

PROJECT APPRAISAL REPORT (PAR)

9310MS(S)
PD-112-673-01

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1. PROJECT NO. 931-0115	2. PAR FOR PERIOD: June 1, 1975 to Dec. 30, 76	3. COUNTRY	4. PAR SERIAL NO. 01
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5. PROJECT TITLE:
Water Delivery and Removal Systems: 211(d) Grant to Colorado State University

6. PROJECT DURATION: Starts FY 70 Ends FY 77	7. DATE LATEST PROP March 13, 1975	8. DATE LATEST PIP	9. DATE PRIOR PAR February 11, 1975
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10. U.S. FUNDING	a. Cumulative Obligation Thru Prior FY: \$1,050,000	b. Current FY Estimated Budget: \$ -0-	c. Estimated Budget to completion After Current FY: \$ -0-
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11. KEY ACTION AGENTS (Contractor, Participating Agency or Voluntary Agency)

a. NAME	b. CONTRACT, PASA OR VOL. AG. NO.
Colorado State University	CSD-2460

I. NEW ACTIONS PROPOSED AND REQUESTED AS A RESULT OF THIS EVALUATION

A. ACTION (X)			B. LIST OF ACTIONS	C. PROPOSED ACTION COMPLETION DATE
USAID	AID/W	HCST		
X			No action required. - Will terminate on schedule.	

12. REPLANNING REQUIRES
 REVISED OR NEW: PROP PIP PRO AG PIO/T PIO/C PIO/P

13. PROJECT MANAGER: TYPED NAME, SIGNED INITIALS AND DATE
 Gilbert L. Corey, TA/AGR/SVM 16 Dec 76

14. MISSION DIRECTOR: TYPED NAME, SIGNED INITIALS AND DATE
 Leon F. Hesser, Director, TA/AGR

II. NARRATIVE

A. Review Procedure

A utilization review was held in September 1976. Conducting the review were the project manager, Gilbert L. Corey, Dillard Gates TA/AGR, Thomas Eliot TA/PPU and Bruce Anderson, Director, CID. The project is in the second and final year of a two year extension. The 211(d) grants at the University of Arizona and Utah State University were reviewed at the same time because the three present a complete water chain package within CID.

B. Summary of Accomplishments

Colorado State University (CSU) has concentrated on channeling of institutional response capability away from large and complicated water delivery and removal systems and practices to smaller and simpler systems more likely to win acceptance and make a major contribution to the improvement of the quality of life of the small farmer in the LDCs.

CSU participated with other CID institutions in meetings to develop plans for a CID information network, CIDNET. It became evident that subject parameters had to be established. It was decided that the computerized index would limit its coverage to the fields of hydrology and irrigation including items on food, resources, and agriculture deemed useful to developing countries. To make this information available to the CID network, a special training session attended by three (3) librarians from CSU and three CIDNET persons from the other universities was held at the CSU Engineering Research Center. Machine readable data are now available, at most of the CID libraries.

As a result of the above training two (2) CSU librarians, part-time, and a half-time indexer-typist, have made more than 1000 index entries which print out into separate indexes by author, title subject and geographical area. While still in the developmental stage, this index promises to be a powerful tool maximizing, and making available to the CIDNET community, the strong collections at Colorado State University. Thus, the first steps have been taken of making the collection known and available to the CIDNET participants. Colorado State University in cooperation with CID universities has continued to disseminate publications to LDC researchers and libraries, to FAO, AID missions and others.

The International School for Water Resources administered by the College of Engineering and the Department of Civil Engineering, continued to provide on a flexible basis, needed additional education for many professional personnel from around the world seeking improvement of their knowledge in order to return to their organization and

perform their role in a more effective manner. The school is an interdisciplinary nondegree school for short or long term (2 weeks to 2 years) training of LDC people in all phases of water resource including other phases of engineering and the applied sciences. Courses chosen for participants are selected because of their practical or applied nature. The International School has no faculty in the various departments of the nine colleges on campus. The School is entirely state funded and no 211(d) grant funds are utilized.

