

AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D. C. 20523  
BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

0129

1. SUBJECT  
CLASSI-  
FICATION

A. PRIMARY

Agriculture

AP10-0000-G730

B. SECONDARY

Water resources and management--Pakistan

2. TITLE AND SUBTITLE

Water management in West Pakistan

3. AUTHOR(S)

Schmidt, R. F.

4. DOCUMENT DATE

1970

5. NUMBER OF PAGES

119p.

6. ARC NUMBER

ARC

PK658.15938.P152

7. REFERENCE ORGANIZATION NAME AND ADDRESS

Colo.State

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publisher, Availability)

(In Water management tech.rpt.no.4)

9. ABSTRACT

10. CONTROL NUMBER

PN-RAA-078

11. PRICE OF DOCUMENT

12. DESCRIPTORS

Pakistan

13. PROJECT NUMBER

14. CONTRACT NUMBER

CSD-2162 Reg.

15. TYPE OF DOCUMENT

**Water  
Management  
In  
West  
Pakistan**

ROBERT FREDERICK SCHMIDT

**Pakistan Academy  
for Rural Development  
Peshawar**

## *A Research Department*

### *Dublication*

Research and survey in problems of development constitute one of the major areas of emphasis in the programmes of Pakistan Academy for Rural Development. The purpose of this emphasis is to provide the policy makers and administrators with scientific information and objective facts for decision making. In its attempt of collecting objective data, the Academy sponsors and supports research in various aspects of development in Pakistan.

The publication under review presents a case study in the Water Management in West Pakistan. In doing so, it tries to fulfil the role of the Research Department which is to undertake collection, analysis and documentation of basic data pertaining to problems of rural development in West Pakistan.

PESHAWAR  
April 1971

S. M. ANWER  
Field Research Specialist

## CONTENTS

<i>Chapter</i>	<i>Page</i>
I. INTRODUCTION	
II. WATER MANAGEMENT IN WEST PAKISTAN	3
Water for Agriculture	3
Administration for Development	6
III. A THEORY OF ORGANIZATIONAL CHANGE	9
A Systems Approach	9
Review of Literature	10
A Theory of Organizational Change	13
The Research Design	14
An Assumption and Three Hypotheses	18
Significance	19
IV. WATER MANAGEMENT AGENCIES	20
The Irrigation Department	20
History	20
Functions	21
Structure	24
Linkages with other Governmental Groups	27
West Pakistan Water and Power Development Authority	30
History	30
Functions	32
Structure	37
Linkages	39
V. WATER RELATED AGENCIES	46
Department of Agriculture	46
History	46
Functions	46
Structure	48

(ii)

<i>Chapter</i>	<i>Page</i>
Linkages	48
Agricultural Development Corporation	51
History	51
Functions	52
Structure	53
Linkages	54
Land and Water Development Board	55
History	55
Functions	60
Structure	62
Linkages	63
<b>VI. ADAPTATION TO NEW ENVIRONMENTS</b>	64
Physical Environmental Factors	64
Salinity and Waterlogging	64
Development of Ground Water Resources	68
Completion of Indus Basin Project	70
Political Environment	72
Administrative Environment	78
Calls for Decentralization	78
Administrative Capability for Decentralization	80
<b>VII. FORMULATING NEW AGENCY GOALS</b>	83
The Irrigation Department	83
Agriculture Department	86
Water and Power Development Authority	88
Agriculture Development Corporation	89
Land and Water Development Department	91
Initial Organizational Goals	93
Integration of Water	93
Integration of Water and Agricultural Inputs	94
<b>VIII. INTEGRATION OF WATER MANAGEMENT AGENCIES</b>	97
Indus Basin Water Authority	97
Water Wing of WAPDA	100

<i>Chapter</i>	<i>Page</i>
Coordinating Agencies	101
Provincial Commissions	102
The Agricultural Development Corporation	104
<b>IX. CONCLUSIONS</b>	<b>107</b>
Hypotheses	107
Conclusion	109
Significance	110
Problems for Further Study	111
Summary	112
<b>BIBLIOGRAPHY</b>	
<b>APPENDIX</b>	
Appendix I	
Appendix II	

<i>Table</i>	<i>Page</i>
I. WAPDA Employment Totals	36
II. WAPDA Receipts and Expenditures 1959-65	38
III. WAPDA Receipts and Expenditures 1963-65	40
IV. Agricultural Machinery Organization Production	47

#### List of Figures

<i>Figure</i>	<i>Page</i>
I. Irrigation Department	25
II. Irrigation Circle	26
III. WAPDA's Relationship to West Pakistan Govt.	42
IV. WAPDA's Relation to Central Government in Indus Basin Project	45
V. Department of Agriculture	49
VI. Land and Water Development Board	58
VII. Integration of Water Agencies in the Central Govt.	95
VIII. Integration of Water Agencies in New Provincial Governments	103

## ACKNOWLEDGEMENT

This thesis was made possible through the aid of many persons directly and indirectly connected with the study of water resources in West Pakistan.

I extend sincerest appreciation to Dr. Phillip Foss who made the thesis possible, and also to Drs. Hautaloma and Straayer who were helpful in their comments and criticisms. Special thanks is extended to Dr. John Straayer who provided useful materials on Pakistan and public administration as well as his own keen insights into organization and administration.

I am also deeply indebted to Bob Dildine and Arlene Dwyer, fellow graduate students on the "Pakistan Project". Both listened patiently to multiplying hypotheses and judiciously helped separate the grain from the chaff. I would also thank Mr. Khalid Mahmood and Mr. Kramul-Haque who filled in the gaps of information needed to complete the study.

Thanks are also accorded to Mrs. Janice Hill, neighbor and excellent typist who prepared the final draft, as well as to the entire office staff of the political science department who worked on the preliminary material.

A special note of thanks goes to Pakistan Academy for Rural Development, Peshawar which undertook the printing of this thesis as a part of their research publications. I am thankful to the Director and all those members of the staff of the Peshawar Academy who worked on the publication of this thesis.

Finally to my wife, Karin, I extend my warm and sincere gratitude for her encouragement, help and patience.

ROBERT SCHMIDT

## **PREFACE**

The thesis entitled, "Water Management in West Pakistan" is but one part of a study on the problem of Water Management in West Pakistan sponsored by the United States Agency for International Development and carried out by Colorado State University. Six departments at the university have joined in on a multi-disciplinary approach to the problem of water management. They are the departments of Agricultural Engineering, Agronomy, Civil Engineering, Economics, Political Science and Sociology. The project of which this thesis is a part serves both to aid in solving problems in the less developed nations and also in building competence at American universities for aiding in International Development. The project has been aided greatly by Pakistani students studying water management problems at Colorado State University. Without their assistance the thesis in question could scarcely have been written.

The thesis has been written during a time of very rapid change in Pakistan. At the time of writing Pakistan was initiating the break-up of the one unit scheme and a return to civilian rule. Thus it must be kept in mind that the thesis was completed in May of 1970 and cannot have taken into account changes which have occurred since then. Nevertheless, the principles behind the specific organization changes recommended seem as valid to the author now as they did at the time of writing.

**ROBERT SCHMIDT**

## **ABSTRACT OF THESIS**

### **Water Management in West Pakistan**

This thesis examines the importance of water management in West Pakistan and describes the agencies which administer water resources. Each water management agency is analyzed according to its history, functions, structure and linkages with other governmental agencies.

The hypotheses state that all ground water and surface water supplies be coordinated for more efficient utilization of water, that delivery of water and agricultural inputs be better coordinated to facilitate a multiplication in agricultural production, and that these coordinating efforts are feasible in light of the current physical, political and administrative factors.

The thesis also tests a model for organizational change, and suggests that it is capable of measuring the wide range of factors which effect organizational change in a developing nation. Data for the thesis was taken from secondary resource material on administration and water resource management in West Pakistan.

## CHAPTER—I

### Introduction

This thesis will examine the present administrative structures for water management in West Pakistan and suggest how they might be restructured to meet environmental changes. To accomplish this we will show the importance of water management in the economy of the region. This will be followed by a proposed research design to handle the data to consider structural changes. In the study we will assume that the new administrative changes will not be successful unless there is a combined physical, political, and administrative impetus for them. There will be four hypotheses:

1. Coordination of water and agricultural inputs requires linkages for coordination at the national, provincial, and project levels.
2. Coordination of ground and surface water supplies requires a single water authority which is responsible for all water planning and management.
3. Coordination of public and private tubewell fields requires the formation of one agency to govern all ground water development.
4. All three suggested changes previously listed are possible in light of the present political and administrative environments.

The chief body of material in the paper will be a description of the present system of water management agencies in West Pakistan. After

describing the agencies, we will analyze the new physical, political and administrative environments of the agencies. We will then show how these environments will call for a reformulation of goals and ultimately lead to a new system of water management. In the conclusion we will re-examine our hypotheses, draw some tentative conclusions, reiterate the significance of the thesis for the science of comparative administration, and make suggestions for further study.

This thesis is but one part of a study on the problems of water management in West Pakistan sponsored by the United States Agency for International Development. At Colorado State University six departments have joined in on a multi-disciplinary approach to the problems of water management. They are the departments of Agricultural Engineering, Agronomy, Civil Engineering, Economics, Political Science, and Sociology.

In the Department of Political Science this is but one of three studies on the administration of water in West Pakistan. This thesis will deal with the structures of water management on a macro-scale. A second study will focus on the administrative behaviour of water management officials in West Pakistan. The third paper will consider West Pakistan's agriculturally related problems in light of problems confronted in other underdeveloped nations.

## CHAPTER—II

### Water Management in West Pakistan

#### Water For Agriculture

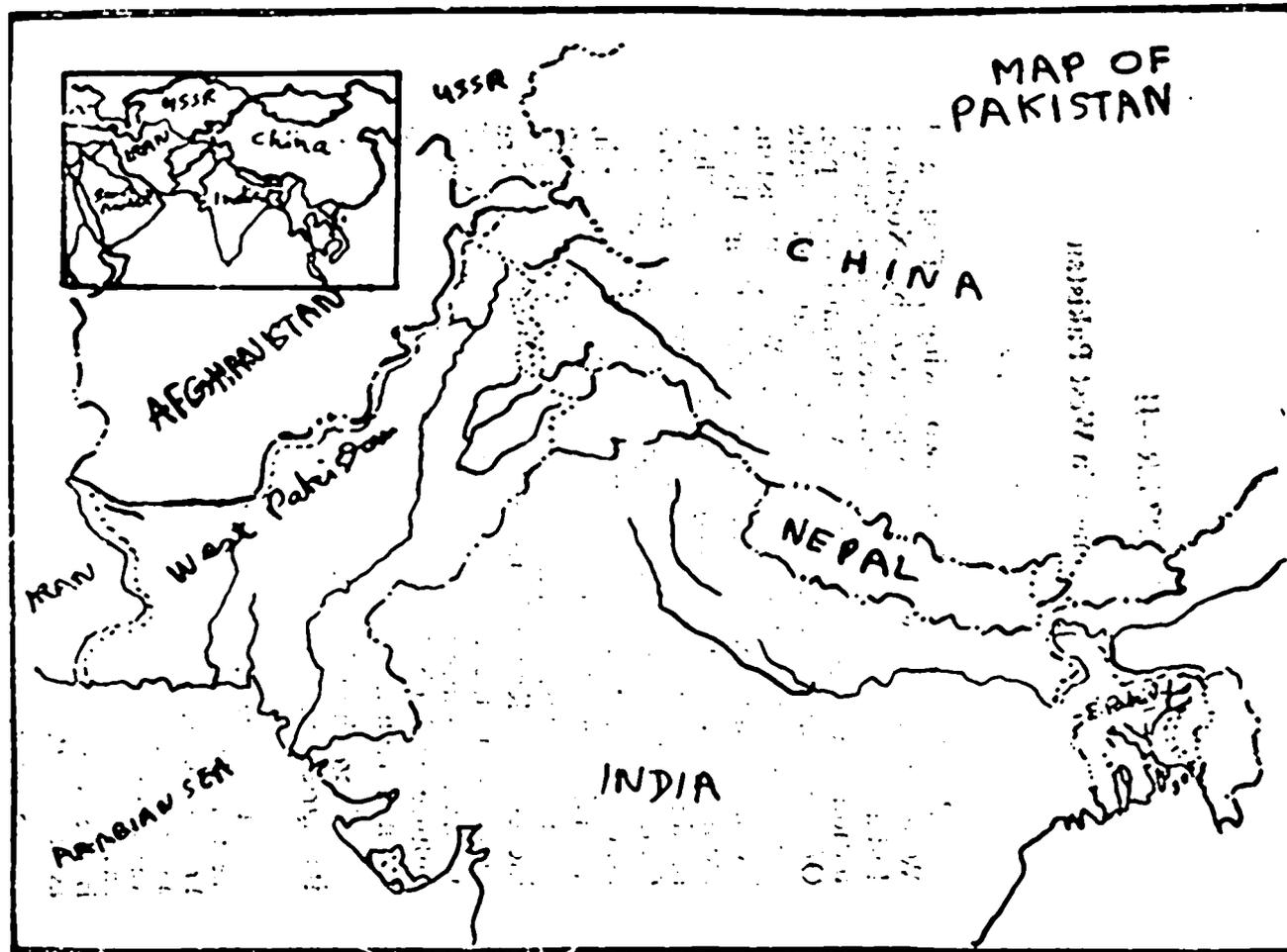
Pakistan consists of two wings, East and West Pakistan, which are separated by Northern India (Map on page 4). It is the world's fifth largest nation with a population of over 100 million people. Of these, thirty million live on the flat and fertile plain of the Indus River in West Pakistan. Twenty-three million of them make their living from farming and closely related occupations. They produce seventy five percent of all West Pakistan's food and fiber.<sup>1</sup> West Pakistan is also an arid land. Except for the foothill region of the North, annual rainfall in the province averages less than twenty inches. Rainfall figures vary from eight inches in Karachi to eighteen inches in Lahore and fifteen inches in Peshawar. The amount of rainfall is unreliable and the risk factor in agriculture is high because of drought or flooding from torrential rains.<sup>2</sup>

Even though West Pakistan is a parched land, its agricultural potential is high because of avail-

---

<sup>1</sup> The White House Report on Land and Water Development in the Indus Plain (Washington: U.S. Government Printing Office, 1964), p. 1. This report was compiled by a special presidential committee headed by Dr. Roger Revelle. The committee went to Pakistan, submitted an initial report and was asked to redo some parts of it. The second report is the one cited above. We shall henceforth refer to it as *Revelle II*.

<sup>2</sup> Donald Wilber, *Pakistan* (New Haven: Human Relations Area Files, 1964), p. 31.



MAP I

able water resources for irrigation. The average annual inflow of the Indus and its tributaries is twice that of the Nile and more than ten times that of the Colorado River. Half of the water carried on to the plain by the rivers is used to irrigate some 23 million acres—by far the largest single irrigated area on the earth's surface. This irrigated area also makes up two-thirds of all the planted land in West Pakistan. In addition to the rivers there is a gigantic underground lake of fresh water. If this source of water is properly exploited through the use of tube-wells, it can serve as a valuable supplement to canal waters.<sup>3</sup>

Despite the potential of the area, agricultural production has remained low. Causes for this can be divided into agricultural factors and water-related factors. The agricultural factors include: 1) primitive methods of cultivation, 2) lack of agricultural inputs such as better seeds, fertilizers, and pesticides, 3) lack of services such as credit and marketing facilities, and 4) the present system of land-holding with small, widely separated plots, and tenant farmers. The water-related impediments to increased agricultural production are: 1) a shortage of irrigation water which prevents double cropping in some places and any production at all in other areas, 2) an accumulation of salts in the soil caused by poor drainage and a lack of sufficient water to flush them away, and 3) the problem of water-logging which is caused by a high water table and results in the accumulation of excess water in low-lying fields.<sup>4</sup>

Because the impediments to increased production are inter-related, the Revelle Report recom-

---

<sup>3</sup> *Revelle II* p. 1.

<sup>4</sup> *Ibid.*, pp. 2, 3.

mended a concerted attack on all of them. It states :

Additional irrigation water, more fertilizer, improved seed and crop varieties, pest and disease control, better cultivation, and salt-free soil are complementary factors of production. Each may increase yields 10 to 30 percent when applied singly, but in combinations they can give increases of 200 to 300 percent. The interaction between the factors of production is one of the basic principles of agricultural science.<sup>5</sup>

#### Administration For Development

The challenges this presents to water management agencies is clear. They are : 1) to provide sufficient water for double and triple cropping, 2) to provide increased supplies of water for leaching salted soils, 3) to encourage and, if necessary, construct tube-wells to increase supplies of water and also to lower the water table to prevent water-logging, and 4) to coordinate water inputs with agricultural inputs so that production can increase with a multiplier effect.

To meet these challenges it will be necessary to improve the administration of the water management agencies as well as improve the technology. Even if additional water supplies are obtained, agricultural production will not be increased significantly unless the water is coordinated with the other agricultural inputs. Since this job of coordination is basically a problem in public administration, it is through better administration that the task can be accomplished. The World Bank study group comments on how much the job of coordination needs to be done when they state :

The most pervasive problem has arisen from the fact that institutions dealing with agriculture

---

<sup>5</sup> *Ibid.*, p. 4.

have frequently had overlapping responsibilities or at a minimum have had jurisdictional limits which were sufficiently vague to permit differing interpretations by different government bodies. Strong and purposeful coordination is essential in such situations, but this has been difficult to attain at times in West Pakistan. Problems have arisen in efforts to relate research to extension, development of water resources to water distribution and utilization, project implementation to project management, and input supplies to credit availability, to cite some examples. Where coordination has been weak, there has been some tendency to protect or expand narrowly construed institutional interests, rather than to focus efforts on the main task of promoting agricultural development. There is, at present, need for better coordination and careful delineation of areas of responsibility.<sup>6</sup>

The World Bank study group focuses on another administrative problem in water management agencies when they write:

A second area affecting institutional performance concerns the quality of the available staff in the various agencies. Lack of skilled and experienced personnel is, of course, a constraining factor in any large and rapid development effort.<sup>7</sup>

Together with these two special administrative problems in West Pakistan, the water management agencies have common problems connected with any large institutions. These include the problems of inter-agency coordination, allocation of funds for equipment and services to supply staff members in field assignments, turnover of high officials and general administrative procedures.<sup>8</sup>

---

<sup>6</sup> Pieter Lieftinck and Associates, *Water and Power Resources of West Pakistan*, Vol. II (Baltimore: Published for World Bank by the Johns Hopkins Press, 1969), p. 19.

<sup>7</sup> *Ibid.*, p. 19.

<sup>8</sup> *Ibid.*, p. 20.

The World Bank study group in overviewing the institutional arrangements as late as 1969 has found the results disappointing both in concrete achievement and also in comparison to expected progress. While this might be due to over optimistic expectations, there still seems to be great room for improvement.<sup>9</sup> West Pakistan has a great agricultural potential if ways can be found to obtain additional water supplies and integrate them with other agricultural inputs. How this can be done most efficiently becomes a problem in public administration and the subject of this thesis.

<sup>9</sup> *Ibid.*, p. 20.

## CHAPTER—III

### A Theory of Organizational Change

#### A Systems Approach

At present the water management agencies and agriculturally related institutions form a complex system of organization. Several like the Agriculture Development Corporation and the Land and Water Development Board almost seem to have the same functions except for different geographical areas and a slightly different emphasis. Others like the Irrigation Department and WAPDA seem to have overlapping functions. Occasionally the Irrigation Department is active in constructing new work, especially if it was begun before the formation of WAPDA.<sup>1</sup> Conversely, WAPDA occasionally maintains facilities it has built. This is normally a function of the Irrigation Department.<sup>2</sup> Even though it is not directly involved in water administration, the Department of Agriculture assists farmers in constructing an immense number of private tube wells and competes with WAPDA which is in charge of constructing public tube wells.<sup>3</sup>

---

<sup>1</sup> In 1968 a sum of Rs. 200 lakhs was provided to meet part of the cost of the raised Chashma Barrage being constructed as a part of the Indus Basin Project. *West Pakistan Yearbook of 1968* (Lahore: Information Dept., 1968), p. 27.

<sup>2</sup> Thus in 1966 WAPDA still operated the Warsak Dam rather than turning it over to the Irrigation Department for maintenance. Guthrie Birkhead, "Government by Corporation: The Case of West Pakistan WAPDA," *Administrative Problems in Pakistan*, Guthrie Birkhead (ed.) (Syracuse: Syracuse University Press, 1966). p. 126.

<sup>3</sup> *West Pakistan Yearbook of 1968* p. 95.

Because water and agricultural inputs are delivered through a system of agencies it is not enough to isolate one or another of these agencies, study it thoroughly, and make recommendations on how it might be improved. This approach would leave out the important relationships between the agencies and other governmental bodies which make up major blockages to efficiency and coordination. *Thus, in this paper, we will study the problem of water management agencies as a problem in changing organizational systems to meet new environmental conditions.*

Problems connected with a systems approach are obvious. Because it views the entire range of organizations, it cannot come to grips with each one in its unique structural and behavioral setting. As a result it will suffer from a certain amount of superficiality and perhaps even inaccuracies in minor organizational structure. Nevertheless, the benefits derived from seeing the entire picture, and the linkages between agencies should far outweigh the disadvantages.

#### *Review of the Literature*

In recent years a significant body of literature has been written about the process of organizational change. These works include *The Management of Innovation* by Burns and Stalker.<sup>4</sup> Here the authors develop two approaches to organization, the mechanistic and the organic. The book points out that organizations must be continually amenable to change if they are to remain in touch with their surroundings.

