No.

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

OROMIA IRRIGATION DEVELOPMENT AUTHORITY (OIDA)
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

THE STUDY
ON
CAPACITY BUILDING PROGRAMS FOR COMMUNITY-BASED IRRIGATION DEVELOPMENT
IN
CENTRAL OROMIA REGION OF ETHIOPIA

Volume I
MAIN REPORT




OCTOBER 2004

NIPPON KOEI CO.,LTD.

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PREFACE

In response to a request from the Government of the Federal Democratic Republic of Ethiopia, the Government of Japan decided to conduct a Study on Capacity Building Programs for Community-Based Irrigation Development in Central Oromia Region of Ethiopia and entrusted to the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr.Masayuki Koyama of Nippon Koei Co., LTD. between April, 2003 and October, 2004.

The team held discussions with the officials concerned of the Government of the Federal Democratic Republic of Ethiopia and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Federal Democratic Republic of Ethiopia for their close cooperation extended to the study.

October 2004

Etsuo Kitahara,
Vice-President
Japan International Cooperation Agency

Mr. Etsuo Kitahara
Vice-President,
Japan International Cooperation Agency
Tokyo, JAPAN

Letter of Transmittal

Dear Sir,

We are pleased to submit herewith the final report for "The Study on the Capacity Building Programs for Community-based Irrigation Development in Central Oromia Region of Ethiopia".

The communal irrigation development in the Region has been accelerated after the catastrophic drought of 1984. To date 132 irrigation schemes with a total irrigable area of 11,000 ha have been developed in the Region. However, the schemes are not fully utilized and only 58% of the total is actually irrigable. The malfunctioning of the existing schemes has mostly caused by the following: deterioration of the facilities due to the lack of maintenance; the lack of capacity of the relevant authorities to provide appropriate technical guidance for the communities; and inadequate managerial capacity of the communal organizations, Water Users' Associations (WUAs), which are responsible for the operation and maintenance of the schemes.

In view of tackling above constraints and promoting sustainable irrigation development in the respective Region, the Study focused on standardization of development methodologies with community participation and the capacity building of Oromia Irrigation Development Authority (OIDA) and WUAs. Thus, the Study has implemented three (3) programs, namely (i) Training Program for the OIDA staff, (ii) WUAs Support Program in Meki Area and (iii) Rehabilitation of Existing Schemes, over 19 months between April 2003 and October 2004. All the experiences and lesson learned acquired through the Study have been compiled into the guidelines in Oromo language and distributed to all 197 waredas of the Region.

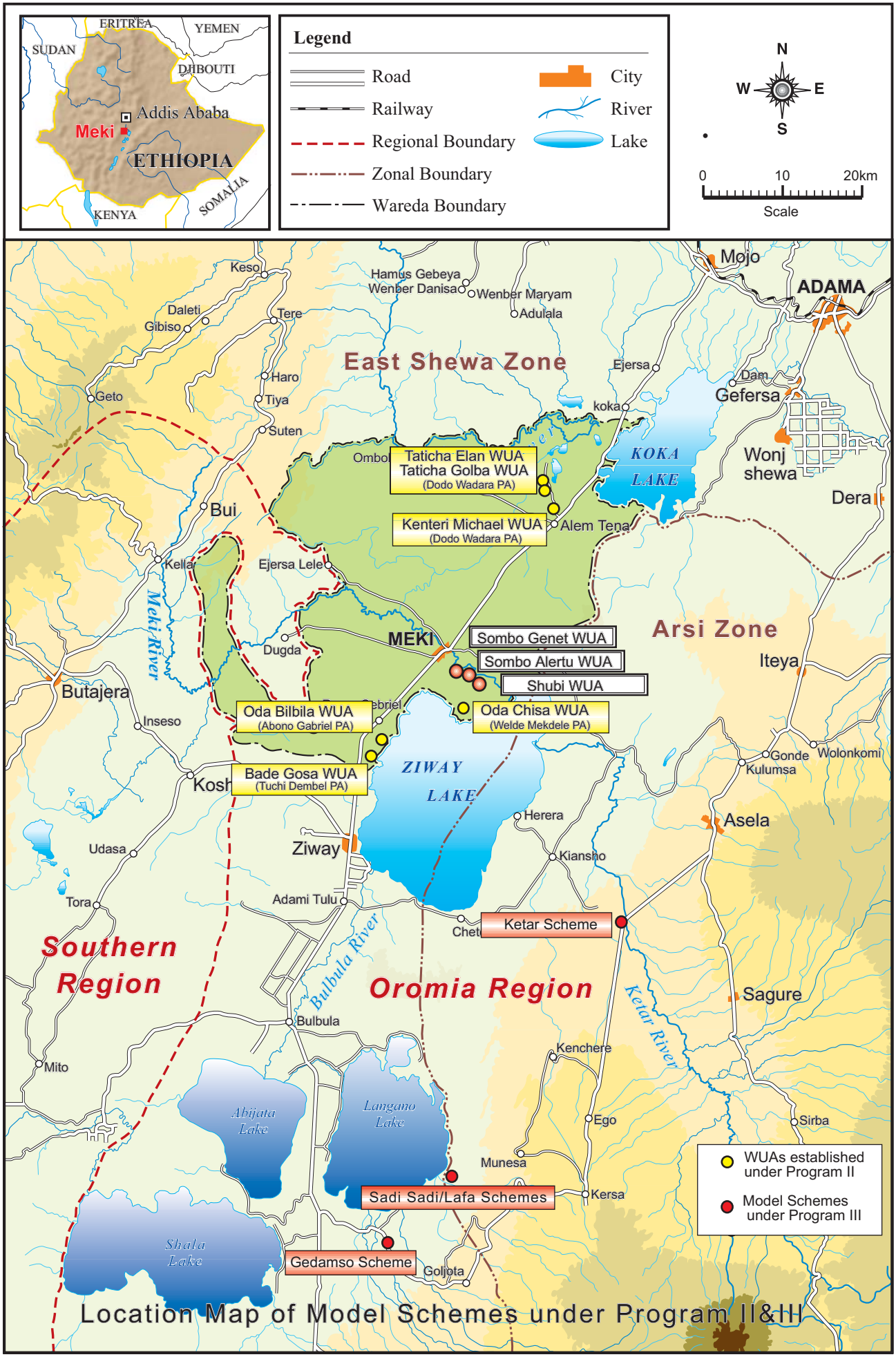
We hope that this report will assist OIDA and relevant authorities in achieving food security and poverty reduction by means of community-based irrigation development in the Region. It is also our sincere hope that this report will contribute to foster a long lasting partnership and friendship between the two nations of Japan and Ethiopia.

Finally, we wish to express our sincere appreciation to the staff members concerned from your Agency for their continuous support throughout the Study. Our highest gratitude goes to the personnel concerned in your office in the Federal Democratic Republic of Ethiopia, the Embassy of Japan for Ethiopia, and OIDA for their cooperation extended to us during our fieldwork during the Study period.

Yours faithfully,

Masayuki Kouyama
Leader for the Study Team

Location Map of the Study Area



Location Map of Model Schemes under Program II&III

PROGRAM I: TRAINING PROGRAM FOR OIDA STAFF

Interview Survey in Shubi-Sombo Schemes
Established by the Meki Study in 2001.
(1st PBME on May 2003)

Interview to 68 Farmers in Shubi-Sombo
Schemes
(1st PBME on May 2003)

Monitoring of Water Conveyance Loss by OIDA
Staff in Shubi-Sombo Schemes
(2nd PBME on December 2003)

Interview to Water Users Association
Established by Program II
(3rd PBME on May 2004)

Project Monitoring Workshop for Intelligence
Sharing of results of PBMEs
(June 2003)

Discussion on Major Finding of PBME in
Shubi-Sombo Schemes
(June 2003)

Preparation of Problem Tree and Discussion
(PCM Training Workshop on August 2003)

Problem Analysis with Shubi-Sombo WUA
Members
(PCM On-the-job Training on August 2003)

PROGRAM II: WUA SUPPORTING PROGRAM IN MEKI (1)

Preparation of Project Design by PRA

Proposal of Scheme Layout Presented by WUA Representative

Participatory Work of Lead Canal
(Bade Gosa WUA)

Topographic Survey by OIDA with Participation of WUA

Agreement on Establishment of WUA in Witness whereof Word Headman

Participatory Work of Pump House

Participatory Work of Irrigation Canal
(Oda Chisa WUA)

Completion of Construction Works
(after 2 months from Commencement of Work, Bade Gosa WUA)

PROGRAM II: WUA SUPPORTING PROGRAM IN MEKI (2)

10 HP Pump installed to Schemes

Training of WUA Members for
Pump Operation and Maintenance

Apply of Pipeline System to Reduce Water
Conveyance Loss (Oda Chisa WUA)

Handing Over Ceremony
(Oda Chisa WUA)

Onion Cultivation in Bade after Completion of
Construction (Bade Gosa WUA)

Pump Installed to Ground Irrigation Scheme
(Kenteri Michel WUA)

Chili Cultivation ater completion of
Construction (Kenteri Michael WUA)

Contract Farming of Tomato after Completion
of Construction (Oda Bilbila WUA)

PROGRAM III: REHABILITATION OF EXISTING SCHEMES (1)

Ketar Scheme

Inventory Survey of Existing Irrigation Schemes by OIDA Staff

Deteriorated Main Canal with Horizontal Cracks (June 2003)

Plastering Works in Cooperation with WUA Members

Main Canal after Plastering Works (Water Loss was largely improved, Nov 2003)

Provision of Gabions for Slope Protection

Handing Over of Documents with Concretized Burden Sharing between OIDA and WUA

Main Canal before Rehabilitation Works (Oct 2003)

Main Canal after Rehabilitation Works (Feb 2004)

PROGRAM III: REHABILITATION OF EXISTING SCHEMES (2)

Gedamso Scheme

Problem Analysis and Discussion for WUA Members

Canal Clearing by WUA Members

Main Canal after Clearing of Sedimentation

1st Onion Harvesting after Rehabilitation

Sadi Sasi & Lafa Schemes

Access Road Damaged by Gully

Repair of Gully by Community People

Bridge Rehabilitation Work by Community People including Women

Rehabilitation Work by Heavy Equipment of OIDA

SUMMARY

Chapter 1 Introduction

1. The Study on the Capacity Building Programs for Community-based Irrigation Development in Central Oromia Region of Ethiopia (hereinafter referred to as "the Study") was carried out in accordance with the Scope of Work (S/W) agreed upon between Oromia Irrigation Development Authority (OIDA), the Government of Oromia Regional State and the Japan International Cooperation Agency (JICA) on 17th December 2002. *(Section 1.1)*

2. The S/W of the Study was drawn and justified from the results of the previous JICA study, namely the Meki Irrigation and Rural Development Project (the Meki study) carried out from August 2000 to February 2002. With full use of the experiences obtained through the Meki study, the Study was carried out over 19 months from April 2003 to October 2004. *(Section 1.1)*

3. The objectives of the Study are defined in Clause II of the S/W as below. *(Section 1.2)*
   1) To enhance the capacity of OIDA through small-scale irrigation development and rehabilitation of model irrigation schemes, and
   2) To standardize small-scale irrigation development and rehabilitation of the existing schemes.

4. The study area covers the central part of the Oromia Region consisting of five Zones, namely East Shoa, North Shoa, West Shoa, Southwest Shoa and Arsi Zones, which are coincident with the service area of Central Branch Office of OIDA located in Adama, the regional capital of the Oromia Region. Meki is located in the center of the study area. *(Section 1.3)*

5. The Study consisted of the following three programs. *(Section 1.4)*
   Program I : Training Program for the OIDA staff
   Program II : Water Users Associations (WUAs) Support Program in Meki Area
   Program III : Rehabilitation of Existing Schemes

Chapter 2 Project Background

6. The agricultural sector of Ethiopia plays a leading role in the growth of the national economy. It contributes employment opportunities to 74% of the total workable population and generates approximately 50% of Gross Domestic Products (GDP). The prevailing rain-fed agriculture is prevalent in the country; therefore, the food production is largely fluctuating due to erratic rainfalls. Food shortage is becoming chronic and will be accelerated by rapidly expanding population pressure in the years to come. *(Section 2.1.1)*

7. The Second Five Year Program of the Ethiopian Peoples Revolutionary Democratic Front (EPRDF) for Development Peace and Democracy (2000-2005) prioritizes the agricultural development (i) to ensure national food self-sufficiency, (ii) to improve citizen's food security, (iii) to speed upgrading the level of living standard of peasants, (iv) to lay a strong foundation for our economic development mainly for industrial development, (v) to strengthen foreign currency earnings, and (vi) to improve the conservation of natural resources. *(Section 2.1.1)*

8. Poverty reduction continues to be the core agenda of the country's development and was codified as the Sustainable Development and Poverty Reduction Program (SDPRP) in July 2002. It consists of four sectors, namely 1) agricultural-development- led industrialization (ADLI) and food security, 2) judiciary and civil service reform, 3) decentralization and empowerment, and 4) capacity building in public and private sectors. Among the four blocks, achievement of substantial progress of ADLI and food security is probably the most urgent issue. *(Section 2.1.2)*

9. Decentralization is an immediate outcome of the adoption of a federal system of government in Ethiopia. A series of proclamations made by the Transitional Government of Ethiopia, culminating in the proclamation of the 1994 Constitution of the Federal Democratic Republic of Ethiopia (FDRE), lays the basis for devolution of decision-making powers and responsibilities to the nine regional states and two city administrations. Each region can establish an administration that ensures self-governance, enacts the state constitution and other laws, formulates and executes socio-development policies and programs, and administers land and natural resources. *(Section 2.1.3)*

10. The Ministry of Water Resources of FDRE has directed every effort towards the full and optimum utilization of the water resources and prepared the Water Sector

Development Program (WSDP), in which priority projects are identified and a detailed implementation plan is worked out using the previous basin master plan studies. The WSDP consists of five sub-sectoral programs, namely irrigation development, water supply and sewerage, hydropower development, water resources development and institution and capacity building for 15 years from 2002 to 2016. *(Section 2.1.4)*

11. The Oromia Region (the Region) is the largest region in Ethiopia with a total area of 359,620 km^2 or 34% of the national land. The regional population is estimated to be over 25 million based on the 1994 census and annual growth rate of 2.82%. Some 88 % of the population lives in the rural area where livelihood entirely depends on subsistence agriculture. *(Section 2.2)*

12. Agriculture is the foundation of the economy of Oromia accounting for about 65% of the regional GDP. Exports of the agricultural products such as coffee, hides and skins, pulses and oilseeds largely contribute to the foreign exchange earning. Extensive plains and plateaus constitute about 5.0 million ha of agricultural land comprising 4.9 million ha of rain-fed agriculture and 93,000 ha of irrigated agriculture in 1997/98. *(Section 2.2)*

13. Due to the diverse agro-climate conditions, a wide range of crops is grown in Oromia. The total cereal production of the Region amounted to 4.3 million ton. Maize, teff, wheat, barley, millet and sorghum accounted for 18% each. More than 50% of the regional cereal production is produced in North Shoa, East Shoa and Arsi zones. The crop yield is as low as 1.2 ton/ha in1993/4 - 1998/9. The major cash crops are represented by Arabica coffee and chat followed by sugarcane and cotton. The annual production of coffee amounted to 0.22 million ton in 1998/9. The production of other crops such as spices, vegetables, fruits, etc. was estimated at 0.45 million ton in the same year. *(Section 2.2)*

14. The Oromia Economic Study Office (1999) estimated that 1.7 million ha of land is suitable for surface irrigation in the Region. Out of this potential area, only 93,000 ha or 5.5 % has so far been developed. Irrigated land in the Region is broken into four categories, namely traditional schemes, state farms, private farms and modern communal schemes. Modern communal schemes have been developed by government efforts after the catastrophic drought of 1984. To improve food security and farm family income, a series of micro and small scale irrigation schemes were constructed throughout the Region. These schemes were fed by springs, streams and small rivers and vary in size from a few ha to 200 ha without use of large

and complicated diversion structures. The Planning and Information Management Service of OIDA identified 132 irrigation schemes in the Region with a total command area of 11,166 ha, of which 9,115 ha are actually operated. *(Section 2.3)*

15. OIDA was established in July 1999 with specific aims at streamlining overall irrigation development services under the sole organizational framework defined in the "Oromia Regional State Irrigation Development Authority Establishment Proclamation, No. 30/1999". The main task of OIDA is to develop irrigation schemes in line with the national policy of food security and poverty reduction. *(Section 2.4.1)*

16. OIDA established the Strategic Planning and Management Plan (2003-2005) in September 2003 to develop a systematic approach dealing with the process that enables OIDA to develop shared vision and maintain appropriate financial and human resources utilization for effective output. The Plan stipulates the following problems be solved urgently under the Plan. *(Section 2.4.2)*

Issue 1 The use of limited irrigation technology

Issue 2 Poor implementation capacity

Issue 3 Low level of irrigation extension service

Issue 4 Insufficient financial resource

Issue 5 Poor sustainability of the schemes and inefficient irrigation management

17. All the activities of OIDA are under the control of the General Manager at the head office in Addis Ababa. The OIDA head office has three departments for study and design, construction, and irrigation extension with four service units for planning and information management, community participation, administration and finance, and audit. Then, the operation is entrusted to four branch offices, namely Central, Eastern, Western and Southern branch offices, and further to the wareda (district) offices. Under the decentralization policy, the tasks and responsibilities of the branch offices and the wareda offices are expanded. Under the branch offices, 112 wareda offices were operational in June 2003. *(Section 2.4.3)*

18. OIDA had 810 staff as of June 2003. The technical staff accounted for 430 or 53% of the total staff. Engineering staff accounted for 195 staff at head office and branch offices. The OIDA wareda staff has been increased from 211 persons at 69 waredas in November 2000 to 273 persons at 112 waredas in June 2003. The Strategic Planning and Management Plan estimates the total staff requirement to be

1,625 consisting of 118 for the headquarters, 583 for branch offices and 924 for wareda offices by 2005. *(Section 2.4.4)*

19. Community-based irrigation management is the principle of the OIDA schemes. The ownership of the schemes is transferred to WUAs after completion of project construction. Given an autonomous status, WUA takes the major responsibilities for scheme management after hand-over of the scheme, while OIDA is responsible for monitoring and provision of necessary advice to WUA. The budget for rehabilitation of the schemes is occasionally allotted as far as external funds are available. *(Section 2.4.6)*

20. The Meki Irrigation and Rural Development Study (the Meki study) was carried out in the period of August 2000 to February 2002. The master plan study clarified the present conditions, development constraints and potentials in the Meki area. Centered around the concept of a "bottom-up approach", the master plan formulated 21 projects to be implemented with substantial participation of rural communities. The master plan study placed an emphasis on capacity building of government staff and communities rather than infrastructure development as well as other physical inputs. *(Section 2.5.1)*

21. The Meki study was directed to examine technical and financial viabilities of the draft master plan through the Verification Study (VS). All the results of the VS were to be incorporated into the final master plan. In addition, the VS was expected to contribute to the capacity building for government staff and to poverty alleviation in the Meki area through pilot projects. Six programs were commenced by OIDA and Oromia Agricultural Development Bureau (OADB) in June 2001 and completed in November 2001. Among the six programs, OIDA focused on Programs 2 and 4, which aimed at standardizing development procedures for community-based irrigation development. *(Section 2.5.1)*

22. Program 4 of the VS established three WUAs organized by 63 farmers for 15.75 ha in Shubi Gamo Peasant Association (PA) near the Meki town. The Participatory Rural Appraisal (PRA) focused on "sustainability" of the community-based project. The most important factor for sustainable unity in the community was deemed to be "fair and even share of limited land and water resources." Group fund formation was proposed on the basis of mutual understanding on rigid collection of water charges and fees for pump replacement. All those experiences were incorporated into the Guideline for WUA Establishment. *(Section 2.5.2)*

23. Program 2 of the VS established the OIDA database of the existing schemes focusing on the considerable gaps between the plan area and the actually irrigated area in these schemes. Only 5,560 ha or 58% out of 9,644 ha of 96 schemes were irrigated in 2000, leaving over 4,000 ha unirrigated. The database was to be applied to systematic monitoring and evaluation for identification of problems and constraints prevailing in the existing schemes. *(Section 2.5.3)*

