



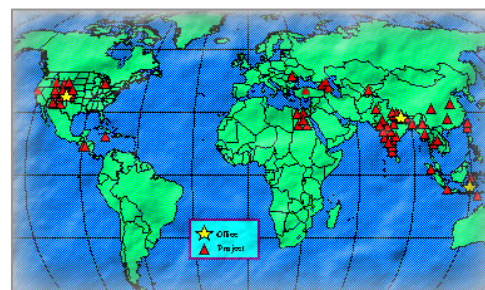
STATEMENT OF QUALIFICATIONS

2010



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CADI is a team of engineers, scientists, planners, and managers with diverse project experiences and a shared interest in domestic and international development issues. We are one of the leading U.S. consulting firms providing technical services and products worldwide, using various computer-assisted approaches since 1987.



CADI provides short-term technical assistance, long-term advisory services, technology transfer, research, and training in:

- Water Resource Management and Agricultural Development
- Environmental Protection and Natural Resource Conservation
- Applied Information Technology
- Human and Institution Capacity Building

We also provide products for informed decision making using:

- Digital Databases and Geodatabases for Institutions, States, Countries and Regions
- Information Management Systems for Projects, States, Countries and Regions

CADI was founded in 1987 as a Colorado C corporation. During our 23-year history, we have successfully completed over 100 contracts in Asia, the Caribbean Islands, Eastern Europe, Latin America, the Middle-East, North Africa, and the United States. Currently, CADI is certified as an SDB/SBE/MBE/DBE with the following agencies:

- U.S. Small Business Administration - Small Disadvantaged Business
- State of Washington - Minority Business Enterprise & Disadvantaged Business Enterprise

Introduction & Background

CADI provides technical services and products to governments and businesses worldwide. We focus on applied, practical, and attainable solutions to complex domestic and international development problems. We have achieved successful results through technical assistance, training, special studies, and technology transfer, including the extensive use of information technology as an effective problem-solving tool.



Maroon Peaks, Colorado

CADI is committed to offering expertise in all phases of project development, including planning, design, implementation, management, monitoring and evaluation. Each member of CADI's interdisciplinary team combines advanced academic degrees with years of practical, hands-on field experience. We adhere to the highest professional standards to provide best-value services and products for our clients worldwide.

We excel at providing timely, quality services in a cost effective manner. CADI is fully capable of implementing projects to produce high quality outputs. We have worked extensively in North Africa, Asia, Central Asia, Eastern Europe, Latin America and the United States, offering technical services and products in irrigation and water resource management, economic and agricultural development, environmental protection and natural resource conservation, human and institution capacity building, and applied information technology.

The company is located in Fort Collins, Colorado, 65 miles (105 km) north of Denver, along the Front Range of Colorado's Rocky Mountains. Locating CADI in Fort Collins, an arid and sub-humid region of the United States, was no accident. We have a close association with Colorado State University, an internationally recognized institution in natural resource management, water resource planning, irrigation management, and computer application development. We maintain an extensive network of international affiliates and representatives. To better serve our clients in Asia, we have representatives in Indonesia and Nepal.

CADI Services and Products

Expertise in Water Resource Management and Agricultural Development

CADI's interdisciplinary team has been involved in many aspects of irrigation and agricultural development, and water resource planning and management. We have provided a variety of short-term technical assistance and long-term advisory services, including integrated water resources planning and management, irrigation and drainage system design and management, irrigation policy analysis, project monitoring and evaluation, rapid appraisals, water users association (WUA) design and development, and environmental and economic impact assessments. Our areas of expertise are listed in *Table 1*.

National Policy Analysis

CADI staff assisted international donors, national planning agencies, and irrigation agencies to analyze existing irrigation policies and develop new medium and long-term water resources and irrigation management strategies and investment options. Working with multi-lateral donors and government agencies, CADI assessed the role of public irrigation in national agricultural strategies, including evaluating: (a) the achievements of government irrigation investment and management strategies; (b) the performance and sustainability of irrigation investments; (c) the impact of programs on O&M and irrigated agriculture; and (d) the market-led evolution of irrigated agriculture. CADI provided options and recommendations to donors and governments regarding future assistance programs, and helped define appropriate policy frameworks and action plans to improve the performance and sustainability of irrigation investments.

Our policy analyses have resulted in revised national five-year plans, long-term investment strategies for multi-lateral donors, and new national policies for O&M, irrigation management transfer, and WUAs.

Table 1. Water Resource Management and Agricultural Development

- Joint management or system turnover
- Water users association development and strengthening
- Share system development and irrigation service fees
- Women's roles in agriculture
- Farming systems R&D
- Irrigation system performance appraisals
- Irrigation and drainage design and management
- Hydrologic studies of surface and groundwater systems
- Integrated river basin planning and management
- Monitoring and evaluation
- Technical and economic feasibility analysis

Management Transfer, Turnover, and Joint Management

CADI staff members have been directly involved with planning, designing, implementing, and evaluating irrigation management transfer programs (turnover, joint management) in Indonesia, Nepal, Romania, and Tajikistan. Working on Asian Development Bank and USAID projects, CADI was instrumental in influencing management transfer policies, programs, and procedures, including turning over routine O&M activities of government managed irrigation systems to formal WUAs. CADI assessed the qualitative and quantitative achievements of irrigation management transfer programs, including analyzing the constraints of effective post-turnover ownership, and the problems encountered in O&M, crop management, and major system repairs. High-level government officials from Mexico, Nepal, and Indonesia participated in CADI-organized multi-national management transfer exchange and training programs. As a direct result of our involvement in turnover and joint management programs, the governments of the Philippines, Indonesia, Nepal and Tajikistan developed policies emphasizing: (a) more effective farmer participation in pre-turnover rehabilitation; (b) developing quality control mechanisms for rehabilitation; and (c) ensuring WUAs readiness to take over full O&M responsibilities and authority after turnover.

Development and Strengthening of Water User Associations

CADI participated in planning, designing, implementing, and evaluating WUA development projects in many countries in Asia, Central Asia, Eastern Europe, and the Mid-East. These projects included designing and implementing irrigation share systems linking water deliveries to fulfill certain responsibilities and obligations. To ensure the long-term sustainability of O&M, CADI staff assisted irrigation agencies and WUAs to implement irrigation service fees among the water users. These fees are used by the WUA to pay for the costs of O&M and manage the irrigation system. CADI also provided technical assistance to irrigation agencies to build linkages between WUAs and agricultural marketing activities. As a result of these efforts, over several hundred thousand ha of irrigated area has been organized into sustainable and self-sufficient water users associations.

Institutional Development

CADI designed and implemented a number of institutional development activities that led to large-scale organizational change in national water management agencies. These activities included both the process and content of change in irrigation institutions, focusing on the agencies': (a) external environment; (b) role and strategy; (c) leadership and management style; (d) organizational culture and structure; (e) human resources; and (f) management systems and practices. As a result of these institutional development activities, governments restructured their national water management agencies and established new organizational divisions and branches that focus on O&M, training, research, and WUAs. The institutional strengthening activities emphasized the internal development of water management agencies, improving their capacity to refine policies and bylaws; formulate regulations and procedures; and design, conduct, manage, and evaluate research and training programs.

