were labelled as

Level 2 Networks. The historical data available did not allow the development of a more detailed network. The Level 2 Networks were combined into a consolidated network. At this point the group compared the initial Master Network with the historical network and thus was able to analyze the actual sequence of activities against the group's initial conceptualization of the project. This was viewed by the group as a valuable exercise in evaluating achievement.

The Simly Dam Project is divided into two major components: watershed management and dam construction. The Project Manager of the construction work was not aware of who was directing the watershed management nor how much work had been completed on the watershed. These two project components are independent of each other in regard to management, although both are conducted under the auspices of the CDA. They are viewed together only at a superior program management level. The group was critical of the poor coordination of these two components.

Visits were made by the group to both the watershed catchment area and the construction works. The work currently in progress made a positive impression on the group. The tour of the construction works was given by a spokesman for the contractor (Mechanized Construction of Pakistan, Limited, MCPL), who explained the reasons for the past project delays and gave his appraisal of the current state of progress. He indicated that the current major constraint was the unavailability of foreign exchange, which did not allow for the acquisition of the necessary earth moving machinery. He said that if foreign exchange were made available, construction work could be completed by December 1977.

The Project Director of Simly Dam, Mr. Khattak, is also the CDA Director of Water and Sewage. He is, therefore, able to give only part of his time to the management of the Simly Dam Project and does not monitor the project in a detailed manner. The actual monitoring of the project is the task of the Project Consultant, WAPDA, an organization which is responsible for public utilities, and like MCPL, is in the public sector. The group learned from the WAPDA Technical Officer that the contractor had not been reliable, and efforts to change contractors had failed due to higher level political decisions. Without authority to change contractors and with the current contract, which has no penalty clauses, there is no accountability of the contractor to CDA. According to the WAPDA Technical Officer, the contractor makes very little effort to maintain the expected rate of progress, delays are commonplace, and CDA does not have the means to speed up the work. The group agreed with the Technical Officer that the utility of a monitoring and reporting system, such as the group was preparing, would be slight, considering these constraints. The group consequently lost interest in developing a management system for this project, and the level of effort of the group diminished sharply.

Subsequent activities revolved around the development of a Level 3 Network for the remaining project activities and the creation of appropriate reporting documents. When this network was completed, Level 3 project staff were invited to scrutinize the network and make suggestions for improvement. Some Level 2 managers were also invited, and they commented on the events that they wished reported to them. Unfortunately not all of the key Level 2 personnel were able to attend. Two critical factors--the remaining project activities being few and not of a complicated nature and the unaccountability of the contractor--

resulted in a lack of interest both by the group and by the project and program staff in making the necessary effort to see a new project management system implemented in the Simly Dam Project. However, the group finished the system development exercises and presented their recommendations.

3. University of Islamabad Project (Group U)

a. Description of the Project and the Work Group

The University of Islamabad, a federal development project, was selected by the Planning Commission for a test of the applicability of the PMS. The University was established as a "seat of learning" for science and technology at the Post-graduate level by the National Assembly. The growth of the University during its first three or four years was devoted to assembling initial staff, planning for future development, and establishing an administrative structure to carry out the work. Initially in rented space, equipment was assembled, teaching began, and construction of permanent quarters was pushed forward. The University now consists of about 200 faculty members, 30 administrators, and a dozen buildings. Nearly 900 scholars were granted degrees in 1975 in about 16 fields of study.

The work group, composed of eight participants of the PMS seminar, consisted of economics graduates working in the Planning Commission, both federal and provincial, an accountant, several program planners and evaluators, an operations research and systems specialist, an engineer from the University project directorate, and the Planning and Development Officer of the University. The latter is directly under the Vice Chancellor in all matters concerning planning and funding of the University and was the Vice Chancellor's official representativ

in the work group so that it became an ad hoc extension of the University for the application of the PMS.

After a three-week training period (lectures, workshop practice sessions, etc.), the work group working from the PC-I "Scheme for Development of the University of Islamabad, Phase II" (Part I: Short-Term Requirements--1974-75 to 1975-76), dated October 1974, and an earlier (1973) document of similar nature, began to dissect and reassemble the University on paper.

b. Analysis of the Development Project

The documentation available provided a basis for elaborating a Logical Framework only in the most general terms. A total plan for the development project needed to be developed by the work group. The University was described by criteria or indicators applicable to each major component, taking the year 1980 as the target date for a complete functioning university.

The Logical Frameworks at the Master and Output levels, were elaborated. Initially no distinction was made between the functions of the components of the University as an operating organism and the functions as a development project. As this distinction became clear the Logical Frameworks slowly took proper shape.

There were considerable difficulties in capturing the complexities of the University's manifold and interlocking authority, approval, and execution systems. The University is a self-governing organism and has multiple intangible objectives. This exercised to the utmost the capabilities of the work group members

in the initial weeks of the seminar.

c. Networks

With the clarification and specification of the outputs, suboutputs, and the detailed quantity and quality indicators needed--professors, equipment, buildings, other staff, etc.--the networks for each component of the University were developed; a separate subgroup for each component. Interviews with various key people at the University provided a basis for checking the logical development of the various components in the network at Levels 2 and 3.

The integration of the separate component networks into a single Level 2 Network was a major feat. The time relations for activities and events were based on past development and constituted models for future projections to 1980. The complexity of the Level 2 Network was a result of the multiple parallel paths the departments followed, each at a pace of its own.

It was recognized very clearly by the work group that representing this University's development, as it has occurred up to the present, was a valid part of the exercise even though it did not constitute an ideally organized project. Further work is expected to articulate this realization with a replanning of the University development as a project discrete from the operation of the University.

Some six or seven detailed networks were developed successively for portions of the University development, each refining further the transition of conceptualizati from a structure defined by persons with official status, rank, and authority to an organization described by activities and achievable targets. In other words, to analyze the University as a project with a purpose, it had to be

described as a sequential series of actions rather than a pyramid of titles.

The networks presented very difficult problems both for showing logical dependencies and for clean graphic representation. The work group was forced to devise "shorthand" techniques, not usually found in less complex projects, to represent repeated activities. Many events, each removed in time from the establishment of the Syndicate as the approving authority, were logically dependent on that authority and also dependent on many other intervening events.

d. Work Breakdown

In developing the work breakdown and coding system preparatory to a fully integrated resource management system including the cost analysis and reporting system, the work group recognized how far they were transcending the present capabilities of both the University administration and of the higher management levels for managing and monitoring this project.

Ultimately the resource management exercise benefited greatly from the intensive effort put into clarifying the logic of the project and paid off in the simplicity of concepts for cost allocation in project development.

e. Recapitulation of Steps

The steps in the testing of the application of the PMS to the University of Islamabad were:

1. Transformation of the intangible objectives described in the PC-I for the University into a clearly defined purpose with objectively verifiable indicators;

2. Transformation of the activities of components of the University, usually described in ceremonial terms, into operationally explicit terms which could be related to the purpose in a set of logical steps;

3. Defining the major components (six outputs) of the project, distinguishing between development and operation of the University;

4. Identifying the necessary resources (inputs) in money, manpower, equipment, building, services, etc., for each component;

5. Integrating Steps 1 to 4 into a Logical Framework with vertical and horizontal logic;

6. Parallel construction of the Level 2 Network (including subnetworks) and of output Logical Frameworks;

7. Drafting and redrafting the Level 3 Networks to show initial development of the academic departments and their subsequent elaboration into faculties;

8. Construction of a work breakdown structure for coding resources used by activities and the development of the code pattern for cost center accounting in the Level 2 Network;

9. Identification of major reporting points for Level 1 and Alpha Networks;

10. Design of achievement and exception reporting forms and specific reporting structure.

f. Remarks

One innovation in networking as applied to development projects is particularly worth highlighting. When the cost breakdown of an academic department was analyzed it was realized that the costs of activities in the development network

needed an arbitrary time allocation. For example, the first year of the Chairman's salary should be allocated to development costs instead of operating costs. This can be generalized to be applicable to other development activities as well.

B. Participant Response, Conclusions, and Recommendations

This section was prepared by representatives from each workshop and presents the workshops' reactions to PMS.

1. Views and Recommendations of Group "C" Presented in Un-Plenary Session on August 8, 1975

The Logical Framework approach has two important concepts:

a) Vertical Logic which is a summary of project design emphasizing the results expected when a project is successfully completed.

b) Horizontal Logic which clarifies what is to be produced and the evidence that will signal success.

Moreover, some things important to project success which are outside the control of the Project Manager or Executing Agency/Development organizations are very clearly mentioned as important assumptions. Some of the assumptions may be vital to the success of the project. Besides other agencies which are involved in the development of the project are also mentioned.

The Logical Framework approach not only spells out the necessary and sufficient conditions for achieving each level in the vertical logic (GPOI) but through horizontal logic it also enables the evaluation team to compare actual accomplishment to a given project level against planned objectives. Thus, it is a good tool for evaluation of the project.

Networking Techniques based on LogFrame will be helpful in implementation of the project. It will not only be useful for the Project Manager but also for the planners and programmers.

The Project Manager will know in advance as to what activities are on critical path and cannot be delayed. Moreover, the concurrent activities, precedence activities and following activities with slack time if any, would be in the knowledge of the Project Manager and he will be able to monitor and control the implementation of the project better than in a situation when hardly any time schedule is followed. Project Manager will be able to take some corrective actions which will save cost overruns or time overruns or both. It will also enable the planners and programmers to know as to what allocation will be necessary in the annual development programme for a project in order to ensure that it is completed without delay and cost overruns are avoided to a great extent which may be due to capitalization of interest during extended periods of execution and inflationary pressures.

The Exception Report will not only highlight the problems/difficulties in advance but will signal that some target is in danger of being missed or already missed with suggestions for overcoming the problem, etc. It will enable the next level of management to take appropriate decision/action in order to prevent further difficulties and bottlenecks.

Recommendations

1. Coordination cell in the Planning Division, Government of Pakistan to sort out issues and problems with various agencies involved in the project which are not under the control of the project manager/executing agencies.

2. Strengthening of monitoring and evaluation sections in the administrative ministries and planning division of the Government of Pakistan.

3. Strengthening of planning departments and evaluation departments in the development agencies in Pakistan.

4. Identification of data elements, data collection methods which is least costly and data analysis plan for evaluation of project.

5. Training of planners, programmers, project managers and field operators in development organizations will be a must for success of this new system of project planning, monitoring and evaluation.

6. The use of computer for monitoring and evaluation of new big projects will be unavoidable. However, in case of such projects, the use of computers will not be economical.

7. The costing system will be vital for each project which then new concepts are tried because without controlling cost of various activities it will not be of much use.

8. The new system of project design and evaluation should be adopted on a few projects in the country in the first instance in order to see if appreciation and utility in our country.

Shortcomings of the Course

1. The durection of the course was too long and it could be completed in 1 1/2 months. Lots of time was wasted in collecting data and information from the Management of Mustehkam Cement Ltd. No participation from project people handicapped the participants in working better.

2. The "Management of Resources" was not covered in detail and only one lecture was given.

3. The case study was based on an expansion project--expansion of Mustehkam Cement Ltd., Hattar. As a matter of fact alot of things involved in a new project could not be covered in the exercise.

2. Findings of Group "D"

In the beginning of this training course we were given to understand that after going through the PCI concepts for project design managmenet and evaluation, there may perhaps be some additions and alterations in the existing revised PC-I for which is being used as a tool for project designing/identification for purposes according approval to development projects. Now after going through this course we are of the opinion that it does not provide relevant information on more comprehensive lines as compared to PC-I form.

For example, the LogFrame (PCI concepts) provides information only on the investment aspects of a development project but does not identify the financial returns from the investment in question. Whereas this aspect is fully taken care of by the revised PC-I form. Thus, LogFrame (PCI concept) does not provide any basis for addition or alternation of revised PC-I form. It may be noted here that both the LogFrame and PC-I form are dependent for their proper preparation on the data contained in feasibility report of a project. Hence annexing of the LogFrame with the PC-I form will not provide any additional information.

As noted above the LogFrame does not provide information on the financial returns from an investment. Hence it cannot be regarded as a good tool for according approval to a development project.

In the course of training, PCI introduced another tool--namely networking for undertaking effective monitoring and evaluation of a development project both during and after execution. In the training course the PCI have laid emphasis on the following aspects of networking:

1. Logical sequence of the activities.
2. Timing of the activities.
3. M/E of the physical aspects only of the events resulting from different activities.

The PCI have not provided any concrete guidance on the following pivitol aspects of the project:

1. Financial,
2. Manpower,
3. Resource Phasing.

The networking however, could be adopted as M/E tool, during implementation of a development project provided the above noted resource aspects are included in its scope.

The group visualizes that if this tool is adopted for M/E it will involve substantial resources in terms of funds and trained manpower in order to strengthen the existing planning units/cells for fruitful implementation of the system.

The quality of the training imparted by PCI was quite satisfactory during the first four weeks in particular and during the remaining seven weeks in general. The entire course could have been completed in four weeks or in six weeks at the best.

3. View of Group "U": University of Islamabad

The process of appraisal/approval of development projects proposed to be located in the public sector, particularly in the context of developing economy, plays a pivotal role in attainment of its professed objectives and overall growth rate. The Framework and techniques of LogFrame analysis developed by the PCI group aims at facilitating the very mechanism governing the processing/appraising/approving development projects.

In the first place, the LogFrame analysis helps the sponsoring agency to go in for their particular project/set of projects for which adequate information both in terms of both quantity and quality at levels of inputs (IOPG), outputs, purpose and goal is available or can easily be made available. The system, therefore, is of tremendous help to sponsoring agency in determining what particular project/projects would qualify to be drawn up or has the potential of surviving the rigorous tests applied to quantify result and gains in terms of time and quality. A large number of projects would therefore automatically stand discarded with the sponsoring agency/ department and as such approval according agencies like the PDWP, CDWP, Ec/NEC would be able to devote time to projects which are really merritorious and are well drawn up, providing all essential information going in to approval

of projects. The LogFrame analysis has the characteristic feature of equiping the project manager with tools helpful in conceiving the project in as clear terms as possible right from its inception to completion.

The LogFrame technique spells out in the logical and rationalized way various steps involved before moving to the next higher pedestal. The analysis clearly establishes the relationship between the magnitudes of inputs and output. Where particular level of output in what particular period of time would need what particular inputs in quantitative and qualitative terms form the hard core of the mechanism. The assured supply of inputs at both the implementation and post-implementation which goes as key factor to signal successful completion implementation of the project as stands this high-lighted and squarely focused. The approach has the potency of identifying in objective terms the various levels of output on the basis of given availability of inputs. This in turn helps the approval according agency to appraise things in realistic perspective. The system therefore concentrates and relies heavily on selection of raw material (quality, quantity, time wise) in signalling success of the project.

The other salient feature of the mechanism relates to funding aspect of each activity, if possible, or the proposed milestone. The approach offers tremendous help to finance and planning division to determine the cost on factual, scientific and rationalized bases. This therefore, helps to eliminate the waste of resources identifying what particular activity/ milestone should be rated really essential for the project and should go backed by the provision of necessary funds. At the same time, the initiation and completion of activity within the stipulated facility to carry out the evaluation done at a later stage.

Resource Management: With all advantages stated above, the fundamental question whether existing PC-I should be replaced or not remain unresolved. The introduction of LogFrame techniques would imply that existing tools in use like cost-benefit ratio, capital output ratio, net present worth of the project, internal rate of return of the project, breakeven point analysis, are felt being deficient in certain respects and that these would need to be replaced. The deficiencies of the existing tools have got to be spelled out at length and in what particular way the present approach proposes to make up the deficiencies and offer improvements have to be looked into before replacing the PC-I. For implementation and evaluation, however, the approach can serve useful purpose and qualifies to be introduced in our system.

C. PCI Conclusions

1. Divergence from Original Plan

The original plan was to provide concentrated training to a group of approximately 30 participants for a period of one month, following which all project-related participants would work at project sites to implement these concepts for the selected "case" projects. The participants were to be selected from the "case" project staff and from the Planning Commission. However, a decision was made to change the criteria for selection of participants with the new approach being towards a more fully representative range of individuals to provide a cross-section of organizations. This mix of organizations gave the seminar access to a broad source of skill, viewpoints, and ideas to apply to PMS development.

2. Diversity of Projects

There was also diversity in the types of projects used as "case" projects. The University project represented a mix of both a capital project (construction of the University) and a social project (education). The Dam project was both a capital project (construction of dam) and an agricultural project (watershed management). The MCL Expansion project was a capital project in the industrial sector. This mix of "case" projects provided a more comprehensive learning experience for the trainees and a better understanding of PMS requirements for system development.

3. Timing of Seminar

The timing of the seminar was not ideal for attracting the highest quality participants. The seminar began during the final month of the

GOP fiscal year, and many of the people who were best qualified for seminar participation were needed for budget preparation in their organizations. However, the high caliber of a number of participants was impressive.

4. Absence of Project Staff

The workshop groups that developed PMS for two of the case projects wasted considerable time and effort obtaining information needed for PMS development due to the lack of direct seminar participation on the part of the staff of these two projects. This absence of project-related personnel in the workshop groups affected the morale of these two groups as the participants were not getting direct and timely feedback regarding the interest of project managers in using PMS. There was also a question as to whether the system could be adopted by these projects if no staff members were undergoing thorough training in PMS techniques.

5. Participant Contribution

The duration of the workshops was increased from the time initially envisaged by PCI. The change was made to accommodate the time period that the participants had committed to the seminar in accordance with their invitations from the Planning Commission. All of the participants had been invited to spend 11 weeks in the seminar although initially it was thought that only project-related people would stay for the duration. This change resulted in an increased contribution to system development on the part of the participants. However, these people did not have direct responsibilities within the case projects, and their interest in assisting in the management of these projects was less than that required for fully effective participation.

6. Seminar Duration

The eight-week period was too long to spend developing PMS for two of the three case projects (Simly Dam and MCL Expansion) and just slightly longer than necessary for the University project, which was a larger and more complicated project than the other two. The work was accomplished more rapidly than planned because (1) the participants grasped the PMS concepts quickly and (2) with more people than planned participating in the workshops, more of the activities could be conducted in parallel. However, as mentioned above, some time was lost due to the lack of direct participation of project personnel.

7. Addition of Resource Management

It had not been made clear initially that changes in the components of PMS would be made for the case projects as needed during the course of the seminar. This created some confusion when the Resource Management component was added near the end of the seminar.

SECTION V

PROJECT MANAGEMENT AND PMS CONCEPTS

The introduction of the project concept for development activities entails major changes in several areas of management concern. Records, reports, controls, planning, etc., that are characteristic of program management are used differently under project management.

These differences need to be contrasted as clearly as possible so that the implications of the project concepts are understood.

Most management systems used in government and business today can be identified as program administration. The emphasis is placed on procedures for carrying on regular and repeated operations of the organization. Whatever the area of activity, work is organized and reported upon in about the same fashion as the use of materials or other resources. The focus of attention of management is on the rates at which daily, weekly, etc., activities, materials, and funds flow through the organization. Whether the organization is profit-oriented, or a public service or a military organization the normal methods of administration are employed: general ledger bookkeeping, inventories, work force reports, balance of debits and credits, etc. Various strategies have been developed for maintaining or increasing efficiency: cost accounting, perpetual inventories, cash-credit ratios, quality controls, and others, have built upon and improved different aspects of administration.

Since the 1930s there has grown up a set of related professional specialties which have analyzed the organizational characteristics of business, government bureaus, and

the like. They have identified certain styles of management as more appropriate than others to the principal objectives or organizations. The questions that are raised in this kind of analysis have often led to profound changes in the perspective of organizers and administrators. For example, traditionally libraries were organized around the central concept of a library as a stock or repository of books. The methods of cataloguing, storing, and protecting the books reflected this concept and the convenience of the library staff. A change in the concept to one emphasizing the use of books as sources of information led to open stacks, detailed cross-referencing by subject matter, and other innovations which were ardently resisted by librarians of several generations ago.

Organizational analysis demonstrated that some activities can be more effectively carried out when the working unit is separated from the routine administration and organized as a project. The normal and presumably effective preoccupations of management are subordinated to a different management perspective pertinent to the project alone. Project organization is usually applied only to non-repeated undertakings such as research, development, major construction, and the like. The internal organization of the project is different from normal administration and can be variable depending on the objectives. Most important, however, is the fact that the management of the project is conducted in a manner different from normal administration. Records, reports, control strategies, tools, processes, etc., of the project are not derived from standard operating procedures but are selected or designed with reference to the needs of the project and its specific limited objective.

Projects have two characteristics which make them very different from routine administration: (1) projects are designed to provide for measures of results which are independent of their internal management's reporting and control system and (2) projects permit operations to cross jurisdictional lines and to be governed according to rules and regulations specifically designed to optimize their own purposes.

The contrasts between program and project styles of organizations and management are illustrated in Figure V-1.

It is important to make explicit the differences between program administration and project management in order to establish the framework for effective use of project management. This is particularly true when project management is an unaccustomed style. Very often components of the program administration system are retained and imposed on the project system distorting the logic, around which the project is developed.

It is worthwhile examining crucial management processes as they apply to projects. Figure V-2 shows that a project's design with its dynamic internal logic and structure is consistent with project purpose but does not follow the program administration pattern of management processes. This, it should be emphasized, does not detract from the role of the approval authority. On the contrary the project approval establishes a specialized system of management processes specifically for the purposes of the project. Certain patterns can be developed for projects in which similar resources, activities, and objectives are found. It is incumbent upon the approval authority to establish whatever combination of specialized and previously standardized procedures and regulations for governing project management as is appropriate in each project.

FIGURE V-1: CHARACTERISTICS OF OPERATIONS AND PROJECTS

CHARACTERISTICS	OPERATIONS	PROJECT MANAGEMENT
Orientation or Style	Steady or cruising rates of production	Research, development, experimentation, one time activities, major construction, new technology applications
Design	Optimization of efficiency by simplified repetitive actions (Bar Charts)	Logically dependent steps, actions, and times organized for specific limited purpose (Networks)
Reporting	Periodic reports; time, materials, labor, funds as used, inventories, production	Episodic: Achievement or completion of steps, exceptions, warnings, changes in assumed conditions, periodic recapitulations, & reviews
Budgeting	By organizational unit, subunit	By logical steps, milestones, specific activities
Accounting	Cash flows, capital investment, credit ratios, cost allocation	Cost centers, periodic resource use
Success Criteria	Profit or loss, sales, units of work accomplished	Achievement of overall purpose based on independent measures

FIGURE V-2: MANAGEMENT PROCESSES APPLIED TO

OPERATIONS AND PROJECTS

PROCESSES	OPERATIONS	PROJECTS
Approval	Granted annually for continued operation with possible modifications. Different approval bodies for different aspects	Granted once on the basis of total design of logically interlinked steps toward achievement of purpose, single approval body
Control and Review	Periodic examination and appraisal of performance	Predetermined by project design as indicators of major events
Funds	Regular flow established on basis of level of operations	Scheduled in project design at time of approval
Reporting	Periodic, timed to reflect regular use of resources and performance	Scheduled in project design, showing achievement of milestones or exceptions any time performance is threatened
Evaluation	Normally follows yearly summary for approval renewal	Evaluation for feasibility prior to approval and then scheduled by design for critical events to ensure responsiveness to problems
Resource Management	General accounting procedures and reports	Activity paced resource allocation based on designed performance steps

There is a tendency in instituting project management to overlook the unexpressed assumptions which underlie either the program administration or the project management system. These assumptions apply to the performance of work, methods of contracting, standards and specific actions, jurisdictional prerogatives, and many others.

As an example there are agricultural projects which have as their outputs increased productivity and farmer's income. Two elements in the problem appear to be crucial: water management and the marketing structure. Examination of the situation showed that the area of the water basin for irrigation did not coincide with the area for the marketing pattern. Clearly different areas in the jurisdictions of the two ministries were involved. More important it was discovered that farmer's use of water did not depend on his knowledge or motivation for improved practices but was regulated by the water officer whose distribution practices were governed by a detailed manual of regulations about water use that had been prepared according to the most enlightened scientific knowledge of about 80 years ago. No one was actively obstructing progress but the projects ignored the fact that water use was dependent upon an elaborate on-going system of administration with different preoccupations and unexpressed assumptions.

This example illustrates the kind of problems that occur when undertaking to introduce change for development and improvement. Reality does not conform to administrative practices or bureaucratic jurisdictions. Moreover, there are incorporated in the fabric of operation administration, accepted definitions of authority and responsibility that constrain the conduct of a project. To break through these constraints deliberately by organizing a project around a

limited purpose means that the ultimate reference is the reality in which the project operates and that setting aside normal rules and regulations requires an analysis of the implications for the project purpose.

To bring together the points that have been examined under the concept of style of management: Project management focuses on logically necessary and sufficient activities, resources, and management practices required to accomplish a particular limited purpose. Operating administration focuses on standard operating procedures, activities, and resources that are needed for continued operation of routine services, production, information, and the like.

Each is appropriate to certain situations, problems, and purposes, but they are not interchangeable.

The GOP Project Management System as defined during PCI's Phase II activities is here summarized in terms of the following concepts:

A. Overall System Concepts

B. Logical Framework

C. Networking and Scheduling

D. Resource Management

E. Achievement and Exception Reporting

A. Overall System Concepts

The PMS is less a system in the sense of people and machinery than it is the application of certain key concepts between two levels of management. The system focuses on the relationship between the project manager and his superiors. However, the reporting rules between superior and subordinate are in essence the same regardless of management level. The system assumes that for each manager participating in this system there can be:

- A Logical Framework expressing his manageable interest, purpose, and goal;
- A network for the project showing the time phasing and logical interdependence of all activities required to produce the outputs on the Logical Framework.

Based upon the existence of this planning information, each subordinate level of management then identifies for his superiors:

- A set of selected "key" events that provides the basis for achievement reporting (that is, at the time that a key event is scheduled for completion, a report must be generated to indicate the nature and level of accomplishment);
- Those subordinate events upon which exception reports will be based (that is, there will be a report if and only if the date, quality, or quantity targets are missed).

Included among the key events so identified will be "special reports"--usually evaluation reports. Such special reports normally would be developed in anticipation of and to support decision points in the project. A decision point is of course any point where the logic of the project in terms of inputs, outputs, or purpose, should be reconsidered in terms of either restructuring of the project or reallocation of project resources to other objectives.

Based upon the planning package and recommended reporting approach presented to him, the superior level manager establishes "his own" project network that consists of the key events identified by the project manager and/or key events that he may deem to be of particular interest to him, plus additional reports--usually keyed to decisions--that he may require. The system excludes periodic reporting per se, although it is possible for superior levels of management to require periodic evaluations (say every 12 months) to assure them that the project is in fact on course and promises to meet goal-level objectives. In recognition of the fact that information also consumes resources, particularly the scarce resources of good managers and analysts, there is a burden on the superior level manager to clearly specify the information he needs and why he needs it. The subordinate level manager also indicates the information he will require regarding progress of other projects and activities upon which the success of his project depends. These are usually the assumptions noted in the Logical Framework, the assessment of which may require additional allocation of information gathering resources.

The superior level manager then retains the planning package as developed by his subordinate, with a clear understanding that the subordinate will actually monitor project activities at the level shown in that package. He (the superior) actually monitors the project based only upon the key events he has selected. It is normal and frequently desirable to have, especially at middle levels of management, the superior and subordinate using the same network with the exception that the key events selected by the superior are represented by different symbols to facilitate their identification.

The PMS requires utilization of the above planning and reporting requirements only at the project level. However, these concepts are indefinitely extendable both "downward" and "upward."

Based upon this dialogue between the two levels of management, a reporting schedule has been established to include three types of reports generated by the system:

- Achievement Reports
- Exception Reports
- Special Reports

An achievement report indicates the quality, quantity, and time of accomplishing a pre-specified key event.

An exception report indicates one of the following two conditions:

- A key event (an event on the superior's network for the project) is in danger of being missed, which constitutes a yellow flag report. This normally signifies that an event immediately subordinate to a key event has been missed.
- A key event has been missed which constitutes a "red" flag report.

Special reports should normally include an assessment of progress at each of the four levels of the project (input, output, purpose, and goal), a determination of the congruence of that relationship, and an extrapolation as to the level and probability of success.

Representative formats of achievement and exceptions reports are shown in Appendix A of this report.

It is recommended, but it is not a requirement of the system, that:

1. The problem causing an exception report be given the same level and degree of attention by management as the project itself receives. This is appropriate in that the success of the project depends on the resolution of that problem.

2. After a red flag report has been generated, management will review and reanalyze the project just as though it were a new project. Once the problem has been analyzed and a solution accepted, then the network will be modified accordingly and the rescheduled event (which was originally missed) returns to the normal flow of reporting and if achieved on time, is reported on an achievement basis.

B. Logical Framework

The Logical Framework approach assumes that development projects are instruments of change: that they were selected from among alternative instruments as the potentially most cost-effective approach to achieving a desired, beneficial result. Our approach accepts the uncertainty inherent in all development projects by explicitly identifying the nature of the uncertainty, the development hypothesis. On the basis of demonstrated application to hundreds of social and economic development projects, we believe that the concepts are both tactically and strategically sound.

It is convenient to think of the Logical Framework in terms of two types of thought processes:

- A vertical logic that clarifies why a project is undertaken (project design)
- A horizontal logic that clarifies what is to be produced and the evidence that will signal success (evaluation)

1. The Vertical Logic of the Logical Framework

Goal, purpose, outputs, and inputs characterize a project and are linked by a set of hypotheses.

Good project design requires that at each level in the vertical logic, the stated conditions be those necessary and sufficient to achieve the objective(s) at the next higher level.

Recognizing both that the full set of necessary and sufficient conditions must be indicated at each level and that many things important to project success may be outside the project's control or influence, the Logical Framework requires that the project manager identify the key assumptions he must make to postulate success of his project. That is, he must explicitly identify the factors beyond his influence that will affect success of his project. Thus, the assumptions about a project are often the focus of dialogue between the project manager and next levels of management.

Having characterized the project as a set of linked hypotheses, it is important to note that there is a significant difference between input-to-output linkage and the other higher linkages. We can expect the project manager to use appropriately the input resources to produce the outputs; he is accountable for results. However, it is his best judgment--a hypothesis shared with his higher levels of management--that outputs will, in fact, result in the purpose. Based on this view, the manager accepts personal accountability for producing outputs; he is a project manager in the contemporary sense of the term. However, in postulating that those outputs will be sufficient to realize the purpose, he is a development scientist. He is held accountable for the quality of his analysis and judgment--not for the purpose-level results.

By separating the conventional management role from that of development scientist--with the project as an experiment in development--we set the framework for a candid and objective evaluation. Thus, the Logical Framework not only clarifies why projects are undertaken, but also fosters the objective and analytical sorting of evidence that will be required by later evaluations.

2. Objective Verification: The Horizontal Logic

Having clarified the basic design of a project in terms of inputs, outputs, purpose , and goal--why the effort is being undertaken--the Logical Framework demands that the project team identify the evidence required to demonstrate accomplishment. We use the term "horizontal logic" because experience shows that defining the evidence required to demonstrate a given event clarifies the nature of the event itself.

Specifically, the horizontal logic demands that at each of the conceptual levels in the Logical Framework the project team must make explicit:

- Objectively verifiable indicators that will demonstrate that the desired result has been realized
- Means of verification--specific mechanisms through which accomplishment will be objectively verified

It is important to note that objective verification does not necessarily mean quantification. Moreover, the two-step clarification of evidence--identifying first the indicator and subsequently the means of verification--is specifically introduced to encourage project teams to measure that which is important, rather than that which is easily measured.

Recognizing the limitations of single indicators for measuring complex change, the Logical Framework encourages using multiple indicators to verify success at the purpose level.

To clarify the project's purpose for planning and evaluation, project designs can be displayed in summary form using the Logical Framework matrix. The framework displays the interlocking concepts that clarify <u>why</u> a project is being undertaken and states specifically <u>what</u> will be done to achieve the desired result.

C. Networking and Scheduling

Networking is the graphic display of the sequence and the interdependence of activities and events in a development project. As a project planning tool, networking will increase confidence in the design of a project. The Logical Framework states the resources and activities that are necessary for the desired outputs to be produced. Networking then illustrates how the resources and activities will be used to produce these outputs. This exercise will bring to light some of the constraints on project activities that were not previously evident.

Networking provides a bridge between project design and implementation. Once implementation has begun, the networks provide a basis for monitoring project progress. Networking also facilitates the reporting of progress to higher level management by making explicit the timing and nature of reports. The networks allow for a more proper management of resources by providing a format to show management where resources are needed, when they are needed, and how much is needed.

Finally, the networks provide a basis for evaluating achievement. Quantity and quality targets of achievement at various critical points of time are clearly stated.

1. Critical Path

The elapsed time for each activity on a network, that is, the time required for the completion of each activity, is shown. The longest time path of activity from the beginning to the completion of a project is called the Critical Path. This is the minimum time period required to complete the project.

An increase in the time period necessary to complete any activity on the critical path will result in at least an equal increase in the time required to complete the project. Activities and events lying on the critical path are therefore generally monitored more closely than other activities and events.

2. Slack

The period by which activities can be delayed without affecting total project duration is called slack. When the slack time is known, project management can delay commencement of an activity with slack for any period of time up to the full slack period of the activity in order to economize on the allocation of resources.

Through networking, project management can receive various reports beyond the previously mentioned episodic achievement/exception reports.

Some of the more intensive reports which would be needed for project analysts and scheduling would be:

1. Listing of all activities, in activity number sequence, to be used as a reference to obtain information regarding any activity;
2. Listing of all events, in event number sequence, to be used as a reference to obtain information regarding any event;
3. Listing of all activities in chronological sequence of start date or completion date;
4. Listing of all activities in order of decreasing slack. This will give management an immediate picture of where the scheduling and resource allocation flexibility lies in the project;
5. Listing of all activities on the critical path and/or all events on the critical path.

These types of reports will facilitate project management in evaluating alternatives in scheduling and resource reallocations. The reports can be generated on a selective basis after making any modification to the network and will show immediately the schedule/cost impact of the modification.

D. Resource Management

In discussing resource management it is important to address two basic conceptual issues.

The first such issue is one that has been raised on a number of occasions by some of the GOP participants in the Phase II activities. Their position is that the lack of sufficient resources available to get the job done represents a fundamental constraint on system utilization. The conclusion they seem to be drawing from this is that any system that does not increase the level of resources available is not useful. It is PCI's position, and it is built into the system concept as it is presented here, that the art of management is exactly the art of maximizing the value added by use of available resources. Resource availability is always a constraint. There is never an infinitude of resources.

Further, examination of the so-called implementation gap suggests that availability of resources is not in fact the most critical problem facing the GOP. Rather, even in projects for which substantial resources are made available, the purpose of any analysis is to highlight the opportunities for optimizing the pay-back from our resource investments and to provide continuing oversight such that those resources can be reallocated based upon increasing expected value of alternative investments.

The second conceptual issue relating to resources is that performance tracking leads cost tracking. That is, a project that is in trouble meeting its performance targets becomes a project that has trouble meeting its expenditure targets and living within its expenditure constraints. Therefore, an orientation

to performance is the most cost effective way of regarding information allowing us to understand and predict probability of project success.

In short there is a choice between a result-oriented management system in which management attention is oriented to performance with resource availability as a constraint. This is a clear alternative, consistent with our earlier discussion that we are in fact talking about a change in management style to an expenditure- and accounting-oriented tracking system. It is possible, although expensive, to know everything there is to know about expenditure patterns and even expenditure projections and know little or even nothing about the success or failure of our projects in terms of their output, purpose, and goal targets. It is important to avoid the specious precision associated with low level cost analysis, tracking, and reporting. The orientation should be toward tracking of performance targets and to giving continuous attention to the definition and redefinition of project and program objectives that are consistent with the span of control of management.

E. Achievement and Exception Reporting

The function of a good management information system (MIS) is to provide the right information to the right people at the right time. The right information is information that identifies a problem in a manner such that it is actionable by the level of management to which the report is made. This means that policy level management must be careful that it does not overwhelm itself with data as opposed to information. It is not appropriate to forward information regarding progress or lack of progress at the lowest level of operations to the highest levels of management. Virtually every project is behind schedule in some regard. Thus, a totally disaggregated system, in which all information is brought to top level management's attention, would simply indicate that "all projects are behind schedule." It is not necessary for an information system to provide this kind of information. One could save the time and trouble and simply write a monthly report for the record saying exactly that--all projects are behind schedule. The job to be done then is to report on those problems that are both important enough to be raised to the management level receiving the report, in a manner such that a resolution can be expected.

The achievement and exception reporting approach (discussed in A above) built into the PMS achieves those objectives. It is keyed to and based on the orderly delegation of responsibilties of accountability established by the Logical Framework approach and, by requiring the maintenance of lower levels of networks and schedules, provides the capability for immediate audit of management performance at all levels of the organization.

SECTION VI

COMPARATIVE ANALYSIS OF PC-I/PC-III AND PMS

A. PC-I

The PC-I proforma, the form which is currently required for development project approval by the Planning Commission, is a composite of elements of different types of feasibility studies. The uniform information demanded for all projects (e.g., industrial, agricultural, health, education, etc.) focuses heavily on financial questions: capital costs breakdown, foreign exchange and local currency requirements, cost of sales for first year, fixed and variable costs, cash flow statement, profit-loss estimate for next five years, and financial structure. In addition, the PC-I demands a statement of project objectives, a project description, and a justification. Finally, technical questions are also raised with respect to physical work schedule; manpower, equipment, and material requirements; estimate of demand for product or service, and expected economic life of project.

Those who have submitted PC-Is view the form as a set of questions which may satisfy Planning Commission informational needs but provide marginal benefit to project execution[1/]. As a result of this, project managers play only a limited role in the preparation of the PC-I: They usually appoint junior managers to the task of completing the report[2/]. Consequently, a constructive dialogue between project planners/managers and project approval authorities is impeded and an adversary relationship often results.

1/ This conclusion was arrived at through discussions with Seminar participants and project management from the three "case" projects.

2/ In discussions with the Seminar participants, five individuals, all "junior" level managers in their organizations, indicated that it is their responsibility to prepare PC-Is on behalf of project managers.

The Project Management System is composed of four basic elements:

1. The Logical Framework--project formulation and evalaution technique;

2. Networking--project scheduling and monitoring technique;

3. Resource Management--resource estimating, budgeting, reallocation, and control;

4. The Reporting Structure--information feedback mechanism which provides the basis for project control, "realignment," and reformulation.

These techniques are not necessarily intended to replace the PC-I nor to add an additional burden to the project cycle (formulation, appraisal, execution, evaluation). Instead, these tools can enhance the usefulness of the PC-I for both project managers and the Planning Commission. Between the Logical Framework and networking, the major elements of the PC-I are pulled together into a concise, integrated project plan which both validates project design and facilitates project execution and control. In some cases, the information required for the Logical Framework is a summary of what is to be provided in the PC-I. In other cases, the Logical Framework and networks are more comprehensive than the PC-I. Exhibits VI-1 and VI-2 analyze the variations between the PC-I and the fundamental components of the PMS (LogFraming and networking).

EXHIBIT VI-1

PC-I DATA AVAILABILITY IN THE PMS

ITEM #	DESCRIPTION OF PC-I ELEMENT	AVAILABILITY IN PMS	
		LOGICAL FRAMEWORK	NETWORKS
1	Name of project	Included in Title	Included in Title
2	Authority responsible for: sponsoring, executing, operating and monitoring	Included in Title Included in Purpose Narrative Sum.	Included in Title of all level networks
3	Time required for completion of project	Purpose (narrative summary) targeted date	Terminal event elapsed time
4	Plan provision in 5-year plant allocation	Applicable as statement of Assumption required for successful completion of project Input Level: with respect to ready availablility of funds Output Level: with respect to Gov't commitment to sector over time	Indicated at the appropriate level as constraining events.
5	Relationship to sector objectives	Precise relationship stated in Goal narrative and objectively verifiable indicators of contribution to Goal spelled out in Goal OVI	Can be included in higher level networks.
6	Capital cost of project	Cost breakdown in input OVIs for local and foreign exchange components	Included in Resource Mgt. component that results from networks (i.e., work breakdown/ cost)
7	Annual operating expenditure	Can be included in: 1) end-of-project status as a qualitative description of successful execution, or 2) Output Level Assumption which compares expected returns to expected costs of production	Not indicated

EXHIBIT VI-1 (CONTINUED)

ITEM #	DESCRIPTION OF PC-I ELEMENT	AVAILABILITY IN PMS	
		LOGICAL FRAMEWORK	NETWORKS
8	Objectives of project (preferably quantitative terms)	Precise definition in narrative summary of purpose and targeted in purpose level OVIs or EOPS (end-of project status: what is expected to be found by the end of the project's execution).	Should be indicated as terminal event of the master network
9	Location of project	Found in Title	Found in Title
10	Market and demand	Indicated: a) as purpose level assumption b) as output level assumption c) as output when project takes within its manageable interests the generation or influencing of demand	Can be indicated as a sequence of activities leading to an end event if project takes within its manageable interest stimulating or influencing demand
11	a) Justification b) Description	a) Reflected in the output-to-purpose and purpose-to-goal linkages. b) specifics are indicated in output and input narrative summaries, and quality, quantity, and timeliness aspects of each aspect are outlined in output and input OVIs.	a) not indicated b) quality, quantity reporting indicators fully describe the details for milestones and other key events
12	Date of calculation for capital expenditure estimates	Not shown explicitly, but can be included as input targets	Not shown
13	Breakdown of capital cost for investment period	Input OVIs for local & foreign exchange costs	Included in Resource Mgt. component which results from networks (i.e., work breakdown/costs)
14	Basis of cost estimates	Details not included	Details not available

EXHIBIT VI-1 (CONTINUED)

ITEM #	DESCRIPTION OF PC-I ELEMENT	AVAILABILITY IN PMS	
		LOGICAL FRAMEWORK	NETWORKS
14	Basis of cost estimates	Details not included	Details not available
15	Costs of sales a) 1st year b) full production	Available in a) purpose OVI in aggregated form or b) in output assumption in aggregate.	Not included
16	Fixed & variable costs & price/ unit	Specified in EOPS	Not included
17	Cash flow statement for 5 yrs.	Available in purpose OVIs	Not included
18	Profit & loss account for 10 yrs. & repayment schedule	Available in purpose OVIs (but not in detail) & referred to in output assump.	Not included
19	Work & financial schedule	Available in detail in input narrative summary & OVIs	Available in detail in network and work breakdown/cost
20	Foreign exchange effect of project	Available in goal narrative & OVIs if so structured, details N/A	Not included
21	Sources of equipment & financing & present position in negot.	Available in input level assump. but detail depends on perceived probability of non-availability of equipment & financing	Should be clearly indicated
22	Financial structure	Can be reflected in input assump.	Not indicated
23	Other benefits	Reflected in Goal narr. sum. &/or goal assumption	Normally not indicated but can be specified in higher level networks (quantity & quality indicators for key events)
24	Jobs to be created	Included in the OVIs	Available in quality, quantity indicators for key events related to manpower
25	Manpower requirements	Included in input OVIs	Included in resource allocation for activities
26	Physical & other facilities requirements	Included in input OVIs	Included in resource allocation for activities

SUMMARY OF PC-I DATA AVAILABILITY IN PMS

(LOGFRAMES & NETWORKS)

NOT INCLUDED	PARTIALLY INCLUDED
14. "Basis of Cost Estimates"	4. "Provision for in 5 year plan"
	7. "Annual Operating Expenditure"
	12. Data of calculation of "Capital Expenditure Estimate"
	15. Costs of sales for 1st year of operation and of a year of production at full operating capacity
	17. Cash flow statement
	18. Profit & loss account & repayment schedule
	21. Source of equipment & financing & present status of negotiation
	22. Financial structure

EXHIBIT VI-2

PMS DATA AVAILABILITY IN PC-I

ITEM #	DESCRIPTION OF PMS ELEMENTS	AVAILABILITY IN PC-I	COMMENTS
1	Goal (objective which relates proj. to sectoral level)	PC-I identifies a set of objectives which often includes more than one that relates the proj. to sectoral objective. By not limiting the "Goal" to the one proj. objective which is most closely related to the impact of the proj. in question, it becomes very difficult to ascribe causality to the project.	
2	Purpose (the single objective which the proj. is planned to effect directly)	PC-I does not require identification of a single objective which the proj. auth. are seeking to effect through the proj.'s implementation. Therefore, proj. impact is rarely evaluated, and mgt. is usually content to see the "outputs" produced to justify the commitment of resources to the project in question.	
3	Outputs (the actual results of the proj. for which the proj. manager is held accountable)	PC-I outlines some of the results expected from the proj. specifically w/respect to physical structures, equipment installed, & jobs created. However, some of the "outputs" which aren't as obvious, but are key to proj. success, are not usually covered (e.g., farmers motivated, community health comm. organized, engineers trained in mgt. techniques).	
4	Inputs (the activities & resources committed to activities which are needed to produce the desired "outputs")	PC-I identifies the major resources needed under several listings: finances (foreign exchange & local currency), equipment, manpower, & materials & supplies. In addition, it outlines the activities in a work plan (some PC-Is indicate the availability of a PERT network, but usually they include bar charts). However, PC-I does not relate the specific activities to the resp. outputs, nor does it relate the specific resources to the specific activities requiring them.	

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EXHIBIT VI-2 (CONTINUED)

ITEM #	DESCRIPTION OF PMS ELEMENTS	AVAILABILITY IN PC-I	COMMENTS
5	Manageable Interest (the aspects of a proj. for which proj. manager is responsible & held accountable for (inputs & outputs)	PC-I does not make explicit the complete set of conditions under which a proj. mgr. is held accountable for his obligations	The development of a LogFrame necessitates a dialogue between the proj. mgr. & higher level proj. auth. in which the expectations of both are made explicit (i.e., resources & mgt. backing for the proj. mgr. & results for higher mgt.)
6	Development Hypothesis (the logical linkage between purpose & goal is a statement of hypotheses which describes the desired result--goal achievement--of purpose accomplishment)	PC-I does not attempt to lay out the terms of a development experiment (i.e., the dev. hypothesis) that engages proj. planners or managers as dev. scientists	
7	Objectively Verifiable Indicators--OVIs-- (the set of indicators which is pre-determined in targeted, objective, & verifiable terms that signals the degree of success or failure in achieving each level objective)	PC-I rarely makes explicit the indicators which will signal accomplishment of proj. objectives	In developing OVIs, one is forced to validate the "logic" even before implementation by comparing the indicators w/what is reasonable to expect based on experience intuition & good tech. judgment.
8	End-of-Project-Status--EOPs--(OVIs at the purpose level which signal proj. completion)	PC-I does not demand that objectively verifiable terms are predetermined to specify the proj. conditions which will signal achievement of proj. purpose & the completion of the project	By specifying EOPS w/in the proj. design, it is clear whether proj. has succeeded or has failed & is to be discontinued.
9	Means of Verification (the source of info. which will be tapped in verifying OVIs and which is pre-determined for each OVI in the proj. design)	The closest PC-I requirement which resembles MOVs is item #14, "Basis of Cost Estimates." However, this info. does not provide a foundation for future verification, merely an explanation of the source of info. already provided	The advantage of specifying MOVs in proj. design is 2-fold: 1) data collection can actually be initiated at the outset of proj. imple. to verify its progress rather than "scurrying" for info. at the end of a proj.--this often reduces the cost of verification & 2) OVIs can be modified early-on or changed if the related MOVs are judged to be too costly or difficult to be practiced

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EXHIBIT VI-2 (CONTINUED)

ITEM #	DESCRIPTION OF PMS ELEMENTS	AVAILABILITY IN PC-I	COMMENTS
10	Assumptions (the set of uncertainties or constraints which are outside of the manageable interest of the proj mgr. & which will affect the probable success of proj. implementation.)	PC-I addresses a limited set of uncertainties. It requests a desc. of the fin. structure, the sources of equipment & financing, the present status of negot. re: equipment & finances, the availability of a mkt. for the new product or svc, & provisions made for the proj. in the current 5-yr. plan. Although all of these data are to be made available they are not registered as uncertainties & related to proj. implementation for which proj. mgt. should be actively concerned. In addition, because the data are not explicitly tagged as risks their net potential influence on successful proj. implementation is not calculated (nor discussed) by either of the proj. auth., the proj. mgr., or the approving auth. Further, the list of uncertainties required by PC-I is limited & does not invite proj. formulators to think in terms which identify the total set of assump. to be considered.	These uncertainties are made explicit in the proj. design so that 1) proj. auth. are appraised of the real risks involved & can either approve or disapprove the proj. based on the most realistic appraisal possible and 2) proj. mgt. can attempt to influence these uncertainties where possible so as to reduce the risk involved in proj. implementation
11	Logical Framework Matrix (a concise display mechanism which enables proj. formulators, mgt., evaluators & others to relate each component of the proj. design to the overall logic)	Not included	PC-I's linear display tends to isolate data as unrelated & discrete facts. This display mechanism impedes the constructive exercise of validating a project's logical design because the logical relationships between proj. elements are
12	Output Logical Frameworks (the set of detailed LogFrames developed for each output of the Master LogFrame)	PC-I does not include anything related to the concept/technique of output LogFrame. Thus, it is difficult to 1) further validate the soundness of proj. design & 2) provide a realistic transition between proj. plan & actual imple	

EXHIBIT VI-2 (CONTINUED)

ITEM #	DESCRIPTION OF PMS ELEMENTS	AVAILABILITY IN PC-I	COMMENTS
13	Networking: Logical sequence of "activities" and "events" to accomplish the proj. [the detailed sequence of inter-dependent "activities" which originate from specific points in time and terminate at specific points in time (events), consume resources & time, & provide the imple. paths which produce the desired "outputs"]	PC-I requires a work schedule either in the form of a PERT Network or a Bar Chart.	In the proj. formulation stage, these networks should serve to further validate the completeness & logic of the activities defined by the LogFrames & the resources committed to them. In addition, they clarify the means by which the activities & resources (i.e., inputs) will produce the outputs. Networks provide a clear bridge bet. proj. formulation & execution by "charting the course," "setting the pace," identifying the resources needed, defining the "interfacing" bet. the various paths of activities, & further defining the mgt. responsibilities of the proj. mgr. & his staff of managers.
14	Quantity, quality, time indicators (the objectively verifiable targets which are identified for each milestone or key event on the networks).	PC-I Networks or bar charts do not include this aspect.	In PMS, the foundation for quality, quantity, and time indicators for the networks is laid in the LogFrame "input output, & purpose" level OVIs. Their inclusion forces managers to closely reexamine the networks before they commit themselves to the "mgt. contract" which makes them accountable for delivering the targeted results.
15	Selection of reporting events (in PMS, events to be reported are identified through dialogue bet. the individual monitoring the network in ques. & the individual who will receive reports on the progress of the activities represented on the network. This identification takes place prior to implementation.)	PC-I Networks & Bar Charts do not require this element.	The selection of these events prior to implementation, induces higher mgt. to become familiar with the imple. design, & to come to an agreement w/ subordinate mgt. on the important reporting events. Familiarity w/higher mgt's reporting expectations in advance enables the subordinates to prepare "to meet those expectations."