Three works which use the human personality as a model for change are *The Dynamics of Plan-*

---

<sup>4</sup> Tom Burns and G.M. Stalker, *The Management of Innovation* (Chicago: Quadrangle Books, 1961), p. 105.

ned *Change* by Lippitt, Watson, and Westly,<sup>5</sup> *Managing Organizational Innovation* by Jeremiah O'Connell,<sup>6</sup> and *Effecting Change in Large Organizations* by Ginzberg and Reilley.<sup>7</sup> They share a common concern about changing the behaviour patterns of executives and managers once organizational change has been decided upon.

Paul David in his article, "Analytic Approaches to the Study of Change," has some useful classifications of the types of change to be encountered. He makes the distinction between types of unplanned change which are dependent in the environment, and those types of change which the organization takes to meet the environment.<sup>8</sup>

Some of the practical problems connected with change are fielded well by Simon, Smithburg, and Thompson, in *Public Administration*. In a chapter on reducing the costs of change, they have practical suggestions on procedures to help bring change about. They speak of costs under the categories of (1) moral costs, (2) self-interest costs, (3) rationality costs, and (4) subordination costs.<sup>9</sup> These costs will figure very prominently in any proposed restructuring of water management

---

<sup>5</sup> Ronald Lippitt, Jeanne Watson, Bruce Westly, *The Dynamics of Planned Change* (New York: Harcourt, Brace, and Co., 1958).

<sup>6</sup> Jeremiah J. O'Connell, *Managing Organizational Innovation* (Homewood: Richard Irwin Inc., 1968).

<sup>7</sup> Eli Ginzberg and E. Reilley, *Effecting Change in Large Organizations* (New York: Columbia University Press, 1957).

<sup>8</sup> Paul David. "Analytic Approaches to the Study of Change," *Public Administration Review*, Vol. XXVI, No. 3 (Sept., 1966), pp. 160-168.

<sup>9</sup> Simon, Smithburg and Thompson, *Public Administration* (New York: Alfred Knopf, 1959), pp. 451-467.

agencies in West Pakistan. Two other writings emphasizing some practical considerations are *The Changing of Organizational Behaviour Problems* by Paul Lawrence<sup>10</sup> and "Crucibles of Change" by Kendall Lingle.<sup>11</sup> The former is the case history of a decentralization by a supermarket chain and the resultant problems encountered by executives in new situations. The latter mentions that increasing the numbers of people who make goal decisions will increase the time necessary to make those decisions.

In the science of comparative administration, particularly that of 'development administration,' books and articles have appeared that emphasize historical and cultural barriers to administrative changes. S. C. Dube<sup>12</sup> in "Bureaucracy and Nation Building in Transitional Societies," describes the values of the post-colonial bureaucracy and explains why it gives only lip service to structural changes in development.

Other articles dealing with development administration are "Developmental Administration: An Approach" by V.A. Pai Panandiker,<sup>13</sup> and

---

<sup>10</sup> Paul Lawrence, *The Changing Organizational Behaviour Problems* (Boston: The Riverside Press, 1958).

<sup>11</sup> Kendall Lingle, "Crucibles of Change," *Public Personnel Review*, Vol. 30, No. 1 (Jan., 1969), pp. 2-8.

<sup>12</sup> S.C. Dube, "Bureaucracy and Nation Building in Transitional Societies," *Political Development and Social Change*, Finkle and Gable (eds.) (New York: Wiley and Sons, 1968).

<sup>13</sup> V.A. Pai Panandiker, "Developmental Administration: An Approach," *Readings in Comparative Public Administration*. Nimrod Raphaeli (ed.) (Boston: Allyn and Bacon, 1967).

"Improvement of Local Government and Administration for Development Purposes."<sup>14</sup> The former focuses on the need for an action-oriented, goal-oriented administrative system. The latter emphasizes the importance of decentralization for greater administrative effectiveness.

An extremely important work in the 'how' of change within developing nations is supplied by Garth Jones in *Planned Organizational Change*.<sup>15</sup> In this work, based upon his experiences in Indonesia and Pakistan, he explicates a theory of the impact of catalyzers and pacemakers in change processes.

A compatriote of Jones' also working on administrative problems in Pakistan is Ralph Braibanti. He speaks of the impact of a foreign nation in administrative change in "Transnational Inducement of Administrative Reform: A Survey of Scope and Critique of Issues."<sup>16</sup> This article is instructive in how change has been brought about through the United States Agency for International Development.

#### *A Theory of Organizational Change*

The theory of organizational change we will use is based upon Talcott Parson's observations. He notes that organizations have habits of existence

---

<sup>14</sup> Emil J. Sody, "Improvement of Local Government and Administration for Development Purposes," *Readings in Comparative Public Administration*, Nimrod Raphaeli (ed.) (Boston: Allyn and Bacon, 1967), pp. 239-257.

<sup>15</sup> Garth Jones, *Planned Organizational Change* (London: Routledge and Kegan Paul, 1969).

<sup>16</sup> Ralph Braibanti, "Transnational Inducement of Administrative Reform: A Survey of Scope and Critique of Issues," *Approaches to Development: Politics, Administration, and Change*, Montgomery and Siffin (eds.) (New York: McGraw-Hill Book Co., 1966), pp. 133-184.

unrelated to environmental changes. These habits are the terms 'pattern maintenance' functions. Organizations seek to adapt to their environments as much as their habits will permit them. This is particularly difficult when there are different and sometimes conflicting environments. The formulation of goals for organizational changes is the product of bargaining between old habits and adaptation to various new environments. Once the new structural goals for the organization or organizations is decided upon, integration of personnel from the old organizations can take place. Every effort should be made to reduce the costs of change so that the change can occur. Unabsorbed costs figure into a new environment so that more bargaining can take place.<sup>17</sup>

Consideration of pattern maintenance functions together with political and administrative environmental factors have previously led to incomplete and unsatisfactory structural changes. We shall make recommendations for organizational change only when all the relevant factors have been considered.

### *The Research Design*

The design of this research is first of all to identify and describe the existing water management agencies and their linkages with each other and with other governmental groups. This will be done on the basis of secondary resources and checked through interviews with informed Pakistanis studying in the United States.

Secondly, we will examine three facets of the environment in which these agencies will work; the

---

<sup>17</sup>Talcott Parsons, quoted in Louis Gawthrop, *Bureaucratic Behaviour in the Executive Branch* (New York: The Free Press, 1969).

physical environment, including engineering and agricultural changes, the political environment consisting of recent political changes, and the administrative environment made up of pressures for administrative reform plus administrative capabilities. To gather information on the first we will consult the latest studies on water-logging, salinity, agricultural inputs, and engineering data. Information on the second will be gleaned from news reports on the political situation in Pakistan in the last year. The administrative environment will be described on the basis of studies conducted by Pakistanis and expatriates brought in to advise the Pakistani Government on public administration.

Thirdly, we will suggest the formation of new goals in line with a compromise between inferred pattern maintenance functions of the agencies and the need to adapt to changing technology and environmental conditions.

Finally, we will suggest how existing agencies might be integrated into a new water management system and how the costs of change might be minimized. In the concluding chapter we will restate the hypotheses, draw some initial conclusions and suggest problems for future research.

In this design we will consciously employ a systems model adapted from one put forth by Almond and Powell in *Comparative Politics: A Developmental Approach*.<sup>18</sup> This model has the flexibility to accomplish three major things necessary for the organizational change contemplated for the water management agencies of West Pakistan. First it deals with systems and not individual organizations,

---

<sup>18</sup> Gabriel Almond and G. Bingham Powell, Jr., *Comparative Politics: A Developmental Approach* (Boston: Little, Brown and Co., 1966).

it has process and motion built into it, finally in its mechanism for feed-back, it can handle continuous change and innovation.

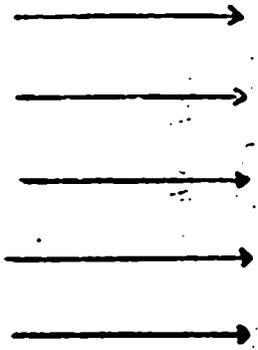
The content of the model in which it applies to structural change is supplied through an adaptation of Talcott Parsons' conceptual model for organizational change which is made up of (1) pattern maintenance, (2) adaptation, (3) goal attainment and (4) integration.<sup>19</sup> The way in which the form of the systems model and the content of the organizational change model are fused can be seen in the following outline.

<i>Almond and Powell Systems Model</i>	<i>Parson's Organizational Change Model</i>
I. Inputs	A. Pattern Maintenance of Existing Agencies
II. Conversion Process	A. Adaptation to Environments
	B. Goal Formation in light of the Goals of the Agency Personnel
	C. Integration of Agency into Modified Structures to Minimize Costs of Change
III. Outputs	A. Modified Structure for Water Management Agencies
	B. Feedback of Unabsorbed Costs which figure into the New Internal Environment

<sup>19</sup>Talcott Parsons, quoted in Louis Gawthrop, *Bureaucratic Behaviour in the Executive Branch* (New York: The Free Press, 1969).

DIAGRAM OF MODEL

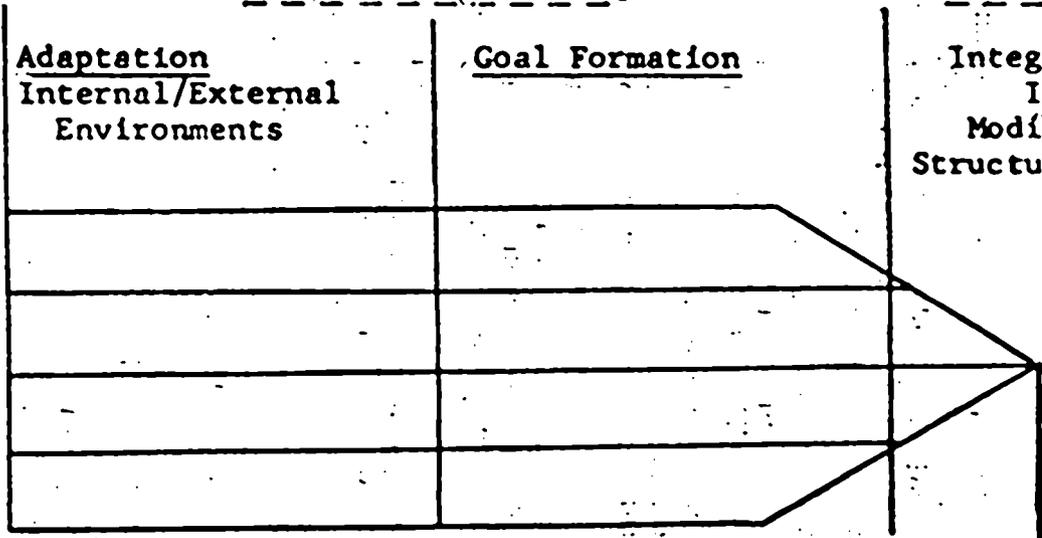
I N P U T S  
Existing Agencies  
Pattern Maintenance



C O N V E R S I O N

Adaptation  
Internal/External  
Environments

Goal Formation



O U T P U T S

Integration  
Into  
Modified  
Structural Forms



F E E D B A C K

### *An Assumption and Three Hypotheses*

From the brief history of the water management agencies in West Pakistan we will see that successful administrative reorganization occurs only when there is combined physical, political, and administrative impetus for it. On the basis of this experience we shall assume that new administrative changes will not be successful unless all three of these reasons for change are present.

As we study the water management agencies and their functions in light of the model suggested above we will test the following hypotheses.

1. Coordination of water and agricultural inputs requires linkages for coordination at the national, provincial, and project levels.
2. Coordination of ground and surface water supplies requires an overall water authority which is responsible for all water planning and management.
3. Coordination of public and private tube-well fields requires the creation of one agency for all ground water development.
4. All three suggested changes previously listed are possible in light of the present political and administrative environment.

In testing the first hypothesis, we will consult chiefly with data compiled by the Food and Agriculture Commission Report of 1960<sup>20</sup> and the Revelle Report II<sup>21</sup> both of which called for more coordination between water and agricultural inputs

---

<sup>20</sup> West Pakistan, *Food and Agriculture Commission Report* (Lahore: Government Printing Press, 1960).

<sup>21</sup> *Revelle Report II*

in project areas. We will test the second and third hypothesis by consulting the opinions of the World Bank Study Group and the Irrigation and Agricultural Consultants Association formed by the Bank. We will test the last hypothesis by analyzing the current political and administrative environment in which any proposed changes might take place.

### *Significance*

The chief significance of this thesis for the science of comparative administration is to test the usefulness of the proposed model for organizational change in the under-developed world. For too long organizational change in the third world have been suggested on the basis of the models worked out in the West or in other political systems. This model seeks to encompass the political and administrative 'facts of life' as well as physical reasons for change.

## CHAPTER—IV

### Water Management Agencies

Water management in West Pakistan is carried out by two agencies which deal exclusively with water and power and three agencies which manage water and supply agricultural inputs. In this chapter we will consider the exclusive water and power agencies, the Irrigation Department and the Water and Power Development Authority of West Pakistan. We shall briefly describe their histories, functions, structures and linkages with each other and with other governmental bodies. In the next chapter we will describe those agencies which combine water management and also supply agricultural inputs.

#### The Irrigation Department

##### *History*

At the time of Pakistan's partition from India in 1947 water was managed by the Irrigation Department of India. After partition, West Pakistan created a similar department of Irrigation to manage her water resources. The department was charged with maintaining all existing distribution systems and also the construction of new works. It continued to carry out these functions until dissatisfaction with the department led to the transfer of some of these activities to WAPDA.<sup>1</sup>

---

<sup>1</sup>George Platt, "Agriculture: Administration and the Search for Expanded Productivity," *Administrative Problems in Pakistan*, Gutbrie S. Birkhead (ed.) (Syracuse : Syracuse University Press, 1966), p. 103.

**Functions.**

The remaining functions of the Irrigation Department are given by the 1968 West Pakistan Yearbook as follows:

1. Maintenance and whenever possible enhancement of operational efficiency of water distribution systems through various canals by proper upkeep of the headworks and the canal systems.
2. Protection of irrigation areas against waterlogging and salinity by construction of surface drains for lowering water table and quick disposal of storm water.
3. Protection of irrigated areas and *abadis* from flooding by construction of bunds and river training works.
4. Hydrological investigations for assessment of surface flows in rivers for regulating and distributing water among different canal systems according to their allocations and requirements.
5. Research work through statistical analysis, experiments, and model studies into problems of hydraulics, hydraulic structures, soil mechanics, physics and ground water, etc., for achievement of increased efficiency and economy in these fields.
6. Research work into problems of soil and water for reclamation of saline and alkaline lands and demonstration of the results thereof, for the benefit of farmers.
7. Survey and investigation in less developed areas such as Quetta-Kalat region, for preparation of technically sound projects for extension of irrigation.<sup>2</sup>

---

<sup>2</sup>West Pakistan Yearbook of 1968 (Lahore: Information Department, 1968), pp. 25, 26.

These stated purposes of the Irrigation Department can be broken down into two major areas: operations and development. In its operational responsibility the Department operates 16 barrages, 3 dams, and about 37,969 miles of canals of different sizes. It also maintains 4,858 miles of drainage channels of which more are being added all the time. From the time of partition to the present the average annual flow diverted from rivers through all the canals increased from 65,572 million acre feet (MAF) to 95,700 (MAF). During the year 1967-68 Rs. 900 lakhs<sup>3</sup> were allocated to the Department of which Rs. 620.07 lakhs were for operational expenses. Thus, during this year, over one half of the allocations were for maintenance. The remainder of the allocations, 279.83 lakhs were for new schemes. However, the budget for 1968-69 of Rs. 1,020.26 lakhs was divided so that 587.02 lakhs was to be spent on operations and 433.24 lakhs on new schemes. The new budget shows that the Irrigation Department is increasing its development capability at the expense of its operations.<sup>4</sup>

The development functions and their estimated expenditures for the department are divided into four areas:

The first is the multi-purpose development of dams, barrages and projects. Some of the most important of these are listed below:

(i) Warsak High Level Canal Allocation	Rs. 13.33 lakhs
(ii) Kurram Garhi Multi-Purpose Scheme	Rs. 2.00 lakhs

<sup>3</sup>Rs. = Rupees = .21 U. S. Currency.  
Lakh = 100,000.

<sup>4</sup>*Ibid.*, pp. 26, 27.

(iii) Thal Project	Rs. 9.48 lakhs
(iv) Taunsa Barrage Project	Rs. 64.67 lakhs
(v) Bakhat Extension Scheme Thal Project	Rs. 20.00 lakhs

The total allocation for multi-purpose development is Rs. 337.29 lakhs. The reason these projects are handled by the Irrigation Department rather than WAPDA is because most were begun by the Irrigation Department before the organization of WAPDA.

The second area is that of survey and investigation. The Department of Irrigation operates an Irrigation Research Institute at Lahore. The Institute has a Hydraulic division and a Soils Mechanics and Physics division. The Institute does research for WAPDA, ADC, and other government agencies. The division on Soil Mechanics has also done much of the research on existing tube-wells in the SCARP projects. Also part of the survey and investigation functions of the Irrigation Department is the special survey in the Quetta-Kalat region. This investigation in 1967 received the largest budget allocation for survey and investigation. The total allocated for survey and investigation is Rs. 36.06 lakhs.

The third area of development functions is that of tube-wells and small irrigation schemes. By the end of 1968 the Department installed about 700 tube-wells for small irrigation projects in West Pakistan. These tube-wells were installed to provide water to undeveloped areas and also to supplement canal waters to convert non-perennial canals into perennial ones. Further plans are to install up to 3,000 tube-wells for irrigation

by 1970. Allocation for tube-wells and small irrigation schemes is Rs. 266.46 lakhs. A fourth area of the development function is that of drainage, reclamation and tube-wells. Allocation for this function is Rs. 97.75 lakhs.<sup>5</sup>

### *Structure*

The Irrigation Department is divided into administrative units called circles (Figure on Page 25). Most circles are irrigation circles and command headworks and canals which distribute surface water to farmers. There are also tube-well circles and drainage circles. The area commanded by an irrigation circle is determined by topographical rather than political boundaries.

A typical circle has as its head a Superintending Engineer (Figure on page 26). Under him is an office wing which handles staff tasks such as (a) correspondence, (b) drawing (drafting), (c) accounts and (d) revenue. A second wing is an operational "live wing" called the Engineering Section. This is in turn divided into a staff section, a deputy collector section, and sub-divisional officers. This wing is headed by up to three Executive Engineers.

The Superintending Engineer and the Executive Engineers are usually Class I officers. Assistant Engineers might be classified as Class II.<sup>6</sup> *Zilladars* work under the Deputy Collector and are Revenue

---

<sup>5</sup>Ibid., pp. 27, 28.

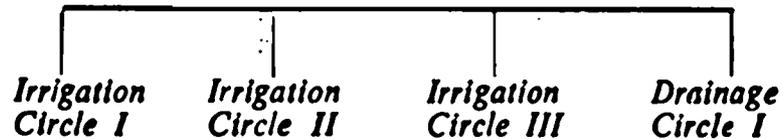
<sup>6</sup>Interview with Mr. Khalid Mahmood, Dec. 22, 1969.

Assistants. Their main functions are assessment of land revenue and water rates. Usually *Zilladars* are Class III officers. The officer closest to the villager is the *Patwari*. A *Patwari* is the official primarily involved with water distribution which involves the divisions of water, the timing of water delivery, and taking care of water demands as approved.<sup>7</sup>

### FIGURE—I

#### IRRIGATION DEPARTMENT

*Permanent Secretary*

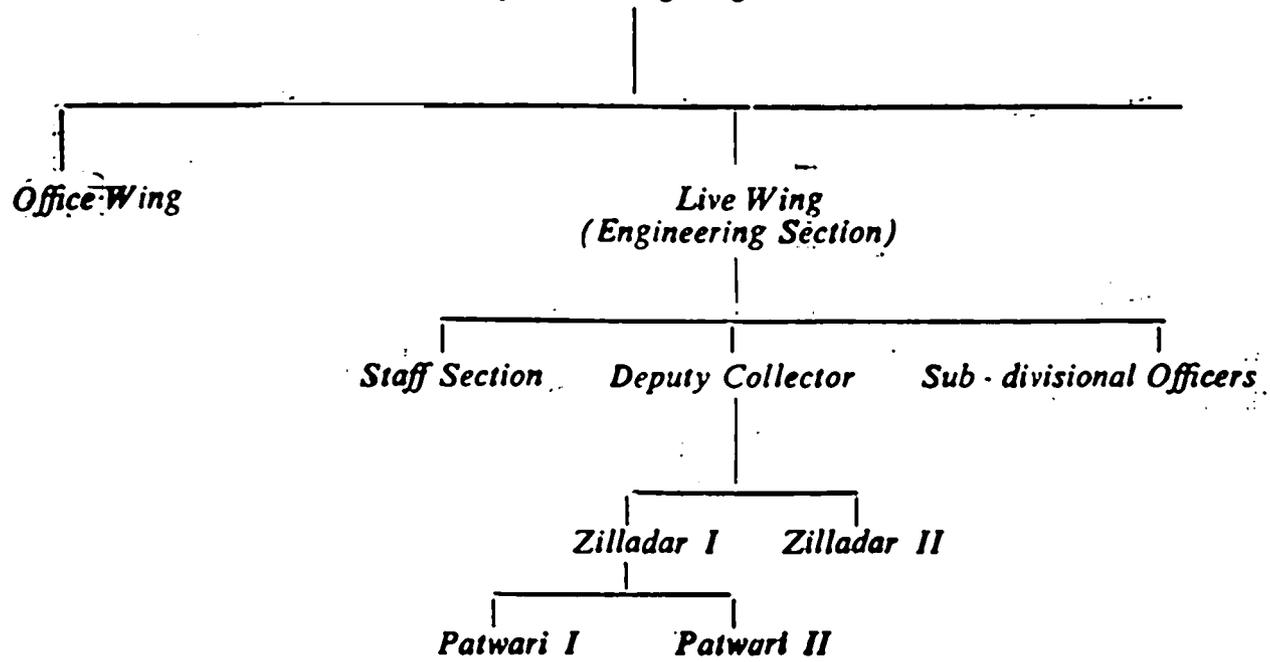



---

<sup>7</sup>Agriculture Division, US AID/Lahore, *Role of Nation Building Departments at the Union Council Level in SCARP - II - A. Concepts and Proposals, Mimeo - Pamphlette (Lahore: US AID, no date), p. 6.*

**FIGURE—II**  
**IRRIGATION CIRCLE**

*Superintending Engineer*



The Irrigation Department receives money both through allocation of funds from the Central and Provincial Governments and also through a water rate charged to *zamindars* or owners of property. The water rate is assessed in relation to the area and the type of matured crop. The background of this type of assessment is the same as the land revenue. It is technically not considered to be a tax but rather the state's share in the produce of the land, or in this case, the water.<sup>8</sup>

Michel comments about the water rates when he states :

Water rates have remained fixed in most cases for the last 30 years. In West Pakistan, the Irrigation Department has been running a substantial deficit which is made up by indirect credits from the Land Revenue Department. A large subsidy has been implicit in the provision of water.<sup>9</sup>

The Irrigation Department has about 700 engineers working in its various circles. When this is compared to about 466 in WAPDA's water wing of the Indus Basin Project, one can get some idea of the relative sizes of the Irrigation Department versus WAPDA.<sup>10</sup>

#### *Linkages With Other Governmental Groups.*

1. Water Management Agencies: One of the most important linkages the Irrigation Department has with other water management agencies is with WAPDA. It stands in a receiving relationship to new projects carried out by WAPDA. Thus, in the Chaj Doab project 213 tube-wells and in the Upper Jhelum Scheme 139 tube-wells have been

<sup>8</sup>Aloys Michel, *The Indus Rivers* (New Haven: Yale University Press, 1967), pp. 389, 390.