Irrigation System Management – O&M, Rehabilitation, and Construction Management

CADI has worked to directly operationalize and execute new irrigation policies in the field. We implemented a number of irrigation system management projects in India, Pakistan, Nepal, Indonesia, and Egypt focusing on:

O&M: Working with local irrigation agencies, CADI staff members synthesized and refined existing government and farmer O&M procedures and assisted with the implementation of new and innovative approaches. CADI staff members also conducted large-scale reviews of existing O&M manuals and developed comprehensive manuals directly linking O&M programs with business and record-keeping procedures for water ordering and delivery. Government staff and farmers were trained to use the new procedures and farmers were assisted in preparing their own O&M plans. CADI has assisted irrigation agencies implement O&M development processes that can be applied on a regional basis.

Rehabilitation: CADI staff members designed and implemented donor-assisted minor rehabilitation programs and processes, focusing on farmer participation and practical quality controls. The rehabilitation programs included detailing and listing emergency maintenance and repair needs, identifying essential structural and catch-up maintenance needs, and recommending necessary system improvements. Rehabilitation cost-sharing arrangements between the government and farmers' WUAs were also implemented. These arrangements for minor system rehabilitation included procedures to ensure that minimum indicators of field-level institutional and WUA development was completed before corresponding physical improvements were carried out.

Construction Management: CADI provided technical assistance for the construction of irrigation and drainage works and village infrastructure. This assistance included verifying engineering designs and managing the construction of irrigation, drainage, and village infrastructure works (water, sewage, roads, and electricity).

As a result of these irrigation system management activities, CADI had a direct role in improving the O&M in several hundred thousands of ha of irrigated land in Nepal, India, and Egypt. These activities produced numerous user-friendly and practical O&M manuals, increased farmer involvement in O&M and rehabilitation activities, and improved quality control of rehabilitation and construction of irrigation schemes.

Feasibility, Design, and Evaluation of Water Resource Systems

CADI provided services for assessing and evaluating water resource systems in Indonesia, India, Pakistan, Bangladesh, and China. In China, CADI developed and field tested a detailed methodology for assessing the engineering, agronomic, economic, financial, and institutional performance of irrigation systems. In India, Pakistan, and Bangladesh, CADI assessed and evaluated the current status of conjunctive water use in government irrigation systems, including evaluating environmental and economic impacts of proposed regional strategies for flood mitigation and increased agricultural production. In Indonesia, CADI conducted an evaluation of pump irrigation systems, leading to the development of new policy alternatives.

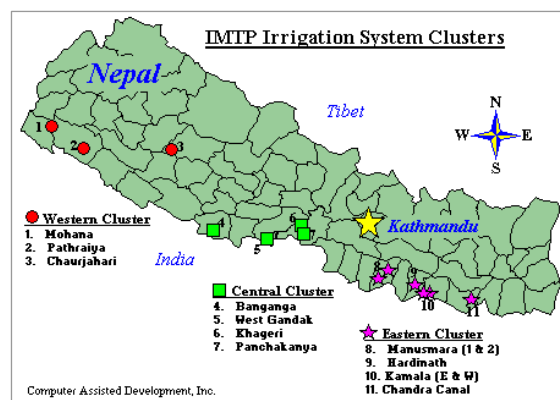
Representative Project Experience in Water Resource Management and Agricultural Development

Water Users' Association Development, Romania. USAID/Romania, 2002-2005.

Reviewed legal and institutional issues related to the formation of WUAs. Worked with the Ministry of Agriculture, Food, and Rural Development, USAID and World Bank to develop a plan for making necessary improvements to the existing regulatory framework, such as identifying areas requiring revision and improvement. Proposed solutions, including the need for additional analysis and study. Issues that were examined included: regulations governing ownership of non-irrigation equipment and the registration process; legal rights of concessionaires on state-owned land; timing and conditions related to the transfer of ownership of the irrigation infrastructure, including responsibilities to carry out repairs on infrastructure prior to the transfer; and organizational structure and division of policy and implementation responsibilities.

Irrigation Management Transfer Project, Nepal. USAID/Kathmandu, 1996-2000.

Provided long- and short-term technical assistance to transfer the management of selected irrigation systems from the government to the farmer WUAs. Rehabilitation of the systems was carried out to improve irrigation system performance. Phase I of the project included transferring the operation and maintenance and/or ownership of three public irrigation schemes (15,000 ha) to the WUAs and preparing eight more schemes (53,000 ha) for future management transfer. Phase II of the project included assisting the government in transferring the eight final schemes to the WUAs.



Assessment of Options for Sustainable Irrigation Development, Indonesia. Asian Development Bank, 1997-1998.

Provided technical assistance to evaluate the achievements of the Government of Indonesia's irrigation investment and management program and defined a medium-term (5-10 year) irrigation strategy, policy framework, and action plan to improve the performance and technical, financial, social, and environmental sustainability of irrigation investment and management. CADI analyzed: (a) the performance and sustainability of recent investments in irrigation; (b) the impact of programs for O& M and related support services for WUAs and irrigated agriculture; and (c) the market-led revolution of irrigated agriculture. Identified options for future irrigation investments and suggested revisions of irrigation policy mechanisms.

Irrigation Management Project, Nepal. USAID/Kathmandu, 1991-1995.

Provided long- and short-term technical assistance to the Department of Irrigation and Hydro Development Unit in research, training, management, and institutional development. Services included developing guidelines for joint management and turnover of irrigation systems; strengthening the Irrigation Management Division to design, conduct, manage, and evaluate their research and training programs; improving the capabilities of the System Management Branch to perform management tasks; and improving irrigation O&M guidelines. Assistance was also given to refine/formulate policies, bylaws, regulations, and procedures for the development of hydropower facilities to attract investments from the private commercial sector and foreign hydro-electric developers and lenders.



Assessment of Conjunctive Use in Maharashtra Minor Irrigation Systems, Maharashtra Minor Irrigation Project, India. USAID/New Delhi, 1990.

Provided short-term technical assistance to review the current status, identify alternative strategies, and recommend actions that the Maharashtra government could take to improve conjunctive water use. A water balance model, conjunctive use performance assessment model, and farmer advisory model were recommended.

Expertise in Environmental Protection and Natural Resource Conservation

CADI professionals have delivered diverse technical services in environmental and watershed sciences, forestry, and natural resources. Services provided in Asia, the Caribbean, Latin America, and the United States include environmental protection, watershed management, soil and water conservation, and natural resource management. Our areas of expertise are listed in *Table 2*.

Natural Resource Management and Ecosystem Planning

As a part of the Environmental Management of Watersheds Project in Jamaica, CADI prepared a draft national watershed policy, developed a watershed M&E database, and classified and ranked all 26 watershed management units. The Government of Jamaica finalized the national watershed policy that was later approved by the Parliament.

Table 2. Environmental Protection and Natural Resource Conservation

- Ecosystem ecology and management
- Regional resource planning and management
- Environmental policy, administration, and litigation
- Agro-forestry research and management
- Watershed survey, planning and management
- Soil and water conservation
- Land capability and use classification
- Landuse adjustment and conservation
- Conservation farming and extension service

CADI developed a detailed strategy for landuse planning of watersheds, including planning for villages and activities to strengthen the capabilities of government agencies. Working with the FAO in Myanmar, CADI developed a plan that included designing a GIS/remote sensing center; recommending procurement of computer hardware and software; determining procedures to be used to plan at both the watershed and village level; and developing approaches for integrating image analysis, GIS, GPS, and watershed models. The action plans also contained procedures for involving local villagers in the process. A digital analysis of resource data for watershed management was carried out in El Salvador, including mapping fuel, wood, and other biomass resources and assessing availability on a regional basis.

