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**THE REVELLE REPORT:  
A CASE STUDY IN THE ADMINISTRATION OF TECHNICAL ASSISTANCE**

**A Staff Paper  
by  
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**January 1965**

**Maxwell Graduate School  
of Citizenship and Public Affairs**

**Syracuse University**

**Draft  
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and Official Use Only**

This is a staff paper which is being circulated in a limited way for comment.

The conclusions reached, and the recommendations made, are the author's own at this point in his research. They may well be revised on the basis of staff discussions and further investigation.

The completion in January 1964 of the Report of the White House---Interior Panel on Salinity and Waterlogging offers an excellent case study of the operation and impact of a unique experience in technical assistance administration. Initiated in the summer of 1961 by the new Kennedy administration, it reflected the President's conviction that science and the best minds in the United State could make a major contribution to the solution of man's problems. It was a project of the newly established White House Office of Science and Technology, whose Director, Dr. Jerome B. Wiesner, recruited the cooperation of the Secretary of Interior and his science advisor Dr. Roger Revelle. Wiesner and Revelle began by recruiting a group of the ablest, internationally recognized U.S. authorities to focus on Pakistan's growing problem of salinity and waterlogging. President John F. Kennedy's personal interest in, and enthusiasm for the project was reflected in his correspondence with President Ayub of Pakistan.

In the standard technical assistance project the Agency for International Development (AID) has been the U.S. Government agency concerned with offering aid to foreign countries. Rarely, if ever, have the White House Office or the President undertaken such a task. For this reason the report of the White House---Department of Interior Panel offers an interesting opportunity for the examination of its potential as a device to assist the developing countries in solving their development problems.

The West Punjab area of the Indus has been suffering the effects of some 70 years of canal irrigation. Thirty million acres of land in the Punjab of West Pakistan serviced by river waters and irrigation canals are now threatened by a rising water table. Studies and test projects had been undertaken by the British administration prior to partition, but little had been

done in the way of major projects to cope with the problem. Each year some 100,000 acres of land are lost to production as the result of waterlogging or salinity. As far back as 1917 tubewells were employed for drainage. In 1936 attempted solutions to waterlogging were initiated by the selective lining of canals to curtail seepage. While providing some reduction in seepage, the cost was high and the number of canals so lined was insignificant. In the 1940's about 1,500 tubewells were installed along and within 60 feet of the main canals. They failed to lower the water table.

Soon after the United States began its program of technical assistance to Pakistan in 1954, the U.S. Geological Survey undertook a project aimed at investigating this problem. The project attempted to assist the Government of Pakistan in (1) carrying on basic data collection, (2) improving the water quality and soil survey laboratory through equipment and staff training, and investigating the scientific facts that would indicate the appropriate steps necessary to deal with the problem.

Upon completion of the investigation, which took place in the Rechna Doab, an area of 7,500,000 acres, the Government of Pakistan hired domestic as well as foreign engineers to design a project that would yield an appropriate engineering solution to the salinity problem. Harza and Co., a consulting firm, developed a technical proposal in which tubewells played a prominent part. The U.S. approved the financing of a \$15,500,000 project, and 1,800 tubewells had been installed under this project by 1963. In the spring of 1961, this 1.2 million acre project, nearing completion, was but a small part of the effort needed to cope with the total problem, but does indicate a U.S. awareness of what is not a new problem.

The Origin of the Revelle Project

The Revelle Report had its origin in a Government of Pakistan Planning Commission Report prepared early in 1961 on the problems of waterlogging and salinity. In April 1961, President Ayub, alarmed by a report of the Pakistan Planning Commission on the increasing extent of salinity and waterlogging gave the West Pakistan Water & Power Development Authority (WAPDA) 30 days to consolidate all existing plans and to prepare a 10-year reclamation program covering the entire irrigated area of the Indus Plain. Planning a total solution to waterlogging and salinity in West Pakistan, WAPDA proposed a \$1,200,000,000 10-year plan for the area: \$500,000,000 for power and \$700,000,000 for all other expenditures.

In the meantime, Professor Abdus Salam, Science Advisor to the President of Pakistan, had met President Ayub in London during a Commonwealth Conference. The President, excited and upset by the waterlogging and salinity problem, conveyed his concern to Professor Salam. Still in April 1961, Professor Salam attended the Massachusetts Institute of Technology (MIT) Centennial. In response to a statement that all that the underdeveloped countries needed was already discovered and on the library shelves and need only be taken down and used, Professor Salam raised for discussion the problem of waterlogging and salinity in Pakistan. Professor Jerome Wiesner, who in January 1961, had become Science Advisor to President Kennedy and who had been involved in the MIT conference in honor of the Centennial happened to be in attendance at this panel. He offered the help of his office, and Professor Salam seized the opportunity. Salam reported back to President Ayub, and Professor Wiesner reported to President Kennedy. Both Presidents subsequently for many and diverse reasons agreed to the proposal that the White House Office

of Science and Technology study the problem of waterlogging and salinity in Pakistan.

Following his discussions with Dr. Salam, and after securing the approval of President Kennedy, Dr. Wiesner had Mr. George Lukes, a technical assistant in his office prepare a memorandum on the problem. This memorandum received as early as May 19, 1961 by Mr. Wiesner set forth the scope of the study to be considered "in the light of the situation today, whether there may be one or a combination of several engineering techniques that might conceivably offer some hope of eliminating waterlogging and in removing excess salts from the root zone, thereby returning to agriculture some 3 million out of 23 million acres already lost to cultivation and in preventing an accelerating loss of other agricultural land, currently at a rate of 100,000 acres per year."<sup>1</sup>

On June 13, 1961, the same day as the Ayub-Kennedy talks began, Mr. Lukes conferred with Professor Alan S. Michaels, later to become a panel member who had prepared a memorandum in July 1959 "Commission to visit West Pakistan in Connection with Problems of Land-Irrigation and Reclamation" and who was a recognized authority on salinity problems.

In response to Mr. Lukes request for assistance, Professor Michaels commented critically on the approach to waterlogging and salinity taken by Tipton and Kalmbach. "Examination of these documents has not revealed to me any fundamental new information of which I have been unaware, nor has it thrown any different light, in my opinion on the philosophy of objectives behind the elaborate tubewell reclamation which is currently underway. I continue to feel, as I indicated to you orally in our meeting, that the premise on which

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<sup>1</sup> Memorandum to Dr. Jerome B. Wiesner from the President's Science Advisory Committee on Salinity and Water-Logging in Canal-Irrigated Areas of West Pakistan, page 1.

the tubewell program is founded is basically defective."<sup>2</sup>

That same day, President Kennedy called George Lukes who was then in Boston attending a meteorological conference to tell him he had agreed to the waterlogging and salinity study. Lukes, in the absence of Wiesner who was in London, flew back to Washington and the project really got underway.

President Ayub received on May 17 the WAPDA plans that he had ordered in April. He gave the WAPDA program his wholehearted support. Vice-President Lyndon B. Johnson arrived in Pakistan on May 20 and spent that day and the next in Karachi. During this stay he discussed the problem with President Ayub. On May 21, Finance Minister Shoaib left Pakistan for Washington and the Consortium talks on the extent of Western aid to Pakistan. The next day the Morning News (Karachi) carried a five-column banner headline proclaiming that an official Pakistan delegation would "shortly" be visiting the U.S.S.R. to seek financial and technical assistance in combating salinity and waterlogging. The article noted that Russia had offered assistance on this problem as far back as 1958. It added that the offer had come up for discussion during the Pakistan Foreign Minister's recent oil exploration talks in Moscow.

In the meantime the U.S. State Department and the Ambassador in Karachi, William Roundtree had been engaged in an effort to establish an agenda for the impending visit of President Ayub to President Kennedy. In their efforts to fix upon a subject which could be dealt with positively and avoid the insoluble question of Kashmir, the State Department and the White House staff came up with the suggestion that waterlogging and salinity was a major concern of President Ayub and that it could be undertaken without a

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<sup>2</sup> Letter dated June 26, 1961 to Mr. George Lukes, Technical Assistant to Dr. Jerome B. Wiesner, from Professor Alan S. Michaels.

necessarily heavy cost in view of the balance of payments, difficulty the U.S. faced at the time. It was then recommended to President Kennedy that he agree to undertake it and this agreement was communicated to President Ayub.

As the waterlogging and salinity problem came to a head, the Consortium was meeting in Washington considering Pakistan's request for \$945,000,000 for its second five-year plan. The Director of WAPDA arrived in the U.S. to seek the necessary funds to fight the problem of waterlogging and salinity. Pakistan's effort to secure these funds in addition to the requirements of its second five-year plan raised doubts in the minds of the Consortium members as to what were Pakistan's real priorities. These doubts contributed to the unwillingness of the Consortium to raise even the original \$945,000,000 requested by Pakistan.

Upset by the failure of the Consortium in June, President Ayub hastened to Washington for talks with President Kennedy. At the airport in his welcoming speech, President Kennedy, who already had agreed to Wiesner's proposal for scientific assistance to Pakistan in dealing with its waterlogging and salinity problem, included in his welcome mention of the proposed scientific collaboration between the two countries. At the formal talks in Hyannisport, the question of technical assistance for the solution of the waterlogging and salinity problem was raised formally amid the discussions of problems such as the admission of Communist China to the U.N. The groundwork having been laid by Professor Salam and Dr. Wiesner, President Ayub (during the talks of July 12-13, 1961) requested the U.S. to examine the technical feasibility of WAPDA's 10-year plan. President Kennedy agreed to undertake research on the problem and assigned the technical review of the project to Wiesner.

The very next day, on July 14, Wiesner convened a preliminary meeting attended by AID officials and consultants on Wiesner's staff. An effort was made to outline the problem. On July 20 a meeting of staff of federal agencies concerned was held to hear the background facts on waterlogging and salinity. The following agencies were represented: (1) White House Science and Technology, (2) Department of Interior, (3) National Science Foundation, (4) Department of Agriculture, (5) International Cooperation Administration (ICA; presently AID), (6) The Development Loan Fund; and four consultants from outside the government attended.<sup>3</sup> On July 26, a Panel was established.<sup>4</sup> Dr. Roger Revelle, Science Advisor to the Secretary of the Interior, was formally named chairman, and the U.S. Geological Survey of the Dept. of Interior was named implementing agency for the study.

During this initial period in the assembling of the Panel the White House Office of Science & Technology solicited the views of many well known experts in the field of salinity and waterlogging. Not only were the technical views of Professor Alan Michael of MIT solicited but also those of Professor David Todd of the U. of California at Berkeley and Professor John Isaaca of the U. of California at San Diego. A thorough examination of the problems resulted in their being organized in the following manner:

I. Hydrologic Regime

To be considered

water balance  
salt balance  
sediment balance

Framework for recommendations

spacing, location, and depth of  
tubewells

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<sup>3</sup> See page (7a) for list of participants.

<sup>4</sup> See pages (7b-7c) for list of Panel members.

