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Project Management

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PREFACE AND ACKNOWLEDGEMENTS

This Manual was prepared by the Project Development Resource Team (PDRT of PAMCO).

The authors of this Manual are indebted to many who have published materials in the past on Project Management Planning and Implementation. Many multigraphs, multiliths, bulletins, circulars and books were reviewed during the months while the PDRT were preparing materials used in training courses with persons responsible for formulating and implementing projects in a sizeable number of Jamaica government agencies, statutory bodies, and ministries.

Many of the Project Management tools that others have found useful and subsequently put in written form, were used as the course materials for training here in Jamaica. But, the PDRT team soon determined that these materials are most readily learned in training situations when they were used on actual projects in which the trainee become involved. This Manual shows how the tools are applied on real Jamaican projects. The PDRT found this "action-training" approach to be a very effective teaching and training model. The participants quickly learn, own and adapt the tools and techniques because of their obvious relevance and applicability, and at the same time projects are actually moved forward during the training period. Thus, both trainees and actual projects benefit from the action-training approach. Based on the training experience of two years, the team strongly recommends this approach in other countries where project management training is attempted. From the trainees viewpoint, it is an exciting, but demanding approach to training and it is quickly accepted because it helps to speed up the actual development project implementation process. This is the crux of the development effort, in developing countries.

Much of the training materials used by PDRT to construct this Manual came from four primary sources. These publications are highly recommended to anyone interested in developing and using training materials on project management.

United Nations, The Initiation and Implementation of Industrial Projects in Developing Countries, A Systematic Approach, U.N., New York, 1975.

J. Bainbridge and S. Sapirie, Health Project Management, A Manual of Procedures For Formulating and Implementing Health Projects, World Health Organization, Geneva, 1974.

Peter Delp, et.al., Systems Tools for Project Planning, PASITAM, Indiana University, Bloomington, Indiana, 1977.

D. Cleland and W. King, Systems Analysis and Project Management, Second Edition, McGraw-Hill, New York, 1975.

The PDRT team is indebted to other who gave assistance previous to and during the preparation of this manual. Foremost among these persons were the Project staff from all over Jamaica who attended PDRT training courses and assisted the PDRT in applying the management tools to the management problems facing them in planning and implementing the Projects. These officers produced

the actual and illustrative working documents that can be applied to other projects. There are also the many officials within the Ministry of Agriculture, particularly those in the Production Unit, who have supported and assisted in this training effort. In addition, the Programme Officers of USAID and the Director of Projects Division (now PAMCO), Ministry of Finance, have encouraged the team to prepare and formalize these and other training materials so they can be used by other resource persons who are given the responsibility of training project management personnel in various segments of the government and in the private sector. Last, but by no means least, is the Secretarial Staff of PAMCO who worked diligently through many drafts to put the material in publishable form. Without the assistance and encouragement of all the persons mentioned above, the publication of this material would not have been possible.

We sincerely hope that the material will be useful to all Project Managers. The Project Implementation Planning Steps introduced here, have broad applicability and can be used and adapted by officials on projects that are faced with the complex problems that surround project management.

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ACKNOWLEDGEMENTS

The Project Planning and Management Series is a product of the Government of Jamaica/USAID National Planning Project (1976/1980). It was developed by the Project Development Resource Team (PDRT) for use in its "action-training" programme and presents practical approaches and tools for project planning and management. PDRT action-training brings teams and persons assigned to live projects into workshops, seminars and consultations, to acquire the specific knowledge and skills needed to perform their particular responsibilities with respect to "live" projects. During action-training, participants complete work on the "live" projects of their sponsoring organizations under the guidance of the Resource Team. In this way, projects are developed and moved forward while officers are being trained in job-relevant aspects of planning, analysis and management.

The publication of a series of this scope is a long and difficult process. All present PDRT members, listed as contributing authors, have worked together in writing, revising and publishing the series. The significant contribution of specific members deserve special mention. Dr. Merlyn Kettering, as long-term project advisor, guided the action-training programme and designed and developed the series. Dr. Bruce Brooks was responsible for final versions of many modules. Mrs. Marjorie Humphreys assumed primary responsibility for editing and production, and deserves much credit for organizing and clarifying the materials. Mr. Lascelles Dixon has headed the PDRT since 1979 and also deserves credit for the cover designs and for improving many of the art illustrations.

The series is the result of extensive experience in project action-training by the PDRT since 1976. Many persons in Jamaica, United States Department of Agriculture (USDA) and USAID have given support to the project and encouragement to this publication. In particular, Mr. Morris Solomon of the Development Project Management Center (DPMC) of USDA was responsible for the original project design and for supplying publications and giving encouragement and advice throughout the project. The many participants of the workshops and seminars have also contributed significantly to the form and content of the series.

Finally, credit is due to the total staff of PAMCO who have given support, constructive criticism and encouragement to the development of this series.

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The publication of this series is only a beginning of the development of relevant and practical planning, analysis and management materials. There are gaps; there are areas needing improvement and revision. The series is intended to be used and to be useful. Use in action-training and practical application to project development will result in revision, expansion and adaptation. All comments on the usefulness, accuracy, and relevance of the materials are welcome. The efforts of all preparing and publishing the Project Planning and Management Series are justified if it helps to develop our national capabilities to design and carry out realistic and successful development projects.

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FOREWORD

Introduction

One of the greatest challenges of this decade will be the effective management of increasingly scarce national resources to meet development objectives. As discrete sets of activities utilizing limited resources to achieve specified objectives within a definite time frame, projects are basic building blocks for the development programmes of nations and lending agencies. If projects are to be realistically designed and successfully implemented, there must be a national capability and commitment to manage and control financial, physical and human resources so their contributions are channelled toward the aims of their parent organizations and societies. A critical test of national maturity is the capability to plan for and effectively manage the use of resources through projects.

The Project Planning and Management Series presents practical approaches, tools and techniques for the formulation and implementation of sound projects. The series consists of a set of manuals on planning, planning for implementation and management along with associated modules explaining specific tools and techniques relevant to various functions of project development. The series can be used as a reference and guide for persons with responsibilities on "live" projects. It is also of interest as a text for persons studying project planning and management. All concepts, approaches, tools and techniques presented have practical relevance to projects and many have broader management applications as well.

The Project Planning and Management Series is based upon experience gained through the extensive use of action-training for project development. The objectives of the project were to (1) increase the flow of development projects, while (2) increasing Jamaican capabilities in planning and managing projects. The "action-training" approach was introduced and tested through the activities of the PDRT which was instituted by the project.

Action-Training

Action-training is carried out within the organizational setting of the participants and uses "live" projects so that the workshops are strongly oriented to operational problem-solving within the context of actual forces and resources of the situations in which projects must succeed. Action-training is a practical response to the pressures of a developing society where scarce management skills do not permit the release of persons from organizational responsibilities to attend long traditional training courses.

The PDRT action-training programme brings teams and persons assigned to live projects and with actual responsibilities into workshops, seminars and consultations and gives them the specific knowledge, guidance and skills required to perform their assignments. In this way, projects are developed and moved forward while project personnel are being trained in relevant aspects of planning, analysis and management of both immediate and future benefit for the individual and the organization.

Action-training on projects utilizes the immediate application of approaches, tools and techniques on "live" projects to ensure that:

- (1) the sponsoring organization and the nation benefit through observable project progress;
- (2) the training is operational and relevant within the real organizational context;
- (3) the participants have understood the concepts, tools and techniques well enough to apply them in actual situations; and
- (4) the participants benefit by mastering new skills and are rewarded by promoting project progress.

Action-training is best instituted where it supports rational and co-ordinated systems of project development, i.e., planning, implementation, monitoring and decision-making. Different groups of persons have responsibility for the various aspects of a project throughout its life. Some persons identify projects, others plan and prepare feasibility studies; others appraise; others select; others negotiate loans; others manage contracts and consultants; others manage; others monitor and so on.

Action-training is used to give persons and teams the specific knowledge and skills necessary to understand their responsibilities within the total project system and to be able to perform their roles effectively. It focusses specifically on what persons need to know to do their jobs and reinforces their understanding by testing the application of new skills on live projects.

An action-training workshop generally follows a simple formula for each topic and technique introduced. An introductory presentation is followed by a simple exercise to illustrate the concept and demonstrate its application. This is then followed by a work period during which participants work on actual assignments on live projects in consultation with the PDRT. The application to live projects reinforces the learning, permits an in-depth exploration of its applicability, tests relevance for this situation, and permits adaptation to fit the actual context, assignment, and experience of the participants. The live projects are not simulations, but actual undertakings of the respective organizations of the participants and represent assignments which are integrated into their normal duties. It is usually necessary to follow a workshop with site and field consultation to see that assignments are completed and that the tools are being used for project development and problem-solving.

PDRT carries out action-training in several ways:

- (1) Project Workshops conducted over several weeks, which result in the completion of a specific stage of project documentation or development; such as a completed Project Profile, Implementation Plan or Management Information System.

- (2) Consultation Workshops lasting several days over a period of time, which help a project team solve specific problems in project design, analysis, implementation, management, monitoring, or evaluation.
- (3) Seminars lasting one day, which introduce specific or general concepts and techniques to persons with particular administrative or technical responsibilities involving these skills.

Use of the Series

The Project Planning and Management Series is structured as a support to action-training. Different persons perform different functions and roles with respect to projects and therefore require different skills. Some persons must be able to perform sophisticated financial and economic analysis, while others may need only elementary knowledge of how to construct a cash flow. Some must focus on the clarity of objectives while others must be able to prepare definitive market and technical plans. Some need to be able to analyze while others must formulate. Some must be project managers, while others are executives. Some must manage contracts and consultants, while others monitor project performances, and so on. This requires that some basic concepts and skills be taught to most project personnel and that specialized skills relevant to specific responsibilities and roles must be taught to the different teams and groups. For this reason, the series is divided into distinct manuals and modules so that the appropriate concepts, tools and techniques can be selected for direct relevance to the specific functions of participants or the specific project problems being addressed by the action-training.

As a project is moved through its life from identification and conception, through planning and approval to implementation and termination, different approaches, knowledge and tools are relevant. The Project Planning and Management Series can be used because of its flexible structure to give the appropriate knowledge and skills to persons with different roles and responsibilities in the project life, e.g., planning, analysis, management, monitoring, contracting, control, and so on. The following examples illustrate some applications of action-training by PDRT using the series.

1. A Project Profile Workshop - conducted over three weeks for project teams with responsibility for the first identification planning document on a project idea. This workshop is conducted using Manual P -- Project Planning with an assortment of modules, including:
 - 1 - Project Objectives; 2 - Logical Framework; 5 - Project Organization; 7 - Project Scheduling--Bar Charts; 13 - Project Technical Analysis; 17 - Project Costs and Benefits; and so on.
2. A Planning for Implementation Workshop - conducted over three or more weeks for project teams with responsibility for preparing

action or implementation plans for projects having been approved or authorized. This workshop is conducted using Manual I -- Planning for Implementation, with an assortment of modules, including:

3 - Work Breakdown Structure; 4 - Activity Description Sheets; 6 - Linear Responsibility Charts; 9 - Project Scheduling--Network Analysis; 10 - Milestones Description Charts; 11 - Planning and Budgeting; 35 - Introduction to Contracts; 38 - Project Files; and so on.

3. Project Seminars - introducing specific concepts, project-relevant skills and project systems as illustrated in Modules 12 -- Role of PAMCO; 31 - Decision-making System for Projects; 44 - Introduction to Lending Agencies; 36 - Project Documents for Planning and Implementation; and so on.

The Project Planning and Management Series is designed to complement the lectures, exercises, project work and consultations of PDRT workshops. IT IS NOT INTENDED TO BE USED AS SELF-INSTRUCTIONAL MATERIAL. It is designed for use in conjunction with the guidance of an experienced multi-disciplinary training and consultation team. An important characteristic of action-training, typical of adult education, is that it draws upon the knowledge and experience of the participants as well as the PDRT as an integral component of the workshop. The material in the series is, therefore, basic, operational and brief. It is expanded and reinforced during project work and workshop interaction.

The ultimate justification of this series is similar to that of the action-training introduced through the National Planning Project. If it contributes to promoting better project formulation, successful implementation and generally helps to move projects forward, it is justified. However, the importance of the series goes beyond this if it ensures that Jamaica increases her indigenous capability and capacity for formulating and managing development projects as part of the thrust toward increased self-reliance and independence.

The present series is part of a process of materials development and action-training which has been initiated by the National Planning Project. There are gaps and inadequacies which will be identified. The series is not intended to be static. It should be expanded, revised, adapted and tested through an evolution of action-training and application to projects so that its relevance is maintained through constant upgrading and revision. The series is only the beginning of a process of developing practical approaches, tools and techniques to ensure effective management of our resources in the challenges of development facing us in the immediate and distant future.

M.1

I. PURPOSE OF THE MANUAL

The purpose of this manual is to help project managers understand the nature of their jobs so that they can carry out their projects successfully. Successful projects are those which achieve their objectives reasonably within the time and resource constraints assigned to the project.

The manual focuses on the managerial practices to be followed for project implementation. It is assumed that project implementation is initiated only after appropriate identification, planning and approval of a project, since projects must have reached an advanced stage of maturity to be successfully implemented. Resources for implementation should not be committed until proper planning has been done and authorization has been received. Pushing 'immature' projects into early execution increases risks or project failure and makes project management unnecessarily difficult.

This manual does not deal with the planning or authorization stages of projects; nor does it discuss the operation of a project once it has been successfully carried to the point of termination, i.e., routine operations. Neither does the manual deal with technical project activities, although these are very important and must be performed with high quality. It would be difficult to give general guidelines on technical planning for projects because there is such a wide variety of projects across a range of sectors.

The manual does deal with the management of project implementation, which can be defined as the establishment of new capabilities and capacities for the delivery of goods and services within the total development programme of an organization, a sector or a nation. The managerial practices on projects must be improved to ensure a higher degree of success in project performance. General guidelines can be given for project management, because all project managers must perform basically the same kinds of managerial activities, regardless of the nature of their projects.

Fundamentally, project managers are responsible for managing the same resources on all types of projects--*money, people, time and physical resources*. Although projects differ in countless ways, certain generalizations of project management are applicable to all projects. Every project takes *TIME*; every project requires *MONEY*; every project requires *ORGANISED HUMAN EFFORT*; every project makes use of some *PHYSICAL RESOURCES* (such as facilities, supplies, and materials).¹ The job of the project manager is to make the money, the time, the people and the physical resources at the project's disposal achieve the project objectives. Thus in all kinds of projects, these categories of project resources are the major areas that can and must be managed.

There are certain management approaches and tools that apply to all projects in some degree. The assumption of this manual is that there are

M.2

certain basic principles and methods of management which *must* be applied to ensure successful project implementation. Sound and successful project management is not haphazard, ad hoc, or luck. It does not vary at random from project to project. It is a systematic application of relevant approaches and methodologies to real development projects. It is these approaches and applications which are introduced in this manual.

II. UNDERSTANDING PROJECTS AND THE PROJECT CYCLE

2.1 Definition of Development Projects

A project is "a combination of human and nonhuman resources pulled together in a 'temporary' organization to achieve a specified purpose".² Projects are best distinguished from programs in terms of time and objectives. Programs tend to be open-ended in nature, while projects have specific objectives and specific end points. There is, however, a great deal of ambiguity in the uses of these administrative terms.

Development projects may be defined as investments to develop new capabilities in a society to produce additional goods and services. Within a specified time and with specified inputs, projects are supposed to produce a particular set of outputs to meet identifiable development needs, e.g., to satisfy the demand for particular products or services, to exploit for productive purposes locally available natural and human resources, to produce goods and services for export, or to create social and capital infrastructures that allow productive activities to be performed more effectively or efficiently.³

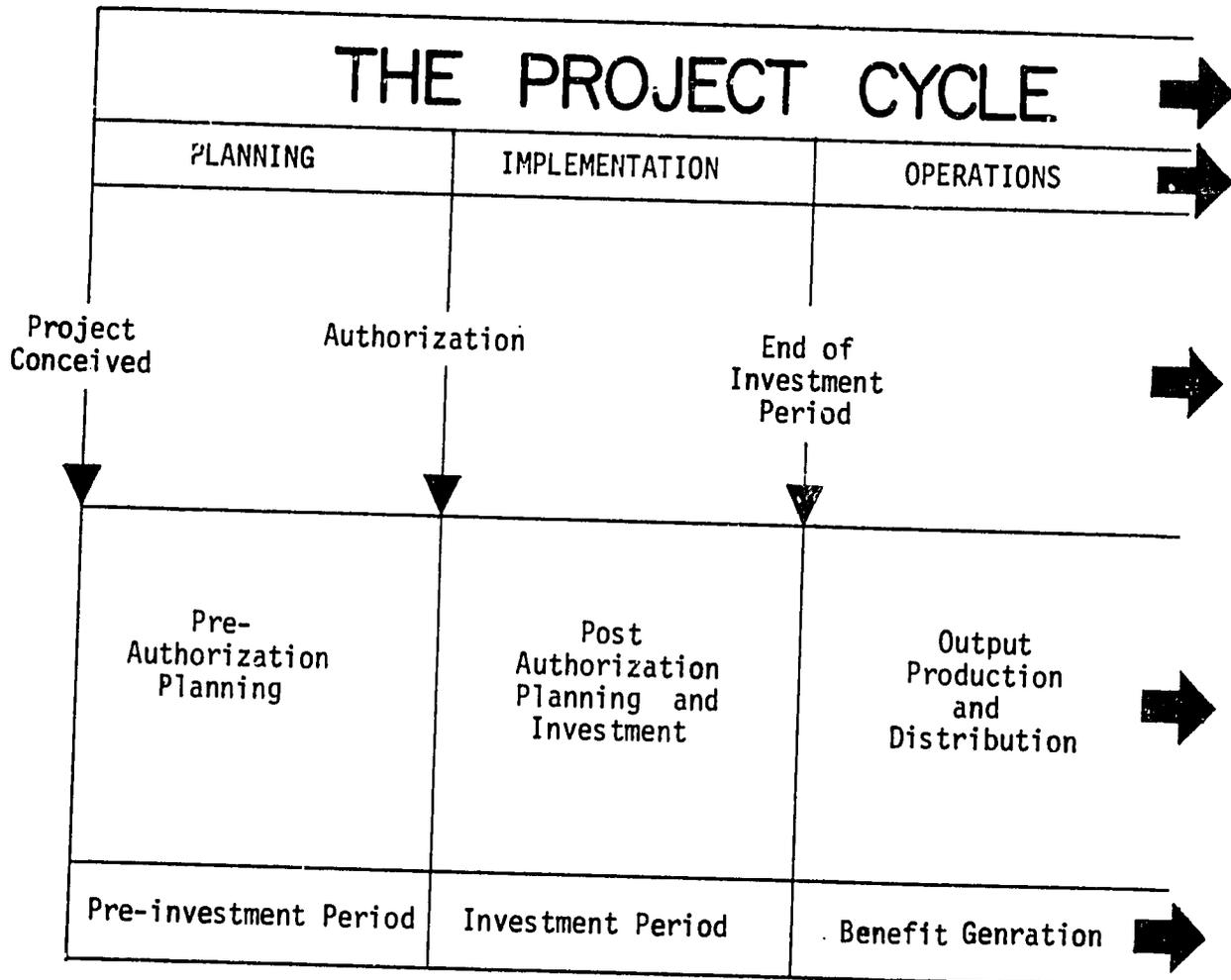
By their very nature, development projects are risky ventures. They involve a great deal of uncertainty. They are *unique*. They are investments of *scarce financial, human and physical resources*. They have *controversial objectives*. They are *change-oriented*. They involve processes which have not been tested in the particular way or setting before. Thus, there is a need for a special approach to project management which promotes problem-solving, resource mobilization and coordination, organizational collaboration and integration, and effective monitoring and decision-making to ensure that deviations from plans are controlled within tolerable limits. Effective planning and management can reduce some of the risks and uncertainties, but certainly not all. Project management calls for a great deal of *creativity* as well as sound project management.

2.2 Project Life Cycle

Projects mature through phases. Three basic periods (1) Planning, (2) Implementation, and (3) Operations are seen in FIGURE 1.4. *Planning* deals with all those pre-authorization activities which attempt to identify the project idea and to formulate this idea into a set of technical and organizational plans which can achieve the objectives intended within the specified time period. *Implementation* deals with the "investment period" of the project when the physical and human structures are put in place for the productive processes of the project which are to follow. *Operations* deals with the period of actual output generation and distribution, where

11.4

FIGURE 1: MAJOR PERIODS OF PROJECT LIFE.⁴



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the benefits of the project are realised. The primary concern of this manual is managing the investment or implementation period for development projects.

All project phases must be accompanied by different forms of financing. But, before there is a heavy commitment of resources to a project, the project idea should be appropriately conceptualized and documented. It should be carefully analyzed before its selection for further development and formulation and before there is extensive pre-investment or investment financing*.

In FIGURE 2 four major project phases composed of distinct stages are shown. The phases are sequential. For example, the stages of the Planning Phase are completed (or nearly so) before the stages of the Implementation Phase are initiated. A project should have passed through all the distinct *planning* stages of identification and selection, formulation and appraisal, and approval before resources are committed for the *implementation* of the project. Each of these phases and its composite stages must be administered throughout the normal project life cycle to coordinate the activities and analyses which are conducted with varying degrees of depth and precision as a project matures. The findings of one stage build upon others until the project has evolved through its life from conceptualization to operations or *termination*. The activities throughout the project cycle are closely interlocked and the success of projects at the various points of development are dependent upon the completeness and accuracy of work done at earlier points.

In the Jamaican Project Planning System, a project idea must be documented in a Project Profile**. Early selection must be made by the Pre-Selection Committee before a Feasibility study is approved. Distinct decision points in the planning phase of a project to test project worthiness facilitate the project formulation and expedite project implementation***. Projects should move systematically through stages of the project cycle to maturity. If any of the stages are skipped in haste to "get something on the ground", it is likely that there will be delays and discouraging mistakes which could have been avoided.

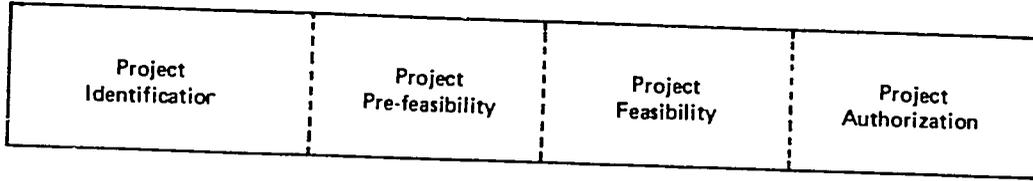
Because projects often have high visibility, there is a tendency to force them into construction and implementation stages before feasibility studies or project documentation are complete. The unfortunate result of

* See discussion of project financing in Manual P, *Project Planning*, Chapter Two, "Understanding Development Projects" and Chapter Three, "Project Planning Systems".

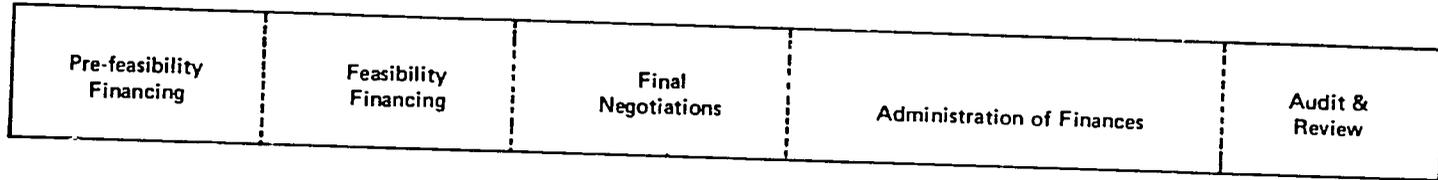
** See Module 18 - Project Profile Preparation

*** See Module 31 - Decision-making Systems for Projects

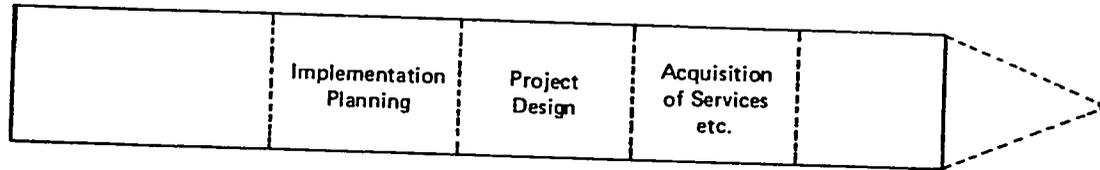
PROJECT PLANNING PHASE



PROJECT FINANCING PHASE

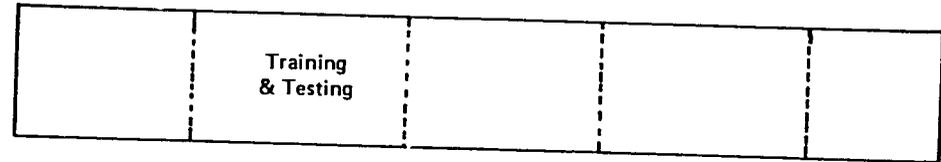


PROJECT IMPLEMENTATION PHASE



M.G

PROJECT DIVESTMENT PHASE



(Idea)

(project time horizon)

(Feedback)

Figure 2: PHASES AND STAGES IN THE LIFE OF DEVELOPMENT PROJECTS

PAMCO, PDRT
Resource
Material

such haste is often inappropriate physical and organizational structures which result in excessive project costs, time overruns, and high levels of conflict, disagreement, and disappointment. Project execution or the commitment of project resources must be constrained until planning for project implementation has been properly completed.

Projects are also usually accompanied by high expectations. They may be seen, by analogy, to be the "examination results" of a government. Project announcements are often highly publicized so that expectations for performance are aroused and project performances are closely observed by all interested persons and groups. Procedures of planning should be adopted to ensure the highest possibilities of project success, especially in light of the general conditions of uncertainty and risk facing so many development projects.

When project managers are assigned, they should investigate the manner and extent to which projects have passed through the planning stages of the project cycle preceding the commitment of resources for investment and the extent of planning for project implementation. *To be able to correctly analyze the stage of development of a project is the first important step in being able to "manage" a project.*

III. THE NATURE OF PROJECT MANAGEMENT

3.1 The Meaning of Project Implementation

Policies are official statements of purposes to be pursued on behalf of an organization or a society in relation to desired changes to be enacted or states of being which are to be achieved. *Planning* is the attempt to guide and control the resources of the organization or the society through the future course of events by prescribed activities. *Implementation* is the process of giving actual effect to and ensuring actual fulfillment of policies and plans through concrete actions and measures. Implementation must be the necessary consequence of policies and plans. It is the realization of dreams and intentions.

Project Implementation is used in an even more specific sense. It refers to the capital or infrastructural investment period of the project life cycle. Project implementation refers to the actions of putting in place the new capacities and capabilities to deliver the desired goods and services to bring about intended changes. *Project operations* refer to the actual delivery from the installed capacities and capabilities of those desired goods and services.⁵ When the project implementation phase is terminated, projects move into routine operations where the more traditional practices and approaches of management are most applicable.

Project implementation is our main interest in this manual. Project implementation requires special management approaches because most development projects are experimental, innovative and/or unique. However, what is introduced in this manual is relevant also to the management of routine operations and should be part of the knowledge and skill training of all managers.

This manual focuses upon management during the processes of project implementation, and assumes that a project has reached a relatively advanced stage of maturity before resources are committed to its execution. The degree of maturity may vary from project to project, depending on the nature of the project, the amount of study and appraisal required, the urgency of the project, and so on. A project manager must have evidence of project authorization from all appropriate bodies before initiating implementation.

The very nature of projects makes them naturally difficult to manage. Projects are unique, have severe time and resource constraints, high visibility, high expectations, high degrees of risk and uncertainty. Projects require high levels of coordination. It is inevitable that the project manager will face confusion, delays, conflicts, inefficiencies, unrealistic expectations and other sources of managerial frustration during the implementation of a project. This is expected. The task of project management is not to avoid these, but to anticipate them as directing and controlling project implemen-

tation. Within defined constraints, the manager must find means of controlling project activities so that the challenges and crises of project management can be identified and performance deviations contained to tolerable levels. There are certain management principles, tools, techniques, and approaches which can be applied in the complexities of project management to make the tasks of carrying out development projects more rational and understandable--and to make the projects more manageable.

3.2 *Organizational Characteristics Affecting Project Management*

Apart from its technical and economic merits, the success of a project depends largely on the effectiveness of the organizational structures responsible for its implementation and execution. Without efficient and appropriate organizational structures, a sound and viable project may end in failure. The form of organization and management selected for a project will depend largely upon the nature and scope of the project activities and the setting in which the project is to operate.

First, one must make a distinction between the "project organization" and the "parent organization" responsible for the project. *Project organization* refers specifically to those structures put in place to carry out the project. The *parent organization* is that entity, usually an existing organization such as a Ministry or Agency, which is responsible for sponsoring and housing the project. The parent organization usually acts through a board or committee which has general responsibilities for decisions on policies, budget approvals, management appointments, and specification of limits to the powers and responsibility of the management. The project organization consists of those persons who are entrusted with day-to-day management and decision-making affecting execution, internal and external coordination, and general project supervision.⁶

A major difference between project management and traditional organizational management lies in the organizational structures used for implementation, i.e., those for actually carrying out of intended activities. Organizations are traditionally structured into departments or units having distinct and specific functions and assignments. Departments are usually composed of people with distinctive sets of skills or professional competencies. Each department has its specific functions in relation to the overall objectives of the total organization. Departments are organized into lines of vertical authority and responsibility and operate according to prescribed organizational procedures and regulations.

In contrast, projects are a temporary form of organization put together for specific tasks and usually imposed upon the traditional organizational structures and operations of the organization. Project organizations are devised to achieve specific sets of limited objectives within a defined

time limit and within prescribed resource constraints. Project organizations may take various forms, from complete submersion in the existing structures through a matrix situation, where a project office is established and draws from resources across the organization, to the establishment of a completely new organizational unit to entity to accomplish the project. In this case, we shall be most concerned about projects with a "matrix" type of organization*.

3.3 *Project Matrix Management*

Matrix Management is basically that situation in which there is a project manager (full-time or part-time) and probably some project staff, but most of the persons who will have roles to play on the project remain under the authority of their respective departmental heads.⁷ The Matrix Management situation is when the project manager may have direct authority over only a few or a proportion of the total required project staff, and has only integrative coordination authority over the rest.

Projects with matrix organization are not only temporary, but also imposed cross-departmentally throughout the traditional functional areas of an organization. At the project level, the coordination and integration of functions, personnel, and resources from organizationally separate units becomes critical to project performance. Because of their inter-departmental nature, projects require the creation and clarification of formal and informal lines of communication, coordination, authority and responsibility which will complement those of the permanent structures of the organization. These project organizational structures must be adapted to the special needs of both the project and the parent organization.

Matrix project management must operate within a complex of vertical, diagonal, and horizontal relationships, all of which can create a great deal of confusion. As a consequence, projects are often characterized by a lack of clarity regarding who does what, who controls whom, and who is responsible for what and to whom. Because of the complexity of project management, projects should not be launched without serious consideration of and planning for the coordination necessary for successful implementation. The project organization should be carefully defined in relation to the needs and characteristics of the project and the sponsoring entity**.