Watershed Management and Erosion Control

Working with officials from the UNDP/FAO and Thai Royal Forest Department, CADI established soil conservation demonstration and erosion experiment plots for the Phu Wiang watershed in Khon Kaen, Thailand by making an evaluation of the project's watershed monitoring program in terms of its suitability for testing and use of watershed models for runoff and sediment yield prediction. Several watershed computer models were introduced to the project staff and tested using available data. One watershed model was recommended by CADI to integrate climatologic, hydrologic, and landuse data to predict the effects of landuse changes to promote economic growth within the watershed.

Soil Salinity and Water Table Mapping and Assessment

CADI worked with Egypt's Ministry of Public Works and Water Resources, and the Academy of Scientific Research and Technology's Remote Sensing Center to characterize and map soil salinization and water table encroachment in the Serry command area, and the Nile River Valley and Delta regions. The method consisted of three major components: (1) reconnaissance mapping using aerial photography and satellite imagery; (2) field investigations to observe and characterize soil and water table conditions; and (3) soil salinity and water table map production by assimilation and integration of all data collected, including laboratory analyses, field observations, and aerial photo interpretation. The detailed study identified the relative severity and extent of soil salinity and water table encroachment in these areas. The salinity and water table maps assisted in prioritizing areas most in need of improvement and/or rehabilitation.

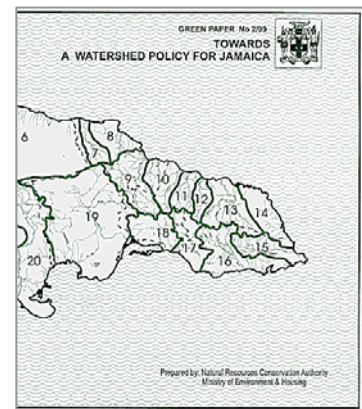
Soil Survey and Ecosystem Classification

As part of the U.S. Department of Agriculture's National Cooperative Soil Survey in Colorado and Wyoming, CADI mapped, classified, and described vegetation in 616,550 acres of U.S. Forest Service land. Vegetation surveys were conducted to collect data on plant species, basal area factor tally by species, site index, average timber production, plant canopy cover and height estimates, fuel categories, and range forage production. The results of the surveys provided the basic documentation for the U.S. Forest Service's Soil Survey Inventory Report.

Representative Project Experience in Environmental Protection and Natural Resource Conservation

Environmental Management of Watersheds, Jamaica. NRCA/PIOJ/UNDP/Kingston. 1998-1999.

Strengthened the Watershed Protection and Management Branch of the Natural Resources Conservation Authority (NRCA) by developing a national watershed policy, a national watershed monitoring program, and a classification system to rank the 26 watershed management units. Provided suggestions and recommendations for preparing a national watershed action plan and strengthening NRCA institutional capacity in the future.



Land Use Planning and Institutional Strengthening Action Plan, Myanmar. FAO/Rome. 1993-1994.

Developed an action plan detailing the activities required for landuse planning of three critical watersheds including a detailed landuse plan for a single village in Myanmar. Strengthened the capabilities of the Ministry of Forestry by designing a GIS/remote sensing center, including recommending the purchase of computer hardware and software; procedures to be used in planning

at the watershed and village level; and approaches for integrating image analysis, GIS, GPS, and watershed models as well as the involvement of local villagers in the planning process.

Monitoring and Mapping Biomass Resources with Landsat-TM and GIS, El Salvador. Commission Ejecutiva Hidroeléctrica del Río Lempa, San Salvador under contract to Los Alamos National Laboratory, New Mexico. 1988-1989.

Provided digital analysis of Landsat-TM data for forest and fuel biomass resource mapping, watershed management, resource conservation, and reforestation. Provided technical support for project planning, design, and performance. Prepared and conducted a two-week training course on the principles of remote sensing, digital image analysis, raster-based GIS, ERDAS, and applications focusing on natural resource management.

Watershed Management and Soil Conservation, Thailand. Integrated Development of the Phu Wiang Watershed Project, FAO/Rome. 1988-1989.

Established soil conservation demonstrations and erosion experiment plots. Developed a computer model integrating climatologic, hydrologic, and landuse data to predict the effects of landuse changes proposed within the Phu Wiang watershed.

Ecosystem Classification, Mapping, and Inventory, USA. U.S. Forest Service/Colorado/Wyoming. 1989-1991.

Conducted four field surveys/inventories to map, classify, and describe the soils, vegetation, and ecological habitat type (including potential natural vegetation) on approximately 616,550 acres within the Arapaho, Roosevelt, and Shoshone National Forests. The work included identifying and collecting data on plant species, basal area tally by species, site index, average timber production, plant canopy cover and height estimates, fuel categories, and range forage production. Also included were data collection and documentation for the Forest Service Soil Survey Inventory Report.

Expertise in Applied Information Technology

With an increased interest in information technology transfer and applications, CADI professionals have assisted many private organizations and host-country governments with a variety of needs in data management system development; GIS and image processing; website design and deployment; Internet map services; computer workplan development; and computer hardware and software design, assessment, and evaluation. Our areas of expertise are listed in *Table 3*.

Website and Map Services Development

In Azerbaijan, Armenia, Georgia, Romania, Egypt, Indonesia and UAE, CADI worked with national government agencies to design and implement websites that are supported by database management systems and/or map services. Clients can now request specific data sets and information, including maps via queries on-line.

Data Management System Development and Implementation

In Azerbaijan, Armenia, and Georgia, CADI provided short-term TA to strengthen the capacity of water resources management agencies and develop scientific and analytical capacity to promote use of sound science for management. Specific activities: (1) designed and constructed a national water cadastre information system for each country, (2) developed a water object coding system for the South Caucasus region, and (3) designed a web-based and GIS enabled water resources information management system for the region.

In North Africa, South and Southeast Asia, and in the United States, CADI worked with national and local government agencies to design and implement database management systems, management information systems, decision support systems, and computer simulation models. In Egypt and India, CADI developed data management and/or decision support systems to assist irrigation managers with planning, operating, monitoring, and evaluating irrigation systems. Relational databases and computer models were established for data and information requirements used by irrigation system managers. GIS and GPS were used to map the irrigation system service areas and manipulate and analyze digital maps, establishing relationships between spatial and tabular data to provide visualization of irrigation and agronomic performance information. Local staff was trained to use these systems.

Table 3. Applied Information Technology

- GIS/Geodatabase applications
- Image processing of satellite and airborne digital data
- Database management, information management and decision support systems
- Natural resources planning and management applications
- Specialized model/information system development and implementation
- Project management, tracking, and evaluation
- Computer software and hardware assessment and recommendation
- Computer software and hardware procurement and installation

In Thailand, Indonesia, and the United States, CADI designed sophisticated and practical computer simulation models. Working with FAO and Thai government officials, CADI developed a watershed simulation model integrating climatologic, hydrologic, and landuse data to predict the effects of landuse changes within a watershed.