Chapter 3 The Study Area

24. The study area is coincident with the service area of the OIDA Central Branch Office, which falls in five administrative zones, namely North Shoa, East Shoa, West Shoa, Southwest Shoa and Arsi, which occupies 71,615 km^2 or 20 % of the Region's land. The population of the study area is estimated to be 9.94 million in 2004, which accounts for 40% of the regional population. The population density of the study area is to be 139 persons/ km^2, which is twice as high as the regional average of 70 persons/ km^2. This high population density implies continuous subdivision of farmland through inheritance. In fact, the average land holding size of peasants are as small as 1.2 ha per household. Erratic and limited rainfalls especially within the Ethiopian Rift Valley system are main constraints against improvement of rain-fed agriculture. Irrigation development has been thus encouraged by both the public and private sectors. *(Section 3.1)*

25. The study area is located between latitudes 6° 52' N and 10° 23' N and longitudes 37° 02' E and 40° 43' E. In the center of the study area the Rift Valley traverses in the NE-SW direction and divides the study area into three physiographic units, namely i) eastern highlands, ii) western highlands, and iii) the Rift Valley. More than 50% of the study area lies on the highlands of El. 2,000 m or above. *(Section 3.2.1)*

26. The agro-climate of Ethiopia is classified broadly into five zones, namely semi-desert, tropical, sub-tropical, temperate, and alpine, which are related to the altitude. Nearly 90% of the Region's land is located in tropical to sub-tropical zones. Average annual rainfalls increase according to the altitude from 650 mm in the Rift Valley floor around the lakes to over 1,300 mm in the Eastern and Western highlands of over El. 2,000 m. The study area is divided into five major river basins, namely Awash, Blue Nile, Wabe Shebele, the Rift Valley lakes and Gibe, of which Awash river basin covers about 30% of the study area. The Rift Valley lake basins cover 16% of the study area. *(Sections 3.2.2 and 3.2.3)*

27. The soils of the study area are represented by Pellic Vertisols, which are dark clayey soils that swell when moist and shrink when dry. They occupy about 30% of the study area, especially North Shoa, West and Southwest Shoa. Due to higher moisture holding capacity, Pellic Vertisols are widely used for crop production. On the other hand, the major soils of East Shoa are Vitric Andosols of volcanic origins, which are predominant on the Rift Valley floor. *(Section 3.2.4)*

28. The natural vegetation of the Region is mainly of tropical savanna, dominantly acacia species occasionally interrupted by riverine broad trees and shrubs. The land use intensity of the study area is significantly higher than that of the Region. The farmland occupies 4.4 million ha or 61% of the study area. Moreover, 45% of the total farmland of the Region is concentrated in the study area. On the other hand, forest, shrub and bush covers only 1.4 million ha or 7% of their regional total. *(Section 3.2.5)*

29. The climatic conditions of the study area are governed mainly by the movement of Equatorial low-pressure zones and are divided broadly into three rainfall seasons. The rainfalls are characterized by a bimodal pattern with the long rainy seasons (Meher) from July to October and the short rainy seasons (Belg) from February to June. Meher is the main crop season in the study area. Cereals are widely planted under the rain-fed conditions. Dry season crops are sown under the irrigated conditions after harvest of rain-fed cereals. In Belg season, cereals are planted to a limited extent. *(Section 3.3.3)*

30. The farming system in the study area can be described as a "traditional livestock-based mixed-farming system", in which crop production and animal husbandry are significantly supplemented by each other. The predominant crops are food grains and pulses including teff, wheat, maize, barley and haricot beans. Crop residues are one of the vital supplemental fodder sources for oxen, sheep, goats and donkeys. On the other hand, the crop production sub-sector relies highly on animals in terms of drafting, transporting and threshing as well as manure sources. Furthermore, livestock provides animal products for home consumption and supplemental cash income. *(Section 3.3.3)*

31. The cropping system is predominantly on a rain-fed basis and crop rotation is not systematically practiced. Teff and wheat represent the main crops in the study areas, which are followed by maize and barley. Other crop such as haricot beans, sorghum, horse beans, field peas and chickpea are planted to a limited extent with utilization of soil residual moisture. Due to erratic rainfalls, the crop production fluctuates

largely year to year. *(Section 3.3.3)*

32. The Household Income, Consumption and Expenditure Survey (HICES) in 1999/2000 verified the current positions of farm family economy in the Region. The income and expenditure were separately surveyed. The average annual income of rural households was Birr 4,663, which was slightly higher than that of the national average, i.e. Birr 4,258. As well, the expenditure in the Region was also higher than that of the national average. *(Section 3.3.4)*

Chapter 4 Training Program for OIDA Staff (Program I)

33. Program I aimed at OIDA staff training. The OIDA staffs were encouraged to learn operational skills and techniques dealing with issues raised in the actual process of community-based irrigation development by applying theories to practice. The following aspects were selected and the relevant training programs were carried out under Program I. *(Section 4.1)*

1) Project Cycle Management (PCM)
2) Participatory Rural Appraisal (PRA)
3) Project Benefit Monitoring and Evaluation (PBME)
4) Engineering Methodologies for Small-scale Irrigation Development

34. The intensive training workshop on Project Cycle Management (PCM) was undertaken focusing on problem analysis, which is formulated as one of the systematic planning and management tools, in order to meet the needs of capacity building for the staff of OIDA Central Branch Office. The workshop was designed to consist of three distinct but interrelated components; namely,

1) Lecture component; in which the basic idea on PCM was presented in the context of participatory social development and planning;
2) Case analysis component; in which participants were encouraged (i) to acquire basic knowledge and skills to identify stakeholders and problems and (ii) to structure a problem tree by analyzing cause-effect relationships; and,
3) Field exercise component; in which participants were further encouraged to conduct problem analysis on existing schemes as a field test.

There were a total of 20 participants including 10 extension workers and five engineers who are working on the ground. *(Section 4.2)*

35. It is required for OIDA to train urgently (i) engineers with basic operational knowledge on the participatory development approach and (ii) social workers who understand the basic engineering and agricultural aspects related to irrigation development. Program II attempted to establish five new WUAs, of which three WUAs were decided to be firstly established for the purposes of on-the-job training, where the JICA Study Team took leading roles to organize a series of PRA sessions with OIDA staff. The remaining two WUAs were established mainly by the OIDA staff *(Section 4.3)*. The outcomes of the PRA training were;

1) OIDA staff who had actual experience in the full process of PRA gained familiarization with problem solving for critical issues such as land re-allocation and even distribution of land and water; and
2) Elaboration of standardized development procedures incorporated in the guideline including a proposed time frame and involvement of personnel of PRA.

36. The methodology of PBME was transferred to the OIDA staff through actual practice in the Shubi-Sombo schemes. The 1st PBME was carried out for the Shubi-Sombo schemes in May 2003, i.e. 2.5 years after handing-over. The JICA Study Team directly provided the training to the OIDA staff selected from the Central Branch Office and the Meki office. The 1st PBME clarified the current conditions of the WUA management in terms of logistics and financial operation and the performance of irrigation farming by individual members for three crop seasons. An interview was conducted with all 63 members including the dropouts and the WUA board members. It was verified that the WUA members faced 14 constraints, which were categorized into four major aspects; (i) conflicts derived from land exchange, (ii) lack of farm operation budget, (iii) water shortage and (iv) insufficient knowledge of farm management. *(Section 4.4.3)*

37. The 2nd PBME executed further field investigations and farmers' interviews in the period from 15th to 26th December 2003 that focused on the water shortage in the downstream areas of the Shubi-Sombo schemes, which had been pointed out during the 1st PBME. The in-depth interviews were held with the WUA members of each of the Shubi-Sombo schemes to clarify present conditions of land utilization and water distribution to each plot, while the field discharge measurement was conducted in collaboration with the staff of the Dugda Bora Wareda Irrigation Development Desk (hereinafter "OIDA Meki office"). The 3rd PBME was carried out from May to June 2004 to follow up the previous two PBME focusing on the WUA management, farming activities and marketing, financial status and land disputes of

the Shubi scheme. *(Section 4.4.3)*

38. Hydrology and water use analyses were carried out under Program I. The largest water consumer is the Meki-Ziway Irrigation Scheme. The OIDA Meki office carried out periodical monitoring of the operation records of the Scheme in order to assess the water consumption of the Scheme. Inventory surveys of groundwater irrigation were also conducted as a part of the capacity building programs. The inventory surveys of groundwater irrigation were carried out in Dodo Wadere PA and Malima Bori PA in Dugda Bora District, where groundwater irrigation is prevailing. *(Section 4.5)*

39. Project Monitoring Workshops were held four times; 5th June 2003, 23rd September 2003, 20th February 2004 and 1st July 2004. The main objectives were to share the results of each of the PBMEs as well as the progress of the Study and to exchange opinions between the JICA Study Team and the OIDA counterparts. The Irrigation Engineering Workshop was also held in Addis Ababa. The JICA Study Team and 20 management staff of the OIDA Head Office, Central Branch Office as well as the Meki office attended it. *(Section 4.6)*

Chapter 5 WUA Support Program in Meki (Program II)

40. Program II was carried out with the following objectives; *(Section 5.1)*

1) Rationalization of community-based irrigation development in Meki by referring to the experience and performance in the verification study of the Meki study.
2) Provision of technical support for establishment of new WUAs at five locations according to the rationalized procedure.

41. The Study placed emphases on the management capacity of the candidate groups. A priority was given to the groups that were expected to become leaders among rural communities encouraging other groups as model schemes with high performance. The JICA Study Team in collaboration with the OIDA Meki office carried out the interviews and field inspections in May 2003 and finally, the following five groups were selected among 50 applicant groups; *(Section 5.2)*

Selected Five (5) Communities for Program II

No.	PA (Community)	Water source	WUA (HH)	Area (ha)	From Meki (km)
1	Tuchi Dembel	Ziway	19	4.75	16
2	Abono Gabriel	Ziway	50	7.00	11
3	Welde Mekdele	Ziway	21	5.25	11
4	Taticha Elan	Groundwater	24	5.00	32
5	Dodo Wadaraa	Groundwater	23	5.00	20
Total			137	27.00	

42. The Meki study advised the groups to share the limited land at the rate of 0.25 ha per HH as a maximum size of land holding. There are three main reasons, namely (i) maximization of the number of memberships for WUA; (ii) equitable distribution of farm plots for irrigation; and (iii) optimum performance and efficiency of irrigation farming by using small pumps around 10 hp. These concepts were also supported by Oromia Regional Proclamation no. 56/1994, which was issued in 2001 to control the land holding size to be less than 0.5 ha per HH under irrigation projects implemented by public organs. *(Section 5.3)*

43. Paying particular attention to the cost-sharing of the projects, it was decided to formulate project premises consisting of the following 11 conditions basis on the conditions set up under the Meki study. *(Section 5.3.2)*

Basic Conditions of Agreement on Pump Use Management (Premises)

1)	Ultimate Goal of Agreement	:	Food Security – Stability of and Increase in Agricultural Production by user households through irrigation farming
2)	Main Stakeholders in Agreement	:	OIDA, WUAs and Peasant Associations
3)	Specific Scope of Agreement	:	Pump Use Management in Irrigation Farming (Implying no support to farm inputs is provided)
4)	Type of Agreement	:	Contract Lease Agreement
5)	Basic Rights of Pump	:	Ownership held by OIDA Usufruct rights enjoyed by WUA
6)	Item in Lease Agreement	:	Pump for Irrigation Use Only
7)	Cancellation of Agreement	:	Existing agreements can be cancelled due to Violation or Unjustifiable Application of Agreement
8)	Basic Principles of Lease	:	One Time Investment for Pump by OIDA Cost Recovery by WUA
9)	Contributions by WUA	:	Physical contributions with 400 man-days by WUA (5 % of investment cost)
10)	Operational Conditions of Lease	:	Effective, Efficient and Sustainable Use and Management of Pump by WUA

11) Water Resources : Construction and Maintenance of Lead Canals to the Site and Wells under Communities' Responsibility

44. Program II was implemented according to the following steps. *(Section 5.5.1)*

Procedure of Community-based Irrigation Development

Step 1 Confirmation of member farmers of an applicant group and their attitude to the community-based irrigation development
Step 2 Proposal of farmers, including water resource and layout plan
Step 3 Land ownership and holding size of farmers with proposals for land exchange among farmers
Step 4 Presentation of the premises by OIDA
Step 5 Basic agreement on farmers' responsibilities for operation and maintenance of pump and facilities
Step 6 Topographic survey
Step 7 Engineering study on a basic irrigation plan on the basis of the farmers' proposal
Step 8 Agreement on establishment of a WUA
Step 9 Procurement and installation of a pump including construction of a pump house
Step 10 Construction of irrigation canals and on-farm facilities
Step 11 Training for pump operation and maintenance
Step 12 Handing-over of irrigation facilities

45. All the activities of Program II were smoothly performed from May 2003 to February 2004 by the joint efforts of OIDA and the JICA Study Team. Finally, the six communities in the following table achieved establishment of WUAs at five sites. *(Section 5.5.1)*

Six WUAs established under Program II

No.	WUA	PA	Members			Irrigat. Area (ha)	Source of Water
			Male	Female	Total		
1.	Oda Chisa	Welde Mekdele	19	2	21	5.25	Ziway
2.	Bade Gosa	Tuchi Dembel	16	3	19	4.75	Ziway
3.	Oda Bilbila	Abono Gabriel	15	3	18	4.50	Ziway
4.	Taticha Elan	Dodo Wadaraa	11	1	12	3.00	G.water
5.	Taticha Golbaa	Dodo Wadaraa	9	3	12	3.00	G.water
6.	Kanteki Michael	Dodo Wadaraa	18	6	24	6.00	G.water
Total			88	18	106	26.50	

46. A PBME was conducted for the above-listed new WUAs to assess the sustainability of community-based irrigation development in Meki. A questionnaire survey was carried out for both WUA boards and WUA members. The surveys were carried out by the JICA Study Team and the OIDA Meki office over 20 days from 19th May to 7th June 2004. The data compilation was done at the Meki office with aid of the computer introduced by JICA. *(Section 5.7)*

47. Six WUAs embarked on irrigation farming in late 2003. The PBME verified that the total membership of the six WUAs reduced from 106 to 103 by dropout of three members. The reasons three members left were (i) lost incentives to WUA activities and (ii) land disputes. Command area was also changed due to dropout of members and reserve of farm plots to allocate as salary for the operator. *(Section 5.7.2)*

48. The main crops are tomato, maize and chili, which occupied 81% of the total scheme area. However, the crop selection was varied by WUA. The results of the surveys are presented below. *(Section 5.7.4)*

Proportional Extent of Plated Area by Crops

Unit : %

Crop	Oda Chisa	Bade Gosa	Oda Bilbila	Taticha Elan	Taticha Golba	Kenteri Michael	Total scheme area
Tomato	5	22	100	0	8	47	34
Maize	0	0	0	86	92	13	24
Chili	64	12	0	0	0	35	22
Onion	2	33	0	14	0	1	8
Cabbage	18	22	0	0	0	0	7
Other	9	0	0	0	0	4	3
Fallow	2	11	0	0	0	0	2
Total	100	100	100	100	100	100	100

49 The crop budget analysis was made for 1st crops in Oda Chisa WUA. Out of the surveyed 11 members, nine members planted chili, of which unit yield ranged from 2.26 ton/ha to 4.92 ton/ha. With large fluctuation of selling prices, gross benefits also ranged widely. Four members planted cabbage, of which yield ranged from 2.1 ton/ha to 15.33 ton/ha. The net reserve of each member from each plot of 0.25 ha is summarized below. *(Section 5.7.4)*

Net Reserve of 1st Crop in Oda Chisa WUA

No. of Members	Crop 1		Crop 2		Crop 3		Total net reserve (Birr)
	Crop	Net reserve (Birr)	Crop	Net reserve (Birr)	Crop	Net reserve (Birr)	
1	Cabbage	1,696					1,696
2	Chili	260					260
3	Chili	104					104
4	Green been	98					98
5	Chili	311					311
6	Chili	1,121					1,121
7	Chili	327	Cabbage	1,199			1,526
8	Chili	654	Tomato	64			718
9	Chili	659	Cabbage	296			955
10	Chili	833	Cabbage	785			1,618
11	Chili	-64	Tomato	-49	Onion	1,306	1,193

The procurement cost of a pump is Birr 40,000, of which annual reserve is estimated to be Birr 5,000 assuming that its useful life time is eight years. Each member with a 0.25 ha plot is requested to pay Birr 250 a year (Birr 5,000/20 members). As seen in the above table, all the members except No.3 and No.4 already generated more than Birr 250 a crop. From the results of the PBME, the farmers' capacity to pay the pump replacement cost is basically proved. The monitoring will be continued by the OIDA Meki office.

50. On the basis of the experiences obtained through the Meki study, Program II of the Study has made further attempts for standardization of the procedure for establishment of WUA. The following are important lessons learned through the Study. *(Section 5.8)*

1) Even Distribution of Land and Water Resources
2) Demarcation of Responsibilities between OIDA and WUA
3) Awareness Creation of Project Ownership
4) Optimum Irrigation Planning and Design
5) Integrated Agricultural Supporting System
6) Institutional Set-up

51. The "Guideline for Establishment and Management of Water Users Associations" (WUA) was prepared by elaborating the guideline prepared through Program 4 of the Meki study. *(Section 5.9)*

Chapter 6 Rehabilitation of Existing Schemes (Program III)

52. Program III selected three model schemes from 37 existing irrigation schemes under OIDA Central Branch Office according to the selection criteria mentioned below. *(Section 6.1)*

1) Schemes face common technical problems prevailing among the OIDA schemes.
2) Schemes are located within an area of good accessibility to ensure study efficiency and high demonstration effects.
3) Schemes require small-scale but urgent rehabilitation.
4) Payback from rehabilitation is high.

53. First of all, the attempts were made to classify the existing schemes into the following three categories on the basis of the cause of low irrigation performance. *(Section 6.2.2)*

Category A : Low irrigation performance is caused directly by serious defects and deterioration of irrigation facilities.

Category B : Irrigation activities are stagnant due to weak WUA management resulting in low irrigation performance.

Category C : Causes of low irrigation performance are complex and vary by scheme. Instead of taking quick action for rehabilitation purposes, the major cause-effect relationship prevailing in a scheme will be identified first.

On the basis the data and information collected through the Meki study, each of the 37 schemes was classified into the above three categories or as functioning at a reasonable level as presented below.

Problem Category and Number of Schemes

Symbol	Category	No. of Schemes
A	Deterioration of facilities	5
B	Weak WUA management	7
C	A+B or other constraints	15
Functioning at reasonable level		10
Total		37

54. Program III selected three model schemes, namely Ketar, Gedamso and Sadi Sadi & Lafa from each of the three categories (category A, B, and C) on the basis of the field inspection results and the discussions between the JICA Study Team and the OIDA counterpart team. *(Section 6.2.3)*

Command Areas and Beneficiaries of the Selected Schemes

No.	Scheme	Wareda	Command Area (ha)		Beneficiaries(HH)	
			Plan	Actual	Plan	Actual
1.	Ketar	Tiyo	400	367	590	642
2.	Gedamso	Munnesa	170	100	134	156
3.	Sadi Sadi & Lafa	Munnesa	140	88	350	380
	Total		710	555	1,074	1,178

Source: Benchmark survey in August 2003

The Ketar scheme (Category A) was characterized by deterioration of main facilities, i.e. main canals 20 years old, which need urgent rehabilitation. The WUA management is reasonably steady so as to maintain the facilities with minimum support from OIDA. The Gedamso scheme (Category B) was initiated under the resettlement program for pastoral communities. Although the facilities are still functional, the WUA management is too weak to operate and maintain them.

The Sadi Sadi & Lafa schemes (Category C) are located in areas remote from the local market center. The deteriorated rural infrastructure, especially roads to the market, was the major constraint against proper agricultural activities.