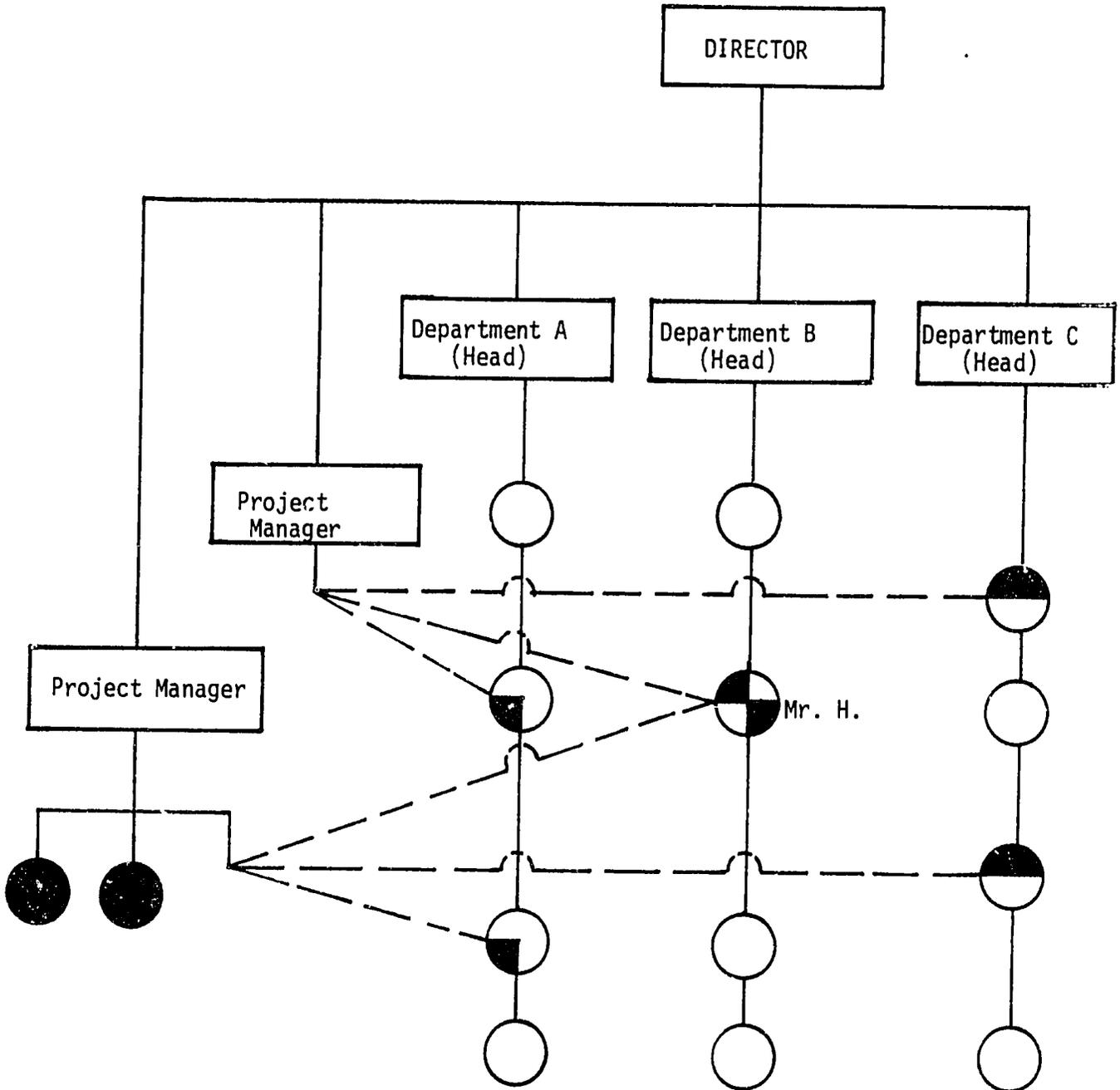
* See Module 5 - Project Organization Charts for a discussion of types of project organizations, especially matrix organization, and the advantages and disadvantages of each.

** For a more detailed discussion see Manual I, *Planning for Project Implementation*, Chapter IX "Clarifying the Project Organization".

M.11

FIGURE 4: PROJECT MATRIX MANAGEMENT ORGANISATIONAL STRUCTURES

PAMCO, PDRT
Resource
Material



- = Department Personnel
- = Project Assigned Personnel (Full-Time)
- = Lines of Authority
- ◐ = Project Assigned Personnel (one-half time)
- - - = Lines of Coordination
- ◑ = Project Assigned Personnel (one-quarter time)

DO NOT DUPLICATE WITHOUT PERMISSION

Projects that are to be carried out within an existing organization, but are dependent upon resources through the organization, tend to create confusion and conflict. Observe the case in FIGURE 3, if the project manager has need of the services of persons in various departments (e.g., Mr. H.) at the same time that the Department Head would need his services Mr. H. would probably choose to work for the Department Head. The Project Manager does not have normal administrative authority to command the services of these persons. In the case of conflicts over time, schedules or responsibilities, these persons would be still primarily accountable to the Department Head.

3.4 *Project Authority and Responsibility*

For the Project Manager, the traditional management principle that "Authority equals Responsibility" is not true. In the project matrix organization situation, "Responsibility is greater than Authority" for the Project Manager. The simple illustration above demonstrates the necessity for thorough planning of project implementation so that inevitable conflicts or competition over personnel and other resources may be anticipated. Agreements, procedures and systems for resolving the subsequent organizational conflicts and for reinforcing the authorities of project management must be established.

Projects represent a strong contrast to the usual hierarchial relationships which generally dominate organizations. Successful project implementation requires the integration of resources from across the organization. This can create confusion and conflict in the absence of appropriate plans and systems for cross-departmental management. This confusion increases when the organization undertakes a large number of projects. Severe strains are put on an organization's personnel and resources. The result is often disastrous for both the organization and the projects. First, the *routine work* of departments suffers because of the assignment of personnel from routine work to project work. Second, *project work* suffers because project managers do not have the authority to command that the temporarily assigned personnel and resources for work on the projects. The final result is a reduction in both the productivity of the project and the organization. When routine ongoing organizational work is not up to standard, projects usually suffer because they do not receive adequate organizational support either for their implementation or to ensure the successful impact of their outputs. Routine organizational productivity suffers when project implementation is delayed, because the projects are designed to contribute to organizational programs and because personnel are often shifted on a crisis basis for urgent project work to the neglect of their normal duties.

Projects present increased demands on all units to perform project-specific functions in addition to routine activities. Without clear implementation plans, for projects, the confusion can become nearly uncontrollable.

This situation is further exaggerated when project personnel from outside the parent organization are assigned to projects, in which case the coordination needs are not confined to one organizational hierarchy. Multi-project commitments can overload organizations and lead to a downward spiral of failure and disappointment further multiplying the confusion created in the organization and significantly reducing productivity.

3.5 *Problems and Project Commitments*

Seldom does an organization undertake a single project. Most government agencies are committed to a number of projects overlapping in time, and using the same personnel and physical resources. The consequence can be a high degree of conflict and competition which not only affects project performance but also staff morale. Most projects are undertaken enthusiastically and there is initially a high staff morale on the project. But as delays and conflicts are encountered, this spirit is turned into frustration and disappointment which often lead to low performance standards and high staff turnover. Each project, taken as a single undertaking, could be managed effectively without the introduction of formalized project management approaches, systems and techniques. However, because of the number of projects and their impact upon the ongoing routine operations of the organization, many projects are ineffectively managed, as evidenced by delays, cost and time overruns, unused allocations, ineffectively used technical assistance, penalties, conflicts, and other symptoms of poor project performance.

A most commonly sited cause for poor project performance is that the project manager is the wrong person. The solution is to, change the project manager. That is, the cause of problems is that the wrong person has been given the job. This may be the case; but often, even the best persons could not successfully manage certain projects, given their contexts and constraints. There are many other causes which can lead to poor performances than the person(s) assigned to the project:⁸

- i) An organization may take on too many projects, more than their resource and management base can manage or implement at one time.
- ii) Projects may not be recognized as projects until some point in their life, so that there were inadequate plans or personnel to accomplish the objectives of the project.
- iii) There may be impossible schedules, cost commitments and other indications of unrealistic planning, which is common to the optimism of certain feasibility studies.

- iv) There may be a poor understanding of the roles and jobs of project managers and their relationships within the total organization, for example, to departmental heads and other administrative officers.
- v) There may not be an integrated model of project administration and reporting systems so that it is unclear who is responsible for what aspects of the project.
- vi) There may not be a system for integrated planning and control of the overall resources within the decision-making systems of the parent organization(s).
- vii) The priorities of organizations may change (especially in response to crisis situations), so that the project is adversely affected.

The list of probable causes for poor project performance could be expanded, but the above list illustrates that the problems may be much deeper than the simplistic analysis of "the wrong person".

It is the responsibility of the parent organization to see that systems are instituted to avoid some of these common causes of poor project performance. The approaches which are advocated in this manual can be used in relation to a single project, or they can be expanded for application to the larger problems of project coordination and integration of organizational resources in a multi-project environment. In general, management performance problems on projects can be categorized into three large groups:

- (a) technical and managerial knowledge and skills of the people involved;
- (b) organization of responsibilities and authority for projects;
- (c) policies, procedures, systems and methods of the parent and supporting organizations.

In the face of poor project performance, it is important first to analyze correctly the symptoms and causes of ineffective project management and then to correct these through technical training, management training, establishment of project plans, and adoption of organizational policies and procedures which facilitate successful project performance.⁹

3.6 *The Need for Systematic Project Management*

Projects are unique, temporary and non-routine. Projects cut across departments, functional areas, and even across organizations. Project management requires the coordination of personnel and resources that are not necessarily under the authority of the project manager. The responsibilities of the project manager are greater than the authority of the manager. Projects must be completed within time and resource constraints. They work on a total project budget rather than calendar budgets. Project work varies throughout the implementation of the project.

FIGURE 4 reviews some of the differences between projects and departments, which in turn, illustrate the significant differences between departmental management and project management.^{10a} Because these differences are often overlooked, organizational problems affect many projects. Project management cannot be approached in the same way as strict departmental management. To do so compounds the common problems of project management. The nature of projects, and especially their organizational characteristics in the Matrix Management situation, require the adoption of systematic approaches for project management and the systematic application of relevant management tools.

The complexity of project management is exacerbated when an organization takes on many projects increasing competition for resources, confusion about priorities and conflict regarding management decisions and performance standards. There must be a realistic approach to the number and scope of projects that any single organization can undertake. Sound project management endorsed by the parent organization and transformed into management requirements for project managers and administrators, can provide a basis for overcoming and avoiding some of the common difficulties faced by them. In a multi-project environment, it is extremely important to introduce systematic procedures and disciplines into project management to improve the effectiveness of organizational and project relations which otherwise tend to be ambiguous and unnatural (and therefore generate conflict). The adoption of sound management principles for projects facilitates the operations of the organization as well as enhances the performance of the projects.

The approaches and tools introduced in this manual are specifically intended for project managers, but all persons contributing to projects, from senior administrators, to technical staff and project team members, can benefit from familiarity with the project management approaches, techniques and tools introduced in this manual. Project management techniques introduced throughout an entire organization can form the foundation for more successful execution of projects, as well as ongoing programmes.

M. 16

PAMCO, PDRT
Resource
Material

FIGURE 5: COMPARISON OF PROJECTS AND DEPARTMENTS ¹⁰

Project	Department
1. Specific life cycle; conception, design, fabrication, assembly or construction, test, initial utilization.	1. Continuous life from year to year.
2. Definite start and completion points, with calendar dates.	2. No specific characteristics tied to calendar dates, other than fiscal year budgets.
3. Subject to abrupt termination if goals cannot be achieved; always terminated when project is complete.	3. Continued existence of the function usually assured, even in major re-organization.
4. Often unique, not done before.	4. Usually performing well-known function and tasks only slightly different from previous efforts
5. Total effort must be completed within fixed budget and schedule.	5. Maximum work is performed within annual budget ceiling.
6. Prediction of ultimate time and cost is difficult.	6. Prediction of annual expenditures is relatively simple.
7. Involves many skills and disciplines located in many organizations which may change from one life-cycle phase to the next.	7. Involves one or a few closely related skills and disciplines within one well-defined and stable organization.
8. Rate and type of expenditures constantly changing.	8. Relatively constant rate and type of expenditure.
9. Basically dynamic in nature.	9. Basically steady-state in nature.

IV. AN INTRODUCTION TO PROJECT MANAGEMENT

4.1 *Two Key Concepts of Project Management*

The objective of project management is to achieve proper and adequate control of the project to assure its completion on schedule within the prescribed human and physical resource constraints while successfully achieving the objectives of the project. This can be quite difficult, especially in the context of matrix project management. Two basic concepts underlie effective project management:

- (1) a single point of responsibility for the project;
- (2) integrative planning and control.

These two concepts are mutually supportive and must be combined to achieve effective project management.^{10b}

"A single point of responsibility" refers to the establishment of a central position of project manager. Within the complex organizational environment of a project this position represents the point of responsibility for coordinating all the contributing functional areas with their specialized tasks into the rational form of a project. The project manager has direct authority over only some of the project staff, and limited authority over other personnel who, although they contribute to the project, are retained in their functional departments. Regardless of the degree of authority, the project manager is responsible for the project. This single point of responsibility is critical, for it identifies the point of accountability for a project and establishes an organizational centre capable of ensuring that the project is carried out.

"Integrative project planning and control" refers to the establishment of plans, procedures and systems to ensure that all the project components and elements are inter-related. This means the coordination of all contributing organizations and units as related to project inputs (human and physical resources), project schedules, and project outputs and their utilization. All aspects and components of the project must be planned and coordinated through a common or united project system rather than separately by their routine programme or functional systems.

Project control cannot be based solely on the traditional principle that "authority equals responsibility". It requires cross-departmental coordination and integration. Project authority is shared, so project control is determined by mutually established objectives, goals, work plans, base lines and schedules. Projects must be mutually defined, shared and based upon

integrated work plans. Project plans must be updated and revised throughout the implementation of the project, so there is need for initial integration of planning and control, and the establishment of systems for ongoing integration of planning and control throughout the life of the project.

These two key concepts of project management must be administratively installed together for successful and effective project management. It is the project manager, the single point of responsibility, who is responsible for ensuring that the integrated plans are adequate and valid and who coordinates the monitoring to verify and signal the management actions to be taken. With integrated planning and control, the project manager is able to coordinate the interfaces between project components and project personnel to help resolve conflicts and problems and to raise unresolved and anticipated issues to appropriate levels of management for decision and action.

4.2 *Role of the Project Manager*

Every project requires that there be someone responsible to see that the basic project resources are controlled, coordinated and used in such a way as to achieve the project outputs and objectives. Every project requires planning, organization, staffing, evaluation, direction, control and leadership from its authorization to its termination. These responsibilities form the outlines of the basic role of the project manager.

The specific roles of project managers vary between projects, but primarily involve leadership, coordination and organization for the project. The project manager's basic responsibilities are:

- (a) to see that the final outputs of the project are produced within the technical specifications and the resource constraints of the project;
- (b) to ensure the appropriate use of project resources throughout the project, including revisions from original plans as necessary to ensure that the resources are used as effectively and efficiently as possible;
- (c) to negotiate or see that there is negotiation on all work orders and contracts with the various functional units and organizations contributing to the performance of the project;
- (d) to monitor performances so as to be able to alert higher levels of project administration when project deviations are out of control and may require significant project modifications;

- (e) to monitor the project so as to be able to make or force the required decisions to ensure that project objectives will be met;
- (f) to make recommendations on project modifications, alternatives and issues as problems arise or as they fall within contractual limits; and
- (g) to serve as the prime point of contact for the project for all associated persons and groups, including higher level administration, project functional and activity managers, and project beneficiaries.

In short, the project manager is responsible for all the management, coordination and control of the project resources to ensure that the project outputs are produced and utilized so as to achieve the project objectives. The project manager is primarily seen as the central point of responsibility for the project.

The project manager may be assisted by a team having all the skills necessary to administer and carry out the project--such as an engineer, a contract administrator, an accountant, a controller, functional coordinators field managers, and so on. Despite the size of the project team, the manager is still responsible for the project. It is important to note that there is a tendency within the matrix management situation for a number of the members assigned to the project team to have responsibilities to other organizational units and loyalties which may be stronger than those to the project. Project personnel are often retained under the authority of departmental heads while on temporary assignment or part-time assignment to the project. Often the only real point of responsibility for the project is, the project manager. It is the role of the manager to see that the project is done--it is not the responsibility of other members of the team, though they assist the manager in his function.

The sense of total responsibility for the performance on the project often forces managers to get unduly involved in the day-to-day field operations of projects. There is a tendency to feel that to get the work done, it is necessary to become personally involved in the tasks. One principle of management which holds equally true for projects is that management is getting work done through others. A project manager is not responsible to do the work--but to see that the work is done. This is why a project manager must be a manager, first of all and (if desired) a good technician in a secondary capacity. A good manager often does not necessarily need to be a technical expert in a particular discipline or project area. It is the job of the manager to use the expertise and energies of others, not to be able to do and know everything personally. This is a virtual impossibility, anyway.

There are two distinct ways of controlling a project as a manager. First, there is *Positive Control* in which the manager is continuously involved with the performance of project activities and assumes operational responsibility for the technical aspects of a project. And, second, there is *Control by Exception* in which the manager measures the performances of others responsible for the operational aspects of the project against a management plan and intervenes only when there are significant deviations from the plan*.

The distinction between project managers and technical personnel or activity managers must be clear.¹² The *project manager* provides the direction regarding what the project tasks are, when they should start and finish so as to meet the overall project goals, how much money is available to perform the work, and what changes in original plans and schedules are necessary and tolerable in light of total project performance. The *technician or activity manager* provides direction regarding who will perform specific activities under his immediate assignment, how the technical work will be accomplished, and how much money is required to perform the work. It is not always easy to differentiate these roles. If the project manager is also a technical expert and also responsible for any project activities, he must learn to differentiate when he is a manager and when he is a professional or technical expert, as he will be performing both roles on the project.

4.3 *The Functions of Project Management*

Project managers perform their responsibilities through three basic functions--*communicating, leading the work, and making or facilitating decisions*. Each of these functions may involve different roles at different times. The function of communicating involves both internal and external communication. Sometimes, the manager is a spokesman for or representative of the project, sometimes giving information, sometimes seeking information. Several of the roles associated with the different functions are shown in the table below. (SEE FIGURE 5).¹³

* See Module 41 - Design of a Project Management Control System

FIGURE 5: TABLE SHOWING PROJECT MANAGER'S BASIC FUNCTIONS

FUNCTIONS		
COMMUNICATING	LEADING THE WORK	DECISION-MAKING
ROLES	ROLES	ROLES
Spokesman or Representative	Getting Goal Agreement	Problem-solving
Information - seeker of team	Reviewing Progress	Resource Allocation
Information giver to project team	Rewarding - Sanctioning	Setting goals
Transmitting Messages	Supervising Progress	Negotiating
Collaborating	Contacting	Corrective Actions

In reviewing the functions of the project manager, the issue of responsibility versus authority again arises. The project manager is responsible for the project and for the management of all project resources; however, the manager does not have full or direct authority over the Persons, Physical Resources, Money and Schedules or Time allotted to the project. A great deal of coordination is required so there is adequate and relevant communication of information regarding plans between organizations, units and persons. Coordination on projects may be more difficult than coordination within normal functional departments, because of the widely dispersed authority and resources.

4.4 *Areas of Conflict in Project Management*

There is a need for the project manager to anticipate the areas of disagreement and conflict and plan to minimize or avoid these as much as possible so that conflict does not subvert the project resources and energies from accomplishing the tasks to which they were assigned.

The nature of projects makes some conflict inevitable during the implementation period. Certain conflicts can be anticipated as was indicated in the discussion of project characteristics and matrix project management. It has been shown that conflicts can be broken into several general categories, as follows.¹⁴

(a) *Conflicts over schedules* are those disagreements which centre around the timing, sequencing and scheduling of project-related tasks and the uses of supportive project resources in relation to those tasks. Scheduling conflicts tend to occur most often with support from departmental personnel over whom the project manager has limited authority and control. The conflicts may result, in part from another area of conflict, i.e., priorities, and have cumulative effects in all areas of project performance, especially with respect to technical performance and manpower utilization. Problems in scheduling may result when an issue or activity which is urgent to a project manager is given lower priority by a departmental head which affects total project performance. The most common and most intense conflicts affecting project management centre around scheduling.

(b) *Conflicts over project priorities* fall into two groups and relate to (i) differences of views and opinions over the sequence of activities and tasks that should be undertaken to achieve successful project completion, and (ii) to the priorities of project activities relative to the programmes of an organization. Conflicts over priorities occur not only between the project team and support groups but also within the project team. The first type develops because there is frequently no previous experience with a similar project, making it difficult to predict the pattern of activities from the original plans, or to make authoritative judgements on the reallocation of crucial resources. The second type of conflict develops because of changing emphases within the organization. As requirements of the project and of supporting departments change throughout the life of the project, there are bound to be changes in priorities which disturb established schedules and work patterns.

(c) *Conflicts over manpower resources* naturally follow from the conflicts of scheduling and priorities. These conflicts are those disagreements which arise from the staffing of the project team. They may be especially intense in the project matrix management situation where personnel are under the authority of departments or functional areas, but are assigned temporarily or part-time to project work. Because of under-staffing, most organizations

are under extreme personnel pressures and there is little slack for shifting and changing which may be necessary to accomplish both project and departmental assignments. In addition, exceptionally competent persons are already overloaded. The conflicts become more intense if a crisis situation develops, demanding urgent and immediate attention to both routine and project work. Manpower conflicts inevitably arise from unrealistic plans for utilizing the human resources which are available.

(d) *Conflicts over Administrative Procedures* present another major area of concern for the project manager. These develop most frequently in the project matrix management situation. They involve issues of authority and responsibility, reporting relationships, administrative support, decision-making, inter-organizational coordination and interface, evaluations, and so on. Disagreements over administrative procedures generally involve questions of the functions, authority, responsibilities, and reporting or decision-making relationships of the project manager, particularly in relation to the administration and department heads of the parent and supporting organizations. Conflicts develop over how the project will be managed and resolution requires clear definition of the reporting relationships in the project and definitions of responsibilities, project scope, operational requirements, implementation plans, work agreements and various administrative procedures. Many of the problems can be anticipated and can be reduced to a manageable level by sound implementation planning.

(e) *Conflicts over technical opinions and performance trade-offs* are related to technical issues, performance specifications, technical trade-offs and the means to achieve technical performance. These conflicts must be considered as a natural part of the project management process. Support organizations, or departments within the parent organization, are often primarily responsible for the technical inputs and performances on a project. Because they usually have expertise in the relevant technical areas, they tend to claim themselves as the logical base for making the technical decisions on a project. But it may not be as simple as it seems, since development projects are often quite complex and require technical integration across several departments and disciplines. The technical unit may have a limited view of the total project and may not have the broad perspective necessary to fit technical information into the context of the project. It may be necessary, for example, for the project manager to reject a desired technical alternative because of cost or schedule constraints. If management decisions differ from the initial technical judgement, the cooperation of technical may be affected. Differences of technical opinion are common, but are generally more manageable than other areas of conflicts. They may, however, become mixed with the other areas, such as scheduling, administrative authority and procedures, and become quite confusing.

(f) *Conflicts over costs* occur throughout project implementation because of tight budget constraints. They may occur because project managers

must seek to minimize costs, while functional units and support groups seek to maximize their share of project budgets. Secondly, cost conflicts also occur as a result of technical problems and schedule slippages. Thirdly, cost conflicts occur as a result of unanticipated cost increases and inflation. Project costs are a primary area (along with timing) for project monitoring, and so the high visibility (e.g., for auditing costs) increases the intensity of cost conflict. To complicate matters, some groups get involved with projects because of the contributions projects can make to their own operations. Then there is a great deal of competition over the financial benefits to be derived from a project especially if work is to be apportioned. Project finances are used to measure project performance and are a major constraint in undertaking projects, therefore, also represent a primary source of project conflict.

(g) The final area of conflict mentioned will be *personality conflicts*, which tend to centre on interpersonal differences rather than on technical or management issues. These conflicts are generally rated low in intensity by project managers, but can be quite frequent. Personality conflicts may arise because of the other conflict areas mentioned above, such as technical conflicts or administrative conflicts. Personality conflicts are often confused with communication, administrative and technical issues, and intensify conflicts in these other areas.

This review of the general areas and sources of anticipated conflicts is to sensitize project managers to problems that can be encountered. They indicate the need for systematic approaches to project management and the major areas in which project control needs to be developed and exercised.

V. PROJECT CONTROL

5.1 *Understanding Project Control*

Project control refers to those management decisions and actions which will solve project problems and conflicts, so as to achieve the project goals through the rational management of all project resources. Project managers are given responsibility for project performances, but often do not have hierarchical authority over all project staff and resources. In contrast to traditional systems, where departmental heads are invested with authority and hence control over their resources, the authority of the project manager is less than the assigned responsibilities. This tends to reduce their ability to control all the human and physical resources necessary to achieve project objectives and leads to potentially ineffective and inefficient management.

This is a convenient point to clear up some ambiguities in the use of some project terms, which are often used interchangeably, viz., appraisal, control, and evaluation. *Appraisal* refers to the *a priori*, pre-investment analysis that is done during the planning stages to determine the worthiness and viability of a project especially regarding the costs and benefits of the project. *Evaluation* refers to the analysis which follows the completion or termination of a project or certain of its stages. It is the ex-post analysis which examines the actual results and impacts of the project in light of the initial expectations. To refer to the Logical Framework*, evaluation is the measurement of the achievement of the higher level project objectives--the purpose and the goals. *Control* deals with the management during implementation of inputs and outputs to achieve lower level objectives.

Project control differs significantly from organizational control. Some managers and administrators assume that control is the ability to direct in a nearly machine-like manner the behaviours of others. This is a limited and often dysfunctional concept of control that implies a strong and well proven cause-effect relationship project activities. Project control is therefore event-triggered rather than oriented to a calendar time or an evaluation period, as in traditional management. Control refers to analysis of problems and opportunities to determine current and potential deviations from current plans which are significant. Control anticipates and identifies both problems and opportuni-

*See Module 1 - Defining Objectives

Module 2 - The Logical Framework

ties and initiates replanning, remedial action, and advantageous adjustments throughout the project.¹⁵

The concept of control can be described as measurement, review, diagnosis and decision-making. Accurate measurements of resource utilization and of project progress against the baseline data for the project, the analysis and interpretation of the nature of deviations and opportunities, the decisions and reformulations of original plans along with the activation of corrective measures are the basis of sound project control. Effective control does not bind a project staff to a set of rigid plans, but takes advantage of the experiences of the project to maximise the remaining resources toward the accomplishment of project objectives.

A formal management control system proposes to:

1. translate planning objectives into performance standard;
2. ensure that these standards are realistic, fair and updated as necessary to remain equitable and reasonable as time passes;
3. provide information feedback systems for management and activity managers on projects;
4. facilitate the comparison of actual performances to predetermined and updated standards;
5. identify deviations that are significant and opportunities which can be utilised; and
6. facilitate the analysis of designated deviations and modifications and ensure that corrective action is appropriate and implemented.¹⁶

Project management requires a continuous integration of planning, implementation and control functions. Project control involves the identification of events that are of special importance to project performance and management. The decision-making process involves planning (or replanning) so that implementation objectives are maintained.

5.2 *What is controllable in a project*

As the project manager seeks to establish authority for control, he must know what specifically is to be controlled. There may not be

a definite distinction between what is controllable and what is not. One project team with an outstanding competence, good leadership or team spirit may be able to accomplish very much more than one which is poorly led or has less ability or less spirit. Thus, while certain aspects, events and outcomes may be relatively controllable in one project and its environment, they may be substantially less so in another. It depends on the nature of the project, the composition of the project team, the systems in which they operate, and other relevant factors.

There are three basic areas of management control, viz, organization, environment, and performance. It is important to differentiate what is controllable in each of these areas, so that the energy of management is not wasted in attempting to gain control of the uncontrollable.¹⁷

The successful application of project management tools and techniques depends on the authority basis managers develop and the aspects of a project they seek to control.

5.3 *Sources of Authority for Project Managers*

Unless the project manager is like the departmental manager who has complete control of all project staff and resources, he will never have the traditional authority commensurate with his responsibility for the performance of the total project, but there are several sources of authority besides that of organizational position which the project manager can use.¹⁸

First, there is *organizational authority* which resides primarily in the organizational position held by the project manager, the relative rank or status of that position and the authorities assigned to that position within the organizational structures of the parent organization.

Second, there is *job authority* which is a result of the direct authorities granted to a specific job position by the delegation of power, the rights to command, and the control of resources immediately included in the job description.

Third, there is *negotiated authority* which stems directly from the project manager's ability to negotiate with other functional managers for specific segments of authority which they may hold in light of

their position or organizational status and assignments and which they are willing to relinquish to the project manager temporarily for the sake of the project. It is very important that these negotiated agreements be well-documented and filed or a disagreement may arise at a later date regarding the actual nature of the authority of the project manager. Certain negotiated authority may require reciprocal actions throughout the project, so should be approached with some caution.

Fourth, there is *expert authority* which the project manager earns or is given because of technical and organizational knowledge and experience. This type of authority is based primarily on the manager's competence and is maintained by evidence of his continued competence in actual performance on the project.

Fifth, there is *personal authority* which results from the personality, persuasive abilities, reciprocal favours and the rapport of the project manager with peers and associates. Persons may be attracted to one another and because they value their relationships and their opinions, personal authority is attributed to them.

It can be noted that all of these types of authority may be either real or attributed.¹⁹ *Real authority* is based upon actual legal or personal or positional basis. The project manager actually possesses it and is in control of its application. *Attributed authority* is the result of the responsiveness of the peers and associates of the project manager and is a result of the authority they believe the project manager has or they attribute to him.

Attributed authority is much less powerful and less permanent than actual authority, but is a useful form of authority which project managers can well use to the benefit of their projects. If the perceptions which form the attributed authority are maintained, then it is the same as if the manager actually had the authority. But if the perceptions are broken, then the authority is broken. Attributed authority is an important and effective form of authority because power relationships in organizations are often vague, ambiguous, indirect and unofficial. Hence, a project manager can often exert much more influence and authority than he actually has by the manner in which he is perceived. The limited real authority of a project manager forces a great deal of dependence upon attributed authority. *It is important that project managers learn to relate effectively with other people.* If a person is disliked or has created negative

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impressions among the project staff, it will make the task of project management even more difficult.

5.4 *Measuring Project Authority*

In the matrix management situation, the project manager shares project authority with functional departments and units which contribute to the project. The varying degrees of authority, power and control which the project manager holds can be analyzed in relation to major project decisions- such as selection of project staff, budgeting allocations, and so on. Figure 6 shows a matrix for determining where the project authority really lies.

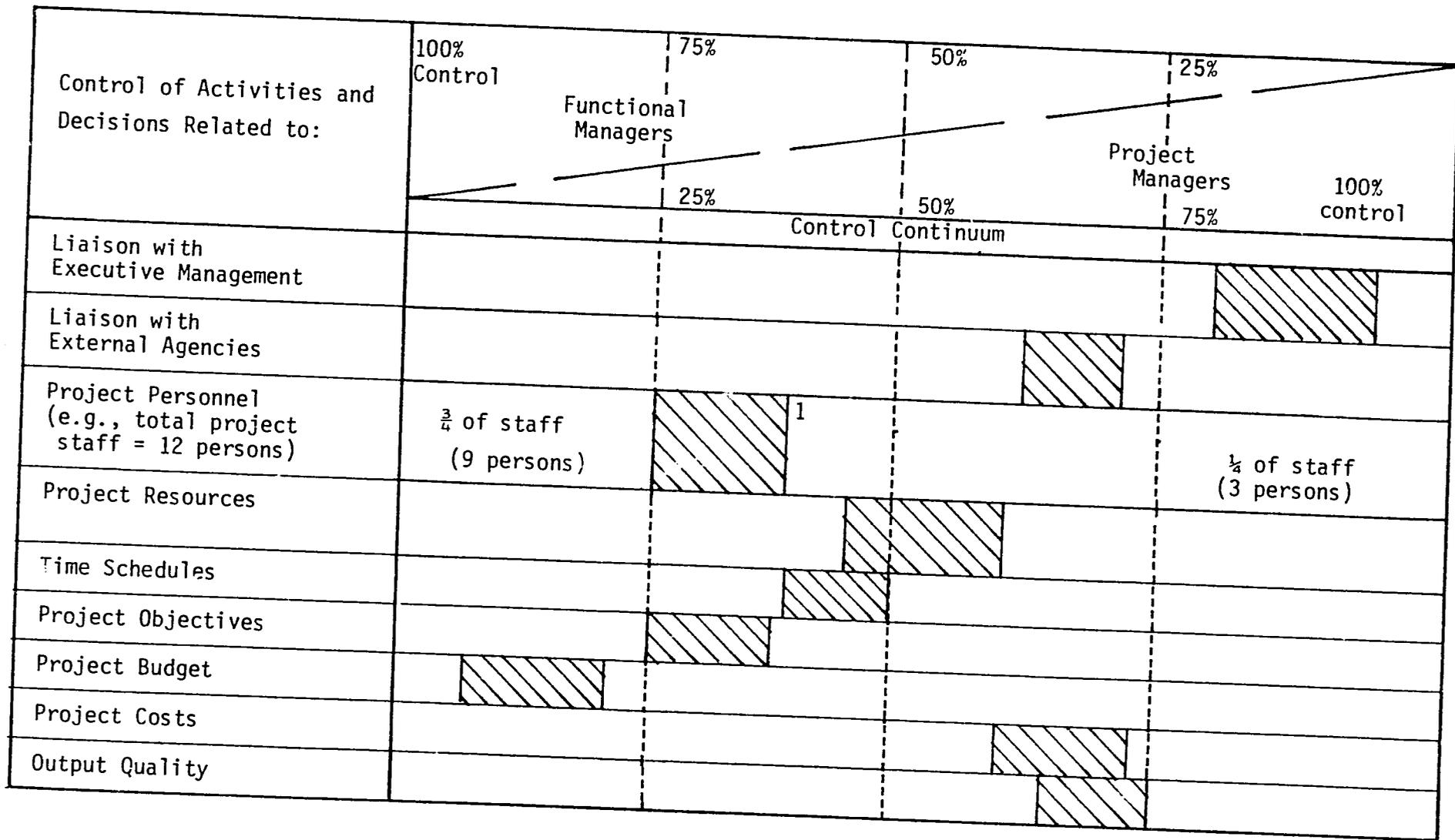
The relative power held or shared by either the project manager or functional managers can be shown on a diagram by identifying points on a continuum between the extremes of complete control by the project manager or complete control by functional managers. The authority distribution will vary between the factors, but a profile line drawn from the top to the bottom of the chart will indicate whether the project manager has a high or low degree of authority relative to the responsibility of completing the project.

