

PJ-AAZ-351

ISN 54895

21

WATER MANAGEMENT SYNTHESIS PROJECT

END-OF-PROJECT SEMINAR

10:00 A.M. - 12:00 noon

2 March, 1988

Executive Conference Room - 5951 New State

Washington, D. C.

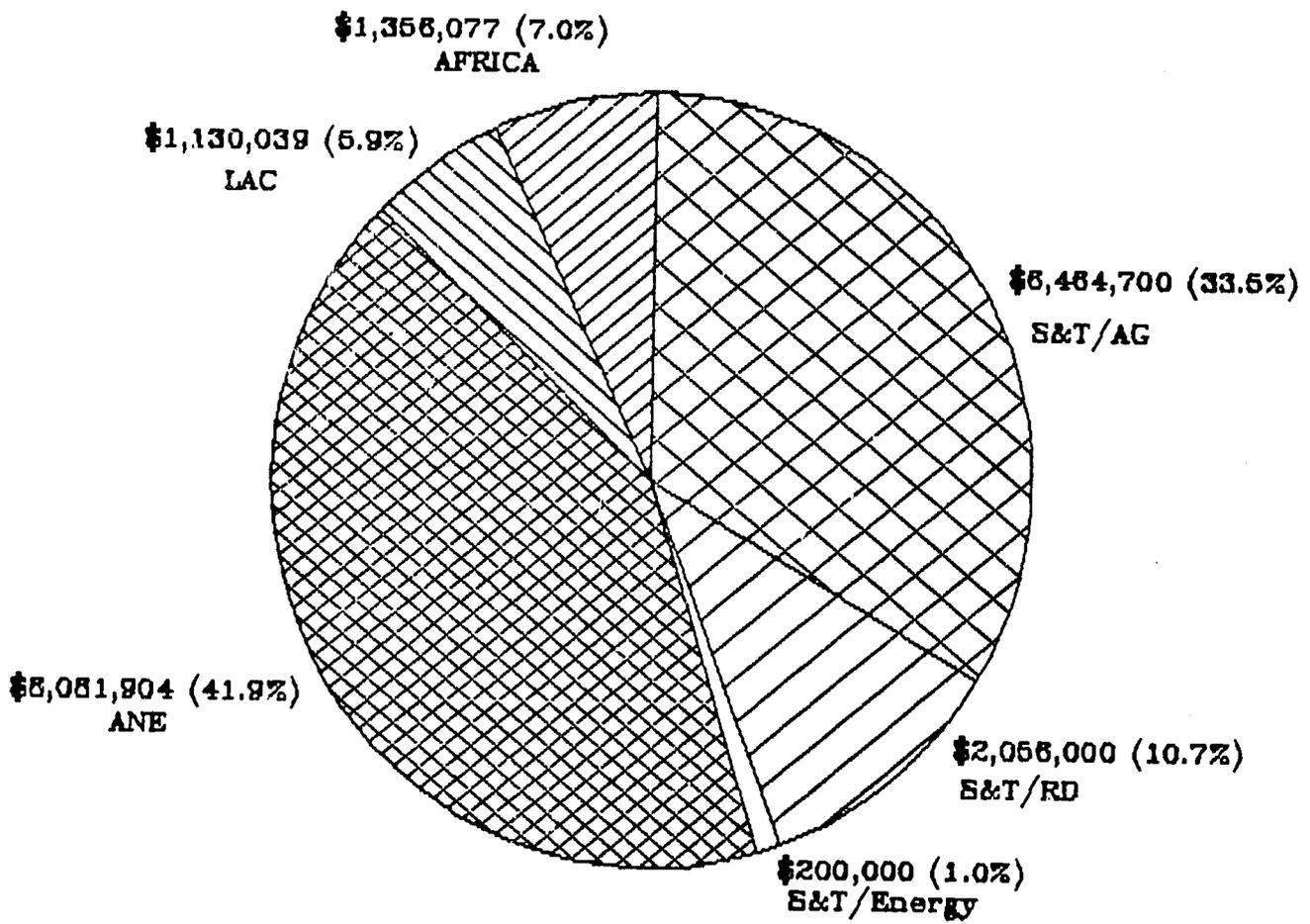
**Source and Level of Funding for  
Water Management Synthesis II Contract: (DAN-2086-00)**

Sources	Core	Buy-in	Total
S&T - Office of Agric.	\$6,464,700		\$6,464,700
S&T - Office of Rural Dev.	\$2,056,000		\$2,056,000
S&T Energy Office	\$200,000		\$200,000
ANE Bureau/Missions	\$4,670,493	\$3,505,370	\$8,081,904
LAC Bureau/Missions		\$1,130,039	\$1,130,039
AFRICA Bureau/Missions	\$800,000	\$556,077	\$1,356,077
<b>Total</b>	<b>\$14,016,193</b>	<b>\$5,391,486</b>	<b>\$19,486,142</b>

**WMSII Authorization by Type and Location**

	ANE	AFRICA	LAC	World Wide	Total
TA	\$3,673,870	\$752,873	\$1,289,754	\$62,007	\$5,778,504
TR & TT	\$2,996,144	\$168,972	\$489,741	\$1,679,710	\$5,334,567
SS	\$1,945,925	\$1,253,823		\$700,523	\$3,900,271
Admin. & Sup				\$4,481,988	\$4,481,988
<b>Total</b>	<b>\$8,615,939</b>	<b>\$2,175,668</b>	<b>\$1,779,495</b>	<b>\$6,924,228</b>	<b>\$19,495,330</b>

### WMSII Sources of Funds



## Water Management Synthesis II

### Purpose

"To develop and disseminate more efficient water management technologies and practices to increase agricultural production and rural equity."

To accomplish this purpose,

the issues of irrigated agriculture

had to be dealt with as an

inter-related set of socio-technical issues.

# WMSII Approach to Irrigated Agriculture

(When Issues Viewed as  
A Set of Socio-Technical Issues)

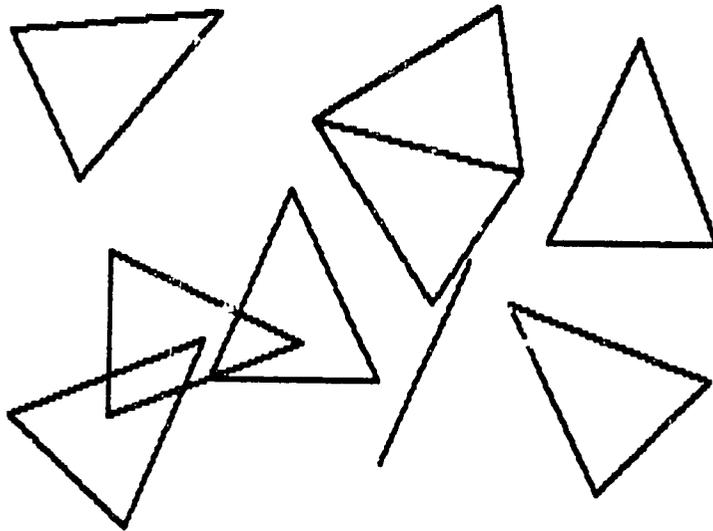
Problems and Opportunities Should Ideally be Identified by

.....  
: An Inter-disciplinary Team :  
.....

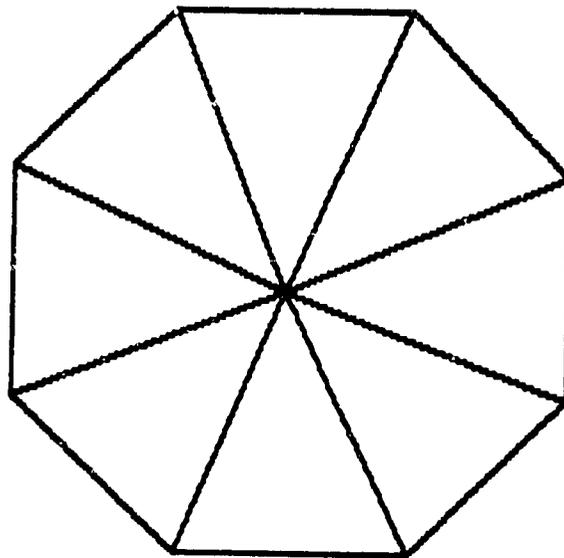
.....  
: Composed of Host Country & Expatriate :  
: Irrigation Professionals :  
.....

.....  
: With Much of the Work Done at the Field Level :  
.....

A Joint Inter-disciplinary Team -  
Working at the Field Level



Synthesis: "A process of combining the parts or elements – into a whole."



Synthesis: Is also the result of the synthesis process which is characterized by a set of inter-related concepts

Concepts are ideas that help us:  
recognize and organize relevant facts,  
understand what has happened  
and assist us in predicting what will happen  
under related, but different circumstances.

As the result of using the synthesis process,  
WMSII has developed evolving sets of inter-related concepts  
that can help decision makers make better decisions  
about improving the performance of irrigated agriculture.

The effectiveness of these evolving concepts depend on the needs of the particular decision makers.