<sup>9</sup>*Ibid.*, p. 392.

<sup>10</sup>Interview with Mr. Khalid Mahmood.

handed over to the Irrigation Department.<sup>11</sup> It also maintains a number of other projects built by WAPDA and handed over to the Irrigation Department for maintenance, such as 486 tubewells handed over to the Irrigation Department in the SCARP II area.

Within the Thal area the Irrigation Department is placed under the West Pakistan Agriculture Development Corporation (ADC) through the chairman of the Thal Development Authority (TDA). This was done so that colonization and irrigation could move together.<sup>12</sup>

The Irrigation Department also has important linkages with the Land and Water Development Board. The Secretary of Irrigation is a member of the Board and the department plays an important role in the SCARP projects.<sup>13</sup>

In SCARP I, Irrigation Department personnel work under the supervision of the Project Director. In SCARP II, the Irrigation Department is in charge of the project assisted by the Agriculture and Co-operative Department. In SCARP II the chief problem has been the malfunction of existing drains. Since the Irrigation Department specializes in the maintenance of drains and canals it is likely that this is the reason SCARP II was given to them.<sup>14</sup>

The linkages with the Provincial Government of West Pakistan are as follows: For approval of all new schemes in nation building sectors such as

---

<sup>11</sup>*Ibid.*, pp. 32, 33.

<sup>12</sup>*Ibid.*, p. 50.

<sup>13</sup>Michel, *Indus Rivers*...p. 500.

<sup>14</sup>*West Pakistan Yearbook*...pp. 41, 42.

water management, the Irrigation Department, as well as the other water management departments, submit their new schemes to the Planning and Development Department. This department approves or rejects the various projected schemes and allocates funds for the projects. The funds are paid out by the Finance Department of the Province.<sup>15</sup>

Staff services governing personnel and administrative organization and methods are handled by the Services and General Administration Department. This department has been assigned to the control of services such as the Civil Service of Pakistan (CSP), Police Service of Pakistan (PSP) and others. As such it is the chief link the Irrigation Department has to the training Academies for the services and the National Institutes of Public Administration which are under the control of the Central Government.

The Irrigation Department has two indirect linkages with the Central Government. The first is through the Provincial Planning and Development Department to the National Economic Council. It is from this source that funds are ultimately allocated through the Provincial Planning Department to the Irrigation Department. The second linkage is that high level Irrigation Department personnel are trained in the service Academies under the Centre's Cabinet Secretariat.<sup>16</sup>

---

<sup>15</sup>*Ibid.*, pp. 20 - 22.

<sup>16</sup>*Pakistan Quarterly*, Vol. XII, No. 4, pp. 48 - 49.

West Pakistan Water and Power  
Development Authority

*History*

In 1958 the West Pakistan Water and Power Development Authority was established with the responsibility of exploiting the water and power resources of the province.<sup>17</sup> Movement for establishing such an authority began in 1948 when the Central Government of Pakistan wished to build the Warsak Dam with Canadian help. The Central Government set up a public corporation to build the Dam. However, it soon became apparent that transmission of power from the Dam would have to be taken over by another agency. This responsibility was then given to the Pakistan Industrial Development Corporation (PIDC). This was not entirely satisfactory for it separated water management from the production of electricity.<sup>18</sup> When this problem became coupled with the need to do more about salinity and water logging, and the necessity to form one agency impressive enough to attract foreign aid for the Indus Basin Project, the idea to build one "development-oriented" agency began to take shape.<sup>19</sup> The form of this single agency had been suggested earlier by Rowland Egger in 1953: He wrote:

As a second principle of organization of the work of the executive branch, those activities of the government which are essentially commercial in nature should be organized as government-owned

---

<sup>17</sup>G. Ahmed, "Changes in the Administrative Organization of the Government of Pakistan since 1953," *Public Administration*, Vol. 39 (London: Spring, 1961), pp. 355 - 356.

<sup>18</sup>Michel, *The Indus Rivers* pp. 348, 349.

<sup>19</sup>*Ibid.*, p. 350.

corporations, and should be permitted to operate with a maximum degree of independence of the control necessary for the regular departments and ministries. As suggested at a later point, they should be put on business-type budgets, and their accounts should conform to the best commercial accounting practices applicable to the type of business they transact. The government should deal with them financially on a net profit or loss basis. It should deal with them administratively as the sole shareholder, not as the board of directors.<sup>20</sup>

At the time when his report was received, the country was suffering from a great amount of political instability and to Egger's disappointment, nothing much was done about it. However, shortly after the martial law regime took over the nation in 1958, most of Egger's suggestions were put into effect.<sup>21</sup>

In answer to the need for coordination of water resources and power, the need for an impressive agency to attract funds for the Indus Basin Project and the need to do more about reclaiming salinized and water-logged land, one single agency was created. Due also to the Egger's report and the need for rapid action, an agency

---

<sup>20</sup>Rowland A. Egger, "Ministerial and Departmental Organization and Management in the Government of Pakistan," *Public Administration*, Vol. 39 (London: 1961), p. 152.

<sup>21</sup>Ralph Braibanti, "Transnational Inducement of Administrative Reform: A Survey of Scope and Critique of Issues," *Approaches To Development: Politics, Administration and Change*, John D. Montgomery and William J. Siffin (eds.) (New York, McGraw, Hill Book Co., 1966), pp. 142-143.

was created in the form of a public corporation. Thus, in 1958 the West Pakistan Water and Power Development Authority was established with the responsibility of exploiting the water and power resources of the province of West Pakistan.<sup>22</sup>

### *Functions*

After 1958 water management was shared by WAPDA and the Irrigation Department. The difference in their functions is spelled out by Michel when he says :

Since its establishment in 1958, WAPDA has controlled both power development and operations in West Pakistan, and with a few minor exceptions all water development (the Gudu Project was transferred from the Irrigation Department to WAPDA, but the Irrigation Department retains a few small development schemes... ..) Surface water operations are still controlled by the Irrigation Department which still assesses and collects the water dues.<sup>23</sup>

The functions of the West Pakistan Water and Power Development Authority or WAPDA according to its basic law are as follows :

1. The Authority shall prepare, for the approval of the Government, a comprehensive plan for the development and utilization of the water and power resources of West Pakistan on a unified and multipurpose basis.

---

<sup>22</sup>G. Ahmed. "Changes in the Administrative Organization of Government of Pakistan since 1953," *Public Administration*, Vol. 39 (London : Spring 1961), pp. 355-356.

<sup>23</sup>Michel. *The Indus Rivers* p. 352.

The Authority may frame a scheme or schemes for the Province or any part thereof providing for all or any of the following matters, namely :-

- (i) irrigation, water - supply and drainage; and recreational use of water resources;
- (ii) the generation, transmission, and distribution of power; and the construction, maintenance and operation of power houses and grids;
- (iii) flood control;
- (iv) the prevention of waterlogging and reclamation of waterlogged and salted lands;
- (v) inland navigation; and,
- (vi) the prevention of any ill effects on public health resulting from the operations of the Authority.<sup>24</sup>

The above functions are carried out by four "wings" of WAPDA. The administration and coordination wing, the power wing, the water wing, and the Indus Basin wing. Under its power wing, WAPDA supplies about 70% of the total electric power in West Pakistan. By 1964 WAPDA had thirty power stations. Total electricity generated has increased from 723 million kwh in 1959 - 60 to 2400 million kwh in 1964 - 65. It is estimated that the total capital investment in four to five years has quadrupled.<sup>25</sup>

---

<sup>24</sup> Guthrie S. Birkhead, "Government by Corporations," *Administrative Problems in Pakistan* (Syracuse: Syracuse University Press, 1966), p. 124.

<sup>25</sup> *Ibid.*, p. 125.

Under the water wing WAPDA is charged with constructing all of the new major works for irrigation and reclamation. It is usually a high policy decision whether new works will be assigned for maintenance and operation to the Irrigation Department or the Agriculture Development Corporation. However, not all operations are turned over to other agencies. In 1966 WAPDA still operated the Warsak Dam.<sup>26</sup>

Recently WAPDA has been very active in the construction of tube-wells for reclamation projects. The 1968 West Pakistan Yearbook describes WAPDA's involvement in reclamation projects when it says:

Top priority is being given to the development of groundwater resources in sweet water zone areas to remove waterlogging and salinity and to supplement irrigation water. It is now estimated that with an investment of about Rs. 1,239 million (including Rs. 400 million for tube-well electrification) during the third plan period, about 9,000 tube-wells will be installed in various SCARP areas, of which 7,856 tube-wells will be put into operation by June, 1970 covering 5 million acres and augmenting irrigation supplies by 10 million acre feet of water per annum. On the basis of the existing cropping pattern, about 2 million acre feet of the additional supplies will be given to wheat production.<sup>27</sup>

The Indus Basin Project Division constitutes the third "line" wing of WAPDA. At the time of partition nearly all of the irrigated land in northwest India went to Pakistan even though most of the headwaters and three rivers were in India. In April, 1948, the government of the

<sup>26</sup> *Ibid*, pp 126-127.

<sup>27</sup> West Pakistan Yearbook 1968 p. 32.

West Punjab in India stopped the flow of water from the three eastern rivers into Pakistan. Tensions rapidly rose on both sides. In 1951 David Lilienthal suggested that there was an engineering solution to the problem. Basically the plan was to give the waters of the three eastern rivers to India and to replace that water for Pakistan needs by means of constructing dams on the western rivers. After the dams were constructed, water might then be channeled to those areas in the eastern part of West Pakistan where the water from India would be cut off.<sup>28</sup> The plan was adopted and will be completed by 1980.

Birkhead describes WAPDA's role in the Indus Basin Plan when he writes:

WAPDA is Pakistan's agent to oversee the construction of the various projects comprising the Indus Basin Plan: two dams, seven canals, linking the rivers together, four diversions barrages, a "siphon" to carry one canal under a river, and extensive remodeling of portions of the old irrigation system.<sup>29</sup>

The two largest projects in the Indus Basin Plan are the Mangla Dam and the Tarbela Dam. The Mangla Dam, completed in 1967, was built largely with technical and financial help from foreign nations. Yet WAPDA was the supervisor of the entire project on behalf of the Government of Pakistan.<sup>30</sup> The contract for the Tarbela Dam, to be completed in 1975, was awarded to a Franco-Italian consortium for execution. This too will be supervised by WAPDA for the Government of Pakistan.<sup>31</sup>

---

<sup>28</sup>Birkhead, "Government by Corporations" pp. 137, 138.

<sup>29</sup>*Ibid.*, p. 140.

<sup>30</sup>*Ibid.*, pp. 141-143.

<sup>31</sup>*West Pakistan Yearbook, 1968*... pp. 30-31.

**TABLE I**  
**WEST PAKISTAN WAPDA EMPLOYMENT TOTALS**  
**AS OF JUNE 30, 1964**

	Adminis- tration & Coordina- tion Wing	Power Wing	Water Wing Minus IBP	Indus Basin Project Division	Total	Con- trac- tors	Expatri- ates with Consul- tants	
Engineers	—	615	466	458	1,539	468	250	2,257
Officers (excluding Engineers)	91	95	318	160	664	168	82	914
Establishment (office workers)	488	7,444	5,219	2,660	15,811	3,571	2	19,384
Laborers (skilled unskilled, general utility)	341	24,938	18,337	4,530	48,146	27,220	—	75,366
<b>Grand Totals</b>	<b>920</b>	<b>33,092</b>	<b>24,340</b>	<b>7,808</b>	<b>66,160</b>	<b>31,427</b>	<b>334</b>	<b>97,921</b>

Source: West Pakistan WAPDA. "West Pakistan WAPDA Manpower Statistics as on 30-6-64." P. and I. Publication No 36, Lahore December, 1964. Table I. 1.<sup>32</sup>

<sup>32</sup>Birkhead, *Public Corporations*.....p. 131.

The fourth wing provides staff services to the other three wings and is called the Administration and Coordination Wing. This wing not only has responsibility toward the "line" operations but also maintains contacts with other water, government, and international agencies.

#### *Structure*

WAPDA is second only to the West Pakistan Railway in the number of people employed. Table I (on page 36) gives the totals working under the various wings.

Birkhead describes WAPDA's personnel practices when he says:

In general, WAPDA's personnel practices are regulated closely by the provincial government. It does have slightly more freedom here than do ordinary departments of government. For example, its salary scales have been allowed to ascend somewhat higher than those of other government agencies, and there are a few advantageous fringe benefits. Many of its professionals, however, are deputed from Irrigation and other departments of the provincial government. Their terms of service, including their salaries, are regulated by that governments<sup>33</sup>

The top post in WAPDA has been held by Ghulam Faruq and Ghulam Ishaq, the chairmen until 1966. Both have been members of the elite Civil Service of Pakistan and have held many other top posts in the central and provincial governments. Birkhead believes that because of the confidence placed in these men, they were given more freedom to operate than normal government departments.<sup>34</sup>

---

<sup>33</sup>Birkhead, "Government by Corporations" p. 133.

<sup>34</sup>*Ibid.*, p. 135.

**TABLE II**  
**WEST PAKISTAN WAPDA RECEIPTS AND**  
**EXPENDITURES, 1959-65**  
*(Million Rupees)*

Receipts		Expenditures	
Revenue (largely from sale of electricity)	848.95	Revenue Expenditure (largely on electricity distribution)	601.07
Debentures	129.84		
Foreign Loans	445.57	All construction except Gudu barrage and Indus Basin Works	2165.74
Indus Basin Plan non-reimbursable costs received from Central Government	64.54	Gudu Barrage	386.55
For Gudu Barrage	367.35	Other	6.08
Loans (grants) from Provincial Government	1196.94	Indus Basin Plan non-reimbursable expenditures	64.54
Other	273.37		
<b>Totals</b>	<b>3327.06</b>		<b>3223.98</b>

*Source:* West Pakistan WAPDA, "Selected West Pakistan WAPDA Financial Statistics." P. and I. Publication No. 41, April, 1965. Table I B, pp. 23-24.<sup>35</sup>

<sup>35</sup>*Ibid.*, p. 129.

Table II (on page 38) summarizes the financial situation of the Authority. The figures in Table II do not include most of the costs of the Indus Basin works being paid from external sources. In the last few years that sum has almost equaled WAPDA's expenditures on all other projects.

Figures for the bienium of 1963-65 in Table III (on page 40) show similar types of receipts and expenditures.

### *Linkages*

WAPDA's chief linkage with the Irrigation Department consists of building dams, barrages, canals, and tube wells which the Irrigation Department will then manage and maintain. WAPDA also obtains personnel from the Department as was mentioned above. WAPDA's linkage with the Agricultural Development Corporation is similar. In the areas where the ADC operates, water works are turned over to them for operation and maintenance. The WAPDA head is also represented on the Land and Water Development Board. In the various SCARP projects WAPDA plays an important if not leading role.<sup>37</sup>

WAPDA's linkages with the Provincial and Central Government are similar to a regular department of government. It operates within its organic law and in the framework of both the Provincial and Central Governments. Top management personnel of its Authority are appointed and can be fired by the Provincial Government. Furthermore, all schemes submitted by WAPDA must pass through regular provincial and central government channels before receiving approval and go-ahead. These proposed schemes are reviewed

---

<sup>37</sup> *West Pakistan Yearbook, 1968 pp. 38 - 43.*

**TABLE III**  
**WEST PAKISTAN WAPDA BUDGETED**  
**RECEIPTS AND EXPENDITURES**  
*(Million Rupees)*

	Revised 1963-64	Budgeted 1964-65
<i>Receipts</i>		
1. Revenue	174.0	195.6
2. Capital		
a. Provincial Government	239.4	328.3
b. Foreign Loan	114.1	202.4
c. Debentures	25.1	12.5
d. Gudu Barrage	62.4	46.7
e. Miscellaneous	.6	.6
3. Indus Works non-reimbursable	14.3	40.3
<b>Total</b>	<b>630.3</b>	<b>826.6</b>
<i>Expenditures</i>		
1. Revenue	159.7	180.3
2. Capital		
a. Other than Gudu	380.5	547.0
b. Gudu	62.4	46.7
c. Other	2.0	2.0
3. Indus Works non-reimbursable	14.3	40.3
<b>Total</b>	<b>630.3</b>	<b>826.6</b>

Source: West Pakistan WAPDA, The Budget 1964-65, pp. 2-3.<sup>36</sup>

<sup>36</sup>*Ibid.*, p. 131.

and approved by an *ad hoc* committee expert in the subject matter under review. They then proceed to the Central Government through the Planning and Development Department of the Province. Eventually the schemes are proposed to the Executive Committee of the National Economic Council. If they are in line with the current five year development plan, they are approved (Figure III on page 42.)

A further connection to the Central Government is exercised by the Comptroller and Auditor General who audits all of WAPDA's accounts. A move was made in 1963 to subject all transactions of WAPDA and other public corporations to review and veto by the provincial authorities. In 1965 WAPDA and the other corporations were still resisting such controls by arguing that public corporations should be judged on their results rather than on their day to day operations.<sup>38</sup>

Because of WAPDA's size and its role in large development projects it has several rather unique connections to the provincial and central Governments. Birkhead observes:

It may..... be emphasized that for all WAPDA operations which are included in the provincial budget, the Authority generally reports to the provincial government through the Secretary of Irrigation and Power. Since, however, the chairman of WAPDA is an official of high status, dealing with matters of first importance, he has access to and indeed status equal to higher officials. For all matters concerned with Indus Basin Replacement Plan, WAPDA is the agent of the central government, and thus these matters do not go through the provincial department at all.<sup>39</sup>

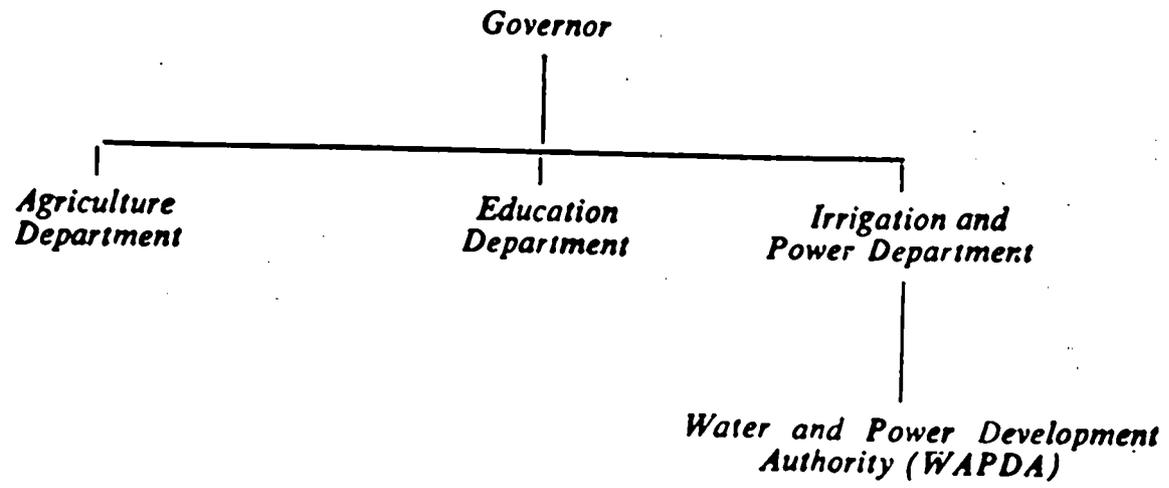
---

<sup>38</sup>Birkhead, "Government by Corporations"...pp. 133, 134.

<sup>39</sup>*Ibid.*, p. 137.

