

TDY TRIP TO PAKISTAN

January 25 - March 10, 1979

Edward W. Sparling

The main purposes of my trip were to complete work on a water pricing linear program and to test that program against an irrigation scheduling program written by Dr. Wynn Walker. Upon arrival I found that two policy issues were of immediate concern: (1) experience was showing that a five year life for earthen watercourse improvements was too optimistic-- consequently some consideration was being given to partial lining of watercourses and (2) the economic justifications for precision land leveling were being questioned. These questions occupied some of my time. I explored possibilities for applying computer programs to the problem of optimal lining of watercourses and I laid groundwork for a graduate student to do a study of precision land leveling.

My first few days were spent meeting with John Reuss and in becoming familiar with the work he was doing on optimal lining. I agreed that his formulation of the problem was correct, and proceeded to work on the linear programming in order to have it functioning by the time that the irrigation scheduling model was ready. During the week of January 27 - February 1 I revised the labor requirements of the matrix after consulting with Dr. Holje of the CSU staff, Dr. O'Mara of the World Bank and Dr. Jones of SCS/USAID. By February 1 the linear program was working and had given acceptable results. However, conversations with the various economists had convinced

me that the fodder section of the linear program needed to be reformulated. This was done in the week between February 3 and February 8, and a water value schedule was derived. During the week of February 10-14 I worked with Mr. Naveed Ahmad to modify the scheduling model so that it could be used. On returning from a trip to Faisalabad on February 15, I found that Naveed had typhoid fever. With hopes that Naveed would be well after a week, I did some fine tuning of the linear program (John Reuss had found an error in water requirements for wheat) February 17, 18 and 19 and regenerated water price schedules. On the 20th I began application of these prices to an optimal watercourse lining problem similar to that which John Reuss solved using calculus. This work was interrupted by a two day (Feb. 21-22) trip to Islamabad with Dr. Holje. In Islamabad I met with Dr. R. Goldman of the Ford Foundation regarding possible cooperation of livestock economics research, and with Dr. Don Jones regarding his knowledge of the fodder components of nonfodder crops and the experience of SCS with life expectancy of earthen watercourse improvements. On returning to Lahore I continued work on the optimal lining problem, finally deriving results which agreed with and strengthened those of John Reuss. By February 26 it was clear that Naveed would not be well in time to help complete work on the simulation model. Therefore I worked from February 26 through March 2 to finish modification of the scheduling model and to use the scheduling model to test the feasibility of the linear programming solutions. Results

showed that when scheduling model water use was aggregated into months, the results were comparable with the water pricing linear program. Application of alternative coefficients for the linear program using the scheduling model could not be done due to the need for further modification to the scheduling model.

During March 3 and 4 I traveled to Faisalabad and Mona with Dick Goldman. In Faisalabad we discussed the prospects of a livestock economy study with Dr. Brian Lockwood and in Mona I met with Senior Research Officers to discuss potential topics for Mr. Barkat Ali's thesis research. We agreed that "Constraints to Precision Land Levelling" would be a good topic. Subsequently it was decided to have Mr. Ray Renfro do a special TDY on that topic.

On return to Lahore I worked from March 5 through March 7 on the design of a mathematical program to solve the optimal lining program for RBAL watercourses. Subsequently Mr. Ali has applied that model to Tubewell 56 at Mona as part of his master's thesis.

I left Pakistan March 8th and traveled to New Delhi. On March 9 I met with Dr. David Seckler to formulate plans for his supervision of Mr. Ali and Mr. Renfro. I Left New Delhi March 10 and returned home.

A Postscript: Intervening events have changed the significance of much that I did on my TDY. Mr. Renfro has already done a study of precision land leveling, and prospects for

his further research under USAID seem dim. Also, Mr. Ali cannot do his research in Pakistan and therefore has chosen to apply my mixed integer program to data from Tubewell 56. Prospects for continued work on the scheduling model/water pricing model are poor as well--at least under USAID auspices.

ITINERARY - TDY TRIP TO PAKISTAN

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January 23, 1979	LV New York	12 noon	PA 110
January 25	ARR Karachi	12:01a	
	ARR Lahore	4:00p	
Jan. 26	Met with John Reuss to discuss agenda for my work.		
Jan. 27-Feb. 1	Revised linear program to fit HP 9825 and got results comparable to those of Dr. Sam Johnson's.		
Feb. 3-Feb. 8	Revised fodder requirements of linear program and got new results.		
Feb. 10-Feb. 14	Worked with USAID computer programmer (Naveed) to revise the scheduling model.		
Feb. 15	Traveled to Faisalabad with Team. Met with staff of Agriculture University and discussed research needs in agricultural economics. Also explained our use of the HP 9825 in estimating value of water and irrigation scheduling.		
Feb. 17-19	Revised linear program water requirements for wheat as suggested by John Reuss and re-ran the linear program to get a new water price schedule.		
Feb. 20	Began work to apply water prices to optimal lining program.		
Feb. 21-22	Traveled to Islamabad with H. Holje to meet with Drs. Jones and Goldman.		
Feb. 23-25	Finished application of linear program prices to optimal lining problem.		
Feb. 26-March 2	Tested linear program solutions for feasibility on scheduling model.		
March 3-4	Traveled to Faisalabad and Mona with R. Goldman. Met with Dr. Lockwood (Faisalabad) and Mona Senior Staff.		

March 5-7                      Designed mathematical program to solved  
optimal lining problem on actual water-  
courses.

March 8                         Flew to New Delhi.

March 9                         Met with Dr. Dave Seckler re: supervision  
of Mr. Ali and Mr. Renfro.

March 10                        Departed for New York via PanAm 001.