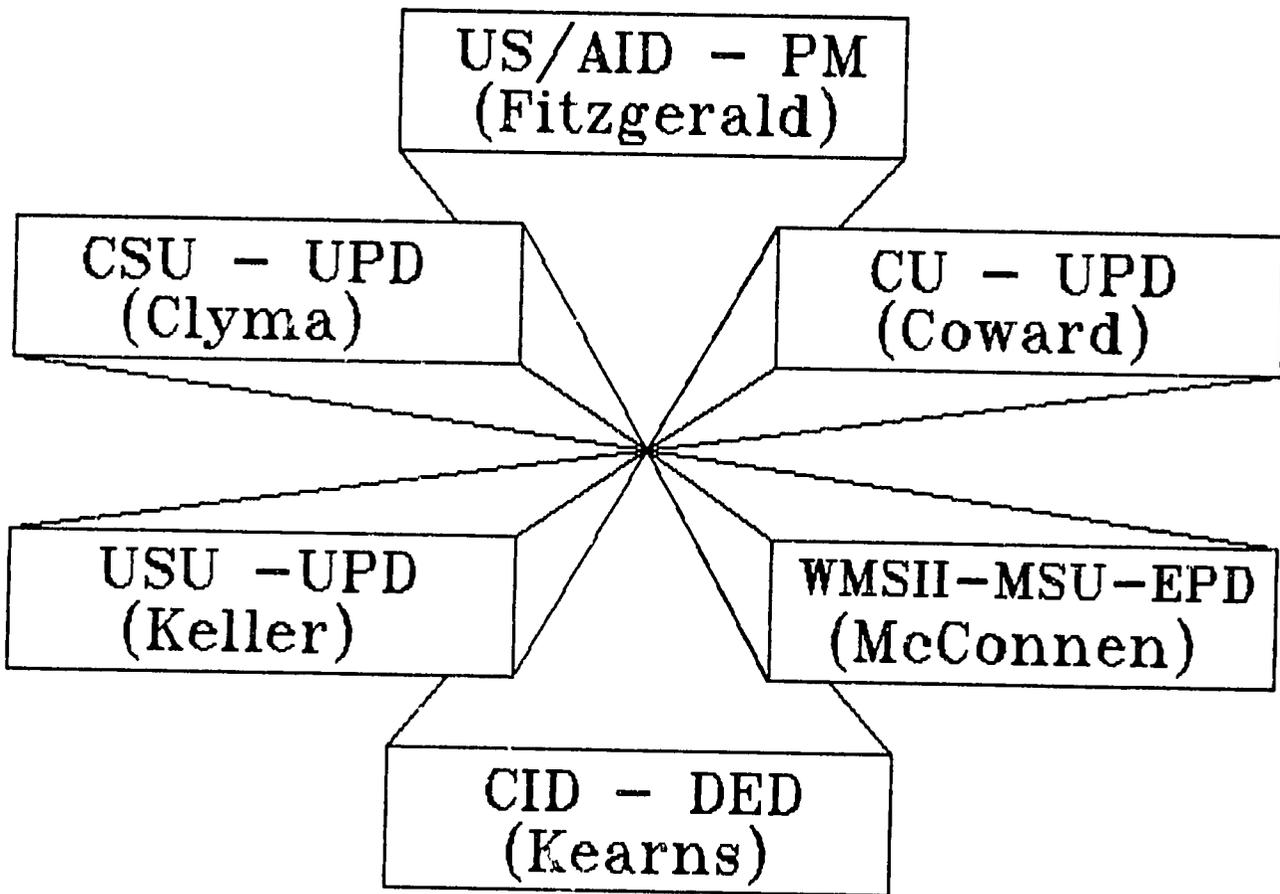
Different decision makers have different needs.

e. g.

1. Farmers
2. Farmer Organization
3. Irrigation Agency Officials
4. Ministry of Agricultural Officials
5. Ministry of Finance Officials
6. Donor Agency Officials

After presenting some information on the type and location of WMSII Activities, we'll present an inter-related set of concepts we think can be of help to Donor Agency Officials as they make decisions about irrigated agriculture.

Water Management Synthesis II  
Joint Project Management Team  
(JPMT)



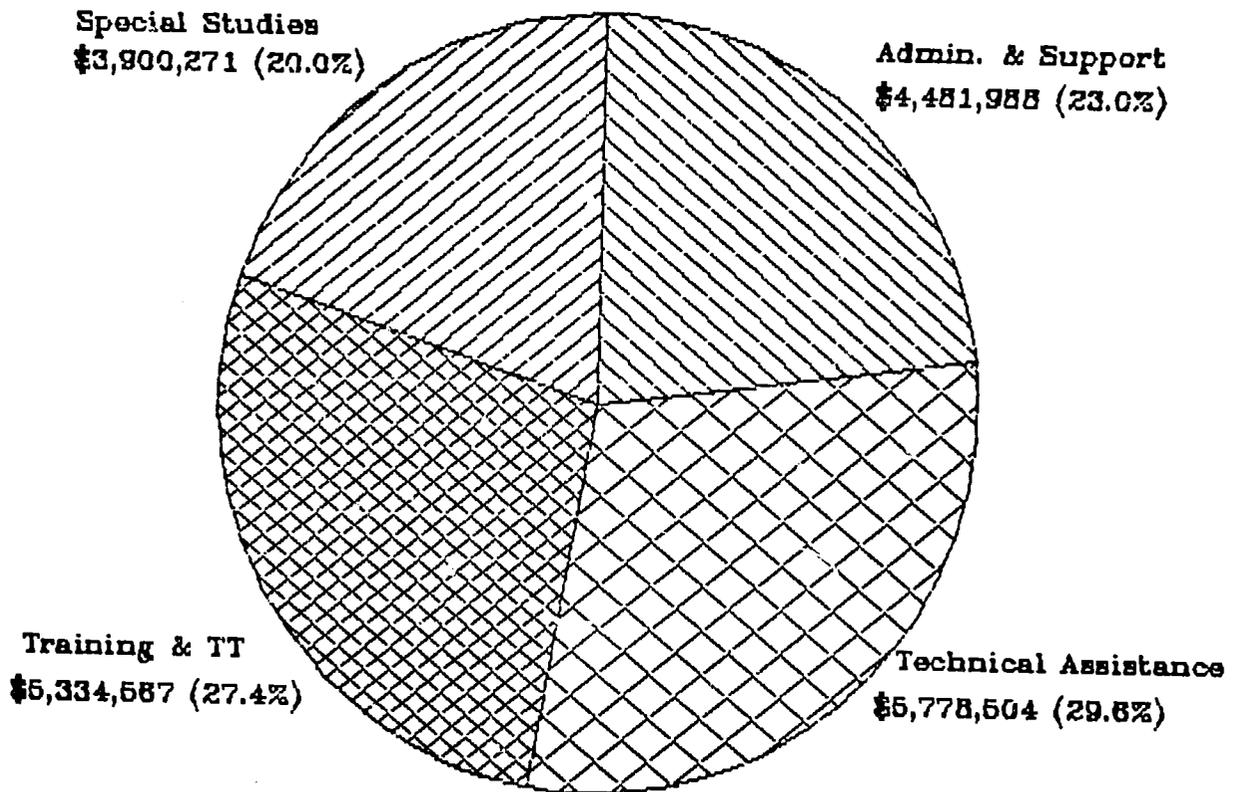
## WMSII Types of Activities

1. Technical Assistance (TA)
2. Training and Technology Transfer (TR&TT)
3. Special Studies (SS)
0. Administration and Support

Prior to implementing an Activity, A SOW had to be approved and a level of expenditure authorized.

Each Activity had many of the attributes of a separate contract between CID and US/AID.

### WMSII Authorization by Type of Activity



## Location of WMSII Activities

Activities are located in :

a) the Africa Bureau

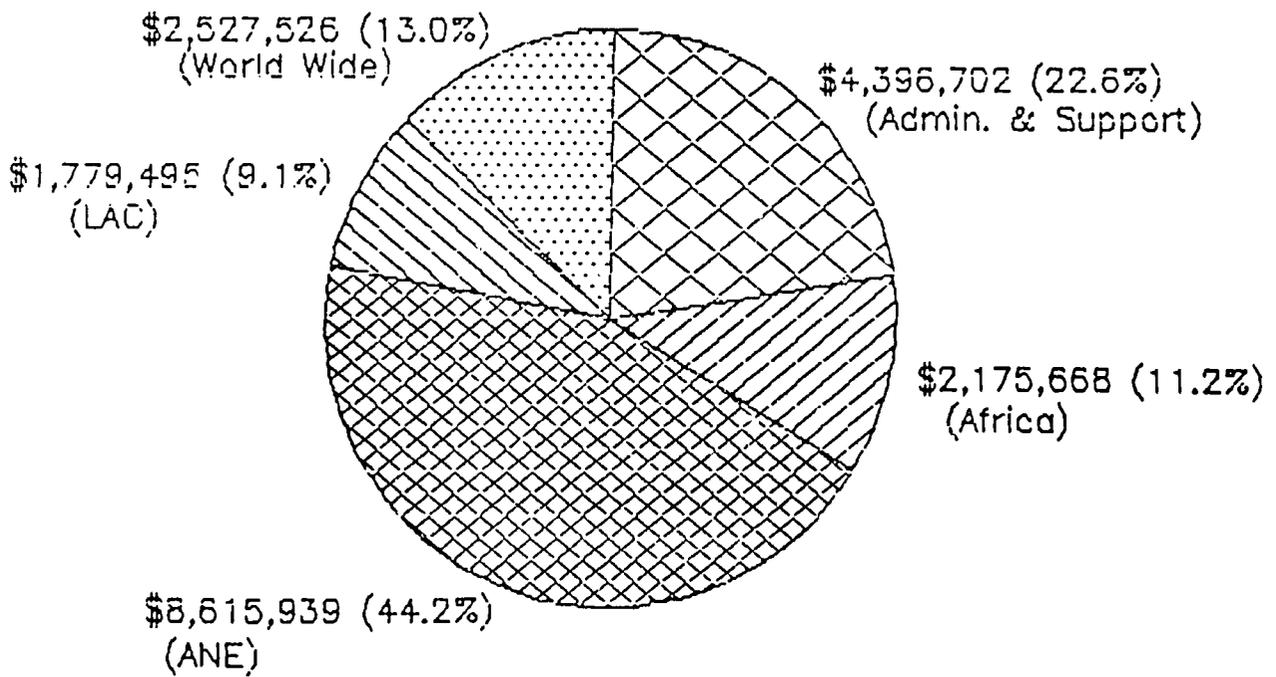
b) the ANE Bureau

c) the LAC Bureau

and

d) World Wide

## WMSII Expenditure Authorizations





## WMSII Expenditure Authorization for ANE

COUNTRY	\$	COUNTRY	\$
BANGLADESH	489,445	NEPAL	377,463
BURMA	4,359	PAKISTAN	1,584,372
CHINA	2,817	SRI LANKA	1,579,150
EGYPT	239,842	THAILAND	422,953
INDIA	1,842,355	TUNISIA	32,992
INDONESIA	440,657	ANEWIDE	1,397,445
JORDAN	59,299	TOTAL ANE	8,615,839
MOROCCO	183,190		