**FIGURE—II**

**WAPDA'S RELATIONSHIP TO WEST PAKISTAN GOVERNMENT**



42

See Appendix I

WAPDA also has some indirect linkages to International bodies. In 1960, the Indus Waters Treaty was signed in Karachi by President Ayub of Pakistan and Premier Nehru of India. Under the treaty a Permanent Indus Commission was set up to watch over the treaty. Birkhead describes the relationship of WAPDA to the Commission when he states :

Pakistan's member on the Permanent Indus Commission reports back to the Joint Secretary for Natural Resources in the Central Government. His immediate superior, the Central Secretary of Industries and Natural Resources is the chairman of a body called the Indus Basin Development Board. This Board is the means of coordinating central departmental functions and central provincial relationships on the Indus Basin works. It consults on expediting the construction of these by WAPDA and other agencies. It considers manpower problems, creation of new industries to provide materials, and other general ways of coping with the impact of the huge building program. It serves, additionally, as the development working party for Indus Basin projects—that is, as the principal planning agency. Therefore its recommendations on Indus projects go directly to the Executive Committees of the National Economic Council and do not go through the Central Development Working Party as the other schemes and projects for WAPDA and other departments. This special status of WAPDA's Indus Basin Plan Projects distinguishes them sharply therefore from other undertakings of the Authority.

WAPDA's chairman of course serves as a member of the Indus Basin Development Board, and WAPDA is also represented by its chairman or by other key officials in reviewing at that high level the course of projects under the Indus Basin Plan.<sup>40</sup> (See Figure IV on Page 45.)

Because the projects undertaken in the Indus Basin Replacement Plan require large amounts of foreign assistance, WAPDA is indirectly connected with donor nations through the Ministry of Foreign Affairs.<sup>41</sup> Donor nations for the Indus Basin Water Plan included Australia, Canada, Germany, New Zealand, United Kingdom and the United States.<sup>42</sup>

In this chapter we have briefly described the Irrigation Department and the West Pakistan Water and Power Development Authority. In the next chapter we will describe those water management agencies which administer water together with supplying agricultural inputs for greater crop production.

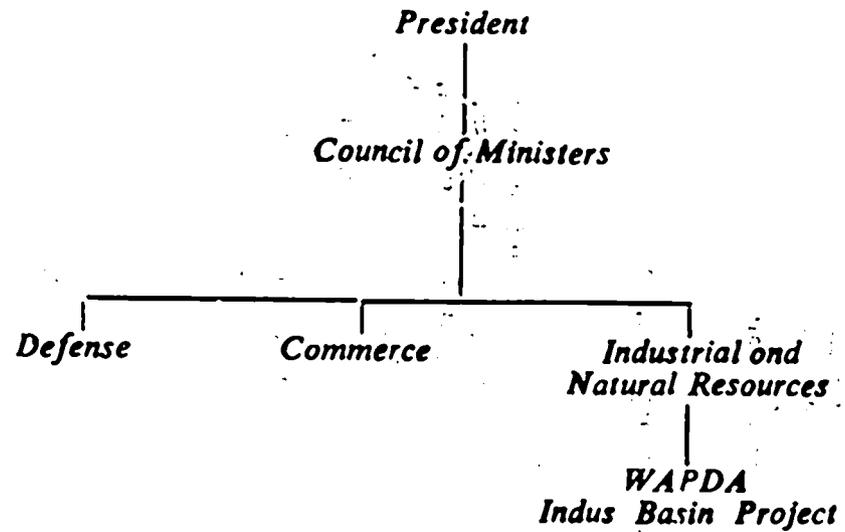
<sup>40</sup>*Ibid.*, p. 140.

<sup>41</sup>*Ibid.*, p. 135.

<sup>42</sup>*Ibid.*, p. 139.

FIGURE—IV

WAPDA'S RELATIONSHIP TO CENTRAL GOVERNMENT  
IN REGARD TO INDUS BASIN PROJECT



45

See Appendix II

## CHAPTER—V

### Water Related Agencies

Department of Agriculture

#### *History*

Like the Department of Irrigation, the West Pakistan Department of Agriculture has been in existence since the founding of the nation. This Department has less to do with water management than any other department under consideration. Although, the Department is quite extensive, its roles in water management are the construction and maintenance of tube-wells in minor irrigation schemes, the construction of private tube-wells, land-leveling procedures for more efficient irrigation, and reduction of water logging.

#### *Functions*

The functions of the Agriculture Department are described as follows:

The objectives of the department are agricultural extension, research, education in the specified fields, improvement of agricultural methods, provision of free services such as required for the control of pests and diseases, land development and installation of tub-wells, etc., improvement of livestock, prevention and cure of animal diseases, conservation and development of forests, soil conservation, development of fisheries and projects of wild life.<sup>1</sup>

---

<sup>1</sup>West Pakistan Yearbook, 1965 (Lahore: Information Dept., 1965), p. 90.

For the purposes of this research the discussion will be limited to the water management and land-leveling functions of the Department. These functions are carried out by the Agricultural Machinery Organization under the Agriculture Wing of the Department. The Yearbook of 1965 describes the activities of the Agricultural Machinery Organization when it says:

It is engaged in the following activities:

- (a) Land leveling by means of earth moving machinery.
- (b) Ploughing/discing etc., of land by means of tractors.
- (c) Drilling of tube-wells and open wells.
- (d) Operation and maintenance of workshops.
- (e) Training of tractor operators.
- (f) Research and development of indigenous farm implements.

To undertake the above activities a full-fledged organization has been set up in the three regions. The work done by the organization has been summarized in the following table.

**TABLE IV**

Work done during 1964-65				
Item of work	Peshawar Region	Lahore Region	Hyderabad Region	Total
1. Area ploughed	12,820	22,334	394	38,548
2. Area levelled	7,716	29,765	22,836	60,317
3. Tube-wells drilled	—	771	39	810
4. Tube-wells installed	114	151	38	303
5. Open-wells dug	14	—	—	14
6. Operators trained	27	100	80	207 <sup>2</sup>

<sup>2</sup>*ibid.*, pp. 93-94.

Each tube-well usually helps raise crops on an area of 100 to 125 acres. In addition to constructing and maintaining some tube-wells, the Agriculture Department constructs a great number of private tube-wells for individuals. The Department estimates that over 25,000 private tube-wells were installed during the second five-year plan from 1960-1965.<sup>3</sup>

### *Structure*

The Department of Agriculture has a large, imposing, and diverse organization comprised of a Forest Wing, an Animal Husbandry Wing and an Agriculture Wing (see Figure V on Page 49). However, in this paper we are only interested in the Agriculture Machinery Organization, a division of the Agriculture Wing which is active in the tube-well drilling and land-leveling. This organization is a subdivision of the Agriculture Wing of the Department. Like other parts of the Agriculture Wing, it has offices at the Divisional Level. Thus, its unit of administration corresponds to the political boundaries of the province. This is the only agency involved in water management where this is the case. At this time, workshops for the Agriculture Machinery Organization exist at Multan, Lyallpur, Lahore, Hyderabad, and D. G. Khan.<sup>4</sup>

### *Linkages*

A chief reason why both the ADC and the LWDB were called into existence is because of almost non-existent structural linkages between the Department of Agriculture and other water management agencies. This is not to say that

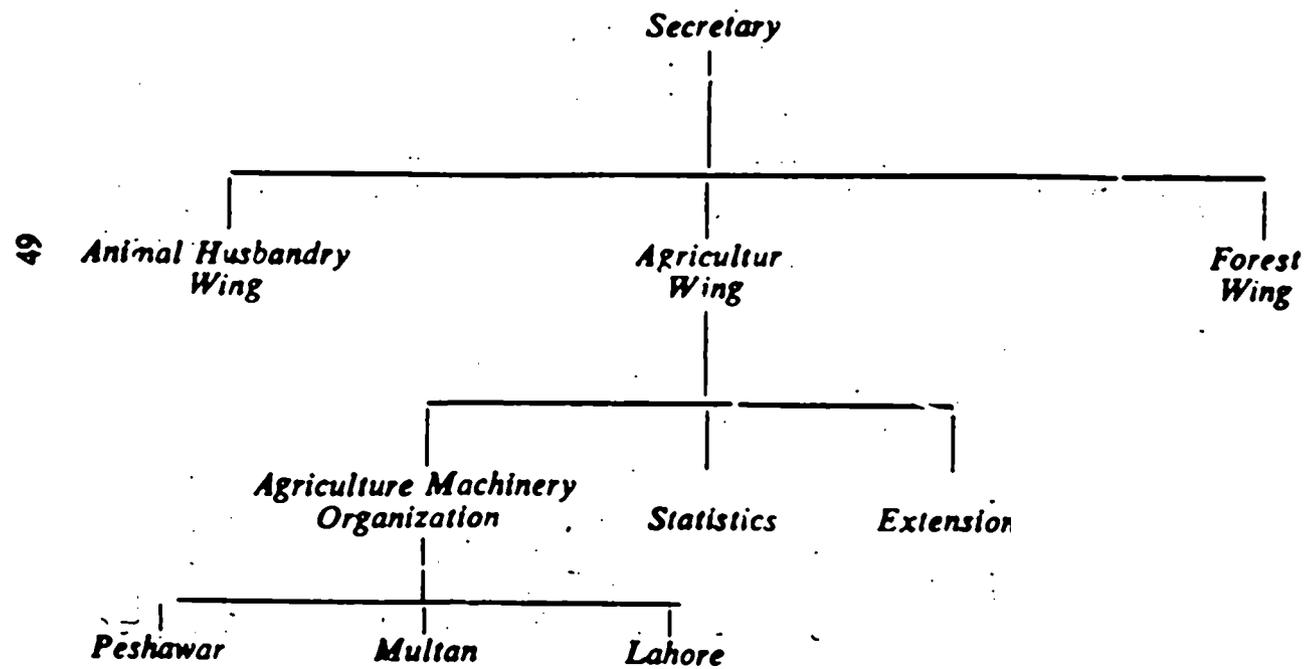
---

<sup>3</sup>Ibid., p. 95.

<sup>4</sup>Interview with Mr. Khalid Mahmood.

FIGURE—V

DEPARTMENT OF AGRICULTURE



informal linkages do not exist at the district or Union Council level. Districts in non-SCARP, non-ADC areas do have a development committee on which are members of the Department of Irrigation and Department of Agriculture. However, whether or not much cooperation takes place depends upon the personalities of the men involved.<sup>5</sup>

In SCARP areas, personnel from the Department of Agriculture are seconded to the project directors. The same is true in the ADC areas. The Secretary from the Agriculture Department is a member of the Land and Water Development Board. A special relationship exists between the Department of Agriculture and the Agriculture Development Corporation since the latter is an attached department of the former and reports to the provincial government through the Secretary of Agriculture.<sup>6</sup>

A significant linkage "gap" seems to be present between the activities of the Agriculture Machinery Organization which drills private tube-wells and other water management agencies. Although the large supply of ground water has minimized difficulties thus far, some problems can develop in the future unless coordination through policy discussions or water law takes place.

Like other provincial departments, the Department reports to the provincial government through the Chief Secretary of the Province. Requests for funds are made through the provincial Department of Planning and Development. Staff services are for the Agriculture Department are handled in the same way as for the Irrigation Department.<sup>7</sup>

---

<sup>5</sup>*Ibid.*

<sup>6</sup>See Appendix I.

<sup>7</sup>See p. 40

## Agriculture Development Corporation

*History*

In 1960 the Central Government authorized a Food and Agriculture Commission to make a study of Pakistan's agricultural needs and potential. The Food and Agriculture Commission (FAC) recommended the creation of a public corporation in both West and East Pakistan. These corporations would be known as the Agriculture Development Corporations or ADCs. Their primary responsibilities would be to integrate water and agricultural inputs so that the farmers could greatly multiply their yields. The idea was to carry out this objective on a project basis, concentrating first on a number of specified areas, but eventually covering the whole of the country.

Michel describes the form of organization of these corporations when he states :

The East and West Pakistan ADC's would be semi-autonomous bodies with their own budgets exempted from the need to recruit through the Public Service Commission but able to borrow technicians "on extended temporary duty" from the older departments.<sup>8</sup>

The FAC clearly saw the need of integrating water and agricultural inputs. They also suggested a strategy based on "project areas." The idea of a public corporation had also been accepted with WAPDA's initial success. Nevertheless, there was no overriding political pressure to put the FAC's recommendations fully into practice.

---

<sup>8</sup>Michel, *The Indus Rivers*.....p. 427.

*Functions*

The Agriculture Development Corporation's responsibilities were defined in terms of certain priorities. Platt describes this when he says :

Thus the functions allotted to the ADCs included : (1) arranging on a commercial basis for supply of seed, fertilizer, plant protection equipment, and machinery; (2) promoting cooperative societies with the aim of eventually handing all supply activities over to them; (3) assuming management of state farms when so directed by the government; and (4) promoting the production of farm machinery. In practice the corporations have limited themselves mainly to supply. They have moved into extension only in special project areas where the department representatives do not come, e.g., in the new lands opened up by the Ghulam Mohammed Barrage in the lower Sind. There they are authorized to supercede the traditional bureaucracy.<sup>9</sup>

In 1968 the ADC had seven projects underway, the Ghulam Mohammed Barrage project, the Gudu Barrage project, the Thal project, the Taunsa Barrage project, the Soan Valley Land Improvement project, Small Dams Organizations and Agricultural Estates.

The *West Pakistan Yearbook* describes the role in which the ADC in that province is involved in water management when it says :

In these projects the Corporation is engaged in hundreds of things which cannot be detailed..... In these projects, especially in GMB and Gudu, work on digging up canals, constructing drains, setting up chako and mandi towns, laying out roads and farms, caring for animals and organizing co-operatives is in full swing ..... In the field of irrigation over 2 thousand miles of canals have been

---

<sup>9</sup>Platt, *Administrative Problems in Pakistan*.....pp. 101, 102.

built, 1,100 miles in GMB and 900 miles in Gudu Barrage since ADC came into the picture. Minor canals and distributories so far built extend over 2,000 miles. In that the capacity of the main canal has been extended from 6,000 to 7,500 cusecs. Besides, as a counter measure to salinity and water-logging, 900 miles of drains have been dug in GMB benefiting over 11 lac acres.<sup>10</sup>

Besides building and maintaining irrigation works in certain project areas the ADC also has been placed in charge of the Small Dams Organization. The *West Pakistan Yearbook* covers the function and history of the organization up to its adoption by the ADC when it states:

Small Dams Organization was set up in December, 1960 under the direct control of the Governor of West Pakistan by constructing dams of low and medium height on small catchments. The objective was to conserve and develop water resources for boosting up food production and also achieve some measure of soil conservation and flood protection, besides providing drinking water to the villages nearby. In 1962, the Small Dams Organization was transferred to Agricultural Development Corporation, West Pakistan.<sup>11</sup>

The ongoing functions of the Small Dams Organization are to construct dams in certain areas and to investigate new sites. As of 1968, work was already progressing on seven dams and investigation has been carried out at 16 other dam sites.

#### *Structure*

For the most part, the ADC is structured according to the project areas it administers. Thus, each project area is governed by a project director who has charge over all of the activities connected with development within the area. Staff is seconded to the project director by other agencies.<sup>12</sup>

---

<sup>10</sup>*West Pakistan Yearbook, 1963*.....pp. 46-47.

<sup>11</sup>*Ibid*, p. 35.

<sup>12</sup>Interview with Mr. Khalid Mahmood.

Platt comments on one aspect of the personnel problem in the organization of the ADC when he says:

The ADC's are confronted with the same set of exhausting circumstances that have plagued previous programs: small farms, poor soils, ancient farming methods, lack of credit, and lack of education. In addition, they have continuously faced the difficulty of obtaining competent professional personnel. The departments hold an almost total monopoly of experienced agricultural specialists, and they have given few indications of willingness to share this scarce resource.<sup>13</sup>

#### *Linkages*

In regard to its water works the ADC has fairly few linkages with other water agencies. It stands in a receivership relation to WAPDA, managing the various water projects which are turned over to it. It also stands in a competitive/cooperative relationship to the Irrigation Department, at times vying for maintenance responsibilities for new work.<sup>14</sup> In the Thal area, the Irrigation Department has been placed under the ADC through the chairman of the Thal Development Corporation.<sup>15</sup>

The chairman of the ADC serves in a part-time capacity as a member of the Land and Water Development Board together with the heads of other agencies.<sup>16</sup>

In regard to linkages with the Provincial Government of West Pakistan, ADC has approximately the same linkages in terms of planning, finance and personnel as WAPDA. However, it reports immediately to the Provincial Government through the Department of Agriculture rather than through the Department of Irrigation as is the case with WAPDA.

---

<sup>13</sup>Platt, "Agriculture: Administration".....p. 102.

<sup>14</sup>See p. 45, 46.

<sup>15</sup>See p. 38.

<sup>16</sup>Interview with A. Lateef.

### *History*

When WAPDA was formed in 1958, it was given responsibility to remedy and prevent water-logging and salinity. WAPDA came up with a reclamation plan in 1961. The unveiling of this plan coincided with a number of other events. Vice-President Lyndon Johnson visited West Pakistan in May of that year where he was briefed on the problems. Shortly thereafter, Dr. Abdus Salam visited M.I.T. and talked with Jerome B. Wiesner, President Kennedy's Science Advisor. When President Ayub visited Kennedy in July of the same year, foundations were laid in Pakistan and the United States for a high level investigation of the water-logging and salinity problem.

After President Ayub's visit a team was assembled by Jerome Wiesner and later turned to Dr. Roger Revelle. Comprised of both technical experts and generalists the panel and its staff had occasions to study salinity and water-logging together with other agriculturally related problems.<sup>17</sup>

Although the Wiesner-Revelle mission was to study water-logging and salinity, the recommendation in their final report (henceforth Revelle report) dealt mainly with the integration of water and agricultural inputs. The primary recommendation of the Revelle report was to reorient the strategy of agricultural production so that all efforts of water management agencies and agricultural input agencies would be concentrated upon a few project areas. Administratively speaking, it would shift the administration of agricultural production from structures based on function to those based on area.<sup>18</sup>

---

<sup>17</sup>*Ibid.*, pp. 475, 476.

<sup>18</sup>*Revelle II*.....p. 4.

The strategy for this approach is spelled out by the report when it states:

We propose that the major part of the culturable lands of the Indus Plain be divided into some 25 to 30 project areas of roughly a million acres each, manned by a competent and adequate staff under the supervision of a vigorous director with responsibility for modernizing the agriculture of his region and provided with the necessary equipment and supplies. In each project area tube-wells or other means of drainage would be constructed to control the level of ground water and salt soil content, and where possible, to increase the supply of irrigation water. Chemical fertilizer containing 40 to 50 million pounds of nitrogen would be provided each year; together with better seeds and means for control of plant disease, insects, and weeds. Maintenance shops for machinery and motor vehicles, and facilities for in-service training, applied research, and plant experimentation, would be constructed and operated . . . For the first five or six years we would propose to bring in project areas at the rate of about one a year. The entire development would be spread over more than a generation.<sup>19</sup>

At the suggestion of the Pakistan government, the Revelle Report also recommended a form of organization to manage the project areas. The panel recommended that the government of West Pakistan mobilize its efforts in the project areas around the legal powers already given to its Soil Reclamation Board. The Board would be renamed and called the Land and Water Development

<sup>19</sup>*Ibid.*, pp. 4, 5.