Working with USAID/Washington and USAID/Jakarta, CADI developed a computer model for calculating water and energy requirements, and a cost/benefit analysis of groundwater irrigation systems in Indonesia and Bangladesh.

In the United States, CADI assisted the City of Denver's Board of Water Commissioners to design a water resources planning and water allocation model, integrating diverse components such as: (a) a geo-relational database to store model input and output; (b) a GIS system showing river networks and model nodes; (c) an existing water allocation model; (d) a graphical user interface (GUI) to facilitate user operations; and (e) several data conversion interfaces to move data seamlessly between model components. Using the simulation model, CADI trained users to edit the model input data in the database, run the water allocation model with the updated input, and store model output data back into the database.

Geographic Information Systems and Image Processing

CADI staff members have been involved in developing and implementing GIS and image processing projects in Asia, Latin America, North Africa, South Caucasus, and the United States. In Azerbaijan, Armenia, and Georgia, CADI worked with national government agencies to design and construct three national water resources geodatabases. As a result, a water resources atlas of Armenia was published in paper and digital formats in 2008.

In Indonesia and Nepal, CADI worked with USAID and national governments to develop a computerized system for monitoring and evaluating training activities and the turnover of government-managed irrigation systems to farmer management. Both systems integrated relational databases, GIS, and a GUI. Maps were developed at the district level displaying the location and number of training courses given and participants taught, as well as showing various aspects of turnover progress from a national scale down to the scale of canals in a particular irrigation system.

In the United States, CADI worked with the U.S. Department of Agriculture-Forest Service and the National Land Management Planning Research Group to develop and test new analysis systems and tools that integrate GIS, GIS based models, and optimization systems to support forest ecosystem planning and management. CADI also developed an ecosystem management framework for planning and designing projects in 190,000 acres of U.S. National Forest, including providing the GIS coordination for the project to link tabular and spatial data.

In El Salvador, CADI provided digital analysis of Landsat-TM data for mapping forest and fuel biomass resources, watershed management, resource conservation, and reforestation. In Egypt, CADI evaluated alternative methods for characterizing and mapping soil salinity and water table levels in the Nile Valley through electromagnetic inductance, and interpretation and classification of Landsat-TM digital data.

Computer Work Plan Development

CADI has worked extensively in Asia and the United States to develop comprehensive computer workplans. In Myanmar, CADI strengthened the capabilities of the Ministry of Forestry in computer technologies in order to support computerized action plans for watershed and landuse planning. Working with USAID in India, CADI developed a program for the Irrigation Departments' computerization efforts, including a workplan for computer-assisted irrigation design and management, an applied computer training program, and workplans for three computerized management information systems. In the United States, CADI worked with the U.S. Department of Agriculture-Forest Service to prepare new computer hardware and software configurations, focusing on database access and GIS capabilities. Working with state agencies, CADI prepared a GIS strategy plan, including a five-stage process for implementation, identification of needed data, a data flow and management network/model, and identification of organizational support for the new information network.

Computer Hardware and Software Design, Assessment, Evaluation, and Resell

In Asia and the United States, CADI evaluated and recommended computer systems and software programs to meet project, management, and cost requirements and needs. In China, CADI worked with the ADB and Chinese government officials to evaluate the technical and financial performance of irrigation systems, leading to recommendations for computer systems and software for management and cost recovery needs. On a USAID projects in Egypt and India, CADI staff evaluated and recommended computer hardware and software to meet integrated water resources management requirements. Working with the U.S. Department of Agriculture-Forest Service, CADI was involved in the sale of Unix workstations, complete with ArcINFO.

Representative Project Experience in Applied Information Technology

South Caucasus Water Program. PA Government Services Inc, USAID/Georgia/Armenia/Azerbaijan, 2005-2008.

Provided short-term TA to strengthen the capacity of water resources management agencies and develop scientific and analytical capacity and promote use of sound science for management. Specific activities: (1) designed and constructed the national water cadastre information systems for Azerbaijan and Georgia; (2) designed a web-based and GIS enable water resources information management system for the region; (3) developed a water object coding system for the South Caucasus region; (4) designed, built and harmonized the water quality, quantity, use permit, and groundwater databases among the three participating countries – Armenia, Azerbaijan, and Georgia.



Improvement in Water Resources Data Management, Indonesia.

Ministry of Settlement and Regional Infrastructure, 2000-2002.

Established a sustainable national water resources data center under the Directorate of Technical Guidance, Directorate General of Water Resources Development in close coordination with other on-going database related projects by: setting up a fully operational data center with the latest information technologies; populating the data warehouse with integrated tabular and spatial data; demonstrating the power of the data warehouse through five water resources management applications; upgrading the network system with fiber optic and network switch technologies; training GOI staff in GIS, DBMS, remote access, GUI, DMI, and data warehouse O&M; and preparing a set of standards for GOI data management. The web-based, geo referenced water resources data warehouse is now on-line (<http://sda.kimpraswil.go.id/>) and providing water resources data and information to all administrative levels (district, provincial, and central).

Assessment of the Benefits and Costs of Pressurized Dual Water Systems, Colorado.

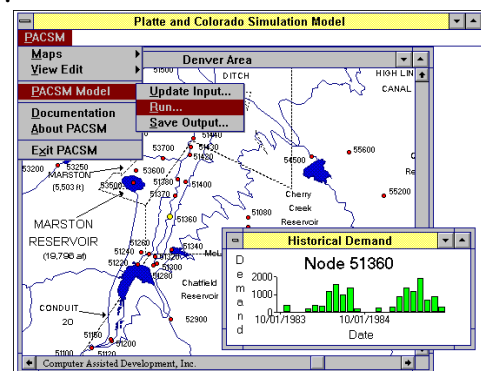
Colorado State University, 2001-2002.

Performed GIS advisory services and guidance to the CSU project team to establish geo-data bases for three irrigation canal companies to assess the benefits and risks of pressurized secondary raw water systems for landscaping in Colorado.

Platte and Colorado Simulation Model, USA.

Denver Board of Water Commissioners/Colorado, 1993-1995.

Designed, built, and integrated the components required for the development of PACSM, a water resources planning and water user allocation model. The components included a relational database to store model input and output, GIS showing the river network and model nodes, an existing water allocation model, and a GUI, as well as several data conversion interfaces to move data seamlessly between the model components. The PACSM user can edit the model input data into the database, run the water allocation model with the updated input, and store model output data back in the database. The user can then examine graphs of model input and output over time by clicking on model nodes on the river network map in the GIS. All PACSM operations are centralized in an easy-to-use, menu-driven GUI. PACSM contains 45 years of daily hydrological data for each of the 250 nodes in the allocation model.



Management Transfer Monitoring & Evaluation System, Nepal.

Irrigation Management Project, USAID/Kathmandu, 1991-1995.

Expertise in Human and Institution Capacity Building

Training for professional and institutional development is the foundation of successful technology transfer, and human and institution capacity building and strengthening. CADI has worked closely with private organizations and government agencies to develop the technical skills of professionals and build and strengthen the technical and training capabilities of institutions. We have provided training for over 500 professionals from Central, South, and Southeast Asia, the Mid-East, Central and South America, West Indies, and the United States in a variety of disciplines, including engineering, agriculture, earth resources, natural resources, economics, and sociology. Our areas of expertise are listed in *Table 4*.