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SUMMARY OF PMS DATA AVAILABILITY IN PC-I

NOT INCLUDED	PARTIALLY INCLUDED
5. Manageable Interest	1. Goal
6. Development Hypothesis	2. Purpose
7. Objectively Verifiable Indicators	3. Outputs
8. End-of-Project Status	4. Inputs
11. LogFrame Matrix	9. Means of Verification
12. Output LogFrames	10. Assumptions
14. Quantity, Quality & Time Indicators	13. Logical Sequence of "Activities and Events"
15. Selection of Reporting Events	

B. PC-III

There are two basic categories of information which are reported between levels of management: physical progress and resource utilization. Reporting is done either on a periodic basis or on an episodic basis.

The result of an "early warning" (exception) reporting system is that the negative impact of implementation bottlenecks can be minimized through early detection and corrective action. Episodic achievement reports inform higher management of the achievement status of specific events upon their completion. Although more than one report may be submitted at a time, achievement reporting is not cumulative but rather focuses on the achievement of discrete events (as identified on a network).

There are many alternative patterns to reporting which can be followed. Exhibits VI-3 and VI-4 describe the existing reporting system utilized by the Planning Commission (PC-III and monthly reports) and the PMS exception/achievement reports developed in the Phase II effort by the seminar groups (Appendix B).

EXHIBIT VI-3

PC-III DATA AVAILABILITY IN PMS

ITEM #	ELEMENTS OF PC-III & MONTHLY REPORTS	EXCEPTION REPORT	ACHIEVEMENT REPORT
1	Code # of project	Included as Reference #	Included as Reference #
2	Report for quarter ended	Time parameter included in Target as well as data	Time parameter included in Date, date of state of lead activities & Date of Completion in Physical aspects & financial aspects
3	Name of project	Indicated as same	Indicated as same
4	Location	Included in Name of Project	Included in Name of Project
5	Sanctioning authority	Included in Title	Included in Title
6	Total cost as per PC-I revisions	Cost of activities or groups of activities leading to key event which is monitored is reported. Cost revisions are included in the annual evaluation report	Cost of activities leading to specific event being reported is included but revisions aren't necessarily shown
7	Actual date of commencement of work	Indicated in event target for specific event	Indicated in date of state of lead activities for specific event
8	Likely date of completion	Both the expected date of event completion & proj. completion (based on the calculated effect of expected or actual event delay) are indicated under impact	The expected date of event completion is indicated under Physical Aspects "target date of completion"
9	Reasons for delay in completion of work (checklist of five reasons)	Reasons are identified under Problem "Source"	Reasons are identified under Physical Aspects "Reason for Deviation from Target if any"
10	Change in scope of design	Changes are suggested in Action Taken & Actions Requested	Changes are reflected in Impact

EXHIBIT VI-3 (CONTINUED)

ITEM #	ELEMENTS OF PC-III & MONTHLY REPORTS	EXCEPTION REPORT	ACHIEVEMENT REPORT
11	Phasing of Proj. Costs: Expenditure as per PC-I & Release of Funds to Executing Authority	Not indicated	Costs are indicated as related to the specific event in Financial "Estimated Costs" & "Actual Costs" Aspects
12	Progress per quarter for major work items (planned vs. actual in % or other terms)	Included in up to date progress and target for activities leading to the specific event	Included in Physical Aspects "Targets" & "Actual" for activities leading to the specific event
13	Planned costs vs. actual per major items (up to end of current quarter)	Can be reflected in condition, problem & impact for the specific event in question & its relationship to the entire project	Identified in Financial Aspects, "Item," "Estimated Cost," "Actual Cost"
14	Expenditure unaccounted for or booked to suspense	Not included	Can be reflected in "Financial Aspects"
15	Reasons for cost escalation	Can be reflected in Problem "Nature" & "Source"	Covered by Reasons for Increase/Decrease in Cost

CONCLUSIONS DRAWN FROM EXHIBIT VI-3

Only one specific item covered by PC-III and Monthly Reports is not covered in the PMS reports developed by the seminar groups; namely, "Phasing of Project Costs."

PC-III & Monthly Reports is a cumulative periodic reporting mechanism which tracks total project performance and adds each quarter's (month's) progress to the sum total of prior project progress reports.

PC-III achieves project-wide reporting at the cost of brevity: consciencious reporting with the PC-III became a demanding time- and resource-consuming operation. PMS can keep reporting streamlined while compensating for the lack of project-wide coverage in the Exception and Achievement Reports by requiring a periodic (annual) evaluation report. This report would summarize the progress of the project's performance (planned vs. achieved) and resource utilization (planned vs. actual) for project replanning and resource reallocation.

EXHIBIT VI-4

PMS REPORTING DATA AVAILABILITY IN
PO-III AND MONTHLY REPORTS

ITEM #	PMS REPORTING MECHANISMS	PO-III & MONTHLY REPORTS
	EXCEPTION REPORT	
1	Reference number	Identified as the code number of the project
2	Date	Time parameter is indicated in "Report for Quarter ended" and by the date which follows the signature of the reporter
3	To: (this report is primarily designed for reporting from one level of mgt. concerned with the proj. to the next higher level - but it could also be forwarded to other monitoring mgt. units (e.g. Plng. Comm)	PO-IIIs (& Monthly Reports) are primarily prepared for the Plng. Comm and GOP.
4	From:	Indicated by the signature at the end of the report
5	Name of Project	Indicated as same
6	Event (the report is providing info. as related to one key event on a proj. imple. network, not the sum of all events to that point in time)	"Progress per Quarter for Major Work Items" identifies in general the activities and events for the total project.
7	Target (results expected upon event occurrence)	Indicated in but not clearly specified "progress per quarter for major work items" for entire project.
8	Condition (the current status of the activities which lead to event occurrence & performance evaluation w/respect to quantity, quality, and time)	(Same as #7 Above)
9	Problem/Nature of (desc. of expected or actual delay of event)	(Same as #7 Above)
10	Problem/Source of (desc. of cause of expected or actual delay of event)	Described in "Reasons for Delay in Completion of Work," however, the limited checklist of reasons available may not describe the actual reason for a delay.
11	Impact (projection of the effect of the delay or expected delay on the entire proj. w/respect to time & cost overruns)	Not included

EXHIBIT VI-4 (CONTINUED)

ITEM #	PMS REPORTING MECHANISMS	PC-III & MONTHLY REPORTS
12	Actions Taken (description of the actions taken by the reporting manager to avoid or correct for time delay)	Not included
13	Actions Requested (list of alternative actions requested of higher mgt. to avoid a pending delay or adjust for an actual delay. Each alternative is qualified by the desc. of its 1) major advantage, 2) major disadvantage, & 3) schedule & resource impact on total project)	Not included
14	Please Respond by ____ (deadline for a response set for higher management)	Not included
1 - 6	ACHIEVEMENT REPORT (Same as for Exception Report	Same as for Exception Report
7	Date of start of activities leading to the specified event	Indicated as "Actual Date of Commencement of Work" (for the entire project, not event specific)
8	Physical Aspects (targets & actual date for both the date of completion of lead activities & their level of accomplishment in terms of quality, quantity time	Reflected in "Progress per Quarter for Major Work Items" (Planned vs. actual in % or other terms) & "Likely Date of Completion"-however, these sections tend to be more general than event specific. Quantity, quality, & timeliness indicators of the level of accomplishment are not required in PC-III.
9	Reasons for Deviation from target, if any:	Partially covered in "Reasons for Delay in Completion of Work." Qualitative assessment of achievement is not a factor which is required by PC-III.
10	Financial Aspects (the "Estimated Cost," "Actual Cost," & "% variation" per leading activity)	Included in part in "Planning Costs vs. Actual Costs per Major Item." These figures are not activity specific but reflect quarterly work-item costs.
11	Reasons for increase/decrease in cost	Covered in part by "Reasons for Cost Escalation." This section doesn't necessarily isolate the reasons that are project unique.
12	Impact (statement of any modifications which may result from the level of accomplishment)	Not included

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CONCLUSIONS DRAWN FROM EXHIBIT VI-4

There are five items which are included in the PMS reports (exception and achievement) which are not required by PO-III or Monthly Reports:

- From the Exception Report:
  - Impact
  - Actions Taken
  - Actions Requested
  - Response Date

- From the Achievement Report
  - Impact

Although 21 out of 26 items covered by the Exception and Achievement reports are also represented in PO-III and Monthly Reports, there are fundamental differences between the two reporting "schools." PMS reporting is directed at assisting project management in controlling and facilitating the project's implementation. It accomplishes this by (1) providing advanced warning of pending problems so that timely corrective actions can be taken in order to minimize the negative affects on overall project accomplishment, (2) maintaining a dialogue between the various levels of management responsible for the project's execution, (3) focusing on current activities and events in order to limit the reporting load to the information required for timely decision making, and (4) relating delays in key events to the time and cost overruns of the entire project.

Conversely, the PO-III mode of reporting is designed primarily to provide GOP levels of management with periodic information regarding the project's progress.

Being a GOP requirement, the PO-III seems to provide only marginal value to the actual project management. It further places a significant burden on lower-level project management in terms of the effort required to collect, generate, and process the data necessary for reporting to GOP.

It should be recognized that the justification for any reporting is its value towards increasing project management's ability to predict and control project success.

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SECTION VII

RECOMMENDATIONS

A. Planning Commission Policy for Management Improvement

The PMS concepts, as presented and analyzed in this report, are more than just a method of planning and monitoring projects and programs. They are at once cause and effect of a management style that is oriented to results rather than activities, action rather than discourse.

PCI's overall recommendation is that the Planning Commission of the Government of Pakistan recognize and accept this change in management style as an explicit objective. It is our further recommendation that the Planning Commission accept policy-level responsibility for related management improvement throughout the Government of Pakistan. We do not recommend that the Planning Commission become involved in the planning and operation of individual projects, or impede the autonomy of other ministries and corporations. We do recommend that the Planning Commission provide support and assistance, as well as conceptual leadership, to management improvement efforts throughout the nation. Specifically, PCI recommends that the Planning Commission perceive introduction of the Project Management System (PMS) described herein as one initiative that may achieve that end and ultimately close the implementation gap.

Specific recommendations for implementing the Phase III activities are presented in the following paragraphs:

1. Organization and staffing of a PMS function within the Project Wing

2. Development of a Planning Commission PMS

3. Implementing PMS for priority projects;

4. Training

1. Organization and Staffing of a PMS Function within the Project Wing

PCI recommends that the Project Wing be assigned staff sufficient to carry out the policy-level responsibilities outlined above, to supervise and assist in implementation of PMS concepts in organizations throughout the government as well as within the Planning Commission, and to oversee operations of the PMS once it has been implemented.

Clearly, the different phases of activity have different implications for manpower requirements. The heaviest demand for human resources will be during system implementation, when assistance is being provided to a number of organizations and/or for a number of projects, and during which time extensive training will be required. Once the implementation program has been completed however, a modest level of human resources should suffice. During the operational phases, the manpower requirements are for the policy-level overview of management improvement and for providing direct service consistent with Planning Commission's normal functions of reviewing and monitoring projects. Successful implementation of the PMS implies that the PMS concepts and functions become a way of life for the participating organizations--implying that the more successful the implementation effort, the more modest the level of resources that must be committed by the Planning Commission during operations.

We recommend that a cadre of six skilled analysts be selected to staff the PMS function within the Project Wing of the Planning Commission. Further,

we recommend that the Planning Commission obtain the commitment for at least 30 additional staff to serve within the PMS cell of the Project Wing, on loan from other ministries and corporations for a period of at least six months. Using these individuals as trainers, as well as participants to assist project formulation and system implementation within other ministries and organizations, should allow for rapid expansion of the PMS. (The general approach to using these personnel on-loan to the Planning Commission is discussed in Section IX of this report and illustrated in Exhibit IX-1.)

The quality of the staff assigned to this function will directly influence both the quality and rate of extending the PMS system and concepts.

2. Development of PMS Within the Planning Commission

PCI recommends de facto utilization of PMS concepts within the Planning Commission in advance of dejure modification of Planning Commission activities. To this end, we recommend that:

1. All Planning Commission staff be oriented in and trained in use of PMS concepts not later than 12 months after start of implementation;

2. All feasibility studies coming under the cognizance of the Planning Commission, use the PMS concepts and that the results of feasibility studies be included in a PMS planning package;

3. Priority federal projects and priority federal evaluations use the PMS concepts.

PCI recommends that the Planning Commission provide technical assistance and other support as required to assist at least two corporations and ministries to comprehensively effect PMS systems for federal projects under control of that organization. The chosen organizations would logically be among those

that have participated--through sending participants or involvement of their projects--in the Phase II activities.

3. Implementation of the PMS for Priority Projects

PCI recommends that the highest priority projects in terms of resources and potential development return be identified and put within the PMS as soon as is practical. It is not unrealistic to expect 20 such projects could be planned or replanned and monitored, using PMS concepts within 12 months after initiation of implementation activities. (Refer to Figure VIII-2 and VIII-3.)

It is estimated that only a small percentage of the federal projects will represent the majority of resource investment suggesting that the bulk of federal development project activities can be quickly brought into the system.

We further recommend that specific consideration be given to coordinating some of the PMS activities with related USAID/Pakistan activities to effect comparable planning and monitoring improvements. Specific projects that might serve as vehicles for activities include the malaria project and the agricultural research activities.

4. Training

PCI recommends that the Planning Commission immediately develop or cause to have developed training packages to serve the following audiences:

1. Project personnel in order to prepare them to reformulate and monitor their projects;

2. PMS staff in order to equip them to not only use but also teach others to use PMS concepts;

3. General federal audiences through the development of audio-visual packages that can be used independent of lecturers;

4. Orientation sessions for top level management to explain the system concepts and to delineate how those concepts should be used by them;

5. Moderators to support packages developed per (3) above.

Curricula and approaches to development of training are presented in Section IX ("The Project Management Unit and Training Program").

SECTION VIII

PLAN FOR IMPLEMENTING A PMS

An abbreviated Logical Framework for PMS implementation is shown in Figure VIII-1. The outputs and targets shown here are tentative as only Planning Commission staff can judge the necessity and sufficiency of these outputs. (This framework should, however, simplify the dialogue regarding just what will be necessary and sufficient to achieve the stated purpose and goal.)

The overall plan for implementing the PMS is shown in Figure VIII-2. The key operational milestones in this schedule are:

> A Critical Mass of Projects covered by the PMS (sufficient to sustain system operations without direct Planning Commission supervision) within 12 months;
>
> Full-Scale Operations: all organizations or projects routinely included within the system--by the end of 18 months;
>
> Steady-State Operations: full-scale automation, development of supplementary analytical capabilities, etc.--within 42 months.

The schedule shown is more accurate than precise. However, the two earlier milestones, of initial high volume capacity, plus full-scale operations including some automation, seem realistic. The ambiguity is as to when or if "steady-state" operations will ever be realized, since that will depend in part upon the definition of system capabilities, which definition will be in a state of evolution as the Planning Commission and other ministries define their needs and interests.

The individual tasks shown in Figure VIII-2 are discussed in the following paragraphs.

FIGURE VIII-1

LOGICAL FRAMEWORK FOR PHASE III IMPLEMENTATION

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS
GOAL Implementation Gap Closed	More than half of PMS-controlled projects meet financial and time targets
PURPOSE Institutionalize cost-effective project management system	Within 12 months: - Projects in PMS format deemed better planned by 90% of reviewers & originators; - Management responses to reports are timely and appropriate; - Replanning and reallocation of resources based on evidence
OUTPUTS	(All targets to be achieved within 12 months)
1. PMS implemented for priority federal projects.	
1.1 Procedures & Reports operational	1.1 PC-3 & PC-1 functionally revised; PC staff aware of & use revised procedures.
1.2 Critical mass of federal projects "in" the system	1.2 20 high-priority, high-cost projects
2. Concepts and systems extended	
2.1 Systems for Phase II orgs.	2.1 (At least) 1 org. adopts basic system to own needs; all find concepts of potential use.
2.2 Non-PC training capability established	2.2 Minimum: At least 2 federal training institutions include PMS in basic top-level training. Target: All 4 federal institutions plus selected ministries
2.3 Awareness among key orgs. and officials	2.3 80% of top-level (Minister & next 2 level federal officials plus provincial P & D staff briefed.
3. Strengthen PC capabilities	
3.1 Organizational placement	3.1 Separate identity within Project Wing; monthly status briefings requested by secretary
3.2 Staff	3.2 6 top-flight analysts (with quantitative and result orientation) assigned to PMS cell; 30 analysts on-loan from interested organizations.

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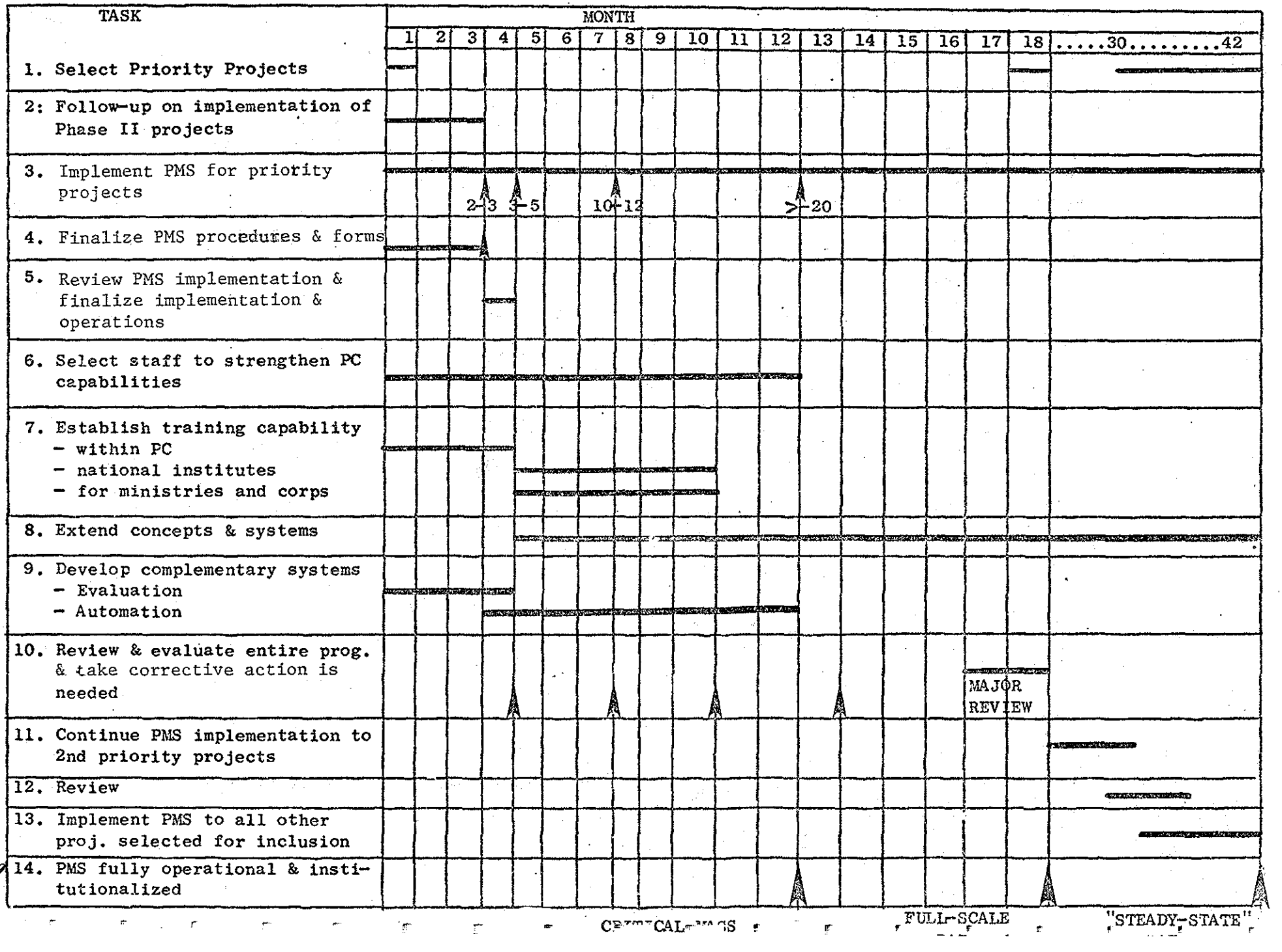
FIGURE VIII-1 (CONTINUED)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS
OUTPUTS (CONTINUED)	
4. Development of complementary systems/capabilities	
4.1 Evaluation	4.1 Mid-term evals. use PMS concepts & feedback to PM staff
4.2 Automation	4.2 Level 1 networks automated for "priority projects" by month 13. Service capability established for running Level 2 and Level 3.
5. Training capability established	
5.1 Within PC	5.1 Replacement needs for PC staff & PC trainers; supplementary training for all "priority project" staff; training in conjunction with planning for all project teams
5.2 National Institutes	5.2 "Most" (60%) attendees receive PMS training
5.3 Other Ministries	5.3 At least 1 non-PC organization establishes internal training capability
5.4 Testing & Certification	5.4 90% of those "passing" and 100% of those receiving "B" or better do use concepts effectively.

FIGURE VIII-2: PHASE III PLAN FOR PMS IMPLEMENTATION



1. Select Priority Projects

Regardless of the strategic implementation approach chosen, the implementation tactic must ultimately boil down to selecting priority projects (from within an organization, based on national level criteria, etc.). We assume that based upon the results of the Phase II activities, the Planning Commission will have selected a number of priority organizations in which the system will be implemented. In this case, the selection of priority projects will involve discussions with top management of those organizations as well as an assessment of project management and analytical capability within the organization. The criteria for project selection then will be the speed and effectiveness with which the PMS can be implemented within the participating organization. Secondary criteria would include the alternative approaches discussed earlier, with emphasis on national-level priority of the project, representativeness of the project in terms of comparable activities and training value.

2. Follow-Up Implementation of Phase II Projects

This task will consist of the following activities:

a. Presentations by the Phase II participants to top and middle-level managers of the organizations implementing the Phase II projects.

b. Analysis of the cost and value of the PMS approach to the parent organization. Discussions would include Planning Commission participation.

c. Follow-up discussions by Planning Commission staff regarding next steps to be taken by the parent organization. These discussions would be similar to those held with organizations for which no case projects had been prepared (per Task 1) with the exception that we have the advantage of a live project that will be used to assess potential value of PMS concepts to the organization.

Note: It is desirable that the organizations from which the case projects were selected participate in PMS implementation. Such participation is not necessary, however, as these projects were not chosen based upon the key criterion of organizational interest in instituting a PMS type of system. However, there is a burden of proof on the PMS. Certainly if none of the three organizations from which the case projects have been selected desire to go forward with the PMS concepts, then the Planning Commission would be well advised to reconsider this entire implementation plan.

In such a case either:

a. The concepts are in fact not suited to the Pakistan environment, in spite of the assessments of our Pakistani participants,

b. The participants have not adequately explained the system concepts; or,

c. The organizations are anomolous (not representative of the types of organizations for which PMS participation is desired).

If the last of the above is demonstrated to be the case, implementation can proceed in accordance with the schedule outlined here. If either of the first two alternatives is the case, then there are implications as to the desirability of PMS implementation, or the level of resources required to effect that implementation.

To the extent practical, implementation of PMS concepts--espeically within the parent organizations for the case projects--should involve the Phase II participants both in a systems as well as a project specific capability. Some Phase II participants have demonstrated insight into PMS and the exigencies of the situation, such that they can provide valuable counsel to system implementors within the participating organizations.

3. Implement PMS for Priority Projects

In order to quickly achieve "critical mass" in terms of projects, personnel and organizations, the implementation activities should do triple duty:

1. Developing the PMS for the project,
2. Training staff involved in that preparation--including both project staff and others who will subsequently serve as trainers,
3. Sharpening insights into how the system should be specifically implemented within the participating organization.

The general approach to this is shown schematically in Exhibit IX-1. The basic assumption here is that after a brief period of initial orientation, trainees acquire and sharpen skills by actually working on projects, after which they themselves can become trainers to help others implement the system for subsequent projects. This approach allows for rapid increase in the number of trained staff. It seems realistic to suppose that an individual trainer could provide training to eight participants. Taking into account the fact that not all trainees will become trainers (particularly the project teams, who must return to their projects rather than participate as trainers), normal attrition, and the possibility that some trainees may not be certified for training, the number of trainers and hence the capability for bringing projects within the system could essentially double after each training cycle. The limiting factor will be the availability of suitable personnel.

To alleviate the problems of personnel availability, as well as to ensure that there is a freshness and vitality brought back to the training program, it is hoped that selected trainees may be called back to serve as trainers on a periodic basis.

That is, individuals who have gone through one cycle of training may work within their home organizations (for perhaps 10 months) and then be called back for a two or three-month period to serve as trainers within organizations other than their own. The cross fertilization effects of such an approach, as well as the positive heuristic impact of having doers rather than trainers provide the training, argue strongly in favor of this approach.

As shown in Figure VIII-2, the initial project implementation activities should be preceded by an intensive training session for Planning Commission and other trainers. At this session, training should emphasize not just the concepts, but methods of training, and methods of training trainers.

4. Finalize PMS Procedures and Forms

This task involves the generation of formal implementing documents. These documents will be generated for at least one of the participating organizations as well as for the Planning Commission on a national level. These documents will set forth procedures, planning, and reporting requirements, etc., as required to sustain "full-scale" operations. However, as full-scale operations are not scheduled until the 18th month, it will not be necessary that these documents be acted upon immediately. Rather, a prolonged period of discussion and analysis is envisioned. Note that, consistent with our earlier discussion, the PMS can be functionally implemented without any formal changes in documentatic or procedures. This task of finalizing procedures and forms is not intended tc preclude that approach, but rather to shed further insight into possible long-terr outcomes.

5. Review PMS Implementation and Finalize Implementation and Operations Plans

Upon completion of the revised procedures and document requirements, and based upon information developed during work on the first set of projects (probably at least three in addition to the Phase II projects), we envision an intensive phase of review and analysis to determine whether it is necessary to revise the implementation plan.

It is during this phase of activities that the GOP should specifically consider:

1. The desirability of technical assistance,
2. Timing of the development of automated capability,
3. Introducing PMS--particularly LogFrame--concepts into all federal feasibility studies,
4. Strengthening of the mid-term and impact evaluation subsystems.

6. Select and Train Staff to Strengthen Planning Commission Capabilities

The Planning Commission must be ever alert as to the number and nature of staff required to implement the system and support it once it is operating. The initial cadre of six senior-level analysts will certainly not be able to handle the peak loading requirements imposed by system implementation, and, in any event, normal attrition suggests that there must be a continual backlog of personnel to fill key PMS slots. Therefore, we envision a continuing effort to ensure that PMS staffing gets a high priority in selection of staff and that the outreach and training process will be a continuing one.

7. Establish Training Capability

Three types of training capabilities are to be developed during system implementation:

1. Within the Planning Commission,
2. Within national institutes of training,
3. Within Other Ministries, Provincial P & D Departments, and Government corporations.

The scarcest resource in establishing training capabilities is the availability of skilled instructors. The retention of skilled instructors is within the manageable interest of the Planning Commission only for the Planning Commission capabilities. (Note that we have recommended, in Task 6 of this implementation program, a continuing process of task selection and recruitment.) Therefore, it is necessary to undertake the following activities to ensure the embeding of residual training capabilities in institutions outside the Planning Commission:

1. Define the essential core curricula;
2. Develop audio-visual packages (e.g., videotape, sound file, or sound and slide) to make it possible to provide quality training without having highly expert instructors;
3. Develop standardized case materials suitable for various audiences;
4. Train "moderators" in the use of those case materials.

It is recommended that in addition to the development of training packages and orienting individuals to the integrated PMS, a separate package be developed to introduce and develop skills and utilization of the Logical Framework. This package would be of particular importance in orienting top management, non-GOP personnel involved in feasibility studies, etc.

Another training package that should be considered is one that would train network technicians, who would provide the bridge between the management-orientec

PMS networks and automation. This training should properly be considered part of the automation activities, however, and need not be given early priority. The task of going from the PMS networks to machinable data is entirely a mechanical one, and that which computer service personnel (e.g., IBM) have currently available will probably meet the training needs.

8. Extend PMS System and the PMS System Concepts

The basic approach to system implementation is to extend the system concepts and/or the integrated system wherever there is a high degree of management interest, and the Planning Commission has resources available to assist in implementation.

This is seen as a continuing process--first, working with organizations selected during the initial (Task 1) activities, and subsequently providing assistance where interest is generated by presentations or discussions between Planning Commission and top management staff.

9. Develop Complementary Systems

Full-scale operation of the PMS will be greatly enhanced by the addition of complementary capabilities. Such capabilities include but are not limited to:

1. Mid-term and impact evaluations
2. Automation.

To this end, it is recommended that the Planning Commission integrate the special evaluation function with the PMS activities, to benefit both. The Logical Framework concepts are ideally constructed to set up impact evaluations as well as mid-term assessments. The integration of this approach into the special evaluation function, as well as the utilization of PMS hierarchical

achievement assessments, should bring immediate benefit to the replanning process as well as the evaluation activities that support such replanning.

The automation approaches that should be considered by the Planning Commission PMS staff include:

1. Automating only PMS data actually processed by the Planning Commission,
2. Including analytical functions as well as "routine" PMS functions within the machine capability,
3. Providing a data processing service to organizations adopting the PMS approach.

These and other alternatives (discussed in more detail in Section X of this report) must be analyzed in-depth during the initial phase of PMS operations and on a continuing basis thereafter. During the first six months, plans must be developed for providing at least a modest level of automated capability, i.e., batch processing of Level 2 networks, within 12 months. Thus, programming activities should be initiated--or selection of existing programs (for example, from among the existing IBM packages) should be effected--by the end of six months.

10. Review and Evaluate Entire Program and Take Corrective Action if Needed

At the end of the 4th month, and every quarter thereafter, we recommend an evaluation of the overall PMS program as well as progress to date. A major review--involving users outside of the Planning Commission as well as Planning Commission and advisory staff--should be undertaken immediately in the two-month period preceding full-scale operations.

11. Continue PMS Implementation to Second Priority Projects

After the PMS has been implemented for all "first priority" projects, it will reach the point of full-scale operations. As of that time, system extension should continue to all other projects and/or organizations.

12. Review

Intensive annual reviews--in addition to the quarterly evaluations--should be undertaken to ensure both that the PMS continues to be successfully operated and that it is effectively integrated with other systems and functions.

13. Implement PMS for All Other Projects Selected for Inclusion

It is not unrealistic to expect that within 30 months after start of this activity, the PMS as it has evolved during the course of those 30 months, will be implemented to include the bulk of federal development projects and organizations. A key question that cannot be answered in advance of Phase III activities is the extent to which provincial planning departments will use these concepts. Certainly it is to be hoped that provincial planning departments will be among those organizations participating early in the third phase. However, we cannot assume this, and in the event that provincial planning departments are not using the PMS concepts by that time, an active program of outreach should be scheduled.

14. PMS Fully Operational and Institutionalized

At the end of approximately 42 months, from the start of Phase III, the PMS should be fully institionalized and a routine part of day-to-day GOP operations.

SECTION IX

THE PROJECT MANAGEMENT UNIT AND TRAINING PROGRAM

A. Introduction

PCI recommends that the Planning Commission establish a Project Management Unit (PMU) within its organizational structure. The PMU would have as its functional orientation the development, implementation, and supervision of the Project Management System (PMS) in the Government of Pakistan. The PMU would have a core of PMS experts whose task it would be to (1) train others to use PMS; (2) give advice and guidance to those using PMS; and (3) scrutinize planning, monitoring, and evaluation documents to see that projects are properly planned and managed.

The PMU would regularly assess the manner in which PMS is being used in different organizations and make recommendations regarding necessary changes in (1) the Project Management and (2) the strategy for implementation of PMS. In the early stages of implementation it is important that careful attention be given to PMS utilization in those projects where the system is already in use. Exhibit IX-1, at the end of this section, shows the network for the initial phases of the PMS training program.

B. PMU Staff Development

1. Seminar I

The PMU would require a strong support staff that can produce quality training materials quickly and make all the necessary arrangements for training seminars.

The first group of PMU trainers should number six persons. They would be recruited from among the ranks of the PCI Phase II training seminar. In order to bring this small group up to trainer capability, they should receive an intensive

three-week training session. During this period there would be instruction and practice, both in using and in presenting the PMS concepts (see Table IX-1). Because of the small number of persons involved, the space required for this training session would be two office rooms in the Planning Commission.

The training session would begin by presenting a review of the concepts immediately followed by short exercises using "live" projects. By the end of the first week, the participants should be able to develop LogFrames quickly and accurately and should understand the techniques of reviewing LogFrames. Also by this time each of the participants will have made a presentation of one set of LogFrame charts.

During the second week LogFrame practice presentations would continue while the group does chart exercises in networking. This second week would also entail the development of case studies to be used for future training sessions. By the end of the second week the participants should be adept at networking techniques including resource allocation and LogFrame presentations.

During the third week there would be instruction in workshop moderator techniques. The group would practice network presentations and develop case studies in networking for future training sessions. Also during this last week of the training session the group would undertake the evaluation of a "live" project using PMS techniques. By the end of the third week the participants will have developed the skill level and the degree of experience necessary to confidently instruct others.

TABLE IX-1

SCHEDULE FOR SEMINAR I

WEEK 1

DAY 1 MONDAY	8:00	Introduction to Training
	8:30	LogFrame Presentation
	10:00	Manageable Interest Presentation
	10:30	Tea Break
	11:00	Select Projects to LogFrame
	11:30	Preparation of LogFrames
	1:00	Lunch
	2:00	Work on Presentation Techniques
	3:30	Preparation of LogFrames
	4:30	End of Day
DAY 2 TUESDAY	8:00	Presentation on Objectively Verifiable Indicators
	9:00	Review LogFrames
	10:00	Presentation on Purpose-to-Goal Linkage
	10:45	Tea Break
	11:15	Practice Presentations
	1:00	Lunch
	2:00	Preparation of LogFrames
	4:30	End of Day
DAY 3 WEDNESDAY	8:00	Review of LogFrames
	9:00	Presentation of Key Concepts of Evaluation
	9:45,	Practice Presentations
	10:45	Tea Break
	11:15	Preparation of LogFrames
	1:00	Lunch
	2:00	LogFrame Review Techniques
	4:30	End of Day
DAY 4 THURSDAY	8:00	Presentation on Evaluation Process
	8:30	Practice Presentations
	10:30	Tea Break
	11:00	Preparation of LogFrames
	1:00	Lunch
	2:00	Preparation of Seminar Training Materials
	4:30	End of Day
DAY 5 FRIDAY	8:00	Practice Presentations
	10:15	Tea Break
	10:45	Final Review of LogFrames
	12:00	End of Day

TABLE IX-1 (CONTINUED)

DAY 6 SATURDAY	8:00	Practice Presentations
	10:30	Tea Break
	11:00	Preparation of Seminar Training Materials
	2:30	End of Day

WEEK 2

DAY 1 MONDAY	8:00	Presentation of Networking & Scheduling
	8:30	Presentation of Networking & LogFrame
	9:00	Develop Output LogFrames for Networking
	10:30	Tea Break
	11:00	Develop Output LogFrames for Networking
	1:00	Lunch
	2:00	Presentation on Critical Path & Slack
	2:30	Prepare LogFrame Case Studies for Training Seminar
	4:30	End of Day
DAY 2 TUESDAY	8:00	Develop Output LogFrames for Networking
	10:30	Tea Break
	11:00	Presentation on Reporting & Monitoring
	11:30	Review Output LogFrames
	1:00	Lunch
	2:00	Develop Networks
	3:30	Prepare LogFrame Case Studies
	4:30	End of Day
DAY 3 WEDNESDAY	8:00	Develop Networks
	10:30	Tea Break
	11:00	Practice Presentations
	1:00	Lunch
	2:00	Develop Networks
	3:30	Prepare LogFrame Case Studies
	4:30	End of Day
DAY 4 THURSDAY	8:00	Develop Networks
	10:30	Tea Break
	11:00	Practice Presentations
	1:00	Lunch
	2:00	Develop Networks
	3:30	Presentation on Resource Management
	4:30	End of Day
DAY 5 FRIDAY	8:00	Develop Networks & Resource Management Tools
	10:30	Tea Break
	11:00	Develop Networks
	12:00	End of Day

TABLE IX-1 (CONTINUED)

DAY 6 SATURDAY	8:00	Develop Networks
	10:30	Tea Break
	11:00	Review Networks
	2:30	End of Day

WEEK 3

DAY 1 MONDAY	8:00	Plan Project Evaluation
	10:30	Tea Break
	11:00	Practice Presentations
	1:00	Lunch
	2:00	Prepare Network Case Studies
	4:30	End of Day
DAY 2 TUESDAY	8:00	Evaluation
	10:30	Tea Break
	11:00	Practice Presentations
	1:00	Lunch
	2:00	Prepare Network Case Studies
	4:30	End of Day
DAY 3 WEDNESDAY	8:00	Evaluation
	10:30	Tea Break
	11:00	Practice Presentations
	1:00	Lunch
	2:00	Prepare Network Case Studies
	4:30	End of Day
DAY 4 THURSDAY	8:00	Evaluation Review
	10:30	Tea Break
	11:00	Practice Presentations
	1:00	Lunch
	2:00	Prepare Network Case Studies
	3:30	Learn Workshop Moderator Techniques
	4:30	End of Day
DAY 5 FRIDAY	8:00	Learn Workshop Moderator Techniques
	10:30	Tea Break
	11:00	Practice Presentations
	12:00	End of Day
DAY 6 SATURDAY	8:00	Final Preparation of Materials for Seminars
	10:30	Tea Break
	11:00	Finalize Network Case Studies
	1:00	Final Practice Presentations
	2:30	End of Training

During the three-week period that the trainers are undergoing their intensive training, the PMU would be producing training materials for future training seminars and be making preparations for Seminar II.

2. Seminar II

This seminar would have two categories of participants; Category A would be future trainers and Category B would be future PMS users. There would be fifteen (15) participants in Category A. These could all be targeted for the PMU staff or some could be from outside the Planning Commission and be targeted as trainers for their home organizations.

The criteria recommended for selecting the Category A participants are as follows:

1. Grade 17, 18, or 19;
2. Available to work as trainers for minimum of one year;
3. Good leadership skills;
4. Ability to speak before an audience;
5. Bright and innovative.

The Category B participants would be project personnel selected from key projects in which PMS is to be implemented. The number of projects would be dependent upon the number of persons available for training from each project. There should be a maximum of twelve (12) and a minimum of eight (8) Category B participants. The number of projects could range from 2 to 3 with a range of 2 to 5 participants from each project. It would be preferable that the projects represent different fields of development (e.g., health, industry, agriculture, education). The organizations in which these projects are located could also send one person

along with the project team who is from the planning cell of the organization.

Seminar II would start with a presentation of the Logical Framework concepts. The form of presentation and the flip charts used would differ very little from what was used by the PCI team during Phase II. It is expected that some minor changes would be made during Seminar I when the presentations are reviewed and new materials produced. The same can be said for all of the LogFrame presentations. However, new presentations would be developed for reporting and resource management showing the specific application of the system to the Pakistani management process.

The workshop materials would differ from Phase II as new case studies could be developed during Seminar I. These case studies would be drawn from development projects in Pakistan. All the necessary data would be supplied to the participants so that no delays would occur trying to obtain additional information about these projects. It is essential that workshops devote their attention to process and not waste their time arguing or analyzing issues of project substance.

Seminar II would also serve as a testing ground for the PMU trainers who would share the tasks of making presentations and moderating workshops.

A schedule for the two-week session is shown in Table IX-2.

TABLE IX-2

SCHEDULE FOR SEMINAR II

DAY 1	8:00	Registration
MONDAY	8:30	Distribution of Course Materials
	9:00	Opening Ceremony
	9:20	Introduction
	9:40	Presentation of Logical Framework Concepts
	10:40	Ground Rules for Project Design Workshop
	10:50	Tea Break
	11:10	Workshop I
	1:10	Workshop Critique in Plenary
	2:20	Homework Assignment
	2:30	End of Day
DAY 2	8:00	Hand in Homework Assignments
TUESDAY	8:15	Day 2 Objectives
	8:20	Presentation on Manageable Interest
	8:50	Presentation on Objectively Verifiable Indicators
	10:00	Ground Rules for Workshop II
	10:10	Tea Break
	10:30	Workshop II
	2:30	End of Day
DAY 3	8:00	Day 3 Objectives
WEDNESDAY	8:05	Discussion of Day 1 Homework Assignments
	8:45	Workshop II Critique in Plenary
	10:15	Tea Break
	10:30	Spot the Errors Exercise in Plenary
	11:45	Presentation on Key Concepts in Evaluation
	12:00	Ground Rules for Workshop III
	12:10	Workshop III, Part A--Project Design
	2:30	LogFrames Complete--End of Day
DAY 4	8:00	Day 4 Objectives
THURSDAY	8:05	Review of Workshop III LogFrames
	9:15	Presentation on the Evaluation Process
	9:45	Workshop III, Part B--Evaluation Plan
		Tea Break when Convenient (15 minutes)
	12:00	Evaluation Data Distributed to Workshops (Part C) Data Analysis
	1:30	Workshop III, Part D--Conclusions and Recommendati
	2:30	End of Day

TABLE IX-2 (CONTINUED)

DAY 5 FRIDAY	8:00	Day 5 Objectives
	8:05	Workshops Present Conclusions and Recommendations to Plenary
	10:00	Tea Break
	10:15	Review of LogFrame Concepts
	12:00	End of Day
DAY 6 SATURDAY	8:00	Day 6 Objectives
	8:05	Introduction to Networking
	8:45	Workshop IV--Network Exercise
	9:30	Time Dimension; Critical Path and Slack
	10:30	Tea Break
	10:45	Workshop V--Calculating Time, Critical Path & Slack
	11:30	Networking and LogFrame
	12:30	Workshop VIA
	2:00	Discussion on Workshop
	2:30	End of Day
DAY 7 MONDAY	8:00	Day 7 Objectives
	8:05	Ground Rules for Workshop VIB
	8:15	Workshop VIB
	9:15	Discussion of Workshop VIB
	10:00	Tea Break
	10:15	Monitoring and Reporting
	12:00	Workshop VII--Level II Networks of Case Study
	2:30	End of Day
DAY 8 TUESDAY	8:00	Workshop VII Continues
		Tea Break when Convenient (15 minutes)
	1:00	Workshops Present Level II Network to Plenary
	2:30	End of Day
DAY 9 WEDNESDAY	8:00	Workshop VIII--Level III Networks of Case Study
		Tea Break when Convenient (15 minutes)
	2:30	End of Day
DAY 10 THURSDAY	8:00	Workshop VIII Continues
	10:15	Tea Break
	10:30	Groups Critique Each Other's Level III Networks
	12:00	Refine Level II Networks and Draw Level 1 Networks
	2:30	End of Day

TABLE IX-2 (CONTINUED)

DAY 11 FRIDAY	8:00	Objectives of Day 11
	8:05	Presentation of Resource Management Techniques
	9:00	Discussion
	10:15	Tea Break
	10:30	Workshop IX--Supplement Networks with Resource Management System
	12:00	End of Day
DAY 12 SATURDAY	8:00	Continue Workshop IX
		Tea Break when Convenient (15 minutes)
	12:00	Discussion on Seminar
	2:30	End of Seminar

At the conclusion of this seminar the participants should be acquainted with all of the PMS concepts. However, their experience so far in using the techniques would be insufficient to allow for confidence in applying the techniques without guidance.

The next step is to implement PMS in the projects from which Seminar II participants were chosen. This implementation phase would have a dual purpose. First, there would be supervised implementation of PMS. Second, both the project personnel and the future trainers would increase their ability to grasp and apply the PMS concepts.

It is estimated that three of the 15 participants of Seminar II would not continue in the training program because they would not have performed well enough during their initial training period. The remaining 12 would be divided equally among the projects. Each project would have eight to 11 trainees and one trainer.

This implementation phase would last six weeks. Each of the projects would provide enough space for nine to 12 persons to work together. The work groups should be located at the same site where the necessary data can be obtained.

The first week would be devoted to development of a Master LogFrame and Output LogFrames. The next four weeks would see the development of networks at Levels 1, 2, and 3 and the development of resource management and reporting systems. It should be expected that one final week would be necessary to put all the management tools into working order. While the Category B participants take care of the final week's work, the Category A participants would change groups

each day to become familiar with the work of the other group(s). Finally, at the end of week six, a formal presentation of the PMS system, as it would work in each project, would be presented in a plenary session. The top management of each of the represented organizations should be in attendance.

The 12 Category A participants would now begin a three-week session to be trained as trainers. This training session would be the same as Seminar I except that it would not need to include the preparation of case studies.

The PMU would then have a total of 18 persons who are capable of training others to use PMS concepts. However, this total would be less if some of the Category A participants were from other organizations and return thereto.

C. Program Expansion

After Seminar II, only four of the PMU trainers would be required to continue working with the participants as they enter the implementation phase. Two PMU trainers would be freed to work with a new Seminar II geared to the implementation of PMS in one to two more projects. This new seminar would not have future trainers as participants but rather only project personnel. Each of the one to two projects would have two to five persons trained, and again, the organizations in which these projects are located could also send one person along with the project team who is from the planning cell of the organization.

The PMS implementation phase for these one to two projects would terminate just one week before the end of the trainer training session for the 12 new trainers.

At the end of trainer training there would be three to five projects using PMS and a core of 18 trainers ready to work on new seminars.

The rate of expansion of PMS could now be increased. The expansion program should now concentrate on training system users. There are several approaches to such training that are not mutually exclusive.

1. Approach 1

The first approach is to train future system users with a two-week training seminar similar to the one used for Seminar II. Each seminar would have 25 participants who would return to their organizations immediately after the two-week session. They would then be free to use PMS on whatever projects they would be planning or managing. The advantage of this approach is that a large number of persons would be trained quickly. A disadvantage is that only two weeks of training would not be enough to give those trained full confidence to use PMS effectively. This could be overcome by having a highly trained PMS superviser in each organization or by having PMU staff on-call as troubleshooters when problems develop.

In order to train large numbers of people a special facility should be established in a training institute. PCI recommends that the National Institute of Public Administration (NIPA) be requested to cooperate with the Planning Commission in this endeavor.

2. Approach 2

The second approach to training is to train specific project personnel and to include the implementation of PMS in the project as part of the training. This

would have two advantages: (1) the implementation of PMS would be supervised by PMU to ensure that it is done properly and (2) the PMS users would be better trained. The format of such training would follow that of Seminar II, plus the implementation program already used. The obvious disadvantage is that this approach cannot train as many people as fast as the first mentioned approach.

3. Approach 3

The third approach is to give short three-day seminars. This is recommended for the training of top management. At their level, an acquaintance with the system is all that is necessary. They would be using the tools for monitoring but the actual drawing of the LogFrames, networks, etc. would be done by lower levels of management.

The three-day seminar would be divided into three equal parts:

Day 1: LogFrame presentations and workshop;

Day 2: Network, Reporting and Monitoring and Resource Management presentations with brief workshops for each presentation;

Day 3: PMS experience in Pakistan.