Participants in July 20, 1961 Meeting on Problems of Salinity  
and Water Logging in Canal-Irrigated Areas of West Pakistan

Government:

White House - Science & Technology

Jerome B. Wiesner  
Harvey Brooks  
George D. Lukes

Department of the Interior

Roger Revelle  
Walter Langbein  
Thomas Maddock  
Nelson Sayre  
Dwight Bertelson

National Science Foundation

William Benson

Dept. of Agriculture, Agricultural Research Service

Cecil Wadleigh

International Cooperation Administration

Ralph Trisko  
S. N. McIntosh  
Monroe Burke (Pakistan Desk Officer)  
David Greenman (U.S. Geological Survey, on assignment to ICA)  
Kenneth Vernon (U.S. Operations Mission, Pakistan)

Development Loan Fund

Dale Harper  
Milburn M. Pehl  
Robert L. Moorman  
Olin Kalmbach (Tipton & Kalmbach, Inc. - by invitation of DLF)

Consultants:

Alan S. Michaels, Massachusetts Institute of Technology  
H. A. Thomas, Harvard University  
David Todd, University of California at Berkeley  
Ayers Brinser, University of Michigan

MEMBERSHIP OF THE WHITE HOUSE--DEPARTMENT OF INTERIOR  
PANEL ON WATERLOGGING AND SALINITY IN WEST PAKISTAN

Dr. Roger Revelle, Chairman*	Professor Robert Dorfman
University Dean of Research	Harvard University
University of California	Cambridge, Massachusetts
Berkeley, California	
Mr. John B. Blandford	Mr. Rollin Eckis, President
Consultant, AID	Richfield Oil Corporation
Washington, D.C.	Los Angeles, California
Dr. C. A. Bower, Director	Professor Walter P. Falcon**
U. S. Salinity Laboratory	Harvard University
Riverside, California	Cambridge, Massachusetts
Professor Ayers Brinser	Professor Robert Gomer
University of Michigan	University of Illinois
Ann Arbor, Michigan	Urbana, Illinois
Dr. Robert P. Burden	Professor John Isaacs
Harvard University	University of California,
Cambridge, Massachusetts	San Diego
	La Jolla, California

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\* Formerly Science Advisor to the Secretary of the Interior

\*\* Added later to the Panel

Dr. Leonhard Katz, President  
Astro-Dynamics, Inc.  
Burlington, Massachusetts

Dr. Walter Langbein  
U.S. Geological Survey  
Washington, D.C.

Dr. R. A. Laudise  
Bell Telephone Laboratories  
Murray Hill, New Jersey

Mr. George D. Lukes  
White House Office of  
Science & Technology  
Washington, D.C.

Mr. Thomas Maddock  
U.S. Geological Survey  
Washington, D.C.

Professor A. S. Michaels  
Massachusetts Institute of Technology  
Cambridge, Massachusetts

Mr. R. C. Reeve  
U.S. Salinity Laboratory  
Riverside, California

Mr. Herbert Skibitske  
U.S. Geological Survey  
Phoenix, Arizona

Professor Harold A. Thomas, Jr.  
Harvard University  
Cambridge, Massachusetts

Professor David K. Todd  
University of California  
Berkeley, California

Dr. C. A. Wadleigh, Director  
Soil and Water Conservation  
Research, Agricultural Research  
Service  
Washington, D.C.

I. Hydrologic Regime Cont'd.

aquifer properties	number and capacity of tubewells
variance in time	canal leakage
seasonal	effect on water table
annual	re-charge of aquifer
secular	
spatial distribution	new canal design and location
transient states	drainage system
sequence of events	

II. Agricultural Regime

<u>To be considered</u>	<u>Framework for recommendations</u>
optimum water management	subsistence vs. money crops
total amounts	
timing	
field drainage	
soil management	size and capitalization of
leaching	operating units
treatment	
tillage	
Crop management	farm tooling
strains; varieties; species	
diseases; insects	
fertilizer	
rotation	
	maximize harvest rather than
	cultivated area

III. Management

<u>To be considered</u>	<u>Framework for recommendations</u>
irrigation and drainage	money, water and food storage
engineering	
power system	coordination of Government
	departments
agricultural operations	equating of authority and
	responsibility
marketing	motivation and education of farmers
import pattern	subsidies

IV. Industrial, Educational, and Scientific

<u>Industrial</u>	<u>Educational</u>	<u>Scientific</u>
pump	hydrologists	hydrologic laboratories
electrical	agronomists	agricultural
steel pipe	managers	research
concrete pipe	engineers	
food & fibre processing	farmers	
farm tools		
fertilizer		

In addition to the technical questions the results of this meeting indicated that the organizational and administrative problems would have to be included. On August 2, 1961, in a subsequent meeting of the Panel, Wiesner reported the President's concurrence with the sense of the Panel's recommendation that the highly technical salinity and waterlogging study be expanded to include the administration and operation of completed projects. By August 9, 1961, President Kennedy was prepared to write President Ayub and report to him on the project.

August 9, 1961

Dear Mr. President:

.... We have also enlisted the direct interest of Mr. (Stewart L.) Udall, my Secretary of Interior, and of his science advisor, Dr. Revelle. Specialists from our Bureau of Reclamation, Geological Survey, Department of Agriculture, and other United States Government agencies have joined forces with scientists and engineers from Harvard, the Massachusetts Institute of Technology and the University of California to study your problem ....

We have tentatively identified four major areas of concern which should be studied concurrently:

First, a comprehensive and, to the extent possible, detailed analysis of the probable effects of different proposed systems for combating waterlogging and salt accumulation in the soil, and at the same time increasing the supply of irrigation water, with the objective of identifying the best and most practical system....

Second, an examination of applicable irrigation techniques and management plans for the Rechna Doab area in which wells are now being installed ....

Since the West Pakistan Water and Power Development Authority's responsibility for construction will shortly be completed, you may wish to consider as soon as practicable the kind of management organization and procedures which the new irrigation practices required by the tubewell system in Rechna Doab will demand, if they are to be effective ....

The third problem, as our experts see it, is that of maintaining and increasing the harvest from irrigated lands, having in mind the fact that agricultural conditions may be improved by the availability of more water than heretofore ....

Finally, we plan to examine the extent to which the equipment and materials needed in these enterprises could be supplied by your industry, either from existing or new plants.

Sincerely,

/s/ John F. Kennedy

The week following the President's letter, John Blandford was appointed to the ICA staff assigned to the study with particular responsibility for management organization aspects.

As the panel got underway Secretary of Interior Mr. Stewart L. Udall on August 25, 1961 wrote to Mr. Henry R. Labouisse, Director of the International Cooperation Administration referring to the visit of President Ayub and the correspondence between the two Presidents. In detailing the scope and content of the project based on the request of the Science Advisor to the President for the services of his science advisor, Mr. Udall stated "... it is believed appropriate that the International Cooperation Administration give favorable consideration to providing needed financial support ....". On September 14, 1961 Mr. Labouisse replied favorably outlining the ICA position with respect to the study.

"As you know, ICA has assisted the Government of Pakistan during the last eight years, in that Government's efforts to assess the problems of waterlogging and salinity in the Indus River System of West Pakistan and has assisted that Government in its progress toward an understanding of the total problem involved in the creation of stable irrigation farming in West Pakistan. I am pleased to note that the letter from President Kennedy to President Ayub tentatively identifies four major areas of concern which should be studied concurrently in an evaluation of the problems of waterlogging and salinity of West Pakistan. I am pleased to note that the President's letter has invited attention to the problem of the kind of management organization required to make effective proposed irrigation developments in West Pakistan. In accordance with informal discussions with Dr. Revelle, we are proceeding with the employment of a special consultant on the problems of organization and management to undertake a study of this problem as a member of the Science Advisors Study Group.

In accordance with your request, a PIO/T is being issued providing \$75,000 for the studies to be accomplished under Dr. Revelle's leadership as outlined in your letter of August 25, 1961, the funds to be administered by the U.S. Geological Survey of your Department in accordance with existing agreements between the Department of Interior and this administration. Members of my staff will continue to be available for cooperation with Dr. Revelle as he proceeds with these studies. You may anticipate full and cordial support, not only of this headquarters but of the USOM/KARACHI, Pakistan.

We shall look forward to the receipt of the report of this study shortly after completion of the 90 to 120 day period of study. I trust it will be possible to plan these studies so that the total review may be accomplished within the time limit and the limit of funds now provided. Following completion of the study, appropriate consideration can be given to the subsequent steps which might be undertaken by the Government of Pakistan in its future work in irrigation in the Indus River Basin of West Pakistan and to the possible assistance of the Government of the United States in the accomplishment of such work."

Sincerely yours,

Henry R. Labouisse

It is important to note that Mr. Labouisse had selected out of President Kennedy's letter of August 9, 1961 the specific reference to organization and management, indicated his pleasure with respect to it and already began recruitment of a special consultant in accordance with informal discussions with Dr. Revelle.

By August 30, 31 and September 1, 1961 a further meeting was held to outline the problem. Discussions continued on the technical problems with the major concentration still on the salinity and waterlogging problem. President Kennedy's personal interest in this project is reflected in a telegram he dispatched to Dr. Revelle.

"I am following with considerable interest the program of your group's investigation of salinity and waterlogging in West Pakistan. Please extend to your colleagues my appreciation of their efforts and of the value and importance of this undertaking."

In a memorandum of September 6, 1961 to Dr. Wiesner, Mr. George Lukcs "put the conference conclusions in perspective" and indicated that attention was devoted to six major operational problems.

- 1) Possible preventative measures in saving land on the verge of loss versus reclamation of land already lost and the balance that it might be expedient to strike between the two.
- 2) Means to achieve a reduction in the height of the water table, taking into account the known hydrology of the lands and the indicated sub-structure, to the extent that data of acceptable quality would suggest solutions.

3) Possibilities of providing actual drainage (surface and sub-soil) as against relatively deep tube well pumping, and the virtues therein of removing some 60 tons of salt per acre from the root zone as against accepting the hazard of leaching these salts into the aquifer.

4) Maintaining the salt balance, of which 3 above is one consideration; and especially anticipating whether proposed solutions to waterlogging and salinity would, in fact, avert a possible future problem when the aquifer might become too saline for irrigation application.

5) The general problem of high salinity soils, viewed especially in the context of agricultural productivity. In this respect particularly, soil chemists and agricultural engineers from the Agricultural Research Service set forth a prescription for their attack on this problem along the following lines:

a) Evaluating the nature and extent of the salt and sodium problem.

b) Salt tolerance and adaptation of plants and species to saline soils.

c) Opportunities for improving water, soil, and crop management.

d) Irrigation, drainage, and mechanics of leaching.

e) Estimates of increased productivity with increasing water.

f) Anticipated crop yields versus costs incurred in correction of salinity and waterlogging; and benefits gained from fertilizers, pesticides, herbicides, and farm machinery.

g) Cost and benefits of various salt removal schemes.

6) Consideration of institutional restraints that mold the overall efficiency of the agricultural economy; such as, the pattern of economic enterprises, the pattern of agricultural plots, unit operation and marketing procedures, including the movement of harvested crops from farm to market outlet.