Water Users Associations

CADI has been directly involved in establishing and sustaining WUAs in Central, South, and Southeast Asia. Training and institutional development activities have been provided in field-level WUA development, water booking and financial record-keeping, irrigation share system development and administration, organizational

aspects of irrigation management, leadership development, management transfer (turnover) and joint management, and WUA evaluation and assessment.

Irrigation System Management – O&M, Water Control, and Measurement

In Asia and the United States, CADI provided O&M and water control training programs for government staff and farmers through field activities, talk programs, and seminars. The programs focused on: (a) developing appropriate O&M guidelines; (b) implementing improved irrigation system O&M procedures; (c) conducting hydraulic operations, flow control structure calibration, and seepage loss; (d) measuring flow in the field; (e) designing regulation and measurement structures to meet agency and farmer requirements; and (f) applying research methodologies (e.g., diagnostic analysis, rapid appraisal, performance evaluation, baseline studies, and impact evaluation). All of these programs included training of trainers' components and direct applications in the field.

Table 4. Human and Institution Capacity Building

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- Irrigation/water resources data and project management
 - Remote sensing, image processing, and geographic information systems
 - Irrigation structures for water control and measurement
 - Irrigation system operation and maintenance
 - Turnover and joint management of irrigation systems
 - Water booking and financial record keeping
 - Irrigation system appraisal
 - Institutional development of irrigation agencies
 - Water users association design and development
 - Training of trainers/instructors and training methodologies
 - Watershed and soil conservation survey and planning
-

Watershed Sciences and Natural Resources Management

Training programs provided in Asia and the United States have focused on watershed management and soil conservation. The courses concentrated on training local government staff to: (a) develop guidelines for integrated watershed management plans; (b) introduce computer applications in soil and water conservation surveys, planning, and monitoring and evaluation; and (c) secure sustained productivity of forest land. In Myanmar, as a direct result of CADI training, participatory watershed planning has become an official function of the Ministry of Forestry.

Water Resources Management – Computer Applications

CADI is a pioneer in providing professional and institutional development in computer applications for irrigation system management. Since 1987, CADI staff have worked in India, Nepal, Indonesia, and the United States, introducing and training government staff in computer curriculum development models; computerized water resource database management systems; and computer applications in irrigation system planning, design, and O&M. Trainers' guides and videotapes have been produced and distributed in Asia and the U.S.

Remote Sensing, Image Processing, and GIS Applications

CADI conducted remote sensing, image processing, and GIS workshops in India, China, El Salvador, and the United States focusing on irrigation management, forest planning and management, watershed management, and soil and water conservation. Topics included: (a) principles of remote sensing; (b) the basics of vector and raster GIS; (c) digital image analysis; and (d) the use of GIS in irrigation management, land capability classification, landuse classification, and forest landscape analysis and design.

Training Program Development and Implementation

CADI provided long- and short-term technical assistance to government agencies in Central, South, and Southeast Asia focusing on training, institutional development, and strengthening of human capabilities. Services included conducting professional training needs assessments, designing and conducting training programs for government staff, producing training modules and materials, and monitoring and evaluating the progress and impact of the training. In Indonesia, CADI trained government staff in all aspects of training program development and implementation, leading to full institutionalization of these training programs within key Indonesian government agencies.

Training Methodologies

CADI staff have conducted numerous workshops focusing on improving the training skills of host country government staff. Emphasis has been on adult learning principles, the experiential learning cycle, and methodologies of conducting output-oriented conferences, seminars, workshops, and demonstrations. Field manuals were prepared, focusing on training appraisal, support, evaluation, and developing a comprehensive list of steps for initiating and completing training programs.

Representative Project Experience in Human and Institution Capacity Building

Irrigation and Drainage Community Development Project, Georgia. Ministry of Agriculture and Food of Georgia, 2001.

Assisted IDCD PIU to prepare long-term training programs for Amelioration Associations, local trainers, and consultants in 110,000 ha of irrigated land.

Rural Roads Maintenance Systems Project, Training Program Phase II, Indonesia. USAID/Jakarta, 1994-1996.

Provided long- and short-term technical assistance to the government of Indonesia's Directorate General of Regional Development. The project focused on training, institutional development, and strengthening of human capabilities in rural roads maintenance and management. Services included conducting a professional training needs assessment, designing training modules and materials for Indonesian government staff, conducting training courses, and monitoring and evaluating the progress and impact of training. The project covered seven districts (Takalar, Jeneponto, Bulukumba, Sinjai, Bone, Sidrap, and Pinrang) in South Sulawesi and two districts (Kupang and Belu) in West Timor.



Watershed Management Training Course, Myanmar. FAO/Rome, 1993-1994

Conducted a ten-week watershed management training course for 25 officials from the Ministry of Forestry, Myanmar. Training focused on securing sustained productivity of forest land and assisting the government by developing guidelines for preparing integrated watershed management plans. As a direct result of the training, participatory watershed planning became an official function within the Ministry of Forestry.

GIS Training and Forest Planning and Management, USA.

U.S. Forest Service, Colorado/Utah, 1993.

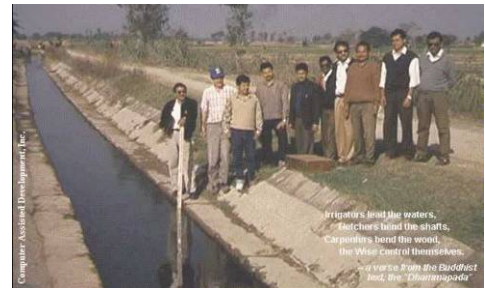
Conducted training courses on the use of GIS in forest planning and management. Course topics included: basics of vector and raster GIS; use of GIS in land capability classification; development of estimation/ simulation models within the grid component of ArcINFO; and data linkages between GIS, Oracle databases, and forest planning analytical tools (e.g., FORPLAN) used by the U.S. Forest Service. Course materials were subsequently incorporated into the Region 4 (USFS) ArcINFO handbook along with several ecosystem applications developed by the Region.

Improvement of Irrigation System Management and Cost Recovery, People's Republic of China. ADB/Manila, 1988-1989.

Conducted a training course for 21 engineers from the Ministry of Water Resources in the use of commercially available software for irrigation project planning, design, operation, and management. Trained engineers to conduct similar courses at the provincial level. As a direct result of the training, several software packages recommended by CADI (FAO's CROPWAT, MapInfo, CalPoly's Irrigation System Evaluation) became widely used within the Ministry of Water Resources.

Irrigation Management Training Courses and Workshops, Nepal. Irrigation Management Project, USAID/Nepal, 1991-1995.

Planned and implemented a series of six irrigation management training courses and workshops in Nepal. Subjects included: organizational aspects of irrigation, irrigation share systems, training methods, applied research methods, irrigation water control and measurement, and irrigation system operation and maintenance. All training courses were field-oriented, focusing on the application of new and appropriate technologies to real problems in the field. CADI staff assisted Government of Nepal officials and farmer leaders to develop training modules and materials, lesson plans, instructor guides, case studies, and training manuals.