Workshops would play an important role in this short PMS orientation seminar. PCI has found that short exercises in applying the concepts are essential if the participants are to leave the seminars with a firm grasp of system methodology.

The third day would consist of discussions on the successes and problems that have been incurred in implementing PMS in Pakistan. The participants should,

as a result of three days of PMS orientation, be able to realistically assess not only the value of the system in their own organizations, but also the manner in which the implementation should take place in these organizations.

PMU should develop the capacity to handle all three approaches to training. Each of the trainers should be capable of working with the three types of seminars.

D. PMU Staff Expansion

After two to three months of an intensive period of training seminars, PMU may wish to further increase its staff. With more trained people actively using PMS there would be a greater demand on PMU experts to solve problems in the field. More troubleshooters would be needed. Although PMU could recruit the new staff from within the Planning Commission, an additional or alternative means of recruitment would be to select individuals who have demonstrated in earlier seminars the ability to quickly grasp the concepts and use them effectively.

Those recruited to be trainers would undergo an intensive three-week training session similar to that used to train the earlier groups of trainers. Those trainers who have already had considerable experience training others would be best qualified as troubleshooters.

E. Videotaped Presentations

An alternative to having the trainers make formal presentations of the PMS concepts would be to have the presentations videotaped and presented on screen.

In an expanded training program this would assure the maintenance of a high level of quality in the initial communication of the concepts. The trainers would be able to concentrate their efforts on their workshop activities. The videotapes could be made available to system users for review purposes.

These advanced training aids, which could be available within the first six months, would facilitate the training program since the emphasis would be shifted to training of workshop monitors. Such training therefore would not be as intensive as in Seminar I.

Monitors would have to be familiar with PMS concepts as well as the conduct of workshops and the related case projects.

SECTION X

CONSIDERATION OF ALTERNATIVES

As was discussed in Section IV, the evidence suggests that important improvements can be made in the GOP planning, monitoring, and evaluating processes, and that those improvements can help the GOP close the implementation gap in development efforts. On the other hand, even though the direction of improvement is clear there are many options, specific mechanisms, timing, and other considerations which are available to the GOP. PCI has recommended a specific course of action and an implementation plan. However, PCI's recommendations are not the only way of moving forward. The Planning Commission, the GOP generally, and organizations interested in PMS clearly have other options that range from (1) development of a management system in very different directions to (2) more aggressive action than PCI recommends.

In order to assist the GOP in such considerations, this section of the report examines some of the issues and alternatives that were considered during the Phase II work (Table X-1). A discussion of these alternatives is presented here to give further insight into the rationale for the plan that PCI has recommended. That insight could also simplify the task of selecting an alternative course of action, should that be desired.

TABLE X-1

ALTERNATIVE COURSES OF ACTION FOR USING PMS

A. Modification of GOP Approval Cycle

B. Modification of PO-I and PO-III

C. Other Adaptations and Time Phasing

1) Reporting Considerations

2) Cost Considerations

3) Priority Projects

4) Selection of Personnel and Training

5) Automation

6) Time Phasing

D. Organization of PC/PMS Staff

A. Modification of GOP Approval Cycle

There are four basic alternatives:

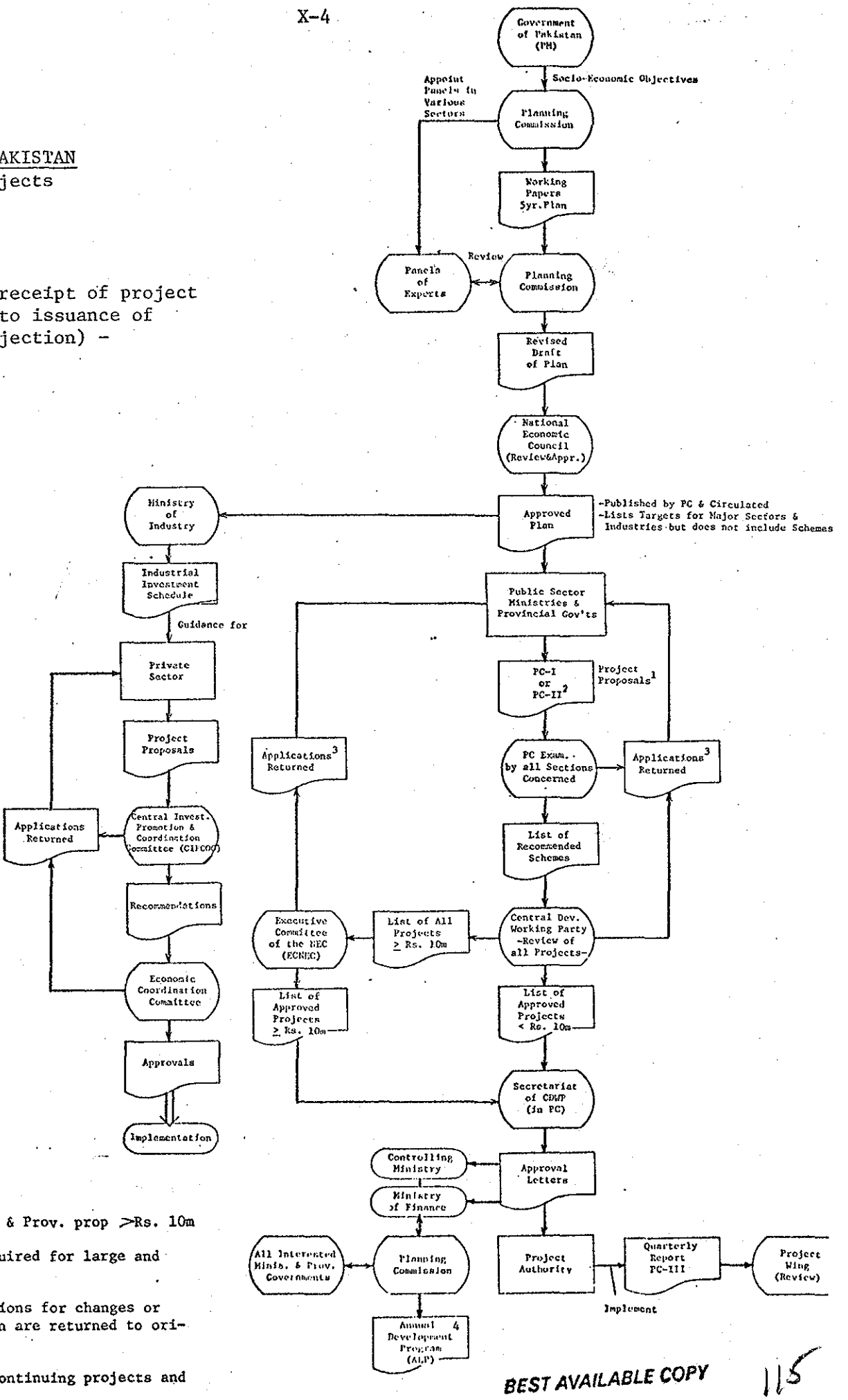
1. Not including the PMS in the approval cycle (Figure X-1),
2. Formally requiring compliance with PMS requirements as part of the Planning Commission approval cycle,
3. Formal inclusion of PMS requirements in other ministries or corporations,
4. Informal compliance--building PMS concepts into projects without formal changes in their requirements for approval.

PCI's work with the trainees, as well as with members of the Planning Commission, our analysis of projects, and discussions with individuals from numerous ministries and organizations, has proven to our satisfaction that real improvements can and should be made. It seems unrealistic, therefore, to consider the first alternative per se for all development projects. A more realistic interpretation would be not to use the PMS approach for projects that have already been formulated. The concepts would be used for all feasibility studies and/or selected new project submissions. PMS staff could participate in feasibility studies to the extent required to ensure proper use of the concepts. By starting the projects off in the right direction, this alternative should realize high payoff from relatively low PMS manpower investments. The major difficulties with using this approach exclusively are that it inevitably must deal with projects rather than organizations and, because of that, implementation would be a relatively slow process. On the other hand, it would be quite appropriate for organizations that introduce the PMS to immediately require use of PMS concepts, particularly the Logical Framework, in all feasibility studies.

FIGURE X-1

GOVERNMENT OF PAKISTAN
Development Projects
Approval Cycle

Cycletime from receipt of project proposal by PC to issuance of approval (or rejection) - 2-6 months



[1] Fed. props >Rs. 2.5m & Prov. prop >Rs. 10m

[2] Feasibility study required for large and complex projects

[3] Rejections or suggestions for changes or additional information are returned to originating authority

[4] Funds available for continuing projects and approved schemes

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The other three alternatives mentioned above (formal/informal inclusion of PMS requirements within the Planning Commission approval process) should be viewed in terms of:

- Comprehensive compliance for all projects;
- Selective compliance for a given class of projects.

Given the practicalities of the situation, only the latter should be considered. Compliance must be on a selective basis.

The essential alternatives to be considered for selective projects are:

1. Upon submission of a project approval request,
2. After project approval,
3. A hybrid approach.

These are examined below. The last of these alternatives appears the most attractive, as it allows us to focus scarce analytical and planning resources efficiently.

1. Compliance Upon Submission of a Project Approval Request

This alternative implies that as part of the original PC-I submission, all projects selected for inclusion in the PMS must comply with PMS requirements. This means that all project staff must be oriented and assisted in the development of the planning package before they have made formal contact with the Planning Commission.

2. Compliance after Project Approval

This alternative is attractive in that there would be a sense of immediacy about any assistance provided the project team. With the project having already

been approved, and the actual commitment of funds dependent solely upon completion of the planning activity, and with full knowledge of the financial resources available, there should be a sense of immediacy and vitality afforded the planning process. A modest procedural change might be useful--by which the Planning Commission could delay commitment of funds until PMS planning packages meet the established requirements.

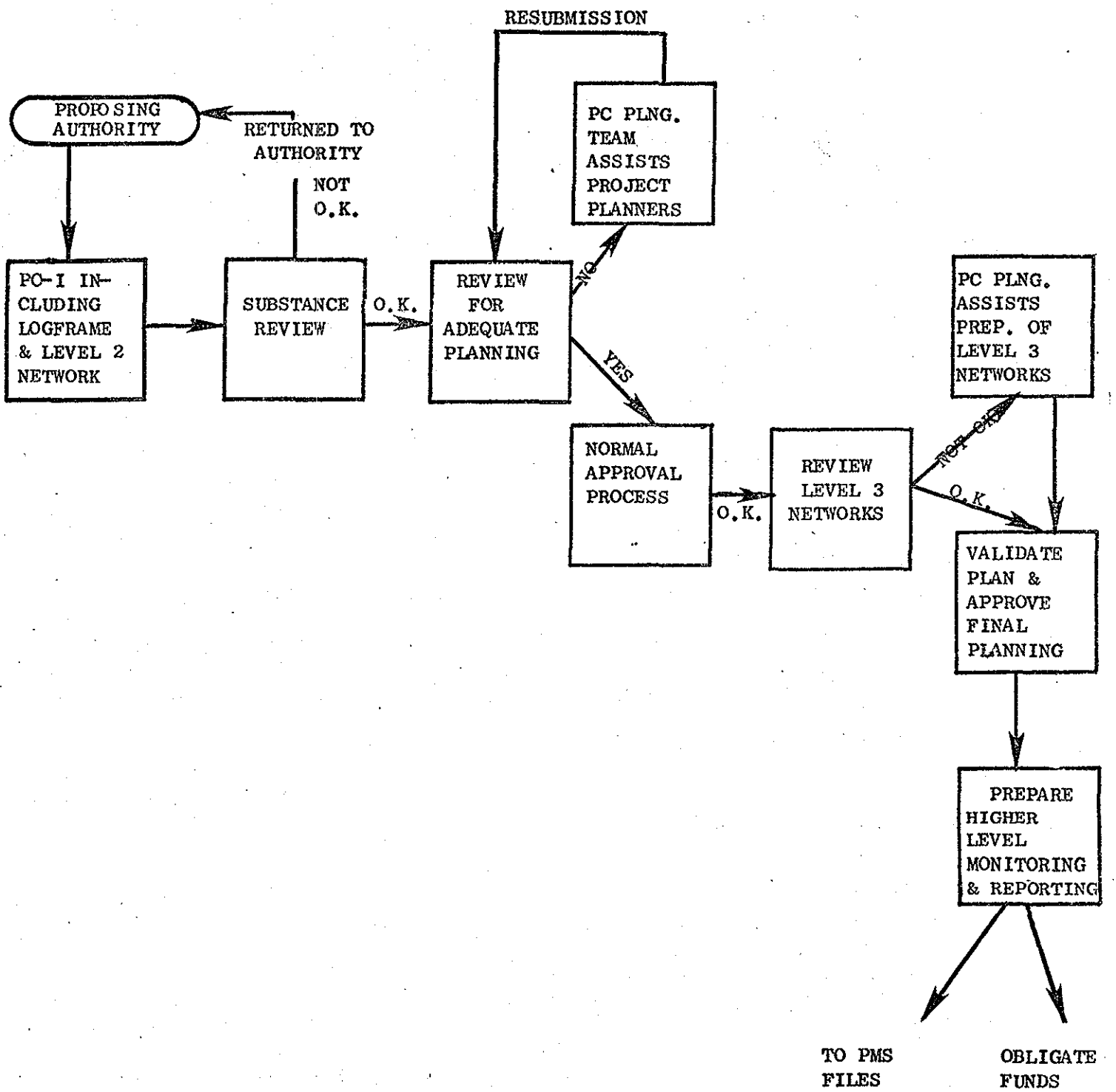
This approach also allows the system to be implemented without any change in the PC-I (either formal or functional) without precluding use of PMS concepts to comply with portions of the PC-I.

3. Hybrid System

This approach would involve partial compliance with PMS requirements as part of the PC-I submission, or immediately thereafter as part of a PC-I revision, with final compliance only after project approval. Planning Commission assistance and guidance would be appropriate at this stage (see Figure X-2).

A key advantage to this approach is that the Logical Frameworks and networks would be available early in the review process, thus facilitating Planning Commission reviews. At the same time, the details of the project--output level Logical Frameworks and Level 3 networks--are not developed until the project has been approved, thus preserving the sense of vitality and immediacy associated with Option 2. Note also that by waiting until the project has been approved to develop the Level 3 networks, the project will have much better data as to the detailed cost implications. They will know how much money has been approved and will be working with current rather than projected prices of both commodities and labor.

FIGURE X-2: HYBRID SYSTEM



B. Modification of PC-I and PC-III

1. The PC-I

PMS reporting requirements can be met without changing the PC-I. That is, submission of Logical Frameworks and related PMS system plans comply with major portions of the current PC-I narrative, thus allowing the project team to simply supplement the basic PMS package with additional narrative as requested by the PC-I. (This compatibility of the PMS and the PC-I. requirements is a further indicator of the effectiveness of both.)

The alternatives thus available to use include:

- No change at all in the PC-I;
- Functional change in the PC-I, requiring PMS products as a means of complying with current PC-I requirements;
- Formally changing the PC-I.

These alternatives need little discussion. As a practical matter, it is possible to view PMS implementation in successive phases. That is, in the first batch of projects, approvals will be based upon "normal" PC-I submissions. Over time, and consistent with the hybrid approach noted in the preceding paragraph, basic PC-I submissions will require PMS products. Finally, based on experience with the PMS, the PC-I would be formally revised to explicitly include PMS requirements.

The essential compatibilities between the PC-I and the PMS concepts are illustrated in Exhibit VI-1 and VI-2.

2. The PC-III

The current PC-III is not compatible with PMS requirements and could not be used as the basis for a result oriented information system.

Therefore, the alternatives to be considered are:

a. Immediate change in the PC-III requirements,

b. Exemption from the PC-III requirements on a case-by-case basis--projects are either within the PMS or continue to comply with the PC-III,

c. A combination of the above--developing a modified PC-III that is used as the basis for reporting for only the selected class of projects that are within the PMS.

The comparisons between the PC-III and the PMS are:

a. Immediate Modification of the PC-III

This alternative is attractive but does not appear feasible in terms of either the ability of the project staff to comply nor with the availability of Planning Commission personnel to judge the utility of reporting alternatives presented by project teams.

b. Exemption from PC-III Requirements

This alternative implies that the project-unique approach to reporting is preserved. That is, the reporting periods, evaluation requirements, etc. are developed as part of a dialogue between successive levels of management. When all projects have been put within the PMS, the PC-III will de facto no longer be required.

c. Combination of the Above

This approach is compatible with both of the preceding. In the case where we preserve project-unique reporting, the PO-III would clarify the guidelines upon which such project-unique reports are developed and forwarded and clarify the concepts underlying the system. It would also contain formats for both exception and achievement reports, as well as indications as to how alternative formats can be approved during the project formulation phase.

To the extent practical, all instructions on the PMS should set forth minimum functional requirements that must be complied with and should include practical guidelines--suggestions as to how to go about meeting functional planning and reporting needs. This will encourage constructive compliance with the system and is in every way consistent with a management style that the PMS is trying to effect--an orientation to results rather than activities.

C. Other Adaptations and Time Phasing

Some important aspects of the PMS need to be elaborated and have bearing on whatever system or combination of systems are used. These include:

1. Reporting Considerations,
2. Cost Considerations,
3. Priority Projects,
4. Selection of Personnel and Training Problems,
5. Automation,
6. Time Phasing.

1. Reporting Considerations

There are many reporting formats that might be considered. In fact, using the project-unique approach emphasized by the PMS, it is possible, to some extent, to combine several kinds within the PMS. However, even recognizing the system's orientation to guidelines rather than requirements, the system should take a strong stand on the issue of timing:

A. Periodic Reports

B. Episodic Reports

- Achievement--reports submitted upon achievement of a given milestone or event

- Exception--developed only when there is a deviation from plan.

The above are by no means exclusive. The PMS can require episodic achievement reporting for key events and exception reporting regarding events subordinate to those key events. One might even impose an additional requirement for periodic reports. For example, mid-level management might demand reports regarding two key events during the course of a year, with instructions that exception reports be developed if difficulties arise for events immediately subordinate to those key events.

In fact, the above noted requirement for all three types of reporting may be a preferred way of getting the system started. However, it should be recommended that periodic reports not be required more frequently than annually and, further, that the content of those periodic reports be evaluative rather than narrative. That is, instead of periodic annual reports, evaluation reports might be developed, examining the congruence of the vertical logic of the Logical Framework (inputs-to-outputs, outputs-to-purpose, etc.).

2. Cost Considerations

In addition to the basic reporting alternatives for performance (achievement and exception reports), cost reports should be considered in two dimensions:

a. Expenditure and Disbursement Tracking

b. Costing Criteria.

a. Expenditure and Disbursement Tracking

Assuming that some form of exception reporting is to be undertaken, the question arises as to the level of variance that would constitute an exception. Clearly this will depend in large part on the level of disaggregation when the report is generated. For a minor activity, clearly larger variances (say 30% ‹ possibly more) would be tolerated whereas at a highly aggregated level (say for the project as a whole) exception reports might be generated based on variance below 10%.

Another alternative to be considered is the utilization of cost trend data. Are variances escalating, remaining constant, etc.? A variance that goes 1%, 2%, 4%, 8%, in successive months, may be symptomatic of greater difficulties then a constant variance of 10%.

There are great difficulties in establishing an expenditure reporting system, particularly at highly disaggregated levels. Truely valid expenditure reporting systems must be based on highly disaggregated data. This implies that valid expenditure reporting depends upon our ability to impose job order accounting systems upon all elements participating in a project. This is impractical and suggests that expenditure reporting should be imposed on a highly selective basis.

Disbursement data should, however, be relatively easily available. In fact, such data frequently can be made available without imposing any reporting burden upon the project team. (Presuming that there are central sources of disbursement.) Where disbursement data are available, then valid cost reporting requires (1) careful prediction of what the disbursement patterns should look like (recognizing the lag time between expenditures and disbursements and (2) correlation of disbursement with achievement reports. Disbursement analysis should allow considerable freedom in developing variance and trend calculations, among classes of projects as well as for individual projects.

Another alternative--valid for performance as well as cost reporting, but of more significance to the latter--is the tracking of only selected elements of a project. If 80% of the project cost is in buildings being constructed by a single contractor and 20% of the costs are in related technical assistance activities, it might be appropriate to require detailed cost reporting only upon the construction activities and rely on performance reporting to keep control of the residual 20%. Performance failures normally precede cost overruns. Note also that there might be an inversion on emphasis between the cost reporting and the performance reporting systems. Performance of the project might be more heavily dependent upon the 20% that is technical assistance, thus requiring more detailed performance reports for these activities, whereas cost analysis would focus on the 80% that constitutes construction activities.

Thus, cost reporting must consider the issue of expenditure vs. disbursement reporting. As a rule, expenditure reporting is appropriate if and only if there

is something like a job order accounting system supporting the cost data at a level of aggregation below that upon which costs are being reported. Imposition of an expenditure reporting system without such an accounting capability to support it is liable to yield the same type of result as imposition of a "percent complete" performance reporting system where there are no objective criteria for the percentage calculations. The inevitable result is spurious information.

As a rule then, where there are no job order accounting systems to support cost reports, it would be advantageous to use disbursement data and perform one's own analysis in an attempt to correlate disbursements with performance.

b. Costing Criteria

As a practical matter there are only two things that a cost reporting system can do:

1. Require that you identify costs associated with individual activities or purchases (laying bricks, buying bricks);

2. Require that you report on the actual expenditures or disbursements.

In theory, and to some extent in practice, the greater the level of disaggregation upon which the cost estimates are based, the greater the degree of certainty that the estimates are valid. An estimate for Rs 100 million to build a university is generally inferior to an estimate that identifies the construction costs for each of the buildings, development of the library, etc. On the other hand, there is a point at which disaggregation will increase the predicted costs.

By way of a simple example of this phenomenon consider the following: It seems safe to estimate that one can write a letter to a friend within the course of an hour. However, if one were to break out the individual activities actually associated with the writing of a letter and then aggregate plausible time estimates for each of those activities it might logically seem that writing a letter would take several hours. Activities involved in the responding to a letter would include: rereading the letter, getting out the pen and ink, identifying the key points made in the letter, considering a series of alternative responses for each of the key points, etc. If one were to disaggregate these activities and assign relatively modest levels of time requirements to each, say 10 minutes or so, the writing of a letter could quickly become extremely expensive in terms of manpower resources.

Thus, manpower estimates that are extremely disaggregated must be carefully reviewed for inadvertent "fat." On the other hand, costs of purchasing commodities and equipment are generally firmer as one gets to more disaggregated levels.

The basic alternative for a cost-estimating element of a system is the level of disaggregation. At one extreme, the concern is only with total cost of the project--saying that a project cost Rs 10 million five years ago and should, therefore, cost Rs 14 million this year (accounting for inflation). At the other extreme, every individual human activity--laying of bricks, mixing of mortar, etc.--is individually estimated. The decision as to the level of aggregation appropriate to an individual project is unfortunately more an art than a science. One must be at a low enough level of disaggregation that the estimate is believable and credible to both reviewer and technican alike, but a high

enough level of aggregation so that one does not unintentionally inflate the manpower costs through the mechanism described earlier.

As a practical matter, it is a good idea to examine or perform a before-the-fact audit of commodity cost estimates at a highly disaggregated level. As a method of ascertaining the care with which the project cost estimates have been developed, one might randomly select from among the lists of commodities and other procurements for the projects and then calculate the unit costs for those commodities. If the unit costs are overstated or not known, then one should have less confidence in all the other items of the cost estimate. An estimate that indicates Rs 1 million for drugs and related supplies should be examined to see exactly what drugs and other supplies need to be purchased. The individual drugs and supplies should be readily identifiable by the project team. If not, it is a symptom of inadequate cost analysis on their part. We have frequently seen projects where the project team was unable to answer the question as to how Rs 1 million was to be allocated among different drugs and commodities. Upon questioning, they might indicate that they intended to buy contraceptives, malaria vaccines, and refrigerators, but could not associate a cost for these individual items. An inability to disaggregate commodity costs down to a relatively low level is generally a symptom of poor planning and suggests that the project may experience performance as well as cost difficulties.

There is another (non-exclusive) alternative to cost analysis and reporting that is of particular importance to the Planning Commission. That alternative is to have each project identify scarce resources--foreign exchange and skilled

manpower--and analyze these during the project and program review cycle as a form of priority resource allocation. Given a good performance reporting system, and careful analysis of disbursement data, particularly regarding scarce resources, it is practical for the Planning Commission to identify projects with higher expectations of success and/or greater development impact. Certainly such a resource allocation system would also be part of the basic project approval process. That is, as projects become more clearly defined in terms of their development goals, we can identify the expenditures of scarce resource associated with each of those goals as well as with each project supporting the goal. As an empirical data base develops, we should also be able to examine the probabilities of success for given projects and higher development objectives, enabling a priori determination of expected values for resource expenditures as well as the post facto determination of actual payoff. Operations of such a resource management system depends in part on the development of an evaluation cell which squarely addresses such issues as calculation of rate of return based on social benefits.

3. Priority Projects

On the assumption that PMS will be introduced on a phase-in basis, as opposed to immediate start-up approach, then the criteria to select projects for inclusion within the PMS should be examined. Some of these criteria, which require little in the way of discussion include:

- Interest on the part of the project personnel and/or the organizations who will be implementing the project,
- Importance to the GOP development effort,
- Total cost of the project;
- Foreign exchange or other scarce resource associated with those projects,
- Quality of the management implementing the project;

- Relative ease with which the project can be put within the system,
- Availability of donor funds to support additional planning and analytical activities,
- Uncertainty--the degree to which additional information is needed in order to decide whether or not to attempt the project,
- The degree of direct federal and/or Planning Commission involvement in the project,
- Expression of interest and commitment by an organization to adopt PMS as an organization-wide internal control mechanism,
- All of the above.

One project that meets a number of the above criteria--perhaps including GOP uncertainty as to the relative value of the project--is the malaria program. Further, this program has tentatively been identified by the USAID Mission as a candidate for inclusion within the AID project performance tracking system (PPT), a system that is in every way compatible with the PMS requirements as outlined. If the malaria project is planned using the PMS planning and reporting requirements, then it will in every way meet the PPT requirements as imposed by AID/W. As it is the USAID and AID/W intention to make the planning of the malaria project a collaborative process involving both AID and GOP personnel, it would be an ideal project in terms of the availability of AID analytical support. This project has the additional advantage of being one that is well understood in concept and could thus readily serve as a useful orientation and training activity for participants and, with the agreement of project staff, as a case for further use in GOP training and orientation activitie

4. Selection of Personnel and Training

The success of the PMS will be dependent on having a sufficient number of project personnel trained to use the system. The practical minimum would be that number of project staff that, regardless of normal circulation of personnel through reassignment and attrition, would be required to effectively use the system as well as orient new project personnel to system requirements. These project staff members who would double as PMS specialists would also on occasion be available to train others outside of their own project or organization.

The retention or subsequent request for project personnel to serve as backup or part-time trainers would depend upon the following three factors:

- Their knowledge and facility with the concepts,
- Their credibility as teachers (which depends heavily on their experience with live project situations),
- Their effectiveness in teaching and interest in developing as PMS specialists.

Some of those trained during Phase II will be available by:

- Allowing them to return to their parent organization and using them as agents for PMS activities within their parent organization,
- Using them as a cadre of trainers (whether immediately or after some period of service in their parent organization),
- Using them as a cadre of system implementers,
- Not specifically involving them in the PMS implementation activities (Phase II was a test in design phase, and need not be integrated with Phase III),
- Assigning some of these individuals to Planning Commission PMS functions on either a temporary or permanent basis,
- Some combination of the above.

The probable alternative is the last--some combination--based on the interest and capabilities of both the individual trainees and their parent organizations.

Given that there are certain key concepts that the GOP wishes to have utilized by project planners, implementers, and reviewers and regardless of whether those concepts are extended individually or as part of an integrated system, clearly some set of activities must be established to train personnel in use of these concepts. Alternative approaches to training will be considered in terms of three dimensions:

a. Organization

b. Curricula

c. Locations

a. Organization

(1) Policy Responsibility

PCI at this time sees no practical alternative to having the Planning Commission responsible at a policy level for training. Even if the decision is made to decentralize training--for example, to include it within the normal activities of government ministries or corporations--the Planning Commission would still have policy responsibilities to some extent for monitoring the effectiveness of such training and certainly to review the applicability of extending training activities to other ministries.

(2) The Home Training Organization

The Planning Commission can choose to have within its own organization and under its own control, a core training staff, or it can assist other organizations (either Ministries or government corporations or training institutions) to develop training capabilities, or it can do both of the above.

Both of the above seems to be the correct alternative at this moment.

b. Curricula

The curriculum for training PMS users will vary according to the level of personnel being trained. For those who will be responsible for developing LogFrames, networks, etc., a more intensive training program will be necessary.

Shorter, briefer training sessions would suffice for higher levels of management that would need only an orientation to PMS.

The range would be from half-day seminars to two-week seminars followed by four weeks of supervised application. Presentations for the short seminars could be developed using videotape, sound film or sound and slide training aids, with one PMS trainer or specialist available to answer questions.

These same training aids could be used for longer seminars with PMS trainers available to moderate workshops.

Training seminars could be conducted on a routine basis at government training institutions and could be included as standardized packages within the entry-level programs of each or of selected ministries.

c. Locations

The location for training PMS users would be dependent on the projects or organizations whose staff is to be trained.

The training institutions such as (1) Administrative Staff College, (2) National Institute of Public Administration, (3) Secretariat Training Institute, and (4) Civil Services Academy could make facilities available to give a home to PMS training activities.

Another issue that must be addressed is the location (s) for training trainers. Two of the obvious alternatives include:

- Initial training in Pakistan,
- Training of GOP staff in the United States.

5. Automation

As a practical matter implementation of a PMS on a large scale argues strongly for automation. Before actually automating the system, however, the Planning Commission must consider whether it wishes to use existing software packages or develop its own. This choice obviously depends in part upon the types of software packages that are available. However, we can assume that for certain types of activities--deemed desirable but not necessary to Planning Commission staff--no existing software will do the complete job (e.g., calculations of probabilities of success, development of cost and performance trend data, etc.).

It is quite possible that the best use of Planning Commission resources would be to support and assist automation of the system in organizations that adopt the PMS. The experience gained could thus be transferred to other users as the occasion arises.

If however, a large number of organizations simultaneously express an interest in or make the decision to automate the PMS, the Planning Commission should seriousl consider setting up a centralized activity that would develop a full-service software package to support the system and contain PMS-unique processing elements. It might also be appropriate to establish--based upon the development of such

software--a service bureau function providing either batch process or on-line (to remote terminal) capability. That is, depending upon the nature and extent of demand, and of the Planning Commission's own needs for automation, the Planning Commission should consider establishing a PMS computer service center (or adding a PMS capability within an existing service bureau). With respect to software, the most probable option will be to procure a standard package from a computer manufacturer or service bureau.

Plans for automation should also recognize the rapid evolution in hardware, such that table-top computers now have a capability exceeding that of most main frames of a decade ago. By using mini or table-top computers separately or in combination with remote access main-frames, a whole new range of options become available. Thus, the basic hardware configurations now include:

a. Central processor (batch process) only,

b. Central processor plus interactive or other remote access console,

c. Same as (2) above, but including a small computer within the remote user console, creating an "intelligent" terminal,

d. A full capability processor at the user site, precluding the need for a remote access.

6. Time Phasing

The scarcity of trained human resources demand that system implementation be time phased rather than executed by fiat. The approaches to time phasing seem to boil down to only four:

a. By project,

b. By organization,

c. By individual,

d. A combination of the above.

Phase II, completed with submission of this report, is the type of activity that might be associated with the third alternative. System concepts and skills are provided to individuals, and the establishment of systems then becomes a function of their competence and interest. Clearly, this alternative is not likely to lead to important change without further assistance on a project or organizational basis.

Most probably, the alternative chosen will be some combination of the above. Specifically, it would be appropriate to establish the PMS in those organizations where Phase II trainees can provide the basis for system implementation (in their home organizations). For those organizations where our trainees and follow-up visits by Planning Commission personnel reveal a high level of management interest and commitment in the PMS concepts, the Planning Commission would actively assist in implementation of the PMS within that organization. The implementation alternatives outlined above of course would again be available to that organization. However, PMS is a project management system and ultimately the unit of that activity will be the projects themselves. Thus, the issue of time phasing ultimately becomes an issue of project selection.

D. Organization of Planning Commission/PMS Staff

The central question to be determined here is the extent to which the Planning Commission will establish PMS staff on a permanent basis. Again these alternatives are not exclusive. It is quite possible for the Planning Commission to establish a core staff and supplement these individuals with temporary staff from other ministries and organizations. This alternative is particularly useful during system implementation phases. System implementation would represent a peak load on the human resources required to support implementation as opposed to

operations. This strongly suggests augmentation of Planning Commission capability on a temporary basis. Further, the individuals so "loaned" to the Planning Commission could consider their service there as a period of training, preparing them to supervise system implementation activities within their own organizations.

In terms of organizational placement within the Planning Commission, the Project Wing, which initiated and supervised this study, seems the logical choice. The key criteria for determining placement of the PMS function should be:

- Management commitment to its success,
- Propinquity to the planning and evaluation functions,
- Ability to raise issues quickly to the very highest levels of management and policy.

GLOSSARY OF TERMS

ACHIEVEMENT REPORTING	Reporting from one level of management to the next higher level on the accomplishment of previously determined performance targets based on quality, quantity, and timeliness indicators.
ACTIVITY (Represented by ⟶)	Tasks to be completed in order to reach project objectives which require resources (money, manpower, materials) and which consume time in the achievement of a planned result. An activity begins at a specific point in time , is preceded by an event, ends at a later point in time, and terminates in the occurrence of an event. If more than one activity occurs at the same time, they are said to be in-parallel.
ASSUMPTIONS	Things that must happen if the project is to succeed, but which are not directly controlled by the Project Team. (For example, if our purpose is to increase agricultural productivity and our goal is to increase farm income, then we must assume that there are sufficient roads, markets, etc. to translate agricultural products into real income.)
CONSTRAINTS	Factors affecting the achievement of a planned result or component of a project. These may include the resources required by an activity, the occurrence of a preceding event or other activities leading to that event, or the existence of factors external to our control which limit the timely execution of an activity.
COSTS	The monetary (money, manpower, materials, equipment, etc.) or non-monetary (e.g., social consequences, sacrifices, or disadvantage) contribution of resources needed to carry out an activity.
CRITICAL PATH	The sequence of activities which takes the longest time from the beginning to the end of the project. It defines the minimum time for the accomplishment of the end, given the level of effort or amount of resources devoted to the activities.
DECISION POINT (Represented by △)	Events which represent key decisions or points of approval. Also, decision points are points in a project life where a reprogramming option exists.

DEPENDENCY	A logical relationship which is indicated by a causal or temporal precedence.(e.g., if an activity cannot begin until the occurrence of an event which is the result of one or more preceding activities, then it is dependent on those pre-conditions).
DEVELOPMENT HYPOTHESIS	"If outputs, then purpose" is called the project development hypothesis. The hypothesis that purpose will lead to goal is called the program develc ment hypothesis. These are hypotheses because we are not certain of the causal relationship between the "if" statement and the "then" statement. Projects should be supported only if informed judgment, based on the best available evidence, provides reasonable confidence that the "then" statement will be achieved. The degree of confidence required should be a function of the value of achieving the intended purpose.
DUMMY ACTIVITY (Represented by - - ▷)	A dummy activity shows that one event which marks the beginning of one activity cannot occur unless another event occurs which signals the completion of a different activity. Dummy activities consume neither time nor resources.
ELAPSED TIME	The time required for the accomplishment of an activity.
END-OF-PROJECT STATUS (EOPS)	The objectively verifiable targets that signal the successful completion of the project purpose, that our primary reason for undertaking the project has been achieved.
EPISODIC REPORTING	Reporting from one level of management to the next higher level based on pre-determined target dates anc levels of accomplishment for the completion of activities and not a routine schedule of reporting with regular time intervals.
EXCEPTION REPORTING	Reporting on an episodic basis to inform the next higher level of management that a planned event did not occur or is in danger of not occurring on time and/or in the same manner as was planned (i.e., with respect to the quantity and quality of performance). Exception reports should also indicate the actions being taken and recommended to ameliorate the situation plus the impact of this change of plan on the rest of the project. The importance of excepti reporting is that it spontaneously keeps higher management aware of current implementation problems so that it can assist in overcoming bottlenecks as they arise, not after progress is paralyzed.

EVALUATION	Analysis and comparison of actual achievement versus planned achievement oriented toward improving plans for future implementation.
EVENT (Represented by ○)	A condition, state, or point in time which can be defined as the end of one or more activities or the beginning of one or more activities. An event consumes no time or resources.
FOCUS	Concentrating attention on the "main thrust" or truly important issues and avoiding the less important. Focus is particularly relevant when considering project purpose. Project purpose should be limited to the single "main thrust" of the project, stated as concisely as possible. (Secondary results of a project may be considered as other projects, with cost-benefit analyses based on incremental, rather than total, cost.)
GOAL	The higher level objective immediately above project purpose. That is, the "then" statement for which the project purpose must provide a plausible "if." The rationale by which a project is undertaken should ultimately allow the project purpose to be linked to a goal that is set out as part of the overall strategy.
GOOD PROJECT DESIGN	The best available evidence convinces us that providing inputs we can provide will result in achieving what we want to happen. The project design can be analyzed into its "linked hypotheses" to isolate critical factors and ensure that the design is based on convincing hypotheses.
GPOI	An acronym for: Goal, Purpose, Outputs, Inputs--the vertical logic of the LogFrame. The results expected when the project is successfully completed are made explicit and classified in a four-level hierarchy as part of good project design.
HYPOTHESIS	A predictive statement based on a causal relationship between two elements involving a degree of uncertainty.

INDICATORS	Measures of the occurrance of an event or the achievement of an output or activity. Pre-establishe targets or pre-determined measures of progress are indicators of project performance. (See Objectively Verifiable Indicators.)
INPUTS	The resources available and activities to be undertaken in order to produce the outputs.
INTERFACE EVENT (Represented by ☐)	An event which occurs in more than one network.
KEY EVENTS	Events which are crucial to the successful implementation of the project and are of interest to higher management but are not necessarily on the critical p
LEADING INDICATORS	Indicators that are observable now and are useful predictors of future success.
LEVELS OF MANAGEMENT	A system of arranging management in a functional hierarchy in which "top management" characteristical is responsible for selling policy (Level Alpha); Program Management is responsible for program planni and steering projects toward the accomplishment of program objectives (Level 1); the "Project Manager" who is responsible for the successful execution of the project (Level 2); "Field Operators" who mobilize and put to use the project resources to achieve the planned outputs (Level 3); "Contractors Consultants" normally monitor at Level 3 but occasic monitor at an even greater level of detail, (Level 4
LINKED HYPOTHESES	Using GPOI, the hypothesis is that achieving the expected results at each level of the GPOI hierarch will lead to the results at the next higher level.

LOGICAL FRAMEWORK	A project design tool developed by PCI that clearly, logically, and explicitly states why a project is undertaken, how the project will be undertaken, what exogenous factors make project success uncertain, and what the project will look like when it has been successfully completed.
MANAGEABLE INTEREST	The scope of responsibility for project activities for which a manager is held accountable. These activities correspond to predetermined project outputs, which in turn contribute to project purpose realization.
MATRIX FOR THE LOGICAL FRAMEWORK (LOGFRAME)	A worksheet divided into four rows (for goal, purpose, outputs, and inputs) and four columns (for narrative, objectively verifiable targets, means of verification, and important assumptions).
MILESTONE EVENTS	Key events which correspond to outputs on the Logical Framework or to major occurrences which contribute to those outputs. Milestones are almost always of interest and are, therefore, reported to the next higher level of management.
MONITORING	The management function of following the progress of a project from its inception to its completion. As management assesses achievement of events, it is interested in the quality, quantity, and timeliness characteristics of the achievement. When actual achievement falls short of planned achievement it is management's responsibility to analyze the source of the problem, assess the net impact on the project and take and/or recommend corrective actions to higher management.
NETWORKS	A graphic representations of the sequence of activities and events required to reach an objective.
OBJECTIVELY VERIFIABLE INDICATORS	Good project design must include pre-establishing "what" will be measured to demonstrate progress (indicators) and "how much" is the minimum acceptable level of achievement (targets). Ways of verifying progress should be objectively stated so that both a proponent of a project and an informed skeptic would agree that progress has or has not been as planned. Pre-establishing objectively verifiable targets helps focus discussion on evidence rather than opinions.

OUTPUTS

The specifically intended results that can be expected from good management of the inputs provided. A project manager is responsible for producing specific outputs; the project manager, line supervisors, and program staff share responsibility for the judgment that producing these outputs will result in achieving purpose.

PARALLEL ACTIVITIES

Activities in a network which can occur at the same time.

PERIODIC REPORTING

Reporting on the degree of achievement of activities and events from one level of management to the next higher level based on a pre-defined, regular time interval reporting schedule.

POINTER
(Represented by)

A symbol which cross-references two events in a network (or between networks) which are interdependen The pointer can be used to replace dummy activities w represent only a time dependency (but consume no time or resources) or to replace a normal activity. In the latter case, the pointer should be carefully labeled in addition to being coded. In both cases, the pointer is used only to avoid overcomplicated crossing of arrows.

PROJECT

A planned undertaking that clearly specifies what will be accomplished, over what period of time, and at what cost.

PURPOSE

What we hope to achieve by undertaking the project. The result we aspire to if we produce the required outputs.

PROJECT DESIGN

A summary of what the project is expected to achieve (purpose) and how it will be achieved with the inputs and time available. The key elements of project design may be summarized in the Logical Framework format.

PROJECT MANAGER

The individual who holds himself personally responsi for the success of a project. More specifically, th individual who is charged with producing the agreed-upon outpu ts within the specified time and cost constraints.

REPORTING	"Provides the right information to the right people at the right time" for timely decision-making regarding the successful implementation of projects. Reporting is the foundation of any management system.
SLACK	The time that an activity can be delayed without delaying the targeted completion of a project.
TARGET	An indicator against which performance is measured in terms of quality, quantity, and time. In the Logical Framework they are identified as objectively verifiable indicators and in networking they are associated with every milestone and key event which is reported to a higher level of management.

2. REPORTING FORMATS

A. Mustehkam Cement Ltd. Project

- Reporting Structure
- Achievement Report
- Exception Report

B. Simly Dam Project

- Management Levels
- Achievement Report
- Exception Report

C. University of Islamabad Project

- Management Levels
- Achievement Report
- Exception Report
- Periodic Report

REPORTING STRUCTURE FOR

MUSTEHKAM CEMENT LTD.

LEVEL	CADRE	MONITOR	REPORTS TO	NATURE OF INFORMATION IN REPORTS	TYPE OF REPORT
ALPHA	Policy Makers	Chairman, State Cement Corp. of Pakistan Ltd. Lahore	Secretary, Ministry of Production Govt. of Pakistan, Islamabad	1. Achievements of events on Alpha network. - Work completed, reasons for deviation from target date, if any. - Actual total expenditure increased against the estimated cost and funds received from the Govt. and other sources.	Achievement Report
				2. Problems relating to: - Provision of funds by the Govt. in ADP and its release. - Import license. - Appointment of higher management. - Coordination with other agencies. - Labor.	Exception Report
				3. Recommendations with alternatives to overcome the problems in order to facilitate policy decision.	-do-
I	Planners & Programmers	Managing Director, Mustehkam Cement Ltd. Rawalpindi	Chairman, State Cement Corp. of Pakistan Ltd., Lahore c.c. 1. Gen. Mgr. MCL, Hattar 2. Gen. Mgr. (Finance) SCCP 3. Gen. Mgr. (Planning) SCCP	1. Achievements of targets (events) on Level I Network - Items of work completed, reasons for deviation from target date, if any. - Actual cost of each event as against estimated cost.	Achievement Report
				2. Problems and bottlenecks due to: - Inadequate finances (funds). - Import policy concerning cement plant, spare parts, etc. - Contractors unsatisfactory performance. - Labor situation and strikes. - Damages to buildings & equipment due to various reasons. - Delay in recruitment and/or promotion of management personnel. - Non-availability of trained manpower, material and services. - Lack of proper coordination with other Govt./Semi-Govt. agencies etc. associated in development work - Event missed or in danger of being missed.	Exception Report
				3. Recommendations with alternatives to overcome the problems and remove the bottlenecks.	-do-

REPORTING STRUCTURE FOR

MUSTEHKAM CEMENT LTD.

(Continued)

LEVEL	CADRE	MONITOR	REPORTS TO	NATURE OF INFORMATION IN REPORTS	TYPE OF REPORT
2	Project Mgr.	Gen. Mgr. Mustehkam Cement Ltd., Hattar	Managing Dir., Mustehkum Cement Ltd., Peshawar c.c. 1. Chief Engineer MCL, Hattar	1. Achievements of targets (events) on Level 2 Network. - Items of work completed, reasons for deviation from target date, if any. - Expenditure against funds received with breakup. 2. Financial position and additional requirements of funds with schedule of disbursement. 3. Problems & bottlenecks due to: - Inadequate finances. - Contractors unsatisfactory performance. - Labor situation and strikes. - Events missed or in danger of being missed. - Damages to property. - Performance of management persons. - Non-availability of trained manpower. - Lack of proper coordination with other agencies. - Delay in recruitment or promotion of management personnel. 4. Recommendation with alternatives to overcome the problems and remove the bottlenecks.	Achievement Report Exception Report -do-
2.5	Executing Officers	1. Chief Engineer Mustehkam Cement Ltd Hattar	Gen. Mgr. Mustehkam Cement Ltd., Hattar	1.a)Achievements of targets (events) on Level 2.5 Networks relating to: - Civil engineering works. - Procurement of plant and machinery. - Installation of machinery. - Manpower recruitment, training & deployment. - Raw material supply system. b)Problems anticipated or existing which will adversely affect the time schedule for: - Construction of buildings & structures. - Procurement of plant & machinery at site. - Installation of machinery & equipment. - Raw material supply system. c)Recommendation with alternatives for removing the problems & bottlenecks.	Achievement Report Exception Report -do-

Practical Concepts Incorporated

REPORTING STRUCTURE FOR

MUSTEHKAM CEMENT LTD.

(Continued)

LEVEL	CADRE	MONITOR	REPORTS TO	NATURE OF INFORMATION IN REPORTS	TYPE OF REPORT
2.5 (Cont'd)		2. Accountant Mustehkam Cement Ltd	-do-	2.a) Financial Progress: - Actual expenditure on each activity along with estimated cost of that activity. - Cost overrun or underrun for each activity.	Achievement Report
				b) Inadequate cash for meeting day-to-day requirements. - Additional funds needed based on commitments. - Suggestions for overcoming financial problems.	Exception Report
		3. Manager (Imports) Mustehkam Cement Ltd Rawalpindi		3.a) Achievement of targets relating to procurement of machinery. - Order placed for import and local purchase of plant and equipment. - Consignments of machinery and equipment received at Karachi Port and expected to be received at site.	Achievement Report
3	Field Operators	1. Civil Engineer Mustehkam Cement Ltd Hattar	Chief Engineer Mustehkam Cement Ltd. Hattar	3.1a) Achievement of targets for civil engineering work on Level 3 Network. (output Network No. 1 relating to buildings and structures in use).	Achievement Report
				3.1b) Problems which may result in some event not completed in time as per specifications such as: - Unsatisfactory performance of contractors. - Non-availability or inadequate availability of resources as per schedule.	Exception Report
				3.1c) Suggestions for recovering the bottlenecks alternatives	-do-
		2. Mechanical Engineer Mustehkam Cement Ltd Hattar		3.2a) Achievements of targets for machinery & equipment on Level 3 Network (output Network No. 2 relating to machinery and equipment functioning.	Achievement Report
				3.2b) Problems which may arise due to: - Delay in receipt of plant and machinery. - Non-availability of constructed buildings & structure. - Inadequate trained manpower. - Breakdown of plant and machinery in transit or during assembly. - Non-availability of services for the machinery and equipment as per schedule.	Exception Report
				3.2c) Suggestions for overcoming the problems with alternatives	-do-

REPORTING STRUCTURE FOR

MUSTEHKAM CEMENT LTD.

(Continued)

LEVEL	CADRE	MONITOR	REPORTS TO	NATURE OF INFORMATION IN REPORTS	TYPE OF REPORT
3 (Cont'd)		3. Electrical Engineer Mustehkam Cement Ltd Hattar	-do-	3.3a) Achievements of targets (events) relating to electrical work on output Network No. 1, 2 and 5.	Achievement Report
				3.3b) Problems which may arise due to: - Unsatisfactory performance of contractors for electrical installations and internal electrifications. - Delay in getting adequate power load from WAPDA. - Non-availability of electrical fittings and equipment.	Exception Report
				3.3c) Suggestions for overcoming the problems with alternatives.	-do-
		4. Admin. Officer Mustehkam Cement Ltd., Hattar	-do-	4.a) Achievements of targets (events) shown on the Level 3 Network relating to manpower functioning on job and management for execution of expansion project (output Network No. 3 and 4.)	Achievement Report
				4.b) Problems which may arise due to non-availability of manpower (skilled or semi-skilled labor union activities).	Exception Report
				4.c) Recommendation for overcoming the problem with alternatives.	
		5. Labor Officer Mustehkam Cement Ltd., Hattar	-do-	5. Problems which may arise due to: - Demand of labor union. - Notice for strike. - Delay the payment of compensation for accidents during working hours.	Exception Report
		6. Labor Officer Mustehkam Cement Ltd., Hattar	-do-	6a) Achievement of targets (events) on Level 3 Network relating to raw material supply system (output Network No. 5).	Achievement Report
				6b) Problems which may upset the schedule for the development/raw material system.	Exception Report
				6c) Recommendations for removing the problems.	Exception Report

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REPORTING STRUCTURE FOR

MUSTEHKAM CEMENT LTD.