# WMSII Expenditure Authorization for LAC



COUNTRY	\$
BOLIVIA	28,187
DOMINICAN REP.	135,308
ECUADOR	366,087
EL SALVADOR	284,278
GUATEMALA	23,252
HAITI	95,114
HONDURAS	7,929
PARAQUAY	6,718
PERU	760,409
LAC WIDE	89,215
TOTAL LAC	1,779,495

## WMSII ACCOMPLISHMENTS - SELECTED ITEMS

<b>A. Direct Field Support</b>	
1. Irrigation Overviews and Sector Reviews	14
2. PP's, PID's & Feasibility Studies	13
3. DA Workshops	12
4. Joint Field Studies	3
5. Special Purpose TA's	22
6. Evaluations	4
<b>B. Special Studies</b>	27
<b>C. Training Programs</b>	28

## **WMSII - Evolving Concepts**

**Concepts designed to enhance the effectiveness of Donor Agency Officials who view irrigated agriculture as an inter-related set of socio-technical issues.**

**1) Meaningful Farmer Participation**

**2) Small Scale Irrigation  
(Locally Managable Systems)**

**3) Organizational and Hydraulic Interfacing**

**4) Main Systems Management**

**5) Identifying Constraints and Opportunities**

**6) Education and Training for:**  
**a. senior officials**  
**b. irrigational professionals**  
**c. farmers**

**7) Coordination Among Management Entities**

**CORNELL TA, TRAINING, AND SPECIAL STUDY ACTIVITIES ARE INTERRELATED.  
THEY SUPPORT ONE ANOTHER**

**A.**

**TECHNICAL ASSISTANCE** activities alert teams to key issues, suggest solutions

to widespread problems, provide comparative examples.

Expatriate teams, AID mission staff, host country professionals

learn new ideas and methods.

**B.**

**SHARING IDEAS AND INFORMATION** sharpens tools for problem identification,

analysis, and solving. Conferences encourage network formation

and improve publications.

**C.**

**STUDIES AND ANALYSES OF KEY IRRIGATION ISSUES** identify factors affecting

system performance, constraints to irrigation development; provide

methodologies for project design and evaluation.

## COLLABORATION

1. Host country colleagues
2. WMSII Universities
  - CU
  - CSU
  - USU
3. Other irrigation professionals
  - Other US Universities
  - US consulting firms
  - US - individuals
  - International

## SHARING IDEAS AND INFORMATION

### Selected Examples

#### INTERNATIONAL CONFERENCES

Research – Irrigation Management – Asia  
Africa Irrigation Forum – Nairobi  
Forum on Irrigation Research and Applications  
Rehabilitation Conference  
Consultation on Water Pricing – Rome (w/FAO)  
Consultation on Farmer Participation

#### WORKSHOPS ON SPECIAL THEMES

Small Scale Irrigation  
Farmer Participation in Water Management  
Improving Performance of Irrigation Bureaucracies  
Triads Synthesis – Small Scale  
Water Management in Nepal  
Planning Policies/Strategies – Irrigated  
Agriculture – Morocco  
Irrigation – High Value Crops – Santo Domingo

#### TRAINING MATERIALS AND PUBLICATIONS

Professional Papers	Computer Simulations
WMS Reports	Technical Reports
WMS Working Papers	Video Modules
Conference Papers	

**ANALYSIS OF KEY IRRIGATION ISSUES (SPECIAL STUDIES)**  
**Emphasis at Cornell**

**Development strategies for small-scale irrigation**

**Farmer participation in water management**

**Managment intensities and system performance**

**Employment, labor demand, and local resource mobilization**

**Direct and indirect investment strategies**

**Meeting recurrent costs of system operation and maintenance**

**Wetlands development**

## **WATER MANAGEMENT SYNTHESIS II: CORNELL**

### **OBJECTIVES:**

- 1. IMPROVED PUBLIC POLICIES AND PROGRAMS FOR SMALL-SCALE IRRIGATION DEVELOPMENT**
- 2. APPROPRIATE BALANCE OF LOCAL AND AGENCY RESPONSIBILITIES AND ROLES IN IRRIGATION DEVELOPMENT AND SYSTEM MANAGEMENT**
- 3. EXPAND KNOWLEDGE BASE FOR COMMUNITY AND GOVERNMENT ASSISTED SMALL-SCALE IRRIGATION.**
- 4. BUILD CAPACITY OF THIRD WORLD AND U.S. PROFESSIONALS TO STUDY WATER MANAGEMENT ISSUES.**

**TO IMPROVE IRRIGATION POLICIES AND PROGRAMS, WE HAVE FOCUSED  
ON THE FOLLOWING ELEMENTS OF IRRIGATION DEVELOPMENT STRATEGIES**

- 1. PROJECT PLANNING**
- 2. IRRIGATION SYSTEM DESIGN**
- 3. STRENGTHENING PARTICIPATION AND LOCAL  
MANAGEMENT CAPACITY**
- 4. IMPROVING AGENCY PERFORMANCE**

**RECOMMENDATIONS AND GUIDELINES FOR  
IMPROVING PERFORMANCE AND COORDINATION:**

- 1. EXPATRIATE TEAMS**
  
- 2. HOST COUNTRY IRRIGATION BUREAUCRACIES**
  
- 3. HOST COUNTRY RESEARCH AND TRAINING INSTITUTIONS  
AND**
  
- 4. LOCAL IRRIGATION ORGANIZATIONS**

## SMALL SCALE IRRIGATION SYNTHESIS

### FINDINGS

- 1) Locally managed irrigation (which government agency does not control) is an important sector in many countries
- 2) Many governmental programs to "modernize" and improve are overlays on existing locally managed systems.
- 3) Constraints to successful irrigation development programs:
  - a) Limited agency capacity to design appropriate physical structures,
  - b) Ineffective agency policies and procedures for interacting with system users,
  - c) Ineffective institutional arrangements for joint project planning and implementation,
  - d) Agency procedures that discourage mobilization of local resources and increase agency capital and O&M costs.

**SMALL SCALE IRRIGATION SYNTHESIS  
RECOMMENDATIONS**

**Donor-assisted projects for irrigation development:**

- a) **Improve agency design skills and procedures –  
Small scale does not mean simple design.**
  
- b) **Re-orient agency away from technically  
dominated construction perspective to a  
service orientation – assisting local groups  
to develop, operate and maintain systems.**
  
- c) **Emphasize investment policies that will make  
it clear who will pay for what and relate  
schedule to control and responsibility.**
  
- d) **Build local institutional capacity  
to govern small systems through  
associations, irrigation cooperatives and  
local government – with budget and staffing  
needed to implement policies.**

## AGENDA FOR THE FUTURE – UNFINISHED BUSINESS

- 1) Increase host country capacity – both institutional and individual– to generate and disseminate new knowledge regarding irrigation policies, technologies, economics and institutions.

Many countries with significant irrigated agriculture sectors have very weak analytical capabilities.

- 2) At U. S. universities. there is the "unfinished business" of training and educating the next generation of irrigation development professionals – both US and foreign – to tackle emerging issues.