In a memorandum dated September 13, 1961 John Blandford appears as the sole member of the Working Group on Management and Operations and on the list of those to visit Pakistan. In connection with the nature of the study and the type of problems considered, an interesting political intervention occurs at this time in our story.

Dr. D. F. Peterson, Dean of the College of Engineering of Utah State University and a consultant to ICA, who had visited Pakistan three times in the past two years, in this very field, enters our story for a short interlude never to appear again. In a letter dated September 8, 1961 to Senator Frank E. Moss of Utah which was forwarded on to Wiesner September 20, 1961, he expresses concern about the problem and the nature of the study.

"The most discouraging factor in the situation is that the Pakistan government, which is an inexperienced one, has not been able to bring itself to take the necessary steps to organize and train the management for the program. A great many farmers are involved; there must be a widespread program of farmer education and demonstration as well as enlightened, modern, technical management. These are the keys to success here and they cannot be replaced by the potential hope of a pending, scientific discovery. Unfortunately, many people in the under-developed areas of the world do not realize that hard work, good planning, and perhaps even political inconvenience, must complement scientific discovery to achieve success. I suspect that part of Ayub's complaint to President Kennedy is still partly in the hope of avoiding the tough management job necessary to get the job done.

As I understand about what happened was this: President Ayub's question was referred to the President's scientific advisor. Since the word "salinity" was involved, the scientific advisor thought about seawater desalinization. He brought in people in this field and formed a committee to study this matter. As I understand it, the great resource of experience and investigation in reclamation and irrigation was almost entirely ignored. I understand that two people from the Agricultural Research Service were eventually consulted but were largely shouted down by starry-eyed physicists with their minds up in the space stratosphere. I think this is dangerous, and I think that an unrealistic approach by the President's committee on this matter could throw the program off-track in Pakistan. This is something I think we cannot afford to do; we have hundreds of millions of dollars invested in this activity."

Wiesner replied September 22, 1961 in the following manner:

"Perhaps I should state and emphasize first that Dr. Peterson's understanding of our approach to this problem--as he states in the last paragraph on page 2 of his letter of September 8--is wholly out of accord with the facts. At the outset, we enlisted the direct interest of Secretary Udall and his science adviser, Dr. Roger Revelle; and Dr. Revelle in turn drew in government specialists from the Bureau of Reclamation, Geological Survey and Department of Agriculture in order to benefit from experiences with irrigation and land reclamation in the western part of the United States. After these discussions we augmented our study groups with scientists who are pioneering in the development of new methods of analysis of complex hydrologic, agricultural

and economic problems. A senior official from the Agricultural Research Service has met with us from the very first meeting and, in fact, we have had Secretary Freeman's expression of interest and all possible support since the outset of our studies. Scientists of the Agricultural Research Service have already made notable contributions to the effort.

A further elaboration on the scope and intensity of our effort is best given in President Kennedy's letter of August 9 to President Ayub of Pakistan, and I am accordingly enclosing a copy. You may feel free to make this available to Dr. Peterson. I am sure you will agree that ours is an enlightened approach to a complex problem. You will also wish to note that we have already invited President Ayub's attention to the need for a management organization and procedure which the new irrigation practices required by the tubewell system in Rechna Doab will demand if they are to be effective."

Dr. Peterson in response to Senator Moss, apologized to Dr. Wiesner for having been misinformed. A review of the record, the competencies of the Panel, the problem of the study and its solution leads this writer to the conclusion that although the formal process may have been appropriate, Dr. Peterson did make a contribution in steering the Panel to problems of management and agriculture and away from "grand slam" solutions.

By September 21, 1961 the President was able to write President Ayub of the impending arrival of Wiesner, Revelle and a team of ten other scientists. As he stated the purpose of the visit, the agricultural production and management aspects of the study began to be included:

One purpose of this visit is to enable our people to obtain a first hand impression of the interrelated hydrologic and agricultural aspects of the problem, the variations in the patterns of drainage, salinity damage, standing water and crops, and the questions of irrigation and agricultural management.<sup>5</sup>

#### The Panel's First Visit

Preparatory to their visit, Dr. Revelle, Mr. Blandford and Mr. Lukes met with Dr. Abdus Salam, President Ayub's science adviser, on September 7, 1961

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<sup>5</sup> Letter of September 21, 1961 from President John F. Kennedy to the Honorable Mohammed Ayub Khan, President of Pakistan.

in order to maximize the gains from the visit. Dr. Salam recommended that the itinerary include discussions with high government officials, particularly with those having a major interest in alleviating waterlogging and salinity and in effecting improved irrigation practices and agricultural productivity. In order to facilitate the mission of the team both Dr. Revelle and Dr. Salam "saw the desirability of the team's leader delivering personally to the President of Pakistan at Rawalpindi a letter from President Kennedy giving the team its commission. On the team's arrival a copy of this letter would be delivered to Ambassador Rountree at the U.S. Embassy."<sup>6</sup>

On September 19, 1961 the Secretary of State informed the Ambassador in Karachi of the impending visit of the Panel including reference to ICA consultant Blandford. Soon thereafter the Panel left for Pakistan.

As beneficiary of the prestige of the White House Office, the Panel received top-level VIP treatment upon its arrival in Pakistan. The Chairman, Dr. Revelle, and the first contingent of the Salinity and Waterlogging Panel arrived on September 27; Wiesner and the second contingent followed one week later. The members of the Panel stayed for varying periods from September 22 through November 1. The Panel members, as guests of the Government of Pakistan, were in the hands of the Ministry of Fuel, Power, and Natural Resources together with WAPDA. Interviews and visits were arranged with President Ayub, his Ministers, and the Governor of West Pakistan. The Government of Pakistan offered full cooperation; it made available aircraft for inspection of parts of the area. The relevant departments and agencies, particularly those of the West Pakistan Government, met with the Panel members and offered them all the

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<sup>6</sup> Memorandum from Mr. George Lukes to Dr. Jerome B. Wiesner dated September 15, 1961.

information they had. The U.S. Embassy and the United States Operations Mission (USOM) in Pakistan remained in the background, but both offered full cooperation. The USOM turned over information from its files and proposed to assist in any way that it could. But the basic relationship underlying the study was seen as a high-level one between the President of the United States and the President of Pakistan.

At the very time the Reville Panel on Salinity and Waterlogging was getting under way, organizational changes arose that later were to plague the implementation of the Panel's proposals. The Government of Pakistan (GOP) had transferred operational control of the tubewells of Salinity Control and Reclamation Project No. 1 (Central Rechna Doab) to WAPDA's Directorate of Land and Water Management effective September 1, 1961. This organization was to have assumed responsibility for three aspects of the project: (a) physical operation and maintenance of tubewells, (b) water distribution below the canal outlet and the collection of canal and tubewell hydrologic data, and (c) reclamation and agriculture extension services, supply of seed and fertilizer, collection and analysis of agricultural and economic data, etc. However, due to conflicting interests within GOP and the lack of firm guidelines for this new approach, only the first of these responsibilities was ever assumed by that organization. The Irrigation Department through its WASID (Water and Soils Investigation Division) however, did initiate (and is continuing) an adequate program of ground water and soil monitoring. Apart from the WAPDA organization, the Soil Reclamation Board, a semi-independent body, had been operating four small schemes in adjoining areas, but lack of staff prevented it from undertaking effective reclamation activities over the entire project area. The search for appropriate organizational arrangements

was to continue throughout the life of the Revelle Panel.

The Panel members returned to Washington with an array of maps, data, photographs, movie film and the full support of the Government of Pakistan and the USOM. No staff was left in Pakistan, however, and the Panel became dependent completely on material and data from these two sources. Upon its return, a meeting was called in Washington, November 15-17, 1961.

In a "rump" session in Boston on November 2, 1961, preparatory to the November 15-17, 1961 meeting held to exchange the views of the two groups which visited Pakistan, Mr. Leonard Katz reported a significant trend in that session's thinking.

"6. To put our entire discussion in a nut shell, we seem to be fairly well agreed that the problem of Pakistan is not waterlogging and salinity, but increased agricultural output".<sup>7</sup>

In a memorandum prepared for Committee consideration at this meeting, Blandford suggested an informal presentation of the recommendation on organization and management prior to January 1, 1962. In that same memorandum he raised many factors for consideration.

The GOP has presently under consideration or in suspense certain organizational changes such as the following:

The transfer of Project #1 to ADC.

The reorganization of the Irrigation Branch.

The next steps in improving the organization of WAPDA.

The launching and the ultimate role of the Agricultural Development Corporation.

The strengthening of the agricultural extension service.

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<sup>7</sup> Letter from Mr. Leonard Katz to Mr. George Lukes, November 6, 1961.

There are several reports shortly to emerge from the Government of Pakistan of general and specific interest:

- (a) Report of a special West Pakistan Committee on the subject of a "flat" rate for tube well and canal water.
- (b) Final revision of the second Five Year Plan in anticipation of the Consortium meeting.
- (c) Report of a "Civil Service Pay Commission" which may recommend important revisions in the Civil Service arrangements.
- (d) A preliminary report of Harza on water resources and their development in West Pakistan---probably in a month.
- (e) Report on the Administrative implications of the New Constitution principles---probably available only on an informal and confidential basis.
- (f) Confidential progress reports on the new constitution drafting.

Is there a national economy aspect to the problem? Is there a West Pakistan---East Pakistan angle?

Also prior to the meeting of November 15, 1961 Blandford informed Chairman Revelle, that the Government of West Pakistan intended to transfer, upon completion, the operation of Rechna Doab Tubewell Project from WAPDA to the Agricultural Development Corporation (ADC), a recently established organization. The transfer would take place approximately January 1, 1962. Blandford proposed that USOM in Pakistan advise the Government of West Pakistan that the Panel hoped informally to convey suggestions before January 1, 1962 and request the transfer be postponed until there was an opportunity to review the recommendations of the Panel. For this purpose Blandford sent Revelle a sketch of background, current findings, and tentative recommendations on organization

and management for programs dealing with land and water development and utilization. At this time he stressed the consolidation of irrigation functions with WAPDA and the strengthening of agriculture with the creation of an Agriculture Development Administration to take over functions of the Department of Agriculture and the ADC. But little of this thinking was to come out of the meetings of the Panel.