(Continued)

LEVEL	CADRE	MONITOR	REPORTS TO	NATURE OF INFORMATION IN REPORTS	TYPE OF REPORT
4	Contractors	Chief Erector	Chief Engineer Mustehkam Cement Ltd., Hattar	4a)Achievements of targets (events) on Level 3 Network	Achievement Report
				4b)Problems which may arise due to: - Delay in receipt of some machinery and equipment at site. - Delay in completion of foundation and structures for installation of machine. - Delay in service consumption-like power gas and water. - Lack of coordination between contractors for electrical works. - Now compliance of request for providing skilled manpower in time by the MCL management.	Exception Report
				4c)Recommendation with alternatives for removing the problems.	Exception Report

MUSTEHKAM CEMENT PROJECT

ACHIEVEMENT REPORT

REFERENCE NO. DATE.

TO:

FROM:

1. NAME OF PROJECT:

2. EVENT:

3. DATE OF START OF ACTIVITY:

4. PHYSICAL ASPECTS

	DATE OF COMPLETION	LEVEL OF ACCOMPLISHMENT
1) Target		
2) Actual		

3) Reasons for Deviation from Target, if any.

5. FINANCIAL ASPECTS:

CODE	ITEMS	ESTIMATED COST	ACTUAL COST	% INCREASE OR (DECREASE)

6. REASONS FOR INCREASE/(DECREASE) IN COST:

7. IMPACT

C.C.

SIGNATURE OF REPORTING OFFICER

MUSTEHKAM CEMENT PROJECT

EXCEPTION REPORT

REF NO. DATE

TO

FROM

1. NAME OF PROJECT

2. EVENT

3. TARGET

4. UP-TO-DATE PROGRESS

5. PROBLEM

   I. Nature
   II. Source

6. IMPACT

   I. Output Level
   II. Purpose Level

7. ACTION TAKEN

8. ACTION REQUESTED

   A. RECOMMENDED ALTERNATIVES

      (i) _____

      (ii) _____

      FOR EACH ALTERNATIVE LISTED:

      a. Major Advantage
      b. Major Disadvantage
      c. Resource Impact on Total Project

PLEASE RESPOND BY: _____

C.C.

_____
Signature of Reporting Officer

SIMLY DAM PROJECT

MANAGEMENT ACTIVITY	ORGANIZATION & CHIEF OFFICER	DEPUTED OFFICER	ORGANIZATION & CHIEF OFFICER	DEPUTED OFFICER
Level Alpha	Minister for Prod.,T.P + A Mr. Rafi Reza		Minister for Plng & Fin Rana Mohd Hanif	
Policy Level I	Secy. T.P.A. Division Mr. S. B. Awan		Secy. Gen. Plng. & Fin. Mr. G. N. Kazi	
Policy Level I	Chairman CDA Mr. M.A. Kazmi		Secy. Plng. Comm. Mr. V. A. Jaffery	
Policy Level I	Member Finance CDA Malik Israr Ahmed			
Policy Level I	Member Technical CDA Mr. Ashfad Hasan			
Policy Level II	Director Technical CDA Mr. A. R. Javed	Deputy Dir. P & E Mr. A. R. Pervez Asst. Dir. Eval. Mr. Inayatullah	Joint Secy. Proj. Wing PC - Mr. Namet Ilahi	Asst. Chief Progressing PC - Mr. Badrul Hasan
Planners Level II	Dir. Gen. Works CDA Mr. S. Hamid Rizvi	Deputy Dir. Tech. Mr. Imtiaz Ali Shah	Chief Engineer P&I WAPDA - Mr. Rehman	
Proj. Dir. Level - II	Proj. Dir. Simly Dam CDA Mr. M.A.K. Khattak	Deputy Director Mr. Jehanzeb		
Consultant Level - III	Chief Resident Engineer WAPDA - Mr. Mohd. Umar	Technical Officer Mr. Mohd Aslam		
Contractor	G.M. Mech. Cons. Pak. Ltd. (MCPL) Mr. M.L. Hussain Tariq	Deputy Dir. Const. Mr. Anwar		

SIMLY DAM PROJECT

ACHIEVEMENT REPORT

GREEN FLAG

REFERENCE NO:

DATE:

FROM:

TO:

NAME OF PROJECT:

EVENT:

ACHIEVEMENT:

IMPACT ON PROJECT IN CASE OF OVERACHIEVEMENT:

SIMLY DAM PROJECT

EXCEPTION REPORT

RED FLAG

REFERENCE NO.

DATE:

FROM:

TO:

NAME OF PROJECT:

EVENT:

TARGET:

ACHIEVEMENT:

SHORTFALL:

REASONS FOR SHORTFALL:

CORRECTIVE MEASURES ALREADY TAKEN BY PROJECT MANAGER:

CORRECTIVE MEASURES PROPOSED TO BE TAKEN BY PROJECT MANAGER:

CORRECTIVE ACTION RECOMMENDED FOR HIGHER LEVEL MANAGEMENT WITH ALTERNATIVES:

ADVERSE IMPACT ON TIMELY COMPLETION AND RESOURCE ALLOCATION IF CORRECTIVE MEASURES ARE NOT TAKEN:

GENERAL REMARKS, IF ANY:

UNIVERSITY OF ISLAMABAD

MANAGEMENT LEVELS

DESIGNATION	LEVEL AT WHICH TO MONITOR
Chancellor	Beta
ECNEC	Alpha
CDWP	Alpha
Senate) Ministry of Education)	Alpha
Syndicate) Vice Chancellor)	One
Registrar/PDO	One/Two
Academic Council) Treasurer) Project Director)	Two
Dean of Faculty) Audit Officer) Executive Engineer)	Three
Chairmen of Departments) Other Officers) Engineers)	Four

UNIVERSITY OF ISLAMABAD

ACHIEVEMENT REPORT

DATE:

1. Reference No:
2. From:
3. To:
4. Name of the Project:
5. Nature of Event:
6. Targets:
   a) Physical Status:
   b) Date of Completion:
7. Achievements:
   a) Actual Physical Status:
   b) Actual Date of Completion:
8. Impact on the Overall Project:
9. Remarks, if any:

UNIVERSITY OF ISLAMABAD

EXCEPTION REPORT

1. Name of the Project:

2. Nature of Event:

3. Target Date:

4. Achievements:

5. Short Fall:

6. Reasons for the Short Fall:

7. Corrective Measures Already Taken by P.M.

8. Corrective Measures Proposed to be Taken by P.M.

9. Alternatives Suggested:

10. Impact on Completion Time and Resource allocation on Project if Corrective Measures are not Adopted in Time:

11. Remarks, if any:

TO: _____ _____ _____

REF. NO. _____
DATED: _____

FROM: _____ _____ _____

UNIVERSITY OF ISLAMABAD

PERIODIC REPORT

MONTH ENDING _____

NAME OF PROJECT _____

ESTIMATED COST _____

S. NO:	DESCRIPTION	QUANTITY	RATE	AMOUNT	REMARKS

WORK DONE UP TO LAST MONTH:

WORK DONE DURING CURRENT MONTH:

UP-TO-DATE WORK DONE:

TO: _____

REF. NO:

FROM: _____

PHASE II REPORT

DEVELOPMENT OF A PROJECT MANAGEMENT SYSTEM FOR THE PLANNING COMMISSION GOVERNMENT OF PAKISTAN

APPENDIX B

Prepared by:

November, 1975

Practical Concepts Incorporated
1730 Rhode Island Avenue, N.W.
Washington, D.C. 20036, U.S.A.

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- Special Level 2.5: "Chief Engineer's Network"

Simly Dam Project

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University of Islamabad

- Level One
- Level Three: "Basic Services"

SECTION III: PC-Is

Mustekham Cement Expansion Project

Simly Dam Project

University of Islamabad

APPENDIX B

INTRODUCTION

The participants in the three workshops--Workshop C (Mustekham Cement Expansion Project), Workshop D (Simly Dam Project), and Workshop U (University of Islamabad Project)--developed two primary sets of documents during the three-month period of their involvement: Logical Frameworks and networks. The initial set of information used by the workshops to develop these documents come from the project PC-I reports (included in this appendix). As further information was needed, the workshop teams obtained it by working in collaboration with the project people. Consequently, several editions of both the Logical Frameworks and networks were drafted during the design process. Each document included in this appendix, represents the last revision.

All of the 14 Logical Frameworks completed by the three workshops are included. Of the 23 networks developed, only eight are presented and were selected to highlight:

1. Specific techniques employed by the different workshops,

2. Different interpretations of the "nested levels" of networks which were judged to be of relevance to project implementors by the respective workshops, and

3. Accommodations which were made in networking project implementation schedules to tailor the networks to the user's needs.

PROJECT RELATED DOCUMENTS GENERATED

DOCUMENTS	MUSTEKHAM CEMENT PROJECT	SIMLY DAM PROJECT	ISLAMABAD UNIVERSITY
Master Logical Frameworks *	X	X	X
Output Logical Frameworks*	• "Buildings & Structures in Use" • "Machinery & Equipment in Use" • "Manpower Functioning on Job" • "Effective Management Established" • "Existing Raw Material Supply System Accommodates Expected Needs"	• "Feasibility Report Prepared" • "Water Stored in Reservior" • "Diversion Tunnel Constructed" • "Service Tunnel & Out-Let Works Constructed" • "Silt Intake Reduced" • "CDA Consultants Live in Constructed Colony"	
NETWORKS			
Level Alpha	X*		
Level One	X	X*	X*
Level Two	X*	X	
Level Three	• "Buildings & Structures in Use"* • "Machinery & Equipment Installed" • "Management Functioning" • "Manpower Functioning" • "Raw Material Supply System Developed"	• "Feasibility Study" • "Diversion Tunnel"* • "Service Tunnel" • "Main Embankment" • "Water Shed Management"	• "Basic Services"* • "Faculties Developed" • "University Press" • "Development, Planning, & Administrative Cycle"
Level Three Composite		X	X
Special Level 2.5	• "Chief Engineer's Network"*		

* Included in this appendix.

MASTER LOGICAL FRAMEWORK: MUSTEKHAM CEMENT EXPANSION PROJECT

PCI 72-6

LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary 9/7/75

Project Title: MUSTEHKAM CEMENT EXPANSION PROJECT (Master LogFrame)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes: Projected Cement shortage of 12 lac ton/year in Northern Zone decreased by 50% by 1980.	Measures of Goal Achievement: 1. Decrease in regional quota of cement factories of southern zone for projected supply to northern zone by 50% by 1980. 2. Increase in production of grade 12 cement to X lac tons/year in northern zone by 1980.	1. Ministry of Production records. 2. State Cement Corporation of Pakistan Records. 3. State Cement Corporation Records.	Concerning long term value of program/project: National target for production of 7 million tons of cement per year met.
Project Purpose: Financially viable MCL expands production of grade 12 cement by 3 lac tons by 1980.	Conditions that will indicate purpose has been achieved: End of project status. EOP 1. Existing and expanded unit produces 3.3 lac tons/year of grade 12 cement by 1980 and thereafter. 2. Targeted minimum rate of return 10% per year achieved by 1980 and maintained.	1. Production Department, MCL record.	Affecting purpose-to-goal link: 1. Actual Demand remains as projected. 2. Other factories in Northern Zone will also contribute towards cement production as planned. 3. Kohat Cement Factory produces 3 lac tons/year of grade 12 cement by 1980. 4. Quota of Northern Zone production is zero for southern zone and no export until the supply is greater than demand in northern zone. 5. Goverment policy regarding cement does not change.
Outputs: 1. Building and structures in use. 2. Machinery and Equipment functioning.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1. a) 100% occupation of buildings for intended purposes by end of 1977. b) Engineer's specification met before occupancy. 2. a) 90% production efficiency obtained during trial runs. b) Down time does not exceed scheduled maintenance time during first year.	1. Admn. Office Record. 2. a) Engineer's Report b) -do- c) No backlog of work.	Affecting output-to-purpose link: 1. Projected production targets not altered. 2. No serious breakdowns due to factors beyond our manageable interest, like: a) Fuel & Power Supply b) Natural disasters. 3. Cost of inputs does not increase at faster rate than cement price.

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LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____
Date of this Summary 9/7/75

Project Title: MUSTEHKAM CEMENT EXPANSION PROJECT (Master LogFrame Continued)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs: (Continued)			
3. Manpower functioning on Job.	3. a) No backlog of work.	3. a) Production Engineer's Record.	
	b) No more than X% rate of absenteeism per month.	b) Personal record.	
	c) Staff turnover per category does not exceed X% per year.	c) -do-	
4. Effective Management established for expanded production capacity.	4. a) Production targets being met at 100% capacity utilization by 1980.	4. a) Production Engineer's Report.	
	b) Production bonus declared.	b) -do-	
	c) Strikes avoided..	c) Labour Office records.	
5. Existing raw Material supply system accommodates expansion needs.	5. a) Timelag between orders placed and received for Gypsum and Spares does not exceed expectation.	a) Purchase Dept.	
	b) X No. of tons per day of acceptable quality of various raw material provided.	b) Store Dept.	
	c) X MG/Day water provided.	c) Civil Engineer's Office records.	
	d) X No. of tons per day of raw material from central store to shops.	d) Store Dept.	
	e) Min/max level of inventory maintained for X, Y, Z.	e) Store Dept.	
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:
1. a) Construct Buildings & Structures. b) Install Services. c) Furnish and equip buildings and structures.			1. Cost of raw material does not increase faster than the price of cement.
2. a) Procure machinery and equipment. b) Instal machinery and Equipment. c) Test machinery and Equipment. d) Maintain machinery and Equipment.			2. Fuel and Power available in needed quantity as per schedule.

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LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____
Date of this Summary _____

Project Title: MUSTEHKAM CEMENT EXPANSION PROJECT (Master LogFrame Contined)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources (Cont'd)	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:
3. a) Determine Manpower needs			3. Foreign exchange loan payment made at required time.
b) Recruit Manpower			
c) Train Manpower 1 - relevant jobs			
d) Deploy personnel.			
4. a) Determine Management needs.			4. Targeted local funds allocated made available according to schedule.
b) Transfer Management from MCL to expanded unit.			
c) Hire and orient Management personnel from outside & deploy.			
d) Extend Review Management System to expanded unit and make good employees permanent.			
5. a) Make purchase arrangement.			5. Dependable transportation system exists between Supply Source and Factory.
b) Develop storage facilities.			
c) Establish services infrastructure.			6. No delay due to the defects in the equipment and machinery received.
d) Deploy personnel in Procurement Cell.			

MASTER LOGICAL FRAMEWORK: SIMLY DAM PROJECT

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM PROJECT (MASTER LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes: Municipal water demand of Islamabad met beyond 1978.	Measures of Goal Achievement: 150 FPD per capita potable water supplied from 1978 to 1985 including industrial uses.	a) CDA Municipal record. b) Water laboratory test.	Concerning long term value of program/project:
Project Purpose: 24 MGD Water supplied from Simly Dam by end of 1978.	Conditions that will indicate purpose has been achieved: End of project status. Release of 24 MDG. Water from Dam by end of 1978. Loss of storage capacity does not exceed 146 AFT/Annum.	CDA's Resident Engineer.	Affecting purpose-to-goal link: • Minimum rainfall of 31" per annum. • Work distribution system laid as per plan and properly maintained. • Filtration Plant works successfully. • Population grows at the rate of 10% per year in Islamabad by 1985. • Other projects such as Rawal Dam, tapping of Nullahs and Tubewells, etc., supply of target quantity of water.
Outputs: 1. Feasiblity Report prepared. 2. CDA Consultants for Simly Dam live in constructed Colony. 3. Diversion Tunnel constructed. 4. Service Tunnel and Outlet work constructed. 5. Water stored in Reservoir. 6. Silt Intake Reduced.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1. Feasibility Report accepted by CDA by January 1969. 2. a) 33 consultants reside in the colony by Sept. 1975. b) Resident are fully satisfied with the construction of colony. 3. 28 FT. DIA & 600 FT. long R.C. Concrete lined tunnel completed by Jan. 1973. 4. a) 6 FT.DIA, 700' Long RC Concrete lined tunnel completed. b) RCC 15, DIA 60' high intake structure as per design completed. c) RCC 10' X 20' and 10' high control tower as per design. d) 200' Prefabricated double line 36" DIA conduit laid and aligned by 1978. 5. Gross storage capacity of 28750 AFT. With live storage of 2,0000 AFT. Attained by 1978 6. Silt Intake does not exceed P.P.M. by 1978.	CDA's record. Site Engineer's report. Director Maintenance Report. Site Engineer's report. Site Engineer's report. Site Engineer's report. Watershed Management report.	Affecting output-to-purpose link: • Earthquake intensity does not exceed the SEISMIC Design criteria. • Seepage does not exceed the level anticipated the soil investigation study. • Watershed Management effective for 60 years.

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM (MASTER LOGFRAME CONTINUED)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
INPUTS: ACTIVITIES AND TYPES OF RESOUCES			
1. (a) Award contract to the consultants. (b) Prepare research design for data. (c) Draft and print feasibility report			1. Govt. maintains priority of this project for financing both local and foreign costs.
2. (a) Construct residences, offices and laboratory. (b) Construct Mosque and Market.			2. Import policy change does not affect this project by 10 years.
3. Construct Coffer Dams, Diversion Tunnel and Divert water.			3. Rate of inflation does not exceed as stipulated in the cost estimates.
4. (a) Construct & make intake structure to function. (b) Install steel gates. (c) Construct control tower & lay conduit.			4. Strikes do not reduce the working days to less than 200 per year.
5. (a) Construct & make concrete spillway to function. (b) Construct embankment.			5. Farmers take interest in Watershed Management works.
6. (a) Construct check dams/detention dams. (b) Construct gully structures. (c) Grow improved variety of grass on lands. (d) Terrace cultivated lands. (c) Grow forest and fruit trees.	150 small detention dams constructed by 1977. 5000 acres range land improved by 1977. Soil conservation works in 31000 acres by 1977. 2,000,000 forest trees and 5,00000 fruit trees growing and spread over 22,000 acres by 1977.	Watershed Management record.	6. Labor is satisfied with the working condition.

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MASTER LOGICAL FRAMEWORK: UNIVERSITY OF ISLAMABAD

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: UNIVERSITY OF ISLAMABAD (Master LogFrame)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes: Scientific and technological development in Pakistan equal to international quality	Measures of Goal Achievement: 1. Percentage increase in Pakistan engaged as consultants by foreign countries/international organizations by 1985. 2. # of patents issued to Pakistan by 1985. 3. Percentage increase in scientific & technological research organizations in Pakistan by 1985. 4. $ of international awards in S&T conferred to Pakistanis by 1985. 5. # of publications recognized internationally by 1985. 6. Percentage increase in the # of appointments in international organizations in the fields of science and technology by 1985. 7. Percentage increase in the # of editorial boards of internationally recognized scientific journals by 1985.		Concerning long term value of program/project:
PROJECT PURPOSE: A national seat of learning for higher education and research in science and technology comparable to international standards.	CONDITIONS THAT WILL INDICATE PURPOSE HAS BEEN ACHIEVED: END-OF-PROJECT STATUS: 1. # of publications/research papers produced by profs/associate profs/assistant profs/lecturers recognized at national/international level. 2. # of post-graduates/research scholars at different levels. 3. # of participants in international conferences and seminars. 4. # of international conference and seminars held in University of Islamabad.	1. Relevant national/international journals/bibliographers 2. Record of controller of exams and registrar. 3. Ministry of Science & Technology as well as Ministry of Education records. 4. University record.	AFFECTING PURPOSE-TO-GOAL LINK: 1. Qualified scientists from University of Islamabad absorbed in science & technology fields. 2. Receptive attitude of people in general toward science & technology. 3. Resources available for science & technology development.
OUTPUTS: 1. Implementation of University Act. 2. Faculties functioning.	MAGNITUDE OF OUTPUTS NECESSARY & SUFFICIENT TO ACHIEVE PURPOSE: 1a)Senate 1b)Syndicate 1c)Academic council 1d)Board of Faculties 1e)Finance & Planning Committee 1f)Discipline Committee 1g)Board of Studies 2a)Academic Staff 1.# of prof-PhDs from school of reputation with ___yrs. of teaching/research exper. 2.# of associate profs. _____ 3.# of assistant profs. _____ 4.# of lectures PhDs/MSc 2b)Supporting Staff 1.# of research assts. having MSc degree w/ ___yrs. experience. 2.# of technicians having degree/diploma w/ ___yrs. experience.	1. Processing of meetings of these bodies. 2a.Relevant university record. 2b.From international & national journals.	AFFECTING OUTPUT-TO-PURPOSE LINK: 1. Policies framed by constituent bodies implemented properly. 2. Non-interference in university affairs.

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: UNIVERSITY OF ISLAMABAD (Master LogFrame Continued)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
OUTPUTS: (Continued)	2c) Academic/Research Activities 1. # of research papers published/yr. by top professors. 2. Pass % of students as a function of enrollment every year. 3. % of targeted students registered in each dept. 4. % increase in the # of depts. & faculties. 5. % increase in the # of courses offered. 6. # of international researchers working in Islamabad University.		
3. Administration functioning	3a) # of senior officers of specified skill with adequate experience. 3b) # of junior officers of specified skill with adequate experience. 3c) # of staff members of specified skill with adequate experience. 3d) # of general service staff. 3e) # of maintenance staff.	3. Personnel records of the university.	3. Favorable attitude of foreign countries/agencies & local organizations towards grants/donations to University of Islamabad.
4. Students undertaking courses of study and research work.	4a) # of students with 1st class career. 4b) # of students having acquired GRE standard and are among the top twenty. 4c) # of students in PhD courses. 4d) # of students in MPhD courses 4e) # of students in MSc courses 4f) # of students in Diploma courses 4g) # of students engaged in research topics.	4. Academic records of univ.	
5. Curriculum prepared	5a) # of courses and syllabi approved and revised by the Committee of Experts. 5b) # of research topics offered.	5a. Record of Board of Faculty. 5b. Record of Board of Higher Studies.	
6. Operative plant	5a) # of various outputs by 1980 under "Operative Plant"	6. Project directorate record & planning & development office record.	

BLDG.	CLASS ROOMS	LABS.	OFFICES	SEM. RMS.	SVCS.	DEPTAL LIBRY.	STORE
Physics							
Chem.							
Math							
Social							
Science							
Etc.							

6b) Central Library-Dimension of covered area.
6c) Hostels of covered area.
6d) Staff accommodation of covered area.
6e) Cafeteria of covered area.
6f) Sports Hall of covered area.
6g) Health Center of covered area.
6h) Mosque of covered area.

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: UNIVERSITY OF ISLAMABAD (Master LogFrame Continued)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
7. Central library functioning	7a)# of qualified librarians & staff 7b)Addition of latest journals/books/reports/micro-films every year. 7c)Total # of: 1. Books available in 1980. 2. Journals being subscribed by 1980. 3. Tech. reports & other relevant publications being read in 1980.	7. Library record.	
8. University of Islamabad Press.	8. # of publications per year.	8. Univ. record and Press Information Dept.	
INPUTS: ACTIVITIES & TYPES OF RESOURCES: 1. University of Islamabad Act.	LEVEL OF EFFORT/EXPENDITURE FOR EACH ACTIVITY: 1a)University Admin/Planning/academic units. 1b)# of MNAs. 1c)# of experts from various fields 1d)# of univ. academic staff reps. of different grades. 1e)Representation of Supreme Court, Public Service Commission, etc.	1. University records.	1. Qualified students & teachers are available.
2a)Rules & regulations of university. 2b)Funds. 2c)Selection/recruitment of teachers. 2d)Incentives for outstanding teachers.	2b)Funds--amount 2c)Recruitment of staff--# of staff.	2. Annual development plans & audit records.	2. Continuity of flow of finances.
3a)Rules & regulations of university. 3b)Funds. 3c)Selection/recruitment of executive & supervisory staff. 3d)Selection/recruitment of clerical staff. 3e)Selection/recruitment of Gen. Studies staff. 3f)Selection/recruitment of maintenance staff. 3g)Means of transportation(cost of fuel, gasoline, maintenance, etc.).	3b)Funds--amount 3g)Buses/Vans/Cars--# 3g)Fuel--Gallons	3. Relevant university records.	3. Funds required for expected inflationary trends.
4a)Funds. 4b)Screening/selection of students in PhD MPhD and MSc levels. 4c)Registration/enrollment to PhD, MPhD, MSc. 4d)Award of scholarships/fellowships.	4a)Funds--amount 4d)Scholarships/Fellowships--# of students registered/selected for PhD, MPhD, MSc.		4. Proper import permits & supplies granted.
5a)Finances. 5b)Printing/reproducing facilities. 5c)Reference to curriculum of other internationally distinguished university in respective fields. 5d)Books & jrnls. for preparing curriculum.	5a)Funds--amount 5b)Printing, reproducing--amount 5c)Curriculum of other universities		5. Reasonable expectation of delivery on schedule.

# OF POSTS	DEGREE	DIPLOMA	EXPERIENCE
Lib.			
Asst. Lib.			
Staff			

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LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____
Date of this Summary _____

Project Title: University of Islamabad (Master LogFrame Continued)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
6a)Rules/regulations of the university. 6b)Finances 6c)Formal approval for location of buildings. 6d)Selection and acquisition of land. 6e)Consultant/architect services hired for design and drawings. 6f)Hire contractors services for construction of buildings and for equipping these buildings with various services.	6b)Funds--amount 6d)Acquisition of land--# of acres of land. 6e)Consultant services--% of the capital cost of construction. 6f)Contractor services--____amount per sq. ft. of covered area.		6. Continuous supply of electricity, water, gas, fuel, etc. maintained.
7a)Finances 7b)Selection/recruitment of qualified librarians and staff. 7c)Procurement of books, journals. 7d)Subscription for current journals and other reports/microfilms. 7e)Procurement of library equipment i.e., M1	7a)Finances--amount 7c)Books and journals--# of latest books/journals added each year. 7e)Equipment--printing, reproducing, audio-visual facilities available.		
8a)Finances 8b)Selection/recruitment of manager, editors and other staff. 8c)Supply of equipment viz. printing, camera, typewriter, xeroxing machine, etc. 8d)Printing facilities	8a)Funds--amount 8d)Machinery for printing--amount		

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OUTPUT LOGICAL FRAMEWORKS: MUSTEKHAM CEMENT EXPANSION PROJECT

Project Title: MUSTAHKAM CEMENT EXPANSION PROJECT: OUTPUT LOGFRAME, BUILDINGS & STRUCTURES IN USE

FOR SUMMARIZING PROJECT DESIGN

Date of this Summary _____

	NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
DEVELOPMENT HYPOTHESES — If Purpose, Then Goal	Program Goal: The broader objective to which this project contributes: Financially viable MCL expands production of Grade 12 cement by 3 lak tons by 1980.	Measures of Goal Achievement: 1.Existing & expanded units produce 3.3 + 3 lak tons/yr of Grade 12 cement by 1980 & thereafter; 2.Targeted minimum rate of return 10% per year achieved by 1980 & maintained.	1.Production Department of MCL Record; 2.Finance Department of MCL Record.	Concerning long term value of program/project: National & sectoral target of 7 million tons of cement per year met by 1980.
DEVELOPMENT HYPOTHESES — If Outputs, Then Purpose	Project Purpose: Building & structures in use.	Conditions that will indicate purpose has been achieved: End of project status. 1.100% occupation of buildings & structures for intended purposes by the end of 1977; 2.Engineers' specifications met before occupancy.	1.Department Record of MCL; 2.Engineer Record.	Affecting purpose-to-goal link: 1.Machinery & equipment functioning; 2.Manpower functioning on jobs; 3.Effective management of existing expanded MCL production capacity; 4.Raw material supply system developed; 5.Quality of raw material product controlled.
MANAGEABLE INTEREST — If Inputs, Then Outputs	Outputs: A.Buildings & structures constructed as per Annex A; B.Services installed; C.Buildings & structures furnished & equipped.	Magnitude of Outputs necessary and sufficient to achieve purpose. A.Buildings & structures list in Annex A completed per construction schedule attached; B.Service facilities (for buildings & structures installed) 100% by June 1977 per approved designs within 15% budgeted cost of Rs. X; C.100% furniture & equipment in place by June 1978 as per approved requirements within 15% budgeted cost of Rs.X.	A1.Certificate of completion by MCL Chief Engineer; 2.Comparison of actual cost per final bill with budgeted cost B1.Engineer's inspection report; 2.Completion certificates; 3.Comparison of actual vs. budgeted cost; C. Physical inventory per department.	Affecting output-to-purpose link: 1.Personnel employed; 2.Plant & machinery installed.
MANAGEABLE INTEREST — If Inputs, Then Outputs	Inputs: Activities and Types of Resources A1.Select Site; 2.Select consultant; 3.Provide data to consultants; 4.Approve consultant's drawings; 5.Prepare tender documents; 6.Invite tenders; 7.Select contractor; 8.Sign contract; 9.Supervise construction under schedule; 10.Take over buildings. B1.Provide data to consultant about services for buildings & structures; 2.Approve consultant's drawings; 3.Prepare tender documents; 4.Invite tenders; 5.Select contractor; 6.Sign contract; 7.Supervise installation; 8.Test services. C1.Determine furnishing required in building & structures in consultation with the consultant; 2.Determine equipment required in building & structures; 3.Prepare tender documents; 4.Invite quotations for furnishing & equipment; 5.Sign contract; 6.Receive equipment & furnishing; 7.Prepare equipment & furnishing.	Level of Effort/Expenditure for each activity. A1-5.# of personnel x manhours + equipment x equivalent hours (if applicable) = cost of 1-6 incurred by _____: (1)Civil Engineer & contractors; (2) Architect & consulting engineers; (3) Purchase manager; (4) Purchase manager; (5) Civil Engineer staff; A3.Design work for attached list of buildings & structures completed by June 1976 for X Rs.; A6.Implementation schedules being met; A7.Contractor hands over keys to site engineer by June 1977. B1-8. # of personnel x manhours + equipment x equipment hours (if applicable) = cost of 1 to 8. Incurred by _____. (1) Consultant engineers; (2) Architect & consulting engineers; (3) Consulting engineers; (4) Consulting engineers; (5) Purchase managers; (6) Purchase managers; (7) Civil engineer staff; (8) Civil engineer staff. C1-4.# of personnel x manhours + equipment x equipment hours (if applicable) = cost of 1-8. Incurred by _____. (1) Interior decorators; (2) Consulting engineers; (3) Purchase manager; (4) Civil engineer staff; C2.Implementation schedule being met; C4.Furnished & equipped rooms.	A1.Comparison of actual cost with budgeted cost by Finance Department; ii.Personnel Department report; 2.Final blueprints; 5.Civil engineer Monthly Progress Reports; 6.Certificate of takeover. B1.Final list of services; 2.Final blueprints; 3.Civil engineer Monthly Progress Report; 4.Engineering staff report. C5.Engineering staff & interior decorators' report.	Affecting input-to-output link: A1.Connections are given by agencies for electricity, gas & water; 2.Trained personnel available to carry out supervisory work; 3.Strikes do not happen; 4.Contractors remain financially viable during the course of construction 5.Contractors start work on scheduled dates. B1-8.Prices do not fluctuate beyond 5% of budgeted estimates; 2.Contractors remain financially sound during the period of contract.

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ANNEX A: MUSTEHKAM CEMENT EXPANSION PROJECT
OUTPUT LOGFRAME: BUILDINGS & STRUCTURES

1. Kilm Structure
2. Mill Structure
3. Crusher Structure
4. Homogenizing Silos
5. Packing Plant & Cement Silos
6. Office Buildings
7. Sub Station (Electric)
8. Railway Siding
9. Storage Yards Stores
10. 63 Housing Units
11. Clinic

QUALITY, QUANTITY AND TIMELINESS INDICATORS

FOR MILESTONE EVENTS OF "BUILDING STRUCTURE IN USE"

KEYS

1. Kiln foundation as per contract specification and design completed within budget costs of Rs. X by 22.5 months after start of project.

2. Mill foundations as per contract specification and design completed within budgeted cost of Rs. X by 21.5 months of start of project.

3. Crusher structure as per contract specification and design completed within budgeted cost of Rs. X by 20.5 months of start of project.

4. Homogenizing silos as per contract specification and design completed within budgeted cost of Rs. X by 21.5 months after start of project.

5. Packing plant structure as per specification and design completed within budgeted cost of Rs. X by 24.5 months after start of project.

6. X s.f.t. of covered area for offices according to specification and design constructed within budgeted cost of Rs. X by 23.0 months after start of project.

7. Substation building as per contract specification and design completed within budgeted cost of Rs. X by 21.0 months after the start of the project.

8. X s.f.t. of Railway Siding of X characteristic completed within budgeted cost of Rs. X by 16.50 months after start of project.

9. X s.f.t. of storage yard as per contract and specification and design completed within budgeted cost of Rs. X by 16.75 months after start of project.

10. X s.f.t. of covered area for stores as per contract specification and design completed within budgeted cost of Rs. X within 14.75 months after start of project.

11. 19 housing units as per contract specification and design completed in budgeted cost of Rs. X by 12.25 months of start of project.

12. 44 housing units as per contract specification and design completed to budgeted cost of Rs. X by 18.25 months after start of project.

13. Clinic constructed as per contract specification and design budgeted cost of Rs. X by 13.25 months after start of project.

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: MUSKEHKAM CEMENT EXPANSION PROJECT (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes: Grade 12 cement production of financially viable MCL increased by 91% by 1980.	Measures of Goal Achievement: 1. Existing & expanded unit produce 3 lac tons & 3.3 lac tons per year of grade 12 cement by 1980 & thereafter. 2. Targetted minimum rate of return of 10% per year achieved by 1980 & maintained.	1. MCL production department records. 2. Finance department records.	Concerning long term value of program/project: 1. Actual demand remains as projected. 2. Other factories in N. Zone will also contribute towards cement production as planned. 3. Kohat cement factory produces 3 lac tons per year of Grade 12 cement by 1980. 4. Agents have effective distribution system. 5. Quota of N. Zone prod. is 0 for SZ.
Project Purpose: Machinery & equipment functioning.	Conditions that will indicate purpose has been achieved: End of project status. 1. 90% production efficiency during trial runs. 2. Downtime does not exceed scheduled maintenance time during first year. 3. No backlog of work for machinery.	1. Engineering records.	Affecting purpose-to-goal link: 1. Projected production targets not altered. 2. No serious breakdowns. 3a) Fuel & power. 3b) Natural disasters. 4. Cost of inputs does not increase at faster rate than cement prices.
Outputs: 1. Machinery & equipment procured. 2. Machinery & equipment installed. 3. Machinery & equipment tested. 4. Machinery & equipment maintained.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1&2. The machinery & equipment mentioned in Annex received & installed according to schedule. 3. X% of installed machinery reported for noncompliance with standards per testing schedule. 4. X No. of corrective action taken in time for each report of noncompliance with set standards.	1. Receipt register of machinery Engineering department. 2. Report of erection engines. 3. Report of maintenance dept.	Affecting output-to-purpose link: 1. Timely availability of services like gas, electricity, etc. in required quantity. 2. Suppliers will supply machinery & equipment as per schedule. 3. Shipment facilities are available. 4. Adequate transport facilities from port to site available.
Inputs: Activities and Types of Resources 1a) Determine No. & type of M/E & spares required. 1b) Identify possible sources of supply 1c) Obtain quotations. 1d) Compare, select, quality, cost & availability. 1e) Place order with down payment. 1f) Arrange for delivery to site. 1g) Arrange finances. 1h) Physically inspect M/E upon delivery.	Level of Effort/Expenditure for each activity. 1a)List of machinery & equipment, and their specifications. 1b)Men X Hours Wages. 1c)X - Rs.		Affecting input-to-output link: 1.• Adequate response for quotations. • Reqd. M/E readily available from local/foreign sources as per schedule. • Adequate shipment/transport facilities available.

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: MUSTEHKAM CEMENT EXPANSION PROJECT (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:
2a) Trans per M/E to location.	2a) Men X Hours X wages forl. erection personnel.	Finance Reports.	2. Machinery & equipment arrvies at site as per schedule (a) No backlog in manufacture and supply of M/E (b) shipment of machinery in time.
2b) Assemble on spot if necessary.	2b) X - Rs. for installation equipment charges.	Erection Dept. Reports.	
2c) Arrange for special installation equipment.			
2d) Place in position.			
2e) Connection of services.			Services like gas & electricity available at right time.
3a) Inspect & prepare for operation according to M/E manual of instruction.	3a) Men X Hourse Wages.	Finance Records.	3. Services like gas, electricity available.
3b) Test run as per manual of instruction.	3b) X No. of machinery reported for nonconformity.	Erection Dept. Reports.	
4a) Determine spares required for M/E fp min. of one year.	4a) Maintenance schedule.	Maintenance Records.	4. Imported spares available in time.
4b) Identify sources of spares supply.	4b) Men X Hourse X Wages.	Finance Reports.	
4c) Invite quotations.	4c) X - Rs. X No. of applied supplier the earliest for spare.		
4d) Compare quality, cost, & availability			
4e) Place order with down payment.			
4f) Arrange for delivery to site.			
4g) Arrange finances.			
4h) Store spares.			
4i) Supply service upon demand.			
4j) Determine preventive maintenance schedule.			

ANNEX FOR MUSTEHKAM CEMENT EXPANSION PROJECT

OUTPUT LOGFRAME

MACHINERY AND EQUIPMENT IN USE

1. A) 1 No. dry process kiln continuous with suspension heaters of 1000 T/day capacity installed within 35.50 months, from the start.

   b) Mill House (Raw Grinding Plant) completed/following equipment erected within 35.50 months from the start of project as per supplier design:

a) Electric Precipatators	1 No.
b) Cooling Tower	1 No.
c) 35 T/hr. closed circuit grinding mill	2 No.
d) Separation & electric pre-cipatators	2 No.

2. A) Installation of crusher consisting of following equipment completed within 32.75 months within the start of project as per design:

   a) 400 T/hr. hire stone crusher

   b) 300 T/hr. scraper

   c) 70 T/hr. scraper

3. A) Following quary equipment assembled and shifted to site within 22.75 months from the start of the project for the development of quary site:

a) 3" DIA. hole wagon drill	3 No.
b) 900 cfm portable compressor	2 No.
c) 3500 cfm portable compressor	3 No.
d) D-8 Buldozer	2 No.
e) 20 ton dumper	4 No.
f) 2.5 CyD bucket shovel	1 No.
g) pay loaders	2 No.

4. Packing Plant erected as per supplier design within 33.75 months from the start of project consisting of following equipment:

a) 1600 bags/hour	1 No.
b) Cement Silos equipment	4 No.

5. 30000 T/month of grade 12 grey cement produced as per rated capacity at the end of test run of 1 month.

ANNEX FOR MUSTEHKAM CEMENT EXPANSION PROJECT
OUTPUT LOGFRAME

LIST OF MACHINERY AND EQUIPMENT

1. Kiln 1 No.

   Dry process kiln continuous with suspension heater (1000 tone/day capacity)

2. Mill House (raw grinding plant)

Electric percipitator	1 No.
Cooling tower	1 No.
35 tons/hr. closed circuit cement grinding mills	2 No.
Separators & electric percipitators	2 Nos.

3. Packing Plant

1) 1600/bags/hr. Rato Packer	1 No.
2) Locomotive	1 No.
3) Cement Silos equipment	

4. Crusher

400/tons/hr. live stone crusher	1
300 tons/HR scraper	1
70 tons/HR scraper	1

5. Quary Equipment

3" diameter hole wagon drill	3 Nos.
900 CFM portable compressors	2 Nos.
3500 CMF portable compressors	3 Nos.
D-8 buldozer	2 Nos.
20 ton dumpers	4 Nos.
2.5 CYD bucket shovel	1 No.
pay loaders	2 Nos.

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: MUSTAHKAM CEMENT EXPANSION PROJECT (OUTPUT LOGICAL FRAMEWORK)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes: Financially viable MCL expands production of Grade 12 cement by 3 laks ton by 1980.	Measures of Goal Achievement: 1.Existing & expanded units produce 3-3 & 3 lak tons/year of Grade 12 cement by 1980 & thereafter; 2.Targeted minimum rate of return 10%/year achieved by 1980 & maintained.	MCL Production Department record.	Concerning long term value of program/project: National Sectoral target of 7 million tons/year by 1980 met.
Project Purpose: Manpower functioning on job.	Conditions that will indicate purpose has been achieved: End of project status. 1.No backlog of work; 2.No more than 10% rate of absenteeism per month 3.Staff turnover per category of manpower does not exceed X% per year.	1.Production Engineer record; 2.Personnel records; 3.Personnel records.	Affecting purpose-to-goal link: 1.Machine & equipment functioning; 2.Effective management of existing & expanded MCL; 3.Raw material supply system developed; 4.Quality of raw material & production controlled.
Outputs: 1.Manpower needs determined; 2.Manpower recruited; 3.Operators trained; 4.Manpower deployed.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1.Recruitment of 290 persons for implementation; 2.Recruitment of 427 persons for operation by 1978.	1.Personnel Department record; 2.Comparison of actual with projected manpower requirement.	Affecting output-to-purpose link: 1.Availability of persons at the time of recruitment; 2.80 persons out of 180 meet our requirement at the time of operation.
Inputs: Activities and Types of Resources A.Evaluate category-wise manpower required for implementation & production;	Level of Effort/Expenditure for each activity. FOR IMPLEMENTATION A1.With Y cost; 2.160 # of skilled labor required for X; 3.Mandays with Y cost; 4.131 unskilled labor required for X man-days with Y cost; 5.X # of white collars required for X man-days qty cost; FOR PRODUCTION A1.# of operators recruited with Y cost in process field; 2.X # of fitters required in maintenance field with Y cost; 3.X # of technicians required for maintenance with Y cost.	1.Consultant's Record; 2.Personnel Office Record. Personnel Department Record.	Affecting input-to-output link: 1.Availability of X # each of trained supervisors & skilled personnel for implementation purpose; 2.More than X # of persons apply for each category for fair competition for selecting suitable personnel.

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LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: MUSTAHKAM CEMENT EXPANSION PROJECT (OUTPUT LOGICAL FRAMEWORK)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:
	JOBS		
B1.Determine job & man specification;	B1a.Operators, fitters, technicians, drivers; b.Clerks;	Personnel, Manager's Records.	
	MANPOWER		
	B1a.X Acc Q; b.X years exp in field; c.X year ago; d.#2 domicile; e.#2 domicile; f.#2 domicile; g.+ typing speed;	Personnel, Manager's Records.	
2.Advertise posts;	2.X # posts advertised for clerks & other staff mentioned above;		
3.Review applications;	3.A # of applications for each category selected;	Personnel, Office Record.	
4.Interview qualified candidates;	4.Y # persons appeared for interview for each category;	Personnel, Office Record.	
5.Select personnel;	5.X # persons selected on the basis of interview (merits in following category);	Selection Record.	
6.Appoint personnel;	6a. b. c. d.		
C1-5.Determine training loads per category.	Persons to be trained from newly recruited persons for each category:	P.M. Record & Finance Department	

	NO.	TRAINING PERIOD	COST
Technicians	8	3 months	Rs
Fitter	20	3 months	Rs
Van Oper.	5	3 months	Rs
Other Oper.	14	24 months	Rs
TOTAL	47	33 months	

D1.Deployment.	Persons who have successfully completed the training in various fields mentioned above placed in respective positions.	Office, Finance Record.	X% qualified training within scheduled time in ABC fields.

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MANPOWER FUNCTIONING ON JOB

MANPOWER REQUIRED FOR IMPLEMENTATION	QUANTITY	QUALITY	TIMELINESS
1. Head office	10	qualified/ unskilled	1.3.76
2. Labor Office	16	qualified	1.4.76
3. Civil Works & Drafting	24	qualified/ unskilled	1.4.76
4. Handling & Stores	45	qualified/ unskilled	1.6.76
5. Erector	163	skilled/ unskilled	1.7.76 1.10.76
6. Electrician	32	skilled/ unskilled	1.10.76 1.1.77
MANPOWER REQUIRED FOR RUNNING OF THE PLANT AFTER EXTENSION			
For Production	427	skilled/ unskilled	1.6.78

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: MUSTEKHAM CEMENT EXPANSION PROJECT (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes: Financially viable MCL expands production of grade 12 cement by 3 lac tons by 1980.	Measures of Goal Achievement: 1. Existing & expanded unit 3.3+3 lac tons/yr. of grade 12 cement by 1980 & thereafter. 2. Targetted minimum rate of return 10% per year achieved by 1980 & maintained.	1. Production department MCL record. 2. Finance department of MCL record.	Concerning long term value of program/project: 1. Actual demand remains as projected. 2. Other factories in N.Zone will also contribute towards cement production as planned. 3. Kohat Cement Factory produces 3 lac tons per year of grade 12 cement by 1980.
Project Purpose: Effective management established for expanded production capacities.	Conditions that will indicate purpose has been achieved: End of project status. 1. Production targets being met at 100% capacity utilization by 1980 & thereafter. 2. Production houses avoided. 3. Strikes avoided.	1. Production Engineer's report. 2. Production Engineer's report. 3. Labor Officer records.	Affecting purpose-to-goal link:
Outputs: a) Management needs determined. b) Existing management for MCL transferred to expanded unit. c) Management personnel from outside hired; oriented aid deployed. d) Management review system extended to expanded unit & good employees made permanent.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1. 2 senior mechanical & civil engineer both B.Sc. Engineers with at least 10 years experience in the cement industry transferred from MCL and deployed at end of 16 weeks. One electrical engineer with B.Sc. and 5 years experience in the cement industry together with 5 junior electrical engineers, one junior mechanical engineer, one junior civil engineer all with B.Sc. engineering degrees and a labor officer with a BALLB deployed by by of week 17. By end of week 17, the following 4 personnel will also have been deployed: a)Project Accountant Part I Qualified ACA b)Purchase Officer BA 5 years exp. as Purchase Officer. c)Assistant Accountant B.Com 3 years exp. d)Cleaning & Forwarding Officer who should be a BA and a license holder. 2. Assessment of personnel complete by end of week 24.	a) Personnel dept. records. b) Supervisor reports.	Affecting output-to-purpose link: Availability of required personnel.

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LOGICAL FRAMEWORK
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Project Title: MUSTEKHAM CEMENT EXPANSION PROJECT (OUTPUT LOGFRAME CONTINUED)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:
A1) Determine needs from within existing organization and from outside.	A1) Management review of existing organization incorporates additional management requirement for expanded units within 1 week. A2) Personnel dept. evaluation report of management/personnel submitted within 1 week.	A) Personnel dept. records & supervisory reports.	Availability of required personnel.
B1) Examine possibilities of promotion & transfer from MCL.	B1) Two persons transferred by end of 3 weeks to expanded MCL.	B) Personnel dept. records & supervisory reports.	
C1) Advertise for required posts	C1) Short list of applicants received within 3 weeks.	C) Personnel Regst.	
C2) Review applications and send calls for interview.	C2) Interview, etc., held within 2 weeks & applicants selected.		
C3) Interview & test candidates.	C3) 8 management personnel oriented within 2 months.		
C4) Select employees.	C4) Management deployed within one week.		
C5) Orient employees.			
C6) Deploy employees.			
D1) Establish assessment forms for all management personnel. D2) Supervision assess individual performance. D3) Manager to decide which personnel to lay off and which to make permanent.	D) Assessment form for management established within one work supervision assess within 8 weeks and management decided within one week which permit to lay off make permanent.	D) Personnel dept. Supervisory reports.	

NOTES ON MUSTEKHAM CEMENT EXPANSION PROJECT
OUTPUT LOGFRAME

I. Quantity and Time

Four personnel employed at end of 17 weeks.

Quality

Project Accountant Part I Qualified ACA

Purchase Officer: B.A., 5 years experience as Purchase Officer

Assistant Accountant: B.Com., 3 years experience

Cleaning & Forwarding Officer: B.A., License holder

II. Sr. Mechanical Engineer: B.Sc. Engineering, 10 years experience

Civil Engineer: B.Sc. Engineering, 10 years experience

III. Lay off 4 Junior Elec. Engineers.

IV. Made Permanent by end of 29 weeks:

Electric Engineer: B.Sc. Engineering, 5 years experience

Jr. Electric Engineer: B.Sc. Engineering

Jr. Mechanical Engineer: B.Sc. Engineering

Jr. Civil Engineer: B.Sc. Engineering

Labor Officer: B.A. L.L.B.