Selected Project Experience

CENTRAL, SOUTH, & SOUTHEAST ASIA

Country	Project/TA	Date	Executing Agency	Brief Description
Bangladesh	Eastern Water Supply	1988-1989	USAID	Provided engineering and groundwater strategies for flood management and agricultural production. Tested and calibrated computer irrigation and aquifer models.
China	Improvement of Irrigation Management and Cost Recovery	1988-1989	Ministry of Water Resources and ADB	Evaluated performance of irrigation systems and recommended management improvements and computer software, hardware, and potential computer applications. Provided training on computer-assisted approach to water resources management.
India	Dahod Tank Irrigation System	1984	Madhya Pradesh Irrigation Department and USAID	Interdisciplinary team from Colorado State and Arizona Universities conducted study of the Dahod Tank Irrigation System in Bhopal, Madhya Pradesh in conjunction with the Irrigation Department. Evaluated the performance and identified the strengths and constraints of the irrigation system. Developed a work plan for the Dahod Irrigation System Rehabilitation project.
India	Workplan for Computerization	1987	Maharashtra Irrigation Department and USAID	Prepared programs to computerize department by developing three decision support systems to strengthen O&M of 102 minor irrigation systems.
India	Computer Application Curriculum Development in Irrigation Management	1988	Central Water Commission and USAID	Organized and conducted a workshop on microcomputer applications in water management for officers of the state training institutes. Evaluated the capability of three WALMIs, two universities, one IMTI, and one WALAMTART in five states on their applied microcomputer training courses.
India	Irrigation Data and Project Management	1988	Maharashtra Irrigation Department and USAID	Developed and conducted comprehensive training courses on irrigation data management, engineering analysis, M&E, and project management.
India	Computer Assisted Design and Management Information Systems	1988	Madhya Pradesh Irrigation Department and USAID	Assisted the Government of Madhya Pradesh/Irrigation Department and Bureau of Design for Hydel and Irrigation Projects in the development of an applied computer training program in irrigation design and management.
India	Irrigation Management Information System	1989-1991	Maharashtra Irrigation Department and USAID	Prepared and implemented statewide computerized Irrigation Management Information System (IMIS), the Minor Irrigation Model. Conducted extensive training of local staff.

Country	Project/TA	Date	Executing Agency	Brief Description
India	Conjunctive Use Model Assessment	1990	Maharashtra Irrigation Department and USAID	Reviewed present conjunctive use practices, identified useful computer modeling activities, and developed specifications of the proposed model.
India	Development of Manual for Minor Irrigation Model	1992	Maharashtra Irrigation Department and USAID	Prepared a detailed user manual for the Minor Irrigation Model, including pre-season irrigation planning, in-season water rotations, and post-season system performance evaluation.
India	Training on GIS for Irrigation Management	1992	Maharashtra Irrigation Department and USAID	Developed and conducted training to use GIS to address issues and problems in irrigation management. Prepared instructor's guide and training materials.
Indonesia	Training for Rural Roads Maintenance Systems Project	1994-1996	Ministry of Home Affairs and USAID	Developed training courses, curriculum, and materials, and conducted training in management skills, engineering, computer skills, and M&E. Helped institutionalize training within the Ministry.
Indonesia	Assessment of Options for Sustainable Irrigation Development	1997-1998	Bappenas (Planning Agency) and ADB	Assessed constraints to present O&M policies and institutional activities. Recommended new policies for user groups, O&M cost recovery, and management transfer to user groups.
Indonesia	Improvement in Water Resources Data Management	2000-2002	Ministry of Settlement and Regional Infrastructure and ADB	Established a sustainable national water resources data center using the latest information technologies. Populated data warehouse with tabular and spatial data. Trained staff to operate and maintain data center. Published data on internet for worldwide access.
Indonesia	Local Governance Support Project	2005-2009	Ministry of Home Affairs, several other ministries, and USAID	Providing long- and short-term technical assistance in designing, constructing, and deploying a local government databank to support: (1) the Web-based EMME system for project M&E, and (2) the comparative benchmarking system for tracking local government performance and compare it against similar localities. The project covers seven provinces with over 100 kabupaten/district governments. Visit http://www.lgdatabank.or.id/
Myanmar	Watershed Management Training	1993-1994	Ministry of Forestry and UNDP/FAO	Conducted in-country training in watershed management principles, resource inventory, planning and management, and people's participation.
Myanmar	Landuse Planning and Institutional Strengthening	1994	Ministry of Forestry and UNDP/FAO	Developed action plan for watershed planning in three critical watersheds and designed Ministry's GIS/remote sensing center.
Nepal	Irrigation Management Project	1991-1995	Department of Irrigation and USAID	Established, trained, and strengthened the Irrigation Management Division within the department, focusing on formation of user groups, improved O&M, training, cost recovery, and research.
Nepal	Sustainable Income and Rural Enterprise – Private	1993-1994	Ministry of Water Resources and USAID	Provided recommendations and strategies to promote private sector investment in hydropower development. Assisted in the design of

Country	Project/TA	Date	Executing Agency	Brief Description
	Electrification			USAID/Nepal's Private Electrification Project.
Nepal	Irrigation Management Transfer Project	1996-2000	Department of Irrigation and USAID	Privatized 67,000 ha of government operated irrigation systems, strengthening local users groups to take over all management authority and responsibilities, including O&M, cost recovery, and water management.
Pakistan	PIME Studies Chasma Right Bank Canal Project	2000	Water and Power Development Authority and ADB	Assisted the WAPDA, PCMU NWFP, and Punjab and PIME staff to establish criteria for the selection parameters for the PIME Studies Program based on secondary data and interviews with farmers in Stages I, II and III. Designed the PIME program based on selected parameters developed by various staff members to monitor the development activities in Stages I, II and III.
Pakistan	Pre-feasibility Study for National Surface Drainage Systems	2002	Water and Power Development Authority and World Bank	The concept of National Surface Drainage System (NSDS) envisages an interconnected system of federally owned and operated outfall drains for the entire Indus Basin Irrigation System. Collected relevant data and study soil conditions in the area in relation with drainage requirements and groundwater conditions. Analyzed cropping patterns and drainage requirements in the area in relation with the soil conditions.
Sri Lanka	GIS and Watershed Management Training	1993	UNDP/FAO	Conducted GIS training for watershed planning and management.
Taiwan	Applications of Microcomputers in Soil Conservation and Watershed Management	1991	Council of Agriculture	Introduced microcomputer applications for watershed planning and management, and soil conservation, focusing on advanced GIS use.
Taiwan	Watershed Management and GIS Workshop	1993	Council of Agriculture	Conducted training on the use of GIS in watershed planning and management.
Tajikistan	Farm Privatization Support Project	2001-2002	Ministry of Irrigation and Water Resources and World Bank	Established and developed private WUAs in 18,000 ha of former Soviet collective and state farms. Developed model rules for the WUA federation. Recommended parameters for monitoring and evaluating the performance and efficiency of the WUAs and prescribed a form of monthly reports to be sent to PIU/PMU/MIWR.
Thailand	Integrated Development of Phu Wiang Watershed	1988-1989	Royal Forest Department and UNDP/FAO	Developed microcomputer-based watershed hydrology model integrating meteorological, hydrological, erosion, and landuse data. Trained department staff in practical use of model.