In the illustration, it can be seen that the project manager generally has very little direct control over any of the major decision areas. In this case, he is largely responsible for liaison with executive management and has nearly complete responsibility for project liaison with external supporting agencies. However, he has very limited control over time schedules, resources and personnel. For example, the manager has control over $\frac{1}{4}$ (3 persons) of the project staff, while the remaining $\frac{3}{4}$ (9 persons) of staff is controlled by functional managers or department heads in the parent organization. The project manager has little control over objectives, and limited control over budgets, but is expected to have full control over project costs. This shows a common area of contradiction within project management authority and responsibility. Although this is only a partial list of the areas of control and decision-making, it illustrates the measures of authority held by project manager.

In Figure 6, it is seen that the general balance of authority is biased toward the functional managers, yet the project manager is expected to implement the project. This is why project management requires careful and integrated planning so that the project manager can gain the control to co-ordinate and direct the project activities. The project manager must be familiar with the degrees of authority

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FIGURE 6: MEASURES OF THE AUTHORITY OF A PROJECT MANAGER



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¹Control range showing 75% control by Functional Manager or 25% control by Project Manager.



they have to co-ordinate and to carry out the responsibilities involved with project management. The project manager is responsible for the integration of the dispersed authorities into an effective project organization. Therefore the manager must be able to measure the power he holds and know where the other powers lie within the total project structures.²⁰

VI. INFORMATION FOR PROJECT MANAGEMENT

6.1 Project Baselines for Control

Project management and control assumes that there is a plan. This plan should include, at a minimum, the set of activities to be managed and the corresponding outputs which the project has been designed to produce.

The life of a project begins at the point of conceptualization with some vague ideas of what should be done and how it should be done. Through the preauthorization studies and appraisals, the project idea becomes more clearly formulated and, as the basic outlines of the project begin to take shape a plan is constructed. As project documentation progresses, increased specification and precision define the project boundaries and mechanisms which are drawn into a design including physical structures, organizational structures, inputs and outputs. These project plans and designs become part of the "base line" of a project.

The project base line is a critical component of project management. Strictly defined, a "base line" is taken from the vocabulary of surveyors and it means a very accurately measured and defined line against which other measurements will be made. From the base line, property lines and other boundaries are established. Transferred to project management, the base lines refer to the initial lines which have been established through careful surveys, plans and definitions from which the boundaries of the project are established.²¹ Project management needs base lines to maintain project activities within the project boundaries and to measure the progress of the project accurately, i.e., changes from or toward prescribed base lines. Without base line data, it is nearly impossible to have a project control system or to maintain control of the critical areas of a project.

Projects have a variety of baselines which need to be carefully measured and defined. There are *work* base lines, *schedule* base lines, *financial* base lines, *manpower* base lines, and so on. Base lines, the foundation for an implementation plan, for project management and control, and for project auditing and evaluation, must be well-defined. Project base lines and subsequent project boundaries provide the means for identifying and measuring changes and deviations, and

judging their significance.*

It is important that the project manager know the extent to which firm base lines have been established and to what extent they are needed. For example, project area, base lines are important to measure the changes which the project was able to bring about in the target populations and area.** Financial base lines permit the auditing of performance in relation to intended expenditures, and so on.*** Base lines are important during and after implementation. The information blocks outlined in planning for implementation form the management base line data required for most projects. *Project implementation should not begin until the plans are complete and all the base line data is in place.*

6.2 Types of Project Management Information

Good project management is built upon sound management judgement and decisions. Good decisions require good information. Planning for project implementation ensures that:

- (i) a sound information foundation for project management is constructed; and
- (ii) information flows to facilitate management and decision-making are established.

When there is a sound informational foundation for a project and when systems are created to provide an adequate information flow, the actual work of project execution is made more manageable. The following types of information are vital to sound project implementation:22

- (a) project scope information;
- (b) project work and action plans information;
- (c) project organization information;

*See Module 8 - Bar Charting for Project Control/Scheduling and Module 42 - Evaluating & Forecasting Project Progress & Performance

**See Module 2 - The Logical Framework and Module 16 - Project Area Analysis

***See Module 19 - Financial Analysis

- (d) project financing information;
- (e) project resource planning and budgeting information;
- (f) contracting, work authorization and resource control information;
- (g) project "product" information;
- (h) project control information; and
- (i) environmental information.

(a) *Project scope information*

The objectives of a project must be clearly defined and broken into outputs (intermediate and final) so that it is possible to know what a project is to achieve and to test if and when it has been done.

(b) *Project work and action plans information*

The objectives of a project and its output are achieved through the performance of distinct tasks and activities which form the work breakdown of the project. These activities are planned on a project master schedule which shows the relationships between the project activities, the major milestones of project achievement and time.

(c) *Project organization information*

A systematic way of showing how all organizations are related to the various work elements of a project makes it easier for the project manager to co-ordinate these organizations and organizational units. It is important that every project team member or contributor gains a full understanding of the total scope of the project and his/her specific responsibility in relation to other persons on the project.

(d) *Project financing information*

A financial plan must be developed (and later revised appropriately) to identify and co-ordinate the various sources of funds, to indicate how each category of funds is to be used as well as the means of repayment. Documents necessary to obtain the release of funds and to control their movement and disbursement must be standardized and consistently used.

(e) *Resources planning and budgeting information*

A plan showing the flow of all resources, such as funds, equipment, manpower and materials, ensures that these resources are available and accessible to the project when needed.

(f) *Contracting, work authorization and resource control information*

Work orders and contracts are standardized formats that authorize expenditure of funds, labour, materials and other resources required to accomplish specific tasks. When properly used, they avoid confusion about responsibility as well as authorization.

(g) *Project product information*

Every output expected from the project should be clearly identified with specifications for measuring performances for each product.

(h) *Project control information*

The basic reason for information is to have data to compare performance on the project against expectations or plans. This requires a formalized and standardized flow of information on a regular and periodic basis to all decision-makers on the project. The information flow should be organised in such a manner that there is not a barrage of irrelevant or unnecessary information but only relevant project information channelled to appropriate decision-makers.

(i) *Project environmental information*

This refers to all available information from outside the project which has an impact on project performance and is the category of information which is least capable to being standardized and defined. It may, for example, relate to information from and about the Ministries, supplies, markets, or even weather conditions. If other categories of information are soundly based, the managers and administrators can put information from this category into better perspective to judge impacts and implications for the project.

6.3 A Project Management Information System

The building of an information base for project implementation is the foundation for successful project management. Management information must be constructed and integrated during planning for project implementation. Management information is useful only when it is used. The information is generated and documented at the beginning of the project and will be used in monitoring throughout the project. It is a means of gaining and maintaining control of a project.

The discussion of the Five Steps for Project Implementation Planning* illustrates the logical and systematic construction of a project foundation by building upon these categories of project information needs. The information "blocks" are constructed and inter-related in implementation planning and will be used for project management throughout the duration of the project.

Information requirements at the different levels of project management are not the same. The needs for information are related to the main functions of project personnel, and the management information system should be designed to give only that information necessary. In this manual we shall be dealing primarily with that information required at the level of the project manager. That information base, is, however, used as an analytic base for the information transmitted to the executive levels of project administration, just as the more extensive information on the activity manager level is condensed for the project manager.

A brief description of the management functions at these three levels will indicate the information needs. At the executive level, the management deals with policy making and strategic planning, which involves establishing objectives and determining levels of resources to be allocated. (SEE FIGURE 7). Management at the project level involves control and allocation of project resources along with monitoring measures of performance. Information needs are periodic, e.g., fortnightly, and are summaries of the data from the operational levels of the project activities. Managing the project activities requires constant information inputs as it involves using the resources to achieve performance. Information at this level is compared to the plans, contracts and procedures established by the project management and summaries of performance are forwarded to management.

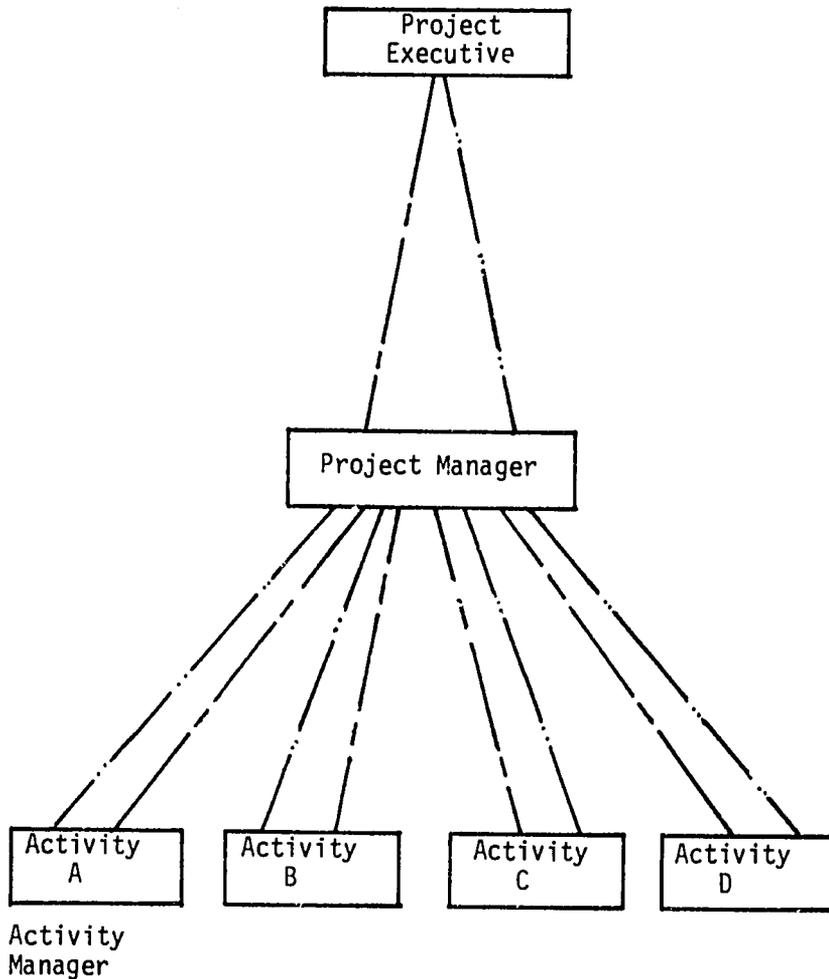
At all three levels, the project management information system is designed to give pre-determined key data elements which were selected for

* See Manual I - Project Implementation Planning for a full discussion of this approach.

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FIGURE 6: PROJECT INFORMATION PYRAMID



Executive Level Information
Summaries of project financial and physical progress. (e.g., monthly and quarterly reports)

Project Management Information
periodic monitoring and measuring in summary form of performances on activities to detect significant deviations from plans. (e.g., weekly and bi-weekly reports).

Activity Level Information
continuous and detailed data about direct use and control of resources and outputs.

— · — · — = Financial Information Links

— — — = Physical Information Links

monitoring and analysis and which summarize the project performance at the degree of detail necessary for that project level. At any level, the major functions of the information system to perform control are to:

- (a) establish performance standards;
- (b) collect and analyze operational data;
- (c) detect deviations from standards;
- (d) provide a basis for determining the implications and significance of deviations; and
- (e) provide a basis for judging the impacts of corrective action.²³

In general, *project information systems provide for control by using formalized data collection and analysis methods in relation to key performance indicators* which have been selected in relation to the component activities of a project. The purpose is to highlight problem areas that affects, or will affect, the overall performance of the project*.

There are two general ways that project managers can use an information system. One is *Positive Control* and the other is *Control by Exception*.²⁴ Positive Control requires more managerial energy because of the need for continuous observation and interaction. It also requires that the manager have some knowledge of the technical operations of a project (or be directly assisted by someone with such knowledge). Positive Control refers to the complete involvement of the project management in the daily workings of a project. It is very directive and often leads to a confusion of the functions of management versus the functions of technical or professional staff. However, certain types of projects are benefitted by this approach, such as particularly risky ventures or those in which the technology is unique and new.

Control by Exception is more common and requires that a management information system has been established. It requires only periodic monitoring, rather than continuous involvement in technical details. Technical standards and performance standards are established and the management becomes involved only when performance deviations exceed established limits or standards, both for better and worse. Then management becomes involved by investigation, analysis, and corrective action as necessary. The information systems promoted by this manual are relevant for either approach, but are most applicable to Control by Exception.

* See Module 41 - Design of a Project Management Control System

6.4 Project Files

What have been described as "project base lines", "information blocks", "project systems", and other necessary foundations for project implementation require easily referenced documentation. A good project manager not only requires good information but requires a good system of documentation and retrieval so the information now is easily accessible and can be referenced to facilitate decision-making and control. A good project file is essential to sound project management.*

Project documentation begins with the initial formulation of a project idea and any correspondence relevant to that formulation. Project Profiles, Project Issues Papers, Project Studies, Project Appraisals, and Loan Negotiations are among the pre-authorization papers that begin to form a Project File. Following a project's authorization, all the documents and forms produced by implementation planning go into the file.* Throughout the implementation of the project, there will be a continuous stream of information related to performance and control flowing into files.

The Project File should be a rationally ordered collection of all documents reflecting all aspects of the project. Its purpose is to ensure that all relevant project information is accessible and continually available to the project management and to others requiring project information. Files may be required by the terms of agreement with lending agencies. They are very useful and necessary. Files must be established and maintained on all government projects.

A good project file should be maintained for the following reasons:

- (a) they provide the basis for orientation of project staff at the initiation of project implementation;
- (b) they provide a record of all project-relevant transactions for follow-up and future reference;
- (c) they are a valuable aid in assuring a smooth and rapid transition in the case of changes in project personnel, including project managers;
- (d) they provide vital information in the case of disagreements or litigation requiring authentic project records and contracts;

*See Module 36

- (e) they provide data for subsequent stages of project implementation, such as that related to pricing, management plans, technical options, schedules and so on;
- (f) they provide important information for monitoring project performances; and
- (g) they provide data required to evaluate the project upon completion and to indicate lessons learned throughout the project. 25

Quite often some member of the project team, usually the project manager, carries around most of the project information in a rather informal manner, e.g., in a briefcase, files in a drawer, or even in his head. This is unfortunate. It is too precarious. Much information can be lost, for example, due to lack of objectivity, poor memory, loss of staff, disagreements, and so on. One of the most important tasks of a project manager is to ensure that a project file is established with procedures to ensure that all documents are properly retained and classified within the file.

In most instances, the actual organization of Project Files will depend upon the nature of the project, the needs of project management and other factors affecting the management system, but it is suggested that the general categories to be included in the project files are as follows:*

1. General Project Information, including pre-authorization studies and authorization documentation
2. Project Management and Organization
3. Project Technical Files
4. Project Financial Files
5. Project Work Plans and Schedules
6. Project Contracts and Work Authorization
7. Project Reporting and Evaluation Files

*See Module 38 - Project Files - for explanation of these categories

8. Internal Project Communications
9. External Project Communications
10. Project Security Files, if necessary.²⁶

Project documentation is critical, especially as most projects are relatively unique and innovative. There are seldom extensive precedents of designs, procedures and regularizations which can be referenced outside the Project Files. Some project documentation must be created specifically for each project, such as manpower agreements, contracts, Project Charter and Linear Responsibility Charts*. Some documents can be carried over from the standard procedures of sponsoring or supporting organizations, such as project accounting forms, personnel evaluations, contracts, etc. In most instances, project information cannot be duplicated if lost*. Project documentation must be placed in well-kept files so that it can be retrieved as a basis for examining project performances, making project decisions and recommendations and helping to resolve differences and disagreements which may arise so that conflict can be more rationally resolved.

* See Manual I for explanations of these documents

VII. THE FIVE STEPS OF PROJECT IMPLEMENTATION PLANNING

7.1 *Planning to Manage Projects*

Project control assumes there is a *plan of action*; project coordination assumes there is a *structure*; project decision-making assumes there are *resources available* to the project. All of these must be carefully defined during planning for project implementation to prepare for management of project investments.

Project management makes every effort to ensure that the project objectives are achieved within their time and resource constraints. It is the duty of management to exercise control over the project by monitoring performances and revising plans in accord with the overall progress of the project against existing plans. The manager must establish effective project structures to achieve this. Without good plans and structures, project management is reduced to ad hoc trouble-shooting and luck. This generally results in frustrating and disappointing results. The manager's performance will be judged on the efficient use of project resources to achieve goals according to prescribed plans.

The need for base line data, plans and control systems on projects is especially acute because project authority is so dispersed, i.e., the matrix management situation, yet control must be coordinated through a "*single point of responsibility*" and "*integrated planning and control*". Project direction and control includes the following coordination efforts:

- (a) joint understandings of project objectives and goals by all project contributors;
- (b) joint definition, planning, scheduling and budgeting of project activities and resources;
- (c) joint agreement on procedures for authorizing work, controlling scope of work and changes in assignments, and control of schedules and costs;
- (d) common measures and evaluations of performances in costs, schedules and productivity to identify current and future variances from plans and to analyze the significance of these; and
- (e) coordinated procedures to initiate appropriate corrective actions and revisions of project plans.²⁷

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7.2 *Feasibility Studies are not Implementation Plans*

High degrees of novelty, experimentation and innovation are associated with many projects. Project control and management must involve planning, measuring, reviewing, decision-making, reformulation, and activation in the light of actual project experiences. Otherwise, it would be much too rigid an approach and not suitable to the nature of development projects.

It is unfortunate that in many projects, pre-authorization studies, such as feasibility studies, are used as a basis for project implementation. Feasibility studies are not intended to be implementation plans. Faulty information and unrealistic assumptions in these plans can often be traced as causes of implementation difficulties. Even extensive pre-authorization planning is often insufficient to suffice for the intensive effort of preparing project implementation plans. Pre-authorization plans, for example, may not involve the participants who contribute to a project, so a common commitment to the plans was not obtained. Mutual commitments of all units contributing to projects and having some degree of autonomy is important for sound project management.

Pre-authorization plans are a foundation for implementation planning, but the project data from pre-authorization project plans must be updated to fill in gaps in project information, to incorporate authorized changes and to overcome any deficiencies in the plans. Feasibility studies are not specifically designed as action plans; they fulfill other functions in the life of a project. They are to study, for example the technical and financial worthiness of the project. Some may have been completed by persons who do not have a working knowledge of the implementation processes, and without the participation of persons from the project area. It is also important to note that there may have been recommendations for significant changes in the project design as a result of the analysis, appraisal and authorization processes. Feasibility studies include schedules and budgets, but these may be based upon assumptions that must be re-examined and updated when a project is finally approved and financed.

The fact that feasibility studies are used to judge alternative projects or competing projects often biases the nature and presentation of the project data. *Many project studies camouflage difficulties which may later be faced by project managers*, in an effort to improve the probabilities of project acceptance. Significant time lags between initiation of studies and project implementation also affect the validity of the data. Implementation *cannot* be successfully undertaken on data and plans generated by pre-authorization stages alone. Project information must be updated to reflect changes that may affect costs, personnel, resources and schedules. Implementation planning must be undertaken to provide the project manager with a more accurate informational base for project execution.

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**FIVE STEPS
OF
PROJECT IMPLEMENTATION PLANNING**

							PROJECT IMPLEMENTATION	
						STEP 5: ESTABLISHING INFORMATION SYSTEM	5: PROJECT CONTROL SYSTEM	
						STEP 4: OBTAINING PROJECT RESOURCES	4: PROJECT RESOURCES	
						STEP 3: CLARIFYING AUTHORITY & RESPONSIBI- LITIES	3: PROJECT ORGANIZA- TION	
						STEP 2: SPECIFYING & SCHEDULING THE WORK	2: PROJECT ACTIVITIES & SCHEDULE	
						STEP 1: ACTIVATING THE PROJECT	1: PROJECT ACTIVATION	
						STEP 0: PROJECT IDENTIFIED & APPROVED	0: PROGRAMME POLICIES & PROJECT APPROVAL	
MAJOR TYPES OF PROJECT INFORMATION NEEDED AND GENERATED	<ul style="list-style-type: none"> - Programme Policies - Approval & Guidelines 	<ul style="list-style-type: none"> - Project Scope - Project Purposes & Outputs 	<ul style="list-style-type: none"> - Project Action Plans - Project Schedules 	<ul style="list-style-type: none"> - Project Structure & Organization 	<ul style="list-style-type: none"> - Procedures & Plans for: Resource, Finances & Manpower 	<ul style="list-style-type: none"> - Reporting Plans & - Control Systems 	<ul style="list-style-type: none"> - Management Information - Environmental Information 	
		PROJECT IMPLEMENTATION PLANNING						

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7.3 . *Planning for Project Implementation: Five Steps*

Planning for project implementation requires that the managerial and technical base lines and frameworks necessary for the implementation of a project be determined and put in place. Project base lines must be established, along with the systems to collect, analyze and act upon the updated information in relation to the base lines.

The information needs, outlined in Section 6.2 above, are logically related to each other and can be methodically developed to construct a sound foundation plan for beginning project work. (SEE FIGURE 8). In Manual I, the *Five Steps of Planning for Project Implementation* describe in detail how to construct a sound foundation and develop a project plan using the relevant techniques and tools associated with each of the step*. These five steps are summarized below to show the managers the sort of project foundation which is needed to help ensure successful project accomplishment and to highlight gaps in the informational base which a project may have, even at this stage.

The Five Steps of Planning for Project Implementation are:

- Step One - Project Activation
- Step Two - Specifying and Scheduling Project Work
- Step Three - Clarifying Project Organization
- Step Four - Obtaining Project Resources
- Step Five - Establishing Project Information and Control Systems.²⁸

Each step establishes information base lines and management systems necessary for project implementation. The "Five Steps" form a sequence of implementation planning activities which precede actual execution of project work. On certain types of projects which are particularly innovative, unique or complex, it may be necessary to phase the planning for project implementation so that *the Five Steps are carried out for the first phase of project implementation and that they are then carried out later for subsequent phases of implementation*, depending upon the results of project execution of the early activities.

* See Manual I - Planning for Project Implementation, Chapters VII, VIII, IX, X and XI.

In FIGURE 8, the Five Steps of Implementation Planning are shown in sequence with the types of base line information generated or systems established by each step along the bottom horizontal row of the diagram.

7.3.1 Step One: Project Activation*

Project Activation involves obtaining tentative agreements from all contributing and associated organizations and departments regarding the nature of the project, the respective project strategies, the tentative inputs and the organizational structures. It is the step which *verifies commitments to the project authorization*. This step involves the following substeps, which produce basic documentation for project implementation:

<i>Substeps of Step One</i>	<i>Documentation</i>
1.1 Review of Project Authorization	Project Strategy Paper
1.2 Confirm Project Approval Process	Approved Approval Process
1.3 Assign Project Manager	Terms of Reference Job Description Letter/Contract of Appointment
1.4 Write Project Charter	Project Charter
1.5 Establish Project Linkages	Memoranda of Agreements
1.6 Ensure Project Funding	Budget Submissions Loan Agreements
1.7 Assign Initial Staff	Letters of Assignment
1.8 Ensure Interim Project Resources	Letters of Agreement

Major products of this step for project are the Project Strategy Paper and the Project Approval Process. *The Project Strategy Paper* summarizes all necessary decisions for implementation from the guidelines and conditions established through project authorization (e.g., agreements on the project,

* See Manual I - Planning for Project Implementation, Chapter 7 "Step One: Project Activation".

sources and levels of funding, project administration, etc.). The *Approval Process* establishes the initial structures for the organization of the project and identifies the parts of the project that must receive approval.

7.3.2 Step Two: *Specifying and Scheduling the Work**

The purpose of Step Two is to produce the actual work plans describing all those activities necessary to carry out the project specifying in detail when, where and how each activity is to be done, and to put these into a schedule. The Project Master Schedule is complemented by--manpower, financial, and physical resource plans. The plans constructed at this point will naturally be revised throughout the implementation processes. They form the *base lines* for project control and are the key to effective project management. The schedules are critical for the coordination because of dispersed project resources and authority. Many implementation problems can be traced directly to deficiencies in work specification and scheduling.

Substeps of Step Two

	<i>Documentation</i>
2.1 Define all project outputs	Output Targets Output Specifications
2.2 Construct Work Breakdown Structure	Work Breakdown Structure
2.3 Define Activity Resources and Times	Activity Description Sheets
2.4 Determine Relationships of Activities	Master Schedules
2.5 Determine Critical Activities	Critical Activities List
2.6 Prepare Manpower, Financial and Physical Resource Plans	Manpower Plans Financial Plans Physical Resource Plans

The plans prepared here should be as detailed and as accurate as possible so that project implementation expectations are realistic. However, these plans will be revised constantly. It is common to overlook even relatively important items, and changes in performance and commitments will demand adjustments in original plans. These plans are the basis for monitoring performances and must be realistically adapted to the actual context in which project implementation takes place.

* See Manual I - Planning for Project Implementation, Chapter VIII;
"Step Two: Specifying and Scheduling Project Work"

7.3.3 *Step Three: Clarifying the Project Organization**

Apart from its technical and economic merits, the success of a project depends largely on the effectiveness of the organization responsible for its execution. Without an efficient organizational form, a sound and viable project may end in failure. The purpose of this step is to *clarify and document all aspects of project authority, responsibilities and relationships*. The need for this has been extensively discussed in terms of the dispersed organizational authority characteristics of the matrix management situation.

Substeps of Step Three

	<i>Documentation</i>
3.1 Determine Organizational Location and Structure	Parent Organization Chart
3.2 Obtain Manpower Commitments	Written Manpower Agreements
3.3 Define Primary Responsibilities and Relationships	Linear Responsibility Charts
3.4 Clarification of Authority and Responsibilities	Responsibility Guidelines
3.5 Complete Legal Requirements	Legal Documentation
3.6 Clarify and Create Administrative Procedures	Project Administrative Policies Procedures and Guidelines
3.7 Revise Schedules and Plans	Revised Master Schedule Revised Manpower, Financial and Physical Resource Plans

Without clear organizational plans, there is likely to be confusion, duplication and overlapping of effort, areas of neglected responsibility, lack of effective coordination and communication and, as noted above, a great deal of conflict or potential conflict. All of these can negatively affect project performance. The project manager can avoid many of the common pitfalls of projects by getting the project well organized.

* See Manual I - Planning for Project Implementation, Chapter IX; "Step Three: Clarifying the Project Organization".

7.3.4 Step Four: Obtaining Project Resources*

The purpose of this step is to *provide the necessary guidance so that the kinds and quantities of project resources required are available at the appropriate places and times as needed.*

The project manager must be acquainted with the processes of procurement, drawdown procedures and requirements, and contract arrangements. The manager must monitor these processes to ensure that resources are available at the desired times and to see that realistic time-tables for obtaining resources are worked out and kept.

Substeps of Step Four

	<i>Documentation</i>
4.1 Obtaining Project Funds	Financial Allotment Plans Drawdown Procedures Conditions Precedent or Requirements
4.2 Obtaining Project Staff	Staff Agreements Contracts Technical Assistance Plans
4.3 Obtaining Supplies, Equipment, Materials and Facilities	Procurement Plans Procurement Procedures Contracts

Obtaining resources is a process that continues throughout project implementation, so it must be planned, well-understood and monitored by management so that these activities become routine rather than crisis events. The inability to coordinate all the project resources into an integrated schedule is a common problem of projects and leads to ineffective and inefficient uses of resources and consequent disappointments and overruns on project performance. Maintaining liaison with administrators responsible for these processes and formulating contingency plans is a major part of the project manager's job.

* See Manual I - Planning for Project Implementation, Chapter X; "Step Four: Obtaining Project Resources".

7.3.5 *Step Five: Establishing the Information and Control System**

The purpose of this step is to establish information and systems for project control which is the managerial function that keeps the project within tolerable limits and on its targets. Plans, base lines data and a system which provide continuous project information for managerial decision-making are the necessary preconditions for control. Information is the basis of good project management as it provides evidence for corrective decisions, including rescheduling, rebudgeting, reassigning staff and resources, project modifications, strategy redesigns and so on. The products of Step Five establish the systems and the base lines to facilitate decision-making for project control.

<i>Substeps of Step Five</i>	<i>Documentation</i>
5.1 Select Areas for Control	Information Strategy
5.2 Identify Points of Information and Decision	Information and Decision Systems
5.3 Identify Performance Indicators	Milestone Charts List of Indicators
5.4 Design Reporting Documents	Reporting Formats
5.5 Design Reporting System	Reporting System Reporting Linear Responsibility Chart
5.6 Communicate the Information System	Letters of Memoranda

In general the information base lines and project systems produced from the Five Steps of Planning for Project Implementation are illustrative. These provide a checklist of the information and systems which should be in place when the project manager is ready to begin project work. This model illustrates the amount of preparation needed to ensure that a project is really ready for implementation and that the project manager has prepared the project team for their challenging task. The importance of planning for implementation cannot be over-emphasized. If any of the significant items on the checklist

* See Manual I - Planning for Project Implementation, Chapter XI; "Step Five: Establishing Information and Control System".

have been missed or omitted, it is likely that at some point a delay may be forced upon the project until some conflict or misunderstanding is resolved and that the appropriate "information block" is put in place so that the project can proceed.

When the system is in place, project work execution is ready to begin. These five steps have laid the foundation for project management, by providing the basic agreements, contracts, information, and systems which the project manager will need to control and direct a project.

7.4 *Reviewing the Project Management System*

The first function of a project manager should be to examine the management foundations for the project. The manager must understand the information requirements for sound project management and establish the data bases and systems for generating and analyzing the project information. These are the inputs for project management decision-making. (SEE SECTION 6.2 and 7.3 above).

The types of information required will be used to meet project management needs, especially performance monitoring and conflict resolution. The major areas of conflicts include conflicts over priorities, schedules, work, performances, technical issues, manpower, costs, authority and personalities. (SEE SECTION 4.3). The project manager must be able to create an information system which quickly alerts attention to problems to permit prompt control and monitoring of conflict or performance.

The Project Management Information System is to provide regular systematic analyses of technical and progressive indicators so that project managers can isolate those areas where they must make decisions for corrective actions. Regular monitoring of indicators, structured analysis, and regularized reporting to management can eliminate much of the guesswork of project management and can direct management energies to significant areas, problems and policies. A good system does not guarantee effective management, but with a poor system, a project manager can waste a lot of energy rushing from one crisis to another, perhaps losing sight of important issues.

The Five Steps of Implementation Planning introduced above provide a framework of the management information required during project implementation. Technical information requirements can be derived from a checklist of the project components introduced through the Project Skeleton, including Objectives and Outputs, Demand and Market Information, Technological and Resources Data, Organizational Information Schedules, and Cost-Revenues Data*.

* See Manual P - Project Planning

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Every manager must review the project management information system to see that it is suited to the needs of the project. There is no perfect system but it is possible to check for gaps in any system.

The following is a checklist of important considerations or factors to keep in mind when reviewing the project management information system.²⁹

1. *Purpose*

Why is a management information system required? Who requires the information and the review? What will be the purposes for which the information is needed? Who will use the information and how? It is likely that there will be several answers to each of these questions and the system must meet the purposes of all persons and groups using the information system.

2. *Scope*

How is the project organized? What are the units from which data will be gathered? Are the units and the required information pieces technical, functional, and/or geographical? Are each of the data elements unique to a particular organizational unit or are there a number of work units which can be structured to produce similar data elements? Are any of the data elements summarized through intermediate organizational levels? Where is summary and analysis performed besides at the central project office?

3. *Environment*

Is the project being implemented in a modern or traditional setting, a rural or an urban setting; a sophisticated or an underdeveloped setting--or what sort of environment? What geographical distances exist between data collection points, and data collectors and processors?

Communications

What methods of communication are available to transmit data and reports from point to point? What modes are being used--c.g., telephone, telegrams, mail, messengers, verbal or written reports? What is the time lag between transmission of data and reports at all points and receipt by appropriate persons, whether processors or decision-makers? How consistent are the time lags, are there seasonal differences or influences by political factors, etc.? How reliable and secure is the

system of communications? Are distortions likely to occur in any way from the communication system?

5. *Man/Machine Interface*

To what extent is the system people-oriented or machine-oriented? Are the indicators the result of "instrument" readings (such as weights, measures, temperatures) or are they judgemental factors? Are they produced automatically or are they interpreted by people?

6. *Cost*

How much is management willing to spend to obtain the information it desires or requires? Is the information needed whatever the cost, or are there budgetary limitations, i.e., some percentage of project cost? Is it preferred that the cost not be explicit but be buried in operating costs? Can costs be determined accurately to reflect the efficiency of the system?

