RESOLVED: That the attached Proposal to Establish the Irrigation Training and Research Center be adopted by the Academic Senate and recommended to the President for approval.

Proposed By:
School of Agriculture
July 12, 1988
Revised August 16, 1988
Proposal to Establish

The

Irrigation Training and Research Center

Submitted by
Glenn L. Dobbs, Interim Director
Agricultural Engineering Department
California Polytechnic State University
San Luis Obispo, California 93407

August 2, 1988
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The Irrigation Training and Research Center
Department of Agricultural Engineering
California Polytechnic State University
San Luis Obispo

The Need

Water and energy are limited resources with increasing demands being placed on them from all sectors of our growing society. As a result, the ability to expand irrigated food production systems is limited but necessary. And water and energy prices are soaring, detrimentally affecting the profitability of food production. Economic and efficient water usage contributes to water savings, energy savings, and decreased production costs which directly affects profitability and competitiveness of the agricultural sector.

Approximately 86% of the water resources in the continental U.S. is pumped from groundwater aquifers. Groundwater provides the drinking water for over half the total U.S. population and for 95% of the rural population. Nationally, agriculture utilizes 68% of all groundwater withdrawn, and in California, agriculture utilizes approximately 85% of the State's diminishing water resources.

The Joint Council on Food and Agricultural Sciences issued a report dated June 1987, and titled Fiscal Year 1989 Priorities for Research, Extension and Higher Education, A Report to the Secretary of Agriculture. The report lists the annual national priorities on research, extension, and higher education to be emphasized as national budgets are developed for the fiscal year 1989. In recognition of the water problems facing our society, the number one priority is specified to "Maintain and Preserve Water Quality" taking precedence to biotechnology. Specific issues listed in this report to be addressed are included in the Appendix along with a brief discussion of how Cal Poly projects, facilities and capabilities are and could be used to address these specific topics.

The Department of Agricultural Engineering at Cal Poly, San Luis Obispo, has made significant contributions while responding to industry demands for research, development and training of water and energy related issues. The Department is unique in terms of its size, facilities and "hands-on" educational philosophy. It has acquired an enviable reputation, especially in irrigation for its undergraduates' performance in industry and continuing education, and its faculty's performance in meeting the needs of past contracts. With this uniqueness and reputation, the Department of Agricultural Engineering has recently become a major focal point for providing the increasing needs in research, development and training related to water conservation and irrigation.

On May 3, 1988, President Warren J. Baker made available $30,000 to be used to establish a center at Cal Poly to continue and expand our training and research activities in water conservation and irrigation. The seed funds were provided in recognition of the substantial growth of grants in this area in recent years and the interest on the part of the Office of Water Conservation to support a more comprehensive infrastructure at Cal Poly to respond to the needs of the State in research and training related to water conservation and irrigation. The State's willingness to provide additional support is a result of past commendable performances of Cal Poly faculty and students meeting the State's needs. Cal Poly has a demonstrated track record, a partial of which (1986-1988) is summarized in the Appendix.
Irrigation Training and Research Center's Concept Paper—Draft 8/2/88

The Purpose

The Department of Agricultural Engineering faculty's commendable ability to meet these increasing needs has reached its limit. It is conceived that the proposed Center will serve as an organizational vehicle to continue to promote and facilitate industry's rapidly increasing demands for research, development and training at Cal Poly in irrigation.

The Benefits

Benefits to Cal Poly
The proposed Center would provide opportunity to
• strengthen existing efforts to attract academically talented students into the water conservation and irrigation curriculum.
• upgrade the quality of faculty, curriculum and support services in our educational program
• expand the experiential and experimental learning environment that already exists
• develop and promote innovative and cooperative instructional programs using new technologies
• stimulate and implement research, development and training in water conservation and irrigation related topics
• more fully engage the use of facilities and capabilities at Cal Poly and in the Department of Agricultural Engineering

Benefits to Industry
The proposed Center would provide opportunity to
• respond readily to the rapidly changing and increasing technological needs of industry
• bring industry closer to the practical use of existing state-of-the-art technologies
• utilize the unique facilities at Cal Poly and in the Department of Agricultural Engineering
• utilize a broader pool of capabilities to address complex, interdisciplinary water conservation and irrigation related issues