55. The rehabilitation work under Program III was started in June 2003 and completed in March 2004 according to the following steps. *(Section 6.2.4)*

Procedure of Program III

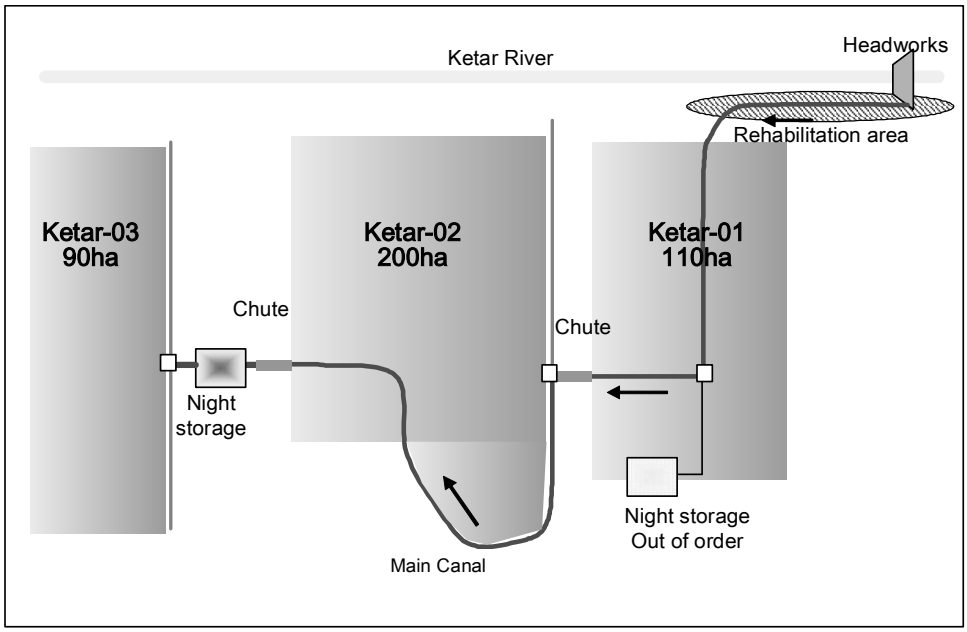
Step 1 Selection of model schemes
Step 2 Inventory survey of existing irrigation facilities
Step 3 Baseline survey of WUA
Step 4 Initial Environmental Examination (IEE)
Step 5 Formulation of rehabilitation plan and detail design
Step 6 Preparation of rehabilitation schedule
Step 7 Procurement and rehabilitation works
Step 8 Preparation of plot map and plot list
Step 9 Handing-over of irrigation facilities
Step 10 Training for DA and WUA for O&M of irrigation facilities

56. The Initial Environmental Examination (IEE) was conducted to assess potential impacts of rehabilitation works for three selected schemes, namely Ketar, Gedamso-02 and Sadi Sadi & Lafa schemes according to the check lists proposed by the following guidelines. *(Section 6.3)*

1) ESRDF's Small Scale Irrigation Project (Gravity) Technical Handbook, Component I on Guideline on SSIP Project Formulation (Nov. 1997), and
2) Study of Small & Medium Scale Irrigation Projects in Ethiopia, Part H Study Guideline on Environmental Impact Assessment, Ministry of Water Resources of FDRE (Aug. 2002).

It is assessed that potential environmental impacts of the proposed rehabilitation works under Program III are low or negligible. Therefore, the Study will not request OIDA to proceed to full Environmental Impact Assessment (EIA). However, it is recommended for OIDA to continue the environmental monitoring as a part of regular PBME

57. Ketar irrigation scheme is located in Tiyo wareda of the Arsi zone. The scheme is located 23 km south of Asela or 105km south of Adama. This scheme consists of three sub-schemes with a total irrigation area of 400 ha, which are called Ketar-01 (Ketar Genet), Ketar-02 (Golja) and Ketar-03 (Hamsa Gasha). The lifeline of this scheme is the main canal, which serves irrigation water to all three sub-schemes. *(Section 6.4.1)*



Layout of Ketar Scheme

58. The design discharge for the scheme is about 860 lit/sec to irrigate about 400 ha, according to previous design report. This design discharge includes domestic demand and consumption by animals. The total length of the main canal system is 12 km, of which the first 5 km is a headrace from the intake to the beginning point of Ketar-01. The main canal was constructed with lining of wet masonry work in 1980s. After continuous use for last the two decades, the main canal is seriously deteriorated with many cracks in mortar joints. Only 460 lit/sec flows at the beginning point of Ketar-01 area against the design discharge of 860 lit/sec. *(Section 6.4.1)*

59. The rehabilitation works were commenced by site according to the following schedule. *(Section 6.4.1)*

11 Jun. 2003	:	Preliminary site inspection
26 Jun. 2003	:	Site selection meeting with OIDA
2 to 16 Aug. 2003	:	Inventory survey of existing irrigation facilities
9 Aug. 2003	:	Baseline survey of WUA
17 Aug. to 15 Sep.	:	Formulation of rehabilitation plan, detailed design, and cost estimate
16 Sep. 2003	:	Meeting on rehabilitation works with OIDA
26, 27 Sep. 2003	:	Preparation of rehabilitation schedule
4 Oct. 2003	:	Commencement of rehabilitation works
8 Nov. 2003	:	Preparation of plot map and plot list
10 Dec. 2003	:	Completion of rehabilitation works
11 Dec. 2003	:	Final inspection and handing-over

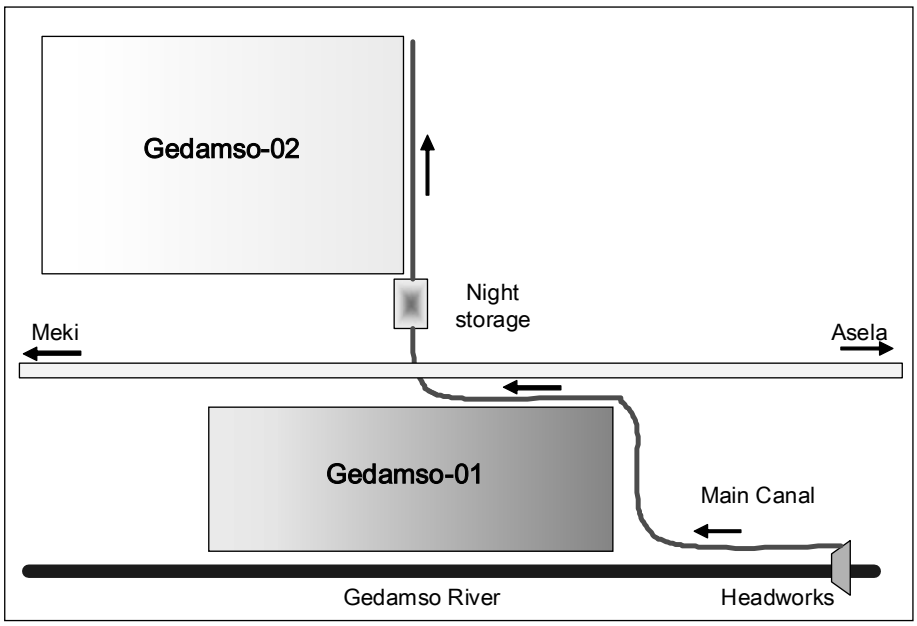
60. The physical rehabilitation works for the Ketar scheme are summarized below: *(Section 6.4.1)*

Rehabilitation Works in Ketar Scheme

Irrigation Facilities	Rehabilitation Works	
1. Main canal		
1.1 Aqueduct (sheet metal)	- Provision of anti rust	: 220m
1.2 Lined canal	- Re-plastering of lining	: 4,600m
	- Construction of retaining wall	: 20m
	- Provision of gabion	: 124m^3
1.3 Earth canal	- Excavation and cleaning	: 5,500m
2. Canal structures		
2.1 Culvert	- Construction of culverts	: 3 nos.
2.2 Spillway	- Replacement of gates	: 2 nos.
2.3 Diversion box	- Provision of gates	: 4 nos.
2.4 Chute	- Re-plastering of lining	: 150 m

61. Gedamso scheme consists of two sub-schemes, Gedamso-01 and Gedamso-02, with one headworks on the Gedamso river flowing into Langano Lake. The water source is the Gedamso river. The design discharge of the main canal is 185 lit/sec to irrigate 170 ha. During the site inspection, no serious problems of the main facilities, i.e. headworks and main canal, were observed. However it identified some symptoms implying weakness of the WUA in Gedamso-02. *(Section 6.4.2)*

62. The scheme was started under the resettlement program for pastoral communities. Since the communities were not sufficiently involved in the planning process of this scheme, beneficiaries are not well aware of their position as owners of the scheme and were too vulnerable to confront the development activities in association with the government agencies. The WUA consists of 156 HHs. Both Gedamso-01 and Gedamso-02 have independent WUAs respectively. The WUAs were organized in 1997. However, they dissolved their committees in 2001 and amalgamated to one WUA. Only 20 HHs are on the leading position of the scheme. *(Section 6.4.2)*



Layout of Gedamso Scheme

63. Farming practices were not well developed since the members were semi-pastoralists in the past. However, they are shifting their livelihood style to sedentary agriculture at present. There is also unequal allocation and distribution of irrigation land among the WUA members that ranges widely from 0.13 ha. to 4.0 ha. Only 70 ha or 50% of irrigation land has been developed, while rain-fed farming is practiced within the scheme. *(Section 6.4.2)*

64. The rehabilitation works were carried out according to the following schedule. *(Section 6.4.2)*

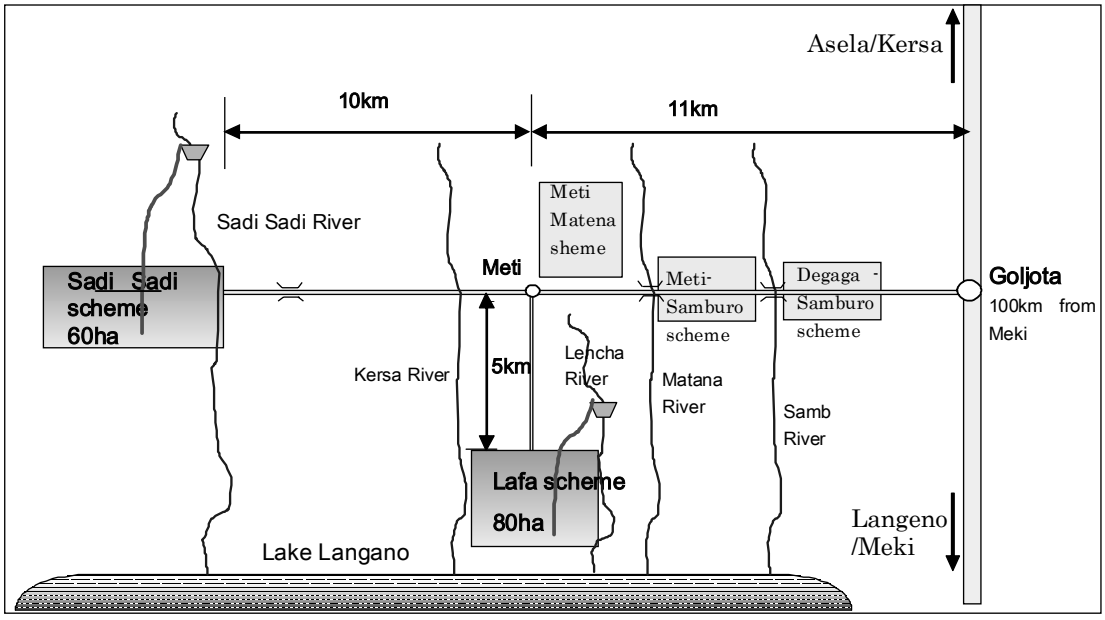
11 Jun. 2003	:	Preliminary site inspection
26 Jun. 2003	:	Site selection meeting with OIDA
2 to 16 Aug. 2003	:	Inventory survey of existing irrigation facilities
6 Aug. 2003	:	OIDA and WUA joint meeting, awareness creation
6 Aug. 2003	:	Baseline survey of WUA
17 Aug. to 15 Sep.	:	Formulation of rehabilitation plan, detailed design, and cost estimate
16 Sep. 2003	:	Meeting on rehabilitation works with OIDA
26, 27 Sep. 2003	:	Preparation of rehabilitation schedule
1 Oct. 2003	:	OIDA and WUA joint meeting, plan of rehabilitation works
4 Oct. 2003	:	Commencement of rehabilitation works
8 Nov. 2003	:	Preparation of plot map and plot list
23 Nov. 2003	:	Re-election of WUA executive committee
14 Nov. 2003	:	Commencement of land exchange
11 Jan. 2004	:	Completion of rehabilitation works
6 Jul. 2004	:	Handing over

65. Apart from community mobilization, the rehabilitation works were implemented in terms of the following facilities by participatory works. *(Section 6.4.2)*

Rehabilitation Works in Gedamso Scheme

Irrigation Facilities	Rehabilitation Works	
1. Headworks	- Replacement of sluice gate	: 1 no
2. Canals		
2.1 Main canal	- Excavation of earth canal	: 3,700m
	- Provision of canal base indicators	
	- Construction of lining	: 20m
2.2 Secondary canals	- Excavation of earth canal	: 2,800m
	- Provision of canal base indicators	
2.3 Tertiary and quaternary canals	- Excavation of earth canal	: 12.2 m
	- Construction of lining at TC4-4	: 40 m
	- Provision of canal base indicators	
3. Canal structures		
3.1 Division boxes	- Modification of gates	: 2 pcs
	- Provision of new gates	: 2 pcs.
3.2 Off-takes	- Construction of additional off-takes :	: 4 pcs..
	- Provision of gates	: 168 pcs
3.3 Drop	- Re-plastering of structures	
3.4 Culvert	- Construction of culverts	: 2 nos.
4. Night storage	- Replacement of outlet gate	: 1 pcs.
5. Canal slope protection works	- Provision of gabion	: 44.0 m^3

66. Sadi Sadi & Lafa irrigation schemes were developed by utilizing small streams flowing into Langano lake along the road between Langano and Kersa running parallel with the southern edge of Langano lake. *(Section 6.4.3)*



Location of Sadi Sadi & Lafa Schemes

67. Sadi Sadi scheme was started by traditional irrigation farming. The project planned to irrigate 60 ha of which only 41 ha are currently irrigated and the rest is occupied by homestead. Due to disordered fencing and expansion of farm plots, the canal

network is not efficiently aligned. The headwork of Sadi Sadi scheme, designed to divert 80 lit/sec from the Sadi Sadi river, is situated in the hilly land. The intake weir of the Lafa scheme was constructed on the Lencha river with diversion discharge of 120 lit/sec in order to irrigate 80 ha, but only 53 ha of land has been irrigated. *(Section 6.4.3)*

68. Poor road conditions are the main constraints against project operation for both schemes. According to the farmers, sugarcane and maize are currently the main crops of the schemes because bad roads do not allow them to produce crops that bruise easily. Due to remoteness and poor road conditions, any government support to these schemes is too limited. OIDA has strong intention to extend their support to road repairing. *(Section 6.4.3)*

69. The rehabilitation works were carried out according to the following schedule. *(Section 6.4.3)*

21 Jun. 2003	:	Preliminary site inspection
26 Jun. 2003	:	Site selection meeting with OIDA
2 to 16 Aug. 2003	:	Inventory survey of existing irrigation facilities
7 Aug. 2003	:	Baseline survey of Sadi Sadi WUA
8 Aug. 2003	:	Baseline survey of Lafa WUA
26 Aug. to 7 Sep.	:	Leveling survey of access road
17 Aug. to 15 Sep.	:	Formulation of rehabilitation plan, detailed design, and cost estimate
16 Sep. 2003	:	Meeting on rehabilitation works with OIDA
26, 27 Sep. 2003	:	Preparation of rehabilitation schedule
14, 15 Oct. 2003	:	Meeting on the issues of access road maintenance with WUAs, communities along the road, PAs, and wareda administration staff
22 Oct. 2003	:	Commencement of road maintenance works by communities
11 Dec. 2003	:	Commencement of rehabilitation works in Lafa and access road by OIDA
1 Feb. 2004	:	Completion of rehabilitation works in Lafa
9 Feb. 2004	:	Commencement of rehabilitation works in Sadi Sadi
3 Mar. 2004	:	Completion of rehabilitation works in Sadi Sadi
6 Jul. 2004	:	Handing over of Sadi Sadi and Lafa Schemes

70. The physical rehabilitation works for Sadi Sadi & Lafa schemes are summarized below: *(Section 6.4.3)*

Rehabilitation Works in Sadi Sadi & Lafa Schemes

Irrigation Facilities	Rehabilitation Works	
1. Sadi Sadi Scheme		
1.1 Headworks	- Improvement of weir body	: 1 no
	- Installation of intake and sluice gates	
1.2 Canals	- Lining of main canal	: 600 m
	- Plastering of secondary canals	: 200 m
	- Lining of tertiary canals	: 500 m
1.3 Canal structures	- Improvement of division box	: 1 no
	- Installation of gates at offtakes	: 24 pcs.
	- Construction of cross drainage	: 1 no
2. Lafa Scheme		
2.1 Headworks	- Extension of right side wall	: 1no
	- Maintenance of sluice gate	: 1no
2.2 Canal	- Plastering of main canal	: 130 m
	- Plastering of secondary canal	: 2,500 m
2.3 Canal structures	- Improvement of division box	: 2 no
	- Installation of gates at offtakes	: 23 pcs.
	- Construction of culvert	: 1 no
	- Construction of cross drainage	: 1 no
3. Access Road between Goljota and Sadi Sadi / Lafa		
3.1 Road	- Road clearing work	: 15.0 km
	- Filling gully erosion	: 10.2 km

71. All the rehabilitation works for three schemes were completed in March 2004. Estimated costs and actual expenditures for the rehabilitation works for the three schemes are summarized below. *(Section 6.4.4)*

Summary of Estimate Costs and Expenditures

No.	Scheme	Area (ha)	Estimated cost (Birr)	Cost	
				Total (Birr)	Unit (Birr/ha)
1.	Ketar	400	295,400	350,400	876
2.	Gedamso	170	106,000	160,700	945
3.	Sadi Sadi & Lafa	140	421,000	473,833	3,385
	Total/Average	710	822,400	984,933	1,387

Source: The JICA Study Team, May 2004-

72. The PBME was carried out for the above-mentioned three schemes through direct interview with the WUA boards and a questionnaire survey to WUA members. The irrigable areas in both Ketar and Sadi Sadi schemes were increased after the rehabilitation as seen in the table below. The planted area of both Gedamso and Lafa schemes were decreased by delay of the rehabilitation work resulting in abandonment of dry season crops. The planted areas of both Gedamso and Lafa schemes will be increased in the next crop seasons. *(Section 6.5)*

Summary of Rehabilitation Schemes

Scheme	WUA	Plan		Before Rehabilitation (A)		After Rehabilitation (B)		Improvement Ratio (B/A)	
		Irrigation area (ha)	Member (HH)	Irrigable area (ha)	Member (HH)	Irrigable area (ha)	Member (HH)	Irrigable area	Member
Ketar	Ketar Genet	110	276	107	277	115	282	107%	102%
	Golja	200	180	170	190	198	202	116%	106%
	Hamsa Gasha	90	114	90	175	125	205	139%	117%
Gedamso	Gedamso	170	134	100	156	150	309	150%	198%
Sadi Sadi & Lafa	Sadi Sadi	60	210	35	240	50	240	143%	100%
	Lafa	80	50	53	140	70	145	132%	104%
Total		710	964	555	1,178	708	1,383	128%	117%

73. The rehabilitation works encouraged the WUA management. The WUA boards embarked on proper water management at completion of the rehabilitation. They prepared water distribution schedules. Under Program III, plot layout maps were prepared by DAs in association of the WUAs. The WUAs recognized that the plot layout maps are useful, especially for collection of water charges and other fees from member farmers. They also understood the necessity of periodical updating of the map information. The majority of the WUA members accepted their individual responsibilities for canal maintenance and minor repairs of facilities. The water charges are already being collected in the Ketar scheme. In Gedamso and Lafa schemes WUA members decided to collect water charges regularly at a fixed rate.*(Section 6.5)*

Chapter 7 Preliminary Study on Master Plan

74. The Study obtained a wide range of experience and lessons learnt through the WUA establishment under Program II and the rehabilitation works under Program III. On the basis of these experiences and lessons learnt, the master plan was preliminarily studied to indicate possible directions to OIDA for extension of both Programs in future. *(Section 7.1)*

75. The small-scale irrigation development in the Meki area will be rational in terms of environmental requirements. The socio-economic advantages of the Meki area suitable for vegetable production will also be taken into consideration for poverty reduction in the Meki area. The Master Plan for the community-based irrigation development will be prepared under the following conditions. *(Section 7.2.3)*

1) Further expansion of the small pump irrigation will be controlled under the government authority. Especially, the pump irrigation along the Meki river is not to be expanded any more. Instead of the Meki river, the Ziway lake and

groundwater will be major water sources for irrigation in the Meki area. Water-saving irrigation techniques will be required.