**IMPROVING THE MANAGEMENT OF IRRIGATED  
AGRICULTURE – CSU**

**Joint Field Study – Zimbabwe**

**Computer Assisted Management**

**Design and Management**

**Data and Project Management**

**Satellite Mapping**

**Level Basin Design for Farmer Management**

**Monitoring and Evaluation for**

**Main Systems Managers**

# **IDENTIFYING CONSTRAINTS AND OPPORTUNITIES**

## **ALTERNATIVE STRATEGIES**

**Sector Reviews**

**Project Designs**

**PID's**

**Joint Field Studies**

**Diagnostic Analysis**

**Diagnostic Synthesis**

## DEFINITION/PURPOSES

DIAGNOSTIC ANALYSIS - Enhance the understanding of irrigation systems to improve management

### PURPOSES OF DA

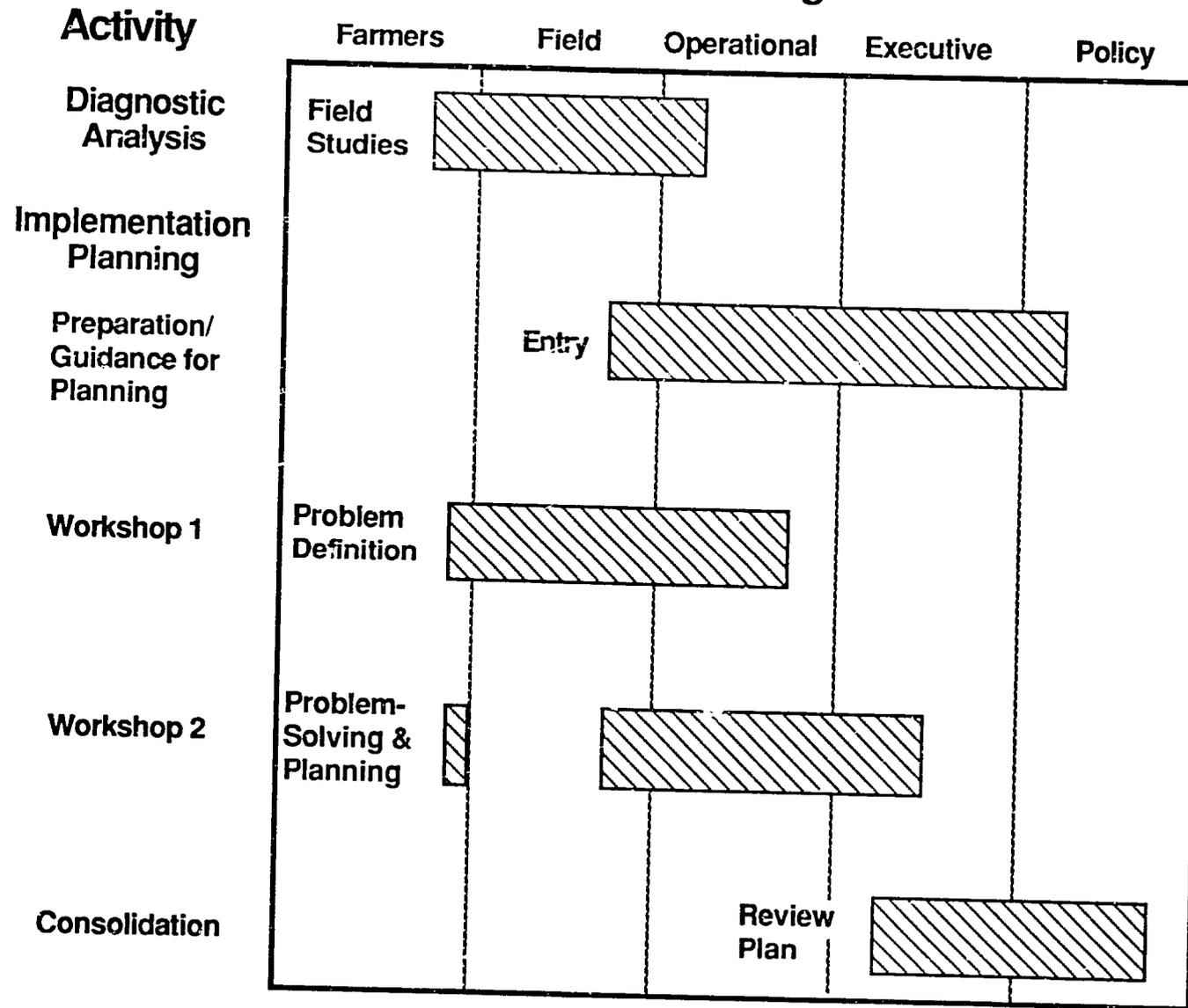
Training - improve disciplinary and interdisciplinary knowledge, skills and attitudes

Knowledge - Understand irrigation system performance to improve management

## TRAINING/KNOWLEDGE

- To understand and apply disciplinary and interdisciplinary skill
- To improve disciplinary and interdisciplinary knowledge and understanding about a specific system
- To increase knowledge about disciplines and management entities involved in irrigated agriculture
- To understand priority problems of irrigated agriculture and the causes of the problems
- To change attitudes about irrigated agriculture through improved understanding

# Levels of Provincial Organization



## **ORGANIZATIONAL AND HYDRAULIC INTERFACING**

**Four studies – four countries**

**Sri Lanka**

**Thailand**

**Pakistan**

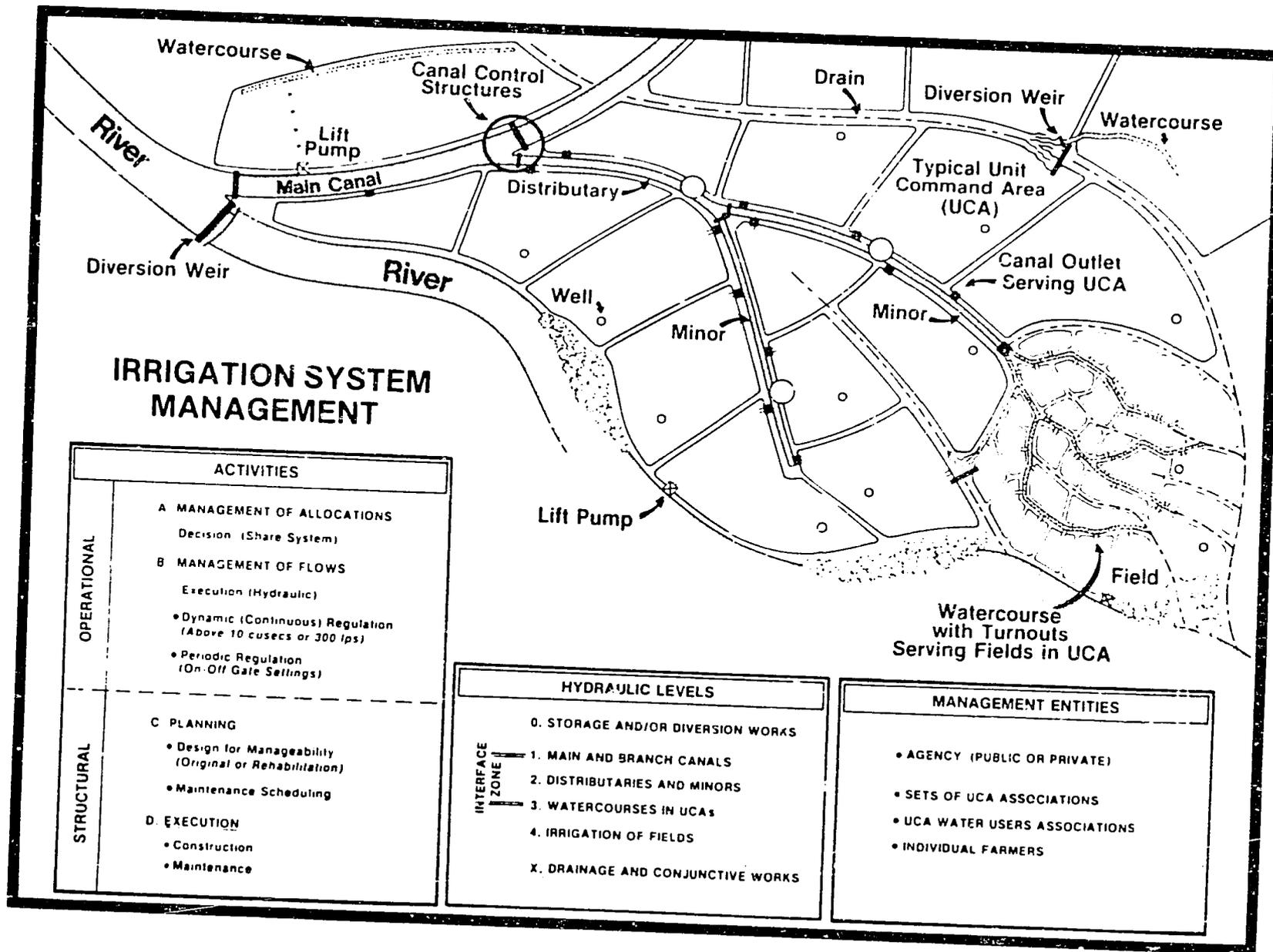
**India**

**Local farmer organizations can interface  
between main system managers and farmers**

**Interfacing approaches/constraints**

**Interfacing enhancement of farmer management**

**Design of interfaces**



A CONCEPTUAL FRAMEWORK FOR DESIGNING IRRIGATION MANAGEMENT

## WATER MANAGEMENT SYNTHESIS II AT UTAH STATE UNIVERSITY

### FOCUS:

- o Improving the management of flows in large-scale irrigation systems
- o Better strategies for anticipating the collective water demands of farms
- o Cost effective pragmatic rehabilitation and maintenance to improve irrigation performance and sustainability
- o More meaningful interdisciplinary dialogue, especially between engineers and sociologists
- o Synthesizing lessons learned and expanding the capacity to transfer water management concepts
- o Building a basis for the appropriate selection of irrigation practices and technologies.