7. *Personnel*

Are there sufficient personnel to collect the data for the total area of coverage? Are the personnel appropriately trained for data collection and analysis? Is supervision appropriate to guarantee accuracy? Are the staff experienced and skilled or must training be part of the project design? To what extent can judgements on data be made in the field before it is processed? Are the data processors skilled, informed and aware of their functions in relation to the project? Have all sources of information been briefed on their roles in relation to the total project?

8. *Data Processing*

How will data be processed and summarized--manually, mechanically or electronically--or a combination? How long will it take after an occurrence before various management levels can have data, summaries, reports and can complete their analysis of the project information?

9. *Frequency*

How frequently does the project manager and other levels of project administration require or desire to be informed of the operational situation--continually, daily, weekly, monthly, quarterly, periodically or infrequently, only as problems arise?

10. *Detail*

How much does each level of management require in terms of detail on information--everything, selected indicators, ad hoc reports, etc.).

11. *Authority and Hierarchy*

Is the project manager central for all reports and have control over these? Does the manager have direct authority over all sources of data (the reporters) or are reports passed through functional managers? Is primary data provided to the manager as an additional task, as courtesy or what? Can the project manager communicate directly with data collectors and processors or does the manager have to go through other intermediate managerial levels? Does higher management receive data and reports from several sources or from the project manager solely?

12. *Summarization*

Is the data only to be summarized on the project as a whole, or is it to be summarized at other intermediate or operating levels? Who determines what sorts of summarization are required and permitted?

13. *Verification*

Can the project manager or the staff get easy access to the sources of data? Will spot checks be performed to sample and verify the validity of the data? How does project administration determine information validity?

14. *Complementary Reports*

What are the arrangements of supporting and sponsoring organizations with regard to data collection and processing? Are there separate mechanisms to complement or compete with the project information system from other parts of government or lending institutions? How can the systems be integrated to avoid overlap and redundancy?

15. *Public Perceptions*

How likely is it that data collection will be influenced by public or political opinions so that data collectors may be likely to encounter resistance, withholding or distortion of data, or judgement regarding the nature of the data or the reports?

16. *Vested Interests*

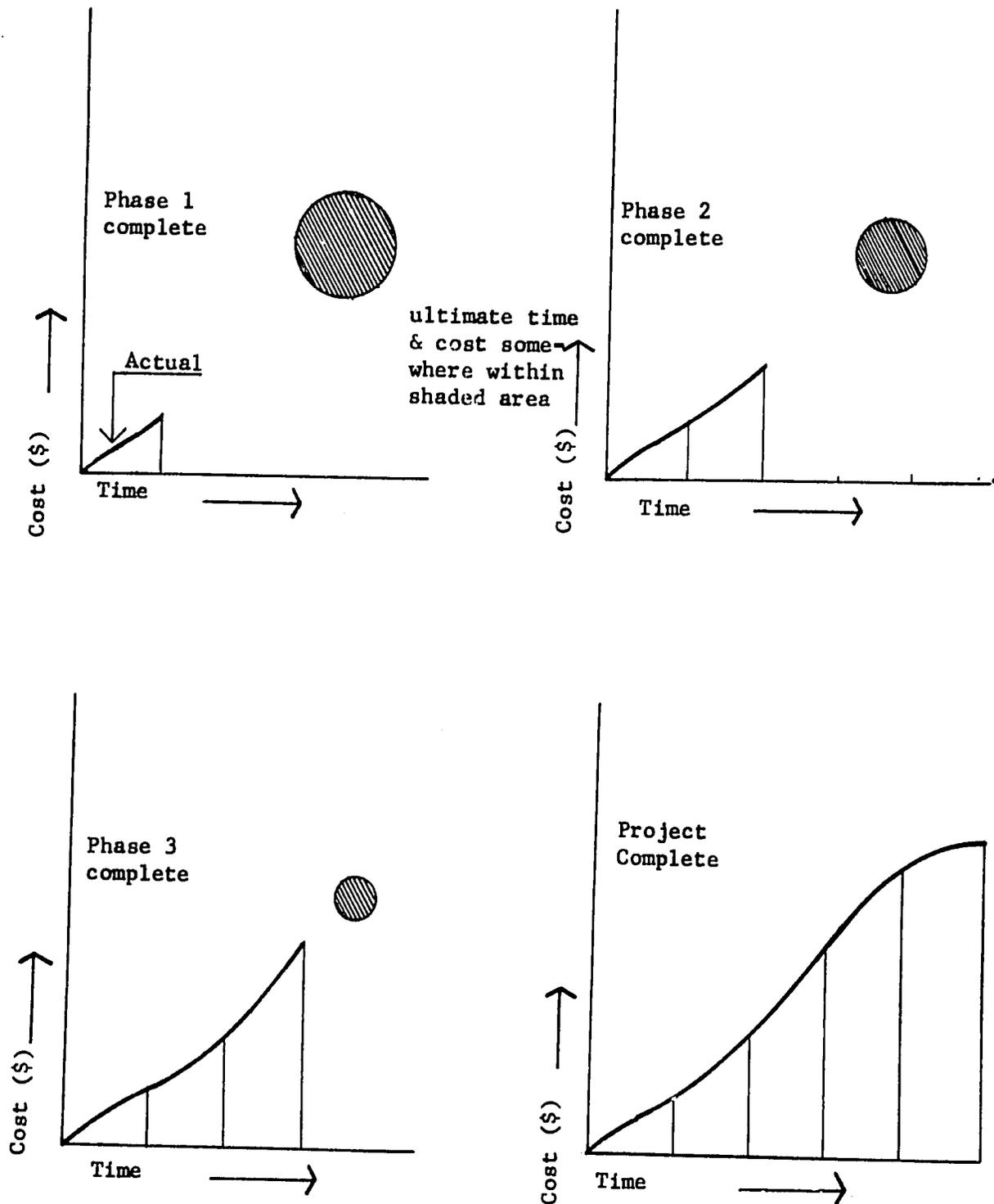
Are the data collectors, the immediate supervisors, the processors or the interpreters completely unbiased observers of the data they are required to collect and transmit? Are there any vested interests among the project personnel or information staff who may bias the facts to the interest of particular groups?

7. *Goals and Targets*

Are the overall goals quantified meaningfully? Has base line data been made available? Can data be reasonably obtained to measure accomplishments toward goals? How frequently should higher level goals be measured? How realistic are the goals? Can the goals be sub-divided into smaller and intermediate targets for reporting and data collection.

The above list could be expanded but it illustrates the detailed attention that the project manager must pay to the management information system established for a project to ensure that it is appropriate to the project and can be managed. Information systems are tools and mechanisms to assist the manager. They should not detract from the real task of project management, but contribute to it. As with any tool, its appropriateness to the tasks must be the judgement of the ones who will use the tools, in this instance the project manager.

FIGURE 9: Project Uncertainty of Ultimate Time & Cost through Implementation



7.5 *Implementation Planning Accuracy*

The Five Steps of Planning for Implementation represent a much more detailed and accurate stage of planning than any of the pre-authorization plans (Project Profile or Feasibility Study). However, implementation plans still contain uncertainties. Periodic reviews and re-planning adjust plans to new information and actual performance.

Although the total project times and costs are quantified by the implementation plan, it is not possible to predict these factors so precisely for development projects. As a project goes through implementation, the uncertainties related to the various factors, such as costs and time, are reduced. Dividing project execution into relative distinct phases, it can be seen that uncertainty is reduced with each succeeding phase, as illustrated in FIGURE 9. Through re-planning, the capability of predicting the final point, (e.g., in terms of cost and time), increases, until the actual point of completion is reached.^{30a}

Thus uncertainty represents the reasons for continuing attention to the cycle of implementation planning--monitoring--re-planning, as introduced in Chapter 8. The tools and techniques introduced above are useful to project managers throughout the implementation management processes. Plans, reports, contracts, analyses--all are necessary to keep control of the direction of the project so that the final project completion point is maintained within acceptable limits.

7.6 *Documentation for Project Management*

Many project management tools and documents have been mentioned in the above discussion of planning for project implementation. These are discussed in more detail in other manuals and modules of this series. The project manager should become familiar enough with these to use them effectively on the project, especially those basic tools and documents illustrated in the following overview.

The *Work Breakdown Structure* (ILLUSTRATION 1) gives a list of all project activities, grouped into basic project components. It breaks a total project into manageable activity units for the manager. Activity managers will be responsible to further break the activities into tasks, using this same method.

Activities must be scheduled. *Network Diagrams* (such as PDM and PERT) establish precedence and show dependence relationships between activities. An example of PDM is shown in ILLUSTRATION 2. Most project

schedules are eventually transferred to a Bar Chart. This convenient form for scheduling is also used for *Project Resources and Financial Plans* (ILLUSTRATION 3) and for *Milestone Progress Charts* (ILLUSTRATION 4).

In monitoring progress on various project activities, the manager must be familiar with the administrative steps for procuring basic project resources. Bar Charts identifying tasks and times involved in the procurement process can be constructed to help the manager, such as *Administrative Steps for Procuring Supplies* (ILLUSTRATION 5), *Procuring Funds* (ILLUSTRATION 6), and *Manpower Assignments* (ILLUSTRATION 7).

Activity Description Sheets describe the outputs, resources, costs and times for specific activities (ILLUSTRATION 8). These must be continually updated by activity managers based on actual project performance. The backs of these documents can be used as an *Activity Log* to record significant observation about actual performance of an activity (ILLUSTRATION 9). *Activity Follow-up Sheets* may also be constructed to keep close track of critical project activities (ILLUSTRATION 10). *Resource Follow-up Sheets* may also be useful for selected critical project resources (ILLUSTRATION 11).

Clarification of project organizational responsibilities and relationships is an important aspect of project management. *Project Organization Charts* (ILLUSTRATION 12) should be prepared to show the relation of the project to the parent organization(s). These should be supplemented by *Linear Responsibility Charts* (ILLUSTRATION 13) which identify specific levels of responsibility for all persons on all activities. Such charts can also be used to keep track of the flow of information and the points of decision in the project management and information system as shown in ILLUSTRATION 14.

The project manager must also be aware of all relevant documents used for work authorization and control, such as *Work Release* (ILLUSTRATION 15) and a work order document (ILLUSTRATION 16). In addition, *Reporting Forms* will be designed for use within the project as well as forms from other agencies, such as that used for the Ministry of Finance and Planning to monitor project progress and financial performance. (ILLUSTRATION 17).

ILLUSTRATION 1

MODEL OF A WORK BREAKDOWN STRUCTURE FOR A PIONEER FARM

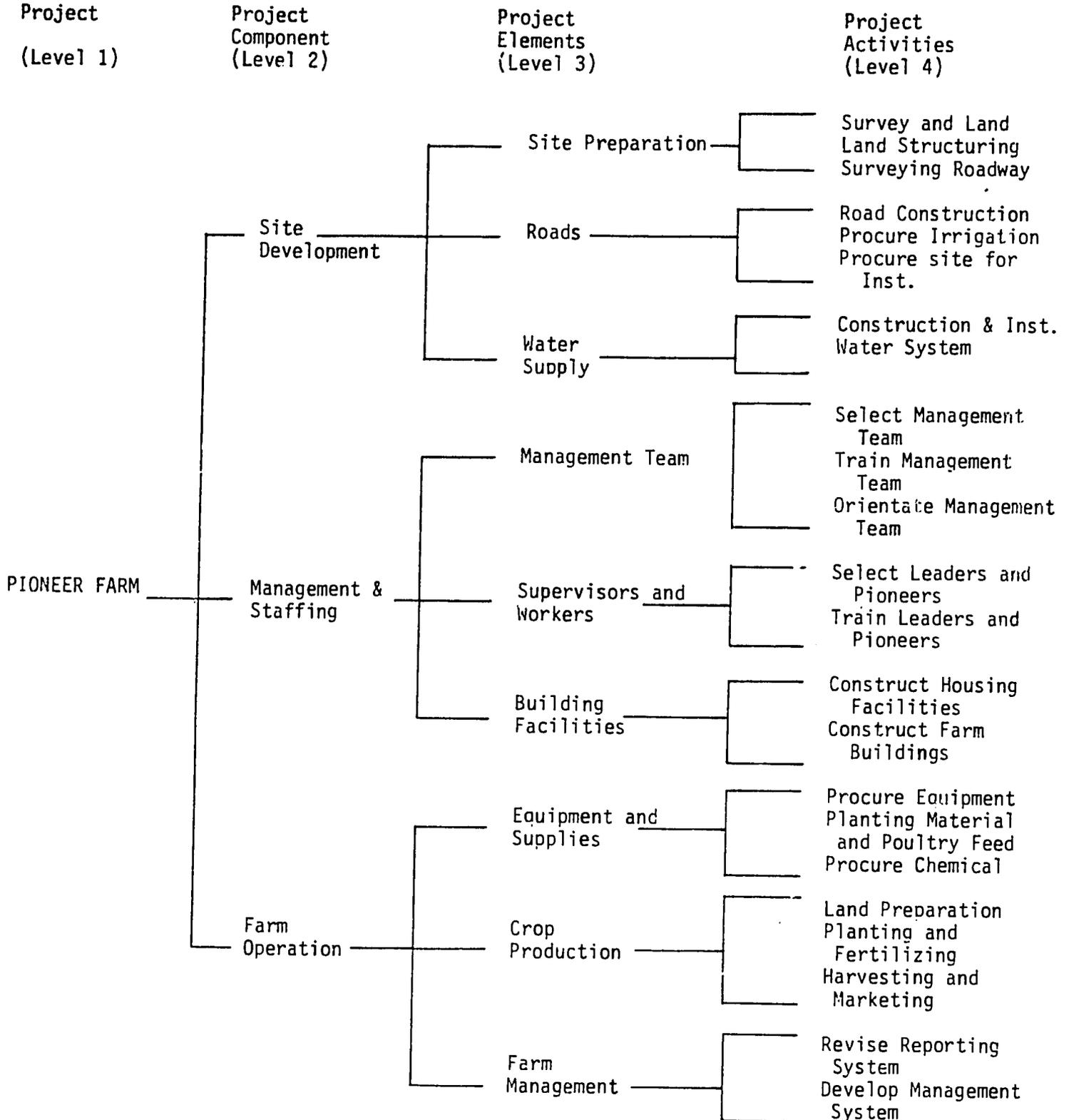
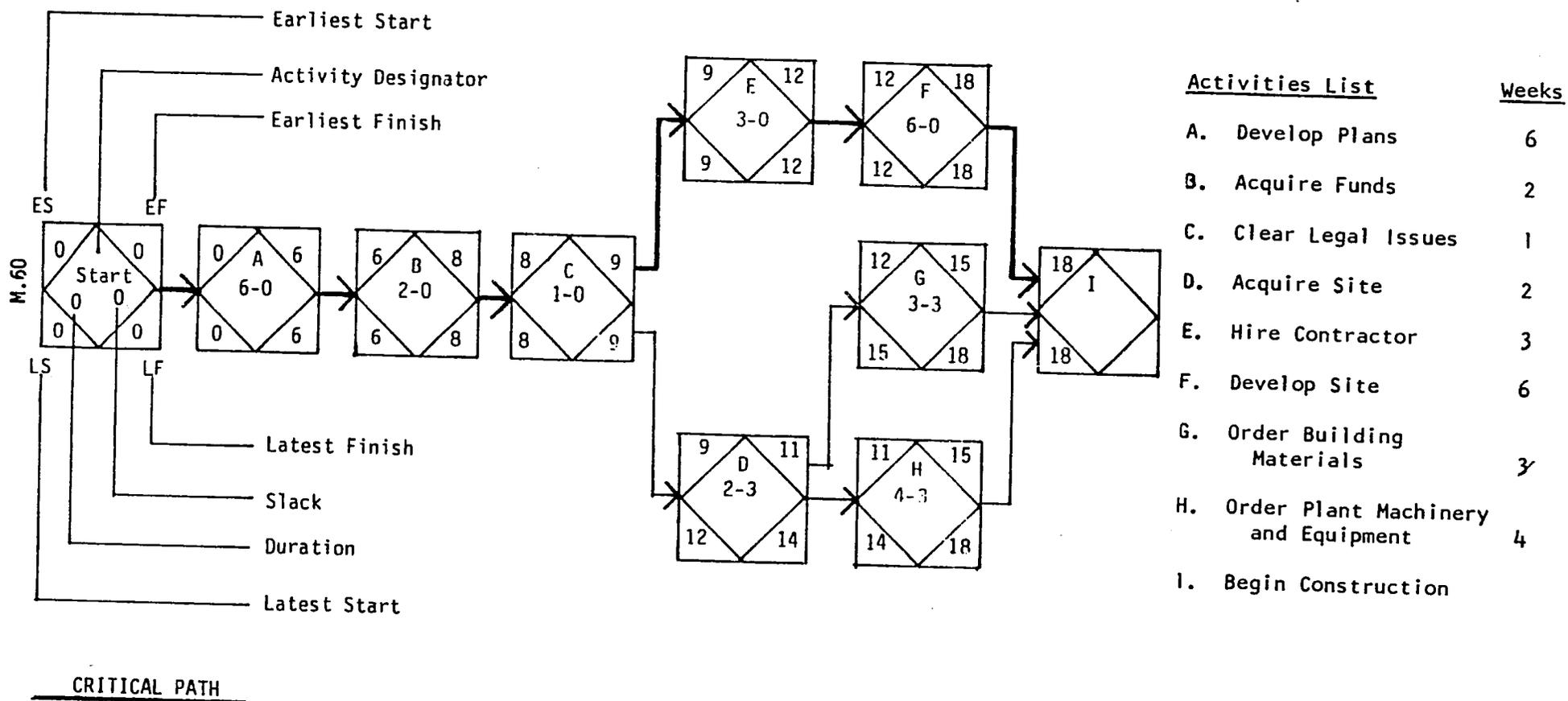


ILLUSTRATION.2

AN EXAMPLE OF PDMNETWORK SCHEDULING FOR BUILDING A SMALL MANUFACTURING PLANT



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ILLUSTRATION 3 RESOURCE PLAN AND BUDGET ²⁵

Project Component: PREPARE 5 ACRES OF LAND AND ESTABLISH IN VEGETABLES

PAMCO, PDRT
Resource
Material

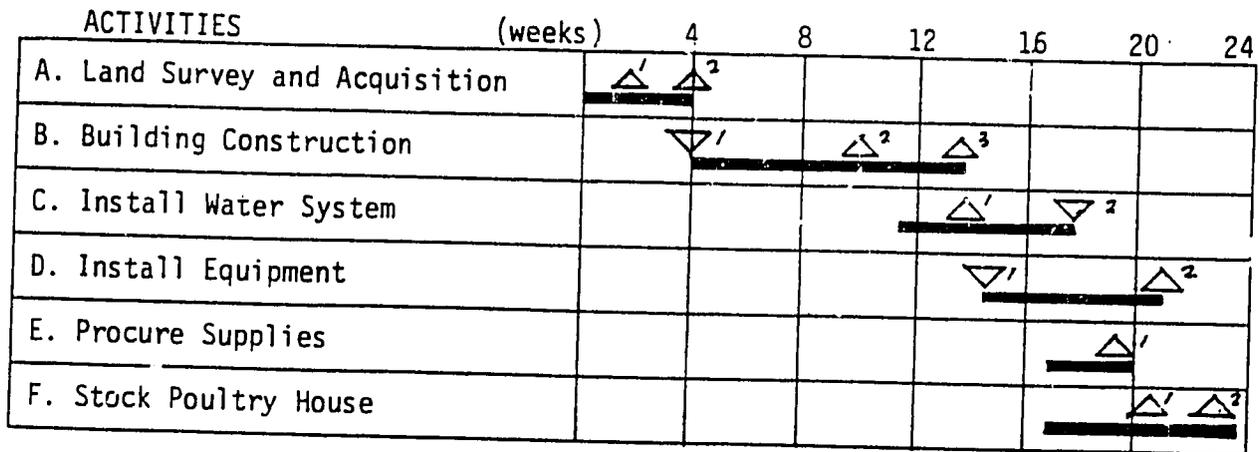
GANTT CHART

		- weeks -							
		1	2	3	4	5	6	7	TOTAL
A TASKS	Clear Land	////////							
	Plough Land		////////	////////	////////				
	Harrow Land			////////	////////	////////			
	Sow Seeds and Plant Seedlings					////////	////////	////////	
MANPOWER REQUIREMENT									
	1) Field Supervisor (mandays)	2	2	2	2	4	4	4	20md
	5) Labourers "	4	-	-	-	25	25	25	75md
	2) Tractor Drivers "	-	4	8	8	8	5	5	38md
MANPOWER COST									
	Field Supervisor @ \$20/md	\$ 40	40	40	40	80	80	80	\$400
	Labourers @ \$8/md	\$ 32	-	-	-	200	200	200	\$632
	Tractor Drivers @ \$12/md	\$ -	48	96	96	60	60	60	\$546
	TOTAL MANPOWER COST	\$ 72	88	136	136	376	340	340	\$1488
MATERIALS									
	a) Herbicides: 2 litres @ \$60/litre	\$ 120	-	-	-	-	-	-	\$120
	b) Fertilizers: 2½ tons @\$260/ton	\$ -	-	-	217	217	217	-	\$651
	c) Fuel:	\$ -	20	40	40	40	20	20	\$180
OTHER COSTS									
	Travelling Expenses	\$ 50	50	50	50	50	50	50	\$350
	Long Distance Telephone calls	\$ -	-	-	-	-	-	-	
	Other	\$ 10	10	10	10	10	10	10	\$ 70
	TOTAL MATERIAL & OTHER COSTS	\$ 180	80	100	317	317	317	80	\$1391
	TOTAL MANPOWER & MATERIAL COSTS	\$ 252	168	236	453	693	657	420	\$3229

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ILLUSTRATION 4 BAR CHART AND LIST OF MILESTONES⁴⁵

SIMPLIFIED BAR CHART FOR POULTRY PROJECT



LIST OF MILESTONES

		Planned date (end of week)	Actual date
A - 1	Land Survey Completed	2	
A - 2	Land Transfer Completed	4	
B - 1	Building Plans Approved/with Permit	4	
B - 2	Foundation and Exterior Completed	10	
B - 3	Building Interior Completed and Inspected	14	
C - 1	Exterior Water Systems Installed	13	
C - 2	Interior Water Systems Installed	18	
D - 1	Equipment moved to Site	17	
D - 2	Equipment Installed and Tested	21	
E - 1	Supplies Inventory Completed	20	
F - 1	Delivery of First Set of Poultry	21	
F - 2	Poultry Stock Inventory Completed	24	

ILLUSTRATION 5 40

SCHEDULE FOR OBTAINING PROJECT SUPPLIES AND EQUIPMENT

Activity	Months Responsibility	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
		1. Formulate requirements, send to Ministry Stores Officer	Project Manager	█											
2. Establish general specifications, estimate costs, prepare purchase authorization	Ministry Stores Officer			█											
3. Approve allotment request	Ministry Finance Representative				█										
4. Prepare purchase orders	Ministry Stores Officer					█	█	█							
5. Send Supplies	Commercial Firms								█	█	█	█			
6. Receive and store supplies	Project Manager Project Officer											█	█	█	█

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ADMINISTRATIVE STEPS IN OBTAINING FUNDS

PAMCO, PDRT
Resource
Material

Activity	Schedule Responsibility																	
		Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1. Issue policy guidelines to Ministries, including budget ceilings	Chief Budget Bureau	■																
2. Prepare supplementary instructions. Issue guidelines to Units, Institutions, Provinces	Permanent Secretary, Ministry	■	■															
3. Review guidelines, prepare and submit budget proposal	Parish Officer Project Manager		■															
4. Review Provincial budget proposals Submit to relevant Ministries	Parish Officer, Finance Officer			■														
5. Review Ministry proposals, submit to Budget Bureau	Ministry Budget Review Committee				■													
6. Review/approve budget proposals	Representative for Budget Bureau				■	■												
7. Review/approve budget proposals	Parliament					■	■											
8. Establish allotments for Ministries	Ministry of Finance Representative for Ministry						■	■										
9. Adjust Ministry spending ceilings. Inform Ministries	Min. of Finance Representative for Ministry								■	■	■							
10. Submit request to spend against the allotment	Project Officer Parish Officer										■	■	■					
11. Approve allotment request	Ministry Controller Ministry of Finance											■	■					

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ILLUSTRATION 7 39
SCHEDULE FOR RECLITMENT OF STAFF

ACTIVITY	Months Responsibility	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		1. Prepare Post Description	(Project Manager)	■							
2. Review/approve Post Description	Ministry Personnel Officer	■									
3. Confirm Funds Available	Controller		■								
4. Approve Post	Civil Service Commission		■								
5. Post Vacancy Notice	Ministry Personnel Officer Project Manager							■			
6. Prepare for and Convene Selection Committee	Permanent Secretary							■			
7. Complete Medical Clearance	Personnel Officer								■		
8. Determine Date of Availability	Personnel Officer								■		
9. Prepare and Send Offer of Appointment	Personnel Officer									■	
10. Give Notice to Current Employer	Candidate									■	
11. Brief Staff Member	Project Manager										■

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ILLUSTRATION 8 ACTIVITY DESCRIPTION SHEET

PAMCO, PDRT
Resource
Material

Activity: To construct 2 miles of farm road to link farm settlement to existing Parish Council Road				
Activity Manager: Works Overseer			Duration: 4 months	
Start Date Planned	Actual	Completion Date Planned	Actual	
INPUTS				
DESCRIPTION OF RESOURCES	QUANTITY	UNIT PRICE	TOTAL COST	SOURCE(S) OF RESOURCES
Bulldozer	2	\$20/hr/bulldozer	\$ 2,800	Private Contractor
Grader	1	\$16/hr	\$ 1,280	Private Contractor
Time Keeper	2	\$8/day/keeper	1,360	
Roller	1	\$15/hr	1,800	Private Contractor
Marl	4000 yd ³	\$5/yd ³	\$20,000	Private Quarry
Labourer	200 man-days	\$7.30/day	1,460	Surrounding Areas
			\$38,700	
PRODUCT (Output) - Scribed, Graded and Rolled 2 miles of farm road				
SPECIFICATION (Output) - 16 ft. width road with 6 ins. depth marl				
HOW TO PERFORM ACTIVITY (1) - Excavating earth and stone; cut 16ft. width road to grade, marl and roll.				
(2) - Work to go to tender after approval of Regional Director				
Authorization				
..... Project Manager		_____ Date Works Manager	
..... Site Manager		_____ Date 20/10/79		

ACTIVITY LOG

(REVERSE SIDE OF ACTIVITY DESCRIPTION SHEET)

Date	PROBLEMS (deviations from schedule, expected results, resources, etc.)	Initials
15 May	Test of registration system in district A to be delayed until District Administrator returns from travel	
7 June	Some traditional officers express reluctance at attending course. First course not filled. Stipends to be offered in addition to kits.	
10 Aug	Procedures manual requiring more time for completion than scheduled	
1 May	First course delayed one month	
1 May	Interest of community volunteers exceeds first course capacity - second course scheduled immediately after completion of the first	

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Activity Number	Activity Name	Activity Manager	Starting Date		Completion Date		OK ✓ In danger ✗											
			Planned	Actual	Planned	Actual	J	F	M	A	M	J	J	A	S	O	N	D
2.1	Prepare description of functions, procedures	Parish Manager	1 Jan	1 Jan	15 Jan	10 Jan	✓											
2.2	Prepare budget	Parish Manager	1 Jan	1 Jan	15 Jan	15 Jan	✓											
2.3	Establish Regional Secretariat	Regional Director	1 Jan	1 Jan	15 Jan	1 Feb	✗	✓										
2.4	Review and approve 2.1, 2.2, & 2.3 (by *P.S.)	*Permanent Secretary	15 Jan	15 Jan	30 Jan	1 Feb	✓	✓										
2.5	Selection of meeting site	Regional Director	1 Feb	1 Feb	1 Feb	1 Feb		✓										
2.6	Document functions and procedures	Parish Manager	1 Feb	15 Jan	1 Mar	15 Feb	✓	✓										
2.7	Do promotion to establish membership	**P.I.O.	1 Feb	1 Feb	1 Mar			✗										
2.8	Finalize membership	*P.S.	1 Mar	1 Apr	7 Mar													
2.9	Distribute membership list and procedures	Regional Director	7 Mar		15 Mar				✗									
2.10	Prepare first meeting agenda and materials	Regional Director	7 Mar	15 Mar	21 Mar	28 Mar		✓										
2.11	Hold inaugural meeting (1 April)	Permanent Secretary	1 Apr		1 Apr													
2.12	Prepare and distribute minutes	Parish Manager	2 Apr		7 Apr													
2.13	Disseminate public information	**Public Information Officer	3 Apr		10 Apr													

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ILLUSTRATION 11 : RESOURCE FOLLOW-UP SHEET

Type of Resource	Source	Unit Cost		Quantity		Total Cost		Actual Expenditure, by Period				Action Required													
		P	A	P	A	P	A	1st Q.	2nd Q.	3rd Q.	4th Q.	J	F	M	A	M	J	J	A	S	O	N	D		
Survey and Land Sample Kits	Supplies Stores	500	950	12	10	6,000	9,500	2,000	3,000	2,000	2,500	X	X					X							
Farm Equipment	Maint'nce Dept.	250	350	6	5	1,500	1,750	800	950									X							
Pesticides and Fertilizers	Supplies					7,000	9,000	1,500	2,000	2,500	3,000														
Petrol for Vehicles	Public Works	3.4	3.3	2T	3T	6,800	9,900	2,800	3,000	2,500	1,600	X	X	X	X			X							
Spare Parts Maintenance	Public Works	700/veh.	1,200/veh.	6	5	4,200	6,000	1,000	1,400	2,000	1,600														

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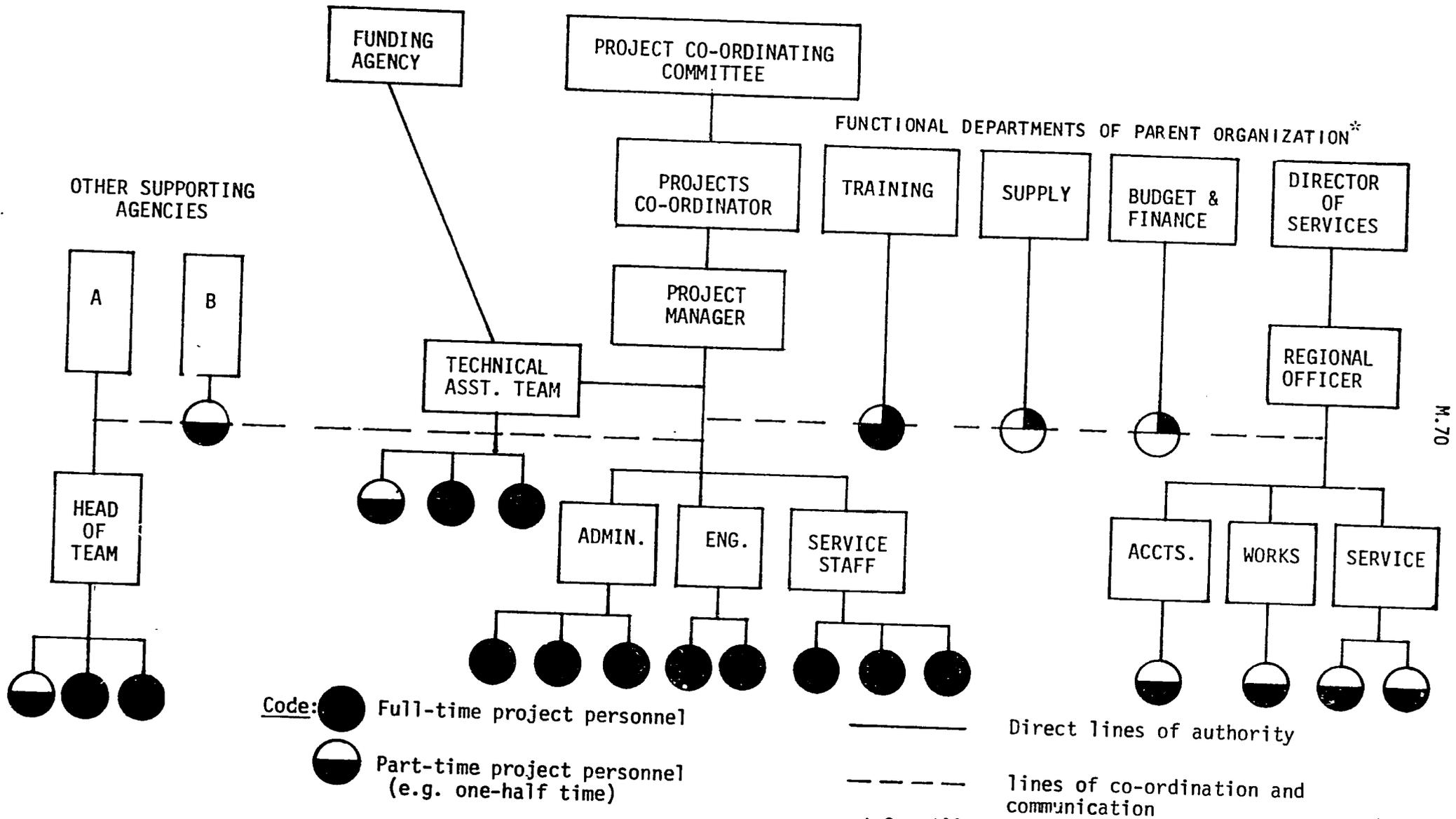
CODE: P = Planned
A = Actual

X = Action Required
✓ = Action Taken

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ILLUSTRATION 12: PROJECT ORGANIZATION CHART (Full-time and Part-time Personnel)

PAMCO, PDRT
Resource
Material



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Code: ● Full-time project personnel
 ◐ Part-time project personnel (e.g. one-half time)

———— Direct lines of authority
 - - - - lines of co-ordination and communication

* See Illustration 8 for Parent Organization

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ILLUSTRATION 13
 LINEAR RESPONSIBILITY CHART:
 TRAINING COMMUNITY WORKERS 30

PAMCO, PDRT
 Resource
 Material

Project Activity	Division Officer	Parish Officer	Department Head	Min. of Local Govt.	Min. of Finance	Director of Training centre	Public Training Inst.	Project Consultant	Tutors
6.1 Design registration system	C	R	A	I					
6.2 Initiate and monitor registration and recruitment		R	S	I					
6.3 Design payment scheme		C	S		R				
7.1 Prepare procedure manual		L	A			S		R	
7.2 Design supervision and support procedures	C	C	A			S	R	L	
7.3 Develop curriculum	C	I	A			S	R	C	
7.4 Train tutors			I				S	R	
7.5 Conduct 1st course						A	C	S	R
7.6 Evaluate 1st course	C		A			S	R	C	C

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- R. Does the work (project staff)
- S. Supervises (activity manager)
- L. Advises, review, or otherwise supports (liaison person)

- A. Must approve
- C. Must be consulted
- I. Must inform

ILLUSTRATION 14

PAMCO, PDRT
Resource
Material

DISTRIBUTION LIST FOR CONTROL DOCUMENTS

Report (Frequency)	Project Staff	Activity Managers	Project Manager	P.S.	Steering Cttee.	Ministry	PAMCO	Cooperative Dev. Commission	Other (Specify)
Activity Log (recorded continuously, submitted monthly)		Orig.	Info.						
Activity Follow-up (updated monthly)		Orig.	Info.						
Resource Input Follow-up (updated monthly)	Info.	Info.	Orig.	Info.	Info.				Budget Stores Personnel
Activity Network (updated monthly)	Info.	Info.	Orig.	Info.	Info.				
Status Summary (written monthly, submitted prior to review meetings)	Info.	Info.	Orig.	Info.	Info.	Info.	Info.	Info.	
Change Order (as occurring)	Action	Action	Orig.	Info.	Info.				Budget Stores Personnel

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Action = for action
Info. = for information
Orig. = originator of report

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ILLUSTRATION 15: WORK RELEASE

AUTHORITY TO INCUR EXPENDITURE
FOR FINANCIAL YEAR 19.....