2) Small-scale vegetable production will be encouraged more for local community instead of commercial farms. More government supports will be required to assist vegetable production by local farmers, especially input supplies. Micro-finance will be required for irrigation development through linkage with NGOs, who have skill and experience with micro-finance. Crop diversification is another important aspect to mitigate market risk for local farmers.

Meki Community-based Irrigation Development Program

76. Efforts have to be directed to rationalization of water use within the system. Since the irrigation sector is one of the primary water users, irrigation activities in the system have to be frequently monitored and optimized under the responsibility of the regional government especially by OIDA in order to reduce a risk of environmental degradation. Under such conditions, the following two (2) components are proposed under the Program. *(Section 7.2.3)*

77. Component 1: Promotion of WUA Establishment - In line with the Study, the Program will continue technical and institutional supports to establish new WUAs by providing them opportunities to access any assistance by OIDA, ESRDF and NGOs. Some 50 applications from candidate groups have been received by the OIDA Meki office. Out of 50 groups, 30 groups, of which water sources are either the Ziway lake or groundwater, will be selected and mobilized for the community-based irrigation. The target area will be 150 ha, i.e. 5.0 ha x 30 WUAs, to be managed by 600 HHs at a standard rate of 0.25ha/HH and 20HHs/WUA. *(Section 7.2.4)*

78. Component 2: Introduction of Water-Saving Irrigation Technology - In view of the limited water resources in the Rift Valley, water use by the irrigation sector will be made more efficient by introduction of water-saving irrigation techniques. To promote the water-saving irrigation technology, the following support will be implemented by OIDA and other agencies concerned: *(Section 7.2.5)*

1) Irrigation research will be executed by OIDA in Meki in order to justify their technology including water management and crop maintenance. The water-saving irrigation technology for local farmers will be optimized by selection of irrigation area, pump capacity, and related equipment requirements, including pipes and water filters.

2) The performance will be demonstrated in order to convince farmers the advantage of the modern irrigation system. In parallel, training will be provided to both DAs and farmers.

3) Financial support, especially long-term credit, will be arranged by the government.

79. Action Plan for Water-saving Irrigation Research Program; As a first step of the program, it is required to embark on the irrigation research with such specific objectives as i) optimization of furrow irrigation techniques by reducing water loss, ii) introduction of modern irrigation systems such as drip and sprinkler, iii) crop diversification with selection of high value crops and iv) intensive training of DAs and leading farmers. *(Section 7.2.6)*

Existing Irrigation Schemes Rehabilitation Program in Oromia Region

80. The rehabilitation works being carried out or planned for 28 schemes selected out of 96 schemes in the Region, which include Ketar, Gedamso, Sadi Sadi and Lafa schemes. The Program aims at continuing rehabilitation works of the remaining 68 schemes. The master plan consists of four components, namely (i) project benefit monitoring and evaluation (PBME), (ii) establishment of standard O&M rules, (iii) O&M training for DAs and WUAs and (iv) implementation of rehabilitation works. The four components will be implemented in parallel. *(Section 7.3.1)*

81. Action Plan for Capacity Building of OIDA Branch Offices for Rehabilitation Program; Program III of the Study implemented the rehabilitation of Katar, Gedamso and Sadi Sadi & Lafa schemes out of 37 schemes. Through Program III, the approach and methodology for the farmers' participatory rehabilitation work were preliminarily optimized. The proposed program will carry out the rehabilitation work as continuation of Program III in the entire region. The implementation schedule will be prepared on the basis of the budgetary status under the OIDA Strategic Planning and Management Plan (2003-2005). Technical and financial assistance, including provision of heavy equipment, will be required for execution of the Program. *(Section 7.3.2)*

Chapter 8 Assessment of the Program

82. An overall assessment was made to evaluate the achievement of the study objectives, namely (i) standardization of the development procedures and (ii) capacity building for the OIDA staff. The Study firstly focused on self-assessment by the OIDA staff though the questionnaire survey. Secondly, the JICA Study Team assessed the impacts of the Study on the OIDA staff and the irrigation sub-sector of the Oromia Region by referring to the lessons leant from Programs II and III. *(Section 8.1)*

83. Some 30 OIDA staff have continuously participated in several training activities under the Study. The training programs were intensively carried out for 10 months from May 2003 to February 2004 and followed up for two months from May to June 2004. The total number of participants amounted to 1,760 person-days apart from other agencies and WUA. *(Section 8.2)*

84. A questionnaire survey was carried out. A total of 31 OIDA staff responded by filling out questionnaires. Through the self-assessment by the OIDA staff, the following findings are presented. *(Sections 8.3.1 and 8.3.2)*

Program II

1) An approach of community-based irrigation development is fairly well acknowledged among OIDA staff for its importance.
2) Involvement of farmers from an initial stage of irrigation planning is recognized to be important among respondents.
3) Roles of social workers in the community approach are evaluated to be important, while improvement of the status of social workers is assessed to be not well achieved in the Study.
4) Applicability of the guideline for establishment of WUA is fairly assessed.

Program III

1) It is obviously found that rehabilitation of existing schemes is assessed to be highly important.
2) With regard to the problem analysis approach to rehabilitation work, the importance of the approach is fairly acknowledged.

85. The OIDA staff was asked to provide the JICA Study Team with prioritized areas where external support is further required for OIDA. Respondents generally gave high importance to (i) research of irrigation technology, (ii) capacity-building for OIDA staff and (iii) continuous activities for community-based irrigation development. The OIDA staff selected the following four main areas of activities to

be strengthened for OIDA in the future. *(Section 8.3.3)*

1) Research of irrigation technology
2) Community-based irrigation development
3) Water harvesting project
4) Agriculture extension in irrigation schemes

86. The JICA Study Team recognized the impacts on OIDA as a result of the capacity building programs under the Study. They include the following aspects. *(Section 8.4.2)*

1) Growing recognition of the bottom-up approach
2) Status of social workers within the OIDA organization
3) Impacts to local communities by frequent visits of the OIDA staff
4) Growing recognition of environmental conservation
5) Close relation among OIDA headquarters, branch offices and wareda offices

The Study
on
Capacity Building Programs for
Community-based Irrigation Development in
Central Oromia Region of Ethiopia

MAIN REPORT

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Abbreviations and Acronyms for Names and Phrases

A/C	Account
ADLI	Agricultural-Development-led Industrialization
AfDB	African Development Bank
BMF	Benchmark Farmers
BO	Branch Office
DA	Development Agents
DAO	District Agriculture Office
DAP	Diammonium Phosphate
DPPB	Disaster Prevention Preparedness Bureau
DPPC	Disaster Prevention Preparedness Commission
EARO	Ethiopian Agricultural Research Organizations
ECA	United Nations Economic Commission for Africa
EIA	Environmental Impact Assessment
EPP	Extension Package Program
EPRDF	Five Years Programmes of the Ethiopian Peoples Revolutionary Democratic Front
ESRDF	Ethiopian Social Rehabilitation and Development Fund
FAO	Food and Agriculture Organization
FDRE	Federal Democratic Republic of Ethiopia
FRG	Farmers Research Group
FSPCO	Food Security Program Coordination Office
GDP	Gross Domestic Products
GOE	Government of Ethiopia
GPS	Global Positioning System
HH	Household
HP	Horse Power
IEE	Initial Environment Examination
IFAD	International Fund for Agricultural Development
JICA	Japan International Cooperation Agency
MD	Mandays
M/M	Minutes of Meeting
MoFED	Ministry of Finance and Economic Development
NGO	Non-Governmental Organization
O&M or OM	Operation and Maintenance
OADB	Oromia Agricultural Development Bureau
OIDA	Oromia Irrigation Development Authority
PA	Peasant Associations
PBME	Project Benefit Monitoring and Evaluation
PCM	Project Cycle Management
PPO	Private Pump Owner
PRA	Participatory Rural Appraisal
S/W	Scope of Work
SC	Secondary Canal
SDPRP	Sustainable Development and Poverty Reduction Program
Self Help or SHI	Self Help Development International
TC	Tertiary Canal
TOR	Terms of Reference
UNDP	United Nations Development Program
VS	Verification Study
WMERDO	Water, Mines and Energy Resource Development Office
WSDP	Water Sector Development Programme
WUA	Water Users Association

Abbreviations (Units and Currency)

kg	Kilogram
t	Ton
qt	quintal (100 kilogram)
h	hour
mm	millimeter
cm	centimeter
m	meter
km	kilometer
ha	hectare
km^2	square kilometer
m^3	cubic meter
MCM	million cubic meter
mm/mon	millimeter per month
mm/d	millimeter per day
m/s	meter per second
m^3/s	cubic meter per second
$^{\circ}C$	degrees centigrade
%	percent
US$	United States of America Dollar

Exchange Rate

US$1.00 = ¥ 117.42 = Ethiopian Birr 8.852

Ethiopian Birr 1.00 = ¥ 13.3

(15 September 2003)

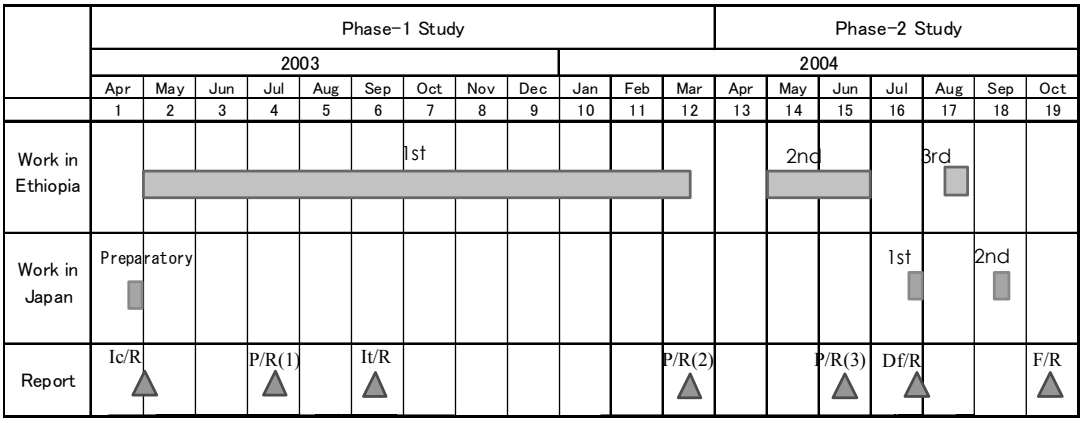
CHAPTER 1

INTRODUCTION

1.1 Authority

The Study on the Capacity Building Programs for Community-based Irrigation Development in Central Oromia Region of Ethiopia (hereinafter referred to as "the Study) is carried out in accordance with the Scope of Work (S/W) agreed upon between Oromia Irrigation Development Authority (OIDA), the Government of the Oromia Regional State and the Japan International Cooperation Agency (JICA) on 17th December 2002. The S/W and the Minutes of Meeting on the S/W are as per Attachment-1.

The Study officially commenced with the arrival of the JICA Study Team in Addis Ababa on 26th April 2003. The steering committee meeting was held and agreed to the plan of operation on the basis of Inception Report. The Minutes of Meeting on the Inception Report are as per Attachment-2. The Study was carried out over 19 months from April 2003 to October 2004 according to the work schedule presented below.



Remarks: Ic/R: Inception Report, P/R: Progress Report, It/R: Interim Report, Df/R: Draft Final Report, F/R: Final Report

Overall Study Period

The interim results of the Study have been discussed and agreed to by the Steering Committee whenever Progress and Interim Reports were submitted according to the work schedule presented above. The minutes of the steering committee meetings are as per Attachments-3 to 6.

1.2 Objectives

The objectives of the Study are defined in Clause II of the S/W as below.

1) To enhance the capacity of OIDA through small-scale irrigation development and rehabilitation of model irrigation schemes, and
2) To standardize small-scale irrigation development and rehabilitation of the existing schemes.

The S/W of the Study was drawn and justified from the results of the previous JICA study, namely the Meki Irrigation and Rural Development Project (the Meki study) carried out from August 2000 to February 2002.

1.3 Study Area

The study area covers Meki and the central part of the Oromia Region (the Region) consisting of five (5) Zones, namely East Shoa, North Shoa, West Shoa, Southwest Shoa and Arsi Zones, which are coincident with the service area of Central Branch Office of OIDA located in Adama, the capital of the Region. The location of the study area is presented in the frontispiece of this report.

1.4 Scope of the Study

In order to achieve the objectives mentioned above, the S/W defines the activities of the Study as follows.

Program I : Training Program for the OIDA staff

- 1.1 Training of participatory development (PRA, PCM)
- 1.2 Training of irrigation engineering
- 1.3 Workshop on project benefit monitoring and evaluation (PBME)
- 1.4 Monitoring and evaluation of the Shubi-Sombo Schemes
- 1.5 Technical studies concerning other related subjects

Program II : Water Users Associations (WUAs) Support Program in Meki Area

- 2.1 Capacity building in WUAs formulation
  - (1) Overall guidance on the guideline to the OIDA staff
  - (2) Selection of five candidate WUAs
  - (3) Planning and design
  - (4) Construction of schemes
  - (5) O&M training to WUAs
  - (6) Monitoring and evaluation

2.2 Capacity building in environmental monitoring
(1) Hydrological and metrological survey
(2) Survey on irrigation water utilization in the Meki-Ziway system

Program III : Rehabilitation of Existing Schemes

3.1 Planning and design
(1) Review and updating of OIDA's database
(2) Preparation of planning and design criteria
(3) Selection of three model areas
(4) Detailed inventory of project facilities and defects
(5) Selection of rehabilitation works under Program III
(6) Detailed design and cost estimates

3.2 Implementation of rehabilitation works
(1) Mobilization
(2) Preparation of construction planning
(3) Construction
(4) O&M training to WUAs
(5) Monitoring and evaluation

1.5 Organizational Set-up

The organizational set-up for the Study is illustrated in Figure 1.5.1. The General Manager of OIDA and the Central Branch Office Manager participated directly in the project coordination for smooth operation of the Study. JICA assigned six Japanese consultants for the Study as per the schedule presented in Figure 1.5.2.

1.6 Steering Committee

The Steering Committee was established in April 2003. OIDA took responsibility to convene and chair the meeting. The member organizations were:

Ethiopian:
Supreme Office for Rural Development and Agriculture
Oromia Irrigation Development Authority (OIDA)
Oromia Agricultural Development Bureau (OADB)
Food Security Program Coordination Office
Oromia Water Resource Bureau
Rural Land Administration and Natural Development Authority
Oromia Environmental Protection Authority
Women's Affairs Office
Ministry of Finance and Economic Development (MoFED)

Japanese:	JICA Study Team
	Advisory Team
	JICA Ethiopia office
	Embassy of Japan

CHAPTER 2

PROJECT BACKGROUND

2.1 Policy Background

2.1.1 Agricultural Development Policy under Fiver Year Program (2000–2005)

The agricultural sector of Ethiopia plays a leading role in the growth of the national economy. It contributes employment opportunities to 74% of the total workable population and generates approximately 50% of Gross Domestic Product (GDP). Rain-fed agriculture is prevalent in the country; therefore, food production fluctuates greatly due to erratic rainfall. Food shortage is becoming chronic and will be accelerated by rapidly expanding population pressure in the years to come.

The Five Year Programs of the Ethiopian Peoples Revolutionary Democratic Front (EPRDF) for Development Peace and Democracy are officially accepted as the primary policy papers to direct the national development strategies in Ethiopia. The first five year program covered the period from 7th July 1995 to 6th July 2000, which was followed by the second five year program from 7th July 2000 to 6th July 2005. Both Programs envisage the agricultural development activities (i) to ensure national food self-sufficiency, (ii) to improve citizen's food security, (iii) to speed upgrading the level of living standard of peasants, (iv) to lay a strong foundation for the economic development, mainly for industrial development, (v) to strengthen foreign currency earnings, and (vi) to improve the conservation of natural resources.

To achieve the above-mentioned goals, the Programs direct to encourage (i) expansion and improvement of extension programs, (ii) improvement of rural marketing systems, (iii) strengthening development activities in pastoral areas and (iv) strengthening irrigation development activities.

2.1.2 Sustainable Development and Poverty Reduction Program

Poverty reduction continues to be the core agenda of the country's development and was codified into the "Sustainable Development and Poverty Reduction Program" (SDPRP) in July 2002. It consists of four building blocks, namely 1) agricultural-development- led industrialization (ADLI) and food security, 2) judiciary and civil service reform, 3) decentralization and empowerment, and 4) capacity building in public and private sectors. Among the four blocks, achievement of substantial progress of ADLI and food security is probably the most urgent issue.

The Government of Ethiopia (GOE) has followed a long-term strategy of ADLI adopted since the mid-1990s within the framework of the draft PRSP. ADLI places emphasis on agricultural growth as the first stage of the national economic development to encourage industrialization as the final goal of the country. To start ADLI, agricultural growth is firstly envisaged to raise the level of national food self-sufficiency and will be followed by producing both export-oriented and industrial crops. The GOE attached his development priority to improvement of food security at the household level as the most effective and direct way of poverty reduction in the country.

Within this perspective, SDPRP highlights the seven key sector development policies and strategies to achieve objectives; namely, (i) rural and agricultural development; (ii) food security; (iii) pastoral development; (iv) roads; (v) water resource development; (vi) education; and (vii) health. Among these seven highlighted sector development policies and strategies, three policies and strategies of (i) rural and agricultural development, (ii) food security; and (v) water resource development accommodate small-scale irrigation as means of development. Materializing these policy implementations in the SDPRP financing program for the five targeted sectors of agriculture, including food security, roads, water, education and health is proposed, including irrigation development.

Besides the above, decentralization and empowerment are addressed in SDPRP in a way that is shifting the centre of socio-economic development to the districts (waredas). Within this framework, small-scale irrigation is placed as one of the waredas' secondary financed socio-economic activities, proceeded only by the five primary activities of primary education, primary health care, rural water supply, rural roads and agricultural extension.

2.1.3 Decentralization Policy

Decentralization is an immediate outcome of the adoption of a federal system of government in Ethiopia. A series of proclamations made by the Transitional Government of Ethiopia, e.g., Proclamations No 7/1992, No.11/1992, No.33/1992, No.41/1993, No.73/1993, and culminating in the proclamation of the 1994 Constitution of the Federal Democratic Republic of Ethiopia (FDRE), lays the basis for devolution of decision-making powers and responsibilities to the nine regional states and two city administrations. Each region can establish an administration that ensures self-governance, enacts a state constitution and other laws, formulates and executes socio-development policies and programs, administers land and natural resources and the like.

Potential benefits from this decentralization include:

1) Local solutions for local problems: Size and diversity of interventions designed at national level are unlikely to be useful in all areas. Decentralization avoids these problems by having solutions decided upon in each district.
2) Better response to needs: Local Governments are closer to rural clients than is the central government. They should be in a better position to respond to the needs of the poor and to manage partnerships with other service providers.
3) Participation: Local control opens the possibility for stakeholder participation in identifying local participation, organizing work plans and evaluating program performance.

Decentralization in general has three dimensions:

1) Deconcentration as a means of transferring administrative functions to sub-ordinate sub-national units;
2) Delegation as a means of transferring complex tasks and responsibilities to semi-independent authorities and
3) Devolution as a transfer of power to sub-national political entities, which are answerable to their electorates via a local /regional parliament or council.