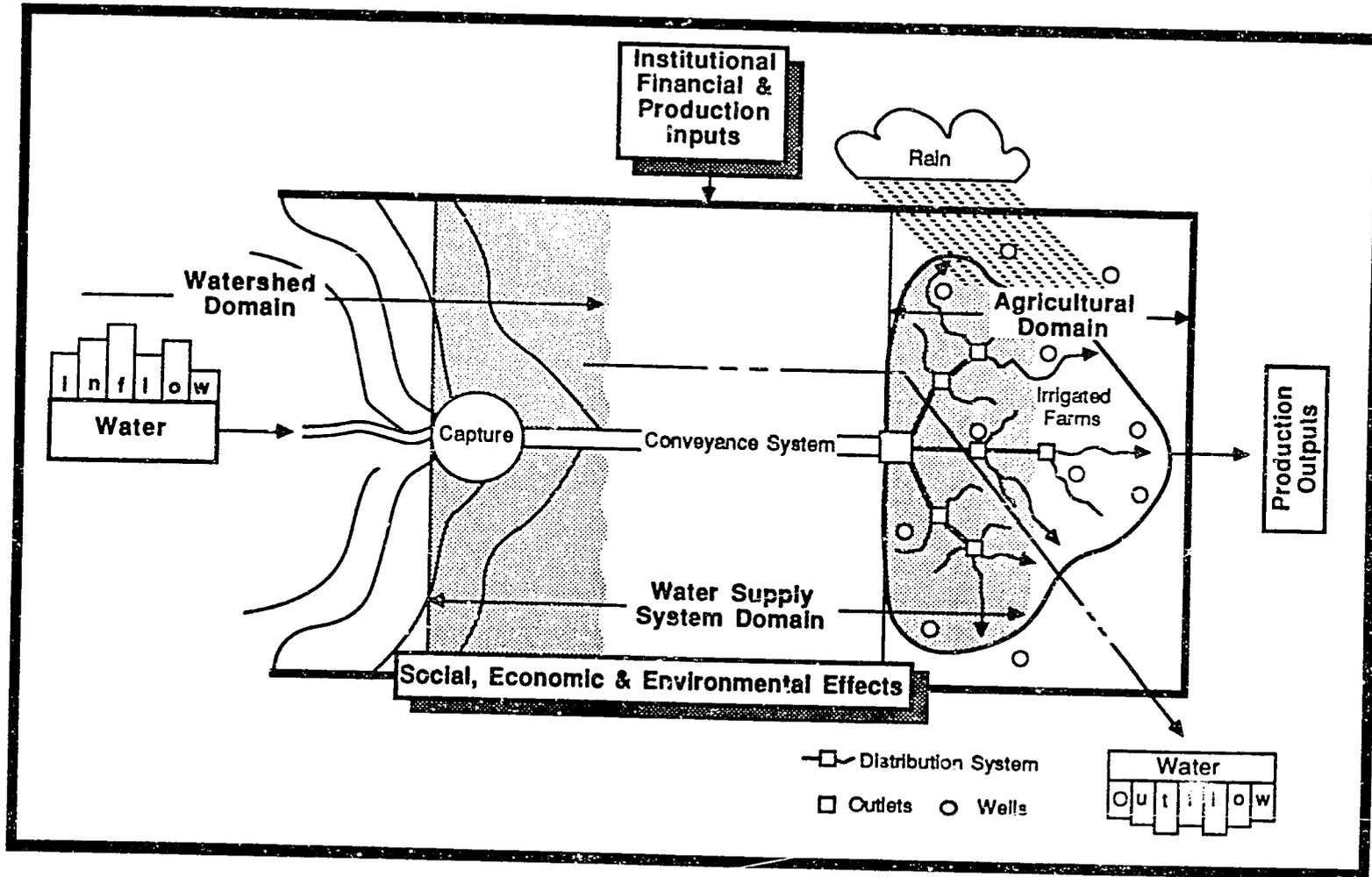
A MAJOR WMS II SYNTHESIZING EFFORT HAS BEEN  
TO INTEGRATE THE EVOLVING SET OF CONCEPTS  
FOR IMPROVING IRRIGATION SYSTEM MANAGEMENT  
OF LARGE-SCALE SYSTEMS

Improving the economic, financial and social  
effectiveness of investments in irrigation requires:

- o Improving agricultural productivity
- o Maximizing positive and minimizing adverse  
social, economic and environmental effects
- o Optimizing institutional, financial and  
production inputs

## IMPROVEMENT BEGINS AT THE SECTOR LEVEL

- o By making the decision to allocate the needed resources for irrigation development
- o Once that decision has been made, the emphasis shifts to the SCHEME LEVEL, which has three domains:
  - o the WATERSHED DOMAIN
  - o the WATER SUPPLY DOMAIN
  - o the AGRICULTURAL DOMAIN.
- o WMS II has focussed on the WATER SUPPLY and AGRICULTURAL Domains, with emphasis on IRRIGATION SYSTEM MANAGEMENT (ISM)



CONTEXT FOR IRRIGATION SYSTEM MANAGEMENT  
WITHIN THE DOMAINS OF AN IRRIGATION SCHEME

USU Public Domain  
October - 1988

169

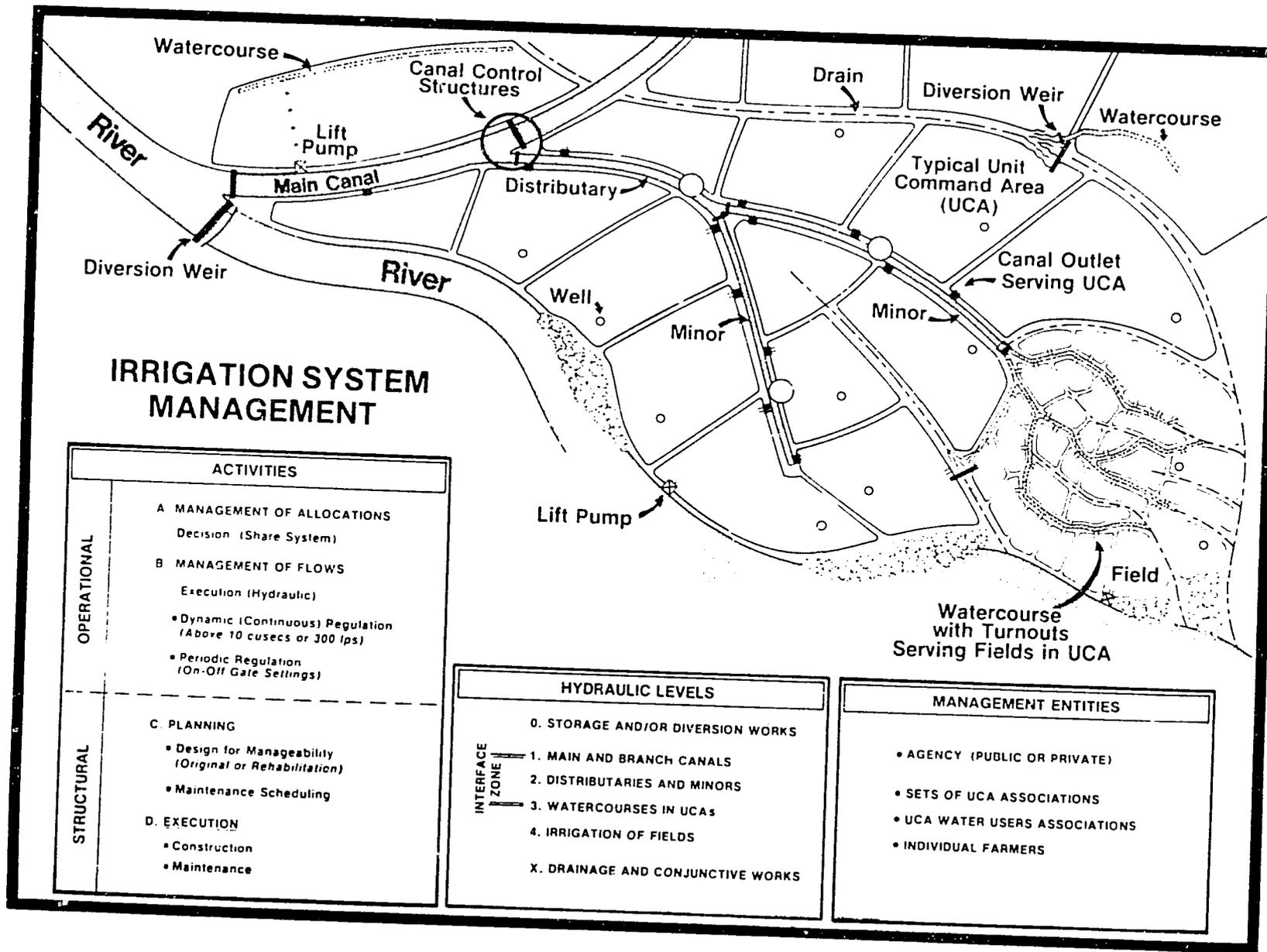
THE GOALS OF IMPROVING ISM ARE:

- o To enhance and more equitably distribute the benefits from irrigation development
- o To increase the productivity of the water and agricultural resources.

NEW CONCEPTS DEVELOPED FOR IMPROVING ISM  
RESULTED FROM TWO LEVELS OF SYNTHESIS:

- I. Special Study activities designed to synthesize relevant material from TA Training and Research for 4 important aspects of ISM:
  - o Hydraulic System Management
  - o Farmer Participation
  - o Organizational and Hydraulic Interfacing
  - o Management Intensities.
- II. A special Synthesis activity designed to integrate these 4 Special Study activities to create a -

NEW CONCEPTUAL FRAMEWORK FOR ISM



A CONCEPTUAL FRAMEWORK FOR DESIGNING IRRIGATION MANAGEMENT

13

LINKING THE SPECIAL STUDY OUTPUTS  
USING THE CONCEPTUAL ISM FRAMEWORK  
PROVIDES A BASIS FOR ANALYTICAL INTERACTION  
BETWEEN DISCIPLINES--FOR EXAMPLE:

- o There is tension in ISM - Engineers contend that water must be controlled from the top, because it flows down;
- o And sociologists stress the need for scheduling deliveries from the bottom if water is to be put to optimal use by the farmers.
- o To select the most effective institutional and hydraulic interfaces requires determining the relative B/C for different scenarios.

...IN THE BEGINNING THERE WAS A NEED TO IMPROVE IRRIGATION PERFORMANCE, WHICH WE BELIEVE MUST BE APPROACHED BY INTERDISCIPLINARY STUDY.

