

CHAPTER 7 ENVIRONMENTAL ASSESSMENT

7.1 Environmental Screening

7.1.1 Objectives

The environment screening aims at preliminary assessment for 21 proposed project under the Master Plan in order to identify any projects, which would be subject to negative environmental impact and need Initial Environment Examination (IEE). The study results are presented below.

7.1.2 Irrigation Development Program

(1) WUA Support Program

Environment Screening: Neutral to Positive. No IEE or EIA is required if planning considers the environmental and social aspects.

The objective of the program is to support small-scale farmers' irrigation activities through technical and institutional capacity building for WUAs as well as local staff of OIDA. The program will also assist in the establishment of new WUAs in the project area. The community mobilization and technical guidance will lead to improved and efficient management of water. The program will also help in improvement of farm income and living conditions of WUA members. This should result in neutral or positive environmental effects due to better management of the projects and program.

(2) Meki Irrigation and Rural Water Supply Project

Environment Screening: Variable. The aim of the project is to increase food security and income in the Meki Project area. The water from the Meki river will be used for the irrigation and rural water supply by constructing water supply system. It will use water from the Meki river. In such case an IEE or IEA may be required after screening of the project is undertaken.

The objective of the project is to introduce a gravity irrigation system, which is more sustainable in comparison to pump irrigation system. Headworks and irrigation system will be constructed on the Meki river to irrigate 2,300 ha of agricultural land. The project is expected to contribute to promotion of stable food production and poverty alleviation in the area. The proposed irrigation system will divert water from the Meki river, which is a source of water for the rift valley lakes (Ziway and Abijata). Therefore, assessment of environment impacts on the lake system is necessary and IEE/EIA should be undertaken when necessary.

7.1.3 Rain-fed Agriculture Improvement Program

(1) Semi-Arid Farming Improvement Project

Environment Screening: Positive. The program will establish semi-arid farming system suitable for the project area. The developed practices will aim on soil conservation, improvement of soil fertility and controlling soil erosion and salinity. These are positive to the environment, therefore No IEE or EIA is required.

The program aims to establish the optimum farming system suited to local conditions of the Meki area under semi-arid climate through the actual three years research in situ. The techniques to be optimized will be transferred to local farmers through existing extension channel. This program, if successful, should result in increase production, and controlling soil erosion and salinity with positive environmental results.

(2) Community Seed Bank Project

Environment Screening: Neutral. The project aims at the preservation of second generation seeds harvested from quality seed planted crops, which are otherwise consumed. Moreover, project will promote community-based approach for the timely distribution of quality seeds. It will contribute to food security with neutral environmental impact. Therefore, no IEE or EIA is required.

The project aims at preservation of second-generation seeds to be harvested from plots sown with quality seeds instead of consumption. Limited use of certified seeds is one of the constraints against reasonable crop yields in the Meki area. Although quality seeds are introduced to the Meki area through the extension program, its coverage is still limited. The project will be promoted by community-based approach with minimum government supports. Quality seeds will be procured by communities and released to peasants timely. The production will increase with improvement of seed quality and its timely distribution to the farmers.

(3) Post Harvesting Techniques Improvement Project

Environment Screening: Neutral. The project will promote improved post harvest techniques for the minimization of post harvest loss at threshing, milling and storing. Therefore, no IEE or EIA is required.

Post-harvest loss is significant in Ethiopia. According to the FAO staff in Addis Ababa, the total loss in the nation is estimated as much as 25% of the total production at on-farm level. The project aims at minimization of post-harvest loss at several processes, namely threshing, transport, milling and storing. It is expected to

reduce the post harvest loss and promotion of micro-enterprises for post harvest sector.

(4) Community Pond Project

Environment Screening: Neutral. The community ponds will be constructed in the remote areas for water supply. The storage capacity of pond will be less than 500 m³ with micro-catchment area less than 5 km², therefore will not have any significant negative environmental impacts. Moreover, these ponds will help in reducing workload of fetching water for domestic water supply. No IEE or EIA is required if planning considers the environmental and social aspects.