A computer program has been developed for carrying out financial and economic analyses of investments in small-scale irrigation projects, based on the LA Bureau computer program and work done in Peru. A Ph.D candidate is working on this program and plans to write his dissertation on computer assisted optimization techniques in project analysis of less developed economics.

Colorado State University is providing leadership for CID in developing state-of-the-art reports on (1) low cost water removal and low energy demand pumps, (2) sediment control in delivery systems, (3) water delivery-rules and procedures, (4) waterlogging and salinity, (5) project planning. Handbooks are in varying stages of development covering design and recommended procedures. These state-of-the-art studies are being conducted by literature reviews, by consultations with appropriate LDCs, AID, Washington, and field personnel, international organizations, and in cooperation with sister universities, resulting in a thorough review of all available sources of information and experience.

A thesis on "Water Lifters and Pumps for the Developing World" was prepared as a state-of-the-art study presenting a review of how water lifting has developed throughout the world, where it stands today, and provides some insight into its future needs. On this report, CSU cooperated with Utah State University to define the division of labor in the report on low head irrigation and drainage water lifting.

Several thesis were prepared, during the year, which relate to the theme of the grant. Although, not directly funded by the grant, they represent the interest of the faculty and students. Examples are: Geology and the Water Resource System of the Indus Plain; Optimal Irrigation Decisions with Limited Water; Investigating Agricultural Waterlogging and Salinity Problems; and in progress; Project Analysis of Small-Scale Water Resource Projects for Agricultural Development; Computer Assisted Optimization Techniques in Project Analysis; and Optimization Improvements to Methodologies in Evaluating Small Scale Irrigation Projects.

The grant has funded a small amount of consulting time to be provided in emergency situations when individuals are needed on short

notice and when other means cannot be found or utilized without causing unacceptable delay for advisory and consulting work in LDCs. Through availability of this fund, CSU has made excellent progress towards responding quickly to requests for technical assistance to LDCs. This flexibility now extends to faculty members from a variety of disciplines. Faculty were paid to substitute in the classroom and laboratory for other faculty members who accepted LDC assignments. Thus, grant provision provided users of faculty resources a wide range of talent which could not otherwise be available for LDC programs. In fact, an advisory capacity was maintained for the whole water chain in addition to capability in water delivery and removal systems. This secondary capacity provided an even greater expanded range of talent than last year for cooperative efforts implemented by CID and other appropriate organizations.

CSU worked closely with CID by means of advisory and other services in developing and providing expertise in problem identification and analysis and in project design and evaluation, functions which AID and the University realize are most significant to future success. For these functions and those related to operations and implementation, Colorado State University has identified faculty members and their specialties for inclusion in the CID talent bank. The CSU grant program director, in effect, acts for that portion of the talent bank dealing with irrigation water delivery and removal systems. Over thirty-six (36) faculty members are now available for consulting on optimum water management for improved crop production in the fields of civil engineering, irrigation engineering, watershed sciences, on-farm water management, agronomy and dryland farming.

CID activities in Africa alone presently involves nine (9) short-term consultant contracts and two (2) pending short-term contracts, and one (1) long-term contract which has been signed but not manned. Colorado State University is constantly reviewing available personnel for the specific positions desired and maintains constant contact with the CID executive office, through CID meetings, correspondence and telephone.

At the beginning of the 211(d) grant program, relatively few professors were willing to leave the confines of the campus for even a short period of time due mainly to uncertainties of what their absence might do to their future, i.e., promotion, tenure, and so forth. Today, largely due to such Federal Assistance Programs as 211(d) grant, the Water Management Program, CID and so on, the general attitude of the University from the President on down, is one of encouragement through rendering of substantial backing to the participating individuals.

Stronger and more meaningful relationships have been developed during the reporting year with networks of existing domestic and

multilateral organizations for the purpose of collaborating in a joint problem-solving approach through cooperative research and information exchange and dissemination. More specifically, the University has made notable progress in strengthening linkages with institutions working in the field of water resources and management for increased food production in Africa, Near East, Pakistan and Latin America; in establishing institutions working on water and water related problems for increased food production in the LDCs; in establishing linkages with Centers and Consortiums working to increase food production through helping the small farmer; and in closer and more effective relationships with the other grant directors in the water chain including strengthening the University's linkage with the other members of CID.