Board. Its members would include the Secretary of Irrigation, the Secretary of Agriculture, the Chairman of the Water and Power Development Authority (WAPDA) and the Chairman of the Agricultural Development Corporation (ADC), the Secretary of Labour and Cooperatives, the Secretary of Local Government and Basic Democracies, and a Finance Member (see Figure VI on Page 58).<sup>20</sup> On the basis of the Revelle Report the Land and Water Development Board was created out of the old Soil Reclamation Board. The government of West Pakistan also adopted the recommendations of the composition of the Board. However, they substituted the Chairman of the Land Reforms Department for an additional Chief Secretary as chairman.<sup>21</sup>

Even though the Land and Water Development Board was created and given control over the first Salinity Control and Reclamation Projects (henceforth SCARPs) little has been done to initiate new projects. Michel says:

It is somewhat disturbing that the Board has not yet moved in the direction of appointing project managers and allowing them to organize the administrative, farmer training, credit and experimental services over the initial three or four years of each project area as recommended by the panel. For the early administrative start, embodying both a concentrated localized application and the cumulative development of a cadre of specialists, represents not only an essential feature of the Revelle approach but undoubtedly one of the most difficult to achieve in the intertwined context of traditional farming attitudes and bureaucratic in West Pakistan.<sup>22</sup>

---

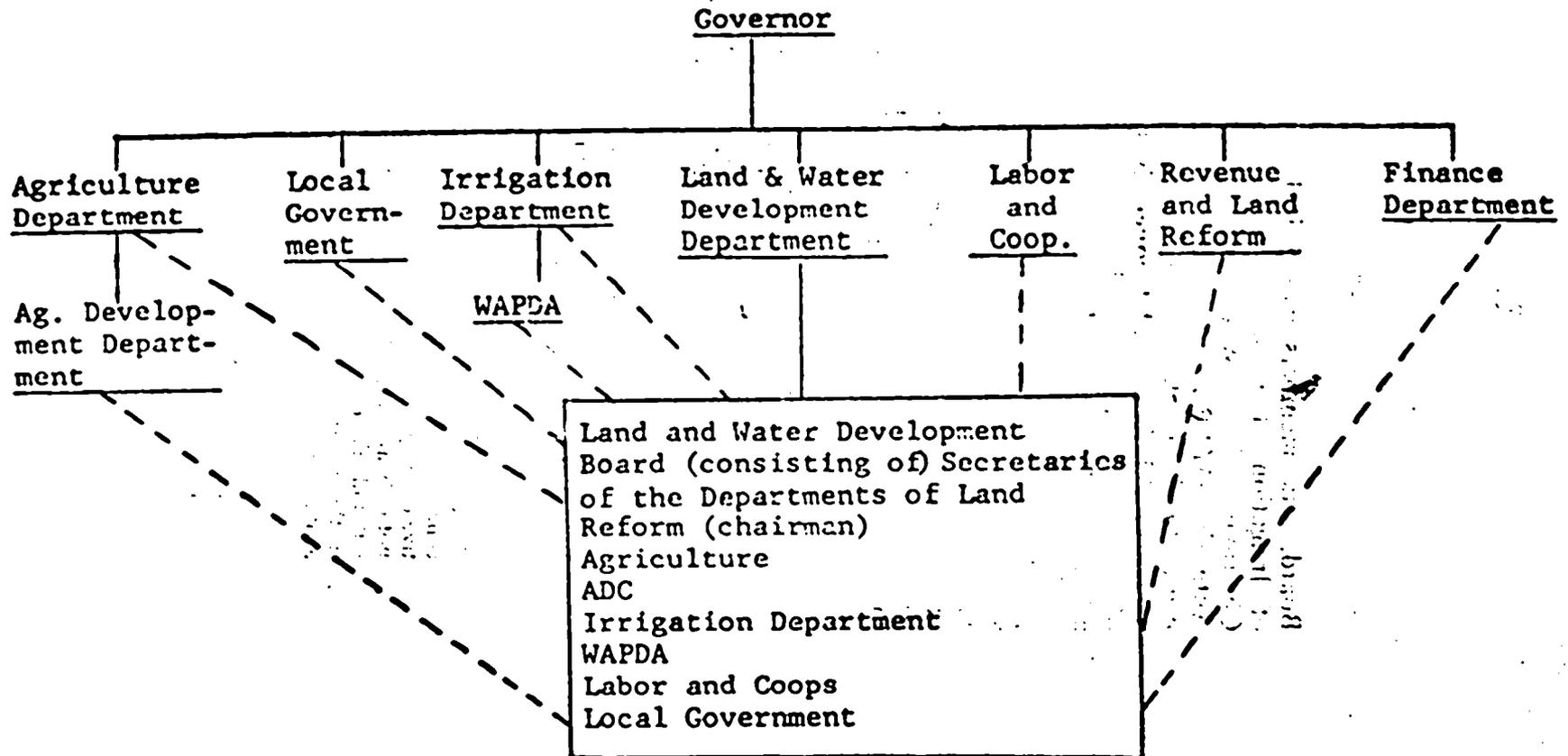
<sup>20</sup>*Ibid.*, p. 16.

<sup>21</sup>Michel, *The Indus Rivers*.....p. 500.

<sup>22</sup>*Ibid.*, pp. 500,501.

FIGURE 6

LAND AND WATER DEVELOPMENT BOARD



Even though the Revelle Panel's suggestions were neither original nor altogether put into practice, they did accomplish a number of important things. Michel states :

Precedents can be found for most of the elements in the Revelle approach, but the combination and emphasis were novel. The Revelle Panel analyzed and endorsed the massive approach embodied in WAPDA's SCARP I, suggested modifications in the scope and phasing of WAPDA's master plan of May, 1961, endorsed ADC's multifactor approach but asked for a much more concentrated application, and, at the urging of Pakistan, made specific recommendations for long-range administrative arrangements. Of all the panel's recommendations, substitution of an administrative structure based on a limited area rather than function, initial and ultimate concentration on the better lands, heavy emphasis upon fertilizer inputs, and the stress upon the principle of interaction represent the major contributions.<sup>23</sup>

In July, 1964, partly due to the recommendations of the Revelle commission, the West Pakistan Land and Water Development Board was created in lieu of the Soil Reclamation Board and was placed in charge of a Salinity Control and Reclamation Project (SCARP) in Central Rechna Doab called SCARP I. This project had its origin in several schemes framed by the Ex-Punjab Government. In 1962 the project was executed through the installation of about 1800 tube-wells. It was hoped that these wells would provide additional irrigation water and lower the water table. These additional water supplies would then be coordinated with other agricultural inputs in the project areas.<sup>24</sup>

---

<sup>23</sup>*Ibid.*, p. 489.

<sup>24</sup>*West Pakistan Yearbook*, 1968.....p. 39.

### **Functions**

The first objective of the Land and Water Development Board (LWDB) is to fully eliminate the water-logging and salinity in project areas and restore the soil to health. The second objective is coordination of additional water supplies with agricultural inputs such as better seeds, fertilizers, pesticides, credit and marketing facilities. The West Pakistan LWDB has attempted to carry out these objectives by establishing a field organization wherein these objectives are met by coordinating and integrating the activities of various departments and putting them under the direct administrative control of a project director.

In 1968 there were two field operations under the control of the Board. The Yearbook of 1968 cites these when it states:

At present there are two projects in operation with the Board:

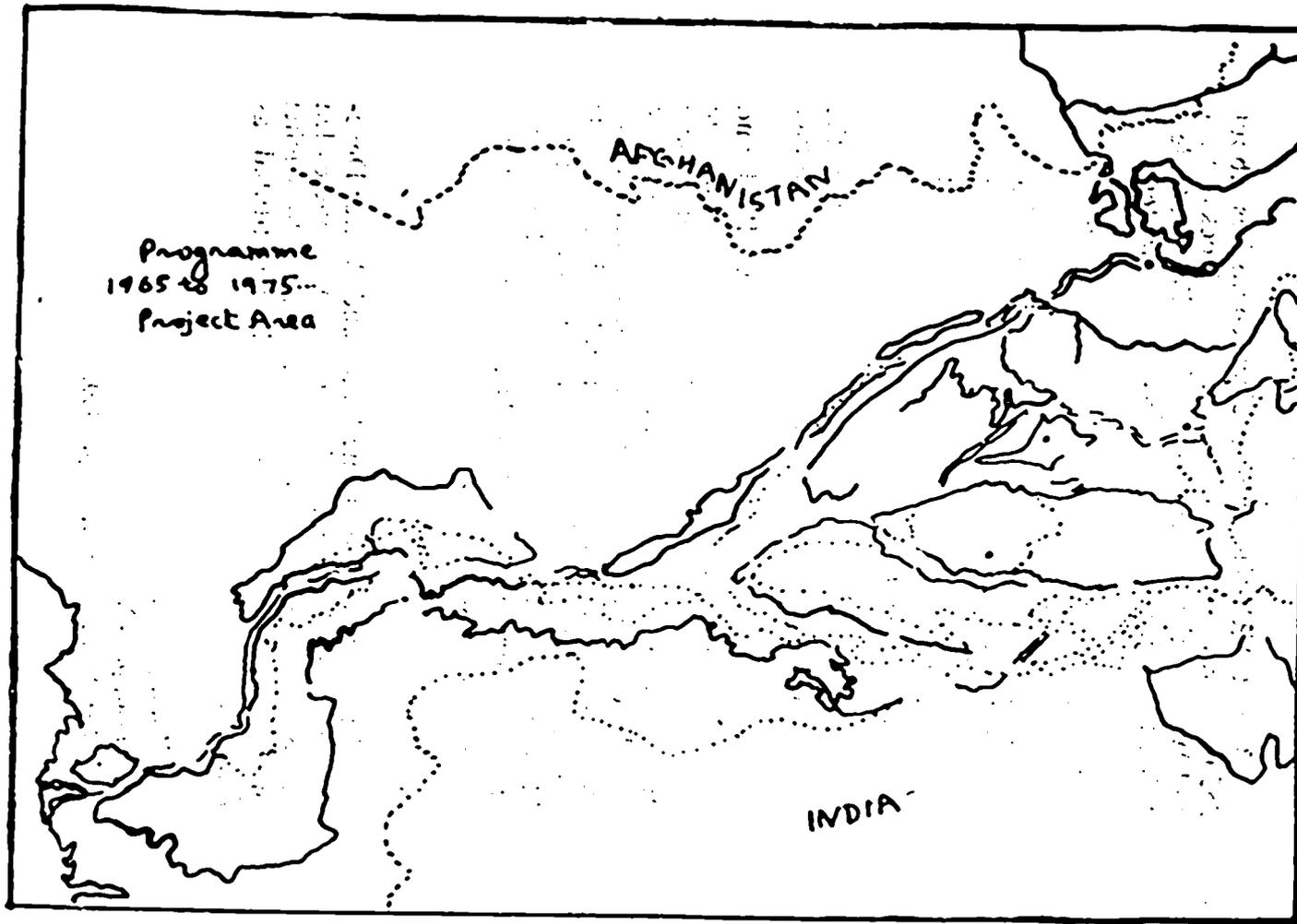
- (1) Salinity control and Reclamation Project No. 1 (SCARP I) comprising 1.2 million acres in the Sheikbupura, Gujranwala, Lyallpur and Jhang Districts.
- (2) Salinity Control and Reclamation Project, Khairpur (SCARP - Khairpur) covering 0.3555 million acres of the ex-khairpur State.<sup>25</sup>

The commanded area of SCARP I is 1,140,678 acres out of which 424,717 acres had been affected by water-logging or salinity. By 1967, 254,975 acres had been reclaimed (Map II on page 61). The ground water depth in the project area had been lowered an average of about 9 feet which completely eliminated water-logging in the area. Yields have increased by 94% in one year and financial gains have become three-fold in the same amount of time.<sup>26</sup>

---

<sup>25</sup>Ibid., p. 38.

<sup>26</sup>Map II.



MAP I

The SCARP-Khairpur project comprises about 355,000 acres and is divided into two blocks, East and West of the Rohri Canal. The *Yearbook* describes the objective of the project when it writes:

The objective of the project is to lower the groundwater to depth of about seven feet and then to control it at that depth. The project also envisages the utilization of the pumped supplies, wherever it is of good quality to increase area under irrigation ... where there is no demand for additional irrigation supplies and where the salinity of the pumped water precludes its direct use the wells discharge into a system of shallow unlined drains.<sup>27</sup>

At this time it is still premature to evaluate either the reclamation of soil or the increase of yield and income.

Together with directly operating SCARP I and SCARP-Khairpur, the LWDB assists the Irrigation Department in its work on SCARP II comprising most of the Chaj Doab. While the project as a whole is to be operated by the Irrigation Department assisted by the Agriculture and Co-operative Departments operating in the project area, 138 tube-wells of the Mona project are the responsibility of the Board and are being operated by WAPDA on behalf of the board as a research project.<sup>28</sup>

### *Structure*

The membership of the Land and Water Development Board is almost the same as the one called for by the Revelle Report.<sup>29</sup> According to Michel the actual membership is presently constituted as follows:

---

<sup>27</sup>*Ibid.*, p. 42.

<sup>28</sup>*Ibid.*, p. 42.

<sup>29</sup>*The Revelle Report II*.....p. 180.

Member for Land Reforms, Board of Revenue (Chairman of the Management Board) Chairman, WAPDA, Chairman West Pakistan ADC, Secretary to Government of West Pakistan for Finance, Secretary for Agriculture Secretary, for Irrigation and Power, Secretary for Co-operation, Labour, and Social welfare, and Secretary for Basic Democracies and Local Development. All of these except the representative of the Board of Revenue were suggested by Revelle II.<sup>30</sup>

A more recent publication lists the Chief Secretary of the Government of West Pakistan as the *ex officio* Chairman of the Board. According to the Irrigation and Agriculture Consultants Association's (IACA) report the full Board meets only once every two months which leaves the coordination tasks up to the Project Director. At the time of the IACA's report, only one project director had been placed and he was given charge over the SCARP I command. As was envisioned by the Revelle Report, he was given the overall command of the development of activities. The staff in SCARP I are seconded from the regular departments and carry out extension, reclamation, input supply, and irrigation activities.<sup>31</sup>

### *Linkages*

Of all the water management departments none has more linkages to other water management agencies as does the Land and Water Development Board. Every one of the agencies is represented at the highest level by the respective Secretaries and Chairman. They are furthermore linked with the

---

<sup>30</sup>Michel, *The Indus Rivers*.....p. 500.

<sup>31</sup>Irrigation and Agriculture Consultant's Association, quoted in Lieftinok and Associates, *Water and Power Resources of West Pakistan, Vol. II*.....pp. 190, 191.

departments dealing with other aspects of agriculture such as Land Reform, Board of Revenue, Co-operation and Basic Democracies. The Land and Water Development Board is an attached Board to the Department of Land and Water Development. The Chief Secretary of West Pakistan, Mr. Afzal Agha also serves as the Secretary of this department.<sup>32</sup>

As with the other water management agencies, appropriations for the operation of the Land and Water Development Department are obtained by submitting requests through the provincial Planning and Development Department of the West Pakistan Government and are paid out through the Finance Department. Supervision of organization, methods and certain personnel are carried out for the LWDB as they are for other departments.

These agencies mentioned in the last two chapters and their linkages make up the present water management system in West Pakistan. In the next chapter we will see what effect the new environments will have upon them.

---

<sup>32</sup>See Organizational Chart, Government of West Pakistan. Appendix I.

## CHAPTER—VI

### Adaptation to New Environments

In the previous chapters we have described the existing water management agencies in West Pakistan. According to the organizational theory we are using, these agencies have as their chief goal to maintain their present patterns of organization and operation. Nevertheless, to satisfy new circumstances and events, which we will term "environments," they will need to formulate new organizational goals and perhaps change their agency forms and functions. We will define "environment" broadly to include events and circumstances in the physical realm, the political realm, and the administrative realm. After we have described these environments in this chapter, we will suggest in the next chapter how they will help shape new organizational goals:

#### Physical Environmental Factors

##### *Salinity and Waterlogging as Problems in Agricultural Production*

The problems of waterlogging and salinity in West Pakistan are almost as old as the irrigation itself. The General Report on the Administration of the Punjab and its Dependencies for 1859-60 contains the following revealing passage related

to the Western Jamma Canal:

Unscientifically constructed, the canal bed is in many places above the level of the country and interferes with its drainage. Swamps are formed: the soil is deteriorated: worst of all, with the excess of water up comes from below a coating of salts, which has for several years gone on spreading, and has unquestionably not only injured the productive powers of the land, but impaired the physical condition of the people.<sup>1</sup>

Through the years the problem has grown worse until it reached such alarming proportions that it became the number one concern in discussions between Ayub Khan and President Kennedy during Ayub Khan's visit to Washington in July, 1961. As a result of this discussion, the Wiesner-Revelle group went to Pakistan in October, 1961.<sup>2</sup>

Perhaps the most interesting outcome of the Revelle study was that instead of increasing concern about the problems of waterlogging and salinity, it put the problem into the broader perspective of agricultural production and played it down somewhat. Michel says:

Although the panel agreed with the Soil Reclamation Board, the Columbo Survey, the WAPDA's May, 1961, program that the waterlogging and salinity menace was indeed a most serious problem, it took issue with their estimates of the areas affected and of those severely damaged.

---

<sup>1</sup>General Report on the Administration of the Punjab and its dependencies for 1859-60, quoted in Michel, *The Indus Rivers*.....p. 455.

<sup>2</sup>Revelle II.....pp. 1, 2.

...The Revelle Panel concluded that less than one fourth of the areas given in the Columbo Survey and in WAPDA's May, 1961, program were seriously affected, a total of between 5 and 6.5 in all of the Indus Plains and Patwar Upland... In addition to reducing the estimates of seriously affected lands, the Revelle Report dismissed the threat that all of West Pakistan's cultivated area would become severely waterlogged or salinized.]

As a result of its findings, the Revelle Report addressed itself more to the complex problems connected with agricultural production than to the narrow range of problems connected with waterlogging and salinity. Thus, in comparing the suggestions made by WAPDA's 1961 Report and the Revelle Report, there is less stress in the Revelle Report on tube-wells and drainage systems, and far more emphasis upon agricultural inputs.

The administrative implications of the Revelle Report are clear. Waterlogging and salinity are not problems which should be tackled alone by one or more water management agencies. Instead, an attempt should be made to solve these problems together with other agriculturally related problems. Waterlogging and salinity are not factors which call for new organizations or new approaches to administration. Instead they are several of many problems which must be taken care of in a concentrated effort to improve agricultural production. The Revelle Report's emphasis on agricultural production as a complex system, however, does call for new approaches to administration. Regardless of the specific recommendations they made concerning the Land and Water Development Board, the lesson is clear that coordination between water and agricultural inputs is necessary

---

<sup>3</sup>Michel, *The Indus Rivers*.. pp. 482, 483.

for a rapid increase in production. This coordination moreover, is necessary at all levels from the Central Government down to the village level.

*Development of Ground Water Resources*

A second environmental factor which has administrative implications is the extensive mining of ground water for agriculture. Ground water extraction through the use of Persian wheels has long been accepted in West Pakistan as an aid to irrigation. However, modern tube-well technology has greatly increased the amount of extraction possible.

The Irrigation and Agriculture Consultants Association gives the objectives and possibilities of more extensive ground water development when they state:

The main objectives of ground water development are to increase agricultural production by provision of additional supplies and by control of the water table. IACA estimates that about 44 MAF of usable ground water could be made available for irrigation each year, compared to the present total ground water abstraction of about 10 MAF a year. The purpose of controlling the water table is to remove the ill effects of high ground water on crop production; for this purpose, it is necessary to establish a means of control that will prevent the water table from remaining within five feet of the surface except for short periods or in rice areas. This control can be obtained by tube-wells with the added advantage of additional irrigation water where they are placed in usable ground water zones.<sup>4</sup>

Because of studies on the nature of salinity and waterlogging, and the whole large-scale deve-

---

<sup>4</sup>Pieter Lieftinck and Associates, *Water and Power Resources*, Vol. II.....p. 74.

development of private tube-wells, two plans of operations will need to be revised. First the main objective of tube-wells is to supply additional irrigation water, and not to reclaim the land from salinity. While the latter is still important in certain areas, land reclamation is secondary to agricultural production. Secondly, because of the growth of private tube-wells, it is necessary to develop schemes which will plan on private tube-well development rather than make the public sector responsible for all development. Thus, particularly in those areas where the private sector can be expected to invest the most in tube-wells, few if any public tube-wells should be planned for. This would result in smaller public tube-well projects, though it is advised that no project under 500 wells should be attempted.<sup>5</sup>

The World Bank Study Group recommends that water supplies from the public tube-well programs and from surface water be integrated for the most effective use of water supplies. Lieftinck and Associates remark :

Total water supplies under the present system might at certain times be more than adequate in tube-well areas, while elsewhere, crops are suffering shortage. Achievement of the full benefits of ground water development would require changes in the present methods of allocating water. One of the most important changes required is that ground water supplies from public tube-wells should be treated jointly with surface water supplies in future allocations.<sup>6</sup>

The chief administrative implication for the integration of water supplies is that there is a request for a provincial Irrigation Authority which would be

---

<sup>5</sup>Ibid., p. 77.

<sup>6</sup>Ibid., p. 95.

constituted at the highest level and would be responsible for the integration of all water supplies. This body would make basic policy decisions on barrage allocations, dam release patterns and tube-well pumping policies with reference to both water and power considerations.<sup>7</sup>

*Completion of the Indus Basin Project.*

As was briefly mentioned before in conjunction with the functions of WAPDA, the Indus Basin Project has been the largest irrigation project in the world. It had its origin in the dispute between India and Pakistan over the six rivers which begin in India and flow through Pakistan to the Arabian Sea. In the agreement India was to contribute toward water works development in Pakistan in exchange for the full use of the three eastern rivers.

Michel records the project description when he writes:

1. The Project consists of a system of works to be constructed by Pakistan which will
  - (a) transfer water from the three Western Rivers of the Indus system (Indus, Jhelum and Chenab), to meet existing irrigation uses in Pakistan which have hitherto depended upon the waters of the three Eastern Rivers (Ravi, Beas and Sutlej), thereby releasing the whole flow of the Eastern Rivers for irrigation developments in India;
  - (b) provide substantial additional irrigation development in West Pakistan.
  - (c) develop 300,000 kw of hydroelectric potential for West Pakistan;

---

<sup>7</sup>*Ibid.*, p. 187.

(d) make an important contribution to soil reclamation and drainage in West Pakistan by lowering ground water levels in waterlogged and saline areas; and

(e) afford a measure of flood protection in West Pakistan.<sup>8</sup>

The system of works envisioned consisted of two large dams located on the Jhelum and Indus Rivers, a system of link canals from the western river-beds of the eastern rivers, three barrages and tube-well and drainage works. For all of these works, WAPDA was the Pakistani agency representing the governments of Pakistan and West Pakistan.<sup>9</sup>

The chief administrative implication of the Indus Basin Project is its approaching completion. Trimmu-Sidhnai Link, Sidhnai Barrage, Sidhnai-Mailsi Link, Mailsi Siphon Barrage, and the Mailsi-Bahawal Link were finished ahead of schedule in 1965. The remaining links and barrages are due to be completed by 1970. The initial part of Mangla Dam on the Jhelum has been completed and work is now underway on the Tarbela Dam on the Indus River. All of this means that personnel working on the Indus Basin Project for WAPDA will need to be taken into WAPDA's regular water wing or have to be sent elsewhere. It is likely that upon completion of the Indus Basin Project, WAPDA will be devoted greatly to public tube-well fields. Nevertheless, the amount of work available to WAPDA will be less in the future. The ramifications of this fact on the organization of WAPDA and the entire system of water management agencies will be assessed in the next chapter.

---

<sup>8</sup>Michel, *The Indus Rivers* .....p. 268.

<sup>9</sup>*Ibid.*, pp. 268, 269.