Accordingly, decentralization may incorporate one, or all three dimensions of administrative, financial and political decentralization. Decentralization is not an objective on its own. It is a means, which is expected to contribute to the following objectives.

1) More appropriate situation-specific services or support.
2) More effective public participation would be created.
3) Increased accountability and transparency
4) Better chances of establishing community involvement and local ownership of public facilities through public-community partnerships, which enhances sustainability.
5) Increased efficiency of public services by avoiding procedures within hierarchical bureaucratic systems and the related demotivation of staff.
6) Multi-sector co-ordination of activities at a local or regional level.
7) Increased performance of public service providers as a result of competition between (semi)-autonomous local government units; and
8) Political stabilization and maintenance of national unity by providing a certain degree of autonomy to regional societies.

The GOE has taken further steps of decentralization since 2004 by issuing a nation-wide policy, the title of which is translated into English as ‘Issues of Democratic System Building in Ethiopia’. This policy identifies waredas as the

centre of socio-economic development. Small-scale irrigation becomes an integral part of development programs that districts have the mandate to conduct.

2.1.4 Water Sector Development Program (WSDP)

The Ministry of Water Resources of FDRE has directed every effort towards full and optimum utilization of the water resources and prepared the Water Sector Development Program (WSDP), in which priority projects are identified and a detailed implementation plan is worked out using the previous basin master plan studies. The WSDP consists of five sub-sectoral programs, namely, irrigation development, water supply and sewerage, hydropower development, water resources development and institution and capacity building for 15 years from 2002 to 2016.

The overall objectives of the Irrigation Development Program (IDP) are;

a) To improve the food security and food self-sufficiency status of the country, both at the national and household levels;
b) To improve the nutritional status and general welfare of the population;
c) To contribute to the supply of adequate raw material inputs for industries;
d) To build national and regional capacities for planning, implementation and operation of irrigation projects;
e) To exploit untapped land and water resources for sustainable irrigated agriculture;
f) To reduce dependence on rain-fed agriculture and attendant vagaries of the Ethiopian climate;
g) To improve rural employment through increased cropping intensity; and
h) To improve land productivity through double cropping.

In the short-term (2002-2006), IDP gives emphasis to the development of small-scale irrigation with the average size of each small-scale irrigation scheme between 70 and 90ha. In addition, capacity building in the study, design and implementation of irrigation projects will be at the forefront of the development program. Wherever possible, priority shall also be given to the completion of on-going and suspended large-scale irrigation projects. Increasing emphasis will be given to the development of large and medium-scale irrigation schemes in the medium to long-term. OIDA's Strategic Planning and Management Plan (2003-2005) mentioned later is prepared in line with IDP.

2.2 Agricultural Sector of Oromia

The Region is the largest region in Ethiopia with a total area of 359,620 km^2 or 34% of the national land. The regional population is estimated to be over 25 million based on the 1994 census and annual growth rate of 2.82%. The economically

active population (15-64 years old) in the Region accounts for 50% of the regional population. Some 88 % of the population lives in the rural area where livelihood entirely depends on subsistence agriculture.

Agriculture is the foundation of the economy of Oromia, accounting for about 65% of the regional GDP. Exports of the agricultural products such as coffee, hides and skins, pulses and oilseeds largely contribute to foreign exchange earning. Extensive plains and plateaus constitute about 5.0 million ha of agricultural land comprising 4.9 million ha of rain-fed agriculture and 93,000 ha of irrigated agriculture in 1997/98.

Due to the diverse agro-climate conditions, a wide range of crops is grown in Oromia. The total cereal production amounted to 4.3 million ton. Maize, teff, wheat, barley, millet and sorghum accounted for 18% each. More than 50% of the total cereal production was produced in North Shoa, East Shoa and Arsi zones in the central area of the Region. Cereal production is characterized by limited use of inputs. Consequently, the crop yield was as low as 1.2 ton/ha in 1993/4 – 1998/9. About 0.36 million ton of pulses and oilseeds combined were harvested in 1998/9. The major cash crops are represented by Arabica coffee and chat followed by sugarcane and cotton. The annual production of coffee amounted to 0.22 million ton in 1998/9. The production of other crops such as spices, vegetables, fruits, etc. was estimated at 0.45 million ton in the same year.

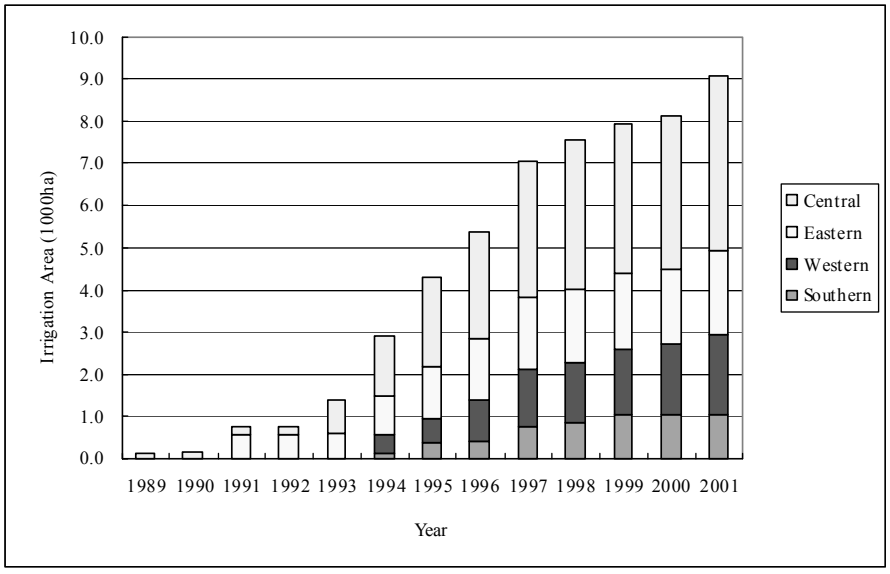
2.3 Irrigation Sub-sector of Oromia

The Region has 63 river systems and 688 tributary streams, which annually generate 58 billion m^3 of surface water. This overall discharge is equivalent to nearly a half of the national total. Despite the large water resource potentials, the regional agriculture is almost entirely dependent on rain-fed farming. According to a recent study (1999) conducted by the Oromia Economic Study Office, 1.7 million ha of land is suitable for surface irrigation in the Region. Out of this potential area, only 93,185 ha or 5.5 % has been developed so far. Irrigated land in the Region is divided into four categories , namely, traditional schemes, state farms, private farms and modern communal schemes.

Traditional irrigation has been practiced in 49,000 ha of the Region. It is based on diversion structures, which are constructed by farmers with use of mud, rocks, twigs or their mixtures. The structures are generally washed away by seasonal floods and require maintenance or reconstruction frequently. On the other hand, there are six large irrigation schemes with modern facilities. They are managed to produce high value cash crops such as fruits and vegetables under the direct control of the government. Private commercial schemes are concentrated mainly in the Rift

Valley system. The river and lake systems on bottomland of the Rift Valley system provide potential for small but highly productive irrigation farming.

Modern communal schemes have been developed by government efforts after the catastrophic drought of 1984. To improve food security and farm family income, a series of micro and small scale irrigation schemes were constructed throughout the Region. These schemes were fed by springs, streams and small rivers and vary in size from a few ha to 200 ha without use of large and complicated diversion structures. According to the latest information provided by the Planning and Information management Service of OIDA, there are 132 irrigation schemes in the Region with a total command area of 11,166 ha, of which 9,115 ha are actually operated. The progress of the irrigation development in the Region is illustrated as seen below.



Progress of Irrigation Development in Oromia

(Source: Planning and Information Management Service of OIDA)

In the OIDA schemes, the irrigation facilities are, in principle, operated and maintained under the responsibility of water users associations (WUA) after the handing-over of the facilities from the government to WUAs at the completion of project construction. So far 132 WUAs have been organized by 31,288 farm households.

NGOs have also expanded their assistance to local communities in the irrigation development of the Region since the middle of the 1990s. As of May 2003, 72 schemes with a total irrigation area of 6,066 ha were operational for 20,695 households.

2.4 Oromia Irrigation Development Authority (OIDA)

2.4.1 Tasks and Responsibilities

OIDA was established in July 1999 with specific aims at streamlining overall irrigation development services under the sole organizational framework. The main task of OIDA is to develop irrigation schemes in line with the national policy of food security and poverty reduction. According to the "Oromia Regional State Irrigation Development Authority Establishment Proclamation, No. 30/1999," the major tasks of OIDA include;

1) Study, design and construction of irrigation schemes in potential areas,
2) Contribution towards hastening the socio-economic development in rural areas,
3) Assistance to rural communities to benefit from irrigation projects through participation in study, construction and operation,
4) Provision of technical assistance in irrigation extension, operation and water management of community-based irrigation schemes, and
5) Promote environmental conservation through watershed management relevant to irrigation development.

Since its establishment, 159 pre-feasibility and 72 feasibility studies have been made and 29 schemes were constructed to develop 2,281 ha of land on which 5,430 family heads were benefited. Introduction of water harvesting techniques was started in 2002 to construct 44,149 ponds, 3,452 dug wells, 509 underground tanks for supplemental water supply to rain-fed crops on 14,443 ha and benefit 48,100 households. The training programs were provided to 663 user community members on irrigation development and their scheme management and 247 Development Agents (DAs) with 9,425 farmers on water harvesting.

2.4.2 Strategic Planning and Management Plan (2003-2005)

OIDA set up the Strategic Planning and Management Plan (2003-2005) in September 2003 to develop a systematic approach dealing with the process that enable OIDA to develop shared vision and maintain an appropriate financial and human resources utilization for effective output. The Plan stipulates the following issues of OIDA to be solved urgently under the Plan.

Issue 1 The use of limited irrigation technology

- 1.1 Promote development of surface water resources
- 1.2 Promote development of ground water resources
- 1.3 Promote indigenous knowledge and practices by using low cost technology.

1.4 Promote appropriate rainwater harvesting technology at household level

Issue 2 Poor implementation capacity

2.1 Develop and strengthen the managerial and technical capacity at all levels

2.2 Provide access to machinery, equipment and other improved technologies

2.3 Efficient personnel management

2.4 Efficient utilization of resources

2.5 Establish irrigation database and management information systems

Issue 3 Low level of irrigation extension service

3.1 Provision of ecology based integrated household package

3.2 Provision of appropriate regular irrigation extension service

3.3 Provide market and credit service information

3.4 Promote post harvest technology

Issue 4 Insufficient financial resources

4.1 Efficient utilization of grants and loans

4.2 Partnership creation with NGO's

4.3 Promote users community participation

4.4 Promote private sector involvement

Issue 5 Poor sustainability of the scheme and inefficient irrigation management

5.1 Promote watershed management.

5.2 Improve study, design and construction, quality

5.3 Organize, capacitate and institutionalize user communities in irrigation management

5.4 Rehabilitate the abandoned projects and Improve irrigation scheme utilization

The Plan also set up the implementation plans for the departments and the service units of OIDA. During the plan period, the targets to be achieved under the Plan are set up as follows;

1) Pre feasibility studies : 11,205 ha
2) Feasibility studies : 7,838 ha
3) Study and redesign for rehabilitation and maintenance : 2,500 ha
4) Construction of new schemes : 5,868 ha
5) Rehabilitation of abandoned schemes : 1,036 ha
6) Organize and institutionalize WUA : 90 ha
7) Conduct WUA training : 1,360 ha

The total fund requirement of the Plan is estimated to be Birr 423 million, of which

Birr 349 million or 83% are expected from the government budget and the rest from international organizations such as IFAD, UNDP and FAO, and donor agencies.

2.4.3 Organization

All the activities of OIDA are under the control of the General Manager at the head office in Addis Ababa. The operation is entrusted to four branch offices, namely, Central, Eastern, Western and Southern branch offices, and further to the wareda offices. Under the decentralization policy, the tasks and responsibilities of the branch offices and the wareda offices are expanded.

The organization charts of the head office and the branch offices are presented in Figure 2.4.1. The OIDA head office is organized into three departments for study and design, construction, and irrigation extension with four service units for planning and information management, community participation, administration and finance, and audit. The branch offices are organized into four teams, namely, study and design, construction, supervision, and agriculture irrigation development and community participation, and four service units, namely, planning and programming, administration and finance, garage and transportation, and audit. Under the branch offices, 112 wareda offices were operational in June 2003.

2.4.4 Staff Structure

OIDA had 720 staff as of November 2000. The technical staff accounted for 430 or 60% of the total staff. Engineering staff accounted for 195 or 45% of the total technical staff. The staff structure of OIDA has been expanded to 810 as a result of increased assignments for both Eastern and Southern Branch Offices. Moreover, 62 staff members were either shifted from the branch offices to or newly recruited at the wareda offices under the decentralization policy. The OIDA wareda staff have increased from 211 persons at 69 waredas in November 2000 to 273 persons at 112 waredas in June 2003. The state government encourages establishment of the OIDA offices at all 197 wareda. The past and current staff structures are presented below.

Staff Structure of OIDA

No.	Headquarters and Offices	November 2000		June 2003	
		No.	%	No.	%
1.	Addis Ababa HQ	103	14.2	97	11.9
2.	Central Branch Office	136	18.9	129	15.9
3.	Western Branch Office	121	16.8	127	15.7
4.	Eastern Branch Office	82	11.4	103	12.7
5.	Southern Branch Office	68	9.4	81	10.0
6.	Wareda (District) Office*	211	29.3	273	33.7
	Total	721	100.0	810	100.0

Source: OIDA Personnel Main Division Remarks: * no. of wareda offices: 69 in 2000 and 112 in 2003.

The Strategic Planning and Management Plan estimates the total staff requirement to be 1,625 consisting of 118 for the headquarters, 583 for branch offices and 924 for wareda offices by 2005.

2.4.5 Financial Status

The average annual budget allocation in 1997-1999 of the Region is stipulated below.

Annual Budget of the Oromia Region (1997-1999)

Sector/Organization	Average in 1997-1999 (Million Birr)			
	Capital Budget (A)	Salary and Recurrent Budget (B)	Total (A+B)	(B)/(A+B) %
I. Economic Sector Total	228.0	108.9	336.9	32.3
Agriculture	59.2	11.9	71.2	16.8
Irrigation (OIDA)	**7.3**	**5.9**	**13.2**	**45.0**
Water, Mining and Energy	72.9	11.4	84.3	13.6
Industry and Tourism	0.2	9.3	9.5	97.9
Rural Roads	85.9	16.1	101.9	15.8
Transport	2.7	12.0	14.7	81.8
Other	0.0	42.3	42.3	100.0
II. Social Sector Total	149.0	515.4	664.5	77.6
Total (I and II)	377.1	624.3	1,001.4	62.3
Regional State Total	384.2	870.1	1,254.3	69.4

Source: Department of Finance, Oromia Region

Annual capital budget (investment) for the irrigation development during the period from 1997 to 1999 in the Region was about Birr 7.3 million on average. That accounts for 2% of the total economic sector investment of the Region, i.e. Birr 228.0 million. Staff salary occupies the largest portion of the recurrent budget. As seen in the above table, the salary in the irrigation sector is as high as 45% of the total budget.

The annual budgets in 2000-2004 after the establishment of OIDA are summarized below.

Annual Budget of OIDA (2000-2004)

Unit : Birr 1000

Year	Capital Budget (A)	Salary and Recurrent Budget (B)	Total (A+B)	Proportion (B)/(A+B) %
2000	5,776	5,176	10,952	47.3
2001	35,006	8,261	43,267	19.1
2002	12,939	11,248	24,187	46.5
2003	18,748	8,758	27,506	31.8
2004	23,506	8,245	31,751	26.0
Average	19,195	8,338	27,533	30.3

Annual capital budget increased from Birr 7.3 million in 1997-1999 to Birr 19.2 million in 2000-2004. The sharp increase in 2001 was due to financial assistance by IFAD. The budget was allocated to capacity building of OIDA, including procurement of vehicles and heavy equipment.

2.4.6 Community-based Irrigation Development

Community-based irrigation management is the principle of the OIDA schemes. The ownership of the schemes is transferred to WUAs after completion of project construction. Given an autonomous status, the WUA takes major responsibility for scheme management after hand-over of the scheme, while OIDA is responsible for monitoring and provision of necessary advice to the WUA. Budget for rehabilitation of the schemes is allotted occasionally as external funds are available. Therefore, project sustainability is highly dependent upon:

1) Quality standards of irrigation facilities linked with OIDA's engineering capacity for appropriate plan formulation, design and quality control of project facilities during construction stage,
2) Trouble shooting linked with OIDA's engineering capacity to identify problems arising from daily operation through intensive monitoring, and
3) WUA's technical and financial management capacity, which is built through awareness creation and training prior to project implementation.

Therefore, capacity building for both OIDA and WUA is of the utmost importance for successful operation and management of the community-based irrigation schemes.

2.5 Meki Irrigation and Rural Development Project

2.5.1 Project History and Framework

The GOE has placed great emphasis upon poverty alleviation in highly populated rural areas of the country for quite a long while. In particular, attention is always paid to rural communities on bottomland of the Rift Valley system passing through the central Oromia Region in a NE-SW direction. The Meki river is one of the rivers flowing into the Ziway lake. In view of its high irrigation development potential, the GOE requested the Government of Japan (GOJ) to extend technical assistance for the development study in Meki in October 1996. The Meki study aimed at formulation of a master plan for sustainable irrigation and rural development with environmental conservation.

In response to the request of the GOE, the GOJ dispatched the study team through

JICA in August 2000. The study was carried out in the 18 months period till February 2002 with the following objectives.

i. To formulate a master plan for rural development in the Meki area of the central Oromia Region considering its irrigation potential, and its overall goal is to be a model for other areas in the Region, and
ii To conduct technology transfer to the Ethiopian counterpart personnel, aiming to contribute to institutional building of OIDA in the course of the study.

(1) Phase I : Master Plan Study

The master plan study was carried out in the period of August 2000 to March 2001. The master plan study clarified the present conditions, development constraints and potentials in the Meki area. Around the concept of a "bottom-up approach", the master plan was formulated to be implemented by substantial participation of rural communities. To facilitate the participatory development, an emphasis was placed on capacity building of government staff and communities rather than infrastructure development and physical inputs. Finally the Meki study worked out a master plan comprising the following 21 projects.

1. Irrigation Development Program
   - 1-1 WUA Support Program
   - 1-2 Meki Irrigation and Rural Water Supply Project
2. Rain-fed Agriculture Improvement Program
   - 2-1 Semi-Arid Farming Improvement Project
   - 2-2 Community Seed Bank Project
   - 2-3 Post-Harvesting Techniques Improvement Project
   - 2-4 Community Pond Project
3. Animal Husbandry Modernization Program
   - 3-1 Demonstration Unit Project
   - 3-2 Forage Production Project
   - 3-3 Improved Breed Promotion Project
4. Environmental Conservation Program
   - 4-1 Environmental Monitoring Program
   - 4-2 Seedling Center Project
   - 4-3 Watershed Management Program
5. Capacity Building Program for OIDA and Wareda Staff
   - 5-1 OIDA Engineers Training Program
   - 5-2 OIDA Community Development Experts Training Program
   - 5-3 Wareda Staff Training Program
   - 5-4 Community Resource Mapping Project
6. Community Development and Cooperative Promotion Program
   - 6-1 Community Leader Training Program
   - 6-2 Envisioning Workshop Program
   - 6-3 Drinking Water and Nutritional Improvement Program

6-4 Community Center Project
6-5 Grain Bank Promotion Program

(2) Phase II : Verification Study

The study was directed to examine technical and financial viabilities of the draft master plan through the Verification Study (VS). All the results of the VS were to be incorporated into the final master plan. In addition, the VS was expected to contribute to capacity building for government staff and to poverty alleviation in the Meki area through pilot projects. The following six programs were commenced by OIDA and Oromia Agricultural Development Bureau (OADB) in June 2001 and completed in November 2001.