At the November meeting the Panel organized itself into eight sub-committees, each with a chairman or person responsible for that section of the report. These eight sections were:

1. Economic and Social Implications

Rollin Eckis, Chairman  
John Blandford  
Robert Dorfman

- a) Costs of components and possible changes in these costs
- b) Cost-benefit considerations
- c) Industrial development
- d) Health, welfare and demography
- e) Governmental and political problems
- f) Technical manpower and training

2. Agricultural Considerations

Cecil Wadleigh, Chairman  
Ayers Brinser  
Charles Bower  
Ronald Reeve

- a) Agricultural practices: fertilizers; seeds; pest control; better farming practices; tools and machinery
- b) Education
- c) Management
- d) Financing
- e) Marketing
- f) Cooperatives and land tenure
- g) Forestry
- h) Livestock and poultry---the whole problem of protein deficiency

3. Research and Development

Leonard Katz, Chairman  
Robert Gomer  
R. A. Laudise  
Alan Michaels  
John Isaacs

- a) Canal lining---soil treatment
- b) Salt removal---salt tolerant crops
- c) Pumping and other technology
- d) Fisheries development
- e) Pakistan research organization

4. Hydrologic Regime

Thomas Maddock, Chairman  
Herbert Skibitske  
Harold Thomas  
David Todd

- a) Short term
- b) Long term
- c) Investigation program
- d) Flood damage control

5. Summary Conclusions and Recommendations

Roger Revelle  
George Lukes

6. Statement of the Problem and Present Programs

Roger Revelle  
George Lukes

7. Administrative Considerations and Technical Assistance

John Blandford

8. Bibliography

George Lukes

A summary of the November 15-17, 1961, Washington, D.C. conference indicates that there had been no resolution of the basic question. As Ayers Brinser stated it .... "the nature of the Panel's report should be a scientific and technological approach to the solution of the problem of water-

logging and salinity, rather than re-definition of the basic issue as one of increasing agricultural productivity."<sup>8</sup> As Lukes summarized the discussion following Brinser's memorandum, the rationale stated above does not mean "necessarily, that increasing agricultural productivity on present arable land--- through improvement of agricultural practices including irrigation, land preparation and cultivation, fertilization, pest control, and farmer education--- is not the basic issue. The Panel's scientific approach to the problem may well conclude that a technical need exists to increase vastly agricultural productivity---a necessary condition for the waterlogging and salinity problem to be amenable at all to an engineering solution."<sup>9</sup>

A deadline of December 15, 1961 was set for completion of the various subcommittee reports. The Panel also proposed to the Pakistan Government the postponement of the transfer of the operational control of the tubewells to ADC and indicated it would have an informal proposal by January 1, 1962. The Government of Pakistan agreed.

The Panel scheduled another meeting for January 7-9, 1962 in Washington. This meeting discussed the extensive activities taking place at Phoenix, Arizona and at Harvard.

By February 18, 1962 George Lukes was able to set down in long hand:

Conclusions

1. Rapid, large and economically beneficial increase in agriculture production is the most important thing to do and can be accomplished.

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<sup>8</sup> Memorandum from George Lukes to the Panel Members, December 20, 1961, page 2.

<sup>9</sup> Ibid., page 2.

2. Concentrate on increments of area---  
Factors of productivity are multiplicative  
Smaller the area the better

% Increase

10<sup>6</sup> acres seems best for: (leaching 15-20%  
(water 15-20%  
(fertilizer 15-20%  
(pest control 15-20%

- i) Hydrology
- ii) Fertilizer
- iii) Management

3. Research is needed )  
Plant varieties) There about 7.5%  
Pest control )  
Water use )  
Fertilizer use ) + learn from each 10<sup>6</sup> acre increment  
Canal lining )

4. Communication system; application of knowledge.  
5. Organization and institutions are needed.

3, 4, & 5 mean considerable input of expertise---  
a massive effort.

About this same time Blandford had completed his section on public administration implications of land and water development and utilization. In the meantime a draft report had been circulated, about which Blandford for one in a memorandum dated March 16, 1962 stated the following:

The Committee (Panel) has the facts and findings to produce a significant report. Happily the prospective recommendations point generally in the direction chosen by the Government of Pakistan with the assistance of Western engineers and scientists---use of underground water, land reclamation, and modernization of agriculture including intensive effort in project areas.

However, he also asked questions, some of which were later to be raised by the GOP or AID. These included:

1. The political feasibility of the project area approach and the ability of the Pakistan Government to concentrate all agricultural effort in the project areas over the next 36 years?

2. The advisability of including specific measures to implement recommendations involving cooperation of AID and GOP?

3. The advisability of prior consultation with AID and informally with GOP particularly on the proposal for the concentration of agricultural funds in project areas almost to the exclusion of effort elsewhere?

4. The informal conclusions which at this stage appeared to suggest autonomous project institutions unattached to a parent body?

Although, at this stage the report was only in outline form and far from complete, its general outlines had begun to take shape.

#### The Completion of the Draft Report

Pressure for the completion of the report mounted. As a result of an April 26, 1962 Dawn (Karachi) report that the Soviet Union had invited Pakistani hydrologists to the Soviet Union and offered help on waterlogging and salinity, Professor Abdus Salam, who had been so instrumental in getting the project started and who was very much aware of the pressures on President Ayub to make arrangements with the Communist countries, became concerned and on a visit to Washington paid a visit to Assistant Secretary of State Phillips Talbot. In the course of the interview he "observed they had waited a considerable length of time for the report". At that same time he visited with Dr. Revelle in Cambridge, Mass. and also requested speed in the completion of the Report.

Finally, in a letter of June 27, 1962, the prime purpose of which was to send to President Ayub a copy of a report on technical education and scientific resources, President Kennedy felt compelled to indicate some of the general lines that the Report on Salinity and Waterlogging would take:

In general terms, the Panel is optimistic that the problem of salinity and waterlogging can be solved in many large areas by economically beneficial investments in water development.

Their specific solutions are not inconsistent with the methods already proposed by WAPDA. The most far-reaching conclusion of the Panel, however, is that the problems of waterlogging and salinity must be attacked within the context of a broad approach toward a large and rapid increase in agricultural productivity. They have been concerned with many aspects of this complex and difficult problem, including economic, sociological and institutional, as well as technical factors. I understand that their report will urge a concentration and balance of effort along all these lines in order to take advantage of the positive interaction between different factors affecting agricultural productivity.<sup>10</sup>

At this time then it had become clear that the report was not to be concentrated solely on the technology of salinity and waterlogging but upon increasing agricultural production. However, in this letter there was no mention of the problem of agricultural management. This omission was prophetic, for in the First Draft of the Report there was no mention of the problems of administration and no organizational recommendations for implementation of the Report.

As the time approached for the completion of the Draft Report, AID-Washington became concerned with the financial implications of the Report and its meaning for the U.S. Aid program. As early as March 10, 1962 Fowler Hamilton in a meeting with Wiesner and Revelle expressed concern that the presentation of the Panel's recommendations might implicitly commit the United States in general and AID in particular to a very large role in implementing the recommendations. On August 23, 1962 Fowler Hamilton in a letter to Jerome Wiesner requested a meeting prior to President Ayub's visit to Washington in late September to permit AID to review the Panel's "financial and other implementation recommendations at an early stage so as not to unduly delay completion of the final report."

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<sup>10</sup> Letter of June 27, 1962 from President John F. Kennedy to His Excellency Mohammed Ayub Khan, President of Pakistan.

Joint discussions were held between the White House Office, the Panel and AID in which AID made some detailed recommendations for incorporating small substantive changes in the Report. In every way AID attempted to make clear that this report in no way implicitly or otherwise committed the U.S. Government or AID to supporting in financial terms the implementation of its recommendations. Fowler Hamilton went so far as to suggest that the copies of the report "go directly from the Panel to their Pakistani colleagues". This was designed to help "personalize the interchange and more importantly, avoid fanning Pakistan's expectations that the United States will finance this entire scheme outside the five year plan framework".

As activity increased with the approaching arrival of President Ayub to the United States, an incipient conflict was avoided when some of the Panel members rose to object to the final version of the Draft Report after it had already been submitted to President Ayub. Brinser, Katz and Michaels detailed in a telegram to Wiesner a list of ten comments on the Report which ranged from criticism of a too heavy reliance on the data, an excessive concern with water as the critical factor to insufficient concern with research and development, agricultural production as such and communications with the farmer.<sup>11</sup>

The tenth item on their list raised a most serious question:

10. If this is to be a report summarizing the judgments of the whole committee, should it not be reviewed by the whole committee before a final draft is released or submitted. A meeting of the panel following a review of the manuscript would in our opinion be useful.

No repercussions followed except to alert Dr. Wiesner to some of the problems he might face in the future.

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<sup>11</sup> Letter of October 5, 1962 from Leonard Katz to Panel Members enclosing telegram sent to Jerome Wiesner September 20, 1962.

President Kennedy transmitted the report on September 21, 1962 to President Ayub and in his covering letter stressed the problem thus:

The solution of the problems of low agricultural productivity and waterlogging and salinity in West Pakistan requires efforts of unprecedented proportions. The most far-reaching conclusion of the Panel has been that waterlogging and salinity must be attacked within the context of a broad approach toward a large and rapid increase in agricultural activity. This can be done by an integrated application of all the factors of agricultural production, combined with sustained human effort and sufficient capital investment to attain momentum in improvement. The Panel's primary recommendation to achieve these goals is a reorientation of strategy to concentrate effort on limited project areas, each roughly a million acres in size, so as to permit a coordinated attack on all aspects of the agricultural problem. In total, this becomes an ambitious program, but one that is required to meet an exceedingly difficult set of problems.

In spite of the Panel's recommendation to the Government of Pakistan (which was accepted) to withhold the transfer of the Rechna Doab Tubewell Project to the ADC, again there was no mention of agricultural management or of the administrative problems involved. President Kennedy personally presented a bound copy of the Report to President Ayub on September 25, 1962 while both were visiting at Newport, R.I. In his letter of transmittal, the President indicated the draft nature of the Report "subject to review and modification" and suggested that Dr. Revelle and other members of the team were available to come to Pakistan at Ayub's convenience for personal discussions with his staff.<sup>12</sup>

President Ayub returned from his September 1962 visit with President Kennedy pleased with the results of his meeting, at least with respect to the Revelle Report. At his first press conference on his return, he made specific reference to the waterlogging and salinity report saying, "They (the Americans)

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<sup>12</sup> Letter of transmittal from President John F. Kennedy to the Honorable Mohammed Ayub Khan, President of Pakistan, September 21, 1962.

have gone to infinite pains to produce a solution which may well be the answer. We are very grateful". Of course, far from a solution had been produced or even proposed but it can easily be seen how expectations in Pakistan rose in spite of AID's efforts to prevent it. Prior to President Ayub's return, a September 22, 1962 press release announced that an official delegation from Pakistan would visit the Soviet Union to study anti-salinity and waterlogging measures. In his statement Mr. Ishaque said Pakistan was expected to get final information about the American experts' report on waterlogging and salinity and the possible form of assistance during President Ayub's current visit to Washington. In the Pakistan mind was the sense of U.S. assistance in the implementation of the Panel's Report.

Ghulam Mohammed and Christoph Beringer of the Institute of Development Economics, Karachi have summarized extremely well the Draft Report in an article in The Pakistan Development Review.<sup>13</sup> They stated its principal proposals as follows:

The most important conclusion reached by the Revelle Panel can be stated as follows: the problem of waterlogging and salinity in West Pakistan is not merely an isolated technical problem but has to be approached in the context of a wide combination of potentially limiting productive inputs, technical as well as human and institutional. Neglect of any one of these interacting factors would in the opinion of the Panel limit the results which can be obtained from any one of the remaining productive inputs.

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<sup>13</sup> Volume III, No. 2, Summer 1963.