A	ISSUED TO:	AF	<table border="1" style="width:100%; height: 20px;"> <tr> <td style="width:12.5%;"></td> </tr> </table>								
		DATE	<table border="1" style="width:100%; height: 20px;"> <tr> <td style="width:12.5%; text-align:center;">D</td> <td style="width:12.5%; text-align:center;">D</td> <td style="width:12.5%; text-align:center;">M</td> <td style="width:12.5%; text-align:center;">M</td> <td style="width:12.5%; text-align:center;">Y</td> <td style="width:12.5%; text-align:center;">Y</td> </tr> </table>	D	D	M	M	Y	Y		
D	D	M	M	Y	Y						

FIRST LEVEL HEAD	SECOND LEVEL PROGRAMME
ACTIVITY	
SUB-ACTIVITY	
RESPONSIBILITY CENTRE RECEIVING	
RESPONSIBILITY CENTRE ISSUING	
COST CENTRE	

B	AUTHORIZED USE OF FUNDS	RELEASE OF FUNDS <input type="checkbox"/>	
		REDUCTION OF FUNDS <input type="checkbox"/>	

LINE NO.	STANDARD OBJECT	CODE	DR CR	AMOUNT IN DOLLARS							
				\$	\$	\$	\$	\$	\$	\$	\$
01		9 9	DR								
02		9 9	DR								
03		9 9	DR								
04		9 9	DR								
05		9 9	DR								
EXPENDITURE NOT TO EXCEED		TOTAL	CR								
DOLLARS											

C	JOB NAME AND DESCRIPTION OF WORK

D	ESTIMATED THIS FINANCIAL YEAR	"A" FORMS ISSUED TO DATE
PREVIOUS AUTHORIZATIONS		
AUTHORIZED/REDUCED THIS RELEASE		
TOTAL AUTHORIZED TO DATE	\$ _____ \$	
BALANCE AVAILABLE	\$ _____ \$	
		TOTAL

E	AUTHORIZING OFFICER
DATE:	TITLE: _____ SIGNED: _____

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MONTHLY FINANCIAL REPORT

for

Externally Funded Projects

Month of _____ 19 _____

- 1) Name of Project
- 2) Executing Agency
- 3) Project cost
- a) Local funding
- b) Foreign funding

Lending Agency	Loan Amount	Loan Number	Date

- 4)(i) Amount provided in 19 ___/19 ___
 Government of Jamaica's Budget
- (ii) Expenditure during current financial year
- 5) Total project expenditure to date

			Total
6)(i) Total amount reimbursable on project by external agencies			
(ii) Total actually reimbursed			
(iii) Total claims submitted but outstanding			
(iv) Total claims not yet submitted			

.....
Name

.....
Signature of Project Co-ordinator/Manager

.....
Date

VIII. CONTROLLING AND DIRECTING PROJECTS

8.1 *Management by Exception*

Management by Exception is an approach that focuses management attention on situations and operations that deviate from implementation plans. It is based upon the assumption that a manager's time is limited and costly and the manager cannot be positively and directly involved in all operations of a project. Complete involvement, constant observation and total interaction are possible only on the smallest and simplest of projects. A manager's limited time can best be spent in dealing with those matters requiring corrective decisions and actions, and only reviewing those areas where performance is satisfactory.

Regular and systematic reports of operations are required to draw management's attention to deviations from implementation plans. Ranges of performance tolerances must be established to determine if the deviations are significant. This can be illustrated by the use of critical paths and float times to indicate variances for time durations of project activities.* As long as performance is within acceptable limits, the project manager does not become involved. Only when performance exceeds these limits is management informed to investigate and, depending upon the analysis, take appropriate corrective actions.

Management information and control systems are central formalized mechanisms for analyzing indicators of performance to highlight problem areas that might affect project performance. It is essential that the project management take time to do careful initial planning, to identify key management and technical indicators and to establish acceptable performance tolerances. Project administrators must also be willing to incur the costs of both staffing and operations, if the monitoring systems are to be useful.

*See Module 7 - Project Scheduling - Bar Charts
Module 8 - Using Bar Charts for Project Control
Module 9 - Project Scheduling - Network Analysis

8.2 *Three Functions of Project Management*

Project Management can best be carried out when the plans and systems described for Project Implementation Planning in Chapter 9 have been established and are well documented. Based upon the implementation plans, the project manager can exercise relatively strong control over project work, schedules and costs.

Once a project is ready for execution, it is the responsibility of the project manager to see that:

- (a) the budget is not exceeded;
- (b) the project is completed as soon as possible;
- (c) resources are not overloaded; and
- (d) the project's basic components are well integrated through planning, reporting and decision-making.

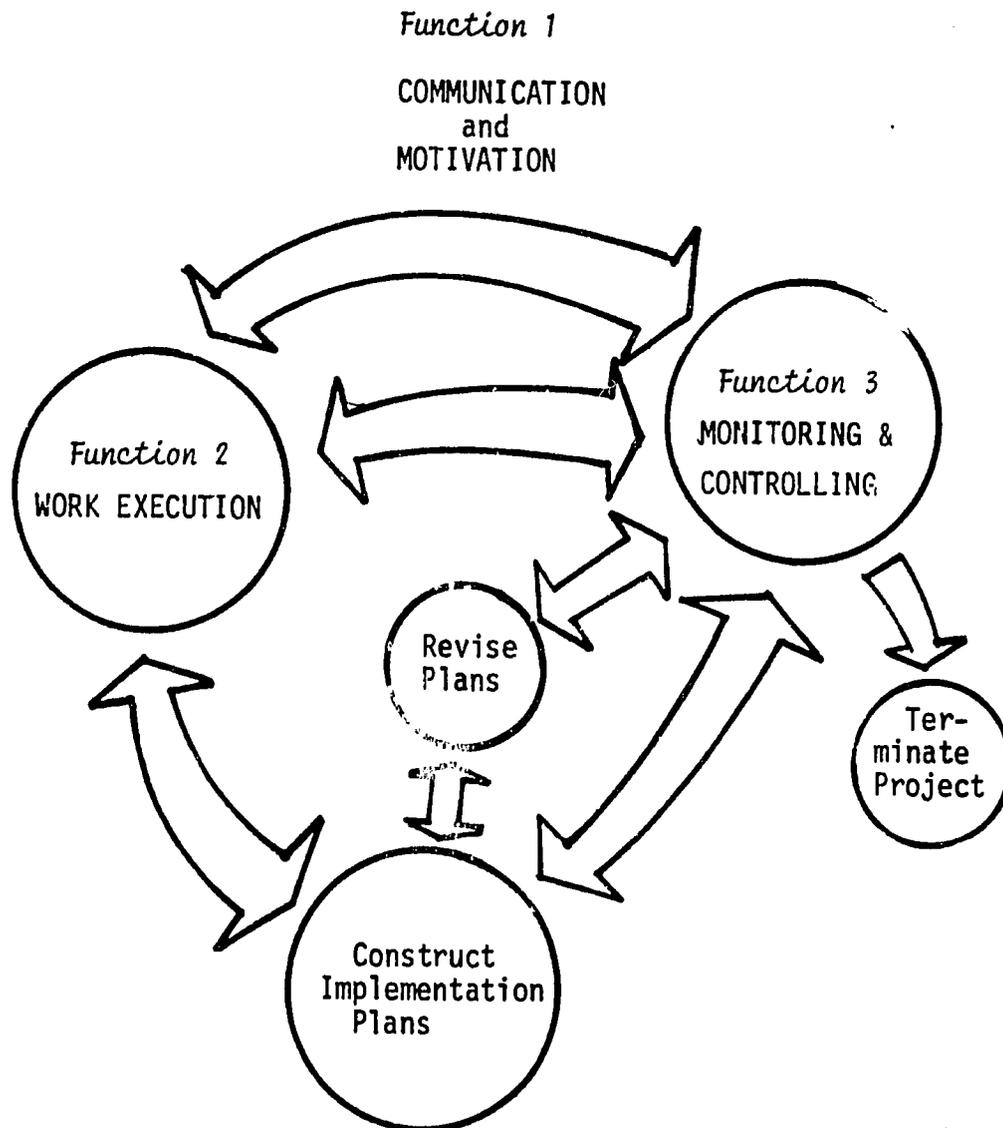
Managing project implementation can be seen to involve three basic functions. (See Figure 10)

- Function 1 - Communication and Motivation
- Function 2 - Work Execution
- Function 2 - Controlling the Project

The project manager will have specific responsibilities within each of these functions and will have overall responsibility to see that each of the basic functions is performed.

The three basic functions of project management are related in a sequential, cyclical manner. The project (and specific project activities) begin with *Communication and Motivation*, (Function One). Project staff and operational or functional units must be informed of what is to be done and must be motivated to do it. Function Two involves the actual *Execution of the Work*. Work performance then, must be *Monitored and Controlled*, (Function Three) to assure that the intended results are achieved. This relationship between the three functions is illustrated by the *solid lines* of Figure 10, which beginning with the Implementation Plan, move cyclically through Function 1 to Function 2 to Function 3.

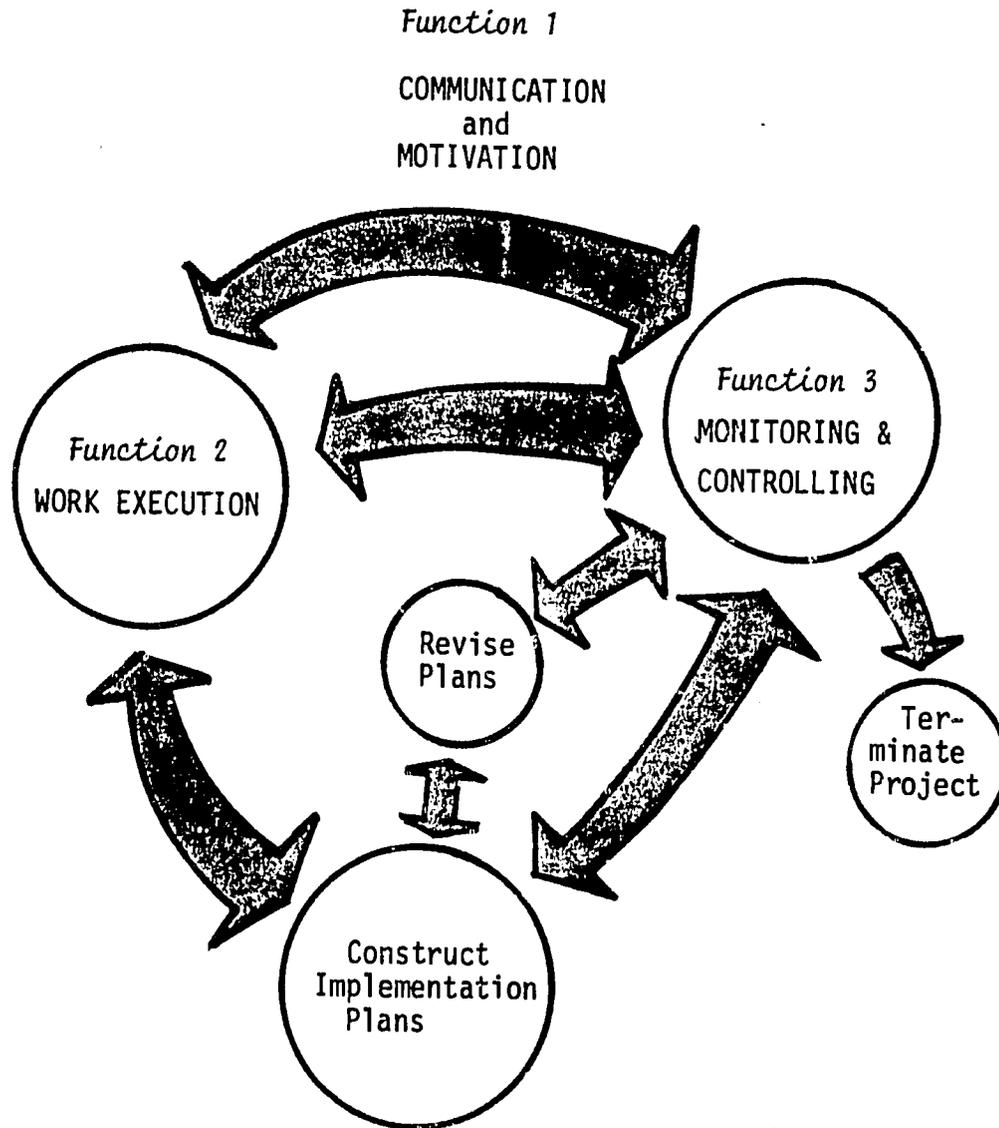
FIGURE 10: PROJECT MANAGEMENT FUNCTIONS



Monitoring involves the measurement of performances to determine those which significantly deviate from plans. When there is satisfactory completion of activities, the project manager approves the completion. However, if there are deviations which require re-planning and the initiation of new or different activities, the *management cycle is continued*. This is illustrated by the *broken line* in Figure 10. The controlling functions of management involves the initiation of corrective action in response to both problems and opportunities which are identified from monitoring. As corrective actions are identified and planned, the changes must be *communicated* to appropriate staff (Function 1) who are responsible to *execute* the activities (Function 2) and which must be *monitored and controlled* to see that performances are satisfactory (Function 3). If the corrective action is still not satisfactory, the cycle is initiated again.

These three basic management functions represent the cycle of project management. Each of the basic functions can be broken into sub-functions, as illustrated in the following detailed discussion of each of the functions. Because different project activities are carried on simultaneously, and will be at different stages of development, all three functions are normally performed simultaneously on different activities. Because of this, project management is very complex once execution has begun. The model of project management, as presented here, is simplified to permit a logical presentation of the manager's responsibilities. It is, however, realistic with respect to individual project activities and relevant to overall project management.

8.3 FUNCTION ONE: *Communication and Motivation*



Motivation is the inner force that causes individuals to exert their efforts and resources toward goal achievement. It is necessary for any group or organization to achieve their objectives successfully, and is usually seen as the result of both internal (or personal) and external (or organizational) stimuli. The project manager must consciously create the conditions and circumstances for individuals working on the project to be encouraged to use their talents and

abilities to the greatest advantage for the project.

Managers need to motivate the staff to perform their assigned tasks as efficiently and effectively as possible because of the time and resource constraints of projects. Motivation may be more crucial on projects than in ordinary organizational settings, and perhaps more difficult, because of the transitory and complex nature of project authority structures and the diversity of project staff which must be co-ordinated. A project manager's ability to lead, encourage and support the staff must be excellent to complement the limited authority the position can exercise. A project manager is often in a position where coercion or commands will not work, but must rely on negotiation, co-ordination and authority earned by personal skill or effort. A project manager must understand what motivates his staff and help them to develop a sense of commitment to the project. Of course, the manager's own personal enthusiasm and positive attitudes toward people and the project are basic requirements.

Communication refers to the meaningful exchange of messages. It is used to achieve favourable responses and promote personal and project goal achievement. A major responsibility of management is to see that communication systems are in place to ensure that proper messages are being sent and received throughout the project organization. The manager must facilitate informal communication as well as formal communication within a project, as this is often the source of messages which can effectively promote or undermine personal performances on project activities.

Good communication tends to prevent negative attitudes and increase motivation among project staff. It reflects the responsiveness of management to issues on the project, from personnel matters and performance to policies and project design. *Communication must be a two-way process.* Project managers must actively listen to messages as they are sending them. Listening is crucial to ensure that messages are understood, to understand messages of others, to convey respect, to detect actual and potential problems, to identify needs, to discover opportunities for modifications to improve project performance and to avoid major problems.

Beyond "spirit" and "style", however, the manager can apply certain management tools to facilitate communication and motivation.*

*See Module 40 - Motivation of Employees and Personnel Evaluation.

These tools effectively help overcome some of the difficulties which may be encountered in communicating with others. These difficulties on projects include the following:^{30b}

- (a) the contributing organizational units may not meet schedules and performance deadlines because their ongoing or routine duties have been given priority or are more urgent;
- (b) the project staff may misunderstand the purposes of the project, the motivations of the project managers, the outputs of the changes being introduced, the result of inter-organizational rivalry, or some other justifiable cause;
- (c) personnel may be reluctant to become fully involved in the project because it means more work for them than previously, or the personal benefits are not clear to them, or they were not involved in the earlier stages of the project; and
- (d) project staff may avoid carrying out project activities efficiently and effectively because they may be uncertain about their own ability to do the jobs, they may prefer their own routine assignments to which they are accustomed, they do not feel the project assignments will enhance their careers or promotion potential, or they feel isolated or alienated from their former or their new organizational and project structures when they have a high need for feeling accepted and belonging.

Communication must be continuously nurtured throughout the project, though it is particularly important when a project is beginning. The following sub-functions represent both project-level and activity-level responsibilities of the project manager. The manager should also see that these sub-functions are performed at lower levels by the activity manager. Communication and motivation are extremely critical to good project management.

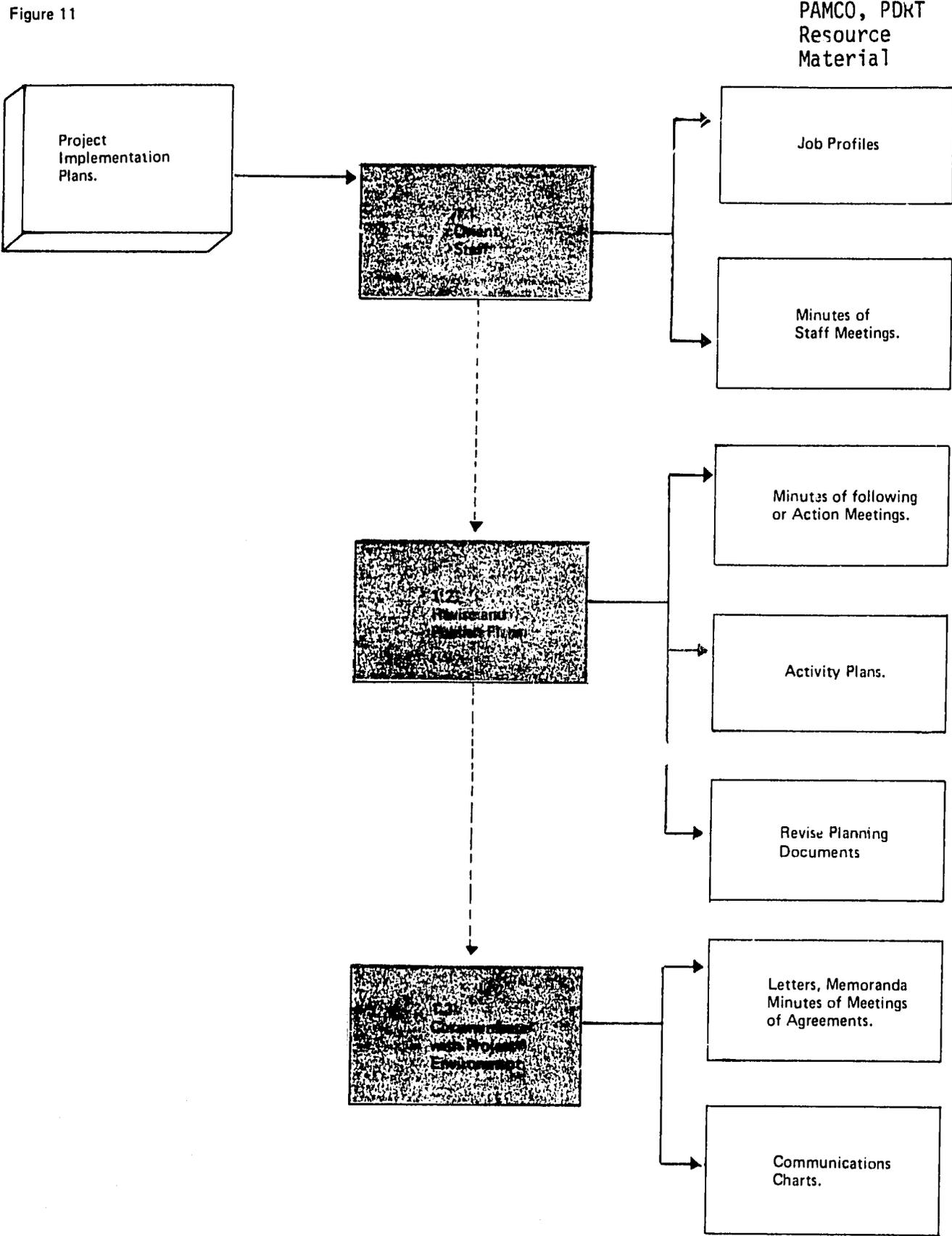
The sub-functions of communication and motivation, shown in Figure 11 are to:

- i) orient the project staff;

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FUNCTION ONE: COMMUNICATING AND MOTIVATING

Figure 11



- ii) prepare and revise activity, descriptions and schedules; and
- iii) communicate with the project environment.

Sub-function 1.1: Orient the Project Staff (See Figure 11)

The project staff must understand what their jobs and tasks are. These should have been formalized in *Job Descriptions* as part of implementation planning. But staff need to be *oriented* to their responsibilities and need to understand how their tasks relate to the overall achievements of the project. A *Job Profile* should be constructed with each member to see that the duties are mutually understood and agreed upon.* This is particularly important if the project team members were not involved in earlier implementation planning. It is too often assumed that each person can do his/her part automatically. A good project manager will see that every contributor understands the relationship of his contribution to the total project.

Staff orientation, a formal and informal set of activities, should include discussion of the following elements:

- (a) an explanation of the rationale behind the project, the problems it seeks to solve, the changes it seeks to bring about and the objectives including the operational outputs and targets;
- (b) a description of the project organization and all administrative policies and procedures;
- (c) a review of the project work structures and key milestones on the master schedules;
- (d) a review of the relevant activities and all associated plans and an explanation of the degrees of autonomy involved in the performances of these; and
- (e) an explanation of the information and control system and the roles of various persons as well as its purposes, so it will be viewed as an aid to performance rather than as a means of sanction.

*See Pioneer Farm Implementation Planning Manual, Appendix 2 for illustration and discussion of the uses and differences between Job Descriptions and Job Profiles.

Staff orientation meetings may be quite brief, or may be extended over several days or even weeks, depending on the nature of the projects involved. It is advisable to get the entire staff together initially for introductions, especially arranging for an informal and friendly atmosphere. This can be important for the development of a good team spirit. Orientation is a key factor for encouraging persons to see the project as a whole, rather than as segmented (and even competing) parts. Staff orientations set the tone for the project and establish a pattern which can be maintained by staff meetings throughout the project.

Staff orientations should be carefully planned and executed to establish good rapport and understanding. They provide the opportunities to discuss the project plans and all issues completely; and should be followed up by personal briefings and problem-solving meetings so the process of two-way communication is evident from the start-up of implementation.

Sub-function 1.2: Revising and Publishing Activity Descriptions
(See Figure 11)

Activity Descriptions are the basis for work assignments.* There should be an initial meeting with all activity managers, project staff and relevant liaison persons to *review and finalize the Activity Description Sheets* which were developed during implementation planning. Activity managers should be given time to inspect and to modify them if necessary. Each activity manager should be encouraged to establish a "plan" for each of their activities, outlining the *tasks* required to accomplish the activity and preparing a time schedule with a detailed resource plan. This will help ensure the accuracy of the master schedule for the project. Although this can be a time-consuming step, it is critical to ensure the validity of management plans. As new activities are identified (e.g., corrective actions) or plans are revised, it will be necessary to review and update all relevant Activity Description Sheets. This function will be performed throughout project implementation.

Sub-function 1.3: Communicating with the Project Environment
(See Figure 11)

Communication with the project environment is important throughout the project. Meeting the need for *continuous communication with*

*See Module 4 - Activity Description Sheets.

different groups, organizations and individuals, is a major responsibility of the project manager. The key linkages in the project environment should be identified and patterns of communication established.* At a minimum these will include the following:

- i) heads of supporting and co-operating departments and organizations who need information on the progress of the project work in light of their contributions;
- ii) liaison persons (in selected speciality areas and administrative support areas) who can advise the project manager about various aspects of the project, e.g., the effectiveness of outputs, and who can relate to the rest of the parent organization or other organizations on behalf of the project in an influential, official and unofficial capacities; and
- iii) members of professional organizations, volunteer groups, and private organizations who can favourably (or unfavourably) bring influence on the project and its acceptability (normative linkages).

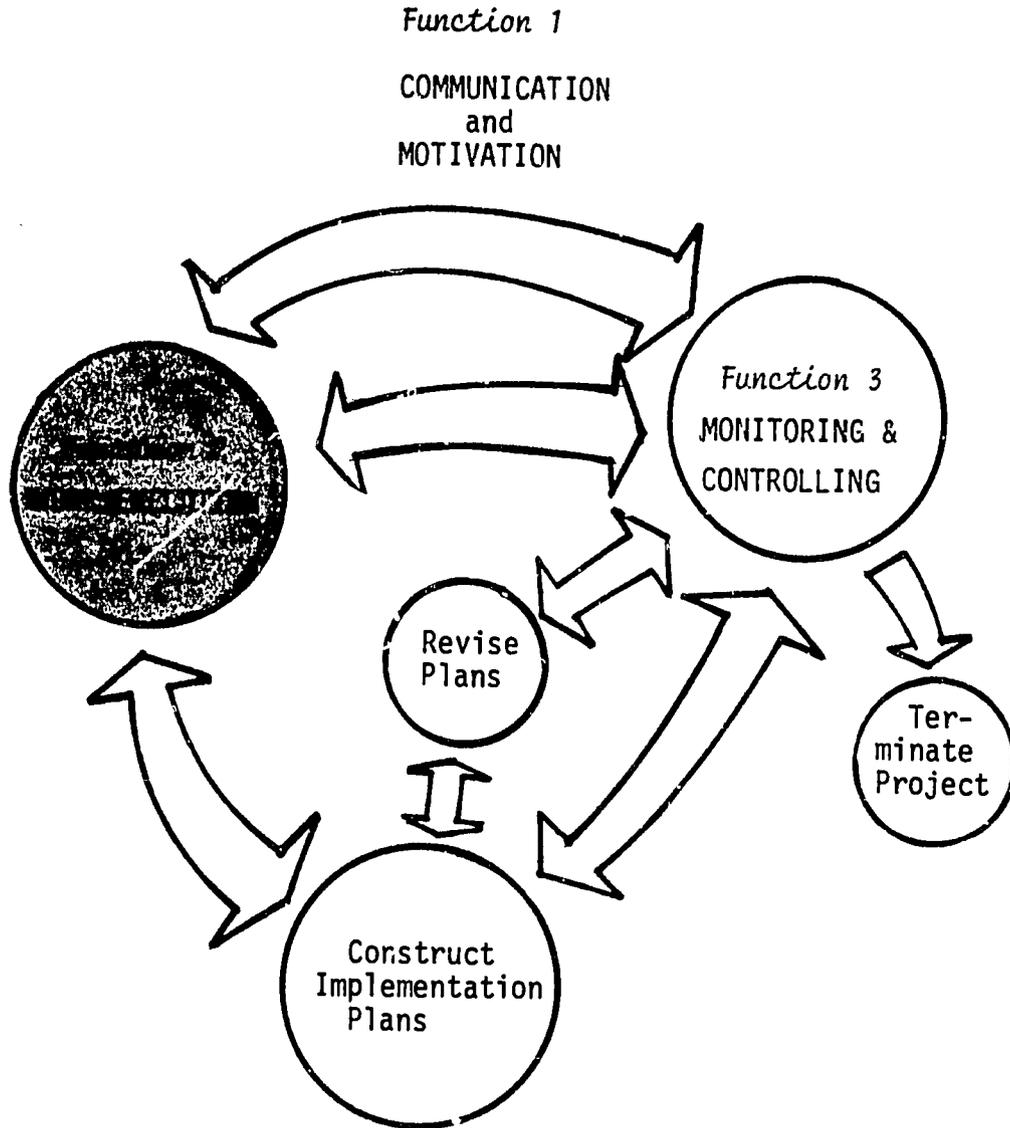
For each of the groups or organizations with which communication must be maintained, it is necessary to:

- (a) identify liaison persons as points of contact;
- (b) identify the purpose(s) of communication;
- (c) identify the timing and frequency of communication;
- (d) identify the types of information to be transmitted;
- (e) identify the method of communication;
- (f) identify the person(s) responsible for the communication; and
- (g) identify procedures for handling returning messages or communication.³¹

*See Module 32 - Environmental Analysis and Institution Building Model.

Developing a *communications chart* and schedule will help ensure that the communications programme works and that important people and organizations are not overlooked. *Important dates, briefings, meetings, etc.*, may be included on the manager's project schedule so they are not overlooked.

8.4 FUNCTION TWO: Work Execution (See Figure 12)



Work execution will be carried out primarily by the functional units, activity managers, project personnel or contractors. Project implementation plans in terms of work assignments must be communicated to relevant persons and units through formal documents that permit record-keeping and control with respect to work performance. The project manager ensures that work is performed through planning, communication and monitoring. The actual work is primarily delegated, so that the manager does not become actively involved in work execution

except for selected activities. It is the responsibility of the project manager to see that the work is done, not to do the work. If the manager does perform certain tasks personally, he is performing the role of a technician or a professional, not the role of a manager.

Efficient work execution requires co-ordination of activities and integration of the responsible units. For work execution, the project manager must ensure that:

- (a) the work to be performed, has been carefully planned;
- (b) precise estimates of time, labour and costs have been calculated;
- (c) the scope of required activities has been clearly communicated to those involved;
- (d) accounting of physical progress and cost expenditure is performed in good time;
- (e) time and cost to complete the remaining work is reviewed periodically; and
- (f) actual progress and expenditures are frequently compared to plans.

The processes involved in work execution will vary greatly between projects as they depend upon the extent to which units contributing to implementation have been involved in the implementation planning for the project. Before work execution actually begins, it is assumed that key project staff and activity managers have been briefed and have submitted revised detailed activity and task plans. (Function One).