The Function

The proposed Center will be responsible for obtaining funds and providing direction for research, development and training for water conservation and irrigation related issues.
• provide research, development and training programs utilizing state-of-the-art technologies in irrigation related areas
• provide short courses, conferences and workshops to practicing professionals, as well as other interested entities
• develop an active field service program to strengthen the "hands-on" approach to transfer technology from theory to practice
• stimulate and promote collaborative relationships with other universities by seeking opportunities to utilize compatible university resources
• make modern equipment and state-of-the-art technologies available to Cal Poly students
Center Activities

Current Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Annual Funding</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation Training and Research Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canal Automation</td>
<td>$75,000</td>
<td>tentative</td>
</tr>
<tr>
<td>Irrigation Evaluation</td>
<td>$15,000</td>
<td>2 courses funded</td>
</tr>
<tr>
<td>Mobile Lab Quality Control</td>
<td>$10,000</td>
<td>funded</td>
</tr>
<tr>
<td>Drainage Reduction Data Analysis</td>
<td>$15,000</td>
<td>funded</td>
</tr>
<tr>
<td>Turf Water Management</td>
<td>$100,000</td>
<td>funded</td>
</tr>
<tr>
<td>Highway Landscape Irrigation Scheduling</td>
<td>$100,000</td>
<td>75,000</td>
</tr>
<tr>
<td>Drought Water Management</td>
<td></td>
<td>negotiated</td>
</tr>
<tr>
<td>Workshop</td>
<td>$120,000</td>
<td>funded</td>
</tr>
<tr>
<td>Irrigation Scheduling Expert System</td>
<td>$80,000</td>
<td>funded</td>
</tr>
<tr>
<td>Irrigation Scheduling Upgrade</td>
<td>$100,000</td>
<td>tentative</td>
</tr>
<tr>
<td>Real Time Pump Efficiency Study</td>
<td>$100,000</td>
<td>negotiated</td>
</tr>
<tr>
<td></td>
<td>$715,000/year</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$520,000/year</td>
<td></td>
</tr>
</tbody>
</table>

The following is a list of some of the major research, development, training and testing activities that could be conducted by the proposed Center. The proposed Center's capabilities result from the expertise and unique facilities currently available at Cal Poly. And the opportunity for expansion of expertise and facilities is improved as state-of-the-art technologies are developed and utilized at the proposed Center.

Research, development and testing
- client profile
  - private institutions (manufacturers, equipment dealers, technical services, utilities, irrigation districts, farmers, etc.)
- industry needs and Cal Poly capabilities
  - energy related research
  - improving related technologies to take maximum advantage of Time-of-use rates
- delivery canal control research and testing
  - electro-mechanical controls
  - canal control software and modeling
  - hydraulic modeling
- pump optimization and configuration research and testing
- valve and control research and testing
- improved irrigation system design and management strategies
- technical training and materials development
Agricultural water management strategy development and training (delivery and on-farm)

- **client profile**
  - end users (farmers, irrigation managers, irrigation districts, municipalities, and other individual irrigation water users)
  - state institutions (DWR/OWC, Cal Trans, WRCB, Food and Agriculture, CEC)
  - national institutions (Soil Conservation Service, USDA-ARS, USBR, USGS)
  - international institutions (USAID, World Bank, Asian Development Bank, Inter-American Development Bank)

- **industry needs and Cal Poly capabilities**
  - urban and agricultural irrigation and water management methodology development
  - improved irrigation system design and management strategies
    - develop interdisciplinary design techniques and performance evaluations
  - risk assessment techniques of new technologies
  - energy related research
    - improve related technologies to take maximum advantage of "Time-of-use" rates
    - pumping plant optimization
  - delivery canal control research, development and testing
    - improve delivery flexibility techniques
    - improve electro-mechanical controls
    - develop control software and modeling
    - develop models to test complex delivery hydraulics
    - research performance evaluation methodology
  - software development for analysis, education and management
    - develop integrated delivery and on-farm system performance evaluation techniques
    - expert systems for hands-on training and management
  - technical training and materials development.
Organization

The organizational chart as proposed for the Irrigation Training and Research Center is presented below.

**Irrigation Training and Research Center**

**Organizational Chart**

- A.E. Dept. Head
  - ITRC Director
    - ITRC Advisory Board of Directors
      - Center Director, Chair
      - A.E. Dept. Head
      - A.E. Irrigation Faculty
      - Irrigation Industry Reps

- Facilities
- Courses/Projects
- Support Personnel
Budget

The proposed Center's budget is as outlined below. Please note this includes the first year showing both current and anticipated activities.