The Panel, therefore, recommends an integrated programme for the provision of drainage and additional water by tubewell pumping, more fertilizer, pure seed of improved varieties, pest and disease control and better cultivation practices. A development programme is proposed which subdivides the major part of the irrigated lands of the Indus Plain into 25 project areas of roughly one million acres each. Development efforts should be concentrated in these areas. New Project areas should be brought into the programme at the rate of about one every year. With respect to administration, the Panel recommends a shift from a type based on function to one based on area. Although the recommendations with respect to administration are lacking in detail, the implication is that all the departments which presently operate more or less independently in the area would come under the supervision and control of a project director who would integrate their efforts toward the achievement of the development plan.

The report is divided into seven chapters: the first chapter described the present condition of agriculture, the land, the water and the causes that have led to salinity and waterlogging in West Pakistan. The second chapter analyzes the role of water, fertilizer, pest control, improved seed and other improved practices in increasing agricultural production. The plan for the development of agriculture is presented in chapter three. Increases in

output that may be expected from one million acres are given in the fourth chapter. In the fifth chapter estimates of fertilizer requirements, its cost of production and distribution are given. The sixth chapter is devoted to hydrology of the Indus Basin and describes the assumptions and calculation on which the expected yield of water from tubewells is based. The last chapter suggests further research that should be undertaken in various fields.

As indicated in this summary, there was no section of the report that dealt with the public administration implications of the report's recommendations. This was true in spite of the fact "with respect to administration, the Panel recommends a shift from a type based on function to one based on area".<sup>14</sup> As Mohammed and Beringer stated, the report was lacking in detail and went no further than to hint at the fact that a project director would have to be in charge of bringing together all the factors that would contribute to agricultural development in the selected area. Virtually all of Blandford's chapter was omitted from the Draft Report in a futile effort to avoid involvement in the politics of the Pakistan bureaucracy.

#### The Impact of the Draft Report

On October 17, 1962 Dr. Revelle sent a copy of the Draft Report to Ghulam Ishaque, Chairman of WAPDA. In a response dated November 2, 1962 Mr. Ishaque congratulated Dr. Revelle and the members of the Panel "on the excellence of the report". He went on to say the following:

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<sup>14</sup> Ghulam Mohammed and Christoph Beringer, "Waterlogging & Salinity in Pakistan: An Analysis of the 'Revelle Report.'" The Pakistan Development Review, Vol. III, No. 2, Summer 1963.

The galaxy of talent which you had associated with this study constituted a guarantee for the sheer technical merit of the report and for those of us who had the privilege of making acquaintance of the Members of your team it was a foregone conclusion, but the comprehensive scope of the present draft, its masterly grasp of the fundamental problems confronting agriculture in West Pakistan and the integrated solutions which it offers of these problems make it an altogether inspiring document, and I can well visualize the limitless pains that must have gone into the preparation of this report.

3. You would appreciate that despite our broad agreement with your approach some of the detailed recommendations of the report and the technical assumptions underlying them will have to be explored further with your team. An expert examination of the draft is now underway and I hope that we would be ready with our final comments and criticism by about the middle of the month.

As a result of early comments on the Draft Report, Dr. Revelle had decided on a visit to Pakistan to "go over the Report" with Mr. Ghulam Ishaque, Chairman of WAPDA and members of his staff. In a letter to Ishaque dated November 29, 1962 Revelle confessed "In talking over our report with various American specialists, it has become evident that some parts of it may be obscure and others may be unrealistic".

On December 13, 1962 Revelle arrived in Pakistan to discuss the Report. Revelle conferred with the Governor of West Pakistan and virtually all the senior officials of the GOP concerned with the problem. Lengthy meetings in Pakistan were held with the top staff of WAPDA and the Planning Commission. Included in the meetings were the AID personnel dealing with the problem. Maynard Shirven of the Embassy staff, in summarizing a meeting of December 14, 1962, indicated the official tone of the Pakistani reactions to Dr. Revelle in the words of Ghulam Ishaque, Chairman of WAPDA.

Mr. Ishaque said that the report handled a vast amount of data most skillfully; it contains no errors as

such, but there may be questions of emphasis and perhaps some omissions. In respect to the correlation between water resources and requirements (chapter 6), WAPDA has proceeded on a different basis; that is, it has assumed a certain cropping pattern and has deduced therefrom the amount of water required and has then determined measures necessary to provide that amount of water. The Report computes the theoretical total amount of available water and then computes its optimum utilization. Another point---it is doubtful whether the water planned for diversion to the Sind is adequate to control salinity there.

Ishaque made his most significant comments on the Report in a private meeting with David Bane, Consul General in Lahore. He indicated concern over the selection of 1,000,000 acre united for development as impolitic, the 25-year period as too long a time period, and the treatment of the Sind with respect to water allocation. His major concerns, it must be noted, were of a political character.

Members of the Planning Commission had private reservations. They doubted the advisability of (1) the shift in emphasis from waterlogging and salinity to increasing agricultural production, and yet not agricultural production for the entire country, and (2) the stress on sugar instead of cotton indicating a concern purely with productivity and ignoring the significance of earning foreign exchange. They felt that most of the benefits were over-estimated and the costs underestimated. Finally, the impression left by President Ayub with some of his Planning Staff was that waterlogging and salinity was to be attacked as a crash program outside the usual aid program. As has

been stated previously, this project had quite an informal birth. Moreover, the U.S. Government had never intended to support a massive development effort in Pakistan on the problem of waterlogging and salinity. This was to have been largely a scientific project seeking a scientific solution. AID had particularly attempted to make this clear but had had to contend with the enthusiasm of a White House Panel in whose wake there developed considerable wishful thinking concerning the extent of the U.S. commitment. The delay in the completion of the Report did nothing to ease the strain engendered by this wishful thinking.

On December 20, 1962, the very day Revelle left Karachi to return to the United States, the Governor of West Pakistan in a meeting generated by the Revelle visit, of his interested staff, dealt with the organizational arrangements implicit in the Panel recommendations. Disagreement is evident in the minutes between the Irrigation and Agriculture Departments and WAPDA and ADC. The absence of organizational and administrative recommendations results in the Governor of West Pakistan observing

"That it was neither desirable nor necessary to set up a Board for the purpose, either wholetime or parttime. What was really necessary was to select a really efficient and dedicated officer to work as the Project Director for areas outside the jurisdiction of A.D.C. The Project Director should further be assisted by a few hand-picked officers. Once this was done, it was immaterial which of the concerned departments acted as the Administration Department. The Governor added that both the WAPDA and ADC were already over-worked and the best thing would be to let the Irrigation Department handle this work themselves. Of course, in the Project Areas, the A.D.C. will be entirely responsible for the work."

The decision was

a) In the Project Areas the A.D.C. will be solely responsible for operational management after tubewells have been installed by WAPDA.

b) Outside the Project Areas, the Administrative Department will be the Irrigation Department which will work in close collaboration with the Agriculture Department. An inter-Departmental Committee will also be set up for dealing with common problems. As Minister for Agriculture and Irrigation is looking after both these departments the coordination required can be easily ensured.

c) A suitably-staffed Cell or Directorate should be set up in the Irrigation Department for handling the operational part of the work outside Project Areas. Details of the staff required in the field and the office will be worked out by the Irrigation Department.

The record indicated little or no discussion with the Pakistanis concerning the organizational arrangements to implement the Report. AID officials, interested and concerned since they were attempting at this very time to support the ongoing program in waterlogging and salinity, were left on their own and subsequently accepted the Irrigation Department as the key department to undertake the assignment in the project areas.<sup>15</sup> In his early discussions with the various government officials in Pakistan, Revelle had become convinced that it would not be wise for the Panel to become involved in the intra-bureaucratic struggle for control of this project. He therefore had decided that it was not his function to tell the Government of Pakistan how to organize itself to cope with this problem. In a meeting with Ghulam Ishaque Khan, Dr. Revelle replied that the Panel had deliberately avoided the problem, feeling that they did not have sufficient information about all the numerous local considerations that must be taken into account in deciding on

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<sup>15</sup> Dr. Revelle in a letter of February 21, 1963 seemed to accept this when he said "I am especially impressed that you have decided to turn over all responsibility for the reclamation project in Rechna Doab to one official of your Government and am sure it is a wise decision. Mr. Kazi is obviously a man of great competence and energy."

an appropriate organization. He felt that only Pakistanis could be aware of all these factors. However, as it became clearer over time that both AID and GOP officials required some recommendations with respect to organization and management, along the lines of the original mandate from President Kennedy, Revelle began to see the need to go into the problems of organization and management.

In the meantime, however, AID had prepared an Indus Basin Plan to begin the implementation of part of the Revelle Report; organizational changes in the GOP continued. The Irrigation Department on the orders of the Government of West Pakistan established a "Soil & Water Management" section on the basis of the first "Indus Basin Plan". AID staff held discussions with the Irrigation Secretary and the members of the Soil Reclamation Board with the end in view of possibly using this board, its organization, and personnel in the operation and management of a unified development project. AID felt there were some deficiencies with the Soil Reclamation Board: a relatively inactive Board of Directors, the lack of a full-time coordinating staff, and a weak extension service particularly along agricultural lines; the plans were made for correcting these deficiencies. But soon thereafter intimations were received that the GOP would do well to await the final Revelle and Blandford reports before taking action. The conclusion of one AID specialist most concerned with this phase of the agricultural program was that

"Because of the history of the project, for better or for worse, the program has lost a year or more in progress."<sup>16</sup>

By this time, however, AID-Karachi had become committed to help the agricultural development effort.

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<sup>16</sup> Supplement to End-of-Tour Report---H. W. Watenpaugh, page 3.

No sooner had Revelle left Pakistan than pressure began to build up for the addition of an organizational chapter. Blandford's original chapter had been largely deleted as a result of Revelle's concern with involving the Pakistanis in the recommendations and his unwillingness to depend solely on Blandford. Now the position was reversed. Only after Ambassador Walter P. McCaughy cabled and indicated that a Blandford visit would be useful and suggested he return in March 1963 with Revelle, did the Panel (or Dr. Revelle?) agree to his return and to the inclusion of an organizational chapter initially to be drafted by Blandford.

In their March visit Revelle, for the third time, and Blandford, for the second time, met with the Governor of West Pakistan. They convinced him of the need for a Land and Water Development Board to be based organizationally at the highest level of the Provincial Government. With no one from the USOM in Lahore present, there was no record left of this decision for them. The Agricultural Division of AID through its advisor, H. Watenpaugh, was still recommending that the Irrigation Department be given the power through its Soil Reclamation Board to expand its functions and take on the pilot project of an area concentration approach. At this point various officials in the Government of Pakistan had differing views of the position of the American Government. For various officials of the U.S.O.M. had differing views. U.S.O.M. Deputy Director D. G. MacDonald in a staff conference reported on the Blandford, April 10, 1963, indicates a firming of mission policy and an understanding by all concerned. It was during this March visit that the private reservations of some of the staff of the Planning Commission came out. A lengthy two day meeting in Karachi with the members of the Planning Commission, and also attended by American Ford Foundation advisors on March 20-21, 1963,

was summarized by an American participant in a memorandum of conversation. It clearly indicated reservations with respect to both direction and content of the Report. Professor Robert Dorfman and Dr. Revelle reacted quickly and made notes to take account of the statements of the participants.