The project aims at development of community ponds in remote areas far from stable water resources such as the Meki river and the Ziway lake. Rather than natural development potentials, social factors may be more important for successful community pond development. The pond water will be used for drinking, animal and supplementary irrigation purposes and it help in reducing the workload for fetching water for domestic supply.

7.1.4 Animal Husbandry Modernization Program

(1) Demonstration Unit

Environment Screening: Neutral to Positive. The demonstration unit for livestock modernization will be established under this project, which will promote the crossbred cattle and modern animal husbandry techniques. The project will also educate farmers about modernized animal husbandry under zero grazing with crossbred and improved forage. It is expected to get neutral to positive environment results from the project in the environmental conservation. Therefore, no IEE or EIA is required.

The objective of this program is to create community based initiative for livestock modernization. The basic concept of the livestock modernization program is to increase livestock productivity by introduction of crossbred integrated, forage production and improvement of husbandry techniques. The environmental conservation, the regional livestock sector needs to be optimized under the zero-grazing system. The program is expected to convince farmers about high profitability of modernized animal husbandry under the zero-grazing system with crossbreeds and improved forages.

(2) Forage Production Project

Environment Screening: Neutral to positive. This project will promote the introduction of forage crops and efficient use of crop residues and by-products of agro-industries such as molasses and cotton seed cake. The planting of grasses and legumes should contribute to environmental conservation. Therefore, no IEE or EIA is required.

The project aims at introduction of forage crops in the Meki area and promotion of efficient use of crop residues and by-products of agro-industries. The program will help in meeting the rapidly increasing forage demand in the livestock sector, thereby increasing their productivity. The efficient use of by-products of agro industries such as molasses will help in improving environmental conditions.

(3) Improved Breed Promotion Project

Environment Screening: Neutral to Positive. This project will promote the crossbred cows and veterinary service in the project area. This should lead to healthier animals with neutral to positive environmental results. Therefore, no IEE or EIA is required.

The project envisages multiplying the Boran and Holstein crossbred and introduce them. For successful introduction of the crossbred, the animal health services will be reinforced. The project promotes introduction of more veterinary services and installation of crushes for preventing and controlling the prevailing diseases. The zero grazing of crossbred cow will lead to enhancement of environmental conservation.

7.1.5 Environmental Conservation Program

(1) Environmental Monitoring Program

Environment Screening: Positive. The project aims at environmental monitoring of the water resources of whole river basin. The monitoring will promote awareness creation and optimum water resources development. This will lead in better management of water resources, thereby positive environmental results. Therefore, no IEE or EIA is required.

The project aims at execution of the environmental monitoring which will cover all these water resources under the same program. The results will fully be utilized for optimum use of the water resources in the Meki area with minimum influence to the natural environment. Within the framework of Environmental Monitoring Program, progress of the WFP watershed management program and other environmental factors including drinking water quality, disasters such as drought, floods and flash

water, frequency and area of epidemic diseases. The project will focus not only on establishment of environmental monitoring system and capacity building for the government staff and communities.

(2) Seedling Center Program

Environment Screening: Positive. The project is expected to contribute expansion of agro forestry and alley cropping system. This will help in preventing soil erosion and enhancing soil conservation with positive environmental effects. Therefore, no IEE or EIA is required.

The project aims at reinforcing capability of the existing tree nursery in order to encourage environmental conservation activities. In addition to tree species for afforestation purposes, it is envisaged to produce seedlings for tree crops such as papaya and coffee in the nursery. This will contribute to expansion of agro forestry and alley cropping system and to improve farm family income through cash crop production.

(3) Watershed Management Program

Environment Screening: Positive. The project envisages establishing a model scheme in which agronomic and engineering measures of soil conservation are effectively integrated in order to supplement each other and enhance their benefits. The model will demonstrate the positive environment effects of expanding soil protection area and agro forestry with above measures for watershed conservation. Therefore, no IEE or EIA is required.

The objective of the project is to introduce agronomic as well as engineering measures of soil conservation. The soil conservation measures are expected to expand the agro forestry and protect the watershed from soil erosion with positive environmental effects. The model program will create awareness and need of watershed conservation and introduce watershed conservation methods. It is anticipated to expand the area of agro forestry and soil protection, which will lead to watershed conservation with positive environment effects.