Verification Study Programs

No.	Verification Study Program	Agency
1.	Training of analytical methodology for water resources development	OIDA
2.	Establishment of management information system and monitoring evaluation system for the OIDA irrigation schemes	OIDA
3.	Environmental monitoring – irrigation water use in the Meki area	OIDA
4.	Preparation of guidelines for formation and operation of water users associations (WUA)	OIDA
5.	Community resource mapping	OADB
6.	Preparation of extension tools and research programs for the Meki area	OADB

Among six programs, OIDA focused on Programs 2 and 4, which aim at standardizing development procedures of community-based irrigation development.

2.5.2 Verification Study on WUAs Support Program in Meki (Program 4)

Large-scale irrigation development with construction of the proposed dam on the Meki river would seriously reduce water volume in Abijata Lake resulting in adverse impacts to the environment. Instead of a large-scale development, it was proposed to embark on small-scale irrigation development, namely [1-1] WUAs Support Program, mentioned above.

Program 4 was started with Participatory Rural Appraisal (PRA) sessions in Shubi Gamo Peasant Association (PA) immediately adjacent to the Meki town. The PRA focused on "sustainability" of the community-based project. The joint team of JICA and OIDA provided farmers with necessary information, which may directly and indirectly affect the project sustainability. The most important factor for sustainable unity in a community was deemed to be fair and even sharing of the limited land and water resources. Financial sustainability was also emphasized.

Group fund formation was proposed on the basis of mutual understanding on rigid collection of water charges and fees for pump replacement. In this connection, marketability and price mechanism of horticultural crops were discussed. Farmers agreed with OIDA to organize WUA and embark on the community-based irrigation project.

The summary of the project is presented below.

Summary of Community-based Irrigation Development in Meki

Description	Shubi	Sombo Genet	Sombo Aleltu	Total
Irrigated Area (ha)	3.75	7.00	5.00	15.75
WUA members (household: HH)	15	28	20	63
Canal Length (m)	580	500	400	1,480
PRA (Commencement)	10th Jul. 2001	11th Jul. 2001	1st Sept. 2001	-
Agreement	27th Aug. 2001	21st Aug. 2001	20th Sept. 2001	-

Responsibilities	OIDA	WUA	JICA
Human Resources and Fund Formation	Program Coordinator (1) Social Workers (3) Design Engineer (1) Site Engineer (1) Topographic surveyor (1)	WUA members + casual labors (1500 man-day) Bank account open for group fund formation and pump replacement	Senior Irrigation Engineer
Facilities and Budgets	Dump Truck (1) Front Loader (1) Plant Operators (2) Mechanics (1)	Farm implements (hoes, axes, etc) WUA: Water Users Association	12 HP Pump x 3 Pump house x 3 Fuel for construction Labor wage Allowances for OIDA

The WUA members participated in construction of irrigation canals and pump houses under the supervision of OIDA. In parallel, the WUA members prepared their by-laws and project operation rules including opening a bank account. At the completion of construction work, pumps were provided to WUAs by JICA. All the findings and experiences were incorporated into a guideline.

2.5.3 Verification Study on OIDA Database (Program 2)

Program 2 of the VS aimed at establishment of the OIDA database of available information regarding the existing schemes. Program 2 focused on the considerable gaps between the plan area and the actually irrigated area in these schemes. Only 5,560 ha or 58% out of 9,644 ha of 96 schemes were irrigated in 2000, while over 4,000 ha were not irrigated. The positions of the OIDA schemes in 2000 are summarized below.

Irrigation Areas and WUA Members by Branch Office (2000)

Branch Office	No. of Schemes	Plan		Actual		Achieve-ment* (%)
		Irrigation Area (ha)	WUA members (HH)	Irrigation Area (ha)	WUA members (HH)	
Central	37	4,823	13,484	3,034	8,130	63%
Western	24	1,685	5,173	514	1,676	31%
Eastern	23	1,948	5,423	1,456	4,682	74%
Southern	12	1,188	2,904	556	1,277	47%
Total/Average	96	9,644	26,984	5,560	15,765	58%

Remark: * % for actual / plan in irrigation area

The database was expected to be applied to systematic monitoring and evaluation for identification of problems and constraints prevailing in the existing schemes. In order to verify the cause of low irrigation performance, site information and questionnaire surveys were carried out from July to November 2001 to obtain the following information.

1) Name of scheme
2) Location
3) Irrigation performance in May 2000 and October 2001
4) No. of beneficiaries in May 2000 and October 2001
5) Construction period
6) Construction cost
7) Water source
8) Intake structure
9) Headworks: type, crest length, weir/dam height, intake size, water duty, etc.
10) Design discharge
11) Conveyance structure (km) : main, secondary and tertiary canals
12) Drainage structure (km) : main, secondary and tertiary canals
13) Headworks (problems)
14) Main canal (problems)
15) Secondary canals (SC), tertiary canals (TC), field ditches (FD) and drainage canals (problems)
16) Availability of design documents and working drawings
17) Status of construction works: completed or not completed
18) Dispatch of OIDA Development Agent (DA)
19) Involvement of beneficiaries in project operation and maintenance (O&M) and their training
20) O&M manual
21) O&M charges and bank account
22) Farm input shortage

23) Water shortage, dispute in water use, conflict between upstream and downstream areas
24) Full use of the scheme
25) Crop selection against scheduled cropping patterns
26) Salinity problems
27) WUA: members, establishment, registration/legal status, water master, by-laws, frequency of meetings, meeting record keeping, etc.

On the basis of the data and information collected in May 2000 and October 2001, the preliminary analyses were made as below.

(1) Project Works

Water Source (May 2000)

Unit : No. of Scheme

Branch Office	River	Spring	Lake	Combined	Total
Central	28	7	1	1 (river+spring)	37
Western	24	0	0	0	24
Eastern	8	15	0	0	23
Southern	12	0	0	0	12
Total	72	22	1	1	96

Irrigation Schemes Categorized by Intake Structure(May 2000)

Unit : No. of Scheme

Branch Office	Dam	Headworks	Pump	Total
Central	3	32	2	37
Western	0	24	0	24
Eastern	0	23	0	23
Southern	0	12	0	12
Total	3	91	2	96

Average Canal Length (October 2001)

Unit : km per scheme

Branch Office	Main Canal s	Secondary Canals	Tertiary Canals	Total
Central	2.68	1.76	4.05	8.49
Western	3.39	1.59	5.26	10.24
Eastern	4.29	0.73	4.50	9.52
Southern	2.52	1.84	3.49	7.85

Average Number of Related Structures (October 2001)

Unit : no. per scheme

Branch Office	Division Box	Turn-out	Off-take	Drop	Culvert	Flume	Chute	Cross drain	Others
Central	3.9	23.2	14.6	52.4	8.5	0.4	0.1	0.4	0.1
Western	0.9	25.8	5.1	16.7	2.4	0.9	0.3	0.2	0.2
Eastern	0.3	18.3	37.0	8.3	1.7	0.0	0.0	0.0	0.0
Southern	2.5	19.3	7.3	31.7	2.3	0.4	0.2	0.2	0.3

Planned Irrigation Area (May 2000)

Unit : no. per scheme

Branch Office	<50 ha	50 – 100 ha	101 – 150 ha	151 – 200 ha	201 – 250 ha	251 – 300 ha	301 ha<	Total
Central	6	14	11	2	3	0	1	37
Western	8	10	3	3	0	0	0	24
Eastern	8	10	2	1	1	0	1	23
Southern	1	6	3	0	2	0	0	12
Total	23	40	19	6	6	0	2	96

(2) Project Beneficiaries

Number of Beneficiaries (May 2000)

Branch Office	Nos. of Scheme	Scheduled		Actual		Achieve-ment (%)
		(HH)	(%)	(HH)	(%)	
Central	37	13,484	50%	8,128	51%	60%
Western	24	5,173	19%	1,676	11%	29%
Eastern	23	5,423	20%	4,682	30%	92%
Southern	12	2,904	11%	1,277	8%	44%
Total/Average	96	26,984	100%	15,763	100%	58%

(3) Problems of Headworks

The detailed data were obtained for 68 out of 96 schemes through the site information and questionnaire survey. Out of the 68 schemes, 28 schemes or 41% suffered from lack of or damaged sluice gates. As well, 24 schemes have problems with intake gates. Damaged intake structures and damaged wing walls were observed at 13 projects and nine projects, respectively. Some of the gates were stolen. In addition to the structural and mechanical defects, silt deposits and weed infestation were found upstream of the headworks.

(4) Problems of Canal Systems

Canal seepage and leakage was observed at 32 schemes or 47% of 68 schemes. Cracks of lined canals and concrete structures were identified at 21 schemes. Some schemes have problems derived from missing structures such as turnouts, extension canals, intercept drains, slabs, etc. Some 11 schemes or 16% of 68 schemes are not completed due to lack of budget during the construction period. Design mistakes often resulted in poor performance of the irrigation system. Problems such as silt deposits, weed growth, illicit water tapping and damaged canal embankment are prevalent due to poor O&M. The inventory identified poor drainage systems in 14 schemes, seepage problems of SC in five schemes and flumes in five schemes.

(5) Initial Investment for OIDA Schemes

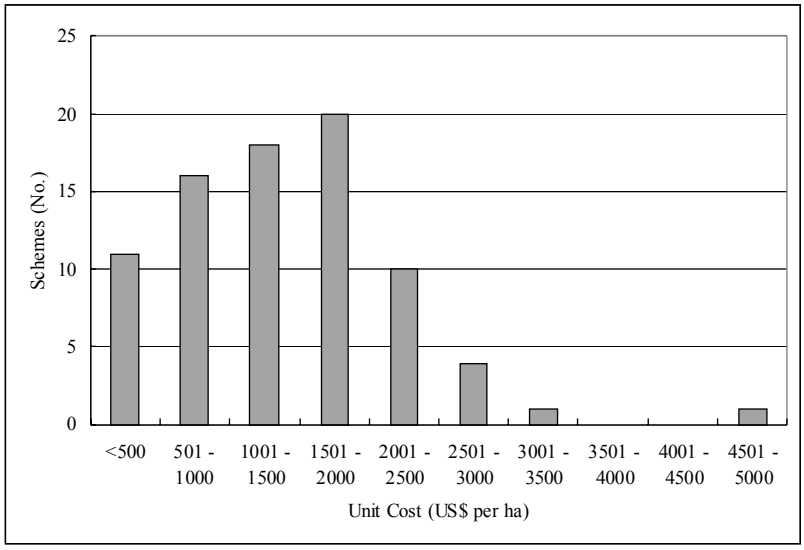
In view of the limited funds available, it is important to optimize the level of investment when irrigation project works are constructed. The investment should be justified from the standpoints of project sustainability, while over-investment also has to be avoided. Through analyses of the database, the past trends of the initial project costs were clarified. The following table summarizes initial investment for the 81 schemes constructed in the period between 1991 and 1999.

Annual Investment in 1991 - 2000

Year	No. of Schemes	Project Cost (Birr 1000)	Exchange Rate * (Birr/US$)	Project Cost (US$ 1000 equiv.)
1991	2	852	2.0700	411.7
1992	0	0	2.8025	0.0
1993	7	1,352	5.0000	270.4
1994	19	8,249	5.4650	1,509.4
1995	16	9,765	6.1583	1,585.7
1996	16	10,610	6.3517	1,670.5
1997	13	10,659	6.7093	1,588.7
1998	7	4,984	7.1159	700.3
1999	1	922	7.9423	116.1
2000	-	-	8.2173	-
Total	81	47,393		7,852.8

Source: * Commercial Bank of Ethiopia

The project cost per hectare falls in a range from less than US$ 500 to US$ 5,000 with an overall average of US$800/ha. Their frequency is illustrated below.



Unit Cost of Irrigation Development

2.6 International Organizations and Donors for Irrigation Development

The OIDA activities are directed in line with the Strategic Planning & Management Plan by obtaining assistance from eight international organizations and donors as follows.

1) Japan International Cooperation Agency (JICA)
2) Agence Francaise de Development (AFD)
3) International Fund for Agricultural Development (IFAD)
4) United Nations Development Programme (UNDP)
5) Ethio-Italy Cooperation (Arsi – Bale Project)
6) Food and Agriculture Organization (FAO)
7) World Bank (WB)

8) African Development Bank (ADB) and others.

The eight donors listed above have their own focus and/or area of support to OIDA in irrigation development activities ongoing in the Region. Therefore, these donors have their own mode of intervention and main project/program components with various sizes of assistance. With the presence of such differences, the main area and size of assistance are presented in Table 2.6.1.

In addition to the eight donors mentioned above, NGOs operate in the Region and are involved in some of the irrigation development activates. As per 2003/2004 statistics there are 15 NGOs operating in Oromia in the irrigation sector. All together they have mobilized Birr 3.63millon and will develop irrigable area estimated to 1,898 ha in the next 3 years. All NGOs in irrigation development activities in the Region are operating according to tripartite agreements with OIDA. Their study and design of projects is approved by OIDA, supervision of implementation activities conducted jointly; final handing over of the schemes to the community conducted after they are checked and approved by OIDA.

CHAPTER 3

THE STUDY AREA

3.1 General

The study area is coincident with the service coverage of the OIDA Central Branch Office, which falls in five administrative zones, namely North Shoa, East Shoa, West Shoa, Southwest Shoa and Arsi, as illustrated in Figure 3.1.1. The study area occupies 71,615 km^2 or 20 % of the Region's land. With relatively favorable climatic conditions, peasants broadly manage a highland mixed farming system. Owing to its advantageous geographic position with high accessibility to Addis Ababa and Adama, these zones have been incidentally developed as suppliers of a wide range of agricultural products including cereals, horticultural crops and animal products.

The population of the study area is estimated to be 9.94 million in 2004, which accounts for 40% of the regional population. The population density of the study area is 139 persons/km^2, which is twice as high as the regional average of 70 persons/km^2. This high population density implies continuous subdivision of farmland through inheritance. In fact, the average land holding size of peasants are as small as 1.2 ha per household. Erratic and limited rainfalls, especially within the Ethiopian Rift Valley system, are the main constraints against improvement of rain-fed agriculture. Therefore, irrigation development has been encouraged by both the public and private sectors.

3.2 Natural Conditions

3.2.1 Physiography and Topography

The study area is located between latitudes 6° 52'N and 10° 23'N and longitudes 37° 02'E and 40° 43'E. In the center of the study area the Rift Valley traverses in the NE-SW direction and divides the study area into three (3) physiographic units, namely the i) eastern highlands, ii) western highlands, and iii) the Rift Valley.

The eastern highlands cover large portions of the Arsi Zone extending south and east of the Rift Valley. There are basalt volcanic piles, in places rising into the mountain ranges, and massifs including Arsi-Bale massif, which forms the highest relief of the Region with an elevation range between El. 2,000 m. and El. 4,000 m. The major peaks are Mt. Kaka (El. 4,245 m) and Mt. Chilalo (El. 3,815 m).

The western highlands extend to North Shoa, West Shoa, Southwest Shoa and a part of East Shoa. This physiographic unit embraces the Shewan Plateau, El. 1,500 m to over El. 3,000 m, which gradually declines from east to northwest and finally reaches the Blue Nile Gorge. The major peak is Mt. Wochecha (El. 3,391 m). The Rift Valley has rolling landscapes lying at about El. 1,500 m. The area is located mainly in East Shoa. The northern part of the Rift Valley lies on the middle Awash valley and the lake systems such as Ziway, Langano and Abijata. More than 50% of the study area lies on the highlands of El. 2,000 m or above as presented below.

Altitude of the Study Area

Unit: %

Altitude (m)	The Study Area					Oromia Region
	North Shoa	East Shoa	West and Southwest Shoa[1]	Arsi	Total	
Above 3,000	3	0	2	8	4	2
2,500 - 3,000	51	1	20	23	23	6
2,000 - 2,500	18	15	42	26	27	13
1,500 - 2,000	19	66	30	24	33	28
1,000 - 1,500	9	14	6	18	12	36
Below 1,000	0	4	0	1	1	15
Total	100	100	100	100	100	100

Data source: Oromia Bureau of Finance and Economic Development, March 2003

3.2.2 Climate

The agro-climate of Ethiopia is classified broadly into five zones, namely semi-desert, tropical, sub-tropical, temperate, and alpine, which are related to the altitude. Nearly 90% of the Region's land is located in tropical to sub-tropical zones. The study area is more temperate although slight difference is recognized by administrative zone, e.g. temperate in North Shoa and sub-tropical in East Shoa. The proportional extent of each agro-climatic zone is summarized below.

Agro-climatic Zones of the Study Area

Unit: %

Zone	The Study Area					Oromia Region
	North Shoa	East Shoa	West & Southwest Shoa	Arsi	Total	
Alpine	0	0	0	5	2	1
Temperate	63	6	36	43	37	11
Sub-tropical	28	76	58	34	48	37
Tropical	9	18	6	18	13	50
Semi Desert	0	0	0	0	0	1
Total	100	100	100	100	100	100

Data source: Oromia Bureau of Finance and Economic Development, March 2003

[1] Because Southwest Shoa zone was separated from West Shoa zone in 2002, most of the statistical data regarding Southwest Shoa are included in West Shoa zone in this chapter.

Average annual rainfalls increase according to the altitude from 650 mm in the Rift Valley floor around the lakes to over 1,300 mm in the eastern and western highlands of over El. 2,000 m. The annual rainfalls of the study area are summarized below.

Average Annual Rainfall in the Study Area

Unit: %

Average Annual Rainfalls (mm)	The Study Area					Oromia Region
	North Shoa	East Shoa	West & Southwest Shoa	Arsi	Total	
Above 1,700	0	0	0	0	0	10
1,300 to 1,700	23	0	54	1	21	17
900 to 1,300	77	45	45	72	59	26
500 to 900	0	54	1	27	20	34
below 500	0	1	0	0	0	13
Total	100	100	100	100	100	100

Data source: Oromia Bureau of Finance and Economic Development, March 2003

Annual rainfall in East Shoa zone, where Meki is located, is relatively lower than other zones as well as the Region as a whole. The climatic conditions of each zone are presented in Figure 3.2.1. The mean annual temperature varies from 14.2℃ at Fiche in North Shoa or Asele of Arsi to 20.5℃ at Adama of East Shoa.

3.2.3 Hydrology

The study area is divided into five major river basins, namely Awash, Blue Nile, Wabe Shebele, Rift Valley Lake and Gibe, of which the Awash river basin covers about 30% of the study area. The Rift Valley lake basins cover 16% of the study area. The catchment areas of the five basins are summarized below.

River Basins in the Study Area

Unit: km2

River Basin	North Shoa	East Shoa	West & Southwest Shoa	Arsi	Total	
Awash	1,226	7,817	6,252	4,840	20,135	29%
Blue Nile (Abbay)	10,064	0	9,122	0	19,186	28%
Wabe Shebele	0	0	0	12,843	12,843	18%
Rift Valley Lake	0	6,043	0	5,377	11,420	16%
Gibe	0	0	6,226	0	6,226	9%

Data source: Oromia Bureau of Finance and Economic Development, March 2003

The Meki area and three model schemes under Program III of the Study are located within Rift Valley lake basins. The northern part of the Rift Valley has seven major water bodies in its hydrologically closed basins, namely the Meki river, the Ketar river, the Ziway lake, the Bulbula river, the Horakelo river, the Abijata lake and the Langano lake. There are also numerous other streams

draining into both Abijata and Langano lakes. The main features of the lakes are shown in the following table.

Main Features of Lakes

S.N.	Lake	Lake Area (km^2)	Storage Volume (MCM)	Mean Depth (m)	Altitude (m)	Catchment Area (km^2)	Annual Inflow (MCM)
1.	Ziway	440	1,466	2.5	1,636	7,380	704
2.	Langano	230	3,800	17.0	1,590	2,006	
3.	Abijata	180	954	7.6	1,580	10,740	227
4.	Shalla	370	37,000	86.0	1,567	2,300	

Source: Water Resources Base Line Survey, Oromia Economic Study, 1999

The Meki and Ketar rivers flow into the Ziway lake, which in turn gives rise to the outflow to the Bulbula river that flows south for 30 km before draining into the terminal Abijata lake. Other rivers, which flow into Abijata, are the Horakelo river from the Langano lake and the Gogessa river, a branch of the Gidu river draining from west of the Abijata. The main features of the rivers are presented in the following table.