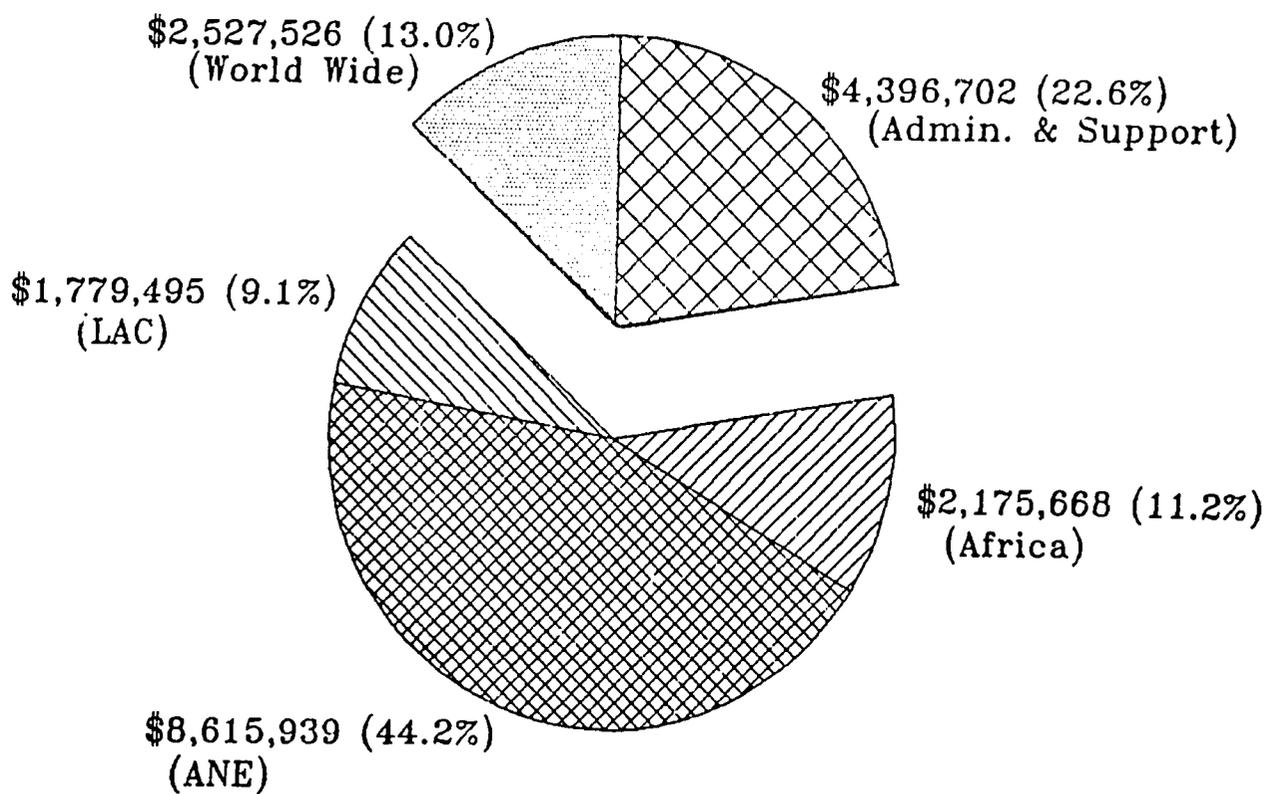
- o Technical Assistance and Research provided information and experience
- o Training and Networking increased the human resources
- o Special Studies synthesized and codified the concepts
- o Synthesis Activities integrated the evolving concepts
- o Technology Transfer disseminated our findings.

24

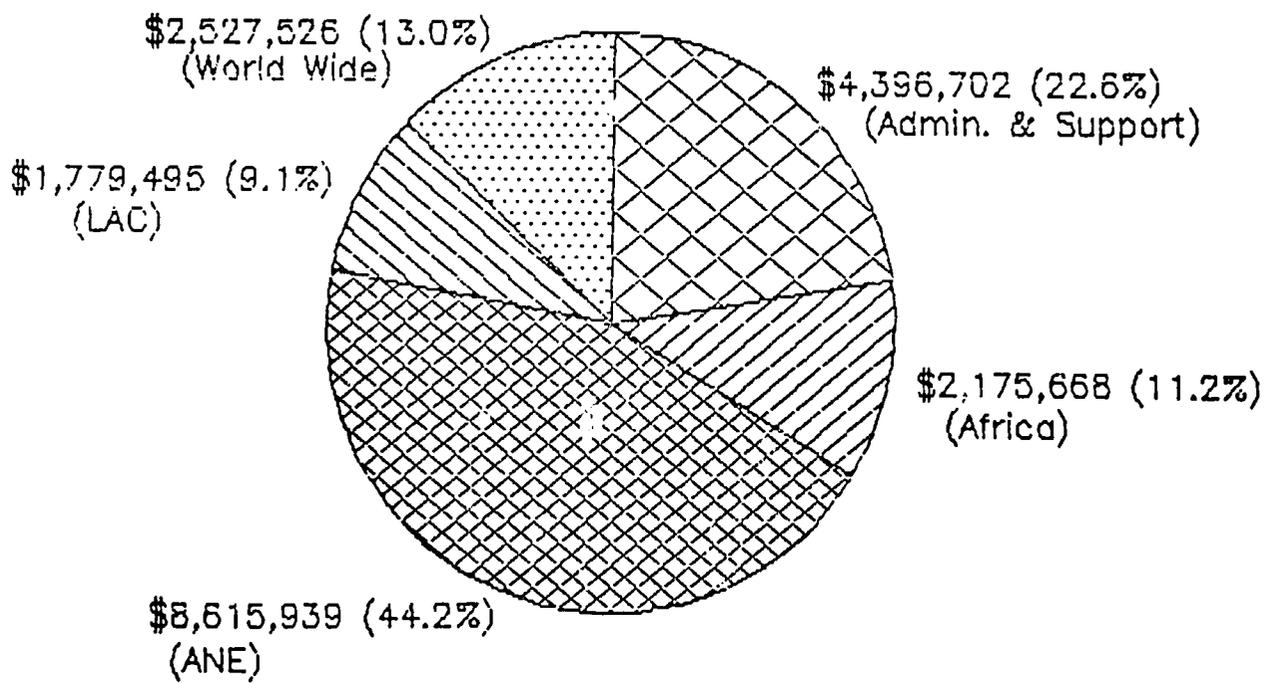
Number of WMSII Activities by Type and Location

Type	Total #	Africa	ANE	LAC	World Wide	Admin. & Sup.
Tech. Asst.	102	12	67	18	5	
Training & TT	97	5	38	8	46	
Special Studies	48	31	21	0	14	
Admin. & Support	28					
Total	273 272	30	126	28	65	28