7.1.6 Capacity Building Program for OIDA and Wareda Staff

(1) OIDA Engineers Training Program

Environment Screening: Neutral to Positive. No IEE or EIA is required.

The OIDA Engineers Training Program aims at providing training to the OIDA engineers on water and irrigation policy, hydrological analysis methods, civil design, preparation of tender documents, environment and watershed conservation, water

management, preparation of reports and participatory development approach. The training program includes environment and watershed conservation and water management, which can provide neutral to positive environmental effects.

(2) OIDA Community Development Expert Training Program

Environment Screening: Neutral to Positive. No IEE or EIA is required if planning considers the environmental and social aspects.

The program envisages to train 20 community development experts including, at least, 5 female staff. The particular attention will be paid to NGOs' activities in the program. The program will establish a database of NGOs accessible for the people of Oromia Region. The gender issue will be highlighted in the program. Therefore, program is expected to give neutral to positive environmental effects.

(3) Wareda Staff Training Program

Environment Screening: Neutral. No IEE or EIA is required.

The training will be provided to the Wareda staff on participatory development, improved techniques of rain-fed agriculture, irrigation technology, and animal husbandry. The program will help in improving working capacity of the Wareda staff of OIDA and BOA.

(4) Community Resource Mapping Project

Environment Screening: Neutral to Positive. No IEE or EIA is required.

The objective of program is to prepare a resource map of each community to verify their geographical position, population of community members, natural resources, social conditions and other essential information. The map will assist in smooth operation of administrative services including extension. The map can also be used for planning of community based rural development. Therefore, the project will have neutral to positive environmental effects.

7.1.7 Community Development and Cooperative Promotion Program

(1) Community Leader Training Program

Environment Screening: Neutral. This program will promote the participatory development and democratic operation of community activities. No IEE or EIA is required.

The program aims at systematic capacity building of community leaders in order to promote democratic operation of community activities and participatory development. This program will enhance community leaders' knowledge for better community management. This program will not have any environmental impacts.

(2) Visioning Workshop Program

Environment Screening: Neutral to positive. The program is expected to promote participatory development and empowerment of rural community with neutral to positive environment impacts. Therefore, No IEE or EIA is required.

Visioning Workshop Program will create awareness for advocacy for quality of life among community and empowerment especially of poverty groups of community. This program will have neutral to positive environmental impacts.

(3) Drinking Water and Nutritional Improvement Program

Environment Screening: Positive. The project aims at creating awareness of improving drinking water quality and nutritional status among rural farmers especial women. It will assist in controlling water borne diseases and reducing the infant mortality rate. Therefore, no IEE or EIA is required.

The objectives of the program is to transfer the knowledge of the prevention of water borne diseases, drinking water quality controlling methods, importance and improvement of nutrition especially for infants and pregnant women and promotion of nutritionally rich horticultural crops. The awareness creation among small farmers especially women will lead to healthier life with positive environmental results.

(4) Community Center Project

Environment Screening: Neutral. No IEE or EIA is required if planning considers the environmental and social aspects.

The Community Center Project aims at provision of conventional shed-type building to rural communities so as to encourage the community activities. The facilities will be utilized for the meetings, training program, administrative service, cooperative activities, recreation, temporary space for seedlings and seeds and other purposes of community. It will promote participatory development and empowerment of local farmers without any environmental effects.

(5) Grain Bank Promotion Program

Environment Screening: Neutral to Positive. No IEE or EIA is required.

This program aims at securing food grains during the lean season through lending and borrowing products among the surplus and deficit farmer producers at PA level. The products in the peak harvesting season will be stored by the farmers at a grain bank warehouse. During the lean season, the deficit farmers who need to purchase food grains shall borrow the food grains from the grain bank and return the grains in the next harvesting season with a certain additional quantity as an interest. The program will establish food grain security system at village level and promote grain marketing.

It will contribute in increasing farmers' income and village welfare with neutral to positive environmental effects.

7.1.8 Conclusion

The initial screening process indicated 20 projects will give positive or neutral environmental benefits. However, only project "Meki Irrigation and Rural Water Supply Project" shows variable environmental impacts and requires IEE for further assessment of environmental impacts. The following chapter describes about the IEE of this project.