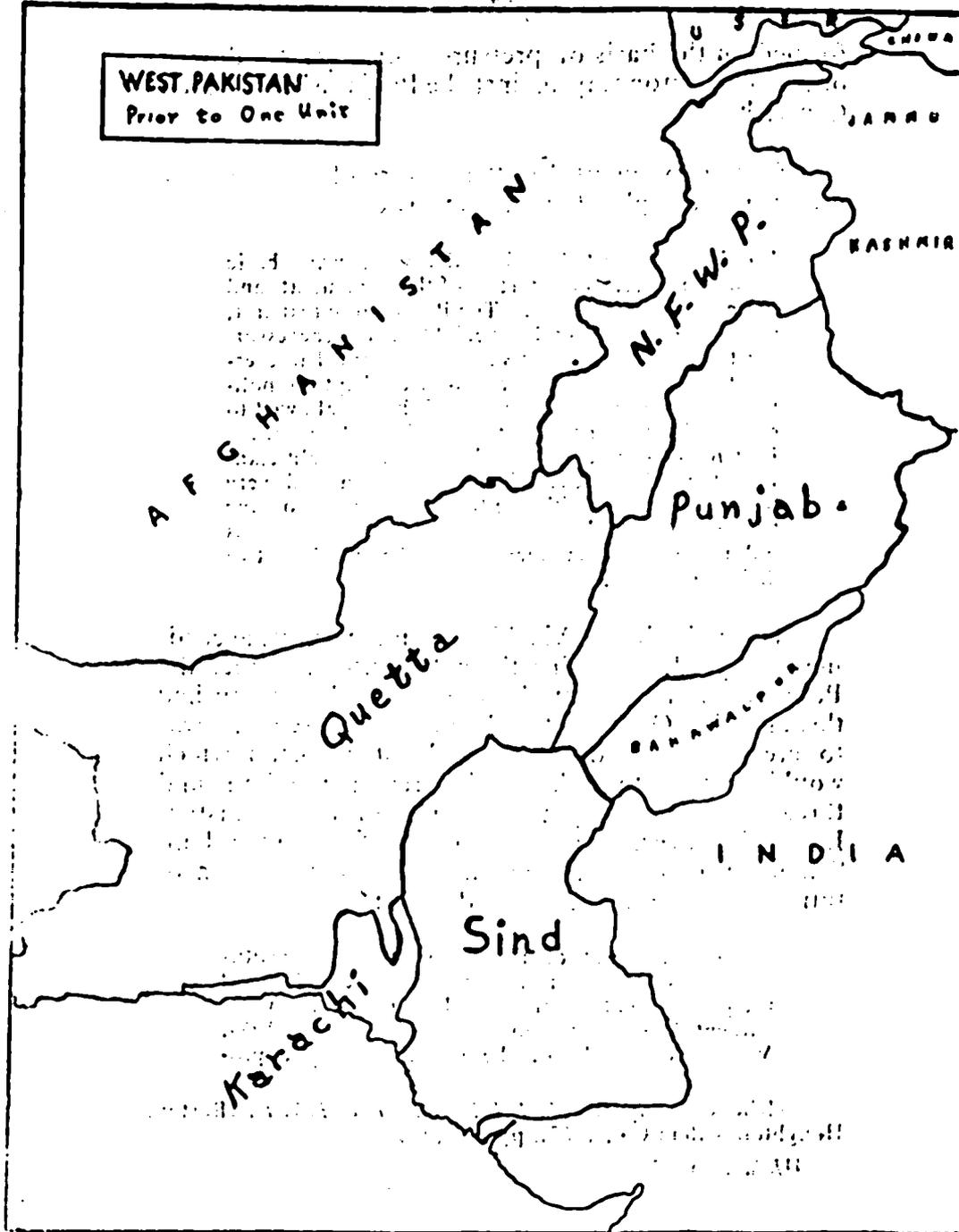
The physical environmental factors affecting administration which will need to be taken into consideration might be summarized as follows:

1. Since waterlogging and salinity are just one aspect of agricultural production and since increasing agricultural production requires the coordination of water and other inputs, a decentralized-coordinated administration is called for. This serves to underline hypothesis number one in this thesis.
2. In order to coordinate surface and the increasing supplies of ground water for rational and efficient water allocation and distribution, one "Irrigation Authority" for the Indus Basin should be constituted.
3. Since the completion of the Indus Basin Project will take away one of the prime reasons for WAPDA's existence, WAPDA may be open to major organizational changes.

#### Political Environment

Prior to 1955 there were four provinces in all of Pakistan. These were East Bengal, or the eastern wing of Pakistan, West Punjab, Sind, and the North-West Frontier Province in the west wing of the nation. Together with these provinces there were also the states of Bahawalpur, Khairpur and Baluchistan and the port city of the Karachi (Map III on page 73). Although the political system was very complex two major power coalitions could be discerned. The first was the power wielded by civil service which was dominated by the Punjabis and some Pathans. The other was the political axis formed by the Bengalis, Sindhis and some from the Northwest Frontier. The latter was

MAP IIIc



formed on the basis of pressures for a greater degree of regional autonomy against the Punjabis' dominated Center.<sup>10</sup>

Sayeed comments on the nature of these power groups more explicitly when he writes :

We have suggested earlier that there was a basic conflict between the interests of the bureaucrats and those of the politicians. The Pakistani bureaucrat, as a successor to his all powerful British predecessor, felt that just as the British civil servant had exercised untrammelled power and often kept the politicians under control, so should he be allowed to exercise his power without political interference..... East Bengali politicians and some of the politicians from the urban areas of West Pakistan had very little in common with the top oligarchs belonging to the army and the civil service. These two groups did not often meet socially and belonged to two different worlds.<sup>11</sup>

Through almost Machiavellian measures, according to Sayeed, including the naked use of force, the Punjabi dominated public services and army pushed through the One Unit Scheme. This scheme was to create a subfederation of West Pakistan which would be used to balance the greater numbers and threat of control by the Bengalis of East Pakistan. Later, however, the enforcement of the One Unit Scheme was to result in the breakdown of constitutional government. Sayeed says:

One of the causes of the breakdown of constitutional government in Pakistan was the holding of the pistol to enforce the One Unit plan. The Constituent Assembly was dissolved on October 4, 1954. Within five months of the dissolution, by appro-

---

<sup>10</sup>Khalid B. Sayeed, *The Political System of Pakistan* (Boston: Houghton Mifflin Co., 1967), pp. 65, 66.

<sup>11</sup>*Ibid.*, pp. 75, 76.

inappropriate dismissals and the installation of military regimes in the provinces, the Governor-General was all set to legalize the creation of West Pakistan.<sup>12</sup>

In September of 1955, the second Constituent Assembly legalized the integration of West Pakistan as one province. While this seemed to simplify things administratively, it left the nation hopelessly divided politically. The Sindhis and the Pathans from the Northwest Frontier were against the One Unit Scheme. The Punjabis were divided between the old Muslim League and the newer Republican Party. The Bengalis were divided between the Awami League and the Krishak Sramik, or peasant and worker party. All of this led to the collapse of the parliamentary system in 1958 and military take-over under Ayub Khan.<sup>13</sup>

When the martial law regime took over, the following steps were taken: (1) the Constitution of 1956 was abrogated, (2) the Central and Provincial Cabinets were dismissed, (3) the National and Provincial Assemblies were dissolved, (4) all political parties were declared illegal, (5) a move was made against all corrupt officials, (6) a beginning was made toward land reform, (7) moves were made to restore health and vigor to the economy, (8) a Basic Democracies Scheme was set up to elect the President and bring the government down to the people. Nevertheless, the fundamental problems of Pakistan could not be solved by better administration. Regional loyalties smoldered ten years under the military regime until they burst into flame.<sup>14</sup>

Disturbances leading to Ayub's resignation began in October of 1968 with student protests over educa-

<sup>12</sup>*Ibid*, p. 79.

<sup>13</sup>*Ibid*., pp. 82-93.

<sup>14</sup>*Ibid*., pp. 93-100.

tional conditions. Shortly after that, massive demonstrations against Ayub's regime took place with charges of corruption and incompetence and demands for constitutional reform and restoration of civil liberties.<sup>15</sup>

In March of 1969 the Bengalis of East Pakistan erupted. Mobs of villagers executed at least sixty of Ayub's 'Basic Democrats' who allegedly had been favourites of the regime. In Dacca, demonstrators and strikers brought the commercial life of the city to a halt. In West Pakistan a wave of strikes swept through the cities. The political pressures behind the demonstrations, particularly in the East, were articulated by Eastern politicians. *Time* writes :

Playing on the longstanding resentment of East Pakistan's Bengalis over the economic and political dominance of West Pakistan, the two Easterners called for far more substantial autonomy for their region. They also wanted parliamentary representation by population (58% of the population live in the eastern sector) rather than the 50-50 representational split that now prevails in the federal government.<sup>16</sup>

At the end of March, Ayub stepped down and invited Yahya Khan, the army's Chief of Staff, to take over. Yahya immediately banned strikes and demonstrations and tried to impose some type of order on the situation.<sup>17</sup> He also promised a quick return to democracy. On December 1, 1969, Yahya commanded an orderly march back to

---

<sup>15</sup>"Pakistan, Ayub's Strategic Retreat," *Time*, Vol. 93, No. 8, February 21, 1969, pp. 29, 30.

<sup>16</sup>"Pakistan, Precarious Task," *Time*, Vol. 93, No. 13 (March 28, 1969), p. 36.

<sup>17</sup>"The Army Takes Over Pakistan," *Time*, Vol. 93, No. 14 (April 4, 1969), p. 32.

civilian rule. Furthermore he surrendered to the regional pressures of the politicians by dissolving the government of West Pakistan, which had been created under the One Unit Scheme. He ordered that the Province be broken up into four Provinces, Sind, Baluchistan, West Punjab, and the Northwest Frontier. By instituting the one-man one-vote rule for the first time in Pakistan's history, he gave East Pakistan greater power and opened up the possibility that the East Pakistanis might name the next Prime Minister. However, to keep the long subservient Easterners from totally dominating the West, Yahya favors a bicameral legislature with the upper house being apportioned equally between representatives of the East and West.<sup>18</sup>

Together with the division of West Pakistan into its constituent parts, Yahya Khan initiated several other acts which will affect water management agencies. Three hundred and three Class I officers were suspended under an anti-corruption campaign.<sup>19</sup> Since many of these were high level officers in water management agencies, the possibilities of structural changes is somewhat increased. Together with this, four days after December 1, 1969, it was announced that the Power and Water Wings of WAPDA would henceforth be divided into autonomous bodies. Whether or not this was prompted by political considerations remains to be seen. The reason given for the reorganization was to "enable professionals to manage their respective affairs." The two wings, however, will continue

---

<sup>18</sup>"Pakistan, Back to Democracy, On the Double," *Time*, Vol. 93 (December 12, 1969), p. 34.

<sup>19</sup>*Pakistan Times*, Vol. XXIII, No. 298 (December 8, 1969), p. 1.

to be served by common services such as law divisions, computer service, medical facilities, and the WAPDA building.<sup>20</sup>

The political factors which will figure into any reorganization of water management agencies may be summarized as follows:

1. There is likely to be four irrigation and four agricultural organizations in each province in Pakistan's West Wing. This may make coordination between water and other agricultural inputs easier, but it certainly does not guarantee this outcome.
2. If the decentralization of departments of irrigation and agriculture occur, it will make even more necessary an overall Irrigation Authority governing all the water resources in the Indus River Basin.
3. With the sacking of high level management personnel and the bifurcation of WAPDA under the new military rule, future chances for change in the water management agencies will increase.

#### Administrative Environment

The "Administrative Environment" will be made up of official recommendations for organizational change together with the administrative capabilities in terms of finances and personnel.

#### *Calls for Decentralization.*

As was mentioned briefly in Chapter IV, two separate reports came out very close together which called for decentralized area coordination of

---

<sup>20</sup> *Pakistan Times*, Vol. XXXIII, No. 296 (December 5, 1969), pp. 1-12.

water and agricultural inputs. The first was the Food and Agriculture Commission whose report was published in November, 1960. The second was the Revelle Report compiled by the Wiesner-Revelle group commissioned by President Kennedy to study the problems of waterlogging and salinity. Their first report was published in 1962 and their final report was in 1964.<sup>21</sup>

After careful review of the situation of the farmer in various parts of the nation as well as a review of what the various water management and agricultural input agencies were doing, it recommended the formation of the ADC. The ADC in project areas is supposed to coordinate water and inputs on a local level giving the farmer a package deal.<sup>22</sup> The Revelle Report made a similar recommendation but it proposed setting up projects in "reclamation" rather than in "colonization" areas. It also proposed to place the projects under the supervision of a board comprised of the chairman of all concerned agencies. This recommendation was probably made on the model of the United States' Water Resources Council.

The logic of both of these reports was challenged by the Irrigation and Agriculture Consultants' belief that seeds, fertilizers and other inputs could be better supplied by private sources. Their suggestion was overruled by the World Bank Study Group, which stated:

The Study Group feels strongly that in addition to efficient distribution the success of the water resource development program depends on emphasis going equally to efficient water use and to better farming practice and the use of more material inputs.

---

<sup>21</sup>Michel. *The Indus Rivers*...pp. 387, 477.

<sup>22</sup>*Ibid.*, pp. 427-529

The Study Group agrees with IACA that it would be desirable to have the private sector assume a growing importance in the supply of agriculture inputs, but until the private system has developed and the capacity to ensure timely and adequate supplies in the project areas, there would have to be continuing promotion and distribution activity by authorities responsible for maintaining the development pace at projected rates. The Study Group feels that something along the line of the ADC and the LWDB concept, with a Project Director in full charge of all development activities and water supply, would provide this close supervision and integration which development requires.<sup>23</sup>

Thus, the World Bank Study Group likewise calls for area decentralization and coordination of inputs. All of this constitutes "administrative pressure" which is an environmental factor in any reorganization of water management agencies.

*Administrative Capability for Decentralization.*

One of the chief problems in accomplishing area decentralization and coordination is obtaining enough qualified personnel. At the moment, there is a great shortage of both engineers and agricultural extension agents. The Study Group comments on the problem of getting enough engineers when they say:

Engineering education has expanded rapidly in recent years, but still the output of graduate engineers during the Third Plan will be only about 3,800 against a requirement, according to the Third Plan document, of an additional 7,000 engineers between 1965 and 1970..... The Study Group adds that critically important task of

---

<sup>23</sup>Pieter Liefstinck and Associates, *Water and Power Resources*...Vol. II, p. 190.

managing the tube-well projects will require staff with administrative as well as engineering ability, and finding this management cadre will require special attention.<sup>24</sup>

To meet this critical shortage, it has been suggested to give more on the job training to engineers, and also to train some people, without an engineering background, to take over certain administrative maintenance tasks. The shortage of engineers, particularly those trained in administration for development will be a crucial factor in establishing many more new project areas either for the ADC or the LWDB.<sup>25</sup>

The second personnel problem which will limit the implementation of a coordinated decentralized administration is the shortage of adequately prepared agricultural extension agents. In raw number figures there does not seem to be great problems. The Study Group states :

There will need to be a substantial expansion of the extension service. It is estimated that the essential requirements of the Government agricultural services for university graduates could be met by an increase of about 1,600 between 1965 and 1975; taking account of the needs of other departments such as Irrigation, WAPDA and the Education Department, present plans for expansion of the agricultural universities appear fully adequate. For Field Assistants, IACA recommended that the number be approximately doubled by 1975: an increase from 3,000 to 6,000. It would not be difficult in a physical sense to meet this target, as an additional six training colleges are projected for the Fourth Plan period.<sup>26</sup>

---

<sup>24</sup>Lieftinck and Associates, *Water and Power Resources*, Vol. I.....pp. 192, 193.

<sup>25</sup>*Ibid.*, p. 193.

<sup>26</sup>*Ibid.*, p. 201.

The real problems involved in securing extension personnel revolve about the phrase "adequately prepared." This does not only concern the quality of instruction but also the back-up services, better living quarters, transportation, good research support and an increase in the status and prestige of agriculture. Whether or not these services can be provided to attract better people into extension service remains to be seen.<sup>27</sup>

The administrative environment formed by requests for administrative change and the limits imposed by administrative capabilities would indicate that decentralization and coordination should take place, but only as adequate numbers of qualified personnel become available to properly administer it.

---

<sup>27</sup>*Ibid.*, pp. 200, 201.

## CHAPTER—VI

### Formulating New Agency Goals

According to Gawthrop, the formulation of organizational goals is done best by anticipating the demands of the participants in organizational change and adapting their goals to their new environments.<sup>1</sup> In the case of the water management agencies of West Pakistan, we will analyze the existing goals of the agencies and see how these goals modified by the new environments. Anthony Downs describes the "Life Cycle" of Bureaus and characterizes them and their goals in reference to their position in the cycle, i.e. (whether they are young, old, etc.).<sup>2</sup> We will use Down's classification system to help us infer the goals of the agencies in our study on the basis of their longevity, size and function. Material concerning the environments will be drawn from the previous chapter.

#### The Irrigation Department

According to Downs, the Irrigation Department of West Pakistan would be characterized as an older, stable and relatively competent bureau at accomplishing routine operations. Downs says of this type of bureau :

Bureaus learn to perform given tasks better with experience. Given the initial level of resources allocated to the bureau, this increased efficiency

---

<sup>1</sup>Louis C. Gawthrop, *Bureaucratic Behaviour in the Executive Branch* (New York: The Free Press, 1969) p. 180.

<sup>2</sup>Anthony Downs, *Inside Bureaucracy* (Boston: Little, Brown and Co., 1967), pp. 5-23.

allows the bureau to generate additional productive capacity just by growing older, with-out any added input of resources<sup>3</sup>

According to Mr. Khalid Mahmood, the Irrigation Department has certain pride and *esprit de corps* in maintaining canals and getting the water to its destination<sup>4</sup>. This would seem to verify Downs' characterization in reference to the Department. However, the reverse side of accomplishing routinized tasks well, is a certain inflexibility. Downs also says of older organizations:

As bureaus grow older they tend to develop more formalized rule systems covering more and more of the possible situations they are likely to encounter.....Consequently older bureaus tend to be more stable and less flexible than young ones. As a bureau grows older, its officials tend to shift the emphasis of their goals from carrying out the bureau's social functions to insuring its survival and growth as an autonomous institution.<sup>5</sup>

Several other things also characterize older bureaus. The proportion of young enthusiastic men (Downs calls "zealots") dwindles and more "conservator" type administrators come to dominate the organization. Secondly, the older a bureau grows, the more administrators there are in proportion to production workers.<sup>6</sup>

The formalized rule systems, the greater inflexibility, the predominance of a great number of conservator type administrator, all seem to fit in

<sup>3</sup>Ibid., p. 18.

<sup>4</sup>Interview with Mr. Khalid Mahmood.

<sup>5</sup>Downs, *Inside Bureaucracy*.....pp. 18, 19.

<sup>6</sup>Ibid., p. 19.

with the basic reason why the Irrigation Department was passed over to head up Pakistan's contribution and supervision of the Indus Basin Project, and why WAPDA was created.<sup>7</sup>

With these organizational characteristics we may infer that the Irrigation Department will probably wish to remain in the position it is. It is not likely to embark on any new projects like the public tube-well program. On the other hand, it may resist any new SCARP projects which could take from it the management of surface water in the project areas. As a gradual supplement to its power and status, it probably would like to act as the water authority for the entire Indus Basin. However, the physical, political and administrative environments all call for a decentralization of the Irrigation Department. Decentralization is recommended in the form of more SCARP areas where water and inputs can be better coordinated. Politically, there will be an attempt to divide the Irrigation Department into four departments, one for each new Province. Administratively, there is also a call for local coordination even outside of SCARP areas which might be better done on the new Province level rather than on the basis of West Pakistan as a whole.

A second physical environmental factor is the necessity for integrating supplies of surface and ground water. Outside of a very few installed tube-wells, the Irrigation Department has been largely concerned with surface water. The integration of both sources of water for more efficient planning would argue for creating another organization or authority. This would take some power of discretion from high level irrigation officials unless they were placed in that new organization.

---

<sup>7</sup>Platt, *Agriculture*, p. 103.

Modified goals for the Irrigation Department would be to remain a single organization until such a time as real power devolves into the new provinces. Perhaps in a year or two the Department might split into four parts, each within a new province. The present leadership of the Department would be siphoned off to serve as the nucleus of a new high level Indus Basin Water Authority.

Each of the new provincial Irrigation Departments would continue to maintain canals, collect water fees, and regulate water given to them by the new Authority. They would also be encouraged by the National Economic Council of the Central Government to coordinate on a provincial level, water and other agricultural inputs in non-SCARP, non-ADC areas.

#### Agriculture Department

The Agriculture Department of West Pakistan is very similar to the Irrigation Department in its basic characteristics. It is an older department with a rather routinized approach to increasing agricultural production. It has further disadvantages in being starved for funds and being held in low public esteem.<sup>a</sup>

Like the Irrigation Department, the chief goal will be to conserve the present functions it now has and if possible extend its operations to gain more financial backing and control. It will probably resent more SCARP projects and more ADC projects which would take more responsibilities from it. It would also resent being split into four units and losing control of its rather successful private tube-well drilling function.

---

<sup>a</sup>Michel, *The Indus Rivers*... p. 420.

Because of the political division of West Pakistan into four provinces, the Agriculture Department will probably be divided. It has no basic West Wing function like the Irrigation Department working with the entire surface water system. Thus there will be no functional reason why the new provincial politicians should not each have their own department of Agriculture. Any research conducted by the Department which would be beneficial to the entire West Wing would probably be given to the Central Government's Department of Agriculture. Local research, however, would be conducted by the individual new provincial departments.