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: MUSTEKHAM CEMENT EXPANSION PROJECT (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes:	Measures of Goal Achievement:		Concerning long term value of program/project:
Project Purpose: Existing raw material supply system accommodates expansion needs.	Conditions that will indicate purpose has been achieved: End of project status. 1. X ton/day of acceptable quality raw material per item received from source to main store. 2. X gallons/day water provided. 3. Min-Max levels of inventory maintained. 4. Central store meet shop store daily requirements.	Store Dept. Report. Mech. Eng. Report. Store Dept. Report. Store Dept. Report.	Affecting purpose-to-goal link:
Outputs: 1. Purchase arrangement made. 2. Services of infrastructure established. 3. Limstone quary and clay pits developed.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1a) X# of persons of A,B,C categories employed in purchase department by June 1978. 1b) Gypsum of acceptable quality procured enough to meet 2 months cement production from 1978 onwards. 2a) X gallons/hour of water provided by 6/78. 2b) X K.wats/day of electricity provided by 6/78 2c) X Cft of gas/day provided by 6/78. 3a) Sample tested from limestone quary give X% of calcium carbonate. 3b) X miles of approach road to quary developed. 3c) Estimated extractable limestone from quary not less than X tons. 3d) Sample tested from site gives X% of Alumina X% of Silica.	Personnel Record. Purchase Dept. Record. Mech. Eng. Report. Elec. Eng. Report. Mech. Eng. Report. Lab. Report. Quary Eng. Report. Quary Eng. Report. Lab. Report.	Affecting output-to-purpose link: 2a) Railway wagon available for transportation of Gypsum.

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

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Project Title: MUSTEKHAM CEMENT EXPANSION PROJECT (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:
1a) Employ procurement personnel.	1a) Man-hour X Men X wage rate = expenditure involved against activities.	Finance Section Report.	
1b) Procure Gypsum.	1b) • Order for X tons of Gypsum with Min X% of calcium suplhate placed to reach MCL upto X. • X tons of Gypsum with Min. X% of calcium suplhate stored in MCL.	Purchase Dept. Report. Store Dept. Report.	Suigas line available in time.
2a) Determine additional requirement of water, gas and electricity.	2a) Man-hour X Men X Wage rate = expenditure involved against different activities.	Finance Section Report.	WAPDA provides additional electricity in time.
2b) Select site for tubewells floats and awards.			
2c) Prepare tendens for drilling of tubewells.			
2d) Commission tubewells.	2d) X off tubewells capable of discharging X GPM installed by ____, 19__.	Mech. Eng. Report.	Quary equipment site reaches in time.
2e) Connect tubewells with water pumpt.	2e) X off pumps capable of discharging X GPM against a head of X ft. installed by ___, 19__.	Mech. Eng. Report.	
2f) Provide data to Suigas Co. & award contract.			
2g) Commission pipelines.	2g) Pipeline capable of conveying X ctf. of Suigas on ___psf installed and commissioned by ____, 19__.	Mech. Eng. Report.	
2h) Provide connections to machines.			
2i) Lay cables.	2i) Substations of ___KVA capacity commissioned by ____.	Elec. Eng. Report.	
2j) Provide electric connections to machines.	2j) Services to machines (gas, water, power) as per requirements specified and provided by ____, 19__.	Chief Eng. Report.	
3a) Survey limestone quary.	3a) Man-hour X Man-hour wage rate = expenditure against different activities.	Finance Section Report.	
3b) Develop quary.	3b) • Sample tested contain min. X% of calcium carbonate content. • Quary site selected contain min. X days.	Lab. Report. Quary Eng. Report.	
3c) Store 15 days consumption of limestone.	3c) Consumption of limestone X tons of limestone of requisite quality stored by ____, 19__.	Store Dept. Report.	
3d) Test sample of clay.			
3e) Prepare pit.			
3f) Store 15 days consumption of clay.	3f) X tons of clay of requisite quality stored by ____, 19__.	Store Dept. Report.	

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OUTPUT LOGICAL FRAMEWORKS: SIMLY DAM PROJECT

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM: FEASIBILITY REPORT (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes: 24 mgd. potable water supplied from Simly Dam by 1977 for 60 farms.	Measures of Goal Achievement: Release of 24 mgd. water from dam by end of 1977.	CDA's Resident Engineer Report.	Concerning long term value of program/project:
Project Purpose: Feasiblity Report prepared.	Conditions that will indicate purpose has been achieved: End of project status. Feasibility report accepted by CDA by "X" date.	CDA's Record.	Affecting purpose-to-goal link: Recommendations of the Feasibility Report are in form of constructing a dam on Simly & their recommendations are acceptable & accepted.
Outputs: 1. Contract awarded to consultants. 2. Local head office of the consultants established. 3. Preliminary technical/financial data collected and examined. 4. Collection of new/more data. 5. All existing & new relevant data analyzed. 6. Report drafted & printed.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1. Letter of intent/acceptance by consultants is issued by "X" date. 2. Foreign technical personnel & supplementary local staff are in position & formed in a building with all the necessary equipment by "X" date. 3. Collection of all the relevant technical/financial data which meet the requirements for evolving a sound research plan. 4. The research design covering geological, meteorological, topographical, hydrological & seismological data prepared by "X" date to meet the requirements not covered under output (3) above. 5. Data analysis establishing geological, meteorological, topographical & seismological soundness is ready by "X" date. 6. 20 printed reports are made available by "X" date to CDA.	CDA/Consultant's Office Record. CDA/Consultant's Office Record.	Affecting output-to-purpose link: P.T.O. Consultants/CDA favor the contract made.

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LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

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Project Title: SIMLY DAM: FEASIBILITY REPORT CONTINUED (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs: 1. Award contract to the consultants. 2. Establish local head office of the consultants. 3. Collect and examine preliminary technical/financial data. 4. Prepare research design for more data. 5. Analyze all the new and existing data. 6. Draft and printed report.	Magnitude of Outputs necessary and sufficient to achieve purpose. MANMONTHS MONEY MATERIALS Survey Equipment Drawing Equipment Office Equipment Sample Testing Equipment Stationery TOTAL 74 Rs. 45 lacs.	-do-	Affecting output-to-purpose link: Government/CDA provide funds according to the contract and consultants adhere to the contract.

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM: COLONY CONSTRUCTION (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes:	Measures of Goal Achievement:		Concerning long term value of program/project:
Project Purpose: CDA Consultants for Simly Dam live in constructed colony.	Conditions that will indicate purpose has been achieved: End of project status. 1. 33 No. of consultants staff reside in the colony by September, 1975. 2. Residents are fully satisfied with the construction of colony.	1. Allotment Officer Record. 2. Resident's interview	Affecting purpose-to-goal link:
Outputs: 1. C, D, E, & F Type houses constructed 2. Hostels for 14 men constructed. 3. Regular water supply made available. 4. Drainage & sewerage lines laid. 5. Pedestrian streets constructed. 6. External electricity lines installed.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1. 2 'C' type, 4 'D' type, 10 'E' type and 3 'F' type houses constructed according to CDA specification & standard by August, 1973. 2. One 6-man and one 8-man Hostel constructed according to CDA specification and standard by August, 1973. 3. Quantity of potable water per day available for the residents by September, 1975. 4. 'X' quantity of sewer and refuse material passes through the sewer and drainage lines by December, 1973. 5. Residents move freely and smoothly through the streets throughout the year by Dec. 1973 6. Colony gets regular electric supply by August, 1975	1. Resident Engineer completion report. -do- 3. Only 'X' no. of water shortage cases registered during the month. 4. Only 'X' No. of gutter Blockage cases registered during the month. 5. (a) Resident Engineer Completion report. (b) No repair work is needed in the rainy season 6. Only 'X' No. of breakdown complaints are registered.	Affecting output-to-purpose link: 1. Consultants prefer to live near site. 2. All other basic necessities of life available nearby.

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LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____
Date of this Summary _____

Project Title: SIMLY DAM: COLONY CONSTRUCTION (OUTPUT LOGFRAME CONTINUED)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS			MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.				Affecting input-to-output link:
	MAN DAYS (350 D/Y)	FINANCES (Rs)	EQUIPMENT & MATERIAL		
1. Construct Houses.	1. 10SK/30UN.SK per day.	8,22,900.00			
2. Construct Hostels.	2. 10SK/30UN.SK per day.	3,50,000.00			
3. Construct Pump House.	3. 2SK/6UN.SK per day	15,000.00	5 H.P. Pump		
4. Construct Service Reservoir.	4. 2SK/6UN.SK per day	75,000.00			
5. Lay 1500 ft. 6" dia, 2000 ft. 4" dia and 1500 ft. 3" dia water pipeline.	5. 3SK/10UN.SK	1,50,000.00	5000' long 6", 4" & 3" C.I. pipeline		
6. Lay 2000 ft. 6" dia R.C.C. sewer and drainage lines.	6. 3SK/10UN.SK per day	30,000.00	2000' long 6" dia R.C.C. pipeline		
7. Construct 1500 ft., long and 12 ft., wide pedestrian streets.	7. 3SK/10UN.SK per day	60,000.00			
8. Install external electricity lines.	8. 4SK/5UN.SK per day.	15,360.00	1300 ft. wire.		

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM: DIVERSION TUNNEL (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes:	Measures of Goal Achievement:		Concerning long term value of program/project:
Project Purpose: Diversion tunnel constructed.	Conditions that will indicate purpose has been achieved: End of project status. 28' DIA & 600' long RC concrete lined tunnel completed by January 1973.	Site Engineer's report.	Affecting purpose-to-goal link:
Outputs: 1. Arrangements for commencement of work completed. 2. Tunnel excavated. 3. Tunnel lined with RC concrete. 4. Open cut area excavated. 5. RC concreting completed for open cut area. 6. Testing of structures carried out.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1a) Letter of intent issued to the contractor on 12.8.66. 1b) 4 No. Compressor. 20 No. Boring equipment; 4 No. dewatering pumps; 4 No. power shovel; one water tanker; can working order reach their site of work. 2) 30' DIA & 600' long tunnel excavated by March 1971. 3) RC concreting 1' thick on the above excavated tunnel by January 1973. 4) 300' X 50' open cut area excavated by March 1971. 5) RC concreting done of the above excavated open cut area December 1972.	CDA's Office record. Site Engineer's record. Site Engineer's record. Site Engineer's record. Site Engineer's record. Site Engineer's record.	Affecting output-to-purpose link:

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM: DIVERSION TUNNEL (OUTPUT LOGFRAME CONTINUED)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:
1a) To process the award of contract. 1b) Deploy supervisory staff. 1c) Arrange & procure material & equipment. 2) To excavate the tunnel 3) To line the tunnel with RCC. 4) To excavate the open cut area. 5) To line the open cut area with RCC.	MANMONTHS: Sk USK 500 2500 COST: L F 9.511 0.074 EQUIP: Compressor 4 No.; Boring 20 No.; De watering 4 No.; Pump with motor 4 Nk.; Power Shovel 4 No.; W/tanker 1 No. MATERIAL: Steel 100 ton; Cement 5,000 ton; Sand 1 lac cft; Bagre 21ac cft; Exp. 20 ton; Safetyfaze 20,000; Det. 13,000	CDA's office record. " " " " " " Site Engineer's record. " " " " " " " " "	

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LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date ____________
Date of this Summary ____________

Project Title: SIMLY DAM: SERVICE TUNNEL AND OUTLET WORKS (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes:	Measures of Goal Achievement:		Concerning long term value of program/project:
Project Purpose: Service tunnel and outlet works constructed.	Conditions that will indicate purpose has been achieved: End of project status. 1. 6' dia 700' long R.C.C. lined tunnel with 100' long shaft completed by 6/76. 2. 6' dia 75' high R.C.C. in take structure as per design completed by 9/76. 3. 12'x14' and 12' high R.C.C. control tower as per design constructed by 6/78. 4. 48" dia 2600' long steel pipe bifurcating in to two 20" dia with butterfly valves layed and aligned by 12/78.	Site Engineers Report	Affecting purpose-to-goal link:
Outputs:	Magnitude of Outputs necessary and sufficient to achieve purpose.		Affecting output-to-purpose link:
1. Contract Awarded	1. Standard Govt. of Pakistan 60 page contract signed by 6/72.	-Do-	
2. Contractor mobilized.	2. (a) 3 miles of 20' wide truck able road built by 12/72. (b) 10 skilled and 25 unskilled workers lived by 12/72. (c) 30'x50' warehouse constructed by 12/72. (d) 20'x30' wareshop with maintenance tools constructed by 12/72.		
3. Service tunnel Excavated.	3. 10 skilled and 25 unskilled workers lived by 12/72.		
4. Service Tunnel lined with R.C.C.	4. 10" thick R.C.C. living done on tunnel by 6/76.		
5. Intake structures constructed.	5. 6' dia 75' high R.C.C. intake structure as per design constructed by 9/76.	-Do-	
6. Steel gate and Trash-rack installed.	6. (a) 6' dia butterfly steel gate I min. opening 1/2 min. closing time installed by 8/76. (b) 6'x10' trash rack (steel installed by 8/76).	-Do-	
7. Control Tower Constructed.	7. 12'x14' and 12' high R.C.C. control tower constructed by 6/78.	-Do-	
8. Conduit laid and aligned.	8. 48" dia 2600' long steel pipe bifurcating into two 20" dia pipes with butterfly valves laid and aligned at 4" by 12/78.	-Do-	

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM: SERVICE TUNNEL AND OUTLET WORKS (OUTPUT LOGFRAME) Continued

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:
1. (a) Prepare estimates & Documents (b) Issue tenders and receive bids (c) Evaluate bids. (d) Award contract	Man Month Cost L F Equipment: Compressor 4, Drills 2dgg, Electric liqus 12. Materials: Explosive, Cement, Aggregates		
2. (a) Deploy Supervisory Staff (b) Make arrangements for commencement of work (c) Arrange and procure materials and equipment.	Man Month Cost L F Equipment Qt.: Trollys 12, Concrete 2 Material: Const. Steel, Shutting, Water		
3. (a) Excavate tunnel and shaft (b) Arrange for equipment			
4. Line the tunnel			
5. Construct intake structures			
6. (a) Arrange and procure steel gate (b) Install steel gate			
7. (a) Arrange for instrument (b) Construct control tower.			
8. (a) Arrange and procure conduite (b) Lay conduit (c) Align the conduit			

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM: WATER STORED (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes:	Measures of Goal Achievement:		Concerning long term value of program/project:
Project Purpose: Water stored in reservoir.	Conditions that will indicate purpose has been achieved: End of project status. Gross storage capacity of 28,750 cft. with live storage of 20,000 cft. attained by 1978.	Site Engineer's report.	Affecting purpose-to-goal link:
Outputs: 1. Arrangement for commencement of work completed.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1a) Letter of intent issued to the Government on June 1972. 1b) 7 No. D-8 Dozer; 5 No. 10-20 cyd capacity Dumper; 5 No. scrappers, 12 No. Rigs; 3 No. Compressor, 600 cft/min; one No. Streep foot roller; 2 No. Vib. roller; one No. Dragline 1 1/2 cuyd; 3 No. Jack Hammer; one No. grader; one No. water tanker, in working order each at site, by December 1972.	CDA office record. Site Engineer's Report.	Affecting output-to-purpose link: 1. Seepage does not exceed the level anticipated in the soil investigation studies.
2. Bund completed.	2) Water flows through diversion tunnel in January 1973.	" " "	
3. Upstream and downstream coffer dams constructed.	3) Water permanently diverted & flows through diversion tunnel by August 1973 & dam site remains dry throughout the year-local rain water.	" " "	
4. Overflow type concrete spillway constructed.	4) Water maintained maximum level at 229' & excess water overflow spillway.	" " "	
5. Structure of embankment constructed.	5) Embankment sustained 229' level of stored water in reservoir after June 1978.	" " "	
6. Structures tested.			

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LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM: WATER STORED (OUTPUT LOGFRAME CONTINUED)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Affecting input-to-output link:
1a) To process the award of contract. 1b) Deploy supervisory staff. 1c) Arrange & procure material & equipment. 2) To construct bund. 3) To construct upstream & downstream coffer dams. 4) To construct overflow type concrete spillway. 5) To construct the structure of embankment. 6) To test the function of structure.	MANMONTHS: SK 5000, USK 20000 COST: L. F.Ex 116,400-40,000 EQUIP: D-8 Dozer 7 No.; Dumper 10-2 yd. 5 No.; Scrappers 12 No.; Rigs 12 No.; compressors 3 No.; Sheep foot roller 1 No.; Vib roller 2 No.; Dragline 1 No. 1 1/2; Tank Hamber; Grader 1 No.; water tanker 1 No.; Crusher capacity 3000 cft.; Dise Harrow 1 No. MATERIAL: Cement 25,000 ton; Steel; Sand 24 lc cft.; Bagre 13 lc cft.; 600cft/m; Stone 25 lac cft; Explosures 580 lac; Safetyfoze 6 lac cft.; 6 lac cft; Detenator 587000; Earith 3 milcyd	CDA's office record. " " " " " " Site Engineer's report. " " " " " " " " " " " " " " "	

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LOGICAL FRAMEWORK FOR SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM: SILT INTAKE REDUCED (OUTPUT LOGFRAME)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program Goal: The broader objective to which this project contributes:	Measures of Goal Achievement:		Concerning long term value of program/project:
Project Purpose: Silt intake reduced.	Conditions that will indicate purpose has been achieved: End of project status. Silt intake does not surpass ppm at reservoir entrance.	Site Engineer's Report.	Affecting purpose-to-goal link: Watershed Management is effective throughout 60 years.
Outputs: 1. Forest trees planted.	Magnitude of Outputs necessary and sufficient to achieve purpose. 1. 20,00,000 forest plants in uncultivated land growing at 2' per annum & spread over 10,000 acres by 1977.	Watershed Management Report.	Affecting output-to-purpose link: 1. 90% trees grow well in catchment area environment.
2. Fruit trees planted.	2. 5,00,000 fruit trees in cultivated land growing at 6" per annum & spread over 4,000 acres by 1977.	Watershed Management Report.	2. Farmers take interest in watershed management works.
3. Road constructed.	3. 4 miles unmetalled, 12' wide road constructed by 1973.	Watershed Management Report.	3. Highway department construct the detension wall.
4. Soil conservation done.	4. Soil conservation works in 15,000 acres completed by 1975 & in 31,000 acres by 1977.	Watershed Management Report.	
5. Diversion channels made & slip controlled.	5. Diversion channels made over 10,000 acres by 1977.	Watershed Management Report.	
6. Detension dams & bed walls constructed.	6. 150 small detension dams & bed walls constructed by 1977.	Watershed Management Report.	
7. Range land improved.	7. 5,000 acres range land improved by 1977.	Watershed Management Report.	
8. Plants pruned.	8. 1,32,000 plants pruned by 1975 & 2,60,000 pruned by 1977.	Watershed Management Report.	
9. Trees grafted.	9. 27,000 trees grafted by 1975 & 50,000 by 1977	Watershed Management Report.	
10. Farmers trained.	10. 150 farmers know grafting & pruning by 1973 & 250 farmers know by 1975.	Watershed Management Report.	
11. Springs developed.	11. 6 springs developed & made functional by 1975 & 200 springs made functional by 1977.	Watershed Management Report.	

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LOGICAL FRAMEWORK
FOR
SUMMARIZING PROJECT DESIGN

Est. Project Completion Date _____

Date of this Summary _____

Project Title: SIMLY DAM : SILT INTAKE REDUCED (OUTPUT LOGFRAME CONTINUED)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: Activities and Types of Resources	Level of Effort/Expenditure for each activity.		Concerning long term value of program/project:
1. Plant forest trees.	1. Rs. 10,00,000 100 labor, 8 staff, 30,00,000 sapl, 50 pickaxes, 100 planting rods, 50 scatures, 2,00,000 polythene bags.	Horticulture Directorate Record	1. Labor is satisfied by their working conditions.
2. Plant fruit trees.	2. Rs. 5,00,000, 40 lab, 2 staff, 7,00,000 saplings, 50 Kassi, 50 shovels, 5,00,000 polythene bags, 40 Kurpa, 10 chua rumba.	Horticulture Directorate Record	2. Farmers are happy with planting of trees in the cultivated lands.
3. Construct road.	3. Rs. 40,000, 25 labor, 2 staff, 25 crowbars, 25 malltoors, 25 small hammers, 12 shovels, 2 maunds blasting powder with fuses.	Horticulture Directorate Record	
4. Develop soil conservation.	4. Rs. 28,00,000, 200 lab, 8 staff, 1,000 farmers 50 crowbars, 50 malltoors, 100 small hammers, 50 pickaxes, 50 shovels.	Horticulture Directorate Record	
5. Make diversion channels & slip control.	5. Rs. 1,00,000, 30 labor, 2 staff, 30 pickaxes, 10 crowbars, 30 hammers, 15 shovels, 10 malltoors	Horticulture Directorate Record	
6. Construct detension dams & bed walls.	6. Rs. 5,00,000, 100 labor, 20 massons, 5 staff, 50 crowbars, 50 pickaxes, 10 malltoors.	Horticulture Directorate Record	
7. Improve range land.	7. Rs. 1,00,000, 25 labor, 2 staff, 25 kurpa, 25 pickaxes, 25 sickles.	Horticulture Directorate Record	
8. Prune plants.	8. Rs. 1,00,000, 20 labor, 2 staff, 20 scatures, 20 handsaws.	Horticulture Directorate Record	
9. Graft trees.	9. Rs. 40,000, 20 labor, 2 staff, 20 scatures, 20 grafting knives.	Horticulture Directorate Record	
10. Train farmers.	10. Rs. 10,000, 250 farmers, 5 staff.	Horticulture Directorate Record	
11. Develop springs.	11. Rs. 120,000, 30 lab, 2 staff, 3 massons, 30 pickaxes, 30 shovels, 30 small hammers, 10 crowbars, 10 malltoors.	Horticulture Directorate Record	

PC-I: MUSTEHKAM CEMENT EXPANSION PROJECT

MUSTEHKAM CEMENT (EXPANSION) PROJECT, HATTAR, N.W.F.P.

P.C. 1 PROFORMA

STATE CEMENT CORPORATION OF PAKISTAN, LAHORE

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PART - A

PROJECT DIGEST

1. Name of Project:	Mustehkam Cement (Expansion) Project, Hattar, N.W.F.P.
2. Authorities responsible for:	
a) Sponsoring:	State Cement Corporation of Pakistan Ltd.
b) Execution:	Mustehkam Cement, Hattar, NWFP.
c) Operation & Maintenance:	Mustehkam Cement, Hattar, NWFP.
3. Time required for completion of Project (in months)	36 months (approximately)
4. a) Plan Provisions:	
i/ If the Project is included in the current Five Year Plan, specify actual allocations:	No.
ii/ If not included in the current plan, how is it now proposed to be accommodated (Inter/Inter-sectoral adjustments in allocation or other resources may be indicated)	The project will contribute to the fullfilment of the sectoral target of the 5th Plan, which envisages an annual cement production capacity of 7 million tons by 1980. More specifically, the project will help partially off-set the acute shortage of cement in the Northern Zone of Pakistan. It has been estimated by the Planning Division, that there will be a shortage of about 12 lac tons in the Northern Zone (area north of Sukkur) by the year 1980 unless new capacity is provided.
iii/ If the project is proposed to be financed out of Block Provision, for a programme, indicate:	Not applicable.
b) If Project is not in the Plan, what warrants its inclusion in the Plan?	To meet the supply gap in the Northern Zone which as stated above is expected to be at least 12 lac tons by 1980, so far only one project i.e. Kohat Cement (capacity 3 lac tons) has been approved. The expansion of Mustehkam (additional 3 lac tons) is therefore justified.

5. Relationship of the Project with the objectives of the Sector. Indicate names of other projects (whether sanctioned or under preparation) which would form part of integrated programme within the sector:

The projections of the Planning Division estimate a demand of 7 million tons of cement in the country by 1980, which means that the present capacity is to be roughly doubled by that date. This objective is proposed to be met by new factories and expansion of existing units as below. The expansion projects have a higher priority due to saving in infrastructural costs. The Mustehkam (Expansion) Project is a part of this integrated programme.

NAME	Approximate Completion date	CAPACITY (In million tons)		
		Total	For Internal consumption	For Export
Javedan Expansion Project (New)	1977	0.30	-	0.30
Spintangi Project(New) Sanctioned	1977	0.30	0.03	0.27
Kohat Project (New) Sanctioned	1978	0.30	0.30	-
Lasbela Project (New) I Phase	1979	0.67	-	0.67
Mustehkam (Expansion) Project	1977	0.30	0.30	-
Dandot (Expansion) Project	-	Capacity not determined as yet		
		1.87	0.63	1.24

6. Capital Cost of Project (in '000' Rs.)

Local Costs	
i/ Capital Cost	Rs. 131,622 (includes capitalized interest charge)
ii/ Working Capital (Portion)	Rs. 6,200
Foreign Exchange Component:	Rs. 171,933
	Rs. 309,755

7. Annual Operating Expenditure and cost of Production (in 'ooo' Rs) initially and on full operation:

It is expected that the project will come into full capacity operation soon after completion and trial runs. The annual operating expenditure is the amount actually spent on operations in the plant and therefore excludes the depreciation charge. The cement industry is now

paying excise duty on actual despatches and consequently the excise duty levy of Rs. 43/- per ton should in principle, not be includedin the cost of production. However, it has been included to afford a convenient comparison with the sale price of cement (currently Rs.220/- per ton) because the sale price includes the excise duty. The annual operating expenditure is estimated as follows:

	Expenditure in ('000') rupees.	Production ('000' tons)	Expenditure per ton
Local:	59674	300	198.91
Foreign Exchange:	9195	300	30.65
Total:	69869	300	229.56

In the first year of operations, when the plant is expected to run at 90% of the installed capacity, the operating expenditure will be Rs. 63867 or Rs.236.54 per ton. The cost of production on 100% capacity utilization in the new plant (including duty levy of Rs.43 per ton) would be as follows:

	Cost in '000' Rs.	Production ('000' tons)	Cost per ton
Local:	87256	300	290.85
Foreign Exchange:	9195	300	300.65
Total:	96451	300	321.50

The cost of production at 90% capacity is estimated at Rs.338.70 per ton (including the excise duty levy of Rs.43 per ton). For details please see item 15. The combined cost of production of the old and new plant is estimated at Rs.284.53 per ton (refer item No. 15 of the P.C.1).

8. Objectives of the Project preferably in quantitative terms:

It is proposed to expand the existing unit at Mustehkam and provide for facilities to manufacture an additional 0.3 million tons of cement. All basic requirements like raw materials and fuel are available. The size of the plant (one dry process kiln of 1000 tons per day capacity) is recommended considering such factors as potential to manufacture certain machinery components within Pakistan and scale benefits under local conditions. The dry process with natural gas as fuel has been adopted for fuel conservation and high efficiency. It is always more economical to expand an existing unit rather than put up a new unit with the same capacity. The project will also afford additional employment opportunities to the local people.

At the current sale price of cement i.e. Rs. 220 per ton, the project will not be financially viable. The cost of production in the new unit has been estimated at Rs. 321.50 per ton. On integrating the new plant with the existing unit, the combined cost of production is estimated at Rs. 284.53 per ton. Adopting this figure as a base, and providing for a 10% return the equity (after payment of taxes), the project will only be viable if the sale price is fixed at about Rs.330 per ton, including excise duty. Calculation details are given in Annexure-IV. It may be added that unless the sale price of cement is fixed somewhere above Rs. 330 per ton, no new cement unit will be found to be financially viable.

PREPARED BY :	MR. ZAHEER SAJJAD, Officer on Special Duty, State Cement Corporation of Pakistan Ltd; Lahore.
CHECKED BY:	-do-
APPROVED BY:	MR. MAZHAR ALI, Chairman, State Cement Corporation of Pakistan Ltd; Lahore.

PART - B

PROJECT'S DESCRIPTION AND FINANCING

9. Location of Project: Hattar (N.W.F.P.)

Project Head Office: Head Office of Mustehkam Cement, Rawalpindi (Punjab).

The expansion project is being located on the present premises of Mustehkam Cement at Hattar, where all basic materials and infra-structural facilities are available. The site is favourably located to serve the entire N.W.F.P and Northern Punjab, where we find a substantial gap between supply and demand.

10. Market

a) Description of Product or Products:

Grey ordinary portland cement with possibility of manufacture of other special cements, if needed.

b) Existing demand (for last 5 years) met from production/imports:

The project will serve the cement market in the Northern Zone of the country which is the area north of Sukkur. In a recent estimate, the Planning Division assessed the demand of about 13 lac tons in the Northern Zone in the year 1972-73. This figure is roughly equal to the production of cement in the Northern Zone in 1972-73. The assumption that actual cement sales in the Northern Zone reflect demand is not a very reasonable method of calculating and projecting demand. For the last many years, there has been a chronic shortage of cement in the Northern Zone which reaches its peak in the summer months i.e. March to October. The Planning Division's approach ignores the un-satisfied demand which could not be met because of a shortage of cement. As a rough estimate, the un-satisfied demand in the Northern Zone is at least about 20% - 25% of the total sales.

Production of cement in the Northern Zone over the last 5 years was as follows:

Year			Production (lac tons)
1969-70	..	..	13.40
1970-71	..	..	12.80
1971-72	..	..	12.38
1972-73	..	..	13.58
1973-74	..	..	14.32

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If we put in a factor for un-satisfied demand, the current demand would be 14.32 + 25% of 14.32 = 17.9 lac tons.

c) As against the Planning Division's estimate of 14.3 lac tons as the current demand, we have arrived at a figure of 17.9 lac tons by making a provision for un-satisfied demand. Most developing countries tend to project their demand for cement at a growth rate of 10% per year. This is also the rate estimated by the Planning Division for this Sector.

On this basis, the demand and supply of cement in the Northern Zone by the year 1980 would be as follows:

Year		Planning Div. Estimate (lac tons)	Our Estimate (lac tons)	Installed Capacity at 85% efficiency
1974-75	..	15.73	16.69	13.41
1975-76	..	17.30	21.65	-do-
1976-77	..	19.03	23.82	-do-
1977-78	..	20.94	26.20	18.86
1978-79	..	23.03	28.82	(Planned by way of addition of Kohat and Mustehkam)
1979-80	..	25.33	31.71	

Even if we were to go by the estimates of the Planning Division, the demand in 1977-78 would be 20.94 lac tons which shows that there is sufficient justification for setting up additional capacity of about 6 lac tons by 1977-78.

11. a) The demand figures establish a supply gap in the Northern Zone of about 7 lac tons in 1977-78 and about 12 lac tons by 1979-80 based upon the projections of the Planning Division. The only capacity so far approved is the Kohat Project which would give us about 3 lac tons of cement per year. Mustehkam Project which would be an expansion of the existing unit, is favourably located and will add another 3 lac tons to the supply side which will partly off-set the gap in the coming years. All basic raw materials are available on the site and such facilities as water and power can be conveniently provided. Hattar is on the main G.T. Road and hence one does not envisage any problem in transportation of the additional quantity of cement produced by this Project to the market i.e. parts of the N.W.F.P. and Northern Punjab.

b) i/ Technological Process

The various processes for the manufacture of cement are classified

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in relation to the amount of water mixed with the raw materials at the grinding stage preceding burning or sintering. Heat utilization and power requirements for each category are as follows:

Process	Percentage of Moisture(representative)	Heat Utilization Kcal/Kg	Power Utilization Kwh/Tons
Wet	35%	1350-1450	95-110
Semi-dry with with Lefol Grate	15%	950	115
Dry with Suspension Preheater.	Nil	820	115-125

The dry process is envisaged for this project as it conserves fuel, keeps over all energy costs down, requires shorter kilns and lower construction costs. Modern technology has over come the disadvantages of hetrogenous mixing, quality variation and dust control.

The long term plan for Mustehkam plant is to convert the existing two semi-dry kilns into dry process kilns.

ii/Size of Unit

A dry process kiln of 1000 tons per day capacity has been selected considering fuel economy, marketability, capital costs and technical suitability. No major pollution problem is anticipated.

iii/Various Sections of the Factory will be equipped as follows:

QUARRY DEPARTMENT

1. Three wagon drills capable of drilling 3" dia holes.
2. Portable Compressors :
   a) Two 900 cfm Compressors.
   b) Three 350 cfm Compressors.
3. Two CAT D-8 Buldozers.
4. Four dumpers of 20 tons capacity each.
5. One 2.5 cubic yard bucket capacity shovel.
6. Two pay loaders.
7. One locomotive.

CRUSHING DEPARTMENT

One limestone crusher of 400 tons per hour capacity.

PROCESS MATERIALS STORAGE GANTRY

30,000 tons capacity storage yard equipped with two scrapers for

limestone and clay having capacity of 300 tons and 70 tons per hour respectively.

RAW GRINDING AND KILN DEPARTMENT

1000 tons per day capacity dry process kiln with four stage suspension preheater. This kiln will be fed by a closed circuit raw grinding plant of 105 tons per hour capacity. The dust collection will be done with the help of an electric precipitator. A cooling tower will also be required for cooling the exhaust gases when the raw mill is stopped. One storage and homogenizing silo of 7000/8000 tons storage capacity for storing raw meal will be needed.

CEMENT GRINDING AND PACKING DEPARTMENT

Two closed circuit cement grinding mills with a capacity of 35 tons per hour each alongwith necessary separators and an electric precipitator for dust collection will be required. Two cement storage silos with a capacity of 4000 tons each will be constructed. The cement will be packed with the help of two roto packers having a capacity of 1600 bags each per hour.

ELECTRIC DEPARTMENT

As the existing sub-station is located in a dusty and congested area, a new sub-station will be constructed to supply the new plant. A provision will be kept to operate the main transformer of this sub-station in parallel with the transformers of the existing sub-station in case of an emergency.

iv/ Arrangements for oil firing will be provided so that furnace oil can be used in the kiln for burning, if needed.

c) The State Cement Corporation of Pakistan is the sponsoring agency for this project. Execution of the project and operation ofthe plant will be handled by M/s. Mustehkam Cement Ltd., at Hattar, District Hazara. Ultimately, the project will be merged into the existing units of the Mustehkam Cement Ltd; Hattar.

d) Details of marketing arrangements:
The marketing of the end product will be handled by Mustehkam Cement through its agents and dealers who cover Punjab and N.W.F.P.

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12. Give date when Capital Expenditure Estimates were prepared.

December, 1974.

13. Give breakdown of Capital Cost covering the whole of investment period as indicated below:

			(Rs. '000')
a) Production facilities	..	..	298885
b) Ancillary facilities	..	..	2415
c) Service & Welfare facilities		..	2255
d) 25% of working capital	..	..	6200
			309755

14. Basis of Cost Estimates:

a) Land and Land Development

Sufficient land is available within the premises of Mustehkam Cement to install a new 1000 tons per day kiln. A provision of Rs.1,00,000 has been made under this head for levelling, development etc. only.

b) Building & Works

The construction of factory buildings and civil works will be taken up as envisaged in the schedule given in the feasibility report. In this report, civil works were estimated to cost Rs. 17.12 million excluding the cost of colony buildings. Providing for an escalation of 50% in costs between November, 1973 (when the feasibility report was prepared) and the date when the civil works will be taken up, the estimated cost works out to Rs. 24.27 million.

c) Plant and Machinery

The estimates for the capital cost for plant and machinery have been based upon quotations which were received by the State Cement Corporation in December, 1974 for a 1000 tons/day dry process plant to be located at Spintangi. There are some differences in the schedule of machinery and equipment required for Spintangi and Mustehkam projects

After catering for these variations it is estimated that if all the machinery for Mustehkam was to be imported from abroad, it would cost about 18 million dollars on C & F Karachi basis. Since, however, we aim to fabricate about 30% of the Mustehkam Project machinery within the country after importing raw materials, the foreign exchange cost of the machinery and equipment has been taken at about Rs. 157 million and the balance (about Rs. 21 million) has been provided in local currency to cover fabrication charges (i.e. value added).

The rupee costs for plant and machinery are as follows:

		(Rs. in '000')
i/	Rupee cost of locally fabricated machinery and equipment.	21384
ii/	Customs duties on plant and machinery at 25% of C & F value of plant and machinery.	39204
iii/	Internal transportation and wharfage at 3% of the duty paid value of the plant and machinery.	5346
		65934

d) Installation charges of machinery and equipment have been taken at 5% of the cost of the machinery and equipment at site. This estimate is based upon actual cost of previous erection and installation works with a provision for escalation in costs since then.

e) Contingencies have been estimated at 5% of the aggregate cost under each head except for residential buildings where a contingency provision of 10% has been made.

f) Phasing of loan utilization is expected to be as follows:

			(Rs. '000') Foreign Exchange Portion
1st year	...	...	40,000
2nd year	...	...	50,000
3rd year	...	...	60,000
4th year	...	...	22,000

Interest during the construction period (nearly four years) has been capitalised. Interest has been calculated on the time schedule of expenditure. Capitalised interest may not be payable depending upon the terms of Saudi Arabian loan of 16.5 million dollars allocated for this project.

Rates of interest assumed are :

i/	Foreign Exchange loan	7.5% with repayment in 10 years.
ii/	Working capital loan from commercial banks.	12%
iii/	Medium term loan from commercial banks to cover local costs.	10%

g) The estimates for residential buildings and colonies are as follows:

C-1 Type quarters	2	1,65,000
C " "	2	1,40,000
B-1 " "	2	1,10,000
B " "	6	2,70,000
A-1 " "	20	5,50,000
A " "	30	6,75,000
		19,10,000
Guest House for foreign Erectors		1,40,000
		20,50,000
Contingencies at 10%		2,05,000
	TOTAL:	22,55,000

h) In all other cases, estimates have been based upon our own experience or upon estimates given by executing agencies.

15. Give cost of sales in the 1st year of operation and on full operation of the project as indicated below:

The plant is expected to achieve 90% capacity utilization in the first year of operation and run at 100% capacity from the second year of operations onwards.

In the first year of operation, when the new plant is expected to achieve 90% efficiency, (production of 270,000 tons) the cost of production is estimated as follows:

	Total Cost ('000' Rs.)	Cost in rupees per ton
Raw materials:		
Local:	5492	20.34
Indirect materials:		
Local:	1418	5.25
Foreign:	2835	10.50
Labour	3351	12.41
Fuel & Power	10324	38.24
Depreciation	27582	102.15
Insurance	980	3.63
Production overhead	300	1.11
Maintenance	350	1.30
Packing material	14850	55.00
Administration & selling expenses	1773	6.57
Financial Expenses	10584	39.20
Excise duty	11610	43.00
Total:	91449	338.70

Cost of Production at 100% Capacity Utilization:

	(3,00,000 tons in 900 Production shifts)		Combined cost per ton existing and planned capacity 6, 30,000 tons per year
	Unit Cost Rs/ton	Total Cost '000' Rs.	
Raw materials:			
Local	20.34	6102	20.34
Indirect materials:			
Local	5.25	1575	5.94
Foreign	10.50	3150	11.88
Labour	11.16	3351	14.13
Fuel & Power	37.68	11304	46.91
Depreciation	91.94	27582	53.73
Insurance	3.27	980	1.95
Production Overhead	1.00	300	1.14

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Maintenance:	1.17	350	2.14
Packing Material	55.00	16500	55.00
Production Cost: ...	237.31	71194	213.16
Admn. & Selling Expenses:	5.91	1773	7.35
Financial Expenses:	35.28	10584	21.02
Excise Duty:	43.00	12900	43.00
Total Cost to make & sell	321.50	96451	284.53

Depreciation has been charged @ 10% on the cost of plant and machinery and at 5% for buildings.

16. a) Indicate fixed and variable costs:

For the new 0.3 million ton plant (at 100% capacity utilization) they will be as follows:

Fixed Costs:	Rs. 4,49,20,000	per annum.
Variable Costs:	Rs. 5,15,31,000	per annum.

b) Give price per unit of each product:

The current sale price of cement is Rs. 220 per ton ex-factory. On the combined production of 6.3 lac tons, the break-even point is Rs. 284.53 per ton. If we are to work on the basis of a reasonable return on the equity (say about 10%), the sale price of cement will have to be fixed at about Rs.330 per ton. For details please see item 8 and Annexure - IV.

17. a) Give a cash flow statement indicating inflow and outflow of cash for five years (preferably for ten years).

Please refer to Annexure-III and III-(a). The cash flow statement has been worked out on the total production capacity of the old and the proposed new unit i.e. 6,30,000 tons per year. In the first year of operation the production in the new unit has been taken at 90% i.e. 2,70,000 tons. In Annexure-III, the cash flow statement has been based upon a sale price of Rs. 285 per ton which is just above the break-even point. In Annexure-III(a), the sale price has been taken at Rs.330 per ton which is shown in Annexure-IV as the price which would give a 10% return on the equity after tax.

18. a) Profit and loss account for 10 years

Kindly refer to Annexure-III and III(a).

Profit/sales and sales/investment ratio.

At the present selling price i.e. 220 rupees per ton, the new unit will incur constant losses. The project can only be viable if a higher selling price for cement is fixed. Not knowing the price at which cement will be sold, these ratios have not been worked out.

b) Schedule of re-payment of the foreign loan is shown below.

(Rs. in '000')

Year	Loan	Re-payments	Balance	Interest	Total Payment
1	172000	-	172000	12900	12900
2	172000	17200	154800	11610	32160
3	154800	17200	137600	10320	30720
4	137600	17200	120400	9030	29280
5	120400	17200	103200	7740	27840
6	103200	17200	86000	6450	26400
7	86000	17200	68800	5160	24960
8	68800	17200	51600	3870	23520
9	51600	17200	34400	2580	22080
10	34400	17200	17200	1290	20640
11	17200	17200	-	-	19200
			Total:	70950	271200

Average annual burden of interest: $\frac{70950}{10} = 7095$

Average burden per ton: $7095 \div$ = Rs. 23.65

The total capital cost of the project is Rs. 309.75 million. Working on a debt equity ratio of 70 : 30, the equity will work out to Rs. 93 million. The local capital costs are estimated at Rs. 137.8 million including a provision of Rs. 6.2 million for working capital. If interest on the foreign loan during the construction period is to be paid, a local loan of about Rs. 45 million will have to be obtained. It has been assumed that this loan will be available at an interest rate of 10% with a repayment period of 10 years. The incidence of interest and yearly repayment has been worked into the cash flow statements.

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19. Annual phasing of physical work and financial requirements for the project.

Period	Physical work, item of work	Financial Requirements Local	Financial Requirements F.E.C.
		(Rs. in '000')	
Already completed	Site exploration and selection, proving of raw material reserves.		
1st year (1974-75)	Site development, selection of machinery and placement of order including down payment, completion of about 30% of civil design work, survey and quarry development work.	1,000	40,000
2nd year (1975-76)	Completion of the remaining civil design work, receipt of about 30% of the machinery, completion of 60% of foundations and 40% of super structures, receipt of quarry equipment, completion of factory stores and other service facilities.	51,000	50,000
3rd year (1976-77)	Receipt of about 90% of the plant and machinery, completion of civil and other structures, completion of about 50% of erection of machinery.	53,000	60,000
4th year (1977-78)	Completion of erection of the machinery, receipt of balance machinery, trial runs.	7,400	22,000

20. Foreign exchange effect of the project

Year	Spares	Interest	Loan instalment	Total F.E. Expenditure.	F.E. Earnings
1	2100	12900	-	15000	-
2	2100	11610	17200	30910	-
3	2100	10320	17200	29620	-
4	2100	9030	17200	28330	-
5	2100	7740	17200	27040	-
Total:	10500	51600	68800	130900	-

For details please refer to Annexure-II(a) and item No. 18(b) for interest and instalments.

21. a) Likely sources of purchase of equipment and financing of foreign exchange cost of the project.

It is envisaged that cash foreign exchange will be provided to import about 70% of the machinery and equipment from abroad. The balance

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of 30% of the machinery is expected to be fabricated locally after importing the necessary raw materials. Some of the well-known manufacturers of cement machinery are M/s. Polysuis of West Germany, M/s. F.L. Smidth of Denmark, M/s. Mitsubishi Corporation of Japan, M/s. Fuller Company and Allis Chalmers of U.S.A., M/s. Buller Miag of Germany and M/s. Fives-Lille Cail of France.

b) Present position regarding availability, commitment or negotiations.

We have been allocated a Saudi Arabian loan of 16.5 million dollars for this project. We received tenders for the Javedan Expansion Project on the 15th February, 1975. We hope that on the basis of these tenders, we should be able to select a suitable supplier and negotiate with him for the purchase of machinery for the Mustehkam Project. This procedure is being adopted purely with a view to save time. Inviting international tenders for Mustehkam would mean a delay of about 3/4 months.

22. Financial structure and sources of financing.

(Rs. in '000')

Debt: Equity = 70 : 30 (approximately)

EQUITY	
i/ Equity participation by Government/State Cement Corporation.	93,000
ii/ Subscription from Government or Public Sector Financial Institutions.	Not known
iii/ Subscription from Public.	Nil
iv/ Other	Nil
DEBT	
i/ F.E. Loan	1,72,200
ii/ Debentures	
a) Guaranteed by Government.	Nil
b) Others	Nil
iii/ Loan from Government	Nil
iv/ Other term borrowings (Local loan repayable over 10 years).	45,000
v/ Cash credit for working capital (Commercial Banks)	18,600
vi/ Self-financing	Nil

23. a) Benefits of project other than sale of products.

It will be able to provide increased employment opportunities and ensure an increase in revenue to the Government.

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b) Returns to Government in form of taxes, reduction in subsidy etc.

Returns to Government will be under two heads, namely Excise Duty and Income Tax. Excise Duty at the rate of Rs. 43 per ton on 3 lac tons will amount to Rs. 12.9 million per year. Income Tax payments will depend upon profits, which will be directly related to the sale price of cement at the time the project is operational.

24. Approximate number and categories of job opportunities likely to be created indirectly as a result of.

i/ Implementation:

Supervisory & Technical	10
Blue Collar	150
White Collar	20
	180

ii/ Operation of Project:

Administrative and Supervisory	5
Blue Collar	75
	80

PART - C

PROJECT REQUIREMENTS

25. Manpower

a) Production

i/ Managers/Engineers	3
ii/ Supervisors	26
iii/ Skilled labour	120
iv/ Unskilled labour	107

b) Non-production

i/ Executives	-
ii/ Officers	1
iii/ Supervisory staff	7
iv/ Clerical staff	12
v/ Service department	31

c) Likely shortage of manpower by occupation:

No difficulty is expected in recruiting suitable professional, technical and skilled craftsman for this project. However, the technology being applied in this project, (dry process) is going to be used in the country for the first time. Consequently the requisite experience base at technical and professional levels has to be built up.

d) Steps to be taken to assure availability of manpower.

A training scheme for apprenticeship at the craft and supervisory level will also be launched as soon as the project comes off the ground to afford opportunities to the local people as well as to broaden the pool of suitable manpower.

e) Approximate number of persons required to be trained per year (locally and abroad) and the kind of skill to be learnt.

At least 6 mechanical/chemical engineers and Burners will have to be trained in the source country of the machinery on Dry Process Plant control and maintenance and this has to be arranged simultaneously with the start of manufacture of machinery. In the following year, the number of trainees may be reduced to 2. Thereafter we will exploit the multiplier effect of this training, and depend upon on-the-job training only.

Apprenticeship scheme for craft and process technicians with an intake of 40 persons annually will be taken up simultaneously with the implementation of this project.

f) Give total capital outlay, give the capital cost of mobilizing one worker for one shift.

The project will provide employment to 307 additional hands. The capital labour ratio works out to about Rs. 1 million per worker, or about Rs. 3 million per worker per shift.

26. Physical and other facilities for project.

Items	Total	To be provided from the project itself	To be provided from public utility.
a) Access roads	-	-	Bridge over Harro River
b) Railway siding	-	Some extension and adjustments will be done in the existing railway siding	Pakistan Western Railways.
c) Power	7.5 MW (Magawatts)	-	WAPDA
d) Fuel (Natural Gas)	* 6 million cft.per day.	-	Sui Northern Gas Pipelines Ltd.
	* including the requirement of gas after the conversion of older two kilns onto the dry process. The new kiln will need 4 million cft/day.		
e) Water	2,50,000 gallons per day	Partly provided from the project tubewells	Partly from Khanpur Dam.
f) Education facilities	-	-	High School
g) Public health requirement.	-	Extension of factory clinic	-
h) Housing by type	C-1 type	- 2 Nos.	
	C type	- 2 Nos.	
	B-1 type	- 2 Nos.	
	B type	- 6 Nos.	
	A-1 type	-20 Nos.	
	A type	-30 Nos.	
i) Others	Guest House for Erectors.	- 1 Nos.	