LATIN AMERICA AND THE CARIBBEAN

Country	Project/TA	Date	Executing Agency	Brief Description
El Salvador	Mapping and Monitoring Biomass Resources with Landsat-TM and GIS	1988-1989	Commission Ejecutiva Hidroelectrica del Rio Lempa, Los Alamos National Laboratory, and USAID	Installed ERDAS hardware and software. Provided hands-on ERDAS training. Applied ERDAS to forestry resource mapping.
Jamaica	Environmental Management of Watersheds: Development of Institutional Capabilities	1998	Natural Resources Conservation Authority and UNDP	Revised and updated a draft National Watershed Policy including modifying the Watershed Protection Act (1963). Provided recommendations for the National Watershed Action Plan.
Jamaica	Environmental Management of Watersheds: Development of Institutional Capabilities	1999	Natural Resources Conservation Authority and UNDP	Established a national watershed monitoring program including developing a national watershed database and classifying and ranking all 26 Watershed Management Units.
Peru	Management of Pilot Watershed	1995	PRONAMCHCS and World Bank	Designed the Pilot Watershed Management Program supporting effective natural resource management of three watersheds.

NORTH AFRICA, MIDDLE EAST, AND EASTERN EUROPE

Country	Project/TA	Date	Executing Agency	Brief Description
Armenia, Azerbaijan, and Georgia	Water Management in the South Caucasus	2003-2004	Hydro-meteorological Departments and USAID	Reviewed the national hydromet data management and exchange activities of all three countries. Provided recommendations for better utilization of the national water quantity and quality databases. Made suggestions for development of a sustainable data exchange program in the region.
Armenia, Azerbaijan, and Georgia	Strategic Technical Assistance for Results with Training	2004	Hydro-meteorological Departments and USAID	Provided a 14-day training program in Utah for 12 Hydromet officials from Armenia, Azerbaijan, and Georgia. The goal of the program was to show the participants the U.S. Bureau of Reclamation, the State of Utah, and non-profit private organization activities in water resources data acquisition, management, communication, and sharing with other agencies in Utah and in the Sevier River Basin
Armenia, Azerbaijan, and Georgia	South Caucasus Water Program	2005-2008	Ministry of Nature Protection, Armenia; Ministry of Ecology and	Provided short-term technical assistance to strengthen the capacity of water resources management agencies and develop scientific and analytical capacity and promote use of sound science for management. Specific activities are: (1) developing national water cadastre information

Country	Project/TA	Date	Executing Agency	Brief Description
			Natural Resources, Azerbaijan; Ministry of Environment Protection and Natural Resources, Georgia; and USAID	systems for Azerbaijan and Georgia, (2) designing and constructing water use permitting databases for Azerbaijan and Georgia, and (3) designing, constructing and deploying a on-line, GIS-based water resources information management system for the region (www.scaucasuswater.org)
Armenia	On-line Hydrological and Water Quality Data Sharing	2005	AED and USAID	Designed and conducted a course to strengthen the professional capabilities of the technical staff of the Environmental Impact Monitoring Center, Armenian State Hydro-meteorological and Monitoring Service, and Water Resources Management Agency in hydrological and water quality data/information collection, communication, and on-line sharing with other water resource stakeholders.
Armenia	Program for Institutional and Regulatory Strengthening of Water Management	2005-2008	Ministry of Nature Protection and USAID	Provided short-term technical assistance to: (1) finalize and implement the proposed generic coding system for water resources in Armenia, (2) develop the required spatial data layers for water management, including possible spatial and tabular database integration (geo-referencing), (3) recommend the necessary hardware and software for implementation of the GIS activities, (4) design, construct, and implement the State Water Cadastre Information System, and (5) assist in drafting a Cooperative Agreement among all stakeholder organizations on the agreed design for the State Water Cadastre. Visit http://www.paconsulting.am/water/eng/index.asp
Egypt	Regional Irrigation Improvement Project	1988	Ministry of Public Works and Water Resources and USAID	Cooperated with Egyptian agronomists to evaluate techniques for predicting potential evapotranspiration under Egyptian conditions.
Egypt	Regional Irrigation Improvement Project	1988	Ministry of Public Works and Water Resources and USAID	Characterized and monitored soil salinization and water table encroachment in the Serry command area and the Nile Valley.
Egypt	Regional Irrigation Improvement Project	1988	Ministry of Public Works and Water Resources and USAID	Evaluated alternative methods for characterizing and mapping soil salinity and water table levels through electromagnetic inductance, and interpretation and classification of Landsat-TM digital data in the Nile Valley.
Egypt	West Beheira Settlement Project	1989	Ministry of Agriculture and IFAD	Coordinated rehabilitation of irrigation and drainage systems and village infrastructure. Prepared O&M plan for irrigation and drainage.

Country	Project/TA	Date	Executing Agency	Brief Description
Egypt	Water Policy Bridging Project	2002-2003	Ministry of Water Resources and Irrigation and USAID	Study No.3 – Water Allocation Options. Worked with other consultants on the team to identify feasible options for water allocation and delivery by 2017.
Egypt	Sustainable Development of the Red Sea and Improved Water Resources Management	2004	Ministry of Water Resources and Irrigation and USAID	Assisted in designing, constructing, and implementing an integrated water resources data management/information system in each of the four Integrated Water Resources Districts (South Zifta, Ibrahimia, Luxor, and West Esna).
Egypt	Livelihood and Income from the Environment (LIFE) Integrated Water Resources Management Project	2004-2008	Ministry of Water Resources and Irrigation and USAID	Advised and assisted the in-country TA team, USAID, IWMU and MWRI to design and implement effective water resources database management and digital mapping systems for the five Directorates and 27 corresponding IWMDs. Visit http://www.iwrneg.org/
Egypt	Integrated Water Resources Management II Project	2009 - 2012	Ministry of Water Resources and Irrigation and USAID	The primary objectives of the project are: increased productivity of water resources, increased efficiency of water resources, more equitable allocation of water resources and improved water quality. The main task for CADI is to assist the Ministry of Water Resources and Irrigation establishes information management systems in 45 irrigation districts and eight irrigation directorates for sustainable water resources management in the East Delta. The project covers a total of 2.2 million acres (28% of the irrigable area in Egypt). The information management systems include eight water resources databases and one digital mapping system to support the matching irrigation supply and demand program to meet the project objectives at the district and directorate levels.
Georgia	Irrigation and Drainage Community Development Project	2001	Ministry of Agriculture and Food of Georgia and World Bank	Assisted IDCD PIU to prepare long-term training programs for Amelioration Associations, local trainers, and consultants.
Middle East and North Africa	Regional Water Governance Benchmarking Project	2009-2010	Egypt, Jordan, Morocco, Turkey, Oman, and USAID	The project aims to assess current water governance systems, with particular focus on mechanisms and capabilities to manage available water resources. CADI's specific services are: (1) conducting an internet reconnaissance of regional and national water-related databases and websites for MENA countries; (2) retrieving relevant legal and policy documents from these websites for inclusion in the project document database; (3) preparing a report documenting the results of services 1 and 2, detailing available materials and data, recommending ways to integrate into or link with the ReWaB website and databases, and suggesting complementarities and possible modes