During the reporting year many joint programs were developed with other institutions including seminars and training sessions particularly with the CID universities. But linkages with the other institutions such as the Tropical Soils Consortium were also strengthened. Attendance by Colorado State University personnel at International Conferences sponsored by such organizations as FAO, OECD, CENTO and AID, placed Colorado State University scientists in contact with scientists in the same field of activity from other areas of the world thus broadening linkages and the network system.

Not often reported in a formal way is the volume of correspondence that takes place between responsible parties interested in getting specific projects underway. Normally, there is a 3-way flow, forward and return, among the key personnel representing (1) AID/W, (2) CSU, and (3) the host country involved. Adequate preparation, timely planning, thoughtful action and follow-through are some of the ingredients necessary and expected on the part of committed individuals. In this respect, CSU as an institution, has begun to acquire a world vision and responsibility in developing International Education through Technical Assistance activities.

C. Utilization and Impact

A two week summer course was held in August 1975 on irrigation water delivery and removal systems. The purpose was to observe many of the irrigation and drainage systems now in use in Colorado and to show how they are adapted to local conditions. The field trips covered commercial and experimental installations in Grand Junction, the San Luis Valley, the Arkansas Valley, eastern Colorado, the Platte River, and the Grant Range. This course was given again this year in August 1976.

A short course on Development Planning for Developing Countries, including instructions in project evaluation was developed. This course has been integrated into the regular University curriculum. Preliminary discussions have been held with USAID officials about

offering a similar course to USAID staff and foreign students during summer sessions. Also a follow-up course to the one noted above is being planned. If approved, this would be given to a small group of graduate students specializing in economic development. Case studies would be analyzed and the techniques of analysis proposed by UNIDO, OEDC, and the World Bank would be studied.

In addition, CSU also participated in the planning and presentation of an-site course in Lima, Peru on the transfer of modern methods of systems analysis in water resources planning. Discussions were held with Peruvians during a one-week visit to the CSU campus. Course activities will include preparation of material, a two-week course participation in Lima, and assistance to the Direccion General de Irrigaciones concerning the proposed Tacna project in southern Peru. At the request of the Mission in Peru, a paper was prepared entitled, Irrigation Scheduling for Peru. The paper points out that irrigation scheduling has as its objective the management of water so that it is applied only at the time and in the amount needed. Under this principle, recommendations suitable to various areas and conditions existing in Peru were made.

Dr. E. V. Richardson, Civil Engineering Department, Director of the 211(d) grant project at CSU was the Team Leader for a group of scientists sent to Egypt, March 25 to April 24, by AID to determine the feasibility of initiating an On-Farm Water Management Program. The team members, other than Dr. Richardson were: Drs. W. Clyma, W. R. Schmehl and W. W. Shaner - all from CSU. Mr. R. S. McCandless was also a member of the team representing AID/W. A feasibility report was prepared which indicated that existing on-farm water and agronomic technologies are available for farm application in Egypt. Also, a project paper for a project titled "On-Farm Water Management" was drafted. While this project was funded from other than 211(d) AID grant funds, it may be considered typical of one of the beneficial off-shoots (utilization) of the grant.

Dr. Richardson also took part in a National Academy of Science sponsored "U.S." - Egyptian Workshop on Research Planning and Management in Cairo. In addition, Dr. Richardson did some consulting work for Engineer Consultants, Inc. (ECI) on reservoir sedimentation in the Philippines. This complemented his 211(d) work as it enabled him to also observe some of the problems of erosion and irrigated agriculture in the Philliping Islands.

Dr. Willis W. Shaner, Mechanical Engineering and Economics Departments, provided consultant services to USAID and the Government of Peru a loan proposed for investments in small-scale irrigation in the Andean highlands from July 29 through August 29, 1975. His report is entitled, Water Resources Projects to Aid Peasant Farmers in the Peruvian Sicra: Technical, Economic and Financial Analysis and was

prepared for the USAID Mission, Lima, Peru. Ms. Lee Ann Ross was a contributor to the report. She attended Dr. Shaner's course on Project Planning for Developing Countries at CSU and was particularly well qualified to assist in the project analysis aspects of the project paper. Upon termination of the above project, she joined USAID as an international development intern.