<table>
<thead>
<tr>
<th>Account</th>
<th>Month</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director (including benefits)</td>
<td>$6,667</td>
<td>$80,000</td>
</tr>
<tr>
<td>Adm. Assistant</td>
<td>2,667</td>
<td>32,000</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>600</td>
<td>7,200</td>
</tr>
<tr>
<td>Phone Bid</td>
<td>700</td>
<td>8,400</td>
</tr>
<tr>
<td>Miscellaneous Expenses</td>
<td>900</td>
<td>10,800</td>
</tr>
<tr>
<td>Office &amp; Center Equipment/maint.</td>
<td>1,320</td>
<td>15,840</td>
</tr>
<tr>
<td>Brochures, mailings, letters, etc.</td>
<td>1,050</td>
<td>12,600</td>
</tr>
<tr>
<td>Overhead</td>
<td>2,780</td>
<td>33,360</td>
</tr>
</tbody>
</table>

**TOTAL:**

\[
\text{TOTAL: } \$16,684 \quad \text{per month} \quad \text{\$200,200 per year}
\]

Facilities

The proposed Irrigation Training and Research Center will be located in Shop #6 of the Agricultural Engineering Department. Construction and remodeling will need to occur in order to meet the needs of the proposed facility. Plans for the changes to be made in shop #6 for the proposed facility are presented in the Appendix.
BYLAWS OF THE CAL POLY

IRRIGATION TRAINING AND RESEARCH CENTER

California Polytechnic State University, San Luis Obispo

These bylaws are applicable within the authorization established by the Board of Trustees of the California State University and the California Polytechnic State University, San Luis Obispo.

ARTICLE I - NAME

The name of this organization shall be Irrigation Training and Research Center (ITRC), referred to in these bylaws as the Center.

ARTICLE II - PURPOSE AND POLICIES

Section 1 - Purpose

The primary purpose of the Center will be to support the multidisciplinary needs for supporting research and training as related to water conservation and irrigation through education and applied research. The Center will foster interaction between the University and industry, consistent with the overall goals of Cal Poly.

Center members are faculty and students who have a declared interest in irrigation technology, training and research programs as related to activities at Cal Poly.

The Center will serve as a vehicle for securing industry sponsorship and support to sustain irrigation training and research oriented projects at Cal Poly.

The Center will be financed primarily by grants. It is intended that funds will be secured to support the Center's administrative cost for three years, so that these costs will be eligible for a line item in the Chancellor's budget.

Section 2 - Policies

The policies of the Center shall be in harmony with the policies of the California State University, the California Polytechnic State University, San Luis Obispo, and the California Polytechnic State University Foundation.

Section 3 - Dissolution

In the event the Center is dissolved, its assets remaining after payment of or provision of, all debts and liabilities shall be distributed to the California Polytechnic State University Foundation in trust for Cal Poly.
ARTICLE III - MEMBERSHIP

Section 1 - Class of Membership

Only faculty, staff, and students of the California Polytechnic State University, San Luis Obispo, and faculty-selected consultants shall be members of the Center. The membership is defined as follows:

a. - Faculty

Faculty members are those persons appointed by the University to faculty rank.

b. - Staff

Staff members are those persons serving the University or the Foundation in either an instructional or non-instructional capacity. Staff members have University or Foundation affiliation.

c. - Student

Student members are those persons engaged in study at the University on either a full-time or part-time basis.

d. - Consultant

Consultant members are those persons serving the University on a temporary basis. Consultant members do not have University affiliation.

e. - Research Associates

Research associates are those individuals on research projects with expertise pertinent to the particular needs of the Center and who are granted time dependent status with the Center and its activities.

Section 2 - Admission to Membership

a. - Eligibility

Is contingent upon the approval of the Center's Advisory Board of Directors.

b. - Proposal of Members

Any faculty member engaged in a Center program may propose candidates for membership for some duration of service in one or more programs.
(Bylaws- -continued)

c. - Acknowledgement of Membership

The Director of the Center shall acknowledge members.

Section 3 - Terms

Terms of members shall be determined by the Director.