Function Two deals exclusively with the execution of project activities and assumes that a control system is established. The sub-functions included in the management of Work Execution are illustrated in Figure 12. These are:

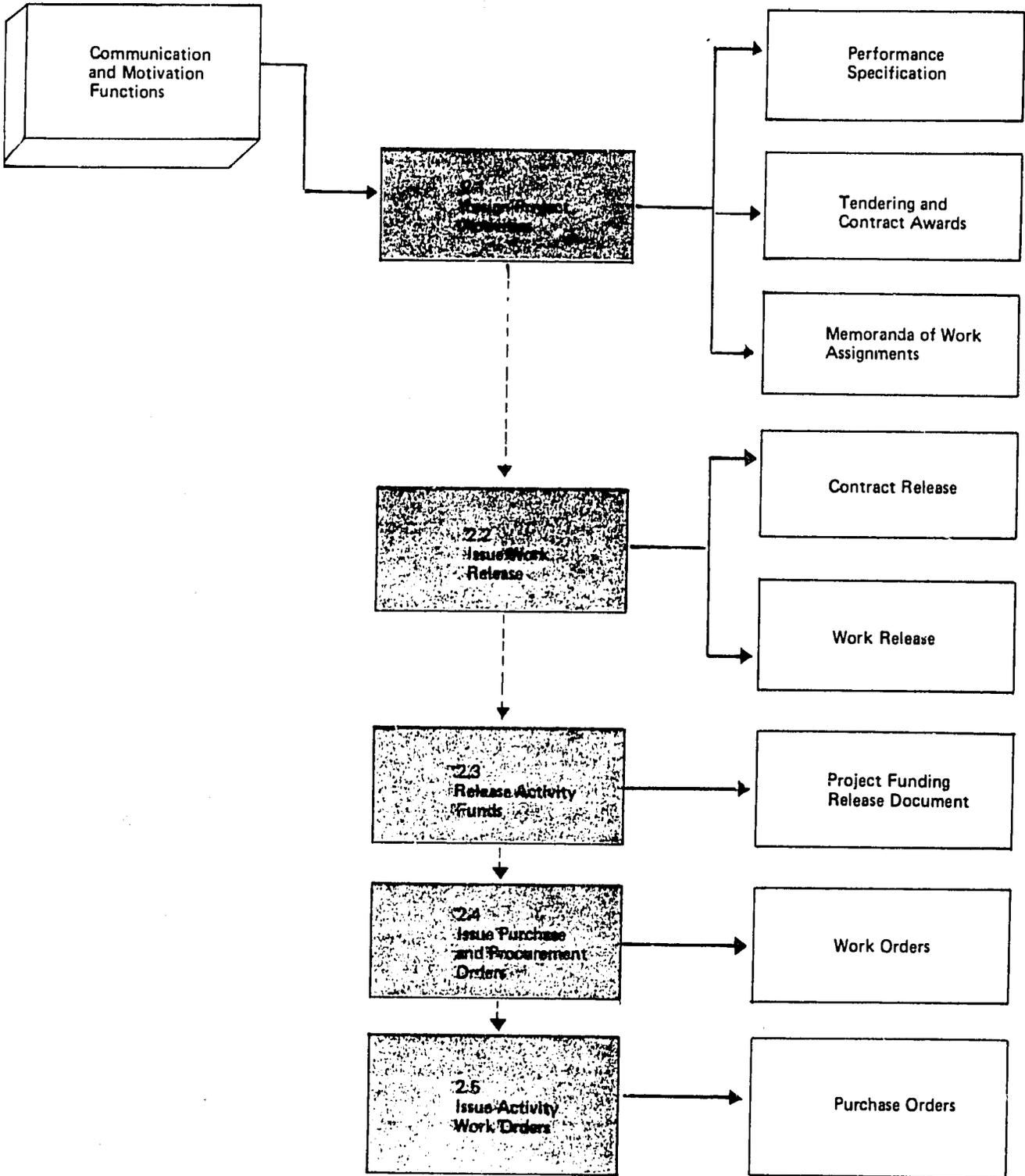
- i) Assign the Work or Award Contracts;
- ii) Release specified work conditions and agreements;

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FUNCTION TWO: WORK EXECUTION

Figure 12

PAMCO, PDRT
Resource
Material



- iii) Release project funds for the Specific Work Assignments;
- iv) Obtain clearance for purchasing and procuring materials and equipment for Specific Assignments; and
- v) Issue Work Orders to begin specific activities.

The specific dynamics of work execution vary, but the manager is to see that the work is properly assigned, defined, funded, cleared and initiated in accordance with the project plans.³²

Sub-Function 2.1: Assigning Work (See Figure 12)

Individual project activities must be assigned in formal documents to the persons or units responsible for their execution. Usually called *work authorization*, this is the official communication which specifies required schedules and approved budgets and permits them to expend definite quantities of money, manpower and physical resources on a project activity. The project manager should obtain the signatures of the activity managers on the authorization to show their acceptance of the assignments under the conditions stated in the document.

In the case of contracts, there may be a period of tendering before the contracts are awarded. In either case, the work authorization document is a preliminary document of work assignment, and must be followed by other authorizing documents, such as *financial releases*, *clearances of purchase orders*, and *work initiation orders*.

As a project progresses, the preliminary work authorizations may need to be altered in accordance with project needs. There are clauses within work authorizations which permit certain types of changes within identified tolerances, such as schedules limits. Generally, the agreements include procedures for modifications, revisions or cancellations and conditions to dictate these on the part of either the project management or the responsible units. The project manager should read these carefully and understand them so as to maintain maximum control over any changes in work execution.*

*See Module 34 - Introduction to Contracts, Jamaican Contract Documents and Tendering Procedures.

Sub-function 2.2: Issue Contract or Work Release (See Figure 12)

The *contract release or work assignment* is a document prepared by the project staff for distribution to key activity managers. It includes a statement of the work to be done, items and prices of hardware, performance requirements, specifications for activity outputs, delivery or activity schedules, support requirements, contract requirements, property and other physical resource requirements, and any other information necessary for execution of the activity. Even if a work assignment form is used rather than a formal master contract, the document actually represents a contract to accomplish the activity within the specifications and constraints of the assignment.³³

Sub-function 2.3: Issue Project Release Document (See Figure 12)

A *project release document* authorizes the total funding of direct costs for the actual execution of the project. There is a specified amount to be released to the various activity managers for each activity. Procedures or requirements for drawing upon the funds must be specified in the project release or activity release documents.* Generally, the release documents require the approvals of various levels of project administration, such as the project manager, a functional director, or the contract manager, the comptroller and so on. If additional funds are required, because of unforeseen problems or a change of the scope of the activity, a revised release is generally required, except in instances in which the conditions of the release or the master contract provide for contingencies and unforeseen circumstances which can escalate the costs without additional approval.³⁴

*Sub-function 2.4: Issue Purchase and Procurement Orders
(See Figure 12)*

Purchase or Procurement Orders are required to obtain project equipment, materials and supplies. In some instances, the activity managers are given responsibilities and authorities necessary for purchasing the material and supply requirements of the various activities. In other instances, these are maintained by the centralized accounting and supplies offices. These responsibilities should be clearly defined, and necessary procurement procedures initiated in time for the physical resources to be present when the

*See Module 46 - Withdrawal of and Accounting for Loan Funds in the Financing of Projects.

work is to begin. Procurement can be quite a lengthy process for certain types of items and no problem at all for others. It is generally wise to allow adequate slack time for purchasing and procurement, but one must bear in mind the storage requirements of any materials or supplies when they arrive as this may present security and storage problems.

The procedures and documents for purchasing and procurement are usually quite well defined. It is generally the responsibility of the project contact or liaison person in the functional purchasing or supplies department to carry out the actual steps involved. The project manager must understand and monitor the procedures as part of an effective project control system.³⁵

Sub-function 2.5: Issue Activity Work Orders (See Figure 12)

A *work order* is the key document used for authorizing the actual execution of activities and for controlling performance on those activities, especially in relation to budgets and schedules. Work orders include the following information:

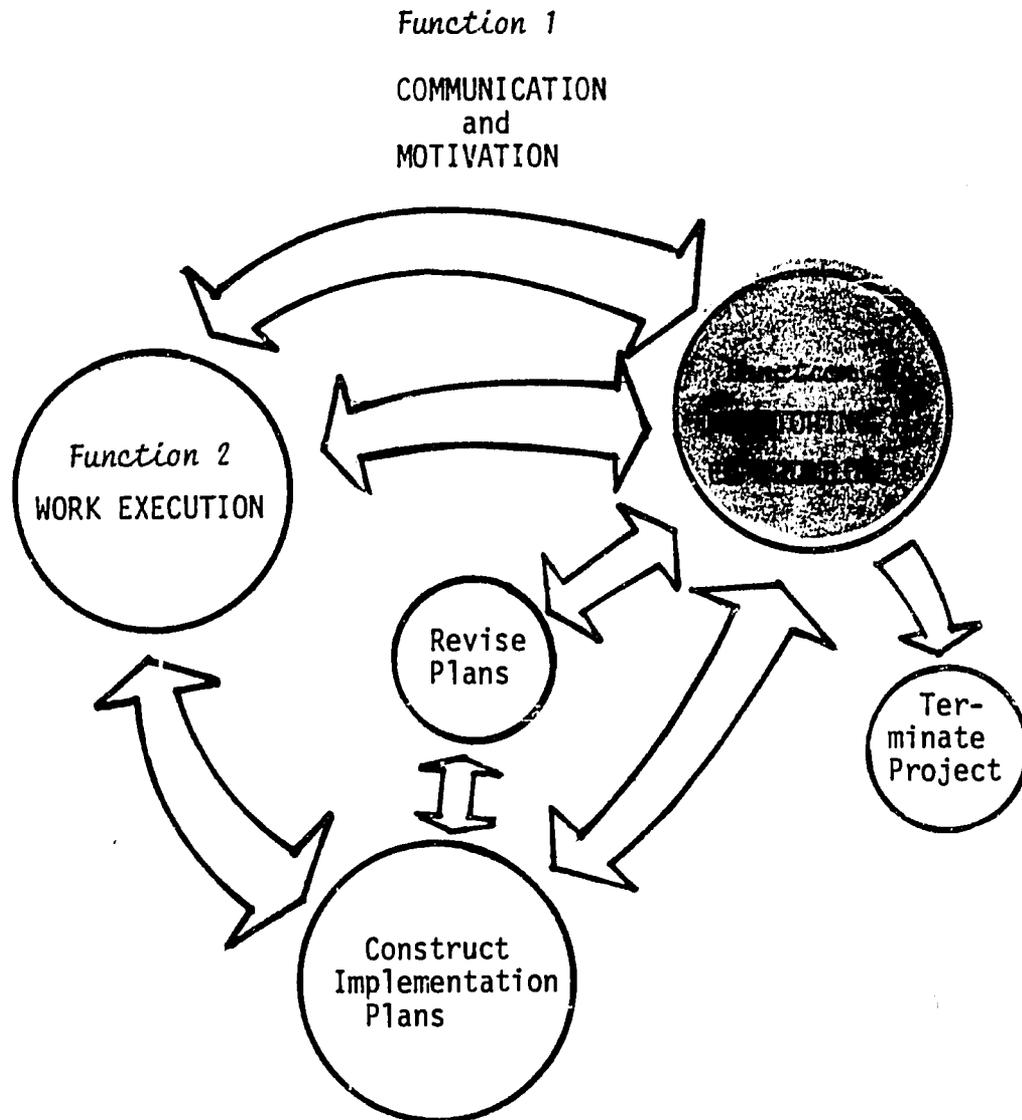
- i) a brief, but complete description of the work with all specifications in detail;
- ii) the budget divided into labour and material quantities indicating unit costs;
- iii) schedule including dependence upon other activities for initiation or completion;
- iv) progress indicators that will be monitored such as intermediate milestones and linking events;
- v) the cost code account with provisions for sub-activity control accounts if necessary; and
- vi) the signatures of officials authorizing the work and accepting responsibility for the work.

Many activities may be sub-divided into a number of significant tasks. Sometimes special formal authorization is required to perform tasks which are under the supervision of the activity manager, or to expend external funds. In general, the administrative procedures with regard to work orders and contracts, especially those involving external operators and contractors are quite well established and

very precise. The project manager should be familiar with the relevant regulations of both the parent organization and the contributing organizations. The manager should develop a good liaison relationship with someone having expertise in this area to avoid errors, to ensure that the work authorization can meet the work requirements of the project, and to ensure that the regulations are properly followed. *Many projects require a specialized contract administrator to be attached to the projects because of the intricate nature of the contract and work authorization documentation.*

Activity work orders are not normally issued until shortly before the work is to be done. This avoids unnecessary confusion regarding the scheduling and performance. Although dates have been established by the Master Schedule Activity Sheets, it may be necessary to revise these dates, and even the exact specification of the activity assignments, based upon the performance of other activities and the progress of the total project. Changes are inevitable because all eventualities have not been accurately anticipated and incorporated into the initial implementation plans.³⁶

8.5 FUNCTION THREE: *Controlling the Project* (See Figure 13)



Every project is unique. It involves achieving objectives which have never been accomplished before under the same circumstances or conditions. It is therefore inevitable that unforeseen circumstances will arise, demanding changes in the original plans. The project control system has been designed to alert project management to deviations from plans, to analyze the significance of deviations, and to initiate corrective actions. The most common categories of changes

can be generalized as:

- i) changes in scope of work;
- ii) changes in schedules;
- iii) changes in costs; and
- iv) changes in technical performance.

Depending upon the significance and implications of deviations, decisions must be made regarding changes and corrective actions at all levels of the project. Certain changes can be made at the *activity level* by the activity managers *as long as deviations do not exceed the agreements, contracts or work authorization documents*. Some changes may be made at the *project manager's level*, especially if they have implications for the total project or on the performance of other activities and aspects of the project, but do not affect overall project objectives or policies. Still other changes can only be decided by the project administration or the *executive level* of the project that is, if they have *implications regarding deviations from the original objectives of the project or major modifications requiring policy considerations*.

To control the project, the manager must know where deviations are likely to occur and where changes or corrective actions can be made. These will be primarily in terms of scope, schedule, cost and performance.

Project Scope Control involves monitoring to ensure that the specifications and contract conditions are being met, no more and no less, as written into the work authorization documents.³⁷ Major problems in project delays and cost overruns, occur when there is an increase in the scope of work being performed. Expansion of the scope of work may be justified if it ensures the successful accomplishment of an activity or because it is a natural addition to or consequence of the original assignment, but it should always receive clearance. The intention may be to produce the best possible result, but if it involves an expansion of the immediate objectives, and/or corresponding increases in costs and time requirements, it is outside the initial agreement. The project manager must ensure that any changes or expansion in the scope of work are properly approved (with identification of all necessary corrective actions relative to the rest of the project) before any unauthorized work is undertaken. The project

manager achieves this by:

- (a) insisting upon well-documented work authorization assignments, as noted above, with appropriate signatures of the activity managers, functional managers and project executives;
- (b) monitoring the performance of the activity managers to see that the specifications and conditions are being precisely met;
- (c) insisting upon revised work statements, schedules and budgets where any changes in performances are taking place; and
- (d) initiating analysis of the significance of any deviations from the original agreements and plans.

Schedule Control must be integrated with control of the scope of work. As a project progresses, the original estimates may prove invalid or may need revision in light of the actual project experience. This is why Activity Work Orders cannot be issued until it is nearly time for activity initiation and co-ordination of all dependent activities are properly updated and integrated. Each activity manager and functional manager must be required to submit regular reports which measure progress against planned schedules and forecasts to completion. The frequency of this reporting may vary, (e.g., daily, weekly or fortnightly), but it should be frequent enough to provide the project manager with an accurate picture of the possible change implications. These *progress reports* should include measurements on:

- i) progress recorded to date, noting completed activities and estimates of work accomplished on activities in progress;
- ii) estimates of remaining time to complete present activities and any future activities under the particular work authorization; and
- iii) judgements on the impacts of activity completion, any changes which may be required, and impacts of these changes on key project milestones dependent project activities.

Good progress reporting requires that activity and functional managers have an overview of how their activity fits into the total project, including inter-linking with other project activities and the overall cost and time demands of the project. It is the responsibility of the project manager to see that they have this for use in Project Review Meetings.

Cost control is also exercised primarily by activity assignments.³⁸ For each activity, the Activity Description Sheets and subsequent authorization documents provide established budgets for each activity. Monitoring will measure expenditures against budgets. It is necessary to have a continuous and well-defined set of procedures for expenditures to see that they conform with requirements and are well-recorded.* When expenditures deviate from plans, corrective actions must be initiated (depending upon the conditions of the contracts and the work authorizations). These must be co-ordinated with other dependent activity changes and must receive the appropriate approvals required for such modifications.

Cost control can be very problematic. For example, many agencies incur expenditures on projects which, when not properly recorded to accounts, or not recorded in time, do not appear for reimbursement or claims. With externally funded projects, it is necessary to provide proper documentary evidence before an organization can be reimbursed for project expenditures. Without the documentation and prompt follow-up, the organization may experience severe cash flow problems, straining the routine budget on project expenditures which are not properly claimed. Cost control requires constant and precise attention to avoid the various pitfalls of penalties, late charges, incomplete reimbursement, etc., which plague so many projects, causing financial headaches such as cost overruns and inadequate funding. Cost control problems affect nearly every project. Often there must be a reduction of project goals because of financial constraints and difficulties.

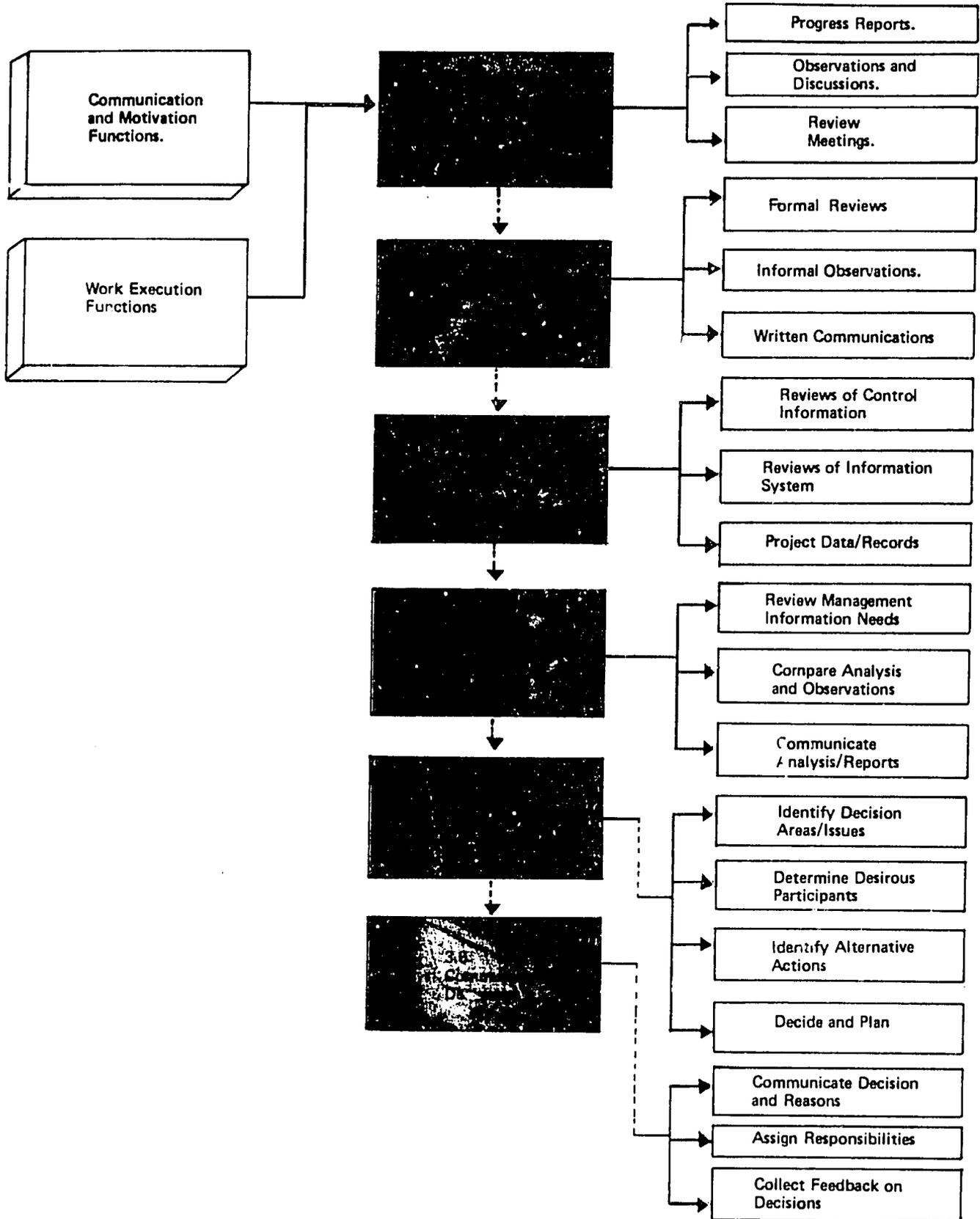
Performance control involves the integration of cost, schedule and technical performance to obtain an overall measure of project progress. The performance reports can be broken into functional

*See Module 46 - Withdrawal of and Accounting for Loan Funds in the Financing of Projects.

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FUNCTION THREE: MONITORING AND CONTROLLING

Figure 13



categories, activity categories, project component categories, or overall project progress. The format depends upon the needs of the persons receiving the information. Manpower, cost, technical, and schedule performance should be integrated into the measurement and analysis mechanics of the project control and reporting system.*

In maintaining control of the project and managing the reporting systems, the project manager must perform, in general, the sub-functions outlined below:

- i) supervise activity managers;
- ii) check work results;
- iii) gather control information;
- iv) analyze data;
- v) make management decisions; and
- vi) communicate decisions.

Sub-function 3.1: Supervise Activity Managers (See Figure 13)

In general, the project manager is not the direct supervisor on most project activities. That is the responsibility of the activity managers. The manager's responsibility lies in managing the supervision by *systematic attention to progress of activities and schedules* of the activity managers and by being available for advice and consultation.

A major dilemma of any project manager is how much to become involved in individual project activities, and when to become involved, or to what extent project staff and activity managers should be permitted to work out their own problems. A project manager should generally not be responsible for too many activities, nor should the manager unduly disturb the work that is in progress or take on the responsibility to re-do any of the work that is unsatisfactory. Rather, the manager should reinforce the responsibility of activity

*See Module 42 - Evaluating and Forecasting Project Progress Performance.

managers. The project manager should, for example, be accessible to the project staff and the activity managers for regular advice and should support the persons responsible for particular efforts on the project, making it clear when the work is satisfactory or not satisfactory. He should maintain constant *communication* by participation in meetings, *report* on discussions held with the project executive administration as appropriate and with supporting and external agencies, be readily *accessible* for consultation, *analyze* with project staff the problems encountered and *explain* the basis for decisions resulting in changes as they affect the project staff.

Sub-function 3.2: Check Work Results (See Figure 13)

The project manager should establish procedures to ensure that activity managers, when satisfied or dissatisfied with the performance of their activities or are at a point of completion, report to the project manager for review and approval. The review will be based on the Activity Descriptions (or their revisions) and other activity plans.

Work results can be checked simultaneously both formally and informally. The project manager can use the information system as a basis for determining the quality and quantity of work that is being done. Status reports on all activities should be submitted according to prescribed procedures for analysis. The project manager, will also find it necessary to keep on top of project work through informal communication and encounters as part of his personal style of managing the project. This may mean periodic tours and discussions with project personnel. The manager should have an "open door" policy so that the information also come to him. Informal and less-structured ways of checking results can be used very effectively to complement the formal information systems.

The project manager should carefully record any mistakes due to misunderstanding of work instructions, problems to be avoided in the future, and deviations from specifications of performance. Consequent changes in work or schedules should be communicated to the relevant persons. Any instances of unsatisfactory work should be communicated directly to the activity manager (not the lower level project subordinates) with clear explanations of the reasons for dissatisfaction and steps for correction, if appropriate.³⁹

Sub-functions 3.3: Gather Control Information (See Figure 13)

The Project Information and Control System, which was established in Step Five of Planning for Implementation,* should be constantly generating information to be used for project management. An information system is designed to provide a continuous flow of information about the present status of the project and expected progress.

The formal information flow must be supplemented by the personal contacts of the manager with the staff, by periodic review meetings, unscheduled analysis and strategy meetings as problems arise, and selected meetings which relevant units outside the project, as noted in Step One, above.

The Activity Recording Sheets or Activity Logs can be very useful in the recording of actual experience on project activities.** They should record satisfactory execution as well as actual and expected deviations from the project plan as they occur. Activity Reporting Sheets record the commencement of activities, activity completion, status and expected completion times and rates of expenditures. Each of these points of information is important to the informal information and data the project manager will be gleaning for use in decision-making.

Sub-function 3.4: Analyze Data (See Figure 13)

As information is gathered for project control, actual time, costs and performance will be compared with the control indicators identified during implementation. There should be systematic and periodic analysis of the data and summarization as necessary to facilitate the decision-making processes. Whenever deviations from plans are discovered, an effort must be made to analyze the significance and causes for the deviations. Deviations are natural and are to be expected. One of the advantages of Management by Exception, is that it permits the management to recognize deviations and leaves them time (as routine efforts are standardized through the plans) to deal with the deviations. Deviations are not necessarily undesirable -- they may represent opportunities as well as challenges. Probable causes of deviations should be identified,

*See Manual I - Planning for Project Implementation, Chapter XI, Step Five: Establishing the Information and Control System.

**See Manual I - Chapter XI, for an explanation of these documents.

such as, unrealistic planning, unforeseen resistance, natural disasters, optimism in expectations of support, policy changes, inefficient administrative procedures, unforeseen constraints (such as manpower or budget), etc. This aids problem-solving and the experience can be feedback into planning for other similar projects.

Project analysis is dependent upon good work reports coming from all project work levels, and is most effective when reported in properly designed project reports. Data analysis must be based upon a clear understanding of what analysis is needed and how it will be used. For example, though they may have common elements, analysis required for the political directorate who review the project will be quite different from the analysis required for financing institutions. Special attention should be paid to preparing reports that are really valuable documents, which are relevant or current, easily understood, and which portray accurate and comprehensive information.

Data is generated for analysis; analysis is done for reports; reports are the mode for decision-making; decision-making is the foundation for corrective action on the project. Poor performance anywhere along this control chain can result in unsatisfactory project results and poor management.

Sub-function 3.5: Make Management Decisions (SEE FIGURE 13)

Project decisions are taken at all project levels. The project information and control systems should designate the types of decisions that can be made at each level and should be designed to ensure that the necessary information is distributed to the appropriate persons to keep them fully appraised of the progress of the project and pending decisions. At a minimum, these include:

- (a) the activity manager level;
- (b) the project manager level; and
- (c) the project executive level.*

Using the approach of Management by Exception, the project information system serves to indicate deviations from the plans and is useful only if it stimulates corrective decision-making.

* See Figure 6 of this Manual

The range of decisions which may be necessary include the following options:

- i) take no action because the deviation has minimal consequences beyond the level of the activity concerned;
- ii) search for more data or modification of the information system or select other useful indicators or relevant information to ascertain the validity of the analysis on deviations or opportunities;
- iii) make changes in the project schedules and plans as a result of the deviations and opportunities so the total project maintains the intended progress;
- iv) make changes in project support from external sponsoring agencies to cope with changes in the project, such as increases in funding from external agencies;
- v) make changes in the policies, objectives, targets, or strategies of the project at the executive level, that is, reformulate the project; and
- vi) terminate, abort or postpone the project until there is a change in significant environmental factors, such as the political climate and community support, and so on.

Many attempts have been made to describe the ways in which management decisions are made. Some managers tend to make decisions in apparently unsystematic ways. However, *good management begins with an understanding of effective and systematic decision-making.* Project managers should certainly use all information available to assist with decisions; they should attempt to structure the problem and look at alternatives; they should determine criteria for deciding among alternatives, e.g., in terms of desired effects on project costs or targets or schedules, etc.

In general, there will be different approaches to different types of decisions, depending upon the number of persons to be involved, the nature of the decisions, the urgency of the decisions and so on. The project manager need not formally structure discussion/ participation on all decisions, and in fact, should not do so. But the manager should encourage the participation of relevant project personnel by consulting them regarding project problems. Such dialogue often brings forth alternatives which may not have been

initially visible.

Under no circumstances should the manager feel that problems tend to solve themselves when left unattended. Even when delegating, the manager should monitor the decisions and understand the basis for the solutions recommended. The anticipated consequences should be carefully analyzed and tested as much as possible before decisions are finalized.

Decision-making is not a solitary activity, although the project manager may feel the acuteness of the problems much more than the project executives, supporting agencies, or even activity managers. The project manager has responsibility to raise the awareness of the executives to the nature of the problems, but not to be unnecessarily alarming in his efforts to get attention. Project executives have a broad range of concerns that go beyond the project, while the project manager must be concerned specifically with the one project. It is important to keep the attention of executives on the project but their involvement should be contained to appropriate types of decisions and actions. It may be dysfunctional to demand their attention too often or too little. When they are involved, the project manager should:

- i) sharpen the focus and limit the amount of briefing materials to deal with the substantive issues for consideration;
- ii) should ensure that adequate notice and time is available for discussions, data collection and decision-making;
- iii) identify the urgency of the decisions in terms of anticipated deadlines for action; and
- iv) highlight the potential consequences stemming from alternative decisions;

The clear responsibility of the project manager in decision-making should be reflected in a project authority matrix, i.e., the Linear Responsibility Charts.* In some instances, the manager can make decisions; in other instances, he is responsible for reviewing decisions; in others, to communicate decisions; and in still others

*See Module 6 - Linear Responsibility Charts

to inform others or facilitate decisions. The project manager should have a clear understanding of his role in decision-making. This should be well documented as part of the job description, authority guidelines and responsibility matrices which have been designed for the project.

Sub-function 3.6: Communicate Decisions (See Figure 13)

Decision-making is continuous. It is not a singular or one time activity. Nor is it a one-way process. Good decision-making is the result of a two-way flow of information between the decision and activity points. A common managerial failure is the lack of adequate effective communication *follow-up* to decisions. Decisions and plans for corrective actions must be communicated to those who are to be responsible for and affected by them.

The project manager should use a communications linear responsibility chart based on the principle of two-way communication. The manager must ensure that there is not only a flow of information to the decision-makers at all levels (the reporting system) but also a *return flow* of communication regarding the decisions. The decisions should specifically identify corrective actions including who does what, when and how. It is the responsibility of the project manager to see that decisions are both taken, communicated and performed for corrective decision-making to be effective.

The primary means of giving internal project directives which include:

- i) action assignments as a result of project review and problem-solving meetings;
- ii) project directives, special memoranda or messages; and
- iii) task work orders and revised work release documents.⁴⁰

Often communications will be verbal. Verbal communications, which are directives as a result of decisions for corrective actions, usually affect costs, schedules, technical performances or scopes of work and should be well documented to maintain a record of project decisions and directives.

8.6 *Project Termination*

Projects, by definition, are to have a beginning -- and an END. This is also true of specific project activities. Terminating a project (or even specific activities) is not easy.* For example, an ending may mean that the manager is putting himself and/or others out of a job -- or out of part-time job that has been a very important aspect of their work for the life of the project. As a result, projects (or specific activities) tend to linger, which results in unnecessary costs, thus reducing overall efficiency and effectiveness. On the other hand, it is often necessary to extend projects (or activities) beyond their intended time span to ensure that the intended purposes are carried out. Activity managers must advise the project manager about activity termination and the project manager must advise the project executive about project termination as well as follow-up recommendations, actions and decisions.

Normal project termination can take place in one of several ways:

1. *Final termination* -- when a project is complete in itself and all project activity ends. Often the investment (such as a road or school or power line) is turned over for routine operations or maintenance to an operating Ministry or Agency;
2. *Termination into a new programme* -- when a project is intended as a pilot for a new programme and must be successfully transferred after the start-up of operations, such as a new factory or production unit or service centre;
3. *Termination into a follow-up project* -- when a project is experimental or is a demonstration project and leads to a second phase in which the expanded project does not have programme or operations status; and
4. *Termination into an existing programme* -- when a project is part of the expansion of an existing programme not the creation of new capabilities, such as, a school or health centre and results in expanded capacities under routine programmes.

*See Module 43 - Project Termination for a description of the steps involved in terminating a project and divesting project resources.

DO NOT DUPLICATE WITHOUT PERMISSION

The above types of project terminations are all successful terminations in which the project moves toward its intended end. The differences between the types of normal termination are primarily those which concern the organizational transfers necessary at the completion of the project, i.e., the transfer to a new organization, to an existing organization, to routine present activities, to new operational capabilities and capacities, and so on.