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Annexure - I

CAPITAL COST OF THE PROJECT

Item	In ('000' rupees).		
	Local	F.E.C.	Total
A. Production Facilities			
i/ Land Development	100	-	100
ii/ Factory Buildings	24270	-	24270
iii/ Civil Design @ 5% of total cost of construction	1214	-	1214
iv/ a. Machinery & Equipment.	21384	156816	178200
b. Import duty at 25%	39204	-	39204
c. Insurance, clearing charges and inland freight (3% on landed cost)	5346	-	5346
d. Cost of engineering services for infra-structural facilities.	1000	-	1000
v/ Installation of machinery & equipment (5% of cost at site of imported machinery & equipment.)	4208	6930	11138
vi/ Contingencies @ 5% of the total sum of items No.ii to v i.e. 95626 local currency and 163746 F.E.C.	4781	8187	12968
vii/ Interest during construction (3½ years)	25445	-	25445
	126952	171933	298885
B. Ancillary Facilities			
i/ Office Furniture, equipment & transport.	800	-	800
ii/ Pre-production expenses	1500	-	1500
iii/ Contingencies	115	-	115
	2415		2415
C. Service Welfare Facilities			
i/ Residential Buildings	2050	-	2050
ii/ Contingencies at 10%	205	-	205
	2255		2255
D. Working Capital			
(Only 25% of the working capital of Rs.24.8 million built into the capital cost of the project.	6200	-	6200
Total: (A + B + C + D)	137822	171933	309755

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ANNUAL OPERATING EXPENDITURE

(Rs. in '000')

At 100% Operation Capacity

Item	Local	F.E.C.	Total
a) Imported material			
As per annexure - II(a)			
Indirect material & spares			
i/ C & F	-	2100	3150
ii/ Duties	762	-	
iii/ Landing charges & transportation cost to site.	288	-	
b) Local materials (cost at destination)			
As per Annexure - II(b)			
i/ Raw material & spares	7677	-	24177
ii/ Packing material	16500	-	
c) Cost of fuel & power	11304	-	11304
d) Cost of Labour	3351	-	3351
e) Depreciation of Equipment & buildings.	27582	-	27582
f) Production overhead	300	-	300
g) Maintenance	350	-	350
h) Insurance	980	-	980
i) Administrative & selling expenses	1773	-	1773
j) Financial expenses	3489	7095	10584
k) Excise duty	12900	-	12900
Total:	87256	9195	96451
Less Depreciation (item e)	27582	-	27582
	59674	9195	68869

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Annexure - II(a)

Imported Spares

	C & F Cost	Duties & Taxes	Others	Total
Fire Bricks	828	290	112	1230
Grinding Media	727	254	99	1080
Stores & Spares	545	218	77	840
	2100	762	288	3150

Annexure - II(b)

Raw Materials	Limestone	Clay	Gypsum	Total
Manufacturing cost	4002	852	300	5154
Royalties & excise duty	348	-	-	348
Transportation cost	-	-	600	600
	4350	852	900	6102

Fire Bricks	
Cost at site	150
Grinding Media	
Cost at site	600
Stores & spares	
Cost at site	825
Packing Material	16500

Annexure-III

CASH FLOW & EARNING FORECAST

SALE REVENUE AT Rs 285/- PER TON INCLUDING (EXCISE DUTY)

	1	2	3	4	5	6	7	8	9	10
1. Sale Revenue @ Rs 285/- per ton	171000	179550	179550	179550	179550	179550	179550	179550	179550	179550
2. Expenses										
a) Raw Material	12204	12814	12814	12814	12814	12814	12814	12814	12814	12814
b) Salary & Wages	8902	8902	8902	8902	8902	8902	8902	8902	8902	8902
c) Manufacturing Overhead	42621	44075	44075	44075	44075	44075	44075	44075	44075	44075
d) Depreciation	33852	33852	33852	33852	33852	33852	33852	33852	33852	33852
e) Excise Duty	25800	27090	27090	27090	27090	27090	27090	27090	27090	27090
f) Packing Material	33000	34650	34650	34650	34650	34650	34650	34650	34650	34650
g) Admin. & Selling Expenses	4631	4631	4631	4631	4631	4631	4631	4631	4631	4631
h) Financial Expenses	19200	17790	16050	14310	12570	10830	9090	7350	5610	3870
Total Expenses:	180210	183804	182064	180324	178584	176844	175104	173364	171624	169884

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contd.....

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	1	2	3	4	5	6	7	8	9	10
3. Net Profit Before Taxes and Workers Perticipation Fund	(9210)	(4254)	(2514)	(774)	966	2706	4446	6186	7926	9666
4. Workers Profit Participation Fund @ 5%	-	-	-	-	49	136	223	310	397	484
5. Net Profit Before Taxes	(9210)	(4254)	(2514)	(774)	917	2570	4223	5876	7529	9182
6. Taxes @ 55%	-	-	-	-	505	1414	2323	3232	4141	5050
7. Net Profit After Taxes	(9210)	(4254)	(2514)	(774)	412	1156	1900	2644	3388	4132
8. Add. Depreciation	33852	33852	33852	33852	33852	33852	33852	33852	33852	33852
9. Cash from operation	24642	29598	31338	33078	34264	35008	35752	36496	37240	37984
10. Repayment of loan (foreign) & (Local)	21700	21700	21700	21700	21700	21700	21700	21700	21700	21700
11. Dividend payment	-	-	-	-	-	-	-	-	5800*	5800*
12. Cash surplus	2942	7898	9638	11378	12564	13308	14052	14796	9740	10484
13. Add. Last year closing balance	-	2942	10840	20478	31856	44420	57728	71780	86576	96316
14. Balance c/o to next year	2942	10840	20478	31856	44420	57728	71780	86576	96316	106800

*Dividend in the 9th and 10th year at 5%

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Annexure - III(a)

CASH FLOW AND EARNING FORECAST

Sale revenue assessed at Rs.330/- per ton including excise duty.

	1	2	3	4	5	6	7	8	9	10
1. Sale Revenue @ Rs.330/- per ton	198,000	207,900	207,900	207,900	207,900	207,900	207,900	207,900	207,900	207,900
2. Expenses										
(a) Raw Material	12,204	12,814	12,814	12,814	12,814	12,814	12,814	12,814	12,814	12,814
(b) Salary & wages	8,902	8,902	8,902	8,902	8,902	8,902	8,902	8,902	8,902	8,902
(c) Manufacturing Overhead	42,621	44,075	44,075	44,075	44,075	44,075	44,075	44,075	44,075	44,075
(d) Depreciation	33,852	33,852	33,852	33,852	33,852	33,852	33,852	33,852	33,852	33,852
(e) Excise Duty	25,800	27,090	27,090	27,090	27,090	27,090	27,090	27,090	27,090	27,090
(f) Packing Material	33,000	34,650	34,650	34,650	34,650	34,650	34,650	34,650	34,650	34,650
(g) Admin. & Selling Expenses	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631
(h) Financial Expenses	19,200	17,790	16,050	14,310	12,570	10,830	9.090	7,350	5,610	3,870
Total Expenses :	180,210	183,804	182,064	180,324	178,584	176,844	175,104	173,364	171,624	169,884

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	1	2	3	4	5	6	7	8	9	10
3. Net Profit before Tax and Workers Participation Fund.	17,790	24,096	25,836	27,576	29,316	31,056	32,796	34,536	36,276	38,016
4. Workers Profit Participation Fund @ 5 %.	890	1,205	1,292	1,379	1,466	1,553	1,640	1,727	1,814	1,901
5. Net Profit before Tax	16,900	22,891	24,544	26,197	27,850	29,503	31,156	32,809	34,462	36,115
6. Taxes @ 55 %	9,295	12,590	13,500	14,409	15,318	16,227	17,136	18,045	18,954	19,864
7. Net Profit after Tax	7,605	10,301	11,044	11,788	12,532	13,276	14,020	14,764	15,508	16,251
8. Add Depreciation	33,852	33,862	33,852	33,852	33,852	33,852	33,852	33,852	33,852	33,852
9. Cash from Operation	41,457	44,153	44,896	45,640	46,384	47,128	47,872	48,616	49,360	50,103
10. Repayment of Loan (Foreign) and (Local).	21,700	21,700	21,700	21,700	21,700	21,700	21,700	21,700	21,700	21,700
11. Dividend Payment.	-	11,600	11,600	11,600	11,600	11,600	11,600	11,600	11,600	11,600
12. Cash Surplus	19,757	10,853	11,596	12,340	13,084	13,828	14,572	15,316	16,060	16,803
13. Add. Last Year's Closing Balance	-	19,757	30,610	42,206	54,546	67,630	81,458	96,030	111,346	127,406
14. Balance carried over to next year	19,757	30,610	42,206	54,546	67,630	81,458	96,030	111,346	127,406	144,209

Dividend payment at 10 % on equity beginning from the 2nd year of operations.

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SALE PRICE DETERMINATION

(Rs. in '000')

CAPITAL

Present paid up capital	...	23,100
Equity proposed for expansion	...	93,000
		1,16,100

NET PROFIT REQUIRED PER TON

Dividend 10%	... ...	11,610
Add income tax 55% on net profit after workers participation fund	...	14,190
		25,800
Add workers participation fund (5%)		1,358
		27,158

i.e. on sales of 6.3 lac tons profit should be Rs. 43.10 per ton.

SALE PRICE DETERMINED

Cost of production per ton	...	284.53
Profit per ton	... ...	43.10
		327.63

In the cash flow statement, the sale price has been taken Rs. 330 per ton.

RETURN TO GOVERNMENT

i/	Excise duty and surcharge 630000 x 43.00	=	2,70,90,000
ii/	Income tax on net profit of 2,58,00,000 at the rate of 55%.	=	1,41,90,000
iii/	Excise duty on limestone 832000 x 0.50	=	4,16,000
iv/	Royalty 832000 x 0.37	=	3,08,000
	TOTAL:	=	4,20,04,000

PC-I: SIMLY DAM PROJECT

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FORM PC-I

GOVERNMENT OF PAKISTAN
PLANNING COMMISSION

P R O F O R M A

FOR

BULK WATER SUPPLY

PHASE-II

FOR

I S L A M A B A D

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PART-'A'

(PROJECT DIGEST)

(All figures are in Millions of Rupees)

1. Name of Project. — Bulk Water Supply for Islamabad Phase-II(construction of composite Rock-earth fill dam and its appurtenant works)

2. Is Project in Five year Plan? If so, what allocation is provided. — Yes. Rs. 30.0 million have been provided for this project in the 3rd plan allocation.

3. Administrative Authorities:-

   a) Sponsoring Authority:- — Capital Development Authority, Islamabad.

   b) Central Ministry concerned:- — Cabinet Division.

4. Location of Project(attach map where necessary) — On Soan River village Simly(map attached)

5. Cost of Project (in millions of rupees)

	Already incurred	To be incurred	Total
Rupees	8.967	75.469	84.436
F.E.Comp.	1.276	17.323	18.599

6. Annual recurring expenditure after completion(1%) — Rs. 0.844 millions

7. Proposed date of commencement and completion of Project:- — I) Commencement - October,1967. II) Completion - December, 1973.

8. Agencies other than sponsoring authority involved in the project.

   a) General or special consultants. — i) M/s. Tecsult Internation Ltd.

   b) Construction Agencies whether local or foreign on turn-key basis or otherwise. — ii) West Pakistan WAPDA

   Tenders will be invited on local cum-international basis on item rates.

   c) Agency for operation and/or maintenance. — CAPITAL DEVELOPMENT AUTHORITY, ISLAMABAD.

9. List of preparatory suveys feasibility reports and project (indicate whether attached)

   i) Feasibility Report has been submitted by M/s. Tecuslt International Ltd, Montreal Canada.

   ii) Review of the Feasibility Reports carried out by the Directorate General Designs, WAPDA West Pakistan.

   iii) Revew of the overall project carried out by world renowned experts Dr. Aurthur Casagrande and Dr. Nickell who visited the site in October,1969 and reviewed the various reports and data relating to the project.

10. Name and designation of officer responsible for preparation of this form:-

Mr. M.H. HYDERI, CESI,
Director General Works.
Capital Development Authority,
Islamabad.

Ajaz A. Khan

(Ajaz A. Khan)
Statistical, Programming & Coordination Officer.

Dated 18th May, 1970.
4th August 1970

PART - 'B'

11. Description, Purpose & Benefits of the Project:-

A - History & Background.

In their report on "Water Supply System of Islamabad" the Chief Consultants, M/S Doxiadis Associates, had proposed the following sources on which the Water Supply System for Islamabad could be based :-

i) Underground water.
ii) Perennial Springs.
iii) Natural Streams.

Exploratory boarings and tests revealed that the underground sources could not be depended upon, and could only be used for supplementing the unforseen requirements of the town and as stand-by arrangements. The yield from the two perrenial springs at Noorpur and Saidpur was estimated at about 1.7 million gallons which was considered to be sufficient to meet the water demands of Islamabad upto 1964 only. The main source of water supply to Islamabad, therefore, based on the natural streams. In order to meet the water requirements of Islamabad beyond 1964, the possibilities of constructing a Dam in the upper reaches of Soan river were examined. After preliminary studies and investigations it was decided that the dam should be constructed at Simly whence water could be brought to Islamabad by gravity.

2) Consequently in December, 1962 the CDA submitted a scheme for "Bulk Water Supply" to Islamabad, which included the construction of a Dam on Soan river at Simly, Conduction Mains and Filtration Plant etc. That scheme was not cleared by the CDWP for want of :-

i) A second expert opinion in the form of a paper on the availability of water and
ii) The feasibility report and design of the Dam.

3) The second expert opinion from the Chief Engineering Adviser, Government of Pakistan, was obtained and submitted by the C.D.A. The feasibility report from the Consultants was likely to take considerable time and the CDA was concerned about the inordinate delay in the execution of the scheme. Meanwhile, in view that the existing sources i.e. the Springs were only sufficient to meet the water requirements of Islamabad upto 1964, the urgency for bringing water to Islamabad was felt and the matter was referred to the ECNEC. While approving the scheme in principle, the ECNEC, in its meeting held on 8th May, 1964 authorised the CDA to incur expenditure to the extent of Rs. 2.0 millions to start work on the Conduction Mains and Filtration Plan to ensure adequate water supply by mid 1965.

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4) The CDWP, in its meeting held on 19.11.1964, also decided that since the Consultants employed by the CDA had not furnished the design and cost estimates of the dam the "flow from Soan river must be brought to Islamabad to meet its growing needs and the CDA may submit a scheme for Conduction Mains, Filtration Plant and the complementary works as first phase of the "Bulk Water Supply Scheme". Thus the scheme was split up into two phases. The phase-I scheme viz. construction of Conduction Mains and Filtration Plant etc. was submitted by the CDA, which was approved by the ECNEC in 1966 and has almost been completed.

5) While the design of the Dam was being prepared, the Consultants had advised that it would save considerable time if the Diversion works were taken in hand urgently. The Consultants had also supplied the designs, bill of quantities and tender documents for the Diversion Tunnel. A request was, therefore, made for authorisation of this work, at an estimated to cost Rs. 6.4 millions in anticipation of the approval of the phase-II scheme. That request was accepted by the ECNEC in March, 1966 and CDA was authorised to incur an expenditure of Rs. 6.0 millions on the construction of Diversion Tunnel of the Simly Dam against the phase-II scheme. The work on the Diversion Tunnel is in progress.

6) The investigations of the project have now been completed to the extent that a feasibility report along with preliminary designs of the Dam, spillway and inlet works have been received from the Consultants. On the basis of these preliminary designs etc; it has now been possible to assess the extent of works fairly accurately. The phase-II scheme has, therefore, been prepared at an estimated cost of Rs. 84.436 millions. This sum includes the revised cost of the Diversion Tunnel.

B. REQUIREMENTS OF WATER.

The water requirements for Islamabad were originally assessed at an average rate of 50 gallons per head per day. Shortage of water was experienced during the summer of 1965, although water was being supplied at a rate of more than 50 gallons per head per day. The matter was carefully examined and it was found that the actual rate of consumption was more than 50 gallons per head per day, which had resulted in the shortage. On the basis of actual consumption of water during the last two summers an average rate of 150 gallons per head per day has been practically established for the peak consumption period viz. May to July. To arrive at a more realistic figure services of Mr. Clive J.Price, an expert of the National Capital Commission, Canberra, Australia, were obtained under the Colombo Plan for advice on the water supply problems of Islamabad. In his report submitted in July, 1968, Mr. Price indicated

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that as compared to other modern developing cities in the world the average per capita rate of 50 gallons per day was quite low. It is a generally accepted fact that per capita consumption of water in all cities increases with the passage of time. Mr. Price assumed the "summer average requirement in 1968" at 120 gallons per head per day. According to his estimates, in the year 2000 - A.D. the peak summer demand would be 175 gallons per head per day. In view of the report of Mr. Price and the experience gained during the last two years, it is necessary that the water supply arrangements in Islamabad are planned and executed on the basis of at least a per capita consumption rate of 150 gallons per day during the extremely dry and hot period in summer, when the consumption of water is at its maximum and yield of the perennial sources like the springs and streams is reduced to less than 50%.

2. As regards the per capita consumption of water, the Committee decided that the designing of appurtenant works, distribution mains, etc; should be based on an average rate of 150 gallons per day, while the total requirements of water should be assessed @ 100 gallons per day, as the seasonal peak loads could be met by suitable operation of the storage reservoir at Simly.

3. Taking into consideration the above revised population projections, the average per capita consumption rate of 100 gallons per day and accounting for the water demands of construction activity, industrial needs, public buildings, parks and green area, the following total water supply requirements of Islamabad were worked out.

Upto 1970.	10.19 mgd.
Upto 1975.	22.50 mgd.
Upto 1980.	34.00 mgd.

The details of the above total requirements, as decided by the Technical Committee, are indicated below:-

Year	Population	Water requirements (100 gphd)		
		Domestic	Constn. Industrial & Horticulture.	Total
1970	75,000	7.50 Mgd	2.69 Mgd	10.19. Mgd
1975	1,50,000	15.00 Mgd	7.5 Mgd	22.5 Mgd
1980	2,25,000	22.50 Mgd	11.5 Mgd	34.0 Mgd

4. However, during the period of three to four months, in a year, when the domestic consumption rises to 150 G.P.H.D., the yearwise requirements for these months, will be as below:-

Year 1970 Maximum Monthly Average 13.94 MGD (Say 14.00 MGD)
Year 1975 Maximum Monthly Average 30.00 MGD
Year 1980 Maximum Monthly Average 45.25 MGD (Say 45.00 MGD)

C. Sources & availability of water.

1. As stated earlier the yield of the two perennial springs at Noorpur and Saidpur was estimated to be sufficient for Islamabad requirements upto 1964. In order to augment the supplies further, for the requirements beyond 1964, the scheme for construction of Simly Dam was submitted by the CDA in December, 1962. Unfortunately that scheme was delayed for the reasons explained earlier. In the meantime, construction activity and population in Islamabad had been steadily growing and consequently the demand of water had also been increasing. In 1965 and subsequent years, drought conditions were experienced during the summar months. The out-put of the natural springs had also provod to be less than the original assessment of the consultants, which reduces to about 50% (i.e. to about 0.8 mgd) during the peak hot period in summer. For these reasons, acute shortage of water was felt during these years. In order to meet the situation and the ever growing need of water in Islamabad it became necessary to take short-term measures for urgently tapping of more sources. Some of the perennial sources like the streams in Golf Course, sector G-10 and Shahdara nullah etc; were tapped to augment the water supply. In order to over-come the shortage of water and to further augment the supplies some more sources are being tapped as short term measures with a view to meet the requirement of the next summer. Although these are termed as short term measures but these sources of water supply will have to continue and will be integrated into the overall water supply system of Islamabad. On completion of these works the accumulated availability of water from all the sources, during fair weather, is estimated at about 18.71 mgd. As most of these sources are based on perennial springs and streams the availability of water during the drought period viz. May to July, when the demand is at its maximum, is estimated to be 11 to 12 mgd.

2. During the recent dry-spell, the President of Pakistan was apprised of the difficult conditions prevailing in Islamabad on account of shortage of water and the measures taken and proposed to be undertaken for meeting the situation. The President directed "I would like this operation to be handled on Top Most Priority by all Agencies of the Government as this serious shortage will kill the capital project."

3. All possible and presently known sources, other than the Dam on Soan, have been/are being tapped by the C.D.A. Although the possibilities of harnessing other sources, unknown at present cannot be ruled out, but apparently there are no prospects for further increasing the water supply in Islamabad during the following years. Therefore, in order to ensure regular and un-interrupted supply of water from the storage at Simly, it is imperative that the Dam must be completed at an earliest date.

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4. The DAM.

The present water supply arrangements for Islamabad are based on the perennial sources. As stated earlier the entire output of these sources reduces to about 50% during the hot months, immediately proceding the monsoons, when the demand for water is at the peak. During this period of about 2 to 3 months a very wide gap is created between the supply and demand of water. This wide gap must, therefore, be filled up to which storage arrangement is the only answer. The construction of Simly Dam for providing this storage, acquires both its importance and urgency.

The Simly reservoir is the only source from which water could be supplied to Islamabad by gravity. Pumping is not only a very costly operation, both in terms of the capital cost and recurring expenditure, but it also creates uncertainty of water supply because of the power break-downs and mechanical defects in the pumps. Construction and early completion of the Dam is, therefore, of crucial importance, For the same reasons, the consulting engineers engaged by the CDA from time to time have emphasised the need for early completion of the Simly Dam Project. Mr. C.J. Price also recommended that "the completion of Simly Dam at the earliest practicable date is vital to the development of a satisfactory water supply to the National Capital".

(i) Location.

The Simly Dam derives its name from a small village situated on the Soan river about 15 miles north-east of Islamabad. Immediately upstream of the dam site, the Soan River leaves the Simly plain and cuts sharply to the left through a ridge of resistant sand stone to form a deep and narrow canyon. The axis of the proposed Dam is located on the narrowest section of this canyon.

(ii) Topography

The reservoir area is a basin including the Simly plain, walled in by the resistant sand stone. The floor of the basin is deeply incised by the Soan River and the temporary torrents that flow into the Soan River during the Monsoon season.

1 .The Simly alluvial plain appears to be a part of an ancient lake which was impounded behind the high and narrow barrier of thick and near-vertical sand stone strata. During the period of land up-lift, a notch was cut through the sand stone ridge by the head waters of a stream which occupied the lower valley of the present Soan River. The body of the old lake was left high and dry after the river continued to cut the ridge and attained its present level.

2). Plugging of the canyon with the dam will bring back the conditions that existed at the time of the ancient lake, Simly. Silt and clay, very similar to the soil formation of the Simly plain, will continue to accumulate in the new lake gradually filling the canyon of the Soan.

(iii) Hydrology of the Soan River.

At Simly site, the Soan River drains about 59 sq miles of the catchment area. This catchment area extends from elevation 2100 to 7000 ft. above the mean sea level. The main source of flow in Soan River is the monsoon rains, because firstly the general formation of the catchment area and the type of vegetation, where it exists, are

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of the type which have very little capacity for mositure retention and, secondly it does not have a permanent snow-fed source. Therefore, like all such other rivers in this area, 80% to 90% of the annual flow of the river comes in the months of July, August and September. Hydrological records of the site were not kept before the investigations were started in 1963. Records have been kept thereafter, but a period of only five years is too short for determining the average run-off on the basis of actual measurements. Reliance had, therefore, to be placed on Meteorological data of the catchment area which exists for more than a hundred years. Co-relation between the rain-fall and run-off was established for calculating the total run-off in the year and flood analysis for determination of the adequate capacity for the spillway. The services of the Water and Soils Investigation Division (WASID), a specialised agency of West Pakistan, WAPDA, were also obtained for calculating the maximum probable floods in the Soan River at Simly. The results of the studies performed by WAPDA confirmed the conclusions regarding the maximum probable flood and the capacity of the spillway of the Consulting Engineers.

As a result of these studies, it has been estimated that the annual average run-off of Soan River at Simly comes to about 58,000 acres ft. The maximum probable flood has been estimated to have a peak discharge of 77,380 cusecs. The details of the studies are given in appendix-I.

(iv) Geology:

The Simly Dam site and the reservoir are located on the out-crop of the Chingi group of Siwalik age. The rock formations consist of well bedded sand stone inter bedded with layers of poorly cemented or friable sand stone and layers of reddish silt stone and clay stone.

These rocks have been folded into anticlines and synclines tending north east to south west and the dips are generally steep. A few faults have been observed but they are mostly strike faults and they do not present insurmountable problems.

The geological investigations were undertaken immediately after the selection of Simly as the Dam site. In the initital stages the surface geological mapping was undertaken which outlined the general stratigraphy of the rocks and the principal geological structures. It further provided the basis for sub-surface exploration to investigate the strength and permeeability of the rock strata at depth under the foundations and abutment of the proposed dam. These geological investigations revealed some heterogenity of the rook and weakness of some of the strata which ruled out the feasibility of a concrete gravity dam at the site.

As a result of the investigations that have been carried out todate, it can be stated with confidence that :-

a) except for two weak points known as Saddle 'B' and Saddle 'C', the reservoir should be economically watertight. These two points have been instrumented with piezometers and should seepage conditions develop during or after impounding, these areas could easily be treated with grout injections.

b) With proper preparations and treatment, including a certain amount of consolidation and curtain grouting the sandstone of the hogback will provide an acceptable foundation for the proposed homogeneous earth fill dam structure.

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c) Although some investigations and tests are still in progress, quantities and properties of borrow materials for construction of the dam have been proven.

v) Diversion works.

A complete diversion of the river will be required during the entire period of construction of the main dam. Necessary diversion facilities have, therefore, been planned which are designed to have a capacity of 20,000 cusecs and include the following works :-

a) Diversion Tunnel

The diversion tunnel is designed to have 28' finished diameter and will be concrete lined. At the inlet the tunnel is provided with a portal that will permit the installation of stop logs for sealing up the tunnel before impounding of the reservoir. At the downstream side, the water from the tunnel would be carried through a diversion culvert which would also be concrete lined as a protection for the softer beds of rock from erosion and dis-integration.

b) Colony

The construction of residential accommodation for the staff required at the site during the construction is necessary. Alongwith this, the site offices and a Laboratory for testing of material, is also required. For this purpose, a colony has been planned at site. Since the cost of the Colony has to be divided equally between phase-I & Phase-II and the colony was required for completing the phase-I of the scheme, as well as the Diversion works most of the construction of the colony has been completed. Costs for the colony have, therefore, been provided for in proportion to phase-II in this PC-I under the Diversion Works.

vi) PERMANENT WORKS

The permanent works of the Simly Dam project include the Main Dam, Spillway and the inlet works :-

a) Main Dam

1:- Embankment.

/fill dam were initially considered first a composite

The main dam is proposed to be 225 ft. above the minimum river bed elevation, and will have a crest R.L.2325 ft. and crest length of 1040'. Two alternatives for an earth-/ Earth-Rockfill Dam and secondly Homogeneous Earthfill Dam. The previous consultants M/s. Teesult International Ltd. had recommended a Homogeneous Earth fill Dam on the basis that the material obtained from the Rock Excavation would not be suitable for use in the Rockfill section of the Dam. However, a second opinion has been obtained from the renowned Dam experts namely Dr. Arthur Casagrande and Dr. Nickel who have recommended the adoption of a composite Rock Earth Fill Dam. The PC-I now, therefore, includes the estimate of cost for this type of section.

The embankment section consists of an impervious core, placed in the middle of a Rockfill section. Part of the rock-fill will be obtained from the excavation, and the balance from a quarry near the Dam site. The material for the impervious core is available in the Simly and Tamair Plains.

ii) Up-stream coffer Dam

The upstream coffer dam would be located a little downstream of the tunnel inlet. It will consist of

rock fill materials on both sides of a central plastic core and transition zones. The material to be used in the coffer dam would be essentially of the same type as would be utilized in the main dam and, therefore this dam will eventually be incorporated in the main dam.

iii) Downstream coffer dam.

The down stream coffer dam would be a concrete gravity structure, located at the downstream end of the lower stilling basin of the Spillway. This structure will act eventually as a permanent cut-off for the lower stilled basin.

b) Spillway.

An over flow weir type of spillway has been proposed for the project. After investigating the various alternative sties of the spillway, and the various types of spillways it was eventually decided to locate the spillway near the dam site and of the type described above. The approach to the spillway inlet would be through a horizontal channel about 100' wide with invert elevation of 2285'. At the end of the open channel would be located an over flow weir with crest elevation of 2295'. The flow over the weir would be carried through a steep chute ending up in the first energy discipator. From this onwards, the water would pass through in the lower channel, the width of which is increased to 125' and ends up in the lower wier which would have a crest elevation of 2187'. The water flowing over the low weir would be taken in the existing channel which would have an invert elevation of 2070' and would be terminated by three rows of baffle blocks to stabilise hydraulic jump.

The basic elements of the design of the spillway have been verified by actual model testing carried out at the Irrigation Research Institute. The spillway would have the following discharge capacity for various Resevoir elevations:-

Elevation 2295'	-	0 cusecs.
Elevation 2315'	-	45,000 cusecs.
Elevation 2320'	-	63,000 "

c) Intake works

The intake level has been determined after the sedimentation study of Simly Resevoir. It has been estimated that after a period of 63 years, the silt level in the lake would be 2220'. At this elevation the live storage capacity of the reservoir would be 19800 acre ft. and with this storage, the studies had revealed that 24 MGD of water can be supplied to the Capital. The sill level of the intake works, therefore, has been kept at an elevation of 2220'-

The Intake would be located on the left abutment between the spillway and the Dam. It would consist of a portal, 6' diameter tunnel approximately 500' long, a 48" diameter steel pipe bifurcating into two 20" pipes with butter-fly valves and from then on to 36" diameter pipes. The intake portal would be provided with trashrack and gate. This equipment can be operated from a control station at elevation 2320'.

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E. LAND ACQUISITION

About 2,000 acres of land would be required for the construction of Simly Dam. This area includes the land required during and for construction of the Dam as well as the area that would be submerged by the Simly lake. On the average the cost of land for Simly and Tamair Valley is worked out as Rs. 600 per acre on the basis of the land already acquired. Provision for the cost of the land in the PC-I has been made accordingly.

F. SOIL CONSERVATION AND WATER SHED MANAGEMENT.

The investigations carried out by the CDA have revealed that during the floods, water carries silt to the extent of 4,000 parts per million. On this basis it is estimated by the consultants that dead storage capacity of 4300 acres ft. would be filled up in a period of about 63 years i.e. at the rate of 70 acre feet per year. After that the quantity of water coming to Islamabad will be gradually reduced. Investigations have been carried out with aview to increase the life of the dead storage. The investigations have indicated that if the catchment area is properly planned and conserved it would be possible to increase the life of the dead storage by at least 25 to 30 years. The cost of gross storage works out at Rs. 3,000/- per acre ft. If we are able to save 33 acre ft. per year by afforestation, we would be saving the depreciation of capital cost to the extent of about Rs.2.0 millions per year as against the capital expenditure of Rs.0.2 million on afforestation (Rs. 5.0 millions) spread over 25 to 30 years). Apart from the question of increase in the life of the dam, it would also result in the uplift of the local population of the catchment area as well as in the increase of the forest wealth of the country. A provision has, therefore, been made in the PC-I for this item.

G. COST ESTIMATES.

a) Works

The estimates of quantities and cost were originally prepared by the Consulting Engineers. These estimates were, sent to WAPDA for review because WAPDA has been doing many projects of this nature. The estimates of cost now provided are based on the advice given by WAPDA. For Diversion works and colony, the actual tendered rates have been applied. A minimum provision of 5% is also made for contingencies.

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b) Engineering Cost.

The Consultants engaged by the CDA for investigations, design and supervision of all major components of the Bulk Water Supply schemes were to be paid a lump sum amount of Rs. 4.8 millions with 25% in foreign exchange. Out of this they have been paid Rs. 3.465 millions which includes Rs. 0.950 millions in U.S.Dollars. In May, 1968 the CDA had approached WAPDA, West Pakistan to undertake a general review of the various design criteria adopted by the consultants in finalising designs of Dam and spillway. The review work was carried out by WAPDA till recently when they were assigned the job of detailed designing of the Project. The fee that would become payable to WAPDA for all kind of services is estimated at Rs. 1.79 millions with a F.E.Component of Rs. 0.45 millions. A sum of Rs. 0.367 millions (Foreign Exchange component of Rs. 0.126 millions) paid to M/S Tams Majeed has also been provided, alongwith costs of special services, Transport and other facilities. The details of all these items is given in Appendix IV, totalling to Rs. 5.622 millions. Since a sum of Rs.2.67 millions has been provided in the Phase-I of the Bulk Water Supply Scheme, the balance amount of Rs.2.952 millions, with a foreign exchange component of Rs. 0.786 millions is being provided in this PC-I :-

FOREIGN EXCHANGE REQUIREMENTS.

For an Earth fill dam heavy earth moving machinery is a pre-requisite, and the consultants have indicated the following equipment :-

1.	Power Shovells.	4 Nos.
2.	Tractor D-8	8 "
3.	Motor Grader.	3 "
4.	Sheep foot rollers.	4 "
5.	Water Tankers.	3 "
6.	10 Wheels 20 tons trucks	35 "
7.	Compressors.	4 "
8.	Drilling and boring equipment	20 sets
9.	Grouting equipment.	2 "
10.	Dewatering pumps	4 "
11.	Workshop tools and plants	1 "
12.	Truck mounted crane.	1 No.

It has been informally ascertained from the Chairman, West Pakistan, WAPDA that they would not be in a position to make the construction equipment available to the CDA for this Project. For the procurement of the construction machinery and the spare parts, the foreign exchange would be needed for which a provision has been made in this scheme. The details of foreign exchange requirements are shown in Appendix-IX and total to Rs. 18,599 millions.

I. RECOVERY OF COST.

The cost of the Bulk Water Supply scheme would be recovered from the consumers through water rates. The project will thus be self supporting. Rates to be charged from the consumer would be arrived at after the exact cost of the project and maintenance 246

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charges are known on completion. A cash flow statement in respect of "Water Supply in Islamabad" has recently been submitted to the Govt. in accordance with the decision of the CDWP taken on 23.2.1970. This scheme has also been included therein. The cash flow statement is attached as Appendix-X.

J. CONCLUSION.

Water is a vital necessity and must always be provided for in advance of inhabitation in any developing city. Unfortunately construction of the Dam has been very much delayed resulting in acute shortage of water being experienced by the people in Islamabad for the last few years. Earliest completion of the proposed Dam is, therefore, of an utmost importance. It is feared that if the project is delayed further and is not immediately undertaken the inhabitants of Islamabad would face a water crisis and the serious shortage of water would kill the Capital Project.

This scheme is a part of the Bulk Water Supply Project which has already been approved by the Government. The Phase-I scheme has already been undertaken and almost completed. Against this scheme (Bulk Water Supply Phase-II) work on the Diversion Tunnel had also been authorised by the Government, which is nearing completion. The expenditure of about Rs. 4 crores, so far incurred on the Phase-I of this project, cannot be utilised effectively and gainfully till such time as the construction of the dam is completed. It is, therefore, imperative that the scheme is approved at an early date so that construction of the dam and its appurtenant works are taken in hand and completed most expeditiously.

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PART A- 'C'

(ESTIMATED COST OF THE PROJECT)

12. Give date when cost estimates were made. January, 1970

13. Give breakdown of cost by major items according to the way they have actually been estimated(attach detailed abstract of cost if available)

S.No.	Name of work	Cost estimates in Millions of rupees: Rupees *	Foreign Exchange ** component
1.	Diversion Tunnel & colony (Appendix-II)	9.511	0.074
2.	Main Dam (Appendix-III)	35.764	12.000
3.	Spillway	23.756	4.510
4.	Intake Structures.	0.683	0.274
5.	Consultants Fees(Appendix-IV)	2.952	0.786
6.	Investigation and sub-soil exploration.	1.549	0.031
7.	Land acquisition for reservoir and borrow areas @ Rs. 600/- per acre for 2000 acres.	1.200	-
8.	Water shed management.	5.000	-
	Total:-	80.415	17.675
	Add 5% contingency	4.021	0.884
		84.436	18.559

2.952
1.549
4.501

* For details please see Appendices-II to VI

** For details please see Appendix-IX.

14. Indicate whether following items are included in the cost estimates, and if so explain the basis of estimates.

a) Overhead cost of the sponsoring authority.	No.
b) Acquisition of land.	Yes.
c) Construction machinery and equipment.	Yes.
d) Import duties sales and excise taxes.	Yes. in accordance with the prevaling rates.
e) Transportation of material & equipment to site.	Yes. in accordance with the prevailing rates.
f) Buildings and works	Yes.
g) Consultants and contractors charges.	Yes.
h) Interest charges.	No.
i) Working capital in case of commercial or industrial project.	Not applicable.

15. Estimated annual recurring cost after completion of Project. Rs. 0.844 millions.

PART - 'D'

(FINANCING OF PROJECT)

16. Estimate annual phasing of expenditure (in millions of rupees)

	68-70	70-71	71-72	72-73	73-74	Total
Total Rupees	8.967	19.560	24.450	24.450	7.009	84.436
Foreign Exchange component	2.045	4.463	5.580	5.580	0.931	18.599

17. Indicate sources and amount of internal financing of both development and recurring expenditure on the Project.

a) From Government resources:-

i) Investment.
ii) Loan.
iii) Grant in aid in the form of counterpart funds.

84.436 millions To be met from Government grants.

b) From sponsoring agency's own or local body resources — No.

c) From non-Government borrowing. — No.

d) From private investment. — No.

e) From miscellaneous source (interest from Bank) — No.

18. State views if any on sources of foreign exchange financing. — From Government allocation.

19. Is it proposed to recover cost of project from beneficieries and if so, how? — Total investment will be recovered in full with operational charges as indicated in Appendix-X

20. Estimated annual income from operation of project. — Please see Appendix-X

PART - 'E'

(MANPOWER MATERIALS AND OTHER REQUIREMENTS OF PROJECT)

21.	Total manpower(attach list of manpower requirement by occupation)	Please see Appendix-VII
22.	List expected shortage of manpower by occupation and indicate steps which should be taken to assume availability of manpower.	Nil.
23.	Public utilities indicate access roads, railway sidings, power, water and other utilities required for the project.	Only those portions which are to be done at the dam site have been provided in this PC-I.
24.	Material and equipment.	Please see Appendix-VIII

PART- 'F'

(SCHEDULE OF WORKS)

25. Indicate approximate annual phasing of physical work on project.

68-70	70-71	71-72	72-73	73-74
11%	24%	30%	30%	5%

26. When is project expected to be in operation at full capacity or producing maximum benefits.

The partial operation would be affected on completion of the Dam in December,1973. Full operation would be between 1975 and 1980, when the population of Islamabad reaches a figure that the entire potential of the Project will haveto be commissioned for providing the needs of the Capital.

27. List other related projects of development which must be completed in time so as not to delay the scheme or work or affect operation of this project.

The Phase-I works of the project are almost complete and the distribution net work for Islamabad in the plan period already exists & would continue to be provided in new areas of development.

EXTRACTS FROM THE CONSULTANTS PRELIMINARY DESIGN REPORT.

1. HYDROLOGY OF SIMLY WATER-SHED.

1.1. General

In order to assess the live storage of the reservoir at Simly for a given consumption of water and to establish the maximum normal water level, hydrological studies have been completed. These studies were based on data and records of stations located in the vicinity of the catchment area.

In order to undertake this study all data required was collected from various sources. These include records on rainfall outside the catchment area and rainfall inter sites, temperature, wind velocities inter sites and direction, humidity, sedimentation, evaporation and stream measurements. The following section describes the data collected and a resume of studies, which were undertaken to determine the yield of the water shed, the maximum flood and the required live storage.

1.2. Raifall and Metorological Data.

Monthly raifall data of stations having influence on the catchment area were tabulated according to the following periods ;

i. Monsoon.
ii. Winter.
iii. Pre-monsoon and
iv. Pre-winter.

Data were obtained from Murree, Sher Bagla, Ban, Karor, Tret, covering a period of 10 years between 1953 and 1962. Part of these observations were obtained from the CDA and part were collected by our representatives in the fileld. These records were used for determining the influence of the Murree station on the catchment area.

In addition, monthly rainfall records were obtained from the Murree Station covering the period of 1875 to 1962. This data was used in relation with the mass diagram required for determining the live storage required for the reservoir.

Murree data also included daily rainfall from 1950 to the present. Observations were used in predicting the maximum flood. Other mateorological data such as air, temperature, himidity weather phenomena, wind velocitieis, cloud, visibility were obtained from Northern Meteorological Department, Lahore and studies in detail.

Sedimentation and evaporation data required for determining the required reservoir capacity were obtained from West Pakistan WAPDA and Lahore and Peshawar Regional Meteorological offices.

13. STREAM FLOW MEASUREMENTS:

Discharges measurements are being presently carried out by the CDA near the Simly Dam site Measurements have been taken only recently and do not cover a period of sufficient duration for the present study except in predicting maximum flood conditions. The readings recorded at this station will be useful in assessing, with better accuracy the yield of the water shed.

The only data available when studies began were stream measurements taken at Chinot on the Soan River covering the period of 1960 to 1962. These measurements were used in correlating rainfall and run off.

1.4. RAINFALL ANALYSIS.

Among stations that have influence on the Simly catchment area only Murree has long term records of rainfall dating back to 1975.

Using observations taken over a period of 10 years from gauges located within the catchment area and directly around it, correlation factor was calculated to determine the degrees of influence that the Murree station has on the Simly watershed. The "Thiessen Method" is the mostcommonly used and the quickest method of determining the influence of a station but has two scources of error. Firstly a station located a considerable distance outside the basin exerts influence on the restults. Secondly it does not take into account the topography of the area. This method was used for checking purposes only.

On the other hand the "Isohyetal Map" method yields reasonably accurate results of the rainfall distribution provided the effect of topography is taken into consideration in locating the isohyetal lines by assigning station weights according to the topography of the area and location.

In order to emphasize and to see the effect of local climate the yearly rainfall was analysed by seasons and divided into four periods. As a check the "Thiessen Method" and the Isohyetal Map" were both used in computing the correlation factor. The results are recorded in Tables 1 & 2. It is significant to note the similarity of the results.

From the results the correlation factor for coverting Murree's data to rainfall on the catchment is :-

$$C = R^{(I)}_{av(10)} \quad \frac{av(10)}{(M)} = \frac{59.07}{69.07} = 0.85522$$

Consequently, the factor of 0.85522 determined using the Ischyetal method was used to transferdata obtained at Murree to the catchment area for the period between 1875 and 1962.

In order to appreciate better the value of the readings recorded at Murree the accumulated value of rainfall at Rawalpindi and at Murree were plotted on a graph for a period extending back to 1875. Both graphs are in agreement as regards the general tendency of recorded rainfall between the two stations.

TABLE -I

RESULTS OF "THIESEEN METHOD".

ARA OF CATCHMENT = 59.02 square miles.

Observation Station	Area square miles.	Percentage of total area.	10 years average rainfall(inches)	Rain-Inch square mile	Influence of station on catchment rainfall.
Murree	7.21	12.2	69.07	497.99	14.3
Ben	23.34	39.6	65.15	1520.60	43.7
Sher Bagla	4.56	7.7	63.50	289.56	8.3
Tret	5.43	9.2	55.97	303.92	8.8
Krore	18.48	31.3	46.84	865.60	24.9
Total	59.02	100%	-	3477.67	100%

Average annual rainfall on the catchment area $\frac{3477.67}{59.02} = 58.92" = R^{(T)}_{av(10)}$

TABLE - 2

RESULTS OF "ISOHYETAL METHODS"

Contours inches of Rainfall.	Area (square miles)	Rainfall (inches square miles)	Comulative area
69	1.20	82.20	1.20
68	4.04	272.70	5.24
67	6.28	417.62	11.52
66	6.03	394.97	17.55
65	4.85	312.83	22.40
64	3.41	216.54	25.81
63	2.04	127.50	27.85
62	1.61	99.02	29.46
61	1.43	86.52	30.89
60	1.40	83.30	32.29
59	1.21	70.79	33.50
58	1.55	89.13	35.05
57	1.29	72.89	36.34
56	1.77	98.24	38.11
55	2.32	126.44	40.43
54	2.67	142.85	43.10
53	2.69	141.23	45.79
52	2.47	127.21	48.26
51	2.28	45.14	50.54
50	2.27	112.37	52.81
49	2.20	106.70	55.01
47	4.01	190.90	59.02
Total	59.02	3486.19	

Average annual rainfall on the cadhment area $\frac{3486.19}{59.02} = 59.07''$* (I)

$= R_{av(10)}$

1.5 RUN OFF ANALYSIS.

Stream measurements were used to calculate rainfall data to run off. However this data from April 1960 to December, 1962 recorded at Chinot gaugin station covers a little less than three years period.

The discharge from chinot was transferred to Simly Dam site by the relation between areas and correcting it by the proportion of the average rainfall in the above mentioned period of the two areas.

	AREA	AVERAGE RAINFALL
Simly Water Shed Chinot	59.02 square miles	59.07"
Water Shed.	48.54 "	59.94"

Area factor $= \frac{59.02}{48.54} = 1.216$

Rainfall factor $= \frac{59.07}{59.94} = 0.985$

Accordingly the correction factor (0.985)x1.216 is 1.2 Using this correction factor in calculation the run off factor for each period was determined. A minimum amount of flow of which amount varies according to the period was included in the calculations.

It is interesting to note that the run off factor varies according to each period this being due to the varying claimate humidity percolation ovaporation and infilteration.

RUN OF FACTORS FOR SIMLY WATER SHED

Winter	January February March	0.283
Pre Monsoon	April May June	0263
Pre winter	October November December	0311
Monsoon	July August September	0309

1.6 EVAPORATION

1.6.1. General

The water that will be lost by evaporation at the Simly reservoir will depend upon the temperature of the area and water wind velocity and atmospheeic humidity.

Unfortunately evaporation data is not available at Simly Only pan observations at Rawalpindi Lahore and Pehsawarare available.

1.6.2. ATMOSPHERIC CONDITIONS

Data regarding air temperature and humidity for Rawalpindi, Simly and Murree have been compared. The temparature at Murree is lowest and humidity highest with simly having average reading between the two stations.

1.6.3. RESERVOIR EVAPORATION

Observation at Lahore and Peshawar span a period of several years (14 and 7) whereas for the data of the Rawal Dam observatory only one year was available Analysing the data of the Rawal Dam observatory it was found that evaporation for one year was 55" However since the recordings do not cover a period of sufficient duration to be considered representative, they were discharged.

Sixty three inches of annual evaporation, calculated by extrapolating from two stations was taken to be the reservoir evaporation at Simly. This was done by taking an average of the annual pan evaporation at Lahore and Peshawar and using a direct proportion in relation to their geographic location. No correction

was made for transforming pan observations to reservoir evaporations. Quantity of water deducted for evaporation for each month can be found in Table-3.

TABLE - 3.

EVAPORATION

Months	Reservoir evaporation in inches.	Reservoir evaporation in acre feet.
January.	1	31
February.	2	63
Marchm.	3	94
April.	5.	157
May.	8	250
June.	9	281
July.	9	281
August.	9	281
September.	8	250
October,	5	157
November,	3	994
December.	1	31
Total	63	1970

1.7 SEDIMENTATION STUDY

1.7.1 GENERAL

An estimate of the amount of sediment which may accumulate in a storage resevoir over a period of years is essential in the design of the dam. This is ore so when dams are built across river which are subject to extereme flow variations and carry a high proporation of sediment in flood pariods. This condition is typical of rivers in the indus basin.

The knowledge of the amount of sediment accomulation can be used in establishing whether an adquate live-storage capacity can be maintained in the useful life of the reservoir of whether some means of getting rid of the sediment must be provided.

Accordingly this study was made to determine the amount of sediment which may be transported by the Soan River into the Simly reservoir.

1.7.2 METHODS OF DETERMINING SEDIMENT QUANTITIES.

Since actual silt observations were lacking at the simly dam site the amount of proble sediment deposit must be estimated from available methods and data.

Several methods have been proposed to determine the amount of sediment which may accumulate in reservoirs in the Indus basin. Each of those have been carefully considered to determine whether it is applicable for the Simly catchment basin. The following is a summary of the proposed methods.

1.7.3. KHOSLA's Method

Khosla states that for the Indus basin the sedimentation is 0.75 acre feet per square mile per year. This figure is an average value for the area and since it does not distinguish between areas of plains and mountains nor between areas of light and heavy vergetation, its use for a specific region may not give satisfactory results.

1.7.4. STARMAN's METHOD

1.59 acre feet of sadiment per square mile per year is proposed for areas between elevations of 1000 feet and 8000 feet. This method is more realisitic than khosla's but it also does not consider the fact that different rivers flowing at this height may have considerably varying vegetation growth in theircatchment basins. Hence this method may not necessrily give reasonable results for the simly area.

1.7.5. Querishi Erosion Formula.

The method is based on an emirical relation as follows :

$$E = C \left(\frac{D}{A}\right)^{0.705} \times \left(\frac{H}{L}\right)^{0.235}$$

Where E = erosion in acre-feat per square mile of catchment area.
C = erosion factor depending on the composition and weathering ablity of the soil.
D = run-off of the stream in acre feet.
A = area of the catchment in square miles.
H = Difference in level of stream near the origin of the longest channel and the point of interest in feet.
L = Length of the longest stream to the point of interest in miles.