Main Features of Rivers

S.N.	River	Station	Catchment Area (km^2)	Annual Rainfall (mm)	Annual Discharge (MCM)	Runoff Coefficient	Drain Into Lake
1	Meki	Meki Village	2,433	1,006	291	0.12	Ziway
2	Ketar	Abura	3,350	874	413	0.14	Ziway
3	Kekersitu	Adamitulu	7,488		180		Abijata
4	Horakelo	Near Bulbula	2,050		47		Abijata

Source: Water Resources Base Line Survey, Oromia Economic Study, 1999

The lakes and rivers mentioned above have interconnected systems. The water resources development of the basin requires judicious planning for protection of the fragile eco-system.

3.2.4 Soils

The soils of the Region are represented by Eutric Cambisols (15%), Dystric Nitosols (12%), Chromic Cambisols (11%) and Chromic Vertisols (9%) according to the legend of the Soil Map of the World (FAO/UNESCO). The major soils in the study area are classified into Pellic Vertisols, which are dark clayey soils that swell when moist and shrink when dry. They occupy about 30% of the study area, especially North Shoa, West and Southwest Shoa. Due to higher moisture holding capacity, Pellic Vertisols are widely used for cereal production. On the other hand, the major soils of East Shoa are Vitric Andosols of volcanic origin,

which are predominant on the Rift Valley floor. They are neutral to slightly alkaline, calcareous, deep, and have a coarse loamy texture. The soil classification of the study area is presented in Table 3.2.1.

3.2.5 Vegetation and Land Use

The natural vegetation of the Region is mainly of tropical savanna, dominantly acacia species occasionally interrupted by riverine broad trees and shrubs. Many of the acacia species provide valuable browse to goats but due to deforestation the density of these trees has diminished. Most grasses are greenish only in the rainy seasons and provide huge grazing sources to the rural communities. Where grass has been preserved for grazing oxen, a tall grass, i.e. *Hyparrhenia ruffa*, is predominant. Due to deterioration of the rangelands, palatable and digestible species have disappeared in most places and been replaced by unpalatable and indigestible species of low nutritional value.

The land use of the study area is classified into four categories, namely (i) farmland, (ii) forest, shrub and bush, (iii) grazing land and (iv) other, including residential, road and swamp. The extent of each category is summarized below.

Present Land Use of the Study Area

Land Use Category	The Study Area		Oromia Region	
	Coverage (km^2)	Proportional Extent (%)	Coverage (km^2)	Proportional Extent (%)
1) Farmland	43,943	61	96,715	27
2) Forest, shrub and bush	13,898	20	201,990	56
3) Grazing land	10,719	15	42,940	12
4) Other	3,055	4	17,975	5
Total	71,615	100	359,620	100

Source: Oromia Bureau of Finance and Economic Development, March 2003

The land use intensity of the study area is significantly higher than that of the Region. The farmland occupies 4.4 million ha or 61% of the study area. Moreover, 45% of the total farmland of the Region is concentrated in the study area. On the other hand, forest, shrub and bush covers only 1.4 million ha or 7% of their regional total.

3.3 Socio-economic Conditions

3.3.1 Demography

The demographic conditions of the study area are presented below.

Population Projection of the Study Area (2004)

Zone	The Study Area						Oromia Region
	North Shoa	East Shoa	West Shoa	Southwest Shoa	Arsi	Total	
Area (km^2)	11,579 (3%)	14,044 (4%)	15,380 (4%)	6,590 (2%)	24,022 (7%)	71,615 (20%)	359,620 (100%)
Population ('000)	1,540 (6%)	2,322 (9%)	2,023 (8%)	1,092 (4%)	2,965 (12%)	9,941 (40%)	25,098 (100%)
Density (persons/km^2)	133	165	132	166	123	139	70

Data source: Oromia Bureau of Finance and Economic Development, March 2003

The major ethnic group in the study area is Oromo, which comprises 82% of the total regional population, followed by Amhara (14%) and Guragie (2%). Around 66% of the population is of the Orthodox religion followed by Muslim (28%), Protestant (3%), and Catholic (3%). The overall literacy rate in the study area was 26% in 1994. The gender gap in the literacy rates was remarkable, i.e. 32% for male and 19% for female. As observed nationwide, lower literacy rates in rural areas are also found within the study area. The primary education in the rural area is conducted in the Oromo language.

3.3.2 Administration Structure

The Oromia Region is administratively divided into 14 zones and 197 waredas, which are further subdivided into about 10,000 peasant associations (PA), i.e. the lowest administrative unit. The study area administratively consists of five zones and 70 waredas as summarized below.

Number of Wareda in the Study Area

	The Study Area						Oromia Region
	North Shoa	East Shoa	West Shoa	Southwest Shoa	Arsi	Total	
Wareda	12	12	14	10	22	70	197

Data source: Oromia Bureau of Finance and Economic Development, March 2003

3.3.3 Agriculture

(1) Agro-climate

The climatic conditions of the study area are governed mainly by the movement of Equatorial low-pressure zones and are divided broadly into three rainfall seasons. The rainfalls are characterized by a bimodal pattern with the long rainy seasons (*Meher*) from July to October and the short rainy seasons (*Belg*) from February to June as presented below.

Rainfall Seasons of the Study Area

No.	Season	Month	Rainfall Condition
1	Dry	November to February	Dry
2	Light rain (*Belg*)	March to June	Light and less reliable rainfall
3	Rainy (*Meher*)	July to October	Area receives most of its rains from July to September

Meher is the main crop season in the study area. Cereals are widely planted under the rain-fed conditions. Dry season crops are sown immediately after harvest of rain-fed cereals utilizing residual soil moisture. Supplemental irrigation is also practiced for the dry season crops. In *Belg* season, cereals are planted mainly in the highlands. In the Rift Valley, they are planted to a limited extent.

(2) Farming systems and cropping patterns

The farming system in the study area can be described as a "traditional livestock-based mixed-farming system", in which crop production and animal husbandry are significantly supplemented by each other. The predominant crops are food grains and pulses including teff, wheat, maize, barley and haricot beans. Crop residues are one of the vital supplemental fodder sources for oxen, sheep, goats and donkeys. They are usually left on the farms after harvesting and are available for the community. On the other hand, the crop production sub-sector relies highly on animals in terms of drafting, transporting and threshing as well as for manure sources. Furthermore, livestock provide animal products for home consumption and supplemental cash income. The major crops prevailing in the study area are as below;

1) Cereals : teff (Eragostis tef), wheat, barley, maize, and sorghum
2) Pulses : broad beans, field peas, haricot beans, chickpeas, vetch, and lentil
3) Vegetables : potato, tomato, onion, cabbage, red pepper, green pepper, beet root (Beta vugaris), and sugarcane

The cropping system is predominantly on a rain-fed basis and crop rotation is not systematically practiced. Teff and wheat represent the main crops in the study areas, which are followed by maize and barley. Other crop such as haricot beans, sorghum, horse beans, field peas and chickpeas are planted to a limited extent with utilization of soil residual moisture. Due to erratic rainfalls, the crop production fluctuates largely year to year.

The following table presents the production records in 2001/02, in which peasants

obtained relatively good harvests (see also Tables 3.3.1).

Cultivated Area, Unit Yield and Production in the Study Area (2001/02)

Crop	Cultivated Area (ha)	Production (ton)	Yield (ton/ha)
Teff	469,782	450,378	0.96
Wheat	390,228	608,958	1.56
Barley	309,585	347,510	1.12
Maize	301,905	679,470	2.25
Sorghum	128,816	200,717	1.56
Broad beans	88,963	112,493	1.26
Linseed	48,846	102,523	2.10
Chickpea	48,737	52,997	1.09
Field peas	45,204	30,657	0.68
Potato	38,014	127,705	3.36
Haricot Bean	36,882	29,608	0.80
Others	99,164	283,572	2.86
Total	2,006,126	3,026,588	

Source: Statistical Report on Area and Production of Temporary Crops, Central Agricultural Census Commission, July 2003

Out of the total cultivated area, 1,864,000 ha (93%) are allocated to cereals and pulses, while horticultural crops occupy less than 3%.

3.3.4 Farm Economy

The Household Income, Consumption and Expenditure Survey (HICES) in 1999/2000 verified the current position of farm family economy in the Region as presented in Tables 3.3.2. The income and expenditure were separately surveyed. The average annual income of rural households was Birr 4,663, which was slightly higher than that of the national average, i.e. Birr 4,258. As well, the expenditure in the Region was also higher than that of the national average. The HICES results are summarized below.

Summary of HICES in the Oromia Region (1999/2000)

Items	Oromia Region (%)	Ethiopia (%)
I. Income	Birr 4,663	Birr 4,258
Household agricultural income	75	74
Non-agriculture income	6	6
Wages and salaries	3	3
Others	16	17
II. Expenditure	Birr 6,126	Birr 5,674
Food	56	57
Rent, fuel, power, water, construction	12	14
Clothing, footwear	8	8
Others	24	21

Source: HICES in 1999/2000

CHAPTER 4

TRAINING PROGRAM FOR OIDA STAFF (PROGRAM I)

4.1 General

Program I aimed at capacity building of the OIDA staff for promotion of community-base irrigation development. They were encouraged to learn operational skills and techniques dealing with issues raised in the actual process of community-based irrigation development by applying theories to practice. The following aspects were selected and the relevant training programs were carried out under Program I.

1) Project Cycle Management (PCM)
2) Participatory Rural Appraisal (PRA)
3) Project Benefit Monitoring and Evaluation (PBME)
4) Engineering Methodologies for Small-scale Irrigation Development

In addition to the training programs for the above-mentioned aspects, a series of workshops was held to report and discuss the performances of Program I from time to time. In the workshops, the OIDA staff had opportunities to learn presentation skills.

4.2 Project Cycle Management (PCM)

4.2.1 Objectives

Within the current policy framework, the community-based irrigation development becomes the principal modality. In this context, the presence of social units, which are capable for sustainable development, is the most crucial. The WUAs are responsible for operation and maintenance of the OIDA schemes given autonomous status. Hence, managerial capacity of WUAs is one of the determinant factors to ensure project sustainability.

Despite the above policy emphasis, however, current performance of WUAs indicates less achievement than planned. The irrigation performance in the Region has not yet reached a stage where the schemes are sufficiently managed by WUAs. Irrigation performance may be determined as a combination of various factors including the degree of even distribution of irrigated land and water in the command area, capacity and strengths of WUA management, accessibility to credit facilities or supportive measure of farm inputs, availability of empirical knowledge on farming and the like. Since these factors are generally interlinked, the cause-effect

relationships need to be verified in order to provide necessary assistance to WUAs. In so doing, more effective and systematic intervention of OIDA is required.

The intensive training workshop on Project Cycle Management (PCM) was undertaken with a focus on its problem analysis, which is formulated as one of systematic planning and management tools, in order to meet the needs of capacity building for the staff members of OIDA Central Branch Office. The PCM workshop was conducted;

i. To expose the OIDA staff on one of the systematic planning tools known as PCM with a specific focus on problem analysis methods;
ii. To equip the OIDA staff with PCM problem analysis methods through classroom exercises as well as field exercises; and
iii. To provide a forum to exchange experiences and views of the OIDA staff to analyze prevailing problems in the OIDA schemes and achieve consensus for the enhancement of irrigation performance.

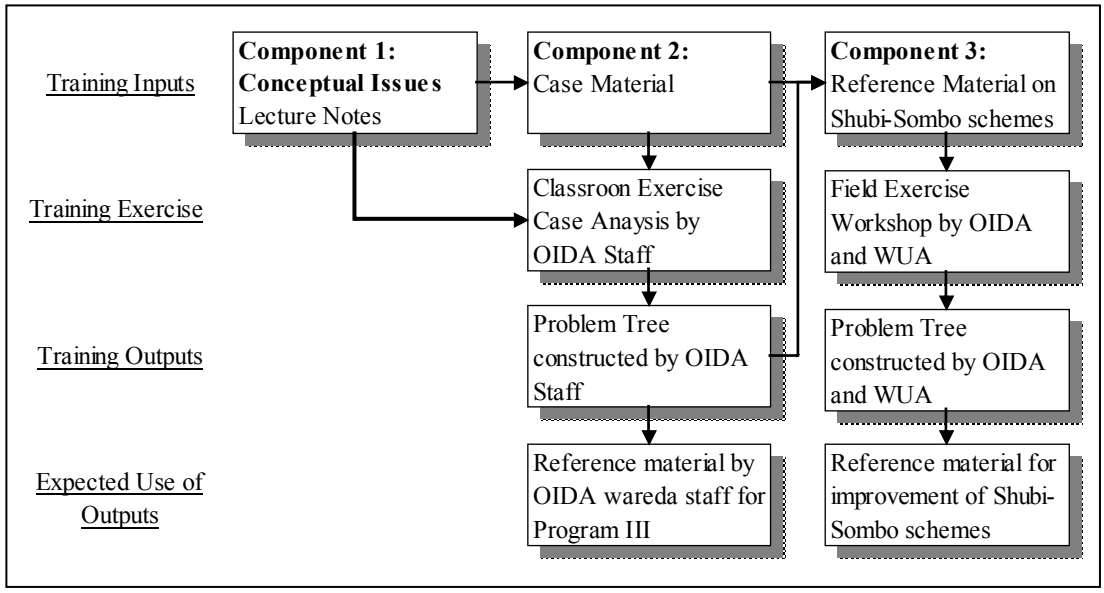
4.2.2 Procedures of the Workshop

The PCM workshop was held for five days from 18th to 22nd August 2003. The approach in the training workshop fosters participatory learning through active exchange of ideas and experiences among participants. The training was organized to create tangible goals to produce a set of reference materials that were prepared by participants. The reference materials thus prepared were expected to be used for extension tools upon their return to their places of duties. Output-oriented training emphasized the socialization process of acquired knowledge and skill. The workshop was designed to consist of three distinct but interrelated components; namely,

i. Lecture component; in which the basic idea of PCM was understood in the context of participatory social development and planning;
ii. Case analysis component; in which participants were encouraged (i) to acquire basic knowledge and skills to identify stakeholders and problems and (ii) to structure a problem tree by analyzing cause-effect relationships; and,
iii. Field exercise component; in which participants were further encouraged to conduct problem analysis on existing schemes as a field test.

The workshop was held as an integral part of the Study. In this line, possible linkage with Programs II and III of the Study was sought. As a result, case analysis of the training workshop was to be linked with rehabilitation works of Program III, while the field exercise was to be related to further monitoring activities of the Shubi-Sombo schemes.

In accordance with the above set framework, the structure of training workshop is illustrated as below:



Structure of PCM Training Workshop

4.2.3 Trainees of the Workshop

Trainees were strategically selected from among the OIDA staff who were directly concerned with Programs II and III. They were (i) OIDA Tiyo wareda staff responsible for the Keter scheme; (ii) OIDA Munesa for the Gedamso scheme, Sadi Sadi and Lafa schemes; (iii) Dugda Bora Wareda Irrigation Development Desk (hereinafter "OIDA Meki Office") for the Shubi-Sombo schemes; and (iv) OIDA Central Branch Office for supportive works to these wareda offices. There were 20 participants in total including 10 extension workers and five engineers who are working on ground.

Their average age was 33 in a range between 23 and 49, while the average work experience was around six years with a wide range from two months to 23 years. About 90 % of trainees were college diploma holders or above.

The JICA Study Team played a role as resource persons for the overall workshop program. In addition to the Team, two OIDA staff, who have already been trained with a method of logical frame analysis by UNCRD Africa office, were nominated as associate resource persons assigned as moderators for the group exercise.

4.2.4 Performance and Evaluation

The methods employed in training were a combination of lecture, group discussions and group exercises in both classrooms and the field. With specific regard to group exercises, the entire process of the workshop adopted group dynamics through which

trainees were fully motivated to discuss issues freely admitting differences among groups that provided a basis for wider understanding. Each group was formed by six or seven participants suitable for group discussions as well as field exercises in the Shubi-Sombo schemes.

Case material on problem analysis was prepared through Participatory Rural Appraisal (PRA) on the Gedamso scheme under Program III. The PRA session was organized on 6th August 2003, when the Gedamso WUA extended executive meeting was held. In the meeting, 42 WUA members assembled for discussion. The following methods were used; (i) historical timeline, (ii) focus group discussions, (iii) sketch mapping and (v) scenario analysis. Also, a semi-structured questionnaire was used for collecting information and data. All the collected information and data was transformed into case material for training purposes in which all the proper nouns were changed into imaginary names.

The OIDA trainees as well as associate resource staff were requested to fill out a course evaluation questionnaire at the end of the workshop. The results indicated that participants in the workshop expressed their satisfaction with the contents of training, except that the amount of time allocated for the workshop was found to be too short for them. Further details of the PCM training workshop are presented in Annex I on Training Program for OIDA Staff (Program I).

4.3 Participatory Rural Appraisal (PRA)

4.3.1 Objectives

OIDA envisaged training (i) engineers who equip themselves with basic operational knowledge on participatory development approach and (ii) social workers who understand basic knowledge on engineering and agricultural aspects related to irrigation development. It is also essential to create a workable framework in which such engineers and social workers can be harmoniously engaged in a full process of irrigation development in partnership with WUA. The JICA Study Team organized the PRA training for both engineers and social workers with a forum where professionals and WUA members can interact with each other. The training aimed;

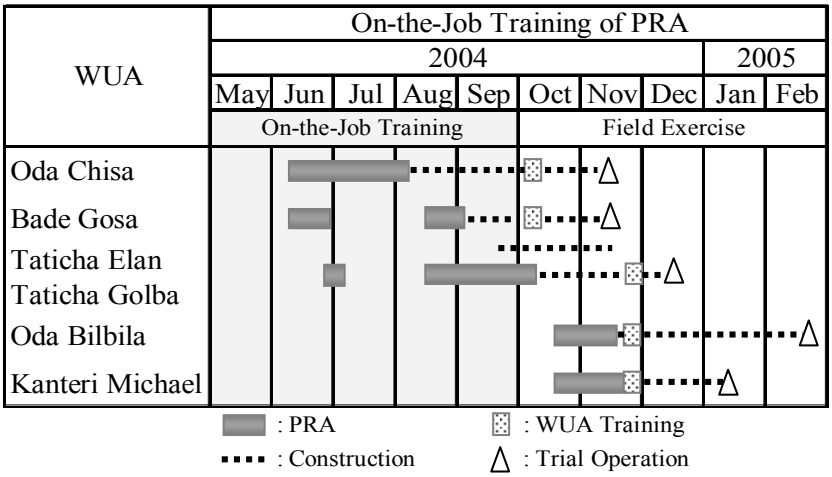
1) To identify and share relevant issues for sustainable irrigation development and management among all stakeholders concerned as an operation study tool;
2) To provide engineers, social workers and community members with an educational opportunity, where local consultation mechanisms can be formulated through creating trust in their relationships with PRA; and,
3) To provide a planning forum for engineers and social workers where they can interact each other for plan formation for irrigation schemes.

4.3.2 On-the-job Training of PRA

(1) Organization of on-the-job training

In addition to transfer of theoretical knowledge, the field experiences of PRA are of the utmost importance for the OIDA staff. Therefore, the Study directed to provide the on-the-job training to the OIDA staff through the actual practices of PRA under Program II, in which five WUAs were actually established.

PRA was carried out for three WUAs as on-the-job training, where the JICA Study Team took leading roles to organize a series of the PRA sessions with the OIDA staff. By employing the experiences thus accumulated, the PRA sessions for the remaining two WUAs were moderated by the OIDA staff in the following time frame.



Time Frame of On-the-job Training of PRA

(2) Participants in on-the-job training

Within a nation-wide policy framework, the decentralization policy has been implemented to provide wareda offices with autonomous power on plan formulation, implementation and monitoring and evaluation of small-scale irrigation projects of less than 1,000 ha of scheme area in line with WSDP.