Project termination may sometimes be abnormal, e.g., project abortion, early termination, late termination, modified termination. Generally, the project manager must know those conditions which may have an effect on planned project termination and which may lead to an abnormal or early termination. A manager must also be able to advise on the possibility of requiring extension before project termination. The manager is responsible to see that the project executives are well-informed on all factors affecting possible project termination.

The project manager is generally responsible for ensuring that the project terminates within specific terms of reference, dependent upon the directives of the project executives. The project manager must generally perform the following managerial functions:

- i) plan for the divestment of project resources;
- ii) obtain a close-out plan for all project components;
- iii) ensure that all plans and schedules comply with project arrangements;
- iv) assist in determining that all contractual responsibilities and work authorizations are complete and documented;
- v) ensure that all project activities are closed out in a satisfactory manner;
- vi) ensure that all required steps are taken for the turnover of the project outputs;
- vii) communicate approved completion of activities and responsibilities to relevant organizational units;
- viii) monitor final financing transactions and legal closing of the project;

- ix) facilitate final project evaluations; and
- x) submit final management reports.⁴¹

The divestment of project resources provides a good example of the importance of sound management for project termination. The life of a project is often much shorter than the depreciation life, and certainly much less than the useful life, of much equipment used on projects -- from typewriters to heavy machinery. It is important that these pieces of equipment are re-deployed for useful development purposes in light of the resource constraints in developing nations. Too often they are left carelessly to an undetermined fate.

Human resources, in terms of personnel with relevant project experience and expertise, should also be divested from a project in such a way that they are professionally advanced (if their competence has been proved). From a national development perspective, their following assignments should build upon their experiences from this project. Although the project manager may not have been the person given specific responsibilities in relation to the staff re-assignment or divestment of other resources, the manager should assume responsibility for these to the greatest extent possible for the sake of the project, for the sake of the contributing organizations, for the sake of the staff and for the sake of the nation.

The effective divestment of project resources is only one indicator of the effective termination of a project which is generally given low priority. Within the context of national development, this should be a more important consideration and the project manager can be instrumental in ensuring that the project is terminated systematically and purposefully.

IX. PROJECT DECISION-MAKING

9.1 *The Importance of Responsible Decision-making*

Once a project is set in motion, the project manager must be able to monitor all project activities and assess the project's progress as a whole. Problems and opportunities are identified from the monitoring and analysis so that appropriate directive action will be initiated. Problem-solving begins with the identification of problems and the project manager needs to be able to identify most problems before they occur so as to avoid or minimize their effects. Opportunities must also be identified early as they tend to be very brief or limited and advantage must be taken before they are lost.

Projects are usually tightly planned and often dependent upon resources which must be released from other organizations. Projects do not have any "redundant" resources. Redundancy refers to an excess or superfluity of something. It is often said of development projects that they "usually have only one of something -- and sometimes even that is missing." Therefore, careful monitoring for efficient use of all project resources is critical. Because there is no over-capacity on projects, it is difficult for projects to cope with sudden changes, unforeseen contingencies and crises. This makes decision-making on projects much more critical than in ongoing organizations and increases the need for early problem identification so they can be managed before they become too critical.

9.2 *The Scope of Project Decisions*

Project decision-making and corrective actions can be categorized in three major areas -- *resource management, organizational management, and performance management*. A continuous process throughout the life of the project is required to avoid panic-like responses occasioned by sudden awareness of problems. The project manager must constantly and/or periodically:

- (a) determine the work actually accomplished, on the total project current and anticipated results, and resources (time, labour, money) expended;
- (b) compare the project status to plans for schedules, cost, and project outputs and specifications;
- (c) identify and analyze variances and opportunities and impacts on the future activities and directions of the project; and

- (d) develop and initiate corrective actions to maintain control of the project.

Project decisions may involve a change of course for those activities that have caused or appear likely to cause problems, e.g., undesirable costs, schedule changes or technical deviations. Decision-making may involve; for example, the following:

- i) replanning to recover or revise the schedule or the project budget;
- ii) initiating efforts to correct technical difficulties;
- iii) re-allocating budgets (money, equipment or manpower) as required for corrective actions;
- iv) alleviating some unavoidable/undesirable results by calling upon the project executives to make revisions in project objectives;
- v) negotiating changes in the project work and activities, negotiating new schedules, prices or funds, or seek new opportunities; and so on.

The project manager can be compared to the pilot-(or a plane or ship) who continuously monitors the progress of the project. Through the direction and evaluation system, he watches for indications of present or future difficulty and communicates to the appropriate functional specialists to activate changes in plans or actions to ensure that the objectives will be achieved. The manager must, in turn, then monitor the corrective actions to be certain they have been received, understood, acted upon and that they do achieve the desired results.⁴³

9.3 *Reports for decision-making*

To facilitate decision-making, it is important that the information system results in properly analytical reports for decision-making which include:

- (a) proper summarization for the specific purpose at hand;
- (b) comparisons with previous ratios as indicators of performance;
- (c) comparisons with previous reports by showing trends;

- (d) selective reporting of relevant information, but not so limited as to avoid dealing with substantive issues;
- (e) graphic and visual displays for ease of understanding; and
- (f) alternative recommendations and opportunities as well as analysis of past performances.⁴⁴

Projects reports, however, are often less effective than they could be for the following reasons:

- (a) they are poorly designed, too detailed, too sketchy, or too difficult to understand;
- (b) they have numerical tabular reports from which it is difficult to identify significant points of change or trends;
- (c) they are written in too much technical detail regarding the previous period immediate to the project with too little consideration to trends, current problems, or future problems and issues;
- (d) they focus too much on satisfactory results rather than analysis of problems; and
- (e) they are too problem-oriented and seldom identify opportunities which are important aspects of corrective actions.⁴⁵

The types of analysis of project data which should be included in project reports is represented by the following list:

- i) Activity Status Schedule Reports, varied by expected and latest allowed dates;
- ii) Project Schedule Reports with critical paths identified and remaining activity float times with departments and expected dates/latest allowable dates highlighted;
- iii) Function Bar Charts;
- iv) Milestone Status Report;
- v) Financial Plan and Status Report;

- vi) Organization Status Report;
- vii) Manpower Loading Report;
- viii) Cost Categories Report;
- ix) Project Outlook;
- x) Time and Cost Projections; and
- xi) Time, Manpower, Performance Projections.

An example of the content of *project progress reports* is contained in a suggested outline for "monthly" project progress reports from the project manager to the project executives:

- A. Summary status -- brief paragraph highlighting current status of the project;
- B. Red flag items -- previous and new red flag or problem items, corrective actions taken already, with prediction on resolution or recommendations for further action required;
- C. Items for Executive Decision -- review of any items requiring the attention of project executive and analysis of issues on alternatives for solution;
- D. Project manpower plan -- showing use of key resources and any limits on resources which may affect plans or require special attention to recruitment or co-ordination;
- E. Major achievements and future schedule -- describing actual accomplishments during current report period and significant implications for changes in future schedules;
- F. Project cost performance -- commenting on current project cost situations with reference to current cost performance trends and forecasts;
- G. Reference to past directives -- commenting on performance related to directives or action assignments as a result of decisions for corrective actions on problems from former reporting periods;
- H. Current and future problem areas -- stating major problems, alternative actions to be considered, possible implications and impact on the project, and recommendations as appropriate;

- I. Exhibits -- attachments of various exhibits relevant to the report or any section, such as a summary Master Schedule (with trends analysis), Project Cost Performances Reports and Charts, Detailed Activity Schedules, etc.46

When decision-making is done, either by the project manager, by activity managers (and reviewed by the project manager), it is necessary that the project manager see that there is a definition and record of each decision, specifying:

- (a) *what the problem is;*
- (b) *how it is to be solved;*
- (c) *who has the responsibility for the action;*
- (d) *who will contribute to the actions; and*
- (e) *when the action is scheduled to begin and end.*

9.4 Management of Project Resources

The project manager's attention must be drawn to the efficient use of project resources. The inability to effectively manage and co-ordinate the resources on a project is a common problem on many projects, resulting in delays, underachievements, penalties and other undesirable effects. Resource management problems can take several forms. Cost and time overruns often result from the lack of adequate consideration to resource needs for timely project execution. Over-commitment by the parent and supporting organizations with respect to the resources actually available to do projects while maintaining routine operations, is common. Resources are often not combined or co-ordinated into a schedule to effectively use them for project accomplishments. Again, project resources may not be adequately flexible for overall project use.

Planning and control must be integrated, especially as project schedules change over time. Project resources must be adapted to the realities of planning and replanning required for development projects. This is true of all resources, and most particularly human resources, in the face of limited professional and technical expertise necessary to carry out projects.

The management of project resources including Time, Money, People, Facilities, Equipment and Materials and Supplies, is based upon the planning

and control and direction steps described in Chapter 8 and involves:

- (a) estimating and forecasting resource requirements by functional areas and activities of the project, as in the use of Activity Sheets, Master Schedules, and Resource Plans (Manpower, Financial and Physical Resources);
- (b) acquiring, providing and allocating needed resources in a timely and efficient manner to be co-ordinated for use on project activity as outlined in Manpower Agreements, Technical Assistance Plans, Contracts, Procurement Plans and Procedures, Drawdowns and Reimbursements, etc.;
- (c) monitoring and controlling the use of project resources for their prescribed purposes and within their assigned performance standards;
- (d) analyzing the performance on the project to detect significant variations or deviations as well as opportunities which require replanning or rescheduling; and
- (e) initiating corrective actions through communication and directives.⁴⁷

Time cannot, however, be managed like the other project resources, People, Facilities, Money, Equipment, Materials and Supplies. For example, in cases of deviations from plans, it is usually possible to replan for the use of other resources or substitutes as they are not "used up", unless actually consumed in another activity. Time, however, is less static. Time flows at a constant rate. If it is not used as planned, it cannot be recovered. Time cannot be stored, accumulated or divided for later uses. Time interrelates all the other project resources into a project plan. It is the foundation for identifying progress indicators and measuring progress. Time provides the basic for combining all aspects of the project into integrated measures of progress and trends necessary for decision-making.

The project manager is responsible to see that the decisions regarding the "technical formulae" are proper and functional, i.e., that the project inputs (people, materials, supplies, equipment and facilities) actually produce the project outputs at the designated target levels. Problems which limit the productive processes for the project include:

limited production capacity for the targets established;

- (b) shortage of space or facilities;
- (c) shortage of key personnel;
- (d) shortage of materials;
- (e) poor management in resource efficiency; and
- (f) inappropriate resources.⁴⁸

The project manager must determine if the project has the capacity and the capability to carry out its assignment. Therefore, it is important to have a work breakdown to know which resources are required to produce specific sets of project intermediate and final outputs.* For example, how many person hours of which technical specialists, combined with what physical resources, would be necessary to complete particular segments of the infrastructure, the training, the construction, or other aspects of project outputs. The area of decision-making regarding resource management involves technical as well as management problems and represents some of the major difficulties faced in project implementation.

9.5 Management of Project Finance

Cost is a special sort of resource. Although money can be simply described, cost is a more complex concept. All physical resources and human resources can be assigned a *value*. The sum values of these resources must be equal to the total support available to the project. Money, along with personnel, is a key indicator of project support. Usually, the project funds are limited to specified uses. All project resources, even if donated or paid for by the donor organization, represent value and have a cost.

Financial management involves an understanding of resource costing and the practice of controlling of funds in relation to specified uses. Physical resources may be rather static (a bag of cement is a bag of cement now or in the future and one man-day of an engineer, is one man-day now or in the future), but values of the physical resources, and values of money, change over time. To make project management decisions, the project manager must understand the dynamics of *costs* and *time* as related to physical and human resources.

*See Module 3 - Work Breakdown Structure

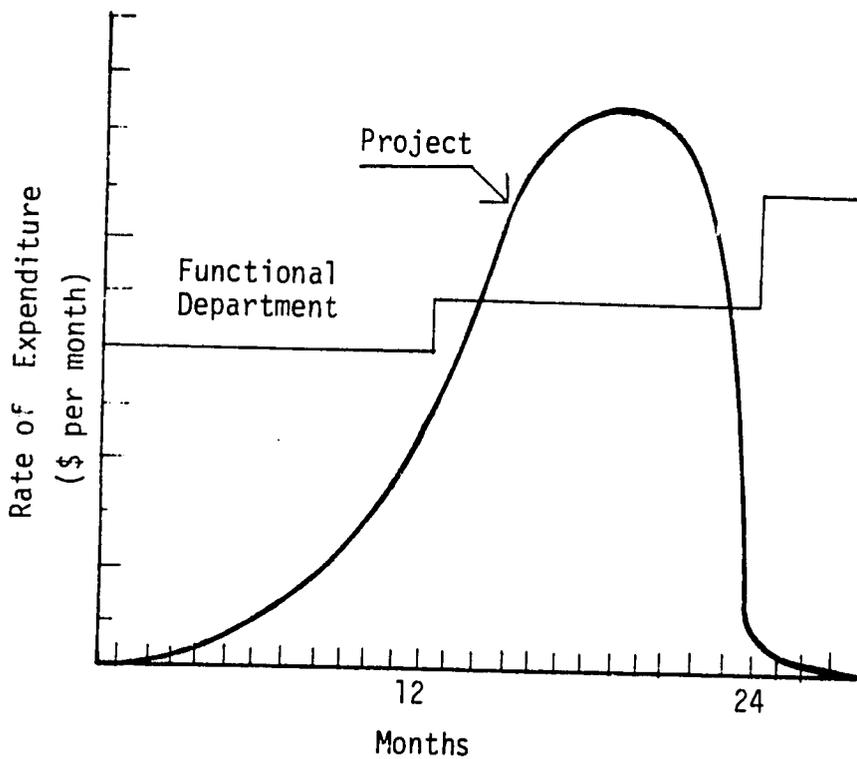
Management of project costs begins with financial control documentation. Project cost control, like schedule controls, is based upon the activities or "work packages" which fall under the responsibility of the functional or activity managers. The project manager is basically responsible for monitoring of activity costs, and summarizing and forecasting project costs to identify significant variances between actual expenditures and approved budgets. The manager will also be responsible for deciding, or initiating decisions, on corrective actions so that final total project costs are contained to acceptable levels. Cost control consists of:

- i) establishing project budgets;
- ii) establishing activity-level budgets;
- iii) ensuring that project funds are appropriately released;
- iv) ensuring that expenditures are proper;
- v) ensuring that all reimbursements are concluded; and
- vi) taking appropriate controlling actions where deviations exist.⁴⁹

The manager needs periodic reports (weekly or monthly) to summarize direct costs by activity and category, e.g., labour, supplies, equipment, etc. Monthly performances against monthly plans, broken down on the activity level if necessary, can show exactly where the deviations occur and identify cost trends, problems and decision points.

Monitoring costs is usually the responsibility of a project controller and/or project accountant (perhaps on part-time assignments). Organizational financial control is based upon typical functional departments handling repetitive work on an ongoing basis, so expenditures are basically steady-state in nature. Project expenditures, in contrast are more dynamic. The comparison is shown in Figure 14.50

FIGURE 14: COMPARISON OF RATES OF EXPENDITURE FOR PROJECTS AND DEPARTMENTS



The manager must ensure that the specialized financial and accounting information systems are established so that the management has the necessary financial data isolated for analysis. Basic procedures must be established to integrate the project with the accounting systems of the parent organizations, to establish account numbers for the project and for the separate sub-accounts as necessary.

At any point in the project, it may be necessary not only to know actual expenditures, but also any outstanding commitments not yet booked so that total project costs can be forecasted as early as possible. Failure to record and control cost commitments is a frequent cause of cost overruns. Problem areas may appear too late to control. Late charges and other forms of penalties represent trouble spots. It may be impossible to avoid all such penalties because of the changes in schedules which haunt all projects. It is important, however, to attempt to contain these within the contingency allowances for the project.

An important concept in cost control information is "*cost to complete*". All reports involving activities in progress or incomplete activities should forecast completion cost for subsequent reporting periods (months or quarters).

Activity level reports should have the following basic components to assist in accurate cost reporting and forecasting:

- (a) progress and costs to date on sub-activity tasks, noting completed tasks and work accomplished on tasks in progress;
- (b) estimations of remaining work, including time to complete tasks in progress and any future tasks not initiated along with any information for replanning or re-estimation on those tasks;
- (c) time remaining to complete each activity and projected cost of completion along with a comparison of the initial or most recently reported plans or estimates; and
- (d) impacts of any other key factors or activities on task or activity completion and recommendations for managerial attention to any significant points of deviation or opportunities to be explored. 51

In-reporting, there needs to be emphasis on percent complete and percent remaining to complete for all activities. This provides management with costs reviews past performance and estimates for future performance.

To facilitate project cost decisions, sophisticated sets of criteria have been developed. Most cost decisions involve cost comparisons over a time horizon. Dimensions of priorities, impact implications (e.g., benefits and trade-offs) can also be evaluated.⁵²

A most common basis for many cost decisions, especially additional investments or shifts of finances, is *urgency*. Urgency may, in situations of genuine emergency, be a suitable and sufficient justification for a decision. In general, however, there is a problem in deciding when real emergency exists and in ranking various emergencies in terms of their relative urgency. Use of Urgency as a basis for decision-making is often abused. This happens when it is used to argue for a series of ad hoc decisions or to support opinions and preferences which may be lacking in quantifiable or objective analysis. Authority may be granted for emergency decisions on expenditures up to a suitable maximum limit at various project levels, such as to activity managers and to project managers. Such authority usually requires subsequent review by higher project management to see that they conform to acceptable decision criteria and purposes.

When the benefits as well as costs from an investment can be calculated, a broad range of financial decision criteria may be used. Perhaps the simplest measure is that involving relative costs with an eye to *minimizing costs* while still maintaining a tolerable performance. Such simple cost comparison can be also applied in the sense of *maximizing benefits*, (returns or impacts) of definitely limited expenditures. This is most appropriate when the range of impacts or benefits for each of the range of cost and investment choices can be adequately quantified and are comparable.

Another frequently applied criteria is *recoupment period*. This refers to time required for payback of investments and identifies how soon can the costs be recovered either from the benefits to be accrued or from other sources. This criteria unfortunately, is biased toward the first few periods of returns, rather than a longer range view and tends to favour minimal or incremental investments.

Most sophisticated financial decision-making tools include some form of a *benefit-cost ratio* to compare cost alternatives with similar or comparable outputs.* Usually, *discounting* is used to reflect the value of money over time.**

*See Module 19 - Financial Analysis

** See Module 21 - Discounting

Present value decision criteria use the tool of cost discounting to determine the present worth of the alternatives with a view to maximizing the value. There are also accounting rates of return and other decision-making tools which can be adapted to such considerations as taxes and depreciation. *Internal rates of return* on projects and on decision within projects have been highly developed, and have the advantage of not assuming a cost of the capital as would be required for those criteria involving present value.**

This is no single criteria which can be applied in isolation as the best way to make cost decisions. Managerial judgement may require multiple analyses and criteria comparison as well as some less formal data and analysis to arrive at a decision. In general, however, there are only several alternative principles which are the foundation for financial decision-making.

- (a) The "*Bigger the Better*" principle which assumes that all things being equal, it is better to have the larger returns than the smaller returns from any cost.
- (b) The "*Bird in the Hand*" principle which assumes if other things are equal, early benefits are preferable to later benefits.
- (c) The "*Trade-off*" principle which assumes that all things being equal, it is better to have a balance which will move to an achievement of the multiple objectives in competing objectives rather than to maximize a single objective.
- (d) The "*One Thing at a Time*" principle which assumes all things being equal, it is best to achieve a priority objective to the exclusion of others.
- (e) The "*Squeaking Wheel*" principle which assumes that all things being equal, it is better to invest where conflicts can be minimized or to select the least controversial alternative.

In general managerial practice, many managers subconsciously will make decisions on one or several of these general principles, depending on their own personal styles and preferences. 53

*See Module 22 - Net Present Worth Analysis

**See Module 25 - Internal Rate of Return

The basis for incorporating time into the calculations of alternative costs arise because it is known that money has the power to generate additional money over time at varying rates of interest. This value of capital, varies between different investment alternatives. It is important that any investment justifies itself financially, economically and/or socially. Internal rates of return have been made sophisticated through application of shadow or border prices (economic values on basic economic commodities such as labour and capital) to permit even more refined analysis of investment alternatives. (SEE MODULE 27 - ECONOMIC ANALYSIS OF PROJECTS).

In some instances, it is possible to accelerate the performance on certain activities by an increased input of resources, which may mean increased costs. But there is a cost-time trade-off as illustrated below.⁵⁴

Cost-time balancing requires the selection of that schedule of time and costs which provides the best balance of optimum achievement for an activity. This is best illustrated where there is a direct relationship between the cost and the time required for completion, as seen in Figure 15. Assigning additional personnel or scheduling overtime, normally reduces the time requirements for an activity, but increases the costs. *Normal cost* is defined as the *minimum direct cost* for a activity and normal time is the associated direct time. *Crash time* is the *minimum possible time*, with crash cost being the associated direct cost. The manager's choice is between minimizing time or minimizing costs.⁵⁴

As an example, an activity normally requiring six weeks at a cost of \$3,000 might be expedited so that it is completed in two weeks, but would involve increased costs up to \$7,000 because of hired labour and equipment. Two weeks at \$7,000 represents the crash time while six weeks at \$3,000 represents the normal cost. The line connecting these points shows the range of alternatives from which the manager can decide.

It is, of course, not quite so simple as the straight line of Figure 15 suggests. Every activity has both *direct costs* and *indirect costs*. Direct costs refer to those which are immediately credited to the activity. Indirect costs can be characterized by the operating costs of the overall project, such as administrative overheads, storage support services, etc. As activities are expedited or moved toward the crash time, direct costs are higher. As activities are moved toward their normal cost, the proportion of indirect costs are higher. This is illustrated in Figure 16. The consequence is shown by a curve representing the impact of both direct and indirect costs on *total* project costs. This shows that the cost-time trade-off is optimized somewhere between the two extremes.

FIGURE 15: COST-TIME RELATIONSHIP FOR AN ACTIVITY

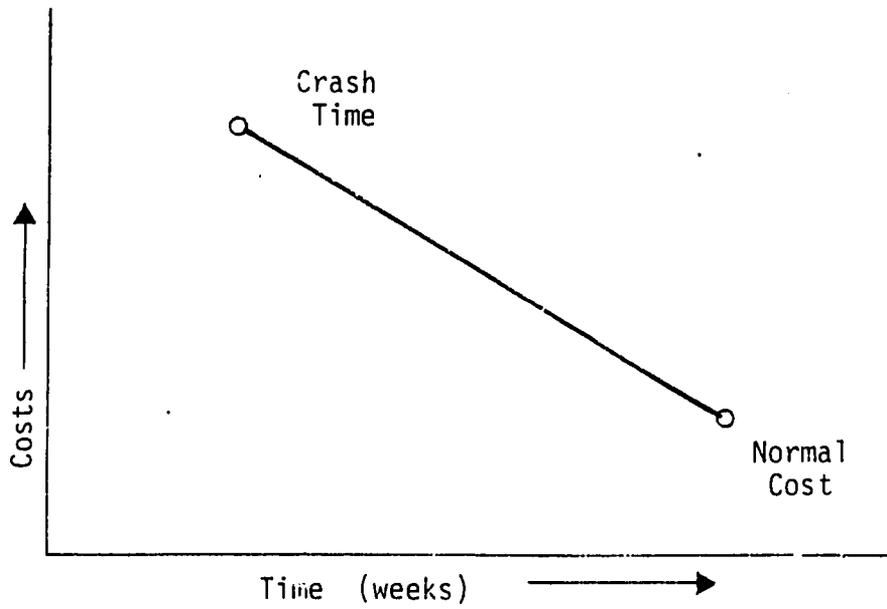
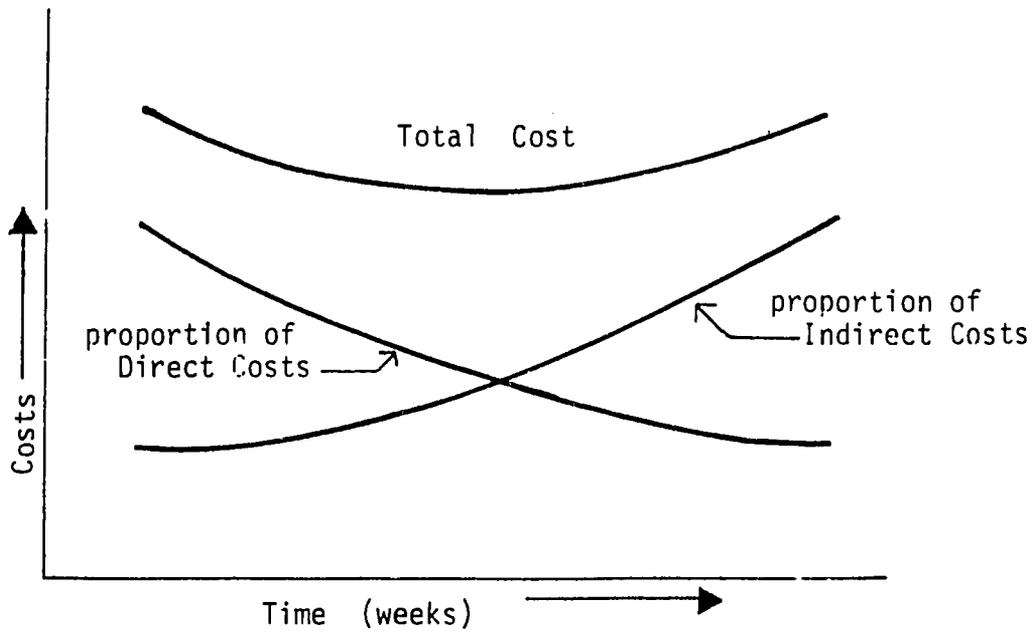


FIGURE 16: COST-TIME IMPACTS ON TOTAL PROJECT



To accelerate an activity, the increased costs would have to be justified in terms of savings or maintained limits on other activities or the project as a whole. Though there may be a direct relationship between manpower and costs (as illustrated in Figure 15), there may not be a direct relation with other inputs such as materials and supplies. Expediting a job too quickly can be costly, yet extending a job over time to reduce certain direct costs can also result in high total costs because of the increased impact of indirect costs such as administrative overhead, storage, and so on. It is possible to attain a suitable balance between the crash time and the normal cost point, so that total project costs are optimized. The extent to which this can be done within a project is also dependent upon all related project activities. Decisions on single activities cannot be considered in isolation from their place within total project schedules and plans.

9.6 Management of Project Performance

Performance management relates to schedule analysis, cost analysis, manpower analysis and work analysis and gives a summary value-of-work analysis of the progress and performance on the total project.*

Management of project performance involves:

- (a) the monitoring of actual project progress in terms of use of inputs and production of outputs against the project plans;
- (b) identifying significant deviations;
- (c) analyzing problems;
- (d) proposing solutions;
- (e) making management decisions to initiate corrective actions;
- (f) planning the corrective actions;
- (g) communicating these to the appropriate project units; and
- (h) monitoring the performance on the corrective activities.

*See Module 42 - Evaluating and Forecasting Project Progress and Performance.

Performance management is based upon systematic reporting which summarizes project experience and data at various project levels and directs the analyses to appropriate decision-making points. Although the reporting system is most concerned with identifiably *controllable* elements of the project, there is also a need to include data or observations on the *uncontrollable* elements or factors of the project (such as price levels or economic and social conditions). Judgements about the future directions of the project must relate both elements.

Performance management is basic to the Management by Exception approach. Performance reports should draw attention to situations and operations that deviate from plans or normal conditions and that call for managerial action and decision.* Because the manager's time is quite limited and valuable, it is best focused on deviations requiring corrective action rather than reviewing routine, satisfactory operations and performances. This does not mean that satisfactory results are not important and should not be reviewed and evaluated. Rewards for satisfactory performance should be a normal aspect for the motivation and incentive of project personnel.

Management of Project Performance uses the Master Schedule and Milestone events or progress indicators as a primary tool and basis for analysis.** A Milestone Status Chart is used by the project manager to record project milestones and their status. It is also necessary to examine project performance in terms of meeting "*specifications*" for various project outputs. Specifications identify the characteristics of outputs and usually have a degree of tolerance, e.g., water supply must be able to sustain a basic output per minute or students must achieve a minimum level of skill and knowledge, and so on. Specifications are very important. They often determine the impact of the project beyond the immediate output, for example, the extent to which trained persons can be used to perform their jobs competently without supervision or further instruction, or to which a road or bridge, can conduct a prescribed flow of traffic over a period of time, and so on.

Management must be able to review all project operations. Their special energies should be drawn to deviations from plans. This is possible only when a good project foundation has been laid by proper implementation planning and again illustrates the importance of this preliminary step of project execution.

*See Module 41 - Design of a Project Management Control System

**See Module 7 - Project Scheduling - Bar Charts

" " 8 - Bar Charting for Project Control/Scheduling

" " 10 - Milestones Description Charts.

9.7 Management of the Project Organization and Environment

The major aspects of managing the project organization and environment have been discussed as a background to Matrix Management. Implementation planning focuses upon structuring the project so that the manager could effectively co-ordinate and integrate the project organization to maintain project control. The project manager is responsible for monitoring all points of interaction between the various components and elements of the project. *Interface management* involves managing those points of interaction to the project environment (*external interface or linkages*) and those within the project structure (*internal interface or linkages*). Organizational interface management consists of identifying, documenting, scheduling, communicating and monitoring all linkages necessary for project performance.

External interfaces are the basic linkages the project has with the organizations of the environment which include:⁵⁵

- (1) functional linkages which include suppliers of inputs and beneficiaries of project outputs;
- (2) enabling linkages which provide the authoritative foundations for the project;
- (3) normative linkages which include relations with overlapping or competitive organizations and interest groups which can have an impact upon the overall impact of the project; and
- (4) diffused linkages which have limited but potentially effective influence over the impact of the project, such as the media and voluntary or non-organized community groupings.*

An example of external interface management is seen in the monitoring of relationships with prominent suppliers to ensure that procurements will be according to schedule or to arrange re-scheduling and replanning to maintain the supply relationships (or replace them with more appropriate linkages, if necessary). The relationships with the beneficiaries of a project is another important interface to ensure that the project outputs are appropriate, accepted and used for the intended purposes. Another interface is with the media which can play a very influential role in the perceptions of the project in the public.

*See Module 32 - Project Institutional Environmental Analysis.

Internal interface management refers to the responsibilities of integrating, co-ordinating and controlling all points of interaction within the project structures and between project activities.⁵⁵ For example, two activities may be sequential and dependent -- there is a point of interaction. Internal interface management refers to the responsibility of the project manager to assign the tasks, and to relay the information so as to ensure a smooth transfer of energy from one activity to the next on a timely basis. The manager must communicate and adjust schedules as necessary so that linkages and interfaces are maintained.

Within the project, a variety of internal interface management areas can be easily identified, including the following:⁵⁶

- (a) *Performance interfaces* which exist between different sub-systems of the project and must be managed to ensure that the interaction takes place to support total project performance, e.g., that infrastructural works are completed in time for construction and installation of equipment.
- (b) *Physical interfaces* which link different components of the projects and which must be managed to ensure appropriateness or technical fit, such as appropriate equipment to match the professional capacity and technical staff capabilities, or doorway openings sized to match the equipment which must be passed through the openings.
- (c) *Responsibility interfaces* which is when one activity is completed and responsibility for further work is transferred to a subsequent activity manager and which must be managed to ensure timely project completion and smooth work transitions.
- (d) *Management interfaces* which exist where important management actions, decisions, approvals, and other management activities will have an impact on the project performance, such as funding cuts or increments, design changes, projected unsatisfactory performances, etc.
- (e) *Beneficiary interfaces* which ensure that the target populations will actually endorse the project and are properly involved to ensure that project outputs will be utilized and accepted.
- (f) *Information interfaces* where information related to one project component or element is relevant to another and must be transmitted effectively and on time to ensure project performance.

- (g) *External information interfaces* which form the linkages of the project to its diverse environment and ensure that the project support is maintained as a foundation for project execution.
- (h) *Material interfaces* which ensure that physical items are available at the particular times and places for tasks to be accomplished within planned schedules.
- (i) *Technological interfaces* which ensure that all technologies on the project are consistent and can be matched to perform the assigned work.

The project manager must have some system to identify, co-ordinate and integrate these linkage and interface events. One such way is to identify the major interface or linkage events and relationships on an *Interface Co-ordination Chart*. This can be done for both the internal and external interfaces. The *Interface Co-ordination Chart* should be coded and time-scheduled to ensure that the manager pays attention to the management and maintenance of priority interface items, events and relationships. For events, expected and latest allowable dates would be identified along with identification of affected organizations. For relationships, important meetings should be highlighted on the chart along with identification of points of responsibility for specific project personnel in relation to that linkage or interface. The linkage or *Interface Co-ordination Chart* should be integrated into the project manager's schedule.