An average value for C of 0.0096 is given. However it is difficult to judge whether the soan river is subject to average erosion conditions. For extreme value of C=0.024 for the Harro and 0.0519 for the kurram are given. Form these values and the erosion quantities available for the same site and at Mukhad on the soan river, an interpolated value of 0:0079 was calculated. However, the catchment area of the Soan at this location is over 5 000 square miles (versus 60 square miles at simly) and most of its highly eroded. Therefore, this value of C will result in a high sedimentation amount of wooded slopes of the Murree hills.

Four site reading have been taken at the charah dam site but because of the inadquate number of readings it is not justified to use the results for any of the computations.

1.7.6. Analysis of Data.

By using the results of the observations of the Irrigation Research Institute, Lahore (I.R.I.) an equation was derived which would be applicable to the Simly catchment basin. A graph plotting the erosion values versus the values of yearly flow per square miles c of catchment area was plotted on semi-logrithm paper. Exculuding the highly sedimented Kurram and tributaries of the Jhelum River, a best straight line was drawn through the points obtained for the other rivers.

The question derived from this straight line was reduced to deduct for the allowance made for the bed load quantity included in the I.R.I. results. The resulting equation gives the erosion as :-

$$E = 4.20 \ln \frac{D}{A}$$

E = Erosion in acre-feet, for 100 -square miles per year.
D = Annual flow of the streamin acre-feet.
A = Catchment area in square miles.

Use of this equation will give a conservative sedimentation value for the simly site.

The sedimentation quantities determined by the various methods have been tabulated for comparision (c.f. table 4) the quantity derived by the Tecsult method is thus seen to be less than that derived from "Qureshi Formula. This is reasonable in view of the fact that the C value in the portions. The Tecsult method reveals that starman's estimate is valid for the Simly catchment, but it does not necessary imply that it will give reasonable quantities for any other area.

A graph has been plotted showing the level of sedimentation which would accur in the Simly reservoir over a period of 100 years assuming no outflow of sediment.

1.7.7. SYNTHESIS.

For the Simly reservoir, a rational approach for determining the sedimentation quantity have been derived. The resulting equation given the erosion.

$$E = 4+20 \ln \frac{D}{A}$$

It is significant to note that 4,300 acre-feet is the accumulation expected within the next fifty years. This is the basic figure used in the design of the reservoir capacity.

TABLE - 4

SED-IMENTATION STUDY.

COMPARISON OF RESULTS

Basis of Estimate	Sedimentation Quantity (Acre-feet)		
	1 year	50 years	100 years
Khosla	45.5	2.275	4.550
Starman	96.5	4,825	19,650
Querishi	147.5	7,370	14,750
Tecsult	86.4	4.300	8.150

1.8 Flood Control

1.8.1. General

In the reservoir design, provision has been made for spilling excess water that may occur during the monsoon periods. This may be done at a spillway located on saddle on the right bank of the river. Keeping in mind, that should the capacity of the spillway be exceeded, serious consequences may result to the works, particularly the earthfill dam which cannot sustain overtopping, as this is synonimous with failure. The spillway is therefore, designed for extreme flood conditions.

In order to arrive at the maximum design flood for determining the spillway capacity, several methods were used and compared.

1.8.2. Concentration Time

Taking into account the topography of the water shed, different mean velocities were assumed forrun-off in different parts of the basin. The following equations were used.

In vallyes $V = 63.5 \text{ Sin } Q\ 0.6$

On slopes $V = 6.35$ " $Q\ 0.6$

Where Q = slope indegrees

V = mean velocity in feet/second.

From this study the concentration time was found to range between 4 and 8 hours.

1.8.3. Unit Hydrograph.

The maximum rainfall for aday, obtained from the Murree record is 8.8" on August 5,1958. This is the highest recorded daily rainfall during the period of 1932 to 1960 at Murree. The value of 8.8 inches of rainfall transfered to the catchment area using the correlation factor is equivalent to 7.52" of rainfall in the watershed.

A unit hydrograph was drawn up using these values and the maximum discharge determined using the appropriate run-off factors. This was found to range between 106,000 and 53,000 cusec depending on the concetration time.

In comparing these results with the Myer's formula, we find a rating of C= 138, and C= 69. The Myer's rating C is defined as the ratio of the peak flor Q in cubic feet per second to 100/A is the drainage area in square miles.

$$C = \frac{Q}{100x\sqrt{A}}$$

In comparing areas in the USA and in Canada, that have similar climatological and geographical conditions, it would seem that the 106,000 cusec flood is on the high side.

1.8.4. STREAM MEASUREMENTS.

The gauging station downstream of the Simly dam site, recorded on September 1, 1963 a flood of 20.000 cusecs.

In addition, observers in the field reported to us that traces could be seen on the banks of the river, indicating that the water level had risen to much higher elevations during floods. A study was made using a stage discharge relationship and assuming that the water had risen to such heights the probable maximum flood was estimated as ranging between 50.000 to 70.000 cusecs.

1.8.5. ISOCHRONES.

In order to compare rainfall of longer duration but of lesser intensity to previous results, records were examined to determine the three consecutive days that give maximum rain fall.

Establishing the excess rainfall (run-off), a flood curve for outflow drawn based on 72 hours interval of rainfall using isochrones. The maximum flood created by these circumstances was estimated to be 47,500cusec. The process was again repeated using 8 hours maximum in flow discharge into the reservoir. The flood was estimated to be 62,300 cusecs.

1.8.6. FLOOD ROUTING THROUGH RISERVOIR.

Therefore, through the use of several methods, the results of which can be found in Table 5, it would be seen that the maximu inflow in to the reservoir could vary between 50.000 to 70,000 cusecs. Using the data of the last result for an inflow of 62,300 cusecs, a flood routing through the reservoir was made. The maximum discharge at the spillway was found to be 15,200 cusecs.

TABLE - 5
ESTIMATE OF MAXIMUM FLOODS
IN CUSECS

Unit Hydrograph	Stream measurements	Isochrones	
		Three consecutive days.	8 hours concetration
53,000 to 106,000	50,000 to 70.000	47,500	62,300

Relying on available records and data used for this study probability studies indicated that the period of reoccurrence for such a flood could be approximately 500 years.

Based on the small amount of data available and studies regarding maximum water inflow in the reservoir, the spillway should be designed to discharge 40.000 cusecs under maximum flood conditions. Taking into account the net free board of the dam, the spill-way will have a greater capacity under extreme conditions and will take care of peak inflows into the reservoir in the range of 100,000 to 200,000 cusecs.

1.9. RISERVOIR CAPACITY AND LEVEL

4.9.1 General

The period between 1875 and 1962 was investigated using a mass diagram. All rainfall was transformed to runoff using the

established correlation factors for each period. Reservoir exaporation was deducted from the inflow representing the amount of water available.

For a consumption of 28.6 m.g.d. at the delivery point, a demand of 30 m.g.d. was assumed at the reservoir, to take into account losses (4%) of the reservoir, treatment plant and conduction main.

1.9.2. DRYEST PERIOD.

During the study the dryest period was found to be in 1921 and the corresponding live storage required is 47,500 acre-feet. It is to be remarked that the three dryest years in the period from 1875 to 1962 acourred consecutively in the years 1919,1920 and 1921. An extensive study was undertaken to establish the reccurrence of the three dryest years. The period of reccurence was found approimately to be 1000 years. In view of this result this dry period was not considered applicable for determining the reservoir live storage for a project whose usefull life will be much shorter.

1.9.3. Live storage and Maximum Normal Water Level

The next dryest period occurs between 1879. Based on this period it is found that the inflow in the reservoir is nearly parallel to the consumption rate and therefore, will not satisfy the demand. The maximum consumption rate at the delivery point that we recommend under these circumstances is 24 m.g.d. (25 m.g.d. at dam) and this satisfies all periods except the dryest one which would require a live storage of 28,600 acre feet to satisfy this consumption rate. In using the results of the second dryest period we find that the maximum normal water level of the reservoir is 2295 feet, determined as follows :-

Bottom of reservoir	EL 2100'
Required dead storage for sediment during a 50 years period 4,300 acre feet.	
Required elevation of sediment assuming horizontal surface.	EL 2203'
Elevation of intake sill	EL 2220'
Maximum elevation of sediment (Provision for 62 years, 5,300 acre feet).	EL 2210'
Maximum drawdown allowed sill of intake EL 2220'	
+diameter of intake tunnel	6'
+minimum cover	7' EL 2233'
Live storage (during 1879 to 1881 period) 19,800 acre feet)	
Required additional height above minimum drawdown.	62 feet
Maximum normal water level	EL 2295'

APPENDIX-II
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COST ESTIMATE FOR DIVERSION FACILITIES.

S.No.	Description of work	Estimated quantities	Unit	Rate in rupees	Amount in rupees.
I-	DIVERSION TUNNEL:				
1.	Overburden excavation.	67,000	Cu.yd.	7.00	4,49,000
	(By Mustafa PRCC)(By Mir Aslam Khan & Sons)	34,000	-do-	1.60	54,400
2.	Rock excavation open cut (A) with side slopes of 1.H 5V.by				
	i)M/s.Mustafa PRCC Ltd.	45,000	-do-	7.00	3,15,000
	ii)M/s.Mir Aslam Khan & Sons.	2,79,541	-do-	6.50	18,17,017
	(B) With sides slopes of 1,H 1.V. by M/s.Mir Aslam Khan & Sons.	2,84,200	-do-	12.00	34,10,400
3.	Line Drilling.	5,000	Lin.ft.	5.00	25,000
4.	Rock excavation tunnel.	17,840	Cu.yd.	21.60	3,85,344
5.	Tunnel enlargement.	2,130	-do-	5.40	11,502
6.	Rock bolts.	1,000	Lin ft.	3.00	3,000
7.	Drilling holes for rock bolts and relief holes.	1,500	-do-	5.00	7,500
8.	Form Plug.	10,000	sq.ft.	2.00	20,000
9.	Form Tunnel	503'-6"	Lin ft.	120.00	60,420
10.	Form intake Plain	3,800	-do-	1.50	5,700
11.	Curved.	2,800	-do-	3.00	7,500
11-	Metal water stopes.	210	-do-	20.00	4,200
12.	Concrete Tunnel unreinforcement.	3,600	Cu.yd.	162.00	5,83,200
13.	Concrete tunnel reinforcement.	1,340	-do-	165.00	2,21,100
14.	Lean Conrete Plug section	850	-do-	108/-	91,800
15.	Concrete Plug section.	775	-do-	25.00	19,375
16.	Concrete Intake.	1,180	-do-	175.00	2,06,500
17.	Reinforcement tunnel.	39,000	Lbs.	0.75	29,250
18.	Reinforcement Intake.	1,84,000	-do-	0.75	1,38,000
19.	GROUTING.				
	i) Grouting to seal off flow during excavation mobilisation and demobilisation.	-	-	L.S.	20,000
	ii) Grouting to seal off during excavation drilling.	500	Lin ft.	15.00	7,500
	iii) Grouting to seal off flow during excavation connection.	50	No.	200.00	10,000
	iv) Grouting to seal off flow during excavation cement.	200	Bags.	20.00	4,000
	v) Grouting to seal off flow during excavation sand.	50	Cu.ft.	2.00	100
	vi) Grouting to fill voides in tunnel roof.	-	-	L.S.	4,00,000
	vii) Grouting to voids in lean concrete.	-	-	L.S.	1,00,000
	viii) Contact & Consolidation Grouting drilling & working holes.	2,500	Lin.ft.	10.00	25,000
	ix) Contact sonsolidation grouting connection.	300	No.	50.00	15,000
	x) Contact consolidation Grouting connection.	2,000	cu.ft.	15.00	30,000
20.	STOP LOG & STOP LOG GAINS SUPPLY & ERECT.				
	i) Stop lo g gains supply fabrication & place.	28,722	Lbs.	2.00	57,444
	ii) Stop lo gs supply & fabrication	60,720	-do-	2.00	1,21,440
	iii) Stop lo gs & gains supply, apply two coats read lead.	8,200	sq.ft.	0.50	4,100
	iv) Stop logsseals 4"x3"/8" supply and fix.	682	Lin ft.	25.00	17,050
	v) Stop logs seals complete supply and fix.	30	-do-	30.00	900
	vi) Stop logs install.	-	-	L.S.	2,000
				Total;	86,99,740

Say Rs. 8.700 Millions(.)

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APPENDIX -II

II. RESIDENTIAL COLONY, SITE OFFICE AND LABORATORY. (Page-2)

S.No.	Description	Quantity	Rate Rs.	Amount Rs.
1.	COLONY.			
i.	A type quarters.	9 Nos.	*16,945/37	1,52,508/33
ii.	B type quarters.	19 "	*18,093/87	3,43,783/53
iii.	C -do-	11 "	*26,356/98	2,89,926/78
iv.	D -do-	7 "	*35,205/53	2,46,438/71
v.	E -do-	2 "	*53,831/04	1,07,662/08
vi.	Sanitary Sewerage System and Water Supply.	38		77,568/37
vii.	Cost of construction of Internal Roads for Colony and Inspection Bungalow.			62,971/92
			Total: -	12,80,859/72
			Say Rs.	1,281 millions.

2. LABORATORY.

	Plinth Area	Per Sq.ft.	
a) Buildings.	2,433 sq.ft.	25/- **	60,825/-
b) Equipment.	-	L.S. **	74,000/-
3. MOSQUE	2,300 "	25/- **	57,500/-
4. MARKET	2,700 "	25/- **	67,500/-
5. INSPECTION BUNGALOW.	2,470 "	30/15 per sft.	74,482/-
6. SITE OFFICE	3,300 "	20/- **	66,000/-
		Total:	4,00,307
		Say Rs.	0.400 millions.

Provision in Phase-I = Rs. 0.840 millions

Provision in Phase-II = 1.681-0.840=Rs. 0.841 millions (B)

Grant total of Diversion Facilities & Colony(A&B)=Rs.8.700+0.841=9.511

*Evaluated from tendered amount.

**Evaluated on the CDA Schedule of rates as these works have not yet been tendered.

APPENDIX-III

COST ANALYSIS FOR MAIN EMBANKMENT (DAM)

S.No.	Item	Quantity	Unit	Rate(Rs/unit)	Amount
1.	Diversion Canal & Dike.	-	L.S.	-	200,000
2.	Rock excavation.	200,000	C.Y	7.50	1,500,000
3.	Foundation preparations.	-	L.S.	-	800,000
4.	Grouting.	-	L.S.	-	700,000
5.	Impervious Core.	620,000	C.Y.	7.506	4,653,720
6.	a) From excavation.	400,000	C.Y.	6,600	2,640,000
	b) From Quarry	1,330,000	C.Y.	12,015	15,980,000
7.	Filters	300,000	C.Y.	24,30	7,290,000
8.	Tunnel Plug & Cave.	-	L.S.	-	1,000,000
9.	Instrumentation.	-	L.S.	-	200,000
10.	Coffer Dams.	-	L.S.	-	800,000
					3,57,63,720

Say Rs. 35.764 millions.

APPENDIX-IV

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CONSULTANTS FEES.

	Fees in Rupees. (Millions)	Foreign Exchange component(Millions)
1. Fees already paid to M/s. Tam MAJEED during 1962 for the preliminary investigations	0,367	0.126
2. Fees paid to M/s.Tecsult International Limited from 1963 to date.	3.465	0.950
3. WAPDA Fees:-		
a) Review.	0.140	-
b) Design.	1.250	0.400
c) Special Services.	0.250	0.050
d) Transport and other facilities.	0.150	-
Total:	5.622	1.526
Provision in Phase-I =	2.670	0.740
Provision in Phase-II =	2.952	0.786

APPENDIX-V

INVESTIGATIONS & SUB-SOIL EXPLORATIONS.

A) AMOUNT ALREADY SPENT.	AMOUNT IN RUPEES.
1. Drilling Equipment mobilzation & move in	29,100
2. Moving Drill holes.	52,500
3. Drilling in Overburden.	2,385
4. Drilling Rock.	18,408
5. Inclind Holes in Overburden.	8,762
6. Inclined holes in Rock.	2,65,478
7. Water pressure test.	20,490
8. Drilling Inclined holes through	2,010
9. Drilling Inclined holes through Rock	60,555
10. Drilling vertical holes.	522/50
11. Drilling vertical holes through Rock.	4,916
12. Cost of Material such as cement/steel etc.	3,984/15
13. Excavation of trial pits & testing of soil samples in Pakistan and abroad.	47,708/51
14. Excavation of trial pits and testing of soil samples	32,291/49
Total:-	5,49,039/82

B) AMOUNT TO BE SPENT	
1. Retary drilling and excavation of trenches.	800,000
2. Excavation of trial pits andtests on samples.	100,000
3. Filed investigat on fillter media and tests in the laboratory.	100,000
Total:-	1,000,000

Grand total = 5,49,039+1,000,000 = Rs. 1,549,039/82
or Rs. 1.549 millions.

-.-.-.-.-.-

APPENDIX- VII

MANPOWER REQUIREMENTS

(A) FOR EXECUTION.

I. a ENGINEERS.

		TOTALS:
1. Director	= 1	
2. XEN Dam.	= 1	
3. XEN Tunnel & Spillway.	= 1	
4. A/Es average four per XEN.	= 8	
5. Overseers average 3 per A/Engineer.	=24	
6. Drawing and estimation staff.	=20	
7. Assistant Director (Geology).	= 1	
Total:	=56	56 Nos.

I.b SOIL CONSERVATION:

1. Soil Conservation Officer.	= 1	
2. Assistant Soil Conservation Officer.	= 1	
3. Range Forest Officers.	= 4	
4. Field Assistant.	= 16	
5. Demarcation Superviosor.	= 1	
6. Head Clerk.	= 1	
7. Senior Accountant.	= 1	
8. U.D.Cs(Estt:Clerk, Record Keeper & Cashier).	= 3	
9. LDSs (Dairy & Despatch, Estt:Typist,Bill Clerk and Accounts Clerk.	= 5	
10. Stenotypist.	= 1	
11. Peons (office-1,S.C.O. ASCO=1,Dar Runner=1	= 5	
12. Drivers.	= 2	
Total:	= 41	41 Nos.
II Skilled Staff	=	450 Nos.
III Unskilled Labours.	=	2000 Nos.

(B) FOR OPERATION/MAINTENANCE.

1. XEN	= 1	
2. SDO	= 3	
3. Overseers.	= 12	
4. Skilled Staff & Workers	=100	116 Nos.

APPENDIX - VIII

MATERIAL AND EQUIPMENT REQUIRED

Sl. No.	NAME OF MATERIAL	1969-70	1970-71	1971-72	1972-73	Total
1.	Cement.	100 tons	10,000 Tons.	15,000 Tons.	4,900 Tons	30,000 Tons.
2.	Steel.	-	400 Tons.	300 Tons	200 tons	900 tons
3.	Sand.	-	10 lac cft.	10 lac cft.	5 lac cft.	25 lac cft.
4.	Bajri.	-	6 lac cft.	6 lac cft.	3 lac cft.	15 lac cft.
5.	Stones.	-	10 lac cft.	10 lac cft.	5 lac cft.	25 lac cft.
6.	Explosives.	250 tons	200 tons.	150 tons	-	600 tons.
7.	Safety fuse.	2,00,00 Rft.	5,00,000 Rft.	1,00,000 Rft.	-	6,20,000 Rft.
8.	Detonators(etc.) and ordinary.	1,50,000 Nos.	2,00,000 Nos.	50,000 Nos.	-	4,00,000 Nos.
9.	Earth.	-	0.5 m.c. yards.	1.5 m.c. yards.	1.00	3.00 m.c. yds.

FOREIGN EXCHANGE REQUIREMENTS

S. No.	Description	Qty.	F.requirements in million rupees.
1.	Heavy earth moving equipment for construction of dam and workship tools and plant as detailed below :-		
	a). Power shovels.	4 Nos.	11.900
	b). Tractor D-S.	8 Nos.	
	c). Motor Graders.	3 "	
	d). Sheep foot rollers.	4 "	
	e). Prime movers for (4).	4 "	
	f). Water Tankers.	3 "	
	g). 10 weel 20 ton trucks.	35 "	
	h). Compressers.	4"	
	i). Drilling & Boring equipments.	20 Nets	
	j). Grouting equipment.	2 "	
	k). De-watering pumps with motors.	4 "	
	l). Workshop tools and plant.	1 "	
	m). Truck monted crane.	1 No.	
2.	Instrumentation.		
	a) Satlement guage.	2 Nos.	0.100
	b) Slop indicators.	2 "	
	c) Surface monuments.	39 "	
	d) Piezomets of different type.	72 "	
3.	Spillway gates including motors and other accessories.		4.210
4.	Steel.	900 tons	0.574
5.	Equipment for soil testing Laboratory.		0.074
6.	Cost of testing of soil samples in USA and Canada.		0.031 As per actual already incurred.
7.	Consultants fees in foreign exchange.		0.786
		Total:-	17.675
		Add 5% contingencies	0.884
		Grand Total:-	18.559

CAPITAL DEVELOPMENT AUTHORITY

CASH FLOW STATEMENT IN RESPECT OF
WATER SUPPLY IN ISLAMABAD.

A cash flow statement of "Water Supply in Islamabad" based on the life of the plant etc; and showing the "recovery correlated with the "Capital cost", interest on investment' and 'amortization/ depreciation charges' has been prepared in accordance with the decision of the C.D.W.P. taken in its meeting held at Lahore on 23.2.1970.

2. The capital cost in the statement includes the revised costs of the two approved schemes viz., "Water Suuply in Islamabad" & "Bulk Water Supply Phase-I" and the tentatively estimated cost of the third scheme viz; "Bulk Water Supply, Phase-II" for which the PC-I is presently under preparation. The annual maintenance and reparis costs have been worked out according to the provisions made in the PC-Is. Availability of water has been taken as 24 MGD from Simly Dam (Bulk Water Supply Schemes) and 15 Mgd as average, taking into consideration the drop in the quantity of water available during summer months, from the sources covered by the Water Supply Scheme (under consideration). Thus the total quantity of 39 Mgd would be available after the schemes are completed and put in full operation.

3. The recoveries have been calculated on the basis of three alternative rates (Rs. 1/- Rs. 1/50 and Rs.2/- per 1,000 gallons) for water charges. Water supply in Islamabad is to be metered and meters have been/are being installed. The present rate of metered supply in Islamabad is Rs. 1/- per 1,000 gallons from the private sector. In the case of Government servants, however, the reduced rate of 60 Paisa per 1,000 gallons, as approved by the Government, is being charged and the class IV employees are being supplied free of any charge under Govt. decision. The subsidy in the shape of subsidy reduced rates for the Government servants and free supply of water to the class IV employees has not been taken into consideration for the purposes of preparation of cash flow statement", as this is an administrative subsidy and not a subsidy to the project.

4. Rawalpindi Municipality has recently increased the water rates by 100%. Water supply in Islamabad being still more costlier on account of different and distant sources tapped, undulating terrain and rockey strata, a review of water rates in Islamabad for upward revision had already been considered necessary, and basic information data for such a study is already being collected by the Authority. While revising the rates, complete details of the cost etc; of the schemes, which would also be worked out in final details, would be taken into consideration.

5. From the attached "Cash flow Statement" it can be concluded that the revised rates would be in the vicinity of Rs.1.50 per 1,000 gallons which compares quite favourably with the revised rates of Rawalpindi Municipality.

CASH FLOW STATEMENT IN RESPECT OF WATER SUPPLY IN ISLAMABAD.

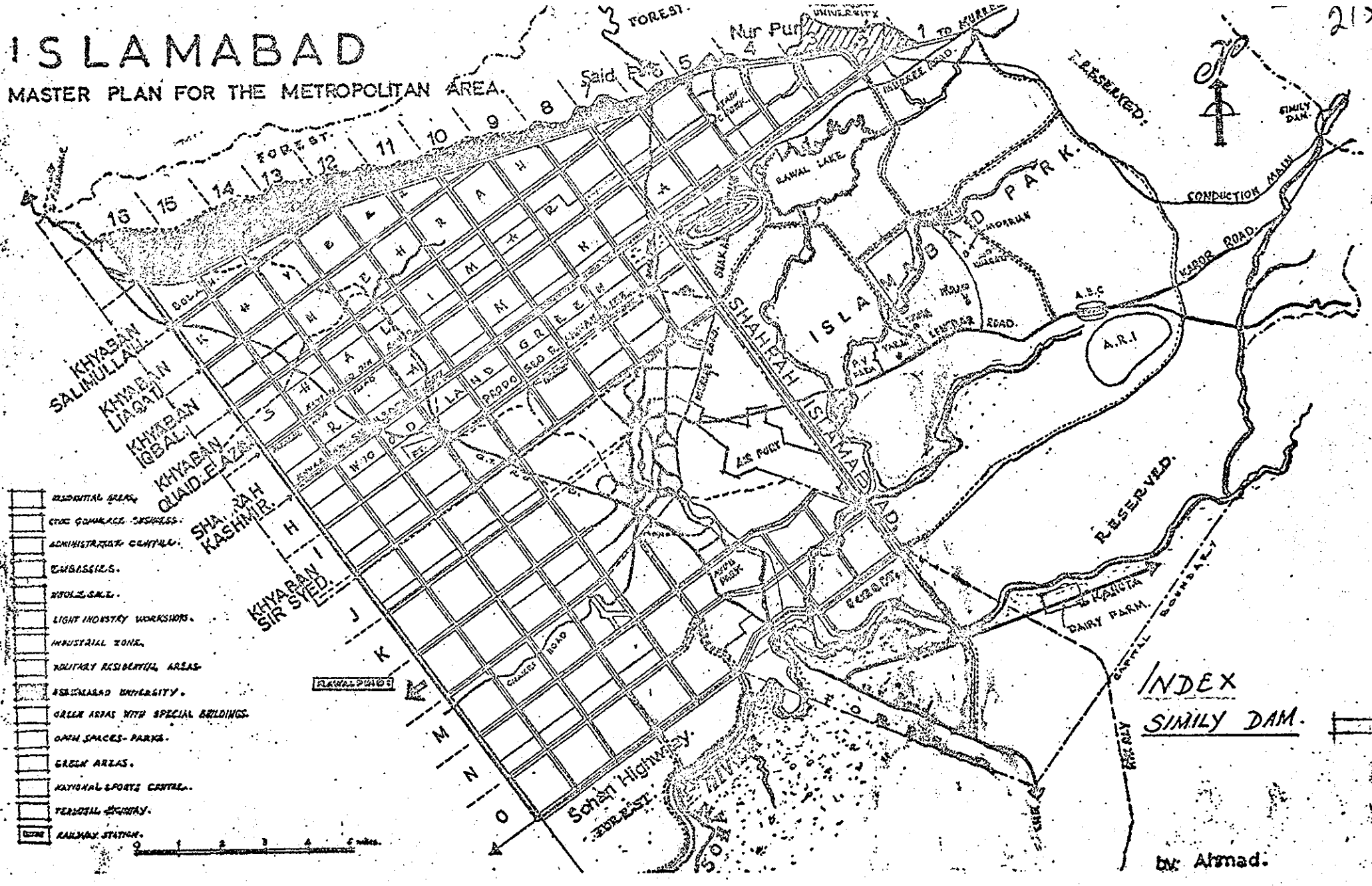
	Rs.
1. Capital Cost of the Schemes.	
a) Water Supply Scheme (Revised PC-I)	10,04,20,000
b) Bulk Water Supply Scheme, Phase-I (Revised PC-I)	4,96,62,000
c) Bulk Water Supply Scheme, Phase-II (Estimated cost as the PC-I is under preparation).	8,00,00,000
Total Capital Cost:	23,00,82,000
2. Annual Costs.	
a) Interest on investment @ 6% (Average cost basis) -	69,02,460
b) Repairs & Maintenance.	
i) Water Supply Scheme @ 1.75% -	17,57,350
ii) Bulk Water Supply Schemes @ 2%	25,93,240
c) Amortization cost (based on 40 years average life) -	57,52,050
Total Annual Cost.	1,70,05,100

3. Recoveries through water charges, after the schemes are completed and in full operation.	At the existing rate of Rs.1/- per 1000 gallons.	At the possible revised rates of Rs.1/50 per 1000 gallons	Rs.2/- per 1000 gallons.
a) Daily recoveries for 39 M.G.D.	39,000	58,500	78,000
b) Annual recoveries for 365 days.	1,42,35,000	2,13,52,500	2,84,70,000

4. Annual Surplus or Deficit. (-)27,70,100 +43,47,400 + 1,14,64,900

ISLAMABAD

MASTER PLAN FOR THE METROPOLITAN AREA.



INDEX

SIMILY DAM.

by: Ahmad.

S C H E M E

F O R

D E V E L O P M E N T

O F

UNIVERSITY OF ISLAMABAD
I S L A M A B A D

PHASE & II

PART - I SHORT TERM REQUIREMENTS

(1974-75 TO 1975-76)

OCTOBER 1974

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FOREWARD

The University of Islamabad was started, at least in terms of the establishment of administrative and planning units, in 1967. Soon after, teaching work in Physics, Mathematics, Chemistry and Economics was started in leased buildings in Satellite Town, Rawalpindi. The new campus in Islamabad was formally inaugurated by the President of Pakistan on 5th October, 1971 and the entire establishment of the University was shifted to the new campus. 1. In physical terms it has by now a campus of 9 academic buildings, 3 hostels and 2 administration buildings. In academic terms it 2. has developed nine departments doing teaching and research work in Mathematics, Physics, Chemistry, Economics, Earth Sciences, Biology, Cultural History, International Relations and Pakistan Studies.

2. This University was established in order to achieve the objectives of creating skilled manpower essential for the educational, scientific and technological development of the country. This was done with a view to decrease the dependence of Pakistan on foreign universities for obtaining high skilled manpower. The University was also created to provide stimulus to research scholars and add to the scope and diversity of education at the highest academic level. In the earlier stages the University was envisaged to have only the Physical Sciences and a few Social Sciences like Economics, Psychology, Sociology, International Relations and Cultural History, but with the introduction of new Educational Policy and changing requirements of the country the field of Pakistan Studies, US Studies and African Studies was also included. Similarly Earth Sciences and Computer Sciences were also started. The University is planning to have additional fields of study. The entire academic programme is based on this concept. The University of Islamabad in all the new fields is attempting to attain the highest academic and research standards. Only those additional fields have in fact been opened/strengthened that entail interdisciplinary teaching. Thus academic base of this University and the new fields of knowledge will provide in its programmes studies in depth.

3. From the beginning this university has been conceived as a seat of learning in terms of research. Higher education without research can not be called higher education. This University has no involvement in college education or as an examination institution. It is thus more probable that it will develop into a real research University.

4. The difference between the technician and philosopher is that the former is trained to construct, adjust or perform functions related to objects requiring mechanical skill and expert knowledge of set of techniques, whereas the philosopher is required to be able to use his or her knowledge, imaginatively and develop new precepts in realm of sciences and arts. The Universities are schools education and research. They preseve and strengthen the inter-action between knowledge and zest for life by uniting the young and the old in the sphere of learning as a creative process. The University trains intellectuals, pioneers of civilization, the statesmen, the doctors, scientists, the scholars; men of letters in various branches of knowledge without which the sources of knowledge go dry and the society becomes dogmatic and cruel. The development of the University of Islamabad is an effort to evoke a spirit of learning, national thinking among the youth to construct a progressive society a society that would appreciate and generate intellect and scholarship.

5. Development of this University as an institution of research and teaching of highest level has been rather slow. A lot of factors are responsible for this. More important, however, are the national conditions through which our nation has passed from 1965 to 1970 i.e. from the time of its conception to the setting up of an administrative unit for the functioning of few schools of learning each confined to a few rooms. Apparently, correct priorities had not been fixed to achieve the basic goal of the University. An example of this is that a Library which is the hub of academic activity of a university has not been constructed. Similarly other areas of development of this university like the residential quarters, student -teacher centre, the Auditorium the Senate hall etc. have been pushed into the back-ground. These short falls have to be met in the future. This has placed heavy burden on the second phase. But there is no alternative.

6. At the present rate of growth of students at this University and the ratio between day-scholars and boarders, the number of expected boarders is going to be considerably higher than originally estimated. The number of hostels for students would thus be more than conceived in the original plan.

7. The phase II lays strong emphasis on the academic development of this University. The completion of this phase would take this University to a level where it can, with few adjustments, approach the objectives of its creation. This university is not at a stage yet where it can have all the branches of knowledge essential for

approaching international standards. There is an explosion of knowledge both in the Physical Sciences and the Social Sciences in the world. It is imperative that endeavour are made to be atleast some where near the main stream of knowledge and disciplined.

8. This original draft of the scheme was prepared in 1973 when the price level was very different from what it is today. In view of the objections raised in the ECNEC meeting the scheme has been divided into two parts; the immediate one for two years and main scheme for 5th five year plan extending upto 1980. Because of the above stated increase in prices, financial implications have increased but in substance the scheme has been reduced by 30%. If it is decreased further it would mean serious set back to the coordinated development of the Federal University.

I may also add that Federal Universities all over the world are important mark in terms of quality of education as well as prestige of the country. A University in the capital is indicative of the attitude of a society attaches to the training of intellect of its people to face the cha llenges of the 20th century. Hence I would request that the programme should be expedited. Educational progress is intrinsically related to the general progress of the society and the country.

Sd/- x x x x x
Dr. (Miss) K.F.Yusuf,
Vice-Chancellor.

Form PC-I

Code Number for Project
(To be filled in by
Planning Commission)

PART " A"
PROJECT DIGEST

1. Name of Project : University of Islamabad Phase-II Part-I Short term requirements

2. Authorities responsible for :

(i) Sponsoring : Ministry of Education Government of Pakistan, Islamabad.

(ii) Execution : University of Islamabad

(iii) Operation and Maintenance University of Islamabad

3. Time required for completion of project. (in months) 24 months

4. (a) Plan provision.

(i) If the project is included in the current Five-year Plan, specify actual allocation. On going scheme Rs. 355 lacs provided in the 4th Five year plan.

(ii) If not included in the current plan, how is it now proposed to be accommodated (Inter/Intra-Sectoral adjustments in allocation or other resources may be indicated.

Not applicable.

(iii) If the project is proposed to be financed out of block provision for a programme, indicate:

Total Block Provision	Amount already committed	Amount proposed for this project	Balance available

Not applicable

(b) If project is not in the Plan, what warrants its inclusion in the Plan.

Not applicable

5. Relationship of the project with the objectives of the sector. Indicate the contribution of the project, quantified if possible to the targets in the Five Year Plan; and the names of other projects (whether sanctioned or under preparation) which would form part of an integrated programme within the sector.

The University of Islamabad was established in order to achieve the objectives of creating skilled manpower essential for the educational, scientific and technological development of the country. This was done with a view to decrease the dependence of Pakistan on foreign universities for obtaining highly skilled manpower. The University was also created to provide stimulus to research scholars and add to the scope and diversity of education at the highest academic level. In the earlier stages the University was envisaged to have only the Physical Sciences and a few Social Sciences like Economics, Psychology, Sociology, International Relations and Cultural History, but with the

introduction of new Educational Policy and changing requirements of the country the field of Pakistan Studies was also included. Similarly Earth Sciences and Computer Sciences were also started. The University is planning to have additional fields of study. Important of these is the Area Studies which will be started in the near future. The entire academic programme is either based on the origianl concept of the University or on the Educational Policy 1973. The University in all the new fields is attempting to attain the highest academic and research standards.

			(Rupees in Million)
6.	Capital Cost of Project	:	
	Local Costs	:	40.85
	Foreign Exchange costs	:	9.00
		Total:	49.85

7. Annual recurring expenditure after completion:

	Local	:	12.00
	Foreign Exchange	:	0.50
		Total:	12.50

8. Objectives of the Project preferably in quantitative terms

As per annexure " B "

Sd/-

Prepared by and Checked by

(N. H. MIRZA)
Assistant Controller Examination

Approved by

Sd/- - - - - -
DR.(MISS) K.F.YUSUF
Vice Chancellor.

PROJECT DESCRIPTION AND FINANCING

9. Location of Project (Attach Map).

(a) Give name of place and administrative district in which the service centre will be located.

Federal Area of Pakistan Islamabad (Location map attached).

(b) Indicate total area which will be served.

Through out the country.

10. Existing facilities :

Give information about public and private sector institutions in the area, their staff and equipment, actual enrolment in various classes and capacity enrolment of the institution. The information about public and private sectors institutions should be given both for the level of the educational programme proposed by the project as well as for the lower level institutions which will be served as feeder institutions for the project.

" The University of Islamabad has been established to decrease dependence on the foreign countries for its programme of higher training. No any other university or institution of the country is unitary type like this University. All the Universities/Colleges of Pakistan are expected to serve as feeder institutions for the project ."

11. Description of the project:

(a) Give brief history, proposed facilities and justification of project.

Please see Annexure " B ".

12. (b) Give population of the area to be served, age groups and income levels.

Pakistan as whole.

(c) Relationship with other programmes in the same sector and in other sectors. Indicate whether coordination with other sectors have been ensured.

Only a few centre of excellence have recently been established by the Government in various universities The co-ordination with such institutions has been ensured. The duplication of efforts as far as possible has been avoided.

(d) Give student-teacher ratio for the project and the national average for the proposed level of education. Give also the extent of library and laboratories facilities per student and how it compares with the national average.

(i) Student-Teacher ratio for this project works out to 5 : 1 in research.

(ii) Library and Laboratories facilities according to the requirement of this special type of University are being developed side by side. It has no comparison with the national average as there is no other research university in Pakistan.

(e)(c) The employment prospects of the persons to be trained in terms of the present and future demand.

The employment prospects of the persons to be trained are very bright as the country is under development and the skilled man-power is needed to a large extent to meet the growing requirements.

(f) Give details of the type of training or education to be imparted. The syllabus and the subjects in which emphasis will be placed. Indicate availability of teaching staff.

The feature of the University are post-graduate teaching and research leading to M. Phil. and Ph. D. level in the following main fields. Pure Mathematics, Applied Mathematics, Computer Sciences, Theoretical Physics, Experimental Physics, Physical Chemistry, Organic Chemistry, Analytical Chemistry, Botany, Genetics, Psychology, Geo-Physics, Geography, Electronics, Bio-Chemistry, Economics, International Relations and Foreign Policy, Cultural History Business Administation, Sociology, Physiology, Anthropology, Pakistan Studies.

(g) Give details of administrative structure for implementing the Project.

The construction works will be carried out under supervision of the Project Directorate while the Academic programme will be taken care of by the Academic Council already established for the purpose.

12. Give date when capital expenditure estimates were prepared. If prepared more than one year ago confirm if they are still valid.

April, 1973

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13. **Capital Cost:**

Give breakdown of capital cost year-wise, covering the whole of the investment period, as indicated below :

Item	Total at official rate of exchange				I Year at official rate of exchange 1974-75				II Year at official rate of exchange 1975-76			
	Local	F.E.C.	Import Duties	Total	Local	F.E.C.	Import Duties	Total	Local	F.E.C.	Import Duties	Total
1. Building construction	33.12	1.00	-	34.12	8.80	-	-	8.80	24.32	1.00	-	25.32
2. Site development and allied services/utilities	1.73	-	-	1.73	1.20	-	-	1.20	0.53	-	-	0.53
3. Consultant's fee	-	0.10	-	0.10	-	0.10	-	0.10	-	-	-	-
4. Office and Scientific equipment	1.10	7.00	-	8.10	0.60	4.50	-	5.10	0.50	2.50	-	3.00
5. Furniture	0.90	-	-	0.90	0.60	-	-	0.60	0.30	-	-	0.30
6. Books	1.20	0.90	-	2.10	0.50	0.50	-	1.00	0.70	0.40	-	1.10
7. Scholarship/Fellowship	1.60	-	-	1.60	0.60	-	-	0.60	1.00	-	-	1.00
8. Project Directorate	1.20	-	-	1.20	0.60	-	-	0.60	0.60	-	-	0.60
TOTAL :	40.85	9.00	-	49.85	12.90	5.10	-	18.00	27.95	3.90	-	31.85

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14. Basis of cost estimates, (give full details)

Prevailing market rates in Islamabad.

15. Estimates of annual recurring expenditure after completion each phase of project. Also indicate sources of financing recurring expenditure.

	Local Cost	F.E.Cost	Total
	(Rupees in Millions)		
			See page 15
Salaries of staff:			
(a) Service staff. (Teaching staff)	5.26	-	5.26
(b) Ancillary staff(e.g para medical)Establishment	3.32	-	3.32
(c) Supervisory and Administrative staff	0.71	-	0.71
(d) Consumable stores and supplies chemicals	0.20	0.10	0.30
(e) Books and Journals	0.10	0.20	0.30
(f) Contingent staff Chowkidars,Malies,Sweepers Cooks and Bearers	0.58	-	0.58
(g) Other contigencies e.g., Electricity,Water and Postage etc.	1.73	0.10	1.83
(h) Rent and rates	-	-	-
(i) Other expenditure e.g., sports and workshop supplies.	0.10	0.10	0.20
Total:	12.00	0.50	12.50

16. Unit cost for each category of service or output e.g. for educational institutions, the cost per student and how it compares with costs in other institutions.

The cost per student works out to Rs. 11904. It may be some what higher than the costs per students in other institutions due to the reasons that :

i) This University is at present in its developing stage and the number of students has to be restricted to the size of faculty, laboratories and library.

ii) This University is not dealing with the under graduate studies and has no affilated colleges with the result that it has no source of income from examination fee Registration fee etc. like other universities.

iii) The most important factor is the house subsidy and the conveyance allowance to the tune of about Rs. 27 lacs per year which has to be paid to the staff residing in Rawalpindi/Islamabad. This expenditure could be eliminated altogether if the residential colony of the university is ready.

It is hoped that on the completion of residential colony and further development of the laboratories and libraries facilities the cost per student will considerably be decreased.

17. In case of project for production of goods and services (e.g. production of textbooks), give expected income statement (profit and loss accounts) for ten years or until normal capacity is reached. Rate of depreciation and salvage value of property should be given.

Not applicable

18. Annual phasing of physical work and financial requirements for the project.(Attahced BRT and BAR diagrams if prepared)

Physical Work			Financial Requirements (Rs. in Millions)				
Item			1974-75 %	1975-76 %	Local	F E C	Total
i) Buildings							
1. Earth Sciences Bldg.		1	-	100%	2.40	-	2.40
2. Social Sciences	"	1	-	100%	1.75	-	1.75
3. Library	"	1	40%	60%	9.45	-	9.45
4. Guest House	"	1	-	100%	0.45	-	0.45
5. Student Hostels	"	2	33%	67%	4.80	-	4.80
6. Mosque (Academic Campus)	"	1	100%	-	0.52	-	0.52
7. Cafetaria	"	1	100%	-	1.30	-	1.30
8. Health Centre	"	1	8%	92%	1.15	-	1.15
9. Staff Residences	"	140	5%	95%	6.80	-	6.80
10. Completion of Phase-I			100%	-	1.00	-	1.00
11. Air Conditioning			10	100%	3.50	1.00	4.50
Total of buildings construction					33.12	1.00	34.12
12. Site Development & other utilities			70%	30%	1.73	-	1.73
13. Consultant's Fee			100%	-		0.10	0.10
14. Office and Scientific equipment			63%	37%	1.10	7.00	8.10
15. Furniture			67%	33%	0.90	-	0.90
16. Books			48%	52%	1.20	0.90	2.10
17. Scholarships/Fellowships			37%	63%	1.60	-	1.60
18. Project Directorate			50%	50%	1.20	-	1.20
			Grand Total:		40.85	9.00	49.85

SCHEME FOR DEVELOPMENT OF UNIVERSITY OF ISLAMABAD
PHASE = II (PART-I SHORT TERM REQUIREMENTS)

ANNUAL PHASING OF EXPENDITURE

Rs Millions

Sl. No.	ITEMS		ESTIMATED COST	1974-75	1975-76	TOTAL
			I-CONSTRUCTION OF BUILDINGS			
1.	Earth Sciences	1 Block	2.40	-	2.40	2.40
2.	Social Sciences	1 Block	1.75	-	1.75	1.75
3.	Library	1 Block	9.45	4.00	5.45	9.45
4.	Guest House	1 Block	0.45	-	0.45	0.45
5.	Students Hostel	2 Blocks	4.80	1.60	3.20	4.80
6.	Mosque (Academic Campus)		0.52	0.52	-	0.52
7.	Staff Residences	140 Nos.	6.80	0.28	6.52	6.80
8.	Cafeteria		1.30	1.30	-	1.30
9.	Health Centre		1.15	0.10	1.05	1.15
10.	Completion of Phase-I		1.00	1.00	-	1.00
11.	Air Conditioning cost of building		4.50	-	4.50	4.50
			TOTAL-I: 34.12	8.80	25.32	34.12
			II - SITE DEVELOPMENT			
12.	a) Cutting, Grading, Land Scaping, Turfing and Arboriculture.			0.10	0.10	0.20
	b) Roads, Parking, Cycle Tracks and Footpaths.			0.40	0.10	0.50
	c) Electrification & Street Lighting			0.10	0.10	0.20
	d) Water Supply, Sewerage, Drainage and other allied internal services			0.35	0.10	0.45
	e) Sui Gas/Telephone			0.25	0.13	0.38
			TOTAL-II :	1.20	0.53	1.73
13.	Consultant's Fee			0.10	-	0.10
			TOTAL:	0.10	-	0.10
			III - EQUIPMENT			
14.	Office Equipment			0.20	0.10	0.30
	Scientific Equipment			4.90	2.90	7.80
			TOTAL:	5.10	3.00	8.10
15.	Furniture			0.60	0.30	0.90
16.	Books			1.00	1.10	2.10
17.	Scholarships/Fellowships			0.60	1.00	1.60
18.	Project Directorate			0.60	0.60	1.20
			TOTAL:	2.80	3.00	5.80
			GRAND TOTAL:	18.00	31.85	49.85

19. Foreign Exchange Expenditure:

Year	Material	Consultants	Others	Total
1974-75	-	-	-	-
1975-76	9.40	0.10	-	9.50

20. (a) Likely sources and amount of foreign exchange cost of the project.

i) Ford Foundation ii) UNDP iii) German Assistance

(b) Present position regarding availability, commitment or negotiations

The above mentioned Aid giving Agencies are being pursued to provide aid in shape of Scientific equipment.

21. Indicate sources and amount of rupee component of project:

Sources	Amount for capital expenditure	Amount of Recurring expenditure
(a) Government sources		
(i) Grant	Federal Government grant	
(ii) Loan	-	-
(iii) Investment	-	-
(iv) Direct Government expenditure	-	-
(b) Sponsoring Agency's own fund	-	Rs.3,84,150
(c) Private Investment	-	-
(d) Local body resources, if any	-	-
(e) Non-Government borrowing	-	-
(f) Other sources (e.g.recoveries)	-	-

22. Results of the project:

(i) Direct benefits — Number of persons served: 1050 students per year.

(ii) Indirect and other benefits Annexure 'B' — Contribution towards specific targets/ social objectives - - - - - - -

23. (a) Approximate number and categories of job opportunities likely to be created indirectly as a results of :

(i) Implementation - - - -

(ii) Operation of project - - - -

(b) Economic life of components of project (Buildings,equipment etc.).

(i) Buildings : 200 years Approximately

(ii) Equipment : The life of equipment depends upon its nature and uses.

-,-,-,-,-,-,-,-,-,-,-,

285

PART " C "

PROJECT REQUIREMENTS

24. (a)

Manpower	For Execution Man	For Execution Month	For Operation Number
1) Professional and technical	12	288	230
2) Administrative, Executive and managerial			28
3) Clerical			290
4) Skilled	22	528	65
5) Service			110
6) Unskilled			74
7) Others			135
		Total:	932

(b) Likely shortage of manpower by occupation — Nil

(c) Steps to be taken to assure availability of manpower — Not applicable

(d) Approximate number of persons required to be trained per year (locally and abroad) and the kind of skill to be learnt — Not applicable

(e) Give total capital outlay, give the capital cost of mobilizing one worker for one shift — Not applicable

25. Physical and other facilities required for project:

Item	Total	To be provided from the project itself	To be provided from the public utility
(a) Housing by type			
	"A" type	72	327
	"B" type	-	164
	"C" type	-	199
	"D" type	-	146
	V.C.'s House	-	1
	Total	72	837
(b) Power supply		Already available	
(c) Water and other utilities			
(d) Others			

26. Materials, Supplies and Equipment requirements:
A.I Minimum total requirements for execution
To be completed only for major items costing more than 10% of the total cost

Items	Unit	Local			Foreign			Already available with agency		
		Quantity	Rate	Cost per unit	Quantity	Rate	Cost per unit			
1.	Materials (a) to (e)	To be arranged by the contractors								
2.	Supplies and spares (a) to (g)									
3.	Equipment of Machinery (a) to (c)									

A.II Materials, Spares and Supplies and equipment for operation of project.