7.2 Initial Environmental Examination (IEE)

7.2.1 The Scope and Objectives of the Study

The IEE, which is a requirement of the Environmental Policy of the FDRE, has two components: screening and scoping. Screening is a preliminary environmental review to assess whether EIA is necessary or not for a proposed development project. And if needed, to decide the nature and magnitude of the proposed project's potential environmental and social impacts and assigns the project to one of the three categories (Schedules) according to the EIA Guidelines of the FDRE. Once a project is categorised, a scoping process defines the project's likely environmental impacts and the area of influence more precisely and develops terms of reference (TOR) for the EIA. As part of this process, information about the project is disseminated to local communities and NGOs, followed by consultations to help to focus the EIA on issues of concern at the local level. The IEE was conducted using existing data and experience in similar projects. To attain these objectives, the Study reviewed all relevant data and documents related to potential environmental impacts of the Project, especially, the Environmental Assessment Guidelines Document of: the FDRE (2000).

7.2.2 Ecological Regions

The proposed irrigation development project includes a diversion weir, canals and drains and related on-farm structures. The environmental items for IEE are principally the common items related to dam and irrigation development projects based on the existing guidelines for the EIA. Consequently, the 20 environmental items for IEE have taken into account the general features of the project. On this basis, the study area can be broadly divided into the following seven (7) ecological regions as shown in a diagram in Figure 7.2.1.

- Region I : Catchment area of the diversion weir
- Region II : Head work area
- Region III : Meki river channel (from the diversion weir to Lake Ziway)
- Region IV : proposed irrigation area, i.e. 3,200 ha covered by agricultural

land owned by some 1,000 to 2,000 HHs

- Region V : Lake Ziway system
- Region VI : Bulbula river channel (from the Ziway lake to the Abijata lake)
- Region VII : Abijata- Shalla lake system

7.2.3 Results of Initial Environmental Examination (IEE)

Based on the data and information related to existing environmental conditions and potential impacts of the Project, the significance and magnitude of the impacts have been preliminarily examined using the environmental attributes – important environmental components for each of ecological regions. The results of the IEE are presented in Table 7.2.1 and summarized below.

(1) Conflicts with water Supply Rights

The diversion of water from Meki River for irrigation in Region IV will reduce water for downstream users especially, in regions III and VII. This can lead to competition and conflicts among various water users (WUAs, the Soda-ash enterprise near Lake Abijata, fishery, and local communities including pastoralists) within the influence of the project.

(2) Social Impacts

Approximately 2,300 ha in Region IV will be irrigated under the Project. Although the command area of the Project is not yet selected, some 1,000 to 2,000 Households live within this farmland. Although no communities in Region IV will be resettled in other areas, parts of their farmland will be reallocated to other communities under the project. This may cause some significant social impacts to these communities, in that, they will lose part of their land and will have to cope with influx of new people and the associated social discomfort.

(3) Change of River Flow Regime

The Project will cause a change of current flow regime in Meki and Bulbula rivers due to diversion of Meki River for irrigation in Region IV. The magnitude and significance of expected impacts should be established based on ecological studies, hydrological data and plan of operation of the Project. Currently, there is no policy on minimum flow requirements in rivers, and minimum water levels in lakes, and this guideline is urgently needed to ensure equitable apportionment of water resources.

(4) Water Quality Change

Water quality deterioration is expected through changes of existing river flow regime and additional pollution loads from the irrigation area, especially, through a return flow from Region IV into Lake Ziway. This would contain chemical fertilizers,

insecticides and herbicides with deleterious effect on human and animal health. The possibility and magnitude of these impacts should be clarified based on the data related to river flow discharge and water quality analysis.

(5) Depreciation of Fisheries

Diversion of Meki River will cause reduced flow downstream, affecting the ecology of fish especially in the lower reaches of Meki River, Lake Ziway and Lake Abijata. The two lakes are economically important sources of fish. Moreover, reduction of fish in Lake Abijata due to reduced water inflow into the lake may reduce the current earnings from tourism and diminish the international status of Lake Abijata as a would-be RAMSAR site. More detailed hydrological and ecological studies are needed to establish requirements for minimum water flow in Bulbula River and minimum water levels in Lake Abijata that will not disrupt ecological balance in these water bodies.