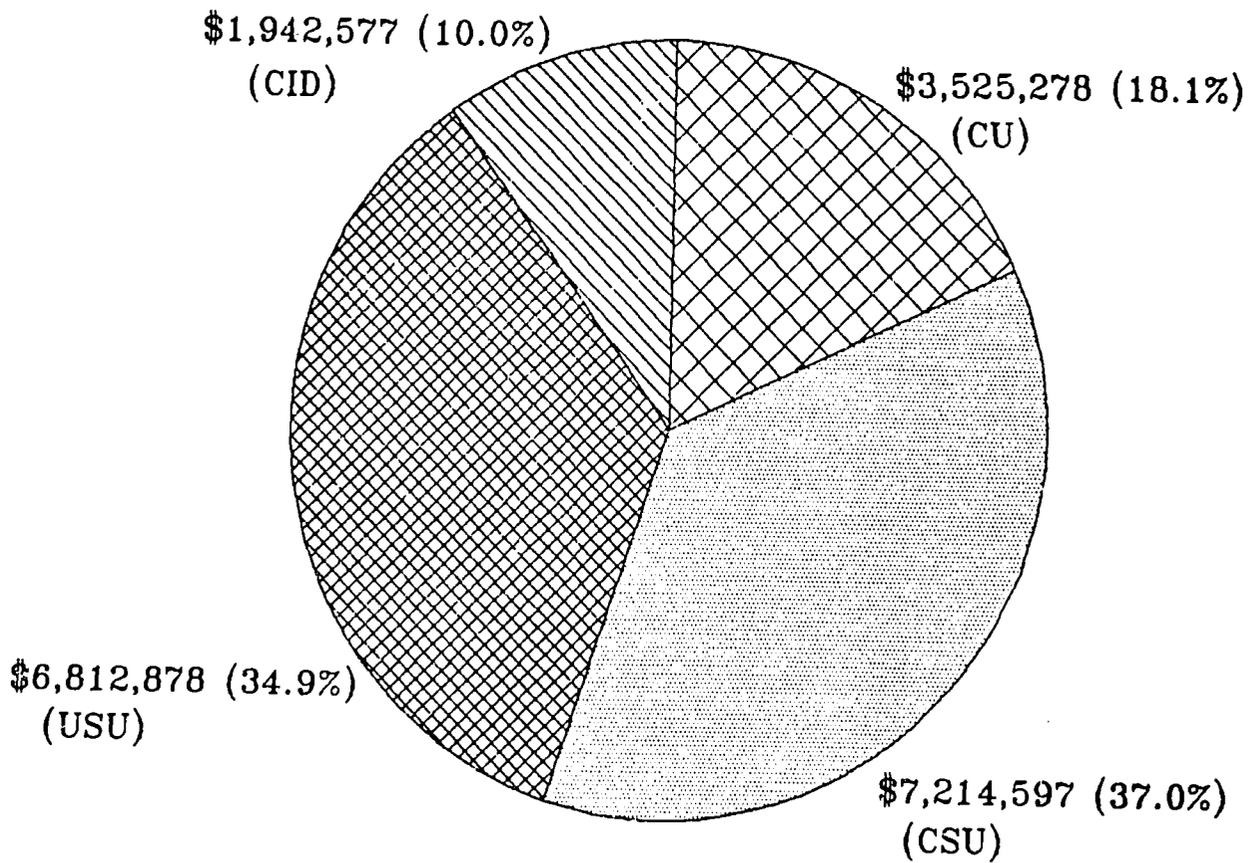
## WMSII Expenditure Authorizations



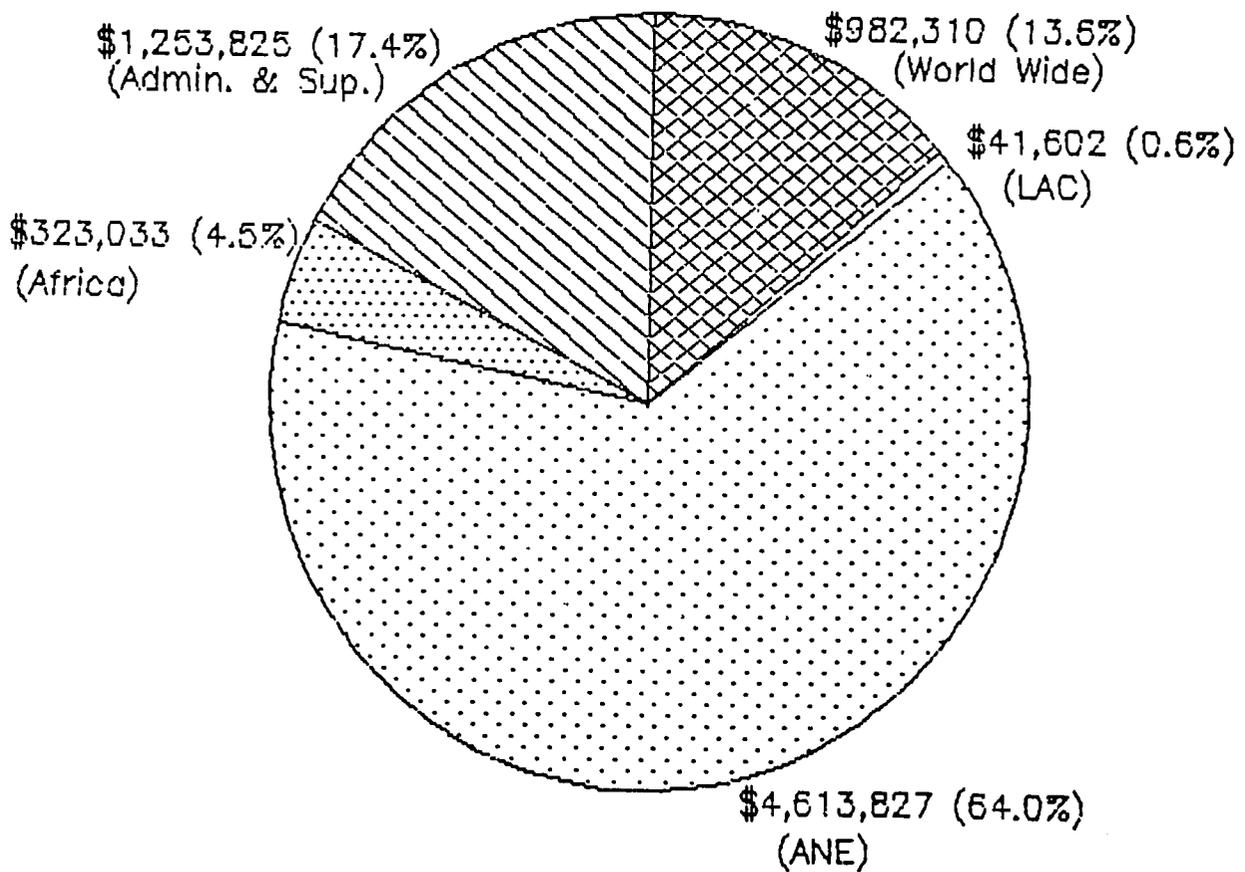
## WMSII Expenditure Authorizations



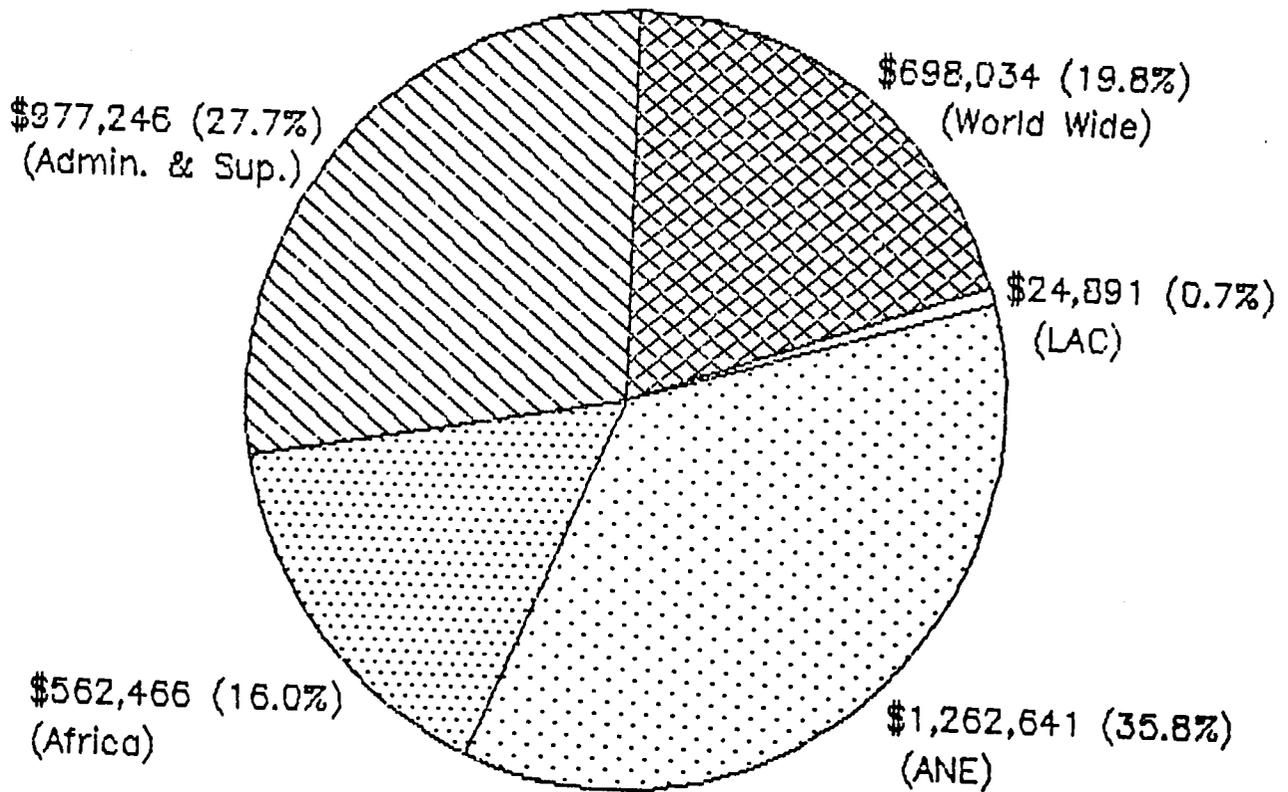
## WMSII Expenditure by University



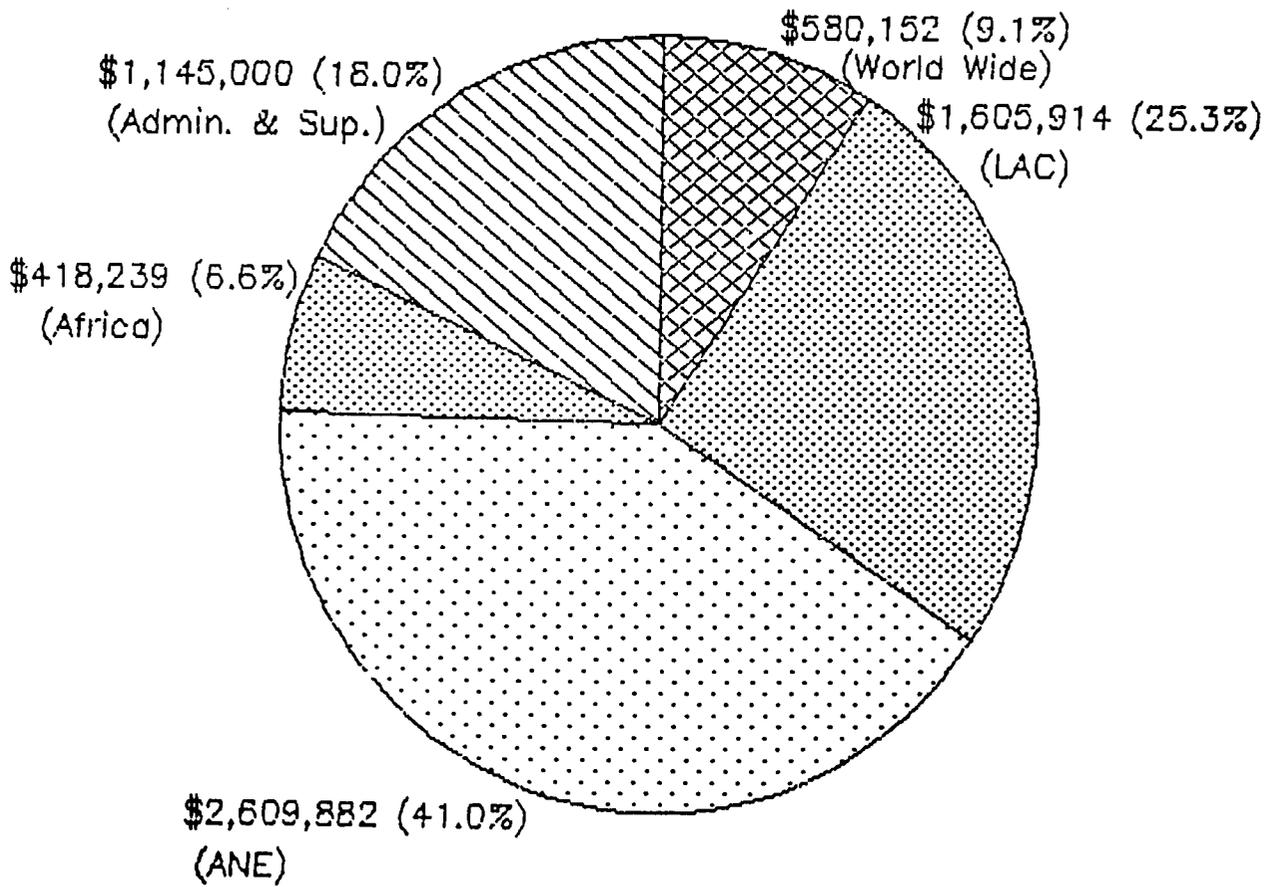
## Authorization for Colorado State University