In this policy context, Program II has focused specifically on capacity building of the OIDA Meki office with involvement of supporting staff from the Central Branch Office of OIDA. Through this arrangement, knowledge and skills required for PRA were shared and transferred by the JICA Study Team. They include (i) the head of the OIDA Meki office, (ii) irrigation engineer, (iii) agronomist and (iv) DA from the OIDA Meki office. The agricultural economist and surveyor of Central Branch Office were also involved.

4.3.3 Performance and Evaluation

Following the on-the-job training, the OIDA Meki staff conducted a series of PRA sessions successfully and established two WUAs in support of OIDA Central Branch Office. The performance of the PRA sessions is described in Chapter 5 of this Report and Annex IV on WUA Supporting Program in Meki (Program II). The outcomes of the PRA training were;

1) OIDA staff who had actual experience in the full process of PRA provided familiarization with ideas on problem solving on critical issues such as land re-allocation and even distribution of land and water; and
2) Elaboration of standardized development procedures, including a proposed time frame and involvement of personnel of PRA, were incorporated in the guidelines.

The details of the guidelines mentioned above are mentioned in Annex V on Guidelines for Establishment and Management of WUA. Standardization of development procedures includes a set time frame required for PRA sessions for one community. A set of around six PRA sessions at a recommended pace of once a week is appropriate for establishment of a single WUA. Avoiding hastening discussions in PRA, allows farmers to understand project components, their responsibilities and issues for sustainable management along with the necessary internal arrangements, especially on the land exchange process. In this regard, the OIDA staff became well aware of how to deal with land re-allocation in the process to legalize land exchange through this PRA training program.

4.4 Project Benefit Monitoring and Evaluation (PBME)

4.4.1 Objectives

Around the concept of PCM, the monitoring and evaluation are the most important stages in the entire project cycle. The methodology of PBME was transferred to the OIDA staff through its actual practice in the Shubi-Sombo schemes. The importance of the project monitoring is theoretically understood by the OIDA staff. However, PBME has not been sufficiently executed by OIDA because of lack of experienced staff at the wareda level and limited budget including transportation facilities. Taking such limitations of OIDA into consideration Program I envisaged optimizing the frameworks of PBME at a realistic level and training the OIDA wareda staff.

The Meki study assisted three WUAs of the Shubi-Sombo schemes, namely Shubi, Sombo Genet and Sombo Aleltu, which were organized by 63 local farmers in Shubi Gamo PA. Within the framework of the Study, PBME was carried out to verify performance of their project management and identify further constraints

encountered by WUA. The lesson learnt through PBME in the Shubi-Sombo schemes were expected to be useful information for Programs II and III of the Study. With such a specific objective, PBME was carried out by the JICA Study Team in collaboration with the OIDA Central Branch Office and the OIDA Meki office. Throughout PBME, intensive training was provided to the OIDA staff. On the basis of the experiences of participation in PBME for the Shubi-Sombo schemes, the OIDA staff was requested to play a major role in the following PBME activities, i.e. the baseline survey and PBME of six WUAs established under Program II and the baseline surveys and PBME of three rehabilitation schemes under Program III.

4.4.2 Outline of PBME Training

The periodical PBME for the Shubi-Sombo Schemes was carried out throughout the Study. The following are major practices performed by OIDA staff under supervision of the JICA Study Team.

1) Preparation of work design of PBME
2) Preparation of questionnaire and monitoring sheets to be used for PBME
3) Interview survey for WUA board members and members
4) Data collected for PBME
5) Crop budget and farm income analyses
6) Computer training for data formatting and storing
7) Data analyses and assessment

The major aspects surveyed through PBME were as follows.

Monitoring Aspects

No.	Stakeholders	Monitoring Aspects
1.	WUA Members (63 members)	Profile of WUA members, Cultivated area(ha), Cultivated crops by season, Harvested area and yield, Type of seeds by crop, Fertilizer application, Spraying, Labour, Sale of products, Gross income, Payment for renewal of pumps, Bank A/C for WUA group funds, Site location of irrigable plots, Water management, Accessibility to extension workers, Irrigation farming, Accomplishment of cropping and reason of crop failure
2.	WUA Committees (3 WUAs)	WUA board profile, Basic information of WUA, No. of members, Accomplishment of cropping performance, WUA meetings, Water management, Land distribution, Pump operators, Bank A/C, Balance of income / expense on crop production of WUA, O&M cost of WUA treasurer, Head of finance, O&M activities of WUA, Bylaws of WUA, Auditing, Irrigation farming, WUA management, Relations with the surrounding community
3.	OIDA Meki Office	Staff profile, Organization structure, Budget, Responsibility, Countermeasures to request, Farmers training, Land distribution

4.4.3 PBME of Shubi-Sombo Schemes

The 1st PBME was carried out for the Shubi-Sombo schemes from 2nd May 2003 to 21st May 2003. The JICA Study Team directly provided the training to the OIDA staff selected from the Central Branch Office and the Meki office.

The 1st PBME clarified the current conditions of the WUA management in terms of logistics and financial operation and the performance of irrigation farming by individual members for three crop seasons since the handing over in November 2001. The interview was conducted with all 63 members, including the dropouts and the WUA board members. It was verified that the WUA members faced 14 constraints, which were categorized into four major aspects; (i) conflicts derived from land exchange, (ii) lack of farm operation budget, (iii) water shortage in downstream areas and (iv) insufficient knowledge for farm management. The details are presented in Annex III on PBME for the Shubi-Sombo Schemes.

Water shortage was derived not only from low discharge of the Meki river but also as ill effects of lack of irrigation knowledge. The 1st PBME recognized the significant gap of fuel consumption between the upper and lower reaches of the main canal over the three WUAs. Time required for water distribution significantly differs by distance from the pump set. The Study took up this issue and made an attempt at urgent settlement so as to avoid friction among the WUA members.

The 2nd PBME focused on the cause of water shortage pointed out during the 1st PBME. In collaboration with the staff of the OIDA Meki office, the field investigation and the farmers' interviews were carried out for each of the Shubi-Sombo schemes in the period from 15th to 26th December 2003 with specific objectives to clarify present conditions of land utilization and water distribution to each plot. The discharge measurements for the existing canals were also conducted. The detailed results of the 2nd PBME are presented in Annex III on PBME for the Shubi-Sombo Schemes.

The 3rd PBME was carried out from May to June 2004 to follow up the previous two PBME focusing on the WUA management, farming activities and marketing, financial status and land disputes of the Shubi WUA.

4.4.4 Performance and Evaluation

The OIDA Meki office has limited capacity to conduct monitoring and evaluation works because of full engagement in the region-wide water harvesting program and other routine duties. Taking such conditions into consideration the JICA Study Team minimized monitoring aspects to the following three aspects of individual irrigation scheme; namely (i) bank balance monitoring; (ii) water distribution to each

plot in the command area in reference with scheme layout; and (iii) cropping monitoring of each plot in command area. Besides, the JICA Study Team supplied (i) two motorcycles and (ii) a set of computer facilities for smooth execution of PBME. It is expected that the OIDA Meki office will continue PBME for nine WUAs established under the Meki study and Program II of the Study.

The staff of the OIDA Meki office has enough basic knowledge of how to conduct an interview as well as questionnaire surveys for execution of PBME. As for knowledge of farm management, however, more training is required, especially for crop budget analysis, which is essential in assessment of financially viability of the schemes. The accuracy of responses/answers by farmers are often subject to confirmation in terms of acreage, crop yield, seed rate, irrigation time, planting season, etc., thus the interviewer should have enough agricultural background to detect and crosscheck the accuracy of the answers.

4.5 Engineering Methodologies for Small-scale Irrigation Development

4.5.1 Hydrology and Water Use Analyses

In view of the limited water resources and fragile environmental conditions of the Rift Valley system, OIDA is in a position to take responsibility for periodical monitoring of expanding irrigation water use and for judicious planning for protection of the eco-system. The Meki study recommended OIDA to embark on the hydrological environmental monitoring in line with [4-1] the Environmental Monitoring Program as one of 21 programs composing the master plan.

The small pump irrigation schemes in Meki were hit by severe drought in 2002. The river discharge of the Meki river was drastically decreased and did not allow local farmers to pump sufficient water for irrigation farming. Since any change of hydrological conditions thus directly affects sustainability of the community-based irrigation development in Meki, continuous observation of the river discharge is most important so as to avoid social unrest, especially for vulnerable people.

The major water source for irrigation in Meki gradually changed from the Meki river to alternative water sources, i.e. lake water and groundwater due to the above-mentioned erratic and limited water availability of the Meki river. With such a background, hydrological observation and water use monitoring were taken up as capacity building programs throughout the study period.

(1) Water Level of the Ziway Lake

The main water source of the Ziway lake is both the Meki and Ketar rivers. The Meki river is gauged at Meki town (CA = 2,433 km^2), while the Ketar river is gauged near Abura (CA = 3,350 km^2). The mean annual flows recorded at the two stations

are 291 MCM for Meki and 413 MCM for Ketar. The total annual average inflow to the lake can be safely estimated by the sum of the Ketar and the Meki river flows as recorded at the gauging stations, which is about 704 MCM. Further, the water balance of the Ziway lake is governed by outflow from the lake through the Bulbula river and evaporation from and precipitation on the lake surface.

The largest water consumer is the Meki-Ziway Irrigation Scheme. The Scheme is located 5 km west of Meki Town. The scheme was established in 1989 to irrigate 3,000 ha, out of which 1,500 ha was to be a state farm and the rest was to be allocated to local farmers. Currently, only 216 ha are cultivated by 332 farm households in Bekele Girisa PA. Nine pumps were installed in the pump station, but most of the time only one pump was operated. Each pump unit has a capacity of 720 lit/sec and is operated by the staff employed by the OIDA Central Branch Office. According to the instruction of the JICA Study Team, the OIDA Meki office carried out the periodical monitoring of the operation records of the Scheme in order to assess the water consumption of the Scheme. The details of the study results are presented in Annex II on Hydrology and Water Use in Meki.

(2) Inventory survey of groundwater irrigation in Meki

Under Program I, an inventory survey of groundwater irrigation was conducted as a part of the capacity building programs. The inventory survey of groundwater irrigation was carried out in Dodo Wadere PA and Malima Bori PA in Dugda Bora District, where groundwater irrigation is prevailing. The OIDA Meki office carried out the inventory survey in collaboration with the OADB development agent (DA) assigned for both PAs from 6th August 2003 to 15th September 2003 according to the following work flow.

1) Interview dug-well owners and pump owners in Dodo Wedere PA
2) Survey of dug-well location using Global Positioning System (GPS) in Dodo Wedere PA
3) Interview dug-well owners and pump owners in Malima Bori PA
4) Related data collection
5) Analyses and report preparation

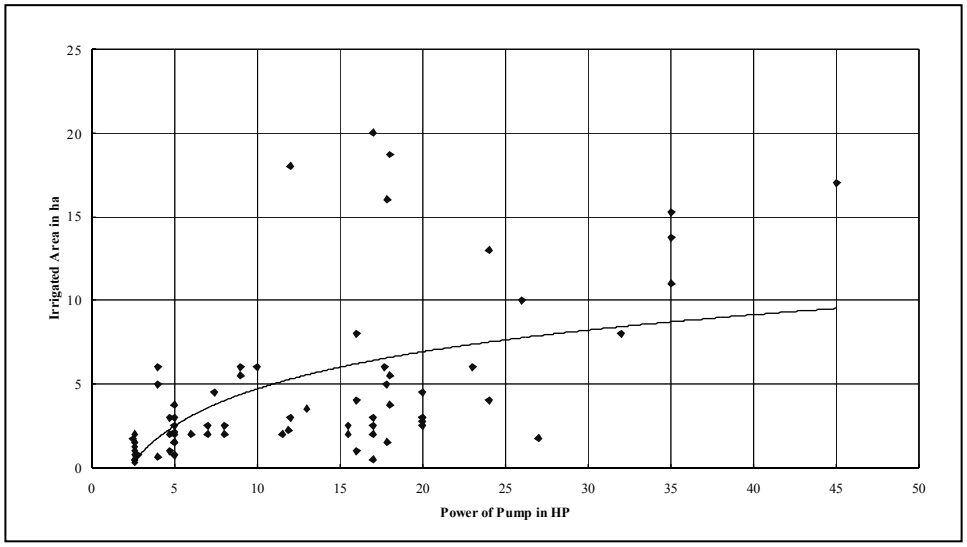
The details of the study results are presented in Annex II on Hydrology and Water Use in Meki.

(3) Inventory survey of small pumps in Meki

Neither water rights nor regulation in the Meki river basin, or probably in the whole country, are officially sanctioned. Therefore, any enterprises or investors can install irrigation pumps in the basin. The inventory survey in 2000 verified that there were

150 pumps in Dugda Bora wareda of which 75 pumps were installed in the Meki river and the Ziway lake. The number of pumps tended to increase in recent years. The 2nd inventory survey was carried out in June 2001 by the OIDA Meki office under the Meki study. The inventory verified that 181 units of small pumps in total have been introduced in the Meki and Ziway basins.

The relationship between the pump capacities (horsepower) and the irrigated areas is presented below.



Relationship between Pump Capacities (HP) and Irrigated Areas (June 2001)

The majority of pumps in the Meki area are smaller than 20 HP for command areas of less than 10 ha. It is highly difficult for the OIDA Meki office to obtain the records of operation hours of the existing pumps due to several reasons. Firstly, the legal status of the OIDA local staff is unclear and they are not officially authorized for the current monitoring activities. Secondly, the pump owners do not keep operation records and are reluctant to disclose their actual water use, if any are recorded. The distribution of the 181 pumps with their total coverage of 834 ha in terms of location (PA) and ownership is summarized below.

Summary of Inventory of Small Pumps (June 2001)

Location (PA)	Water Sources	Pump (No.)	Area (ha)	Land Ownership (No.)		
				Rent	Private/ Share	Unknown
Malina	Groundwater	46	208	-	-	46
Meki Town	Meki River	36	65	23	12	1
Shubi Gamo	Meki River	33	62	12	1	20
Bekele Girisa	Meki River/Ziway	27	96	20	2	5
Elen	Groundwater	10	39	-	-	10
Tuchi Dembel	Ziway lake	7	87	5	1	1
Wayo Gabriel	Ziway lake	3	31	-	-	3
Others	Ziway lake	19	246	-	-	19
Total		181	834	60	16	105

Most of those pumps were introduced for commercial vegetable production. Pump owners in Addis Ababa and Meki enter into farming contracts with local peasants and provide pumped water to them. Although private investors were not officially entitled to use water resources in the Meki area, it is difficult for the wareda administration to take legal measures since the prevailing contract farming is currently a significant income source for local peasants and functions as a safety-net.

As a part of the capacity building program under Program I, the 3rd inventory survey of existing pumps was carried out in May to June 2004. The survey verified that there were 462 small pumps owned by private owners, farmers, and 23 WUAs in the wareda units. The distribution of the 462 existing pumps by water source is summarized below.

Comparison of Small Pump Irrigation (2001 and 2004)

Water Sources	No. of Pumps (unit)		Irrigation Area (ha)	
	June 2001	June 2004	June 2001	June 2004
Meki river	96	193	233	397
Ziway lake	29	46	364	515
Groundwater	56	223	247	649
Total	181	462	834	1,561

During last three years, the number of pumps increased from 181 to nearly 462 and the irrigation area increased from 834 ha to 1,561 ha. This drastic increase is observed in the Ziway lake and groundwater irrigation.

The pump irrigation was previously expanded near Meki town due to easy access. However, as a result of intensive water use by pumping along the lower reaches from Meki town to the Ziway lake, the discharge of the Meki river was nearly nil in the lower reaches during the dry seasons. In 2002 to 2004, the discharge of the Meki river was decreased to as low as 0.2-0.3 m^3/sec at Meki town (the bridge) where the water level is observed. Since the pump irrigation has been intensified downstream below Meki town, this limited discharge, i.e. 0.2-0.3 m^3/sec, is almost completely consumed by the pump irrigation. Therefore, the private investors lost interest to tap the river water and shifted to the lakeshore and the northern wareda with higher groundwater due to the Koka and Elan lakes in Alem Tena, 30 km north of the Meki town.

First of all, the environmental impact to the Meki-Ziway-Abijata system should be carefully assessed under governmental authority. In view of optimal use of water resources belonging to the nation, governmental control is immediately required along with optimized use of the limited water resource in the Meki area giving more priority to local communities.

4.5.2 Small-scale irrigation facility planning

Technical training was provided to the engineering staff of the OIDA Meki office. The main engineering aspects focused on optimum design, especially for required specification of pump sets and water distribution system. The details are given in Annex IV on WUA Supporting Program in Meki (Program II).

4.6 Project Monitoring Workshop and Irrigation Engineering Workshop

4.6.1 Project Monitoring Workshop

During the course of the Study, Project Monitoring Workshops were held four times; 5th June 2003, 23rd September 2003, 20th February 2004 and 1st July 2004. The main objectives were to share the results of each of the PBMEs as well as the progress of the Study and to exchange opinions between the JICA Study Team and the OIDA counterparts. The workshops also contributed to the capacity building of the OIDA staff in presentation skills and report writing.

Project Monitoring Workshop (1)

On 5th June 2003, the Project Monitoring Workshop (1) was held in Adama between the JICA Study Team and 24 management staff of the OIDA Central Branch Office. The historical background, objectives and plan of operation of the Study were explained in detail in line with the Inception Report. The JICA Study Team made the presentation focusing on the results of the 1st PBME for the Shubi-Sombo schemes. After both presentations, discussions were held on land exchange issues by referring to the lessons learned in the Meki study, the necessity of more training for PBME, the importance of coordination between OIDA branch offices and wareda offices under the decentralization policy, etc.

Project Monitoring Workshop (2)

On 23rd September 2003, the Project Monitoring Workshop (2) was held in Addis Ababa between the JICA Study Team and 16 management staff of the OIDA with seven cadres from steering committee member agencies. The progress of the Study was presented by the JICA Study Team and OIDA counterpart personnel according to the Interim Report. The performance of the PCM training workshop was reported by the OIDA social worker. The participants recognized that there were further requirements for PCM training for the OIDA staff to enable them to identify prevailing constraints in irrigation schemes and make logical analyses to set up necessary approaches and appropriate countermeasures. The work progress of Programs II and III was also reported in the workshop by the JICA Study Team.

Project Monitoring Workshop (3)

On 20th February 2004, the Project Monitoring Workshop (3) was held in the Central Branch Office in Adama. Since most of the staff members are currently assigned to the water harvesting projects as well as other on-going projects, the attendants of the workshop were limited to only 20 OIDA staff. In response to the request from the JICA Study Team, the discussion was directed more to the issues around the project monitoring. The ultimate goals of the irrigation projects promoted by OIDA are poverty reduction and food security. In order to quantify the project impacts to poverty reduction and food security, a wide range of socio-economic information has to be acquired through PBME. Consequently, PBME will become a big workload for OIDA. All the participants agreed to establish a simple but essential PBME system taking the existing capabilities of OIDA into consideration.

Project Monitoring Workshop (4)

On 1st July 2004, the Project Monitoring Workshop (4) was held in Addis Ababa between the JICA Study Team and 20 management staff of the OIDA. The progress of the Study was presented by the JICA Study Team and OIDA counterpart personnel according to Progress Report (3). The results of PBME for the schemes established under Program II and rehabilitated under Program III were reported by the JICA Study Team. In the workshop, the Guidelines for Establishment and Management of WUA were explained by the JICA Study Team as one of the important outcomes of the Study and transferred to all the OIDA branch offices for distribution to the entire Region, i.e. 197 wareda offices.

4.6.2 Irrigation Engineering Workshop

On 14th January 2004, the Irrigation Engineering Workshop was held in Addis Ababa between the JICA Study Team and 20 management staff of the OIDA Head Office, Central Branch Office as well as the Meki office. The Senior Irrigation Engineer of the JICA Study Team presented the results of the 2nd PBME focusing on the technical constraints against the Shubi-Sombo schemes in terms of the following topics.

1) Results of field investigation and farmers' interviews.
2) Lesson leaned from the study on technical optimization of irrigation facilities.
3) Needs of continuous monitoring for the case of the Shubi WUA.