Because of the greater degree of focus upon agricultural production, the various new provincial departments will receive more qualified personnel, and better agricultural inputs than they have received formerly. This should in some ways raise their prestige. This is also a way to keep some of their best personnel from leaving. Downs describes the way in which slowly expanding departments can raise their qualitative growth when he writes:

What really attracts climbers is not promotion *per se*, but increased power, income, and prestige. Normally, bureaus offer their members these prerequisites primarily through promotion. They can usually promote many people rapidly only if fast growth creates more high-level positions. However, if the organization in essence promotes everyone simultaneously by increasing the power, income, and prestige of nearly all its members...it can achieve the same effects.<sup>9</sup>

In order to help WAPDA meet its own new environment and also to integrate public and private tube-well development, the Agriculture Department could afford to lose its tube-well drilling function

---

<sup>9</sup>Downs, *Inside Bureaucracy*, pp. 14, 15.

from the Agricultural Machinery Organization. While this would hurt the Department as a whole before its division, it might be done more easily after the division during the time of reorganization.

#### Water and Power Development Authority

The Water and Power Development Authority might be characterized as a young organization which grew rapidly but now has reached a period of deceleration because a great part of its social function, namely the Indus Basin Project, has been completed. Downs characterizes a bureau in this stage of its life cycle as follows:

*This decelerator effect is most likely to occur when the bureau is forced to reduce its total membership because of a sharp drop in the relative significance of its social function. Such a decline, stagnation, or just slower than average growth tends to reduce the opportunity for promotion within the bureau to a level below that prevailing in comparable organizations. This will usually serve notice for climbers to depart.*<sup>10</sup>

The chief goal of WAPDA may be to survive the next ten or fifteen years. Since most of the Indus Basin Project will be completed in that time, it is likely that they will jealously protect their present function as the chief agency for public tube-wells. Thus, they will probably fight any move of the Irrigation Department to work extensively in groundwater. They will also seek to frustrate a rapid increase in SCARP areas where they will have to second personnel and lose managing control. Conversely they can be counted on to support public tube-well projects which remain under their control. Since WAPDA has worked on individual projects instead of within geographical

---

<sup>10</sup>Downs, *Inside Bureaucracy*, p. 13.

areas, there will probably be no move to split it into the four new provinces of West Pakistan. They would fight any such move to do so and might win. Since WAPDA has had the greatest contact with non-Pakistani firms, it might be expected that foreign firms such as Harza, and Hunting Technical Services, and perhaps foreign governments will back WAPDA's goals.

Two environmental factors which most affect WAPDA are the completion of the Indus Basin Project and the need to integrate all water supplies. Both of these factors can be met if the responsibility for all groundwater development is given to WAPDA. This would give to WAPDA a new reason for existing and it would also serve to integrate groundwater resources from public and private tube-wells.

The Central Government might turn over to WAPDA the private tubewell functions of the Agricultural Department's Agricultural Machinery Organization. The Department of Agriculture is likely to be split four ways (see above). A single agency throughout West Pakistan with facilities in a number of divisions would probably be able to do a more efficient job. This would enable WAPDA to integrate public and private tube-well fields so that a rational ground water program throughout the province can be planned.

#### Agricultural Development Corporation

The chief characteristic of the Agricultural Development Corporation is its fragmented nature. It has direct responsibility for a number of colonization areas, but it also has a small dams division and is partially responsible for the distribution of agricultural inputs. As a result, the

Corporation should be looked upon as a system. Downs describes such a fragmentized bureau when he states:

When there is a rapid growth in the relative social importance of the function served by such a system, the system as a whole normally expands to meet this increased demand. This can involve the addition of new bureaus to the system, the expansion of existing bureaus, or both. Under such conditions, the "laws" of acceleration and deceleration we have set forth above, apply to the system as a whole rather than just to individual units therein.<sup>11</sup>

If one looks at the West Pakistan ADC as a whole, it would be characterized as an expanding and accelerating system. Since it is relatively new it will seek to increase its size as much as possible. Thus far it has done so by taking over the Small Dams Organization and the Thal Development Corporation. It will be looking for more areas of growth in the future.

The chief environmental factor confronting the ADC is the view that puts agricultural production in a more important place than land reclamation or colonization. This has several important ramifications. One, since the Revelle Commission recommended putting the inputs on good land rather than bad land, the West Pakistan ADC should not look for any new "colonization" schemes in the near future. Most financial backing will likely go into reclaiming "good" lands rather than in colonizing bad lands. Secondly, since the emphasis has gone on agricultural production, the ADC will probably expand its operations most in the areas which deal with providing more agricultural inputs like seeds, fertilizers, insecticides, etc.

---

<sup>11</sup>*Ibid.*, pp. 15, 16.

Like WAPDA, the ADC as a Corporation has not been working in any geo-political areas. As a result, it probably will not be affected by the dissolution of the One Unit Scheme. Hereafter, it should probably be an attached department of the Central Government, Department of Agriculture and Works.

#### Land and Water Development Department

The Land and Water Development Department is the newest and smallest of all the water management agencies. As a result it will be, according to Downs, the most vulnerable to attack. A crucial point in the history of any such young bureau is called by Downs, the *initial survival threshold*. He says of this threshold:

As a general rule, a bureau arrives at this threshold after a period of rapid growth in both its size and the relative social significance of its functions. This usually occurs in response to external environmental conditions favorable to the expansion of the bureau's functions..... For bureaus that do not develop by splitting off from existing agencies, rapid growth normally occurs immediately after they have been formally born as separate agencies. The leaders of such a new bureau must quickly serve enough customers to reach an initial survival threshold before their original allocation of resources is exhausted, or its replenishment is blocked<sup>12</sup>

Whether the Land and Water Development Department has reached threshold of survival is unclear. Undoubtedly the goals of the personnel in this department will be to continue functioning as a regular water management agency, however, a number of factors argue against it. One, the Land and Water Development Department is

---

<sup>12</sup>*Ibid.*, p. 9.

governed by the Land and Water Development Board. On the Board are the chairmen of both functional and allocational rivals to the Department. Although the idea for the Board was probably suggested by Revelle on the model of the Water Resources Council of the United States, the Revelle Report inserted one new idea that changed the whole concept of the Board. Revelle II suggested that "Project Directors be given authority to supervise and direct the Project personnel.....not merely to coordinate their activities."<sup>13</sup> This addition turned the Land and Water Development into a regular line agency, and it also made it into a rival to other departments for allocations and functions. Since their chairmen are on the LWDB which governs the Department, this may be the chief reason why the LWDB meets only once every two months,<sup>14</sup> and also why the growth of project areas has been slow.<sup>15</sup>

The only way in which the Department might stay alive is to point with pride to the increase in crop production during "The Green Revolution." They might well claim that the integrated approach of combining water and other agricultural inputs has turned the trick. However, this argument will not hold water with people who realize that the Agricultural Development Corporation does the same type of integration even though its areas have traditionally been "colonization" rather than "reclamation" areas. It is furthermore almost universally conceded that if other agencies had had the financial inputs which the LWDB Department has enjoyed, they too would have increased agricultural production significantly.<sup>16</sup>

---

<sup>13</sup> Revelle II, .....p. 139.

<sup>14</sup> Lieftinck, *Water and Power Resources*, Vol. II... p. 189.

<sup>15</sup> Michel, *The Indus Rivers*..... p. 500.

<sup>16</sup> Interview with Mr. Khalid Mahmood.

Since the ADC is already an operational "line" agency integrating water and agricultural inputs, we recommend that the present Land and Water Development Board be terminated and that the Department of Land and Water Development be henceforth administered by the ADC. Functionally, it can be justified because the ADC carries out the same functions in different areas. Politically, its demise can be justified both because it was originally an American idea brought to fruition under Ayub Khan and secondly, under the present provincial reorganization, there is no place for it. Administratively the termination of the LWDB can be justified because there are few powerful people who need or want to keep it alive.

We believe that one organization, the ADC, can better meet the functional environmental factor of decentralization and coordination of inputs than can two who will fight one another for allocations and even functions. Since the ADC has the flexibility of a corporation and as a new bureau probably has a greater number of innovators and climbers, it should be equal to the task.

#### Initial Organizational Goals

Proper organizational goals for the water management system in West Pakistan according to this analysis are as follows:

#### *Integration of Water*

At the central level, ground water and surface water should be integrated through a new central department called the Indus Basin Water Authority. This should be formed at the highest level with top personnel from WAPDA and the Irrigation Department (Figure VII on page 95).

The linkages of this new authority would be as follows. It would receive requests for water and funds from the new provincial Irrigation Departments and also from the Project Directors of the ADC. In turn it would make requests for funds from the National Economic Council of the Central Government. An attached Department of the New Water Authority will be the Water Wing of WAPDA (Figure VII on page 95).

### *Integration of Water and Agricultural Inputs*

Integration of water and agricultural inputs for project and non-project areas can be facilitated by insisting upon such integration before approving any large scale funding for either new water facilities or new agricultural inputs. To do this, the water and agriculture staff of the National Economic Council would probably have to be increased. This proposal is basically in line with the World Bank Study Group's call for additional integration for the Province of West Pakistan before it was dissolved. They stated:

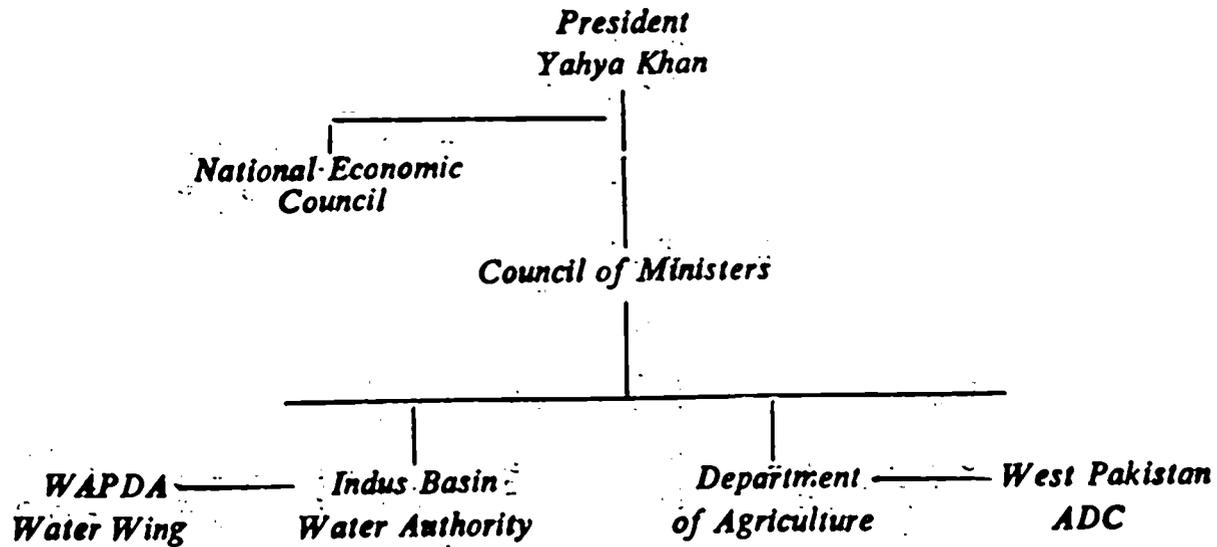
There appears to be a need for additional coordination of agricultural planning and policy implementation. The logical body to undertake this task would seem to be the West Pakistan Planning and Development Department, which is already responsible for keeping under review the Development Plans. At present, the Department has insufficient technical and professional staff to perform such a role effectively. But the problem is particularly important, and the savings to be had from more effective deployment of human and financial resources are sufficiently large, that the coordination function should be put on the priority list for man power requirements.<sup>17</sup>

---

<sup>17</sup>Lieftinck, *Water and Power Resources*, Vol. II.....p. 1190.

**FIGURE VII**  
**INTEGRATION OF WATER AGENCIES IN THE**  
**CENTRAL GOVERNMENT**

95



With the reorganization of the Province of West Pakistan, basin-wide coordination could only take place at the national level in the National Economic Council.

Coordination of water and agricultural inputs at the new provincial level, in non-project areas might best be done through provincial commissions on irrigation and agricultural development. These would correspond roughly to the river basin commissions set up in the United States under the Water Resources Planning Act of 1965. We will describe them, their functions, personnel and linkages more fully in the next chapter.

Coordination of inputs in the project areas throughout the Indus Basin would be the responsibility of the Agricultural Development Corporation. Through their unified control and flexibility of operation and their experience in integration of inputs, they should be able to handle this responsibility.

In the next chapter we will describe more fully the new water management system and the new linkages. We will also describe how the existing agencies can be integrated into the system with as little disruption as possible. In addition we will predict certain unacceptable or excess costs which will make up the feedback into the new internal environment.

## CHAPTER—VIII

### Integration of Water Management Agencies

In the previous chapter we suggested three overall organizational goals for the water management system in West Pakistan. One, an agency to integrate all water supplies; two, an agency to integrate all ground water supplies and three, a group of agencies to coordinate water and other agricultural inputs. In this chapter we shall view more closely the recommended structures, their functions, personnel, and linkages, and also see how the old agencies can be merged into the new system with the least amount of disruption or "costs" to individuals or organizations.

As we determine what the new organizational goals may cost the various groups, we will also suggest ways by which these costs of change can be minimized. According to Simon, Smithburg and Thompson, the costs of change can be summed up as (1) moral costs, (2) self interest costs, (3) rationality costs, and (4) subordinations costs.<sup>1</sup> In viewing the various group's anticipated reaction to the new organizational goals, we will seek to identify which of the above costs they will have to pay. Then we shall use some of the suggestions put forth by the above writers to reduce these costs.

#### Indus Basin Water Authority

The function of the Indus Basin Water Authority will be similar to that of the United States

---

<sup>1</sup>Simon, Smithburg and Thompson, *Public Administration* (New York: Alfred Knopf, 1959), pp. 451 - 467.

**Water Resource Council.** We might summarize these functions and apply them to the Pakistan situation as follows:

1. To maintain a continuing study and prepare periodically an assessment of the adequacy of water supplies to meet requirements in the various areas of lands in the Indus Basin.
2. To appraise the adequacy of administrative means for coordination and implementation of water policies.
3. To carry out its responsibilities with regard to the creation, operation, and termination of Basin Province commissions.
4. To receive plans for reclamation, development from water management agencies, and to review and transmit them, together with their recommendation, to the National Economic Council.
5. To assist the Provinces and the ADC in developing and participating in the development of comprehensive water and agricultural development plans.<sup>2</sup>

The new Water Authority will not have the function of carrying on any of its own work. Thus, it will hopefully avoid becoming a rival agency as was the Land and Water Development Board.

The new water authority would be composed of the most senior policy making officers from

---

<sup>2</sup>See United States Water Resources Council, *The Nation's Water Resources* (Washington D.C., U.S. Government Printing Office, 1968), pp. xi, xii.

the present Irrigation Department, the Indus Basin Project personnel of WAPDA, and the top administrative personnel from the Land and Water Development Department. If this is done, it would have two beneficial results. First, it would give the new authority the necessary expertise and prestige needed to control the vast water system. Secondly, by removing the top people, *en masse* from the existing agencies, resistance to change is undermined by reducing subordination costs. The officials heading the existing agencies will fight being under a new water authority. Simon, Smithburg and Thompson state: "Subordination costs are partly a result of status differences. Many people do not like to be commanded by someone of the same or lower status."<sup>3</sup>

This cost can be considerably reduced by raising their status and prestige by becoming a member of the authority. Likewise, the officials who are left in the old agencies will not take on greater importance as the top men leave.

The linkages of the new water authority will be as follows: The head of the Authority will be minister in the cabinet and the Chief Secretary will be on par with other department secretaries. All requests for funds will be made through the National Economic Council. The Water Wing of WAPDA will become an attached department of the Authority and will be assigned duties and request funds through the Authority. The ADC will also receive water allocations and funds for water development through the Authority. However, most of the water development will probably be done by WAPDA personnel seconded to the ADC

---

<sup>3</sup>Simon, Smithburg, and Thompson, *Public Administration* p. 460.

in project areas. The Water Authority will also receive requests for water allocations and funds from the provincial Irrigation Departments. In this respect, however, the control should be quite general allowing the provincial departments wide latitude within certain general restrictions.

Basin wide power development through the power wing of WAPDA will also report to the Central Government through the Water Authority. This would retain the pattern established under the old West Pakistan's Irrigation and Water Department. By reporting through the Water Authority there would also be the beneficial result of coordinating irrigation and power development when feasible.

The linkage with all international bodies in the Indus Basin Development works will be handled through the new Water Authority. Henceforth, the Chief Secretary of the Authority should be Pakistan's chief representative on the Indus Basin Commission which is the international body governing the use of the Indus Basin Rivers.

#### Water Wing of WAPDA

The functions of the water wing of WAPDA will be three fold. (1) They will carry on the residual tasks of the Indus Basin Project, (2) they will be responsible for drilling and maintaining all public tube-wells in non-project areas, and will second personnel in projects areas for the same purpose, (3) they will consult and aid in the constructing of all private tube-wells.

Personnel in WAPDA will largely be the same as in the old water wing of the Agency. However, they will be joined by the wholesale

inclusion of the personnel responsible for constructing private tube-wells in the old Agricultural Machinery Organization of the old Department of Agriculture. The old personnel in WAPDA would probably appreciate this development because it would enhance their span of control. The transferred members of the Department of Agriculture would probably also like the switch because of WAPDA's traditional more liberal pay policy. This would reduce the self-interest costs of both groups and make them more amenable to the structural change.

Linkages to the Central Government would be through the Indus Basin Water Authority (see Figure VII on page 95). Funds and orders for construction of canals and public tubewells would come from that source. In order to integrate ground water and surface water in non-project areas for agricultural development, representatives of WAPDA would be members of provincial commissions on agricultural development within the provinces. WAPDA personnel would no longer serve on the permanent Indus Commission, since they would be replaced by representatives from the new Water Authority.

#### Coordinating Agencies

In the new water management system coordination between suppliers of water and other agricultural inputs will take place on three levels. At the Center it will take place at the National Economic Council. The Council would not pass on any major water development scheme unless plans for coordination with other agricultural inputs is also supplied. However, the more important coordination will have to take place on the provincial and project levels.

### *Provincial Commissions*

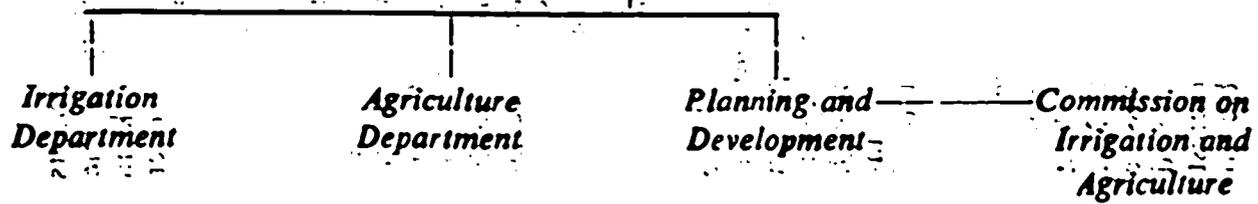
Under the new water management system each of the four provinces would have a Provincial Irrigation and Agriculture Commission to coordinate water and agriculture inputs in non-project areas. The function of these commissions will be chiefly to coordinate planning on the provincial level. In a certain sense, these commissions are modelled upon the Regional River Basin Commissions in the United States. They will carry out no actual work. Instead they will seek to advise the "line departments" on when and where this work should be carried out.

Personnel on these commissions should be made up of the following people: Secretaries of the provincial departments of Agriculture, Irrigation, Credit, Basin, Democracies, and representatives of the Center's WAPDA and ADC. By selecting the personnel in this way both the new provincial departments and the Center's agencies are coordinated for the provincial non-project areas (see Figure VIII on page).

These commissions would be attached to the new provincial planning and development departments. Thus, at the provincial level the commission could pass on submitted requests for funds and insist that plans for coordination are included for all new and existing projects. It would be linked with all agricultural and water agencies through the membership of its board. Although they would not be directly connected with the central agency, they would be connected indirectly through WAPDA and the provincial irrigation departments. The inclusion of a representative from the Basic Democracies is crucial if there is to be meaningful coordination on the village level.

**FIGURE—VIII**  
**INTEGRATION OF WATER AGENCIES IN**  
**NEW PROVINCIAL GOVERNMENTS**

*Provincial Governments (Punjab, N.W.F.P. Sind, Baluchistan)*



The Agricultural Development Corporation.

Coordination of water and agricultural inputs in project areas will be the responsibility of the ADC. They will continue their existing work in the large colonization areas, and will take over the work begun in all of the SCARP areas. The higher leadership of the ADC will probably appreciate this more. Those paying the highest costs of subordination will probably be the former upper echelon personnel of the old Land and Water Development Board. One way to reduce these costs for these men, would be to create a "reclamation" wing of the ADC as separate from the existing "colonization" wing. Thus, the people from the old LWDB probably are a little more knowledgeable on strictly "reclamation" type projects with massive use of ground water mining. If existing leaders of the LWDB are given some autonomy in the SCARP areas the subordination costs could be reduced.

The ADC's links with the Center would be through the Central Agriculture Department as an attached agency. This follows the existing pattern of the old government of West Pakistan. Application for water resources would be made through the new Water Authority Linkages to new provincial Commissions on Irrigation and Agricultural Development.