	Unit	Local			Foreign		
		Quantity	Rate per unit	Cost	Quantity	Rate per unit	Cost
1.	Material						
	(a) Scientific Equipment		1.10				7.00
	(b) Air Conditioning		3.50				1.00
	(c) Books/Journals		1.30				1.10
2.	Supplies and Spares						
	(a) Chemical/Consumable		0.20				0.10
	(b) Workshop		0.10				0.10
	(c) Maintenance of Computer		0.20				0.10
	(d) Consultant's Fee		-				0.10
			6.40				9.50

27. In the case of imported material and equipment for execution. indicate :

(a) Justification for imports
(b) Proposed source/sources and supply

Not applicable

(This part should be filled up only for revised scheme)

1. Comparative cost estimate of the last sanctioned and revised schemes.

	Last sanctioned project			Revised project		
	Local	Foreign Exchange	Total	Local	Foreign Exchange	Total
(a) to (i)	Not applicable					

Give reasons for the revision in cost estimate

Items	Reasons for the revision
(a) to (i)	Not applicable

2. Total expenditure incurred so far

UPTO 1973-74

	Rupees in Lacs		
	EXPENDITURE		
	LOCAL	FOREIGN	TOTAL
a) Building	242.38	-	242.38
b) Site Development & other services	55.76	-	55.76
c) Equipment	56.49	3.00	59.49
d) Books	10.37	5.92	16.29
e) Furnitures	27.30	-	27.30
f) Consultant's Fee	5.87	5.06	10.93
g) Scholarship/Fellowship	14.28	-	14.28
h) Project Directorate	20.07	-	20.07
i) Cost of land	27.50	-	27.50
Total:	460.02	13.98	474.00

3. Progress of work

(a) As per schedule last sanctioned	(b) Actual achievement	(c) Reasons for delay

Please see Annexure " B "

4. Project History

Cost			Planned period of completion in months	Reasons for revision
Local.	F. E.	Total		

Please see Annexure " B "

Original sanction

Ist Revision

2nd Revision

3rd Revision

UNIVERSITY OF ISLAMABAD
PROJECTED ESTIMATES OF TEACHERS (FACULTY WISE) FOR 1974-75 TO 1975-76

~~Faculty~~ Departments	1974-75 Professor	Associate Professor	Assistant Professor	Lecturer	Total	1975-76 Professor	Associate Professor	Assistant Professor	Lecturer	Total
Mathematics	3	5	5	5	18	3	6	6	6	21
Computer Science	1	2	2	4	9	1	2	2	4	9
Physics	4	10	9	4	27	4	10	9	4	27
Electronics	-	-	-	-	-	1	2	1	1	5
Chemistry	6	16	16	5	43	8	18	18	6	50
Bio-Chemistry	-	-	-	6	6	-	-	-	6	6
Biology	4	6	5	3	18	4	6	6	4	20
Earth Sciences	2	3	3	3	11	2	4	3	3	12
Economics	2	6	6	2	16	2	6	6	6	20
Cultural History	3	2	3	2	10	3	3	3	3	12
International Relations	2	6	6	2	16	3	6	6	3	18
Business Administration	1	1	-	-	2	2	4	3	-	9
Sociology	1	1	-	-	2	1	1	2	2	6
Psychology	1	1	-	-	2	1	1	2	2	6
Anth ropology	1 11	1 18	- 15	-	2 50	1 13	1 22	2 24	2 18	6
Total:	31	60	55	36	182	36	70	69	52	227

natural sciences

Biol. Sci

social sciences

30

32

50

26

12

77

(11)

289

UNIVERSITY OF ISLAMABAD

PROJECTED ESTIMATED OF STUDENTS FACULTY WISE DURING 1974-76

S.NO.	Names of Departments	1974-75 DSC.	M.Sc.	M.Phil.	Ph.D.	Total.	1975-76 DCS.	M.Sc.	M.Phil.	Ph.D.	Total.
A.	NATURAL SCIENCES										
1.	Mathematics	-	80	20	2	102	-	90	30	5	125
2.	Computer Science	110	-	-	-	110	110	-	-	-	110
3.	Physics	-	80	30	2	112	-	90	30	5	125
4.	Electronics	-	-	-	-	-	-	20	-	-	20
5.	Chemistry	-	90	30	2	122	-	90	30	5	125
6.	Bio-Chemistry	-	-	-	-	-	-	20	-	-	20
7.	Earth Sciences	-	25	-	-	25	-	30	-	-	30
8.	Biology	-	85	30	2	117	-	90	30	5	125
	Total A	110	360	110	8	588	110	430	120	20	680
B.	SOCIAL SCIENCES										
1.	Economics	-	70	-	-	70	-	80	10	-	90
2.	Cultural History	-	40	10	-	50	-	40	10	-	50
3.	International Relations	-	70	20	-	90	-	80	10	-	90
4.	Business Administration	-	-	-	-	-	-	20	-	-	20
5.	Sociology	-	-	-	-	-	-	20	-	-	20
6.	Psychology	-	-	-	-	-	-	20	-	-	20
7.	Anthropology	-	-	-	-	-	-	20	-	-	20
8.	Pakistan Studies	-	60	-	-	60	-	60	-	-	60
	Total B	-	240	30	-	270	-	340	30	-	370
	TOTAL A + B.	110	600	140	8	858	110	770	150	20	1050

PROJECTED ESTIMATE OF SCHOLARSHIPS/FELLOWSHIP

Sr. No.	Class	Projected Strength of Students.	Scholarships/ Fellowship to be provided	Rate of Scholarship/ Fellowship per student per year.	Amount.
1	2	3	4	5	6
			1974-75		
		No.	No.	Rs.	Rs.
1.	Diploma(*)	110	-	-	-
2.	M.Sc.	600	300	1800	540000
3.	M.Phil	140	140	3000	420000
4.	Ph.D.	8	8	6000	48000
	Total:	858	448		1008000
			1975-76		
1.	Diploma(*)	110	-	-	-
2.	M.Sc.	770	385	1800	693000
3.	M.Phil	150	150	3000	450000
4.	Ph.D.	20	20	6000	120000
	TOTAL:	1050	555		1263000

* Diploma in Computer Science

SUMMARY OF RECURRING EXPENDITURE

FOR THE YEAR 1975-76

		Total	Local	F.Exchange
1)	Teachers	Rs. 5265991	5265991	-
2)	Administrative Officers	Rs. 713505	713505	-
3)	Establishment	Rs. 3324562	3324562	-
4)	Contingent Staff	Rs. 582885	582885	-
	Total:	Rs. 9886943	9886943	-
5)	Misc and other charges	Rs. 1835000	1835000	-
6)	Raw Material and supply for Workshop.	Rs. 200000	100000	100000
7)	Journals	Rs. 300000	100000	200000
8)	Laboratory Chemicals	Rs. 300000	100000	200000
	Total:	Rs. 2635000	2135000	500000
	Grand Total:	Rs.12521943	12021943	500000
	Say:	Rs.12500000	12000000	500000

FORECAST OF RECURRING EXPENDITURE
(1975-76)

1. TEACHING STAFF

Name of Post	Pay Scale	No of Post	Annual Pay
A. Pay			
Professor @ 1900/- P.M.	1800-2200	36	820800
Associate Professor @ 1325/- P.M.	875-1750	70	1113000
Assistant Professor @ 1000/- P.M.	600-1250	69	828000
Lecturer @ 750/- P.M.	450-1050	52	46800
	Total : (A)	227	2808600

B. Allowance	
Administrative Allowance	48000
House Rent (*)	1404300
Medical Allowance	272400
C. P. Fund	351075
Special Compensatory Allowance	303600
Rest and Recreation	78016
Total : (B)	2457391
Total : (A + B)	5265991

FORECAST OF RECURRING EXPENDITURE

1975-76

ADMINISTRATIVE OFFICERS

NAME OF POST	PAY SCALE	NO OF POST	ANNUAL PAY
Vice Chancellor	3000 Fixed	1	36000
Treasurer @ 2200/-	1800-2200	1	26400
Registrar @ 2160/-	1800-2200	1	25920
Controller of Examination @ 1880/-	1800-2200	1	22560
Deputy Treasurer @ 1075/-	1000-1750	1	12900
Deputy Registrar @ 1075/-	1000-1750	1	12900
Deputy Controller of Examination @ 1075/-	1000-1750	1	12900
Planning and Development Officer 1075/-	1000-1750	1	12900
Officer Incharge Student Affairs @ 1075/-	1000-1750	1	12900
Purchase & Stores Officer @ 1075/-	1000-1750	1	12900
Audit Officer @ 1225/-	1000-1750	1	14700
Administrative Officer @ 1300/-	1000-1750	1	15600
Assistant Registrar @ 1050/-	500-1250	1	12600
Asstt. Controller of Examination @ 1050/-	500-1250	1	12600
Assistant Treasurer @ 1000/-	500-1250	1	12000
Public Relations Officer @ 1050/-	500-1250	1	12600
Secretary to Vice-Chancellor @ 1100/-	500-1250	1	13200
Librarian @ 1800/-	1800-2200	1	21600
Deputy Librarian @ 1000/-	1000-1750	1	12000
Senior Medical Officer @ 1300/- + 200 Spl Allowance	1000-1750	1	15600

Contd 18/-

NAME OF POST	PAY SCALE	NO OF POST	ANNUAL PAY
Resident Medical Officer @ 750/- + 150 Spl Allowance	500-1250	1	9000
Resident Warden @ 750/-	500-1250	3	27000
Purchase & Stores Supervisor @ 750/-	500-1250	1	9000
Workshop Supervisor @ 1075/-	1000-1750	1	12900
Asstt. Workshop Supervisor @ 750/-	500-1250	1	9000
	Total :	26	388680

ALLOWANCES

House Rent	194340
Medical Allowance	31200
C P Fund	48585
Special Compensatory Allowance	38700
Rest and Recreation Allowance	12000
Total :	324825
Total Pay & Allowances	713505

FORECAST OF RECURRING EXPENDITURE
(1975-76)

I. ESTABLISHMENT STAFF

Name of Post	Pay Scale	No of Post	Annual Pay
A. Pay			
Asstt Liberian @ Rs.750.00	500-1250	8	72000
Classifi[illegible]/Catal[illegible]guer @ Rs.400.00	350-750	6	28800
Catographer @ Rs.375/-	325-700	3	13500
Photographer @ Rs 250/-	225-400	2	6000
Caligrapher @ Rs. 300/-	275-600	1	3600
Instrument Mech/ Sem Technican Asstt Workshop @ Rs. 480/-	375-825	4	23040
Tech Supervisor @ Rs. 375/-	325-700	1	4500
Asstt Instrument Mech @ Rs. 300/-	275-600	1	3600
X Ray Mech @ Rs. 250/-	225-480	1	3000
Technican @ Rs. 250/-	225-480	1	3000
Guard Technican @ Rs. 167/-	150-200	3	6012
Computer Trainee @ Rs. 500/-	450-600	4	24000
Key Punch Supervisor Plant Operator @ Rs.300.00	275-600	4	14700
Key Punch Operator @ Rs. 220/-	200-425	3	7920
Supdt @ Rs.500/-	400-1000	13	78000
Asstt/TA @ Rs. 500/-	350-750	3	18000
S. Grade S/grapher @ Rs. 400/-	350-750	8	38000
Stenographer @ Rs. 300/-	275-600	21	75600
Asstt/Technical Asstt @ Rs. 300/-	275-600	42	151200
Research Assistant @ Rs. 300/-	275-600	16	57600
Stenotypist @ Rs. 250/-	200-450	25	75000

FORECAST OF RECURRING EXPENDITURE

1975-76

1. ESTABLISHMENT STAFF

Name of Post	Pay Scale	No of Post	Annual Pay
A. Pay			
UDC/Store Keeper/ Library Clerk @ Rs. 200/-	180-380	82	196800
LDC/Typist @ Rs.167/-	150-280	120	240480
GMO/Lib/Lab Attendant @ Rs.120/-	110-160	42	60480
Drivers @ Rs.130/-	120-180	20	31200
Conductor/Helper @ Rs.110	100-140	12	15840
Peons @ Rs. 110/-	100-140	65	85800
	Total : (A)	511	1324372
B. Allowance			
C.P.Fund			165546
House Rent			662136
Medical Allowance			304800
L C A			60960
Special Compensatory Allowance			521220
Conveyance Allowance			240000
Washing Allowance			8740
Rent & Recreation Allowance			36788
	Total : (B)		2000190
	Total : (A + B)		3324562

FORECAST OF RECURRING EXPENDITURE

1975-76

CONTINGENT STAFF

NAME OF POST	PAY SCALE	NO.OF POST	ANNUAL PAY
Malis, Chowkidars, Sweepers, Cooks and Helpers @ 110/-	100-140	135	178200
	Total:	135	178200

ALLOWANCES

C.P.Fund	22275
House Rent	89100
Medical Allowance	64800
Conveyance Allowance	64800
L C A	16200
Washing Allowance	4860
Dearness/Spl.Com.Allowance	137700
Rest and Recreation Allowance	4950
Total:	404685
Grand Total:	582885

OTHER CHARGES

Items		Budget Estimates 1975-76 Rupees
A. EXPENDITURE ON ACADEMIC DEPARTMENTS		
1.	Copy charges/Reprints/Micro Filming	10,000
2.	Associateship/Research/Fellowship	-
3.	Remuneration to Part-time Teachers/Examiners	10,000
4.	Visiting Professors	30,000
5.	Training/Conferences/Seminars	50,000
6.	Contribution to IUB and International Associations, and Organizations	10,000
7.	Computer Maintenance Charges	3,00,000
8.	Students Union, Associations & sports activities.	20,000
	TOTAL A:	4,30,000
B. GENERAL EXPENDITURE ON ACADEMIC DEPARTMENTS AND ADMINISTRATIVE SECTIONS		
9.	T.A.etc. for officers, establishment including officers joining the University from abroad and other members of the University Bodies	1,00,000
10.	Dispensary	50,000
11.	conveyance charges	20,000
12.	Entertainment etc	20,000
13.	Group Insurance	5,000
14.	Honorarium to Legal Advisor	10,000
15.	Stationery Printing & Publications including Computer stationery	2,00,000
16.	Office General supply & Crockery for Hostels	1,50,000
17.	Postage,Telegrames and Telephones	1,50,000
18.	Electricity/Sui Gas/Water charges & maintenance of Air-Conditioning	2,50,000
19.	Maintenance & Repair of Equipment	50,000
20.	Advertisement	20,000
21.	Liveries	25,000
22.	Maintenance of transport	1,60,000
23.	Insurance of University buildings/equipment	5,000
24.	Audit Fee	5,000
25.	Misc.expenditure(i.e. Freight charges convocation and Newspapers Drivers overtime honorarium to staff etc.)	75,000
26.	Raw Material for Workshop	1,00,000
27.	Maintenance allowance Ex-East Pakistani employees	-
28.	Students Welfare	10,000
	TOTAL B	14,05,000
	TOTAL A+B:	18,35,000

PROJECT DIRECTORATE
BUDGET ESTIMATES FOR THE YEAR 1975-76

Designation	Scale of Pay	Budget Estimates for 1975-76 No.of Posts	Provision
P A Y			
OFFICERS			Rupees
Project Director	1000-1750	1	16,320
Executive Engineer	1000-1750	1	14,400
Asstt.Executive Engineer	500-1250	9	97,660
Architect	500-1250	1	8,450
		Total:	1,16,830
TECHNICAL STAFF			
Senior Draftsman Sanitary	325-700	1	4,940
Senior Draftsman (Elect.)	325-700	1	4,380
Jr. Draftsman	200-425	1	2,640
Overseer(Construction)	225-480	9	44,540
Overseer (Elect.)	225-480	1	2,880
Overseer (Maint).	225-480	1	2,880
Tracer	120-180	3	5,100
Surveyor	225-480	1	4,940
Ferro Printer	120-180	1	1,560
		Total:	73,860
OFFICE STAFF			
Superintendent	375-825	1	6,070
Accountant	350-750	1	4,200
Assistant	275-600	4	16,640
Stenographer	275-600	1	3,680
Stenotypist	200-425	1	4,800
U D C	180-370	3	9,400
Record Keeper	180-370	1	2,520
Account Clerk	180-370	1	2,280
L.D.C.	150-280	5	9,510
Drivers	120-180	3	6,440
Daftri	100-140	6	1,200
Peon	100-140	6	7,580
		Total:	2,65,010

ALLOWANCES :	Rupees
C.P. Fund Contribution	33,260
Medical Allowance	41,520
House Rent Allowance	1,04,050
Conveyance Allowance	18,360
LCA/Spl.LCA	10,140
Washing Allowance	360
Rest & Recreation Allowance	8,000
Total:	2,15,690
Total Pay and Allowances	4,80,700

OTHER CHARGES	
Postage, Telegram, Telephone	9,000
Stationery	10,000
Electricity/Gas	9,000
Technical/Scientific Journals	2,000
Maintenance of Transport	30,000
Advertisement	8,000
Meetings	3,000
Conveyance charges	5,000
Office and General Supply	10,000
Conference/Seminars	2,000
Contigencies	6,000
T.A.Staff/Consultants	20,000
Leave Salary and Pension Contribution	-
Leave Salary staff/officers	5,000
Total:	1,19,000
Total Pay + Allowances + Other charges	5,99,700
OR SAY :	6,00,000

SCHEDULE OF ESTIMATED ANNUAL INCOME

DURING 1975-76

		Rupees
1.	Tution fee 1050 x12 x15 Rs/mo	189000
2.	Admission Fee 880 x 15 Rs	13200
3.	Registration Fee 1925 x 10 Rs M.Sc. 170 x 15 Rs M.Phil & Ph.D.	2250
4.	Hostel Rent 660 x 5 Rs x 12	39600
5.	Breakage charges 660 x 10 Rs	6600
6.	Hostel service charges 660 x 10 Rs x 12	79200
7.	Electric charges for lighting 660 x 2 Rs x 12	15840
8.	Electric-charges for Fans 660 x 3 Rs x 6	23760
9.	Identy cards 1050 x 2	2100
10.	Medical charges 1050 x 12 Rs	12600
	Total:-	384150

LIBRARY BUILDING
UNIVERSITY OF ISLAMABAD

GROUND FLOOR

	Size		Area	Rate	Amount
Reading Area	36'x54'	1944			
	18'x54'	972			
	54'x117'	6318	[illegible]	100/-	9,23,400.00
Passage	2'x9'x54'	972	972.00	80/-	77,760.00
Lobby	18'x36'	642			
	9'x15'	135	777.00	90/-	69,930.00
Elec.Panel Room	27'x9'	243	243.00	80/-	19,440.00
Art Display	27'x27'		729.00	100/-	72,900.00
A.C. Ducts	2'x12'x9'	216			
	2'x9'x9'	162	378.00	70/-	26,460.00
Pump Room	9'x27'		243.00	80/-	19,440.00
Staff Lounge	27'x27'	729			
	6x9'	54	783.00	100/-	78,300.00
Stair Hall	2'x12'x27'	648			
	1'x9'x27'	243	891.00	100/-	89,100.00
Binding/Mending room	24'x9'		216.00	75/-	16,200.00
Machine Room	24'x9'		216.00	75/-	16,200.00
Elevator space	9'x9'		81.00	60/-	4,860.00
Mech.Room	27'x24'	648			
	36'x24'	864	1512.00	75/-	1,13,300.00
Book Storage	126'x63'		7938.00	70/-	5,54,600.00
			24213.00		20,83,860.00

FIRST FLOOR

A.C.Ducts	2'x9'x12'	216			
	2'x9'x9'	162	378.00	70/-	26,460.00
Stair	2'x12'x27'	648	891.00		
	1'x9'x27'	243		100/-	89,100,00
Art Display	1'x27'x24'		648.00	100/-	64,800.00
Vestibule	2'x54'x18'	1944			
	1'x9'x27'	243	2187.00	80/-	1,74,960.00
Lobby	1'x9'x15'	135	135.00	90/-	12,150.00
Jointer's Room	1'x9'x15'		135.00	85/-	11,475.00
Receiving Area	1'x15'x18'		270.00	85/-	22,950.00
Elevator Space	9'x9'		81.00	60/-	4.860.00
Store	27'x13'x6'		364.50	80/-	29,160.00
Mechanical Room			607.00	80/-	48,600.00
Machine Room	27'x36'		972.00	75/-	72,900.00
Elec.Panel Room	9'x27'		243.00	80/-	19,440.00
Reading Hall	54'x102'	5508			
	18'x54'	972			
	30'x54'	1620	8100.00	100/-	8,10,000.00
			1512.00		13,86,855.00

SECOND FLOOR	Size		Size	Rate	Amount
Stair Hall	2'x12'x27' 1'x9'x27'	648 243	891.00	100/-	89,100.00
A.C.Duct	2'x12'x9' 2'x9'x9'	216 162	387.00	70/-	26,460.00
Men Lavatory Women Lavatory	24'x18' 18'x24'	432 432	864.00	100/-	86,400,00
Typing Room	18'x15'		270.00	100/-	27,000.00
Janitor's Room	15'x9'		135.00	85/-	11,475.00
Elevator Space	9'x9'		81.00	60/-	4,860.00
Lobby	9x27' 9'x15'	243 135	378.00	100/-	37,800.00
Acquisition department	27'x27'		729.00	80/-	65,610.00
Office	9'x27'		243 .00	100/-	24,300.00
Catalogue Deptt.	36'x27'		972.00	75/-	72,900.00
Elec.Panel room	9'x27'.		243.00	75/-	18,225.00
Launge	162'x162'	26244 - 5184.00			
		=	21050.00	90/-	18,95,400.00
			26244.00		23,59,530.00

THIRD FLOOR					
Stair Hall	2'x12'x27' 1'x9'x27'	648 243	891.00	100/-	89,100.00
A.C.Ducts	2'x12'x9' 2'x9'x9'	216 162	378.00	70/-	26,460.00
Gents Lavatory Lady Lavatory	24'x18' 18'x18'	432 432	864.00	100/-	86,400.00
Typing Room	18'x15'		270.00	100/-	27,000.00
Janitor's Room	9'x15'		135.00	80/--	10,800.00
Elevator Space	9'x9'		81.00	60/-	4,860/00
Lobby	9'x27' 9'x15'	243 135	378.00	100/-	37,800.00
Archives/ Manuscripts	27'x27'		729.00	80/-	58,320.00
Listening	9'x27' 9'x27'	243 243	486.00	100/-	48,600.00
Seminar Room	27'x27'	[illegible]	729.00	100/-	72,900.00
Elec.Panel room	9'x27'		243.00	90/00	19,440.00
Book Stacking			19764.00	80/-	15,81,120.00
			24948.00		20,62,800.00

EXTERNAL CORRIDORS

4'x144'x18'	=	10368.00	95/-	9,84,960.00
2'x54'x 6'		648.00	95/-	61,560.00
		11016.00		12,46,520.00

AREA

i) Basement	=	2916 Sft	105/-	3,06,180.00

FLOOR	AREA	COST Rs
Ground Floor	24213	20,85,860.00
First Floor	15112	13,86,855.00
Second Floor	26244	23,59,530.00
Third Floor	24948	20,62,800.00
External Corridor	11016	12,46,520.00
Basement	2916	3,06,180.00
GRAND TOTAL =	104449	94,45,745.00
	Cost per Sft.	94,45,225.00 / 104449
		= Rs.90.50

University of Islamabad
University Guest House

A) Areas

1)	10 Bed Rooms	10x(17x14)	= 2380 sft.
2)	10 Bath Rooms	10x(9x9)	= 810 sft.
3)	Dining Room	Kitchen etc. 17x29	= 493 sft.
4)	Entrance Lobby	Stairs Hall 2(17x25)	= 850 sft.
5)	Enquiry/Reception/Linen Storage	17x17	= 289 sft.
6)	Common Lounge	17' x 29'	= 493 sft.
7)	Family Suite	1x17'x29	= 493 sft.
8)	Corridors etc. on the two floors	2(40x8)+2(24x8)	= 2048 sft.
			7804 sft.

Say 8000 s.ft.

B) Cost

8000 s.ft. @ Rs.55/- per sft. = Rs. 4,40,000

Say Rs. 4.50 Lacs

UNIVERSITY OF ISLAMABAD

MOSQUE (ACADEMIC CAMPUS)

(A) AREA:

S.NO.		SIZE	AREA
1.	Main praying Hall	52 x 32	2704
2.	Ablution	16 x 14	224
3.	Lavatory Block	16 x 12	192
4.	Store room	10 x 7	70
5.	Boiler room	7 x 7	49
6.	Reading Room/Library	16 x 12	192
7.	Imam's Quarter	16 x 22	352
8.	Reflection pool etc.	31 x 15	465
9.	Minerate		300
10.	Add for stair etc.		1000
			5548
11.	Prayer Area (Open)		7075

COST

Main Mosque @ Rs.63/- per Sft.	5548 x 63	Rs.3,49,524.00
Prayer area @ Rs.25/- per Sft.	7075 x 25	Rs.1,76,875.00
	TOTAL:	Rs.5,26,399.00
	or SAY:	Rs.5,26,000.00

CAFETERIA BUILDING

DETAILS OF BUILDING COST

A. Areas

			Sft
a)	Entrance Hall (Main)	29.5'x46'	1357
b)	Dinning Hall (North)	"	1357
c)	" ")South)	"	1357
d)	" " (Central)	46x46	2116
e)	" " (Formal)	20.75x29.5+8.75x11.25 =	710
f)	" " (Ladies)	17'x29.5	510
g)	Service Hall	29.5x46	1350
h)	Kitchen	29.5x46	870
i)	Storage etc	21x17.75	372
j)	Bearer's Preparation Room	29.5x8.5	250
k)	Manager Room	12.25x13	155
l)	Toilets/Wash etc	8.75x9+13.5x 29.5+8x12.25	570
m)	Electric Room	8.75x9.5	80
		Sub Total :	11052
		4(7.5x39.5)	1185
		T Grand Total:	12237

B. Cost estimate

Main building	11052 Sft @ Rs. 75/- per Sft	=	8,28,900/-
Verandahs	1183 Sft @ Rs.25/- per Sft	=	29,625/-
	Total :		8,58,525/-
	Say Rs.:		8,58,000/-

C.	External Works & Other Services	3,67,000/-
D.	Furniture and Fixture	50,000/-
E.	Equipment and Utensils	25,000/-

****

Total: 13,00,000/-

Or Say 1.30 million

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HEALTH CENTRE

ROUGH COST ESTIMATE

AREA

Main working area	5040 Sft.
Corridors/Lobby	2260 Sft.
	7300 Sft.
Terraces	2270 Sft.
	9570 Sft.

ROUGH COST ESTIMATE:

a)	Main Building 7300 Sft @ Rs.80/- per Sft.	Rs.5,84,000.00
b)	Terraces 2270 Sft @ Rs.20/- per Sft.	Rs. 45,400.00
c)	External Civil works and services (i.e. water supply, sewerage, electricity, Sui Gas etc.) @ Rs.15% of building cost i.e. Rs.5,84,000/-	Rs. 87,600.00
d)	Air Conditioning (L.S.)	Rs.2,92,000.00
		Rs.10,09,000.00
e)	Hospital Equipment (L.S.)	Rs.1,40,000.00
	GRAND TOTAL:	Rs.11,49,000.00
	or SAY :	Rs.11.50 Lacs.

BREAKUP RESIDENTIAL COLONY

Sl. No.	Category of House	Pay Range	Plinth Area per unit	No. of units to be constructed	Total plinth Area S.Ft.	Cost per S.ft.	Total estimated cost
1.	A	0-224	500	80	40000	Rs.55/-	Rs.22,00,000
2.	B	225-449	1000	42	42000	Rs.55/-	Rs.23,10,000
3.	C	450-1249	1800	10	18000	Rs.60/-	Rs.10,80,000
4.	D	1250 and above	2500	8	20000	Rs.60/-	Rs.12,00,000
				140	120000	Total	Rs.67,90,000
						or Say	Rs.68,00,000

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ANNEXURE-B

DESCRIPTION, PURPOSE AND BENEFITS OF THE PROJECT

The need for establishing this University, its aims and objects and characteristic features are described briefly in the following paragraphs. They are given in more detail in the Report submitted to the United Nations Development Programme by the Unesco experts who had come here on a fact finding mission. A copy of the Report is annexed herewith.

2. Pakistan needs a large number of experts and specialists in various branches of knowledge and different fields of scientific and technological disciplines to staff its colleges, Universities, research laboratories, professional and technical departments of Government, and the continually expanding sphere of trade and industry. All our national plans and schemes for economic development depend on the availablity of a large number of men of requisite qualifications and competence.

3. Until now the country has been depending largely, if not wholly, on foreign countries for its programmes of higher training. But it is obvious that this arrangement cannot continue indefinitely. Moreover, the number required has become so large that the training of all these people in foreign countries would involve a colossal expenditure in foreign exchange. There is also the added risk of brain-drain when so many young men go abroad for long period of training.

4. Taking stock of the whole situation Government felt concerned about the production of trained manpower, and about the quality and standard of education and advanced studies and research in the country. They felt that a stage had been reached in the national development when, according to the recommendations of international organizations like UNESCO, the country should set up its own Centres for Advanced Studies and Research comparable to the best in the world.

5. It was because of these considerations that the Government decided to establish the University of Islamabad as a residential and unitary institution devoted to post-graduate studies and doctoral and post-doctoral research. They were anxious that the new University should produce scholars and specialists who may be able to contribute effectively to the development of the country, and who may provide leadership in education and science of the best international standards.

Contd..2.

6. The main objectives of the Islamabad University can be explained briefly as follows:

(a) Since very few Ph.Ds. have been produced in the country in the major scientific disciplines so far, the Islamabad University would meet the growing demand for leaders and creative scholars, who combine professional excellence with breadth of education, experience and outlook which could be gained in such a centre of higher learning, and which will be increasingly vital as the country developed economically and socially.

(b) The University would also provide a stimulus to the research scholars and add to the scope and diversity of education at the highest academic level.

(c) It is well-known that post-graduate studies in any subject cannot be developed properly and adequately unless a considerable number of highly qualified and competent specialists in any individual subject are assembled in one institution. For example, there are several major branches in Pure Mathematics for teaching each of which at the post-graduate level separate specialists are needed. Our post-graduate studies have not prospered so far mainly because we do not have the requisite number of well qualified specialist teachers assembled in one place. The few good people are scattered all over the country in various institutions, and consequently it has not been possible for them to develop post-graduate education and research on proper lines anywhere.

7. The main characteristic features of the University are as follows:-

(i) It will have a number of constituent Institutes and colleges, and very few affiliated instituttions. The Education Commission and other recognized authorities have emphasized that for ensuring good standard and quality of education, a University ought to be of the unitary type. Although the Islamabad University may have a few affiliated institutions, it will be mainly a unitary in character and its emphasis will be on its own constituent Institutes and Colleges.

(ii) The University would deal largely with advanced post-graduate studies and research, and to a small extent with undergraduate advancement of knowledge, and produce scholars and experts of high calibre needed for various sectors of national life. It awards the M.Sc., M.Phil and Ph.D.

Contd..P.3.

Degrees, and provides opportunities for post-doctoral research.

(iii) Another feature of the University is that it awards Research Fellowships/Associateships to young talented scholars who have completed their Ph.D. and who wish to continue a life of research activity.

(iv) In all of its plans and policies, the University recognises that research and education are inseparable, and that each reinforces the other.

(v) The University provides an opportunity for original creative thinking, and thus encourages individual development and initiative.

(ii) The University recognises the growing inter-relationship among different branches of knowledge and fields of learning and research. In its structure and in all of its programmes, the University stresses the unity of knowledge, and seeks to achieve a flexibility which promotes inter-relationship among various fields, and which avoids rigidly organised departments.

8. When fully developed, the University will consist of the following Faculties.

1. Faculty of Mathematical Sciences.
2. Faculty of Physical Sciences.
3. Faculty of Chemical Sciences.
4. Faculty of Biological Sciences.
5. Faculty of Earth Sciences.
6. Faculty of Social Sciences.
7. Faculty of Area Studies.
8. Faculty of Pakistan Studies.

9. The various Faculties will, for the time being, deal with the following subjects:-

FACULTY OF MATHEMATICAL SCIENCES

1. Pure Mathematics.
2. Applied Mathematics.
3. Computer Science

FACULTY OF PHYSICAL SCIENCES

1. Theoretical Physics
2. Experimental Physics.
3. Nuclear Technology.
4. Electronics

FACULTY OF CHEMICAL SCIENCES

1. Physical Chemistry
2. Organic Chemistry
3. Analytical Chemistry.

Contd..4.

FACULTY OF BIOLOGICAL SCIENCES

1. Botany.
2. Genetics.
3. Physiology.
4. Bio-Chemistry

FACULTY OF EARTH SCIENCES

1. Geo-Physics.
2. Geography.

FACULTY OF SOCIAL SCIENCES

1. Economics.
2. International Relations.
3. Cultural History.
4. Business Administration.
5. Sociology.
6. Psychology
7. Anthropology

FACULTY OF AREA STUDIES

1. North America Studies.
2. South America Studies
3. Africa Studies.

FACULTY OF PAKISTAN STUDIES

1. Pakistan Studies
2. Pakistani Languages.

10. At the end of 1964 Government decided to set up a post-graduate University at Islamabad, and arrangements were made for the preparation of the plans and organisation of the work. The scheme of the University was prepared in the PC I form and forwarded to the Planning Division by the Ministry of Education in February 1965.

11. The Central Development Working Party considered and recommended the Scheme in May, 1965 and the Executive Committee of the National Economic Council approved it in principle in March 1966. It was finally approved by the ECNEC in July 1971, was estimated to cost Rs.3.30 crores in capital expenditure and Rs.1.37 crores in Recurring expenditure druing the five years period.

12. A site measuring about 1500 Acre was acquired on the Margala Avenue in Islamabad, and the Architects (Edward D. Stone of New York and Tajuddin Bhamani of Karachi) were appointed in September 1966. The Master plan was approved in 1967, and the Foundation of the new University Campus was laid by the President of Pakistan, who is also Chancellor of the University in June 1967.

13. The University Act was passed by the National Assembly and was promulgated by Government after the approval of the President in July 1967. The Vice-Chancellor was appointed under the Act. and the Syndicate, Academic Council and other University Bodies were constituted under the Act and the Statutes.

14. The work of preparing the schematics and design development as well as of working drawing and tender documents of the buildings to be

Contd..5.

constructed in the first pahse was started by the Architects early in 1968. Construction of the first building was started in August 1968, and the follwoing fourteen buildings included in the first phase have been constructed so far.

1)	Hostels	3 Blocks
2.	Administration	2 "
3.	Mathematics& Computer	2 "
4.	Social Sciences	1 "
5.	Physics	2 "
6.	Chemistry	2 "
7.	Biology	2 "
	Total:-	14 "

15. The last six Buildings have been delayed because of the shortfall of Rs.7.75 million in the grant of the University during the year 1970-71 and 1971-72.

16. Pending the construction of permanent Campus, post-graduate studies and research in Mathematics (Pure & Applied), Physics (Theoretical and Experimental), Chemistry (Physical and Organic) and Economics (Mathematical) and Modern Languages, were conducted on a small scale in some temporary buildings in the Satellite Town from 1967 to 1971. During 1967-1972 the University has been able to produce 242 post graduate Scholars; The University Institutes, Offices and Hostels were shifted to the new Campus in August-October 1971. The subjects of Botany, Gentics, Phsiology, Geo Physics, International Relations, Cultural History and Pakistan Studies for advance studies and research while the Diploma in Computer Sciences have been started during the Session (1972). As a result of shifting to the permanent Campus and with the introduction of aforesid new subjects the admission of student to various disciplines has been raised to 579 during the session 1972-73 andthe number will a lmost be doubled during the next session). 109 teachers, most of whom were working in Europe and America, have been appointed pending the completion of laboratories and introduction of new subjects, This reversal of the brain-drain is regarded in national and international circles as a very commendable feature of the University.

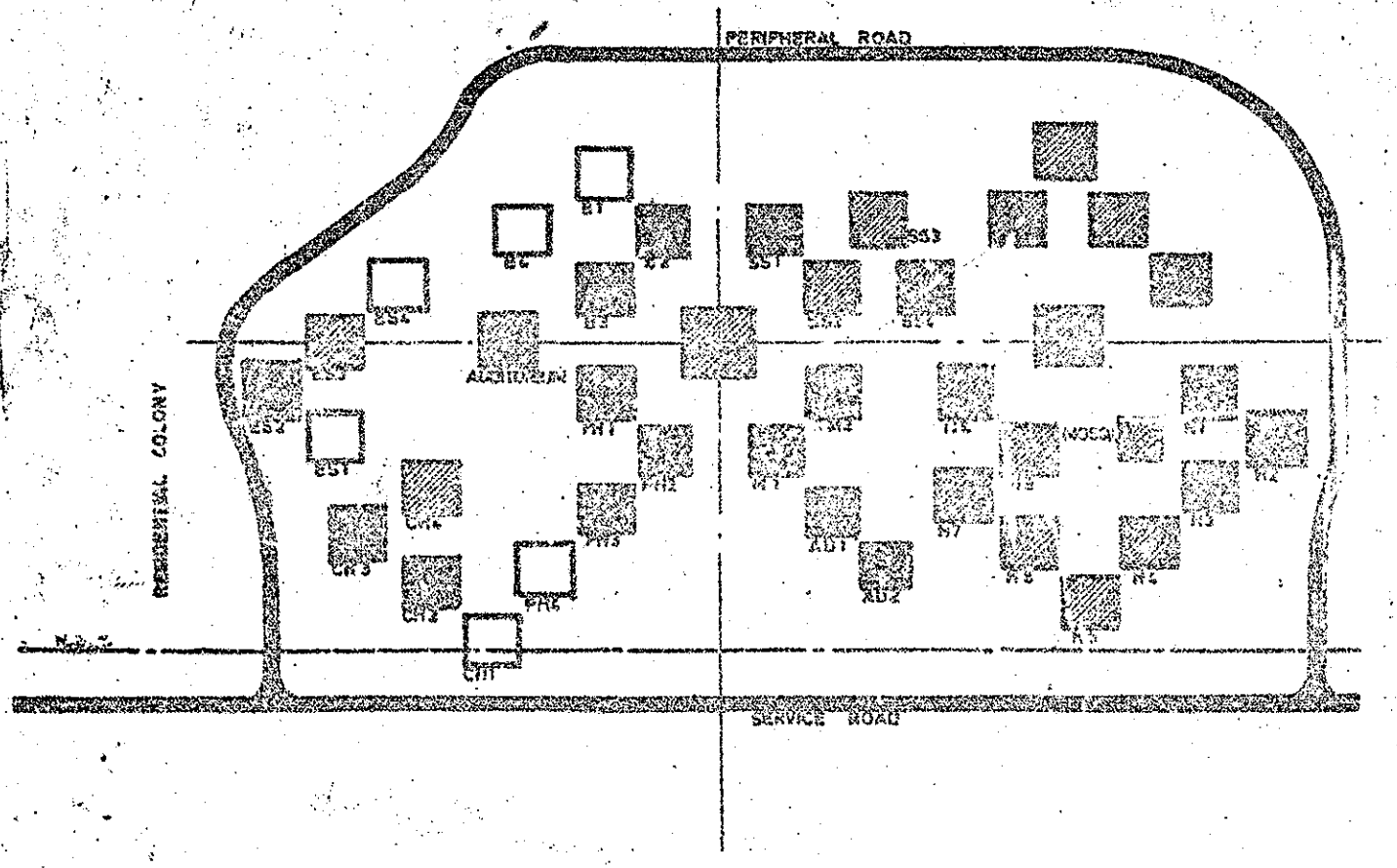
Contd..6.

17. The University is developing advanced studies and research in the above subject. Students are selected from the point of view of their ability and capacity for research but, as far as possible, they are admitted in the first instance to the Master's Degree course in order to give them an intensive training in the specialised subject which they wish to take up for their Ph.D. Degree. Those among the M.Sc. students who are found competent and capable and who show a good record at the M.Sc. level, are allowed to continue with the advanced studies for the M.Phil. course. After completing this pre-Doctoral year successfully, they are admitted to Ph.D. research status. Selection of students at the various levels is made carefully by the teachers concerned after interviewing the candidates, and testing them for their intellectual ability and capacity. Talented and deserving students are given an adequate allowance as Scholarship and Fellowship, and arrangements are made to accommodate them in the Halls of residence.

18. The staff of the University will consist mainly of talented pakistan scholars who are working abroad at present. The Ministry of Education compiles lists of Pakistani scholars working in some advanced countries, like U.K., U.S.A., etc. These lists show that in many subjects there are a sufficient number of brilliant Pakistanis in almost every branch of knowledge, and every effort is being made to bring them back to the Islamabad University either as teachers or as research scholars and Fellows. Since the University started work in 1967, a good number of highly qualified and talented Scientists have been repatriated by the University and many more of them are waiting to come back as soon as the laboratories are completed, and new subjects are introduced.

19. A number of people in the existing colleges, universities and other institutions of learning and research, are coming to the University to work as visiting scholars for a specified period with the concurrence of their parent organization. Their stay in this congenial atmosphere provides them with an opportunity of contact, consultation and discussion with brilliant and talented scholars in their own subject or allied fields, and gives them an incentive to do good research work for which the facilities and opportunities are not always available in the parent institutions.

20. International Organizations like the Ford Foundation, Unesco and the United Nations Development Programme have examined the scheme, plans and working of the University during the last few years through a number of experts, and, having satisfied themselves, have extended considerable support to the University in foreign exchange.



LEGEND

- BUILDINGS IN FIRST PHASE
- " " SECOND "
- " " THIRD "

N

BUILDING LAYOUT PLAN OF ACADEMIC CAMPUS
UNIVERSITY OF ISLAMABAD

SCALE 1:400

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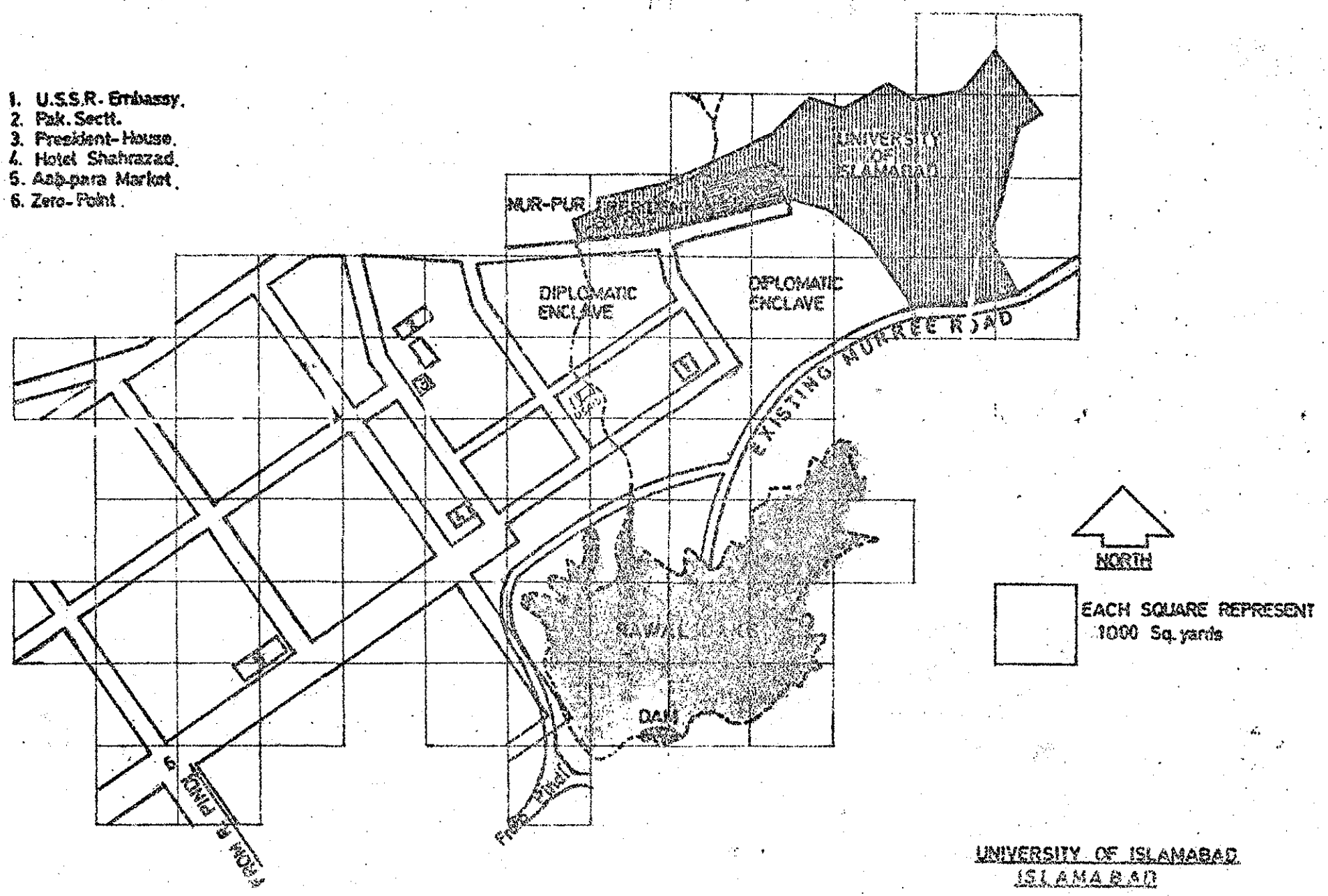

UNIVERSITY OF ISLAMABAD
ISLAMABAD

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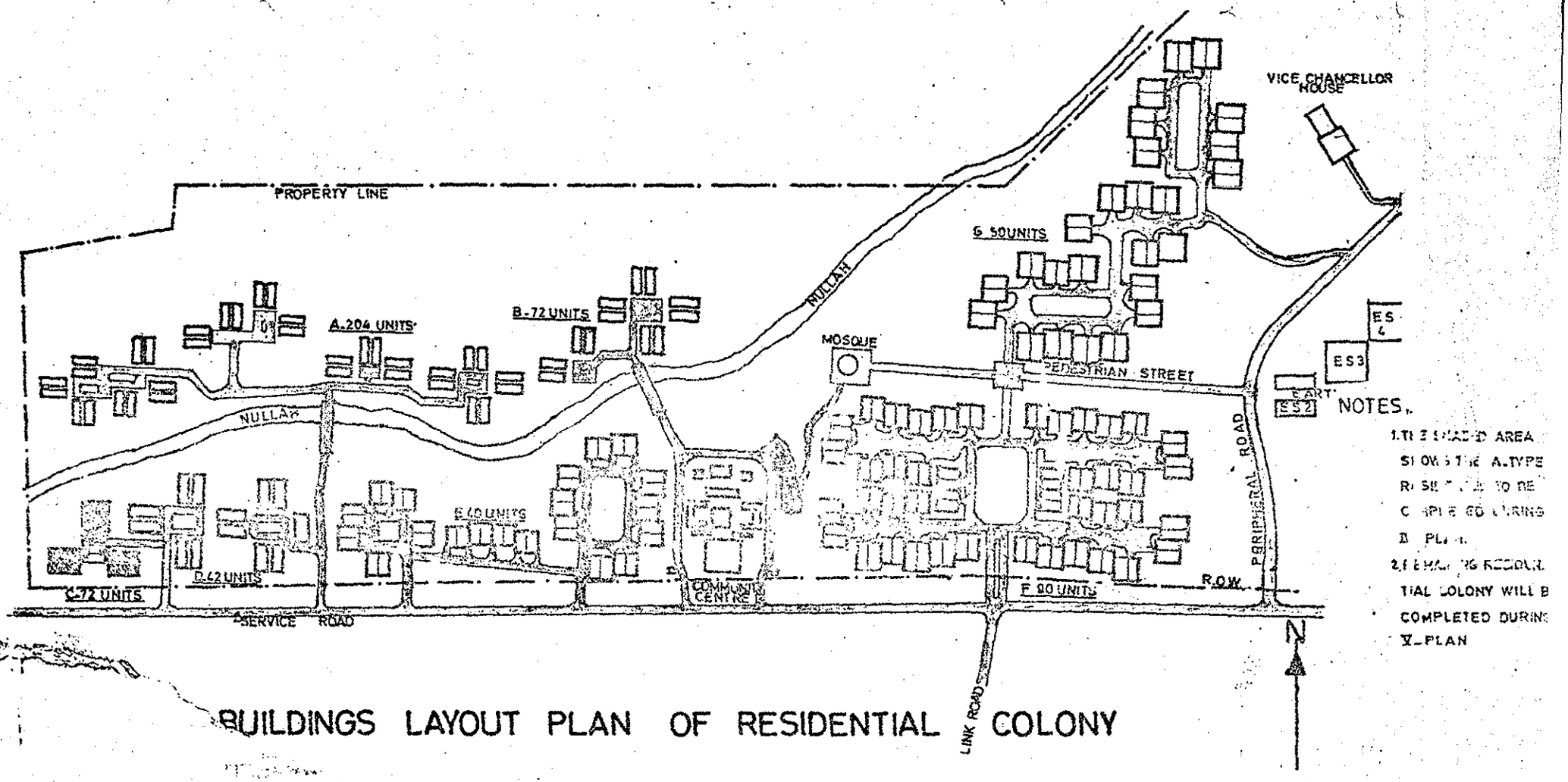

BUILDINGS LAYOUT PLAN OF RESIDENTIAL COLONY

UNIVERSITY OF ISLAMABAD

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PROJECT DIRECTORATE UNIVERSITY OF ISLAMABAD SCALE 1:400