Section 4 - Fees and Dues

There shall be no fees or dues paid by members.

Section 5 - Role of Members

Members are encouraged to participate in the activities of the Center. They may propose programs to be implemented by the Center. If approved, these programs will receive Center support as necessary and possible. The membership will have priority consideration in Center activities and interaction with industry.

Members are expected to provide support to the programs of the Center and assist the Director in program development.

ARTICLE IV - ADMINISTRATION

Section 1 - Director

The Center will be administered by a Director, appointed by the Center's Advisory Board of Directors and with the approval of the Vice President for Academic Affairs.

The Director will serve on a full time basis, duration depending on available funding obtained. The Director will report to and be a member of the Center's Advisory Board of Directors.

The Director will submit an annual report to the Vice President for Academic Affairs, the Dean of the School of Agriculture, the Associate Vice President for Graduate Studies, Research, and Faculty Development, and members of the Center's Advisory Board of Directors. The report will include a summary of:

(a) what was done
(b) who did it
(c) how it was financed
(d) future plans
(Bylaws continued)

ARTICLE V - ADVISORY BOARD OF DIRECTORS

Section 1 - Advisory Board of Directors

Advisory Board of Director members for the Irrigation Training and Research Center are those persons selected by the irrigation faculty of the Department of Agricultural Engineering, and are to serve in an advisory capacity to the Center.

The Advisory Board of Directors will include irrigation faculty members from the Agricultural Engineering Department, the department head, at least one member from outside the University that represents the irrigation industry, and the Center's designated Director. The Chairman of the Board of Directors shall be the Director of the Irrigation Training and Research Center. Initial appointments for Directors will be from one to three years in order to stagger committee membership, but nominal terms of office will be for three years.

Section 2 - Powers and Duties

The Advisory Board of Directors shall provide advice and comment on Center programs, shall engage in public relations and fund raising for Center programs, and shall provide overall guidance and direction to the Center.

Section 3 - Meetings

The Advisory Board of Directors will meet at least once a year to review Center programs and to provide general direction to the Center. The Advisory Board of Directors may elect to meet for special purposes at any other times upon agreement of a majority of Board members.

Section 4 - Number Constituting a Quorum

A majority of members shall constitute a quorum.

ARTICLE VI - FISCAL POLICIES

Section 1 - Fiscal Year

The fiscal year shall correspond to that of the Cal Poly Foundation.

Section 2 - Accounts and Audit

The books and accounts of the Center shall be kept by the Cal Poly Foundation in accordance with sound accounting practices, and shall be audited annually in accordance with Foundation policies.

Section 3 - Funding

Funding for the Center shall come from private solicited sources, gifts, and fees from Center generated short courses, conferences and publications, and from the State.
(Bylaws continued)

ARTICLE VII - AMENDMENTS

The bylaws may be amended by a two thirds vote of the Advisory Board of Directors voting at any meeting of the Center, provided that each member had received an advance notification of the proposed amendment. They may also be amended on recommendations of the Director and approved by the Advisory Board of Directors.
Appendix
Joint Council on Food and Agricultural Sciences

The Joint Council on Food and Agricultural Sciences issued a report dated June 1987, and titled Fiscal Year 1989 Priorities for Research, Extension and Higher Education, A Report to the Secretary of Agriculture. The report lists the annual national priorities on research, extension, and higher education to be emphasized as national budgets are developed for the fiscal year 1989. The number one priority is specified to "Maintain and Preserve Water Quality" taking precedence to biotechnology. Issues specifically listed to be directly addressed include:

- develop techniques for increasing water yield and availability
- develop irrigation design and water management techniques that maximize water availability while minimizing water losses and quality degradation
  - the Automated Pumping Plant and Water Delivery Facility
- improve understanding of and develop management guidelines for sediment and chemical transport in surface and subsurface flows
- develop educational programs that inform water users about the importance and methods of conserving and protecting the quality and quantity of water resources
  - develop innovative programs to transfer improved technologies to various water user groups
  - Cal Trans/OWC highway scheduling
  - OWC CIMIS develop and implement technology transfer
- develop risk assessment models to evaluate sociological, economic, legal and political consequences of water quality and management problems
- develop methods for economically solving soil and water contamination problems
  - assess effects of various pollutants on production
  - improve methods to assess the environmental fate of chemicals in the soil-water continuum
  - develop agricultural systems that minimize pollution of surface and groundwater resources
Cal Poly's Demonstrated Track Record, 1986 to 1988