(6) Impacts on Precious Ecology

Like in (4) above, precious ecology that is host to phytoplanktons, zooplanktons, fish and water fowls in the water bodies in the ecological Regions III and V-VII will be disturbed significantly due to change in water flow regime. The same remedial measures as in (1-4) above are needed.

(7) Positive Impacts

Despite the above potential negative impacts of the proposed Project, the overall effect of the Project on the people of Dogda Bora is expected to be positive. The environmental conservation component of the Project will ensure environmentally sustainable development. The planned afforestation and water conservation will ensure sustainability of the irrigation development and animal husbandry modernisation components in the currently badly degraded Project area by reducing soil erosion and sedimentation in the planned irrigation system as well as by improving riverflow regime and water supply. Also, the environmental monitoring and management plan to be developed in the EIA is expected to effectively mitigate the negative environmental and social impacts of the proposed irrigation development. Overall, the Project is expected to improve the livelihood of the target group through increased food production and availability of water for crop production, human and livestock use, thus achieving the objective of the Project of ensuring food security and poverty reduction. The Project will further contribute to food security and poverty reduction through the other three components of the Project: (i) rain-fed agriculture improvement; (ii) capacity building for OIDA and Wereda Staff; and (iii) community development and co-operative promotion. And on a short-term basis, the Project will create employment for over 200 people during the construction phase.

7.2.4 Conclusion

Overall, the Project is expected to improve the livelihood of the target group through improved food security and reduced poverty through environmentally sustainable practices. According to the IEE results, the proposed project falls under Category (Schedule) I, which requires a full EIA, as its adverse impacts may be sensitive, irreversible, and diverse. The most crucial negative impact of the proposed project relates to diversion of water Meki River through an intake for irrigation. The diversion of water will result into competition and conflicts from water users downstream due to change of river flow regime. The conflicts relate mainly to reduced flow for on-going irrigation activities, pastoral and domestic water uses, depreciation of fish and fisheries, and reduction of waterfowl population (especially, Pelicans and Flamingo) in Lake Abijata-Shalla National Park, which is a proposed RAMSAR site. The adverse social impact of the Project relates to loss of land by the communities in the proposed irrigation area due to the planned influx of new farmers and the associated social discomfort. Although these impacts range from moderate to highly significant effects, they were identified during the limited period of the IEE, which is characterized by inadequate supporting data. Therefore, the IEE results are not considered decisive to approve or discredit the project viability at this stage.

7.3 Environmental Impact Assessment (EIA)

The TOR for EIA is presented in Attachment 8-1 of Appendix VIII. The Project falls under Category (Schedule) I, which requires a full EIA, as its adverse impacts may be sensitive, irreversible, and diverse. The EIA will be directed to assess the most crucial issue of change in water flow and the expected impacts focusing on the following issues.

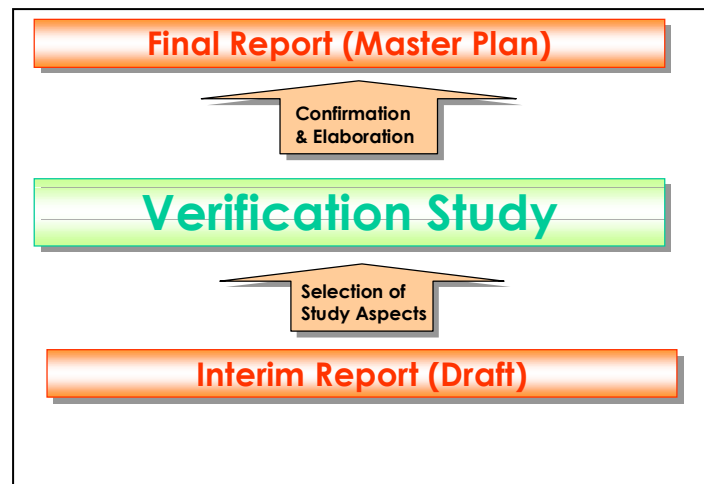