- From February 2 to March 5, 1976, Dr. Shaner was a consultant to USAID and the Government of Honduras for a loan proposal for institutional development in water resources planning. Preliminary discussions with USAID/W indicates he will return to Honduras the latter part of the year to assist in setting the scope of work and analytical procedures of a feasibility study of alternative investments in water resources projects.

- Dr. Shaner continued his consulting services by joining a CSU team member on assignment to Egypt from March 25 to April 24, 1976 to develop a research project paper on the topic of On-Farm Water Management. As a result, Dr. Shaner became one of the contributors to the preparation of a feasibility report, On-Farm Water Management Project for Egypt, submitted to AID/W last April.

Dr. Hubert J. Morel-Seytoux, Civil Engineering, lectured for two weeks (December 1975) at the Centro Interamericano de Desarrollo Integral de Aguas y Tierras (C.I.D.I.A.T.), Merida, Venezuela for a post-graduate course on Land and Water Resources Development.

- In June of 1976, Dr. Morel-Seytoux, under the sponsorship of the Ford Foundation, went to the University of Roorkee, Roorkee, India to develop a course in "Systems Planning with reference to Ground Water Resources." He will return to CSU early in October.

Late in June 1976, the first two of four professors of Colorado State University left for Lima, Peru to give a four-week in-country intensive water resource course for thirty (30) engineers. The course titled, Water Resources Planning in Peru, which is in progress at this writing, will cover six professional areas: (1) Hydraulics and hydraulic structure; (2) Mathematical modeling; (3) Technology of sedimentation and river mechanics; (4) Advanced hydrology, systems engineering of water resources and (5) Project planning. The CSU professors involved are: Dr. Vujica Yevjevich, (Project Director), Professor of Civil Engineering and the Professor in Charge of the Graduate and Research Program in Hydrology and Water Resources; Dr. Daryl Simons, Professor of Civil Engineering, Professor in Charge of the Graduate and Research Program in Hydraulic and Hydraulic Engineering, and Associate Dean for Research of the College of Engineering; Dr. Warren Hall, Professor of Civil Engineering, and Professor in Charge of the Graduate and Research Program for Water Resources System Engineering and; Dr. W. W. Shaner, Associate Professor of Mechanical Engineering and Economics for Water Resources Planning and Development.

Dr. Daryl B. Simons, Associate Dean of the College of Engineering made a number of trips during the reporting year in an advisory or consultant capacity. These included a trip to the Dominican Republic with regard to the development of the natural resources of the eastern provinces and utilization of the Rio Chavon and its tributaries for the irrigation of arable lands. On the same trip he went to Sao Paulo, Brazil to be session chairman at the IAHR conference and from there he went to Iquitos, Peru where he met a group of engineers to discuss channel and embankment stability problems on the Amazon River. In October he visited Porto Alegre, Brazil with Dr. Neil Grigg to discuss coordination of a CSU subcontract with UNESCO/UNDP and the Center for Applied Hydrology. A month later he was called to Quito, Ecuador for a preliminary analysis of River Mechanics and Sediment Transport problems related to the development of the Guoyas Watershed in Ecuador. In December he went to Montreal, Canada as a consultant on the James Bay project involving a review of the hydrology of the La Grande River, general properties of the soils forming the bed, banks and stability conditions.

D. Recommendations

It is obvious that Colorado State University through this grant and other AID funded activities has developed a large pool of talent related to problems associated with irrigation water delivery and removal systems. It is equally obvious that CSU as an institution is committed to providing this talent for the developing world. Considerable international experience has been gained through their AID related activities.

The University scientists are available through their role in the Consortium for International Development. The outlook for continued utilization is excellent, due to AID's emphasis on improving water management worldwide.

It is recommended that this 211(d) grant terminate as scheduled on 30 June 1977 and that AID continue to utilize this talent bank of experts.