On March 28, 1963 as they were returning from Pakistan, Irvin Tobin<sup>17</sup> and Revelle agreed that the Report had to be completed as soon as possible; and Tobin wrote this up in a memorandum to the file. The spring and summer of 1963 would appear to have been the time when the Report was to have been finished.

During April AID met with the appropriate officials of the GOP to discuss the implementation of the Report.

On April 12, 1963 Ambassador McConaughy cabled asking for the separate dispatch of the organization and administration section at the earliest possible date to sustain the momentum generated by the Revelle-Blandford visit in March and provide the basis for a discussion of organization and administration. On April 25 Blandford submitted to Revelle a draft chapter, which immediately was sent on substantially as drafted and including the recommendations discussed with the Governor. In his letter to President Ayub, Revelle dealt not only with organization and administration but also indicated an AID involvement in the implementation of the Report.

April 26, 1963

Dear Mr. President:

Our panel group returned from Pakistan deeply appreciative of the generous and sustained cooperation we received from officials of your Government in reviewing and commenting upon our draft report on waterlogging and salinity. We now have a target date of mid-summer for the final report.

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<sup>17</sup> On the staff of the Science Advisor to President Kennedy; Tobin had also accompanied Revelle and Blandford to Pakistan.

May I express my personal appreciation for the opportunity to discuss with you some of the key facets of the Indus Basin challenge, including that of organization and management. As promised, I am sending you three copies of a draft chapter on this subject entitled "Organization and Management in the Project Areas". Copies are also being sent to His Excellency, the Governor of West Pakistan and to the Director of the U.S. AID Mission in Karachi.

We hope that our suggestions in this chapter will be helpful in early implementation of the program of reclamation and intensive agricultural production in Rechna Doab and in the establishment in Lahore of a Board of high prestige for policy formulation and general supervision of development in a succession of project areas.

The Panel, of course, will be happy to supplement this presentation in any way that may be suggested. It is our understanding that the U.S. AID Mission, at the request of the Government of West Pakistan, is preparing to be helpful on the details of implementation whenever it is felt that it can make a contribution.

The Government of Pakistan agreed in principle with the Indus Plain Goal Plan (SCARP-1) not until May 24, 1963, as indicated by a cable from Ambassador McConaughy. Two committees were set up by the Government of West Pakistan to review the Indus Plain Goal Plan and to prepare a draft position paper on the program. Committee No. 1 was to consider agricultural and irrigation phases, and Committee No. 2 was to consider education and health. They also were to come up with the request and requirements for AID and Peace Corps technical assistance. The U.S.O.M. thus began to organize to aid in the implementation of parts of the Report.

On June 3, Heires of the Pakistan Desk transmitted this information to Revelle in an effort to speed the Report. Revelle responded, requesting \$25,800 and stating that the "final version of our Report will be completed by end of this summer. I believe we can do this and I plan personally to spend most of July and August on the job".

Work had continued on the Report during the spring but disagreement plagued the Panel. On February 20, 1963 Alan Michaels, also a member of the Panel, had complained in a letter to Revelle because Tipton and Kalmbach, whose activities in Pakistan had come under some criticism in the Report, had been given the Report by Pakistan to review it for the GOP. After the first draft Michael had nothing to do with the Report. On May 22, 1963, Dr. Cecil Wadleigh took Revelle to task for recommending a comprehensive research program in Pakistan through AID. He called it the "pursuit of intellectual curiosity". Blandford, after his organizational chapter had been submitted in April 1963, had nothing to do with the Report. Gradually members of the Panel withdrew from active participation in its work and the task of completing the Report was more and more assumed by Revelle and a small group of the Panel members.

At the same time, the Government of Pakistan had begun to take action on the Blandford recommendations. On June 25, 1963 the Pakistan Times (Lahore) reported the Government of Pakistan's action to set up the Land and Water Management Board.<sup>18</sup>

In order to co-ordinate the activities of various departments for controlling waterlogging and salinity in the Rechna Doab Project Area, the Cabinet set up a Land and Water Management Board under the Chairmanship of Mr. I. U. Khan, Member, Board of Revenue. The Board has been established on the recommendation of the White House Interior Panel on salinity and waterlogging which had surveyed this twin menace in West Pakistan about a year ago.

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<sup>18</sup> The Land and Water Management Board later became the Land and Water Development Board.

The Board will review and reconcile the agricultural and water policies and programmes, participate in the planning of projects and negotiate with the Basic Democracies, the Agricultural Development Corporation, the Co-operative Development Board and the Agricultural Development Bank in respect of this project. It will mobilize and utilize all available resources to counter waterlogging and salinity in the project area. Other members of the Board are: Chairman, WAPDA, and ADC, and the Administrative Secretaries of the Irrigation, Agriculture, Cooperative, Basic Democracies and Finance Departments.

By July 10, 1963 the Land and Water Development Board had been established by an order of the Governor. I. U. Khan CSP, recommended by Ghulam Ishaque Khan and Revelle, was selected by the Governor to head it. Initially the Land and Water Development Board struggled along without real funds until its chairman, I. U. Khan, also was made head of the Soil Reclamation Board, so that he could then use the funds already budgeted for it. Then the program began to come to life.

#### The Completion of the Final Report

By the fall of 1963 the White House Office and AID began to get anxious about the eventual completion of the final Report. On September 13, 1963 W. J. Farr, Jr., Director of the Office of Afghanistan and Pakistan Affairs, asked Irvin Tobin of the White House Office of Science and Technology how they could get the Report finished. Tobin recorded this request in a memo to the file. On September 17, 1963 Farr wrote to Revelle noting that the

Report was to be in their hands by the end of September 1963 for editing and printing. This relatively young foreign service officer appears to have been the only one as a matter of record to chastise Revelle.

A substantial part of our aid program in West Pakistan is keyed to the waterlogging and salinity report. We have conditioned much of our assistance in the Indus to progress by the Pakistan Government in carrying out the recommendations in the Panel's Report. We are constantly urging the Pakistan Government to speed up its project implementation, to streamline its administrative procedures and to meet its deadlines. Delays by the U.S. Government, such as the one here involved, are not only embarrassing, but seriously detrimental to our Pakistan program.

By this time the situation had become embarrassing not only for its own sake but also to AID which was attempting to get its own agricultural program going based on the Revelle Report.

On October 14 Tobin, whose patience began to wear thin, wrote to Wiesner indicating his discontent with Revelle's performance and suggested that, if the chapters of the Report had not come by the end of the month, either Wiesner or David Bell, Administrator of AID, call a meeting of the principal drafters in order to complete it. On November 6, 1963 Tobin sent another memorandum to Wiesner in which he indicated that Professor Robert P. Burden had stated that the Report should be completed by the end of November. Professor Dorfman also wrote to Farr and indicated the Report should be wrapped up by the end of November 1963. Tobin in the same memorandum also indicated that Dr. Leona Baumgartner, head of what was then named AID's Office

of Human Resources and Social Development, had been upset at the lessening of interest on the part of the AID Mission in Pakistan. AID-Karachi had waited long enough to base its technical assistance program on the long delayed report. She suggested preparation of a status report and a statement of future intentions on implementation both to serve simply as instruments of communication.

While the Washington office of AID over the summer and fall of 1963 was attempting to secure the completion of the Report from the White House Office of Science and Technology, the White House Office was attempting to get the Report from Revelle. In the meantime AID-Karachi was attempting to secure the implementation of the chapter on organization through the Land and Water Development Board. In fact, prior to the completion of the Report, AID-Karachi was recruiting and staffing its West Pakistan Provincial Food and Agriculture Division with additional agricultural extension specialists and technicians to support the Land and Water Development Board. Technicians also were transferred from assignments with the Irrigation Department. This served to increase the displeasure of the Irrigation Department, since the initial decisions had appeared at the outset to place responsibility for the SCARP project with it. Furthermore, AID-Karachi had been attempting to recruit for itself a high-level coordinator of the American activities in the SCARP but had not been able to do so. The very special qualifications established for the post made it extremely difficult to fill. Since the Final Report was still awaited, there was only minimal pressure to staff the post. The Land and Water Development Board also became slowly hemmed in by the pressures of the other Pakistani agencies that were resisting the transfer of their functionaries to the Land and Water Development Board and that were using as a weapon the fact that the Report had not been released in its final form. All parties were

making best use of the time lag for their own purposes. The Government of Pakistan simply had to wait upon the completion of the Report for it and Revelle to have their catalytic effect.

By January 7, 1964 it had become clear that there would be a Final Report. Tobin raised, in a memorandum to Wiesner, the question of the Authorship of the Report, the manner in which it should be worded, the responsibility of the U.S. Government for its contents, and the problem of its screening by the U.S. Department of the Interior. This problem arose to a great extent as a result of the conduct of the research and the manner in which the Panel had operated. By this time so many of the Panel members had withdrawn from active participation in preparation of the Report that the foreword to the Report read:

All members of the Panel contributed information and ideas to the Report, and wrote draft chapters or chapter sections related to their special fields of interest. This final version, however, was worked out by a subcommittee of the Panel, consisting of Messrs. Burden, Dorfman, Falcon, Thomas and Revelle, and they accept responsibility for it.

All parties concerned apparently accepted this statement.

On February 6, 1964 Revelle arrived in Pakistan with a copy of the Final Report in hand and met again with the Governor and all the Government of West Pakistan officials concerned. By this time the Land and Water Development Board had been organized and was beginning to function. Revelle's meetings were then held with the officials of the Land and Water Development Board as well as with WAPDA and included the full participation of the AID staff in both Karachi and Lahore.

The discussions with officials of WAPDA and contractors focused mainly on (1) the total water supply, present and prospective, available to the Indus Plain, i.e. former Provinces of the Punjab, Bahawalpur and the Sind; (2) the principles, criteria and guides for determining optimum distribution of the limited water supply; (3) the principles and guides for maximizing returns through optimum combination of water with land, other production requisites and modern cultural practices. The keynote of the Panel Report was neatly stated by Revelle, "this report is a text book on how to make decisions".<sup>19</sup>

The discussions with the Land and Water Development Board reviewed the organization and legal status of that board and dealt with seed improvement, fertilizers, plant protection, agricultural credit, agricultural extension, information, and training.

With the completion of the Final Report the concept of a concentrated agricultural program, of which AID had been attempting to convince Pakistan for some years, had been sold by Revelle and the Revelle Report.

In view of their efforts, on March 23, 1964 Ambassador G. Ahmad, for the President of Pakistan, awarded to Dr. Jerome Wiesner the Sitara-i-Pakistan and to Dr. Roger Revelle the Sitara-i-Imtiaz, decorations of the Government of Pakistan.

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<sup>19</sup> Report from C. M. Elkinton, Food and Agriculture Officer, to D. G. MacDonald, Director, USOM, February 17, 1964.

## ANALYSIS, CONCLUSIONS, AND RECOMMENDATIONS

Although the establishment and operation of the White House Panel on Waterlogging and Salinity can in no way be considered a typical technical assistance project, yet it provides an opportunity to study a technical assistance project carried out at the highest levels of government. The very different circumstances under which it was carried on highlight certain aspects of the administration of technical assistance that otherwise might not appear on the surface of most such projects. Moreover, its very special character, its origins, the nature of its auspices, and the character of the Panel members posed problems as well as offered advantages to its work.