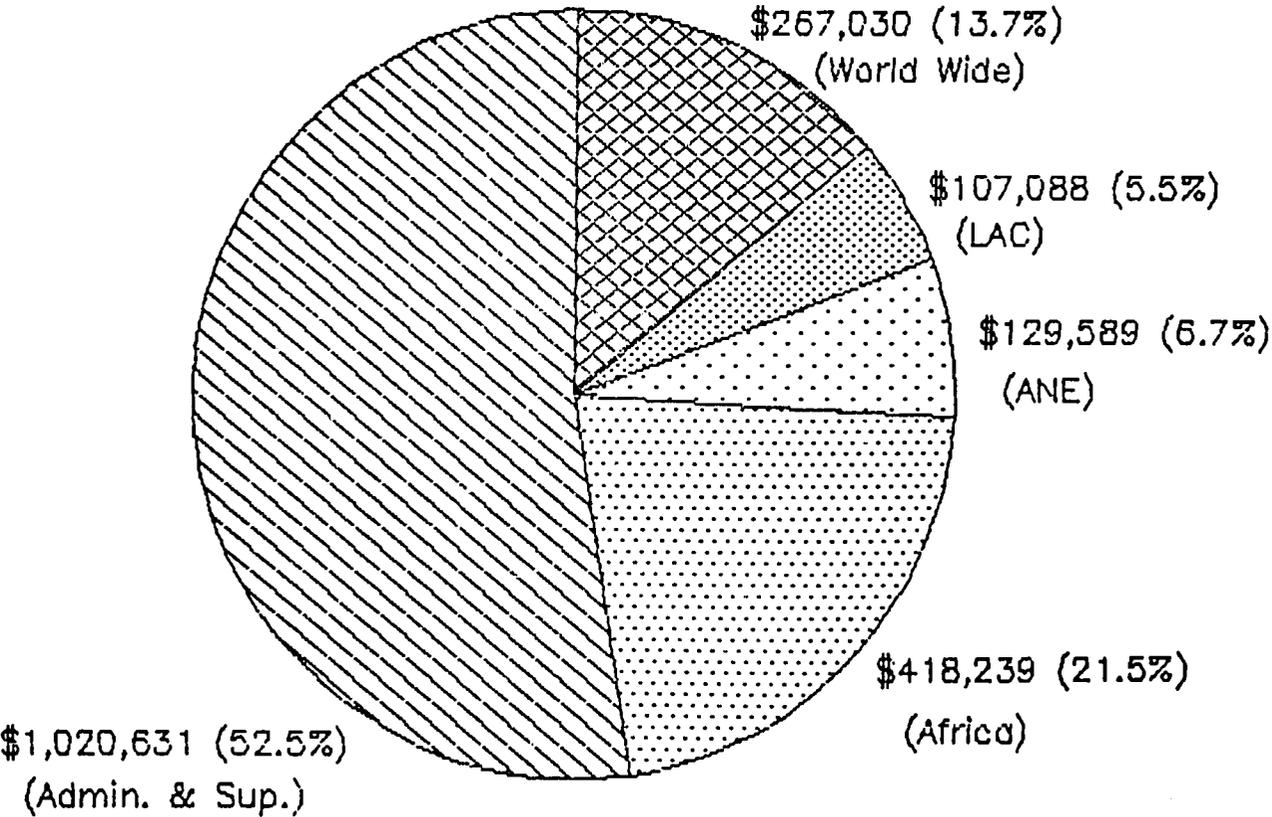
## Authorization for Cornell



## Authorization for Utah State University



# Authorization for CID



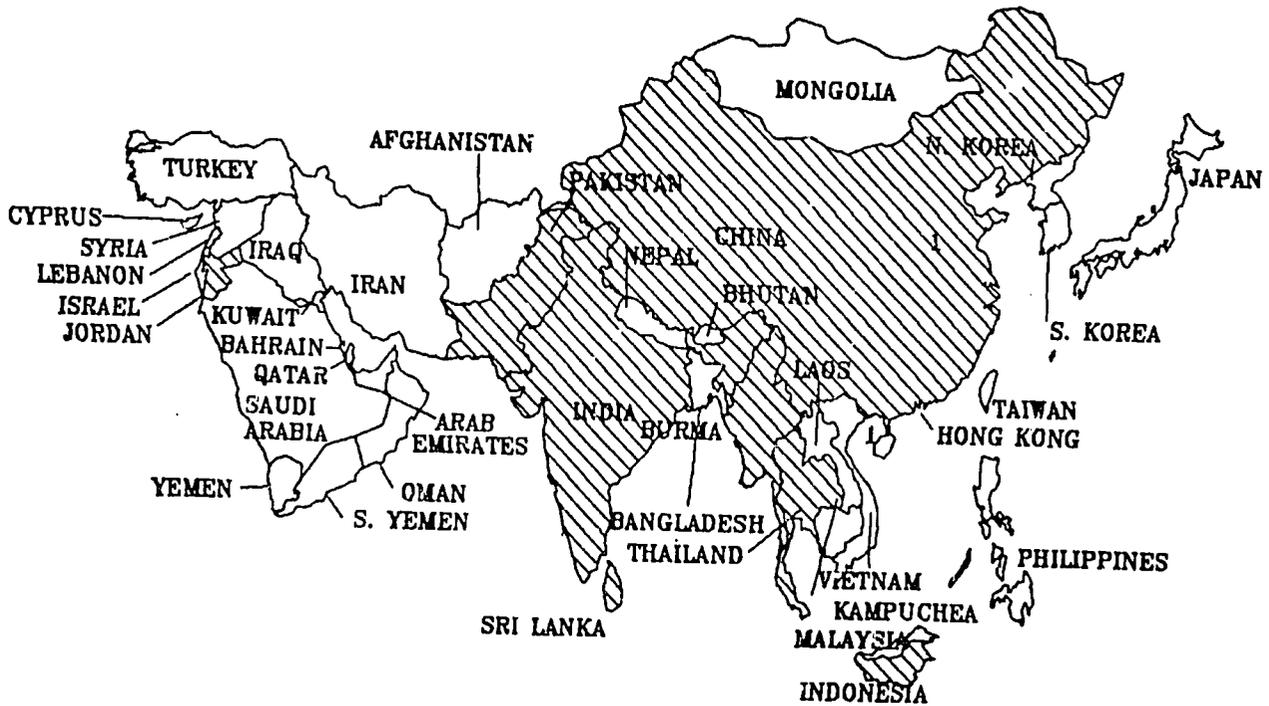
# WMSII NUMBER OF ACTIVITIES FOR AFRICA

AFRICA BUR.		ANE BUR.	
COUNTRY	#	COUNTRY	#
MALI	1	KENYA	1
TANZANIA	1	MOROCCO	4
MAURITANIA	1	TUNISIA	1
NIGER	6	EGYPT	4
CHAD	1	BOTSWANA	1
SWAZILAND	1	ZIMBABWE	3
		AFRICA WIDE	11
TOTAL AFRICA BUR. 30		TOTAL ANE BUR. 9	



## WMSII NUMBER OF ACTIVITIES FOR ANE

COUNTRY	§	COUNTRY	§
BANGLADESH	6	NEPAL	5
BURMA	1	PAKISTAN	17
CHINA	1	SRI LANKA	19
EGYPT	4	THAILAND	7
INDIA	33	TUNISIA	1
INDONESIA	7	ANEWIDE	11
JORDAN	4	TOTAL ANE	120
MOROCCO	4		



# WMSII NUMBER OF ACTIVITIES FOR LAC



COUNTRY	#
BOLIVIA	3
DOMINICAN REP.	4
ECUADOR	2
EL SALVADOR	3
GUATEMALA	1
HAITI	4
HONDURAS	1
PARAQUAY	1
PERU	5
LAC WIDE	2
TOTAL LAC	26

55