The excess costs come from the three old water management agencies which are losing power and responsibility. The first is the old West Pakistan Irrigation Department. According to Mr. Khalid Mahmood it has acquired some impressive traditions and *esprit de corps*. While the proposed new structure might be able to reduce self-interest and subordination costs, what will it be able to

do about the tradition (we might classify this as a moral cost). Obviously, the retention of this tradition would argue against any division of the old Irrigation Department into four provincial departments. This moral cost will probably be unabsorbed, and become a part of excess costs. This could prevent the division of the Irrigation Department, and a modification of the new water management structure.

Excess costs will probably also come from some people connected with existing Land and Water Development Department. The abolition of a department which was formerly expected to be a pioneer in new projects will not go down lightly. Whether or not the protests of such people will be heard, remains to be seen. Once again the moral costs of backing a "new approach," and seeing it dissolved, will be hard to reduce. This may result in the continuation of the LWDB in a modified capacity, and a further modification in the new water system.

The third excess cost would probably come from the former Agriculture Department. It undoubtedly would not like to lose its very profitable private tube well division. It would probably also object to the "rationality" of placing it under the control of WAPDA. It could reasonably argue that if coordination of water and agricultural input is so important, why remove the private tube-well operation from the Department of Agriculture. Whether or not this "rationality cost" could be reduced remains in doubt. Since the necessity of integrating a ground water program and water and other inputs are both necessary, deciding which is the most important is open to debate.

Unless these excess costs are met and reduced by the sheer power of the military government or by provincial political pressures, they could seriously modify the suggested structure of the new water management system. This writer, however, believes that within the next two years, political and military power will gain ascendancy over the bureaucratic power. As a result, I believe the suggested water management system to be functionally, politically, and administratively feasible.

## CHAPTER—IX

### Conclusions.

#### Hypotheses

The first hypothesis stated :

1. *Coordination of water and agricultural inputs requires linkages for coordination at the national, provincial, and project levels.*

On the basis of the data supplied by the Food and Agriculture Commission of 1960, and the Revelle Report, we can conclude that such coordination is necessary. This hypothesis, however, goes beyond the recommendations of the Revelle Report calling for coordination in project areas. It also calls for coordination in non-project areas. It also calls for coordination at the national, and new provincial areas in order to coordinate inputs in non-project areas. This part of the hypothesis can be supplied by the World Bank Survey Group which mentioned that little or no coordination was taking place in non-project areas.

Hypothesis number two suggests :

2. *Coordination of ground and surface water supplies require an overall water authority which is responsible for all water planning and management.*

The Irrigation and Agriculture Consultants' Association formed by the World Bank Study Group called for such a water authority because up to this time, little integration of ground and surface water has taken place. They called for the Irriga-

tion Department of West Pakistan to become that authority. In this paper we have called for a new water authority attached to the Central Government. And while the form and make-up of this water authority is open to question, the data supplied by the IACA supports the need for a single water authority.

The third hypothesis proposes :

3. *Coordination of public and private tube-well fields requires the creation of one agency for all ground water development.*

This hypothesis can hardly be supported with data we have gathered up to this time. It is largely a hypothesis that may or may not become more important in the future. Actually an alternate proposal might be made to control future private tube-well mining through a developed system of ground water laws. However, on the basis of future need for integration of public and privately mined ground water, and because administrative agencies rather than water law has been the established method of regulating water in Pakistan, this hypothesis can also be supported.

4. *All of the three suggested changes listed above are possible in light of the present political and administrative environment.*

The data to support this hypothesis comes from the present political and administrative environments. Prior to Yahyah Khan's proposal to abolish the "One Unit Scheme" the suggested changes would have been difficult to accomplish because of administrative inertia. With the profound political changes and a whole rewriting of the constitution taking place, these changes are possible, and most of them become quite likely.

## Conclusion

At the beginning of the paper we set out to show what changes ought to come about in order to meet new environments. Thus, on the basis of describing what is, we made suggestions on what ought to be. Therefore, the purpose of the paper was *prescriptive*. However, as we viewed the political environment and the changes coming over the nation, we conclude that the same data to which we have referred supports not only *prescriptive* conclusions but also *predictive conclusions*. As a result, we can predict a substantial reorganization of the water management agencies in West Pakistan. We can predict one, that there will be further coordination of inputs, at least in project areas; two, that there will be one main water authority; three, that there will be a decentralization of many agriculturally related functions as West Pakistan is divided into new provinces. At some later date there may also be an agency and/or a set of policies to integrate public and private tube-wells for a rational efficient ground water program.

The chief beneficiaries of the prescriptions will be those people in West Pakistan who are in charge of the present reorganization that is now going on. This includes not only Pakistan's but also American personnel advising, the National Economic Council and the US-AID. Mission. Those who will benefit most from the predictions include the engineering firms working in Pakistan, associated scholars and technicians who are working on Pakistan's problem, and personnel in US-AID. These predictions should enable them to better understand how the new system will work, and how they might best be related to the new system.

## Significance

The chief significance this study has for the science of comparative administration is the proposed model for structural change. The model described in Chapter II has been adequate for dealing with the water management system in West Pakistan on a macro-scale. Since it takes in the large relevant factors of political and administrative environments as well as the factors of efficiency and rationality to meet new physical environments, it should be able to come to predictive as well as prescriptive conclusions.

Several cautions about the model are in order. At the moment it has little place for the behaviour of personnel in organizations which are under considerations. In this paper we inferred what this behaviour might be from general theoretical observations on western bureaucracy. Whether or not this inferral is accurate remains to be seen. It is quite possible that mistakes in this area could throw off the conclusions of the study and the usefulness of the model.

Secondly there is no way in which the model itself can discriminate between the various assessments of the physical environment. Thus, there may be several different conclusions reached about what is called for in structural changes in management systems. Thirdly, the conclusions that the model comes up with will not necessarily be adopted unless these conclusions are fostered by "change agents" in the organizations. Thus, while the new goals of the system might be predicted and prescribed, the form of integration of old agencies into the new system will not be adopted unless it is actively proposed by influential change agents.

With a few reservations such as these, we believe that this model could also serve other attempts at reorganization in the underdeveloped world. We also believe that the experience of Pakistan in breaking up the "One Unit Scheme" and decentralizing the administration will also be a good example for both keeping the nation united and also providing for more efficient administration.

#### Problems for Further Study

Many different kinds of problems for further study suggest themselves in the course of writing such a paper as this. Thus, we shall limit ourselves to suggesting only those problems which have to do with a macro view of water agencies as a system of management.

An important study would be to do an administrative study of a SCARP area now administered by the Land and Water Development Board and a Colonization project administered by the ADC. Such a study would focus on different administrative systems for coordination in a project area and might reveal the type of administrative system best adapted to coordination of water and agricultural inputs.

Another study might consist of examining what kinds of coordination inputs occur at the village level in non-project areas. This study would show the needs and also the possibilities of how such grass-root coordination can be induced through administrative action.

A third area for study is the important issue of land reform. Land reform is defined as splitting up large estates to give more peasant ownership of the land and also the consolidation of small plots which are economically dysfunctional.

How might land reform be connected to the present system of agricultural development. What standards have the ADC's come up with in assigning in their colonization areas.

A fourth area of study which would be beneficial is to test the linkages in the new system of water management which will shortly come about. This might be done by having a union council submit a plan for agricultural development consisting of the need for better coordination of water and other inputs. Then, after the plan has been submitted for some time, see what has happened to it by tracing it through the various agencies concerned. Hopefully, one could identify administrative blockages and dead ends and see in the future how these might be avoided.

#### Summary

In our thesis we have described the importance of water management in the economy of West Pakistan. We have also described the existing agencies as to their functions, structure, and linkages. Because of important changes in the physical environment together with political and administrative changes, we have suggested modified goals for the existing organizations. We have also proposed a new water management system in line with those goals.

We believe that this study can be beneficial to people working on the problems of water management and agricultural development in West Pakistan, and that the suggested model might usefully be employed by others in the discipline of comparative administration.

# **BIBLIOGRAPHY**

## BIBLIOGRAPHY

### Books

- Ahmad, Muneer. *The Civil Servant in Pakistan*. Karachi: Oxford University Press, 1964.
- Ahmad, Mushtaq. *Government and Politics in Pakistan*. Karachi: Pakistan Publishing House, 1963.
- Almond, Gabriel, and Powell, G. Bingham, Jr. *Comparative Politics: A Developmental Approach*. Boston: Little Brown and Co., 1966.
- Burns, Tom, and Stalker, G.M. *The Management of Innovation*. Chicago: Quadrangle Books, 1961.
- Downs, Anthony. *Inside Bureaucracy*. Boston: Little, Brown and Co., 1967.
- Gawthrop, Louis C. *Bureaucratic Behavior in the Executive Branch*. New York: The Free Press, 1969.
- Ginzberg, Eli, and Reilly, Eging. *Effecting Change in Large Organizations*. New York: Columbia University Press, 1957.
- Goodnow, Henry Frank. *The Civil Service of Pakistan*. New Haven, Conn: Yale University Press, 1964.
- Fickett, Lewis P., Jr. *Problems of the Developing Nations*. New York: Thomas Y. Crowell Co., 1966.
- Jones, Garth. *Planned Organizational Change*. London: Routledge and Kegan, Paul, 1969.

(ii)

- Lawrence, Paul. *The Changing Organizational Behavior Problems*. Boston: The Riverside Press, 1958.
- Lippitt, Ronald; Watson, Jeanne; and Westly, Bruce. *The Dynamics of Planned Change*. New York: Harcourt, Brace, and Company, 1958.
- Michel, Aloys. *The Indus Rivers*. New Haven: Yale University Press, 1967.
- Millikan, Max F., and David Haggood. *No Easy Harvest: The Dilemma of Agriculture in Underdeveloped Countries*. Boston, Mass. Little, Brown and Co., 1967.
- Montgomery, John D., and William J. Siffin. *Approaches to Development: Politics, Administration and Change*. New York: McGraw-Hill Book Company, 1966.
- O'Connell, Jeremiah J. *Managing Organizational Innovation*. Homewood: Richard Irwin Inc., 1968.
- Papánek, Gustav F. *Pakistan's Development*. London: Oxford University Press, 1968.
- Raphaeli, Nimrod, (Ed.) *Comparative Public Administration*. Boston: Houghton Mifflin Company, 1964.
- Sayeed, Khalid B. *The Political System of Pakistan*. Boston: Houghton Mifflin Co., 1967.
- Simon, Smithburg, and Thompson. *Public Administration*. New York: Alfred Knopf, 1959.
- Wilber, Donald H. *Pakistan*. New Haven, Conn.: Human Relations Area Files, Inc., 1964.
- Williams, Lawrence F.R. *The State of Pakistan*. London: Faber and Faber, 1966.

(iii)

Articles

- "The Army Takes Over Pakistan." *Time*, Vol. 93, No. 14 (April 4, 1969).
- Birkhead, Guthrie. "Government by Corporation: The Case of West Pakistan WAPDA." *Administrative Problems in Pakistan*, Guthrie Birkhead (ed.), Syracuse: Syracuse University Press, 1966.
- Braibanti, Ralph. "Transnational Inducement of Administrative Reform: A Survey of Scope and Critique of Issues." *Approaches to Development: Politics, Administration, and Change*, Montgomery and Siffin (eds.), New York: McGraw-Hill Book Co., 1966.
- David, Paul. "Analytic Approaches to the Study of Change." *Public Administration Review*, Vol. XXVI, No. 3 (Sept., 1966).
- Dube, S. C. "Bureaucracy and Nation Building in Transitional Societies." *Political Development and Social Change*, Finkle and Gable (eds.) New York: Wiley and Sons, 1968.
- Lingle, Kendall. "Crucibles of Change" *Public Personnel Review*, Vol. 30, No. 1 (Jan., 1969).
- Pakistan Times*. Vol. XXIII, No. 298 (December 8, 1969), p. 1.
- Pakistan Quarterly*. Vol. XII, No. 4.  
"Pakistan, Ayubs' Strategic Retreat." *Time*, Vol. 93, No. 8 (February 21, 1969).
- "Pakistan, Back To Democracy, on the Double." *Time* Vol. 93, No. (December 12, 1969).
- "Pakistan, Precarious Task." *Time*, Vol. 93, No. 13 (March 28, 1969).

- Panandiker, V. A. Pai. "Developmental Administration: An Approach." *Readings in Comparative Public Administration*, Nimrod Raphaeli (ed.), Boston: Allyn and Bacon, 1967.
- Platt, George. "Agriculture: Administration and the Search for Expanded Productivity." *Administrative Problems in Pakistan*, Guthrie S. Birkhead (ed.), Syracuse: Syracuse University Press, 1966.
- Sody, Emil J. "Improvement of Local Government and Administration for Development Purposes." *Readings in Comparative Public Administration*, Nimrod Raphaeli (ed.) Boston: Allyn and Bacon, 1967.

Documents

- Lieftinck, Pieter, and Associates. *Water and Power Resources of West Pakistan*. 3 Vol., Baltimore: Published for World Bank by the Johns Hopkins Press, 1969.
- United States Water Resources Council. *The Nation's Water Resources*. Washington, D. C.: U. S. Government Printing Office, 1968.
- The White House. *Report on Land and Water Development in the Indus Plain*. Washington, D. C.: Government Printing Office, 1964.
- West Pakistan. *Food and Agriculture Commission Report*. Lahore: Government Printing Office, 1960.
- West Pakistan Yearbook of 1965*. Lahore: Information Department, 1965.
- West Pakistan Yearbook of 1968*. Lahore: Information Department, 1968.

(v)

Agriculture Division, US—AID/Lahore. *Role of Nation Building Departments at the Union Council Level in SCARP - II-A, Concepts and Proposals.* Mimeo-Pamphlette, Lahore: US—AID, no date.

Interviews

Interview with Mr. Khalid Mahmood, December 22, 1969. Mr. Mahmood, has worked for the Irrigation Department of West Pakistan for sixteen years, part of the time as Superintending Engineer in Lahore.

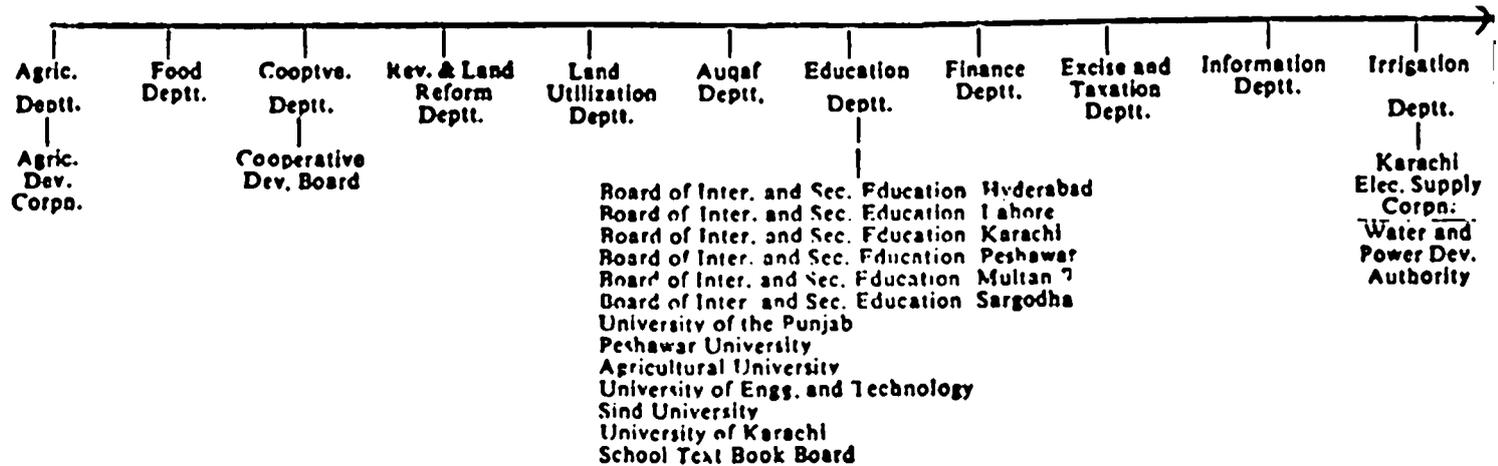
Interview with Mr. A. Lateef, September, 1969. Mr. Lateef serves as the Secretary of the Land and Water Development Department.

---

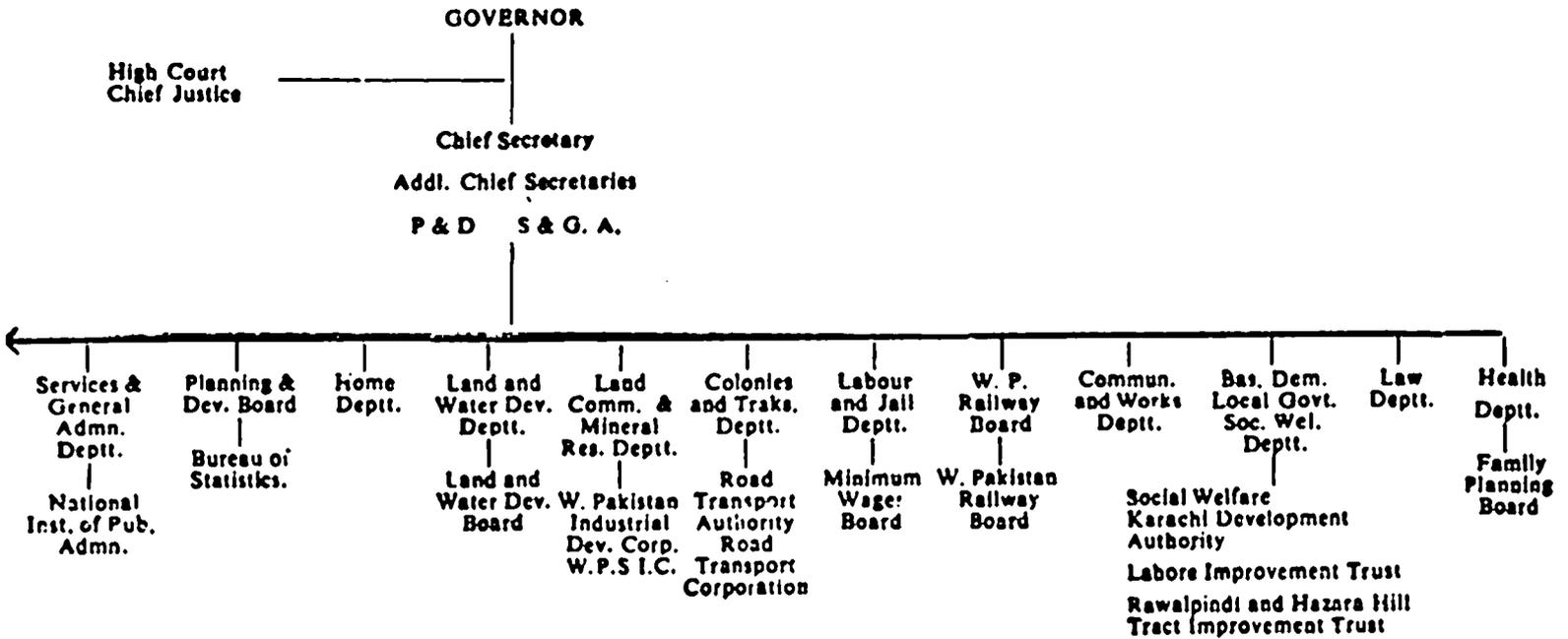


# APPENDIX

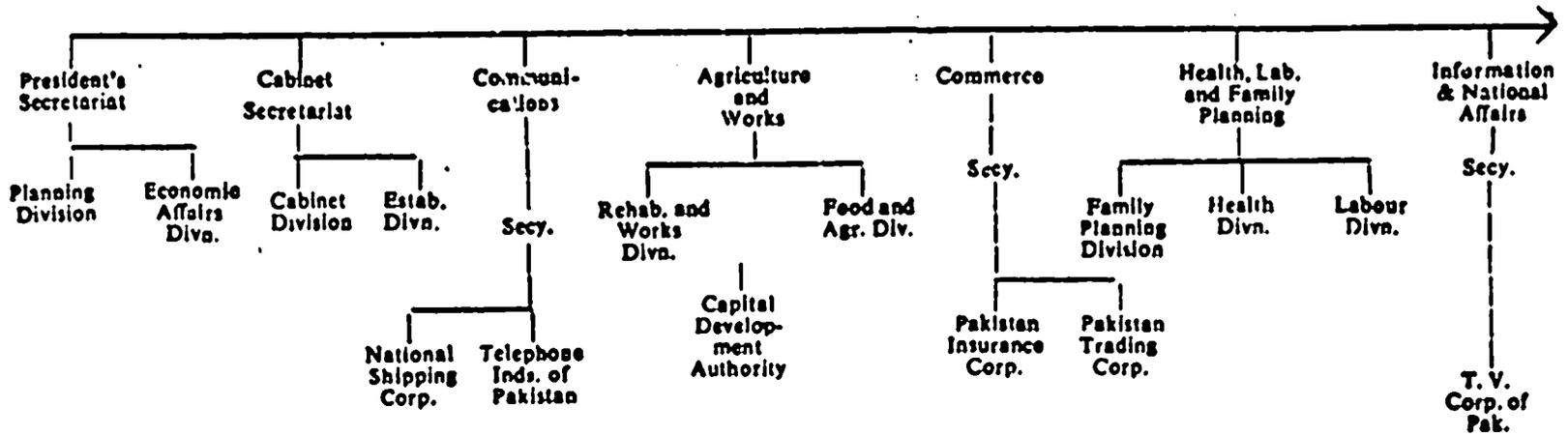
# APPENDIX I



# ORGANIZATION CHART GOVERNMENT OF WEST PAKISTAN



# APPENDIX II



# ORGANIZATION CHART GOVERNMENT OF PAKISTAN