9.8 *Forecasts and Trend Analysis on Projects*

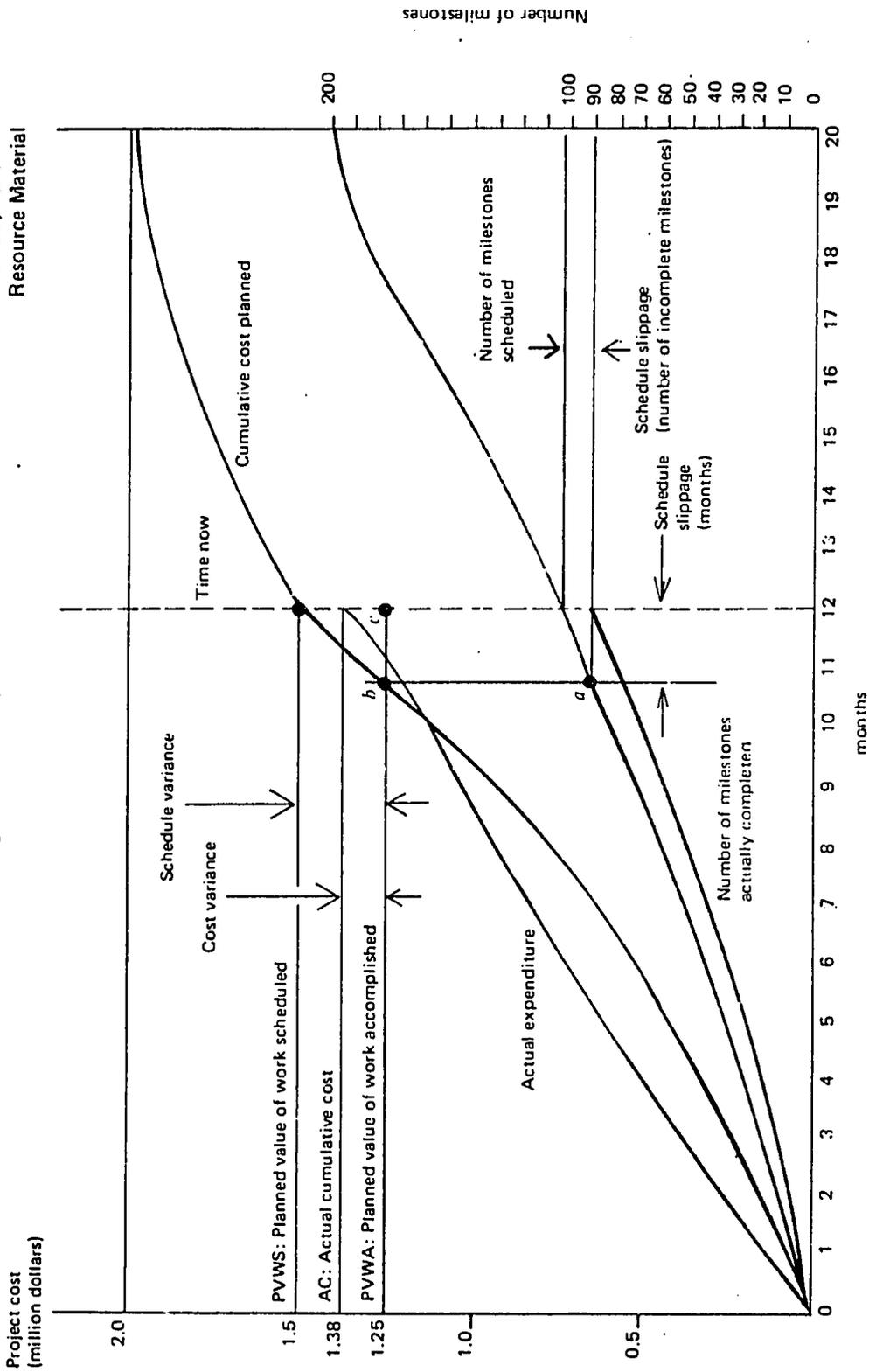
Trend analysis involves a forecast of project performance based on actual work data up to a specific time. Several dimensions of management can be integrated or isolated, e.g., costs, work performance, time, etc. Schedule trend chart, based upon the project plans and actual progress, give quick views of the history of a project, its actual performance and its planned performance. Charts can highlight the gaps in performance to facilitate analysis of trends. Causes must then be identified, as well as alternative corrective actions.

An analysis of the value-of-work completed against the planned value-of-work, correlating schedule and cost information, can be used to judge present performance and to make forecasts for the performance of the total project. The method involves the calculation of a value-of-work index and permits the comparison of actual cost incurred with the accumulated planned value-of-work completed. Although there are difficulties in the application of such indexes, they are useful for project administrators to get an overall

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Figure 4: Value-of-work chart



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view of the performance and implications (cost and schedule) of deviations from plans.*

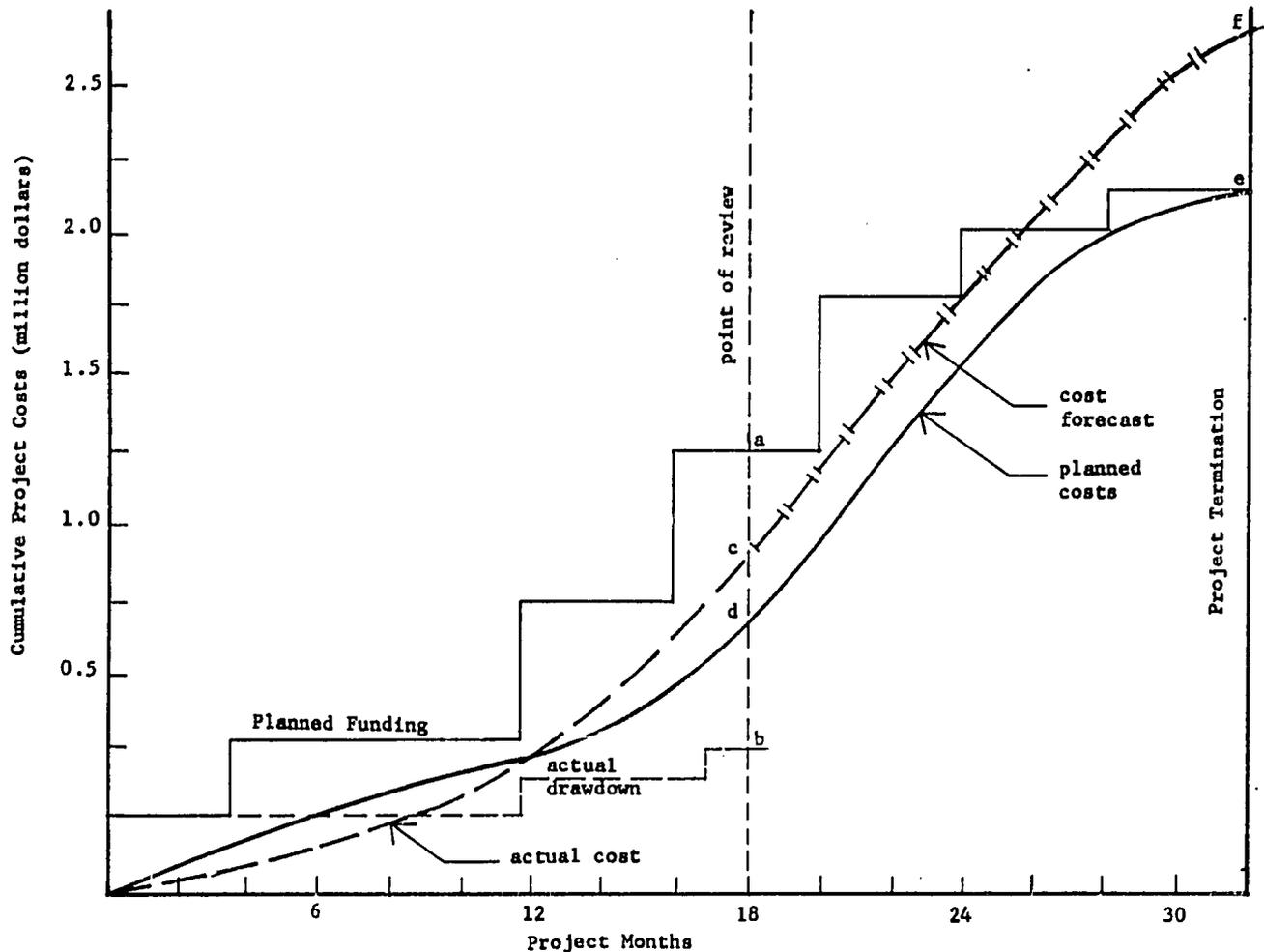
Figure 17 is an illustration of a schedule trend chart.⁵⁷ The project time is on the horizontal axis of the chart, and key indicators of project progress are identified on the vertical axis. The slippage of the project is shown in the performance gap of milestones.

The integration of performance, resource information, as seen in value-of-work analysis assists the project manager in correlating schedule and cost information for evaluation and forecast of project performance. As seen in Figure 17, planned and actual cost trends can be shown parallel to planned and actual work trends. As the project progresses and different activities are completed, they are credited by the achievement of project milestones. By comparing the actual cost incurred with the accumulated work accomplished and the planned value of that work, it is possible to have a relative measure of the efficiency of the work in comparison to the planned efficiency. A status index is used to forecast the cost and time overruns. The project manager can then initiate corrective actions at an early date, such as initiating requests for additional funds, reducing the scope of some activities, and so on.* Specific charts could be constructed for each major component of the project to identify where specific problems lie.

Similar charts can be constructed, for example, to facilitate detailed cost analysis. It is possible to graphically display performances with other resources, such as manpower, equipment use, or any other resource for which commensurate quantifiable data can be generated. Cost-trend analysis is a history of costs in comparison to planned cost schedules, and approved budgets. A master financial plan, for example, can be made into a graphic presentation showing planned dates of drawdowns and expenditures. As the project progresses, curves can be drawn to show funding received to date, and funding requirements remaining. This is particularly useful, given the nagging problems of delayed drawdowns and unused allocations on many projects. (See Figure 18).

*See Module 42 - Evaluating and Forecasting Project Progress and Performance for an explanation of several value-of-work indices and graphic displays of project performance.

FIGURE 18: DISPLAY OF FINANCIAL PLANS AND PERFORMANCE



Assuming that (1) the project is on schedule, i.e., that 18 months of planned work have been completed in time for the 18-month review, and (2) that an initial project fund of \$250,000 was established, several problems are readily from the financial picture in this figure.

- (i) The performance gap from *a* to *b* represents a cost overrun on work performed to present.
- (ii) The performance gap from *c* to *d* represents the forecast overrun for end of project based upon performance to present.
- (iii) The performance gap from *e* to *f* represents a deficiency of expected inflows of foreign exchange to the national budget.

If the first assumption is not valid and there is work slippage as well, the problems are compounded. Cost overruns will be higher because the "actual Cost" curve reflects less than the planned amount of work.

It must be noted that there are both advantages and disadvantages to trends analysis, associated indices, and forecasting performance. These should be used with a conscious awareness of both their strengths and weaknesses. Properly designed and displayed graphic presentations, however, are effective because:

- i) large amounts of complex information can be presented in easily understood form;
- ii) changes in rates for progress and or expenditure are easily identified;
- iii) different kinds of information can be presented simultaneously for integrated analysis, e.g., schedule, cost, manpower, etc.; and
- iv) original plans, past performance and future predictions are easily shown and compared.

However, such displays require effort to design, prepare and maintain and often are not updated. Also displays of information at too gross or abstract a level may mislead decision-makers by hiding certain types of problems. Displays are excellent public relations and staff briefing instruments as well as decision aids. They can be used effectively in the carrying out of a number of the managerial functions.⁵⁸

When graphic displays are used, there should be a written narrative report or explanation, giving a brief summary of project status, present and potential problems, record of corrective alternatives and actions and a short analysis of tasks to be controlled in the completion of the project. In analyzing problems on the project management level or facilitating analysis at the project executive level, the manager should attempt to promote rational decision-making by the types and presentations of information forwarded for decision-making. Special attention should be paid to reporting formats and data presentation as this invariably influences the context and content of the decisions.

9.9. Project Review and Decision-making Meetings

Meetings are important for carrying out the responsibilities of a project manager. Project managers must conduct regular, periodic meetings for project review, analysis and decision-making. In addition, special meetings may be conducted at any of the three basic project levels -- the activity level, the project level and the project executive level. At all levels, the manager must be effective in both scheduled and impromptu meetings. The manager must know how to organize and prepare for meetings

so that they are not non-functional or routine events. Whenever a meeting is conducted, its purpose should be clear. Meetings should be problem-solving, decision-making events which facilitate the progress of the project.*

Periodic project review meetings on a regular basis provide opportunities for key project staff to be confronted with the current, integrated analysis of the project's total progress against the plans and to review forecasts for the remainder of the project. Review meetings are basically designed to identify problems and opportunities and organized to respond to these appropriately.

In the meetings, the group should attempt to:

- (a) review previous action assignments to assure their timely completion;
- (b) review and verify new data and analysis;
- (c) expand the analysis to determine possible causes of significant deviations;
- (d) identify project opportunities not evident from the information or analysis which often remain hidden to higher level management (such as opportunities to accelerate schedules or reduce costs);
- (e) obtain real agreement regarding the problems (that they actually exist and require action) and the opportunities (that they are real and should be pursued); and
- (f) identify persons responsible for actions to resolve each of the problems or to follow up on opportunities (these assignments must be clearly recorded in the minutes).⁵⁹

Impromptue or specially called problem-solving meetings should be held as required and should be attended only by those persons directly assigned to or concerned with the problem. Project review meetings are not problem-solving meetings, but are the forum for arranging follow-up problem-solving meetings. Problem-solving meetings may also be arranged as the result of

*See Moduel 45 - Organizing and Conducting Conference Meetings.

crises or problems identified at any time and which need immediate or urgent attention. Problem-solving meetings supplement project review meetings, follow up on the activity assignments determined in the review meetings and handle crises matters between regular meetings. Problem-solving meetings should result in direct action assignments, carefully defined as to the problem, the solution, the responsibilities for various actions, schedules of activities, and implications for other project activities or units. The project manager is responsible to see that there is adequate follow-up on these meetings and that the responsibilities are properly communicated to all relevant persons to facilitate the corrective actions.

All meetings should be as brief as possible and should follow an *agenda* which the participants have had a chance to study, comment upon, and amend. *Minutes* should be kept of meetings. It is especially important to make a record of decisions, so that there is a clear understanding by all participants upon the details of any agreements. Action assignments and other information, such as deadlines and discussion notes, should be distributed quickly after the meeting.

The manner in which meetings are conducted is very important. Meetings can be a total waste of time and can contribute to low project morale or they can provide the opportunity to build project team spirit. If there tends to be too much time spent on specialized items or subjects of little interest to the staff, participation in the meetings will deteriorate. They will become less functional in relation to their intended purposes.

Project meetings, especially those involving all team members, permit opportunities for personal statements on specific areas of responsibility and progress as well as problems. If one person, such as the manager, dominates too much, other team members are likely to close off communication. Eventually, the team discussions turn into monologues and the manager has to discover problems and solutions alone -- an impossibility. The strength of the project team is lost if this happens. Ineffective conducting and use of project meetings is a frequent cause of project team breakdown. So, managers can use project meetings to generate a strong team spirit and a sense of commitment to the total project which can make the bonds of this temporary organization stronger.

9.10 *Establishing a Project Office*

The project manager is usually assigned an office, or at least, office space. Regardless of the amount of room available, it is to the advantage of the manager to consider the effective use of a project office as

a center of project operations. The project office can be used to:

- (a) provide a central clearing house of project information;
- (b) store project records and files;
- (c) provide a single location for display of relevant project information;
- (d) serve as a physical representation of the project, reminding all concerned persons of its existence, status, importance, etc.;
- (e) serve as a centralized meeting place for review or problem-solving meetings;
- (f) provide a central place for contact with the manager or project staff;
- (g) provide location for simultaneous displays of all aspects of the project; and so on.⁶⁰

To be used effectively, the project office should have facilities for records and files, wall displays, conference tables, work tables or desks, blackboard, telephone, and other equipment necessary for centralized project operations which will facilitate the work of project staff.

A project office will be properly used only if the project manager sets a personal example of its use and encourages the same of the project staff. This means that it is more than the personal office of the manager, but a facility resource for the total staff. To be useful, it must be maintained. For example, there should be wall displays (such as graphic presentation of schedules and progress or status charts (which make excellent public relations visuals) and so on, but these must be updated regularly to be useful, not just decorative. The project center can be a valuable project resource for direction, review, communication and control, if used properly. Good use of the project office is the responsibility of the project manager.

X. MANAGEMENT STYLES

10.1 *Management is what and how*

It can be said that, "project management is what project managers do". But some managers seem to do better than others. The difference can usually be attributed to a combination of the use of management tools and techniques and to a manager's style. With appropriate management tools, techniques and approaches, the project manager can build strong foundations for project management and can carry out project implementation through positive direction and control.

The major responsibilities of project management include:

- (a) ensuring detailed implementation planning;
- (b) communicating with and motivating project staff;
- (c) ensuring proper execution of project activities;
- (d) monitoring project performances;
- (e) ensuring prompt collection and analysis of project information;
- (f) facilitating actions to correct significant deviations from plans or potential opportunities; and
- (g) ensuring implementation of corrective actions.⁶¹

This is *what* a project manager does. Despite their titles, persons assigned to the position of project manager may not be managing their projects because they are unable to or do not carry out these responsibilities. It is necessary to examine not only *what* managers do, but also *how* they do it. Managers work with and through others. The project manager, just as any other manager, must rely on interpersonal relationships as well as formal authority to get work done. The manager's style of relating is very important. In the case of the projects, this is especially vital because the responsibility of the project manager is greater than the formal authority. The project manager must, therefore, rely heavily on other forms of authority besides the formal hierarchical organizational authority which is conferred.

The project manager may have or develop *expert authority*, *perceived* or *attributed authority* and/or *personal authority* as supplementary forms of authority to maintain leadership and control.⁶² The lack of formal authority makes *style* a major consideration of project management. Management styles and behaviours which alienate the project staff and support and cause the manager to lose control of project activities and resources. This erodes the limited formal authority that can be exercised and may cause project performance to deteriorate. A good project manager must consciously select not only *what* to do, but also *how* to do it. Style is as important to the manager as experience, expertise, discipline or formal authority.

10.2 Use of Managerial Power on Projects

Power refers to the capability to achieve one's goals. The project manager must have "power" to ensure that all the means necessary for doing the job can be mobilized and controlled. This power is analogous to authority. Some managers hold a great deal of organizational authority. But in most instances of matrix management, the manager is dependent upon the organizational authority of others to accomplish project work. The limited direct authority of the manager can be complemented by other types of authority. Other sources of authority besides position include experience, knowledge, resources, position, legal sanctions, norms and values, coercion, social pressures and, as noted above, personal style. For the project manager all these sources of authority are pertinent and have to be put to use.

Managerial power can be exercised through both positive and negative behaviours.⁶³ *Positive behaviours* are those which tend to share authority and power through cooperation and collaboration with other project personnel in such a way that team work is supported. *Negative behaviours* are those which tend to hold or rely solely on one's own power or authority to achieve one's own goals. Either may be used at different times. Neither is "right" or "wrong"; it is rather a matter of effectiveness, i.e., does the behaviour have the intended or desired impact and does the job get done.

The project manager's assignment is to get the project done. This means he must have the necessary authority to get work done. Managers must be able to exercise the "power" to ensure that all the means necessary for doing the job can be controlled. Personal style and behaviours are an especially important form of power. In general, positive behaviours are more productive over the life of a project. Negative behaviours may get an immediate job done, but may hinder the total project by alienating staff. Examples of positive and negative behaviours are shown in FIGURE 19.⁶⁴

FIGURE 19: POSITIVE AND NEGATIVE BEHAVIOURS FOR MANAGERS

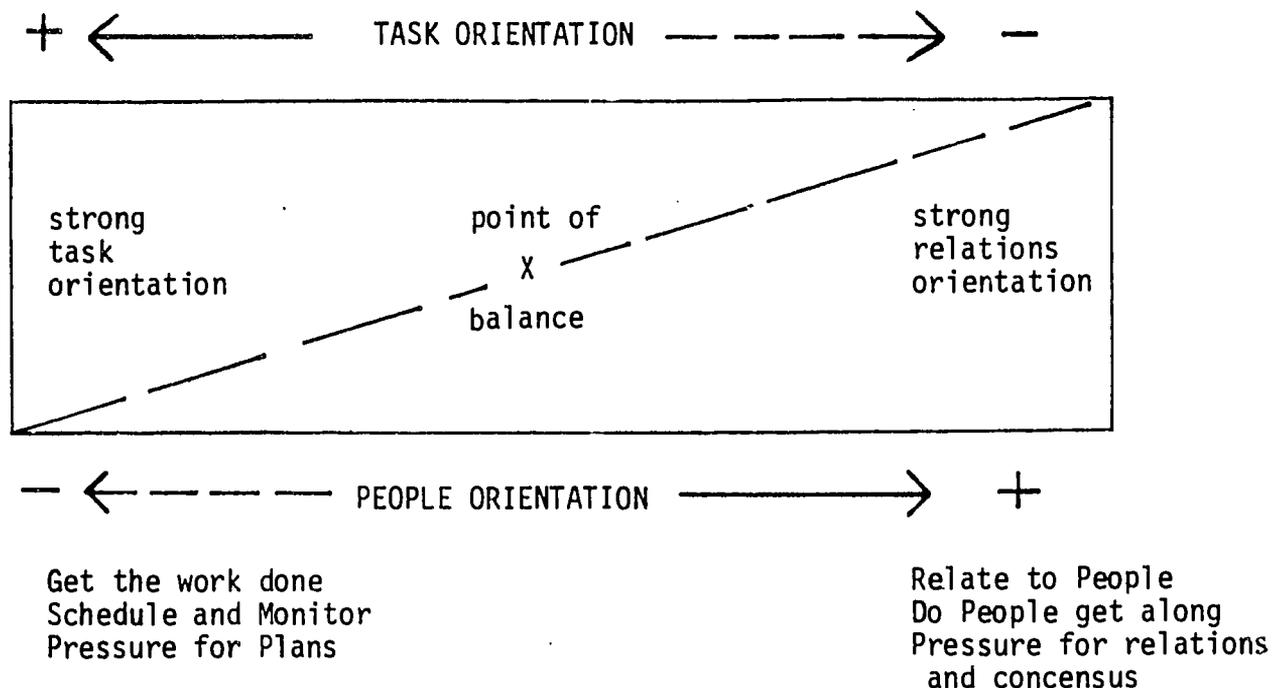
Management Behaviours Reflecting Power Orientation	
Positive Behaviours	vs. Negative Behaviours
creative, alert, responsive collaborative, consensual efficient, preplanned, proactive supportive, independent, adaptive with initiative supporting teamwork stimulating, participatory	violent, explosive, irrational impetuous competitive, nonsupportive, uncommunicative inefficient, diffuse, reactive combative, dependent, rigid without initiative individualistic manipulative, commanding

10.3 People Orientations and Task Orientations

Project managers must get the project done, this means that they must have a *task orientation*. They must also work through others to get the work done; this requires a *people orientation*.⁶⁵ A manager is predominantly task-oriented when concerned primarily with the accomplishment of the work, regardless of the feelings of others. A manager is people-oriented when concerned with maintaining relationships with and between people and gives work a lower priority. These two orientations can be seen to be at opposite ends of a continuum as illustrated in FIGURE 20.⁶⁶

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FIGURE 20: TASK ORIENTATION VS. PEOPLE ORIENTATION



It is possible to observe if a manager is predominantly performing roles with a task orientation or a people orientation.

Roles which involve specific *task orientation* include:
initiating activity, seeking information,
seeking opinions, giving information,
giving opinions, elaborating or clarifying
work, coordinating work, and so on.

Roles which have specific *people orientations* include:
encouraging, following expressing feelings,
setting behaviour standards, and so on.

The manager can also perform certain roles which have *both task and people orientations* such as:

evaluating, diagnosing work, testing for agreements, mediating, relieving tensions or resolving conflicts.

Sometimes people-oriented roles are important for the progress of the work and sometimes task-oriented roles are important to maintain human relationships. So they are properly placed in relation on a continuum upon which the manager attempts to maintain a balance.

It is important that the project manager does not behave too strongly at either end of the continuum, but maintains a balance, shifting from concern for work to concern for people, depending upon the immediate managerial circumstances faced. A good project manager must be concerned about *both* getting the job done *and* maintaining good relationships with people.

10.4 Three Management Styles

Three general management styles can be identified in terms of the managerial attitudes toward power, people and work: *autocratic, manipulative and participative.*⁶⁷

A project manager tends to be *autocratic* when using primarily POWER, AUTHORITY, and PRESSURE to get the work done by others. This is reflected through behaviours based upon the assumption that the amount of work done by a person or organization is a direct result of the amount of pressure that can be exerted on them. To be effective, such an approach requires clear hierarchical organization with strong authority and sanction at the top of the organization for rewarding or punishing lower level personnel in the organization. This autocratic orientation often results in the delegation of activities but not in the delegation of power or authority. Managers who tend to use this approach may be moderately effective in traditional organizational structures, but will tend to have difficulties on projects. The shared and dispersed project authority erodes the effectiveness of commands. Authoritative managers may still be effective, however, if they have sufficient skill, knowledge, ability, and especially, honesty so that they are able to adapt themselves to events and to the perceptions of others.

Autocratic management does have certain advantages, if allowed maximum levels of control, and is easy to administer if power is greatly centralized. It can facilitate speedy actions for certain types of activities. In the long run, it tends to give priority to tasks rather than to people. Its major disadvantage is dependence on pressure to get work done, so that in the absence of such (usually personal) pressure, work generally suffers because motivation is very weak. Project staff may

feel treated as "objects" by the autocratic manager. On projects, this can undermine the collaboration, coordination and integration necessary for successful project performance.

A project manager tends to be *manipulative* when basically EXPLOITING SUPERIOR-SUBORDINATE RELATIONSHIPS OF DEPENDENCE. That means that using both position and dependence relationships to benefit himself or his purposes, rather than incorporate the purposes and goals of others. Every one behaves this way at one time or another. As a general approach, however, it generally results in failure with respect to both tasks and personal relations. There is a psychological dishonesty in such an orientation which undermines the possibilities for genuine and cooperative relationships which are so important to the integration of project resources and personnel.

A more positive orientation to management is participative management. A manager tends to be *participative* when using LEADERSHIP, GUIDANCE AND ENCOURAGEMENT to get the project work done. Participative management recognizes that power does not reside in a person or a position alone. It resides in the relationship between the manager and others, and is a result of the wills and inputs from both sides of the relationship. This orientation is based on the assumption that powers flow upward and downward in the organization, i.e., that performance can be influenced at the bottom as well as the top of the project organization structures. This basic assumption leads to sharing of authority, responsibility and accountability in an attempt to have a balance between recognizing the needs of persons and the needs to get tasks done. For example, the project manager does not dictate solutions to problems, but encourages staff participation in problem identification, alternative selection and solution. This orientation is particularly appropriate to the project matrix management situation.

A key aspect of project implementation planning and management is the dependence upon agreements to structure the responsibilities and authorities on the project into a controllable project system*. The project manager develops a strong dependence upon both personal and contractual relationships with persons and organizations who will be contributing to the organization. The autocratic approach demands strict adherence to lines of authority and legal requirements; the manipulative approach uses and interprets the contract relationships to personal advantages; and the participative approach seeks two-way communication in a relationship with mutual and shared responsibilities for total project achievements.

* See Manual I - Project Implementation Planning, Chapter IX, "Clarifying the Project Organization".

Within the dynamic context of development projects, the autocratic approach may become too rigid and undermine project performance. The manipulative approach may subvert commitment to the project into seeking personal gains and may cause a disintegration of the project team. The participative approach tends to be more successful in creating a project team capable of responding and adapting to the shifting circumstances and challenges of project execution.

10.5 *Styles & Strategies for Conflict Resolution*

As noted earlier in this text* the management of project conflicts is a major part of the responsibilities of the project manager. The various foundations (information and systems) established for project implementation can be useful to anticipate areas of conflict, reduce conflict, and present a basis for conflict resolution. Conflicts will, none-the-less, arise on projects. The ability to resolve conflicts successfully is one of the most important skills of the project manager. Personal styles of conflict resolution are generally reflective of a general orientation to project management, discussed above.

Conflict-resolution strategies can be classified into three categories:

- (a) *avoidance*, the tendency to ignore a situation. This may be a deliberate strategy to let the problem solve itself, to defer dealing with the conflict, or to repress emotional reactions.
- (b) *defusion*, the attempt to distract attention from the conflict. This may be a deliberate strategy to temporarily or permanently avoid confrontation or to begin resolution by dealing with minor or tangential issues as a foundation before tackling the major areas of conflict.
- (c) *confrontation*, the facing of the conflict directly. This may occur in two major forms:
 - i) the use of coercion or power resulting in the forcing of one party in the conflict to accept the solution of another, or

* See Chapter IV, Section 3, "Areas of Conflict in Project Management".

- ii) the use of negotiation, whereby affected parties work through disagreements to mutually negotiated settlements.⁶⁸

Avoidance of conflicts is generally an unsatisfactory long-term strategy. Defusion may buy immediate time for the project manager but eventually it is necessary to face the conflicts and their causes directly. Avoidance and defusion may tend to result in feelings of dissatisfaction, uncertainty and anxiety because issues remain unresolved and can create further concern and confusion for persons involved in the conflicts and for their positions.

Direct confrontation tends to result in better clarifications. Uncertainties and anxieties can be aired and, if constructively managed, true resolutions of conflicts is promoted. The use of power or force to achieve conflict resolution may result in an increased rigidity of hierarchical or legal structures and undermine creative problem-solving in the future. Negotiated or compromise resolutions of conflicts tend to be the preferred approach on projects and more in line with the actual management characteristics of development projects.

FOOTNOTES

1. John Rubel, "An Outline of Implementation Considerations: Some Notes That Should Be Useful to Trainers in Project Implementation", Development Project Management Center, USDA, Washington, D.C., n.d. Module 3.0.
2. David I. Cleland and William R. King, *Systems Analysis and Project Management*, McGraw-Hill Books Company, New York, 1968, p. 184.
3. Raymond Radosevich, *Development Project Management: An Integrated Approach to Project Planning and Implementation*, Graduate School of Management, Vanderbilt University, 1974.
4. This figure is a revision of Figures 3 and 4 in Morris Solomon, *Elements of Project Management*, Development Project Management Center, USDA, Washington, D.C., 1976, pp. 6 and 11.
5. For further discussions of the nature of development projects, see the following:

Albert O. Hirschman, *Development Projects Observed*, The Brookings Institute, Washington, D.C., 1967.

Hirschman refers to development projects as "privileged particles in the development process" (page 1) and calls project implementation "a long voyage of discovery in the most varied domain from technology to politics". (page 35).

A.J. Creshkoff, *The Planning and Management of Projects in Developing Regions* (draft, limited circulation) Chapter 1, Graduate School of Public and International Affairs, University of Pittsburgh, Pittsburgh, Pa., 1976.

Creshkoff identifies five basic and common components of a definition for a project:

- (a) a project is a discrete activity;
- (b) a project has specific objectives;
- (c) a project is coherent organized actions;
- (d) a project has a definite spatial and temporal location; and
- (e) a project has a scheduled beginning and ending.

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6. John Rubel, *op. cit.*, Module 4.0.
7. For a full discussion, see Robert Youker, *Organizational Alternatives for Project Management*, Economic Development Institute, World Bank, (mimeocopy) n.d.
8. Russell D. Archibald, *Managing High-Technology Programmes and Projects*, John Wiley & Sons, New York, 1976, p. 10.
9. P.D.R.T., "A Project Planning Manual" (PDRT01), Project Development Resource Team, Projects Division, Ministry of Finance & Planning, Government of Jamaica, Kingston, Jamaica, January, 1977.
- 10a. Russell D. Archibald, *op. cit.*, pp. 25-26.
- 10b. *Ibid.*, pp. 4-7.
11. *Ibid.*, pp. 35-36.
12. USAID, *Training Guide For USAID Project Operating Support Systems*, U.S. Agency for International Development, Washington, D.C., 1977, pp. 8-9.
13. Notes from Lecture on Administrative Theory -- Minzberg's View of the Roles and Functions of the Manager by F. Bruhns, Graduate School of Public and International Affairs, University of Pittsburgh, Pittsburgh, Pa., 1974.
14. Russell D. Archibald, *op. cit.*, pp. 46-52.
15. Mimeograph copy of paper "Module 1: Control", n.d., author unknown.
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PAMCO, PDRT
Resource
Material

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- 30b. *Ibid.*, pp. 35-36.
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34. *Ibid.*, pp. 184-187.
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41. See J. Bainbridge and S. Sapirie, *op. cit.*, Chapter 16, or Russell D. Archibald, *op. cit.*, Chapter 10.
42. Russell D. Archibald, *op. cit.*, p. 228.
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DO NOT DUPLICATE WITHOUT PERMISSION

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