The history of this report reveals four areas where problems developed for the White House Salinity and Waterlogging Panel: (1) the nature of the study and the organization of the Panel, (2) the administration of the research, (3) the impact on AID administration, and (4) relations with the Government of Pakistan.

### The Nature of the Study and the Organization of the Panel

Undertaken as it was by an ad hoc committee to deal with a difficult technical problem, the study of waterlogging and salinity in the Indus Plain of West Pakistan quickly became focused on the problem of agricultural production. As a result of the discussions with AID/Pakistan it soon became apparent that the problem was one of low agricultural productivity resultant from many factors, perhaps the least of which was the problem of waterlogging and salinity. This meant that the problem of seed, fertilizer, credit, insecticides, and application of modern methods of farm production were to be considered in addition to the problem of land and water. By the time the focus of the study

had shifted, the Panel had been largely formed to consist of 21 highly qualified and scientific and technical advisers, few of whom had any real specialization in the problem of agricultural production or in the particular problems of Pakistan. They were largely men in hydrology, engineering, economics, and the social sciences; and the Panel was chaired by Dr. Roger Revelle, an oceanographer. The absence of specialists in agricultural production created some difficulties for the Panel. Some conflicts over the nature of its recommendations and their impact were the direct result of the qualifications of Panel members originally chosen and the changed nature of the project.

Because the Panel was composed of high-level specialists, none of whom were able to devote anything like full time to its activities, it depended upon data available largely in Pakistan as the basis for its findings. Little or no original research was undertaken. The Panel's major contribution lay in the application of new equipment such as computers and simulation equipment to the problems of tubewell construction, their size, depth, and spacing and to the optimum use of water, fertilizer, seed, and insecticides, in appropriate ratios to make recommendations for the maximum benefit to be derived from various combinations of these factors.

The organization of the Panel was completely in the hands of Revelle. No staff was retained on a full-time basis directly hired by the Panel either in the United States or in Pakistan. The Panel was dependent upon data from the Government of Pakistan or AID. Upon receipt, requested data was then turned over to the Panel member who would take responsibility for that phase of the Report. The lack of continuity of activity over the course of the almost three years of the study is the result of the absence of any full-time director whose prime function was the completion of the Report. This informality of

organization extended to the total administration of the project. Revelle was the chairman of the Panel and the only man who had responsibility for the total overall Report. In many ways the Panel members simply acted as consultants to Revelle, who used them as he saw fit for the various aspects of the Report for which they were most qualified.

It is true that the high-level status of the Panel operating from the White House Office made available to it whatever data could be gathered, but the time necessary for the collection of the data and the accuracy of the data left something to be desired. However, the high-level status of the Panel succeeded in securing the highest degree of cooperation from the Government of Pakistan. There is no doubt that Revelle and the Revelle Report convinced the Government of Pakistan of the advisability of "an integrated approach to agricultural production". However, the Land and Water Development Board grew directly out of the chapter on organization, which drew heavily on the May 1961 WAPDA report which recommended a Water and Salinity Control Board. The Panel did convince the Government of the advisability of this recommendation. AID operations in this area of technical assistance also were a direct product of the activities of Revelle and the Panel.

It is unfortunate that the Panel was set up as a White House-Interior Panel and not as a White House-AID-Pakistan Panel in which AID Technical Cooperation and Research would have provided the Director of Research and the operating staff (who might very well have been on loan from the Department of the Interior) under the chairmanship of Revelle. In this manner AID, which inevitably operated in those areas most closely related to the activities of the Panel, would have been a participant in its research and would have had more of an opportunity to carry the Report to a more rapid conclusion. This

could have been done without the fear, as expressed by some AID officials, that this would then have become a commitment of the United States Government to support, in its entirety, the recommendations of the Revelle Panel. The problem of the U.S. commitment to the Panel's recommendations arose anyway in the course of the study; and U.S.-AID-Pakistan, already involved in supporting a project to increase agricultural production, simply expanded its program in the direction of the Panel's recommendations.

Although the Panel received maximum prestige from its affiliation with the White House Office of Science and Technology, it should not have attempted to work directly out of that office. The Panel members should not have been involved in staff work. This Panel should have been a policy-making panel, with the staff work carried on by a full-time staff who, wherever necessary, could have had some of the work performed for it under contract by the technical agencies of the Department of the Interior or Harvard University. Moreover, if the Panel had been a White House-AID Panel, AID-Pakistan could have provided a field staff that would have kept in close touch with the Panel members in the United States. Once provided with an adequate research staff, there would have been no reason for a Panel of 21 members. The size then could have been reduced so that agreement among a fewer number of members could have been obtained. This would have permitted all the members of the Panel to assume responsibility for its contents. Moreover, by the time the nature of the study had shifted to agricultural production, the size of the Panel was such as to mitigate against increasing its size even though it had not been staffed particularly for this type of a study. Subsequent criticisms were a product of the Panel's lack of experience with problems of agricultural production. The establishment of a research staff also would have provided sufficient flexibility

to provide experience not only for the problems of agricultural production but also for any other problems that arose in connection with the study. If Pakistan had participated formally in the conduct of the study, Pakistanis could have been of invaluable assistance to the Panel in its considerations of the social and economic factors necessary for agricultural development.

As a result of the nature and organization of the Panel, the Revelle Report became a highly technical study of a rather detailed scientific nature. This is a partial explanation for the delay in the completion of the Report. In his comment on the Committee Report of March 1962 which was, at the time, in rough outline, Blandford recommended what, in retrospect, to this author, would have been the most appropriate way of handling the Report.

The Committee report with this content should be responsive in scope and stature to the level of Committee sponsorship and membership and to the importance of the assignment. The report would be balanced as to breadth of recommendation and as to degree of detail.

At some point, the Committee mission moves into another stage of consultation and possibly different sponsorship. Certainly the formulation of specific measures to implement recommendations involving cooperation between governments requires consultation with AID and GOP. Generally, the detailing of proposals with respect to hydrological research, agricultural techniques and communication as well as reorganization procedures belong in a stage of "follow-up".

Adoption of this suggestion could have resulted in the completion of a report

in the spring of 1962, at least two years earlier than its final completion. The detailed research could have been continued in the "follow up" stage as Blandford had originally recommended. If AID had been supporting the Panel, the small subcommittee that, in the end, completed the Report could have continued under joint White House-AID-Pakistan auspices on the technical and scientific side to the extent desired. In the meantime AID and the Government of Pakistan could have moved ahead more rapidly to tackle the problem. The time lag, as Abdus Salam indicated, resulted in some loss of momentum. A mitigating factor to be noted was the fact that the continuous contact that Revelle maintained over the two-and-one-half-year period was a tremendous source of support in the education of Pakistani officials as to the nature, extent and importance of the problem of agricultural production and the method of attacking it. The status and prestige that Revelle, as the chairman of President Kennedy's White House Panel on Salinity and Waterlogging, brought to the problems of agricultural production made possible the administrative steps to their solutions.

#### The Administration of the Research

The major characteristic of the administration of the research for the Revelle Report was the curious combination of its administrative informality and its rigid scientific character. Dr. Revelle managed the entire research by himself; became an expert on waterlogging and salinity over the course of the study; and was able to support and, if necessary, defend any part of the study. Modern simulation techniques and electronic data processing equipment were used to determine the maximum benefits to be obtained from a variety of alternative methods of pumping water, spacing tubewells, digging tubewells to

a ,articular depth, deciding on quantity of fertilizer, deciding on types of fertilizer for specific soils, etc. These parts of the study were contracted out to different organizations, and the Panel attempted to integrate the findings. In the end the only person to integrate the various activities was Revelle himself.

The Panel organized itself into various subcommittees to deal with various aspects of the Report, and these subcommittee reports were to be discussed in full Panel sessions. This procedure, carried on in the early period of the project, resulted in conflict among Panel members and was discontinued later. As indicated previously there never was a consensus of the entire Panel on either the preliminary or the final Report. But the bringing together of specialists from the natural and social sciences made the report as complete as possible.

Because of the conflict, however, meetings were held infrequently; and since there was no administrative staff to integrate the activities of the various subcommittees, which themselves were of an extremely informal character, the Report had to wait upon Revelle and the time that he had available for pulling it together. During the first phase of the activities of the Panel, Revelle was Science Adviser to the Secretary of the Interior; but not long after the Panel had gotten under way, Revelle left that post and returned to the University of California to become Dean of Research. He retained his chairmanship of the Panel, however, and continued his activities from Berkeley, still without any full-time staff except the Panel members who in effect were engaged as their time permitted on various phases of the Report.

Not only was there no staff in the United States then under the direct supervision of the chairman, but also in Pakistan the Panel was dependent

for its data upon the Government of Pakistan and AID, which was 10,000 miles away. This led to excessive correspondence and much effort on the part of both the Government of Pakistan and AID to provide the White House Office of Science and Technology with the information that Revelle required. The only staff available to Revelle was the right to call upon a staff member or two of the White House Office for information that could then be requested from the other agencies. AID provided funds for the study, which were transferred to the Department of the Interior, and the expenditure of these funds was handled by a junior-level officer in the U.S. Geological Survey. But in no sense were any of these people full time on the administration of the project.

With respect to the research, there were no trained scientific personnel involved in devoting full time to the massive task of collecting, amassing, and analyzing data either for the subcommittee of the Panel or for the chairman. The professors on the Panel and the scientists from the government and from private industry gave of their time on an ad hoc basis, time that only obviously could be spared from other activities. In this sense the administration of the research was of an extremely informal character and is perhaps the most significant reason for the delay in the report. It was only the constant pressure from AID that finally resulted in the completion of the Report. The files are replete with evidence to this effect.

It seems clear that if AID through its Division of Technical Cooperation and Research---Agricultural Section had undertaken to support the Panel and had provided a full-time staff assigned to the project, the Report could have been finalized at a much earlier date and would have dovetailed much more smoothly with the operations of AID in Pakistan. This is not to deny the value of a presidential commission and the benefits to be derived from its

high-powered presence. It is, however, important that such a commission's program be integrated into existing governmental programs in order to maximize its impact. It is true that AID worked closely with the Panel---but again on an informal basis, and then only AID-Karachi. After AID-Washington had originally been called in on the establishment of the Panel and recommended Blandford on the administrative problem, it had little or nothing to do with the Panel. It had no formal representative on the Panel despite the presence of Blandford, who in no way had been intended to represent AID but simply had been provided by AID to work on the administrative aspects of increasing agricultural production. AID-Washington could have provided extensive technical support had it been called upon.

The White House Office of Science and Technology should have asked AID to participate formally in the conduct of this study. Had this been done, not only would the administration of the research been eased, but also perhaps the scope and content of the initial study altered. The Report could have taken the direction of a high-level policy report appropriate to the White House level of the Panel and its recipient, the President of Pakistan. Subsequent technical and scientific studies could have been conducted by a follow-up team, a unit of AID, the White House Panel, and the Government of Pakistan brought into the picture as necessary. Certainly if AID had been directly associated with the Panel, the organization and management chapter would have been included in the original Draft Report. This would certainly have saved six months of time in the implementation of the administrative section of the Report and would have avoided some of the subsequent tensions between the Irrigation Department and AID.