Approximately $1,026,000 has been received within the Department of Agricultural Engineering from a variety of sources. They include the following:

- Pacific Gas and Electric Company $157,000 (received)
- Supplemental Funding from Pacific Gas and Electric Company $160,000
- Southern California Edison 60,000
- Merriam Endowment Fund 6,000
- Boswell Grant 3,000
- USGS 120,000
- Southern California Gas 20,000
- California DWR 350,000 (Charles M. Burt)
  150,000 (Robert E. Walker)

Major equipment donations received are as follows:

**DONOR:**
- Peabody Floway Pumps
- Cascade Pumps
- Cornell Pump
- Waterman Industries
- Fresno Valves
- Rain for Rent
- Superior Farming Co.
- McCrometer
- Texaco
- Unocal
- US Electrical Motors
- MG Piping Products Couplings
- Lake Co.
- Waukesha Engine
- Medallion Electric Supply
- Layne Western
- Amarillo Gear Co.
- Trusco Tank, Inc.
- Water Specialities Corp.
- ASC Pacific Inc.
- Murphy Controls

**ITEM:**
- 6 pumps (not yet delivered)
- 1 pump
- 1 pump and 60 HP motor
- Butterfly and check valves, air vents
- Line Gates
- Fittings, valves
- Fittings, valves
- Flow meters
- Steel pipe
- Steel pipe
- Electrical motors
- Flexible couplings
- Fittings
- Natural gas engine (not delivered)
- Electrical panels
- Electrical panel
- Gear Head
- Steel
- Flow Meter
- Galvanized Steel Decking
- Engine Controller
Open space - Laboratory For Regular Cal Poly Classes

Lab Prep
Grad. Student Carrel

Center Meeting Room and Computer Lab.

Storage

Fill in door

Proposed Facilities of the Irrigation Training and Research Center
Proposed Facilities of the Irrigation Training and Research Center
Resolution on Consolidated Recommendations of Peer Review Committees  
(AS-295-88/PPC)  
6/3/88 Recommendations of Peer Review Committees which clarify reporting process used by various levels of peer review.  
6/28/88 President referred to Vice President for Academic Affairs and Director of Personnel and Employee Relations for review and recommendation.  
8/22/88 Approved by the President with an addition to the resolution.

Resolution on Guidelines for State Faculty Support Grants (AS-297-88/RC)  
9/1/88 Interim guidelines for State Faculty Support Grants.  
9/6/88 President referred to Associate Vice President for Graduate Studies, Research and Faculty Development for review and recommendation.  
9/9/88 President approved interim guidelines for State Faculty Support Grant competition for fall and appointed review committee.

Resolution on Proposal to Establish The Irrigation Training and Research Center (AS-298-88/SAGR)  
9/1/88 Proposal to establish The Irrigation Training and Research Center forwarded by Academic Senate with note that changes continue to be made to document, especially regarding status of funding activity.  
9/6/88 President forwarded resolution to Vice President for Academic Affairs for recommendation.  
6/26/89 President approved proposal after consultation with Vice President for Academic Affairs.

Resolution on Honorary Doctor of Laws Degree (AS-299-88/Gooden) - CONFIDENTIAL  
10/7/88 Recommends conferring of honorary Doctor of Laws Degree at June 1989 Cal Poly Commencement.  
10/17/88 President approved resolution and forwarded to the Chancellor's Office a recommendation that the Board of Trustees award the Honorary Doctor of Laws Degree.

Resolution to Amend Procedures for Meritorious Performance and Professional Promise Awards (AS-300-88/PPC)  
11/17/88 Recommends that applicants and nominees for a Meritorious Performance and Professional Promise Award should be notified if they do not receive an award.  
11/22/88 President approved resolution for immediate implementation.

Resolution in Support of Merit Salary Adjustments for All Nonfaculty Employees (AS-301-88/PCS)  
11/17/88 Recommends and supports reinstatement of MSA's to nonfaculty employees.  
12/12/88 President acknowledged receipt of memo. Noted efforts of Trustees, the Chancellor and Chancellor's staff regarding this issue and suggested Academic Senate consult with the Vice President for Business Affairs or Director of Personnel and Employee Relations if more information is desired.