Country	Project/TA	Date	Executing Agency	Brief Description
				of cooperation with ReWaB, (4) creating a project website for displaying project descriptive information and outputs and post content supplied by others; (5) supporting the Arab Water Academy (AWA) in developing their website and create a seamless link with ReWaB document collections and reports; and (6) preparing research reports and technical articles and participate in project conferences and workshops, as appropriate. Visit: http://www.rewab.net
Lebanon	Litani River Basin Management Support Project.	2009 - 2012	Litani River Authority and USAID	The purpose of this project is to set the ground for improved, more efficient and sustainable basin management at the Litani river basin through provision of technical support to the Litani River Authority and implementation of limited small scale infrastructure activities. CADI with its partners will undertake tasks grouped under the following components: (1) Building capacity of LRA towards integrated river basin management, (2) Long term water quantity and quality monitoring of the Litani River, (3) Integrated irrigation management, and (4) Improving Litani River and Qaraoun Dam monitoring system.
Romania	Water User Association Development Project	2002-2004	Ministry of Agriculture, Food, and Forestry and USAID	Provided short-term technical assistance to the Ministry of Agriculture, Food & Forestry related to strengthening the role of WUAs in irrigation management and facilitating the market-driven rehabilitation of Romania's irrigation system. Developed a WUA information management system to monitor and evaluate the WUA formation and their performance.
Turkey	Watershed Monitoring and Evaluation Training	1998	Ministry of Forestry and World Bank	Conducted training in watershed M&E for government officials from Turkey's Eastern Anatolia Watershed Rehabilitation Project.

USA

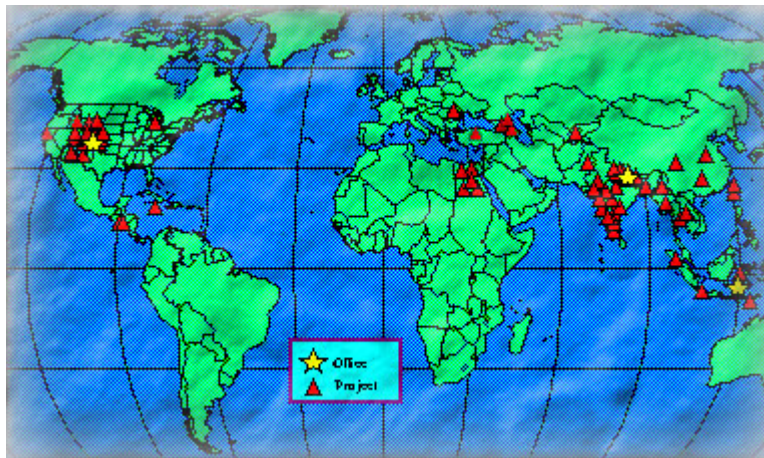
State	Project/TA	Date	Executing Agency	Brief Description
Arizona	Forest Landscape Analysis and Design	1993	USDA; Forest Service	Developed ecosystem framework for planning and designing projects for the West Clear Creek Watershed (190,000 acres), including producing maps and tabular data.
Colorado	Microcomputer Applications in Irrigation Data and Project Management	1987-1992	Colorado State University	Designed and conducted training to develop computer skills of irrigation professionals in irrigation data management and project management.

State	Project/TA	Date	Executing Agency	Brief Description
Colorado	Watershed, Soil Conservation, and Planning for Developing Countries Using Microcomputers	1988-1992	Colorado State University	Coordinated and conducted workshops providing basic training in watershed and soil conservation survey, planning, and M&E to technical officers from developing countries, with special focus on microcomputer applications.
Colorado	Remote Sensing, Image Processing, and GIS: Principles and Natural Resource Applications	1988	Hidroelectrica del Rio Lempa (El Salvador) and USAID	Provided training on the background, principles, and use of remote sensing and raster-based GIS, including providing hands-on experience using all modules of ERDAS system.
Colorado	Soil Resource Inventory	1989-1991	USDA; Forest Service	Mapped, classified, and described soils and vegetation within 325,000 acres in Arapahoe and Roosevelt National Forests.
Colorado	Local Area Network	1991-1992	Ministry of Public Works and Water Resources (Egypt)	Conducted professional development workshops on computer network operation and maintenance for Egyptian government officials. North
Colorado	Design and Development of Denver Water's Hydrological Database Management System	1993-1995	Denver Water Department	Designed and developed a geo-referenced relational database for storing water resources data for the past 45 years to be used for water resource planning and management.
Colorado	Conservation Guide on Computer Assisted Watershed Planning and Management	1994-1995	UNDP/FAO	Prepared FAO Conservation Guide 28/1 – "Computer Assisted Watershed Planning and Management: Technologies for National Planning."
Colorado	Assessment of Benefits and Costs of Pressurized Dual Water Systems in Colorado	2001-2002	Colorado State University; U.S. Bureau of Reclamation	Identified a step-by-step low risk method of entry by traditional agricultural water suppliers into pressurized secondary water supply service for outdoor landscaping use in unincorporated areas.
Colorado	Improvement in Irrigation Information Management Project	2003	Grand Valley Irrigation Company	Assisted the GVIC staff with: (1) procuring and installing specific software and hardware for the new system; (2) building a company-wide geo-referenced database via tabular (CIIS-Rimroc) and spatial (Mesa County parcels) data integration; and (3) linking each headgate to the county parcel(s) within the GVIC service area. Trained the GVIC staff to: (1) operate and maintain the system, and (2) utilize the system to make better water management decisions.
Michigan	Information Strategy Plan	1996	Michigan Department of Natural Resources	Developed information strategy plan in ecosystem management, landscape planning for biodiversity conservation, and forest management.

State	Project/TA	Date	Executing Agency	Brief Description
New Mexico	Project GIS Readiness and Action Plan	1994	USDA; Forest Service	Provided software and hardware alternatives to Forest Service for developing database access and GIS capabilities.
Utah	GIS Training in Forest Management	1993	USDA; Forest Service	Developed materials and conducted training in the use of the GRID component of ArcInfo for building forest resource models.
Utah	ADP (UNIX) Equipment and GIS Software	1993	USDA; Forest Service	Provided UNIX workstations and GIS software for running GIS applications.
Utah	Improvement in Irrigation Information Management Project	2003	Strawberry Water User Association	Assisted the SWUA staff: (1) building an association-wide geo-referenced database via tabular and spatial data integration; (2) implementing a mechanism to automatically compare county parcel layer with the SWUA water parcel layer, and detect and highlight changes; and (3) developing the ability to access information via a single entry point to allow SWUA to gain new insights and make significantly better decisions.
Wyoming	Soil Survey Inventory	1989-1991	USDA; Forest Service	Mapped, classified, and described soils and vegetation within 290,000 acres of Shoshone National Forest.
Wyoming	Forest Planning Temporal-Spatial Optimization Analysis System Development	1994-1995	USDA; Forest Service	Developed and tested new analysis systems that integrate GIS, GIS-based models, and optimization systems to support forest ecosystem planning and management.

Clients

During our 23-year history we have successfully completed over 100 contracts/technical assignments in Central, South, and Southeast Asia, Eastern Europe, the Middle East, North Africa, Latin America, the Caribbean, and the United States. Our projects have been funded by the following institutions worldwide:



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