### The Impact on AID Administration

The establishment of the Panel on Waterlogging and Salinity had a major impact on AID-Pakistan operations. Located on the periphery of the study, AID-Washington provided largely financial support for the activities of the Panel but made clear that it in no way was committing itself to the implementation of the Panel's recommendations. The latter had presidential support, for the only commitment that the United States Government had intended to make was to provide to the Government of Pakistan a high-level scientific research team that would attempt to find answers to the problems of waterlogging and salinity. Once the problem was altered to "the increasing of agricultural production", AID became more interested since it already had in operation an agricultural program designed for this specific purpose.

The activities of the Panel stimulated, initially at least, intense interest in AID-Karachi. Its own agricultural program was given top priority. To a great extent a major portion of its technical assistance budget became allocated to agriculture. The Agriculture Division of AID-Karachi and its provincial agriculture officers not only provided the Panel with data but also attempted to educate the Panel members on the major agricultural problems in Pakistan. The AID project in the SCARP I area in some ways became a pattern for the Panel. Its recommendation that 25 units of 1,000,000 acres each be taken up one area at a time and dealt with in an integrated fashion is an extension of the program in the SCARP I area. AID-Karachi began to plan its technical assistance program on the assumption that it would use the Revelle Report as a basis for a major effort in developing agriculture in Pakistan. The enthusiasm generated by the first visit of the Revelle Panel carried over through January 1962, but gradually it waned as even a Draft Report failed to

materialize. In the meantime, of course, AID continued with its existing program but slowly and hesitantly, awaiting the findings of the Revelle Panel. Few additional staff were hired, either in agriculture or other areas, since no commitments of funds were being made pending the Revelle Report. Not until the latter half of calendar year 1963 and mid 1964 was AID-Pakistan staffed to its proposed staffing pattern in support of the Revelle Report.

Interest in AID picked up again with the completion of the Draft Report. On Revelle's second visit to Pakistan in December 1962, AID participated fully in the discussions on the report with Revelle and the Pakistan officials. However, the absence of a chapter on organization and administration left a gap both for AID and the Government of Pakistan. At Ambassador McConaughy's request for the return of Blandford and for a chapter on organization and administration, Revelle returned with Blandford to Pakistan in April 1963. Recommendations for the creation of the Land and Water Development Board were developed. President Ayub and the Governor of West Pakistan were convinced of the advisability of this proposal, and it became the basis for the administration of an agricultural program in West Pakistan. Notwithstanding AID-Washington's unwillingness to make a major financial commitment to the implementation of the Revelle Report, AID-Karachi again began to reinforce its own agricultural program, to see what it could do to support the goal of increasing agricultural production in West Pakistan. AID seriously began to seek the services of a top-level senior agricultural specialist who could serve as a coordinator for all agricultural and engineering activities in the SCARP I area. A month after the April 1963 visit of Revelle and Blandford, the Blandford chapter arrived, and the Government of Pakistan began its implementation.

As has been indicated previously, prior to this time the Agricultural Division of AID-Lahore had been heavily involved with the Irrigation Department in attempting to use the Soil Conservation Board and the Irrigation Department as its vehicle for developing an integrated agricultural program in the SCARP I area. The visit of Revelle and Blandford and the recommendation of the Land and Water Development Board undercut the activities of the Agricultural Division of AID-Lahore as well as those of the Irrigation Department, which had become extremely interested in administering this project. AID, loyal to the Revelle Report, supported the creation of the Land and Water Development Board. Once the Land and Water Development Board had been established, AID then began to transfer its personnel from the Irrigation Department to the Land and Water Development Board at the expense of its previously excellent relations with the Irrigation Department. AID-Karachi again began to search in earnest for its top-level agricultural coordinator for the SCARP area, but the Government of Pakistan seemed unable to move the Land and Water Development Board any faster pending the receipt of the Final Report of the Revelle Panel. Not until the Final Report arrived was the Land and Water Development Board actually operating and functioning.

There is no question that the AID agricultural program in Pakistan was delayed as a result of the Revelle Report. This is not only the opinion of the previously quoted agriculture specialist, Howard Watenpaugh, but also of other AID administrators in the field. Not only was there a delay in the AID program, but AID's relations with the Government of Pakistan in the field of agriculture were strained as a result of the lack of coordination between AID-Pakistan and the Revelle Panel. This can again be attributed to the absence of an administrative and research staff in the United States under the

chairman of the Panel and its formal link to AID-Karachi. It is only fair to state that the Revelle Report did succeed in doing something that the AID agricultural specialists had been unable to do---convince the Government of Pakistan of the need for an integrated approach to the increasing of agricultural production: that is, the use of water, fertilizer, insecticides, and agricultural extension activities<sup>20</sup> in the appropriate amounts that can maximize the net return on investment in agriculture.

During the course of the Revelle project, Dr. Revelle made four trips to Pakistan: September 1961, December 1962, March 1963, and February 1964. In each instance AID was heavily involved in preparation for the trip, in supporting Revelle and his colleagues during their stay, and in following up on the results of the visits. The Agriculture Division of AID, as it was required, on an ad hoc basis devoted much time to, and focused its activities around, Revelle. The status and prestige of Revelle in return provided the type of professional support for agriculture that helped AID-Karachi in its day-to-day job of assisting Pakistan in agricultural development. One returns to the previous recommendation that AID-Karachi should have been staffed and formally made a part of the Revelle project.

The delay in the completion of the study required a considerable degree of sensitivity on the part of AID. AID agricultural staff had to attempt to anticipate the Panel's recommendation. It had to switch its support from the Irrigation Department to the new Land and Water Development Board. Finally, it had to apologize for the delay, and to do so in view of its constant criticism of Pakistani delays was a continual source of embarrassment.<sup>21</sup>

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<sup>20</sup> Dept. of State, Unclassified Cable, American Embassy, Karachi to Secretary of State, Washington, D.C., February 10, 1964 (McConaughy).

<sup>21</sup> As indicated by W. J. Farr, Jr. in his letter cited above.

Relations with the Government of Pakistan

In spite of the delay in the completion of the Report, the Revelle Panel had a significant impact on agriculture in Pakistan. Its effect was felt in three areas: (1) land and water policy, (2) the problem of agricultural production with respect to land and water policy, and (3) the administration of agriculture.

The Revelle Report made some significant scientific contributions to the nature of the water table in the Indus Plain, the maximum benefit to be derived from this water table, and the manner in which these benefits can be best obtained. Its recommendation that the most saline land be left alone and a priority effort be concentrated on those areas least saline and on bringing new areas into production is a major contribution to agricultural thinking in Pakistan. Although recommended as early as 1960 in the Report of the Agricultural Commission of the Government of Pakistan, the convincing of the Government of Pakistan of the need for integrating water, seed, fertilizer, insecticides, extension work, and new agricultural methods is the second major contribution of the Revelle Report. This integrated approach to agricultural production has been accepted at all levels in the Government of Pakistan as a basic principle of agricultural policy. In the administration of agriculture the Revelle Report has made a major contribution; for the creation of the Land and Water Development Board, which has been operating the SCARP areas and providing them with the necessary requirements for increasing and maximizing agricultural production, is a direct product of the Revelle Panel.

Subsequent tensions in the bureaucracy among the various departments concerned with agriculture have been caused by two factors: (1) the inordinate delay in the completion of both the Draft Report and the Final Report, and

(2) the omission in the Draft Report of a chapter on the administrative implications of the Report. The time lag in the completion of the Draft Report resulted in the gradual waning in the enthusiasm of the Pakistani officials not only for the findings of the Report but also for their implementation. Although the initial reaction to the Draft Report was generally favorable, the fact that it was a draft, and admitted to certain errors even though of a minor nature, enabled those opposed to the possible changes implicit in its recommendation to dig in and hold fast against the changes. The request for a chapter on Public Administration Implications from both AID and the Government of Pakistan testifies to the need to fill this omission. In the interval between the Draft Report, the April 1963 visit of Revelle and Blandford, and the submission of the Draft Chapter on Organization and Management, considerable vacillation took place both by AID and the Government of Pakistan on the appropriate organizational structure to implement the Report. Finally, although the Land and Water Development Board was organized in July 1963, it can safely be stated that the delay in the activation of the Land and Water Development Board was attributable directly to the delay in the issuance of the Final Report. AID and the Government of Pakistan waited upon the completion of the Final Report to begin large-scale action on salinity and waterlogging using the SCARP I area as the initial test area.

The recommendations of the Report created their own problems. Competition for control of programs exists in every bureaucracy. The injection of the influence of a Report by nationals of foreign powers created tensions in the bureaucracy particularly among those adversely affected by its recommendations. Neither the delay of the Report nor the omission and then final inclusion of the Organization and Management Chapter helped to ease these tensions. The

absence of a close and continuing relationship between the Panel and AID-Karachi also did not permit AID to bridge the gap. Actually AID became enmeshed in making recommendations that it then had to revise once the Revelle Report became public. If both AID and the Government of Pakistan had been partners in the conduct of the study, liaison and communications with the operating officials in the Pakistan agricultural area would have been much easier. The indecision in structuring the organization to deal with agricultural development would have vanished. There never would have been much of the unnecessarily generated ill will, and the Americans and the Pakistanis could have gotten to work earlier and under more appropriate circumstances to tackle the problem of agricultural development.

#### Some Concluding Comments

This study of the Revelle Report has had one purpose---to determine what lessons can be learned from its experience that would be helpful in future activities of this type. A high-level presidential commission has much merit as a vehicle for highlighting a technical assistance program. It has support that no other body can have. In order for it to maximize its purpose, however, its activities must be coordinated with other activities of the United States Government in the same technical assistance area. This can be done by appropriate administrative arrangements. AID administrative support for the Revelle Panel did not necessarily require that it agree to support the implementation of its recommendations, but with a high-level commission of this sort it is most important that its terms of reference be completely clear. Expectations had been established in Pakistan that were not lived up to; this was the product of poor coordination and administration on the part of the United States Government.

The sum total of the Revelle Report has been a positive one as evidenced by (1) the award of the medals of the Government of Pakistan to Wiesner and Revelle, (2) the generally favorable reception by those in Pakistan most concerned with the Report, and (3) the steps taken by the Government of Pakistan to create the Land and Water Development Board. To this author the major lessons are: (1) had the Report been completed more rapidly as a high-level study with the organization and management chapter in the draft version, the enthusiasm for implementation would have carried the Government of Pakistan and AID to a more rapid and larger scaled implementation of its recommendations; (2) had the Panel been a joint White House-AID-Pakistan Panel with its own research staff, much of the technical criticism and administrative vacillation would not have taken place; (3) had the American technical assistance mission considered the political implications of its technical and scientific recommendations, it could have avoided much of its difficulty; and (4) the success of the Panel and of Dr. Roger Revelle was a product of the triumph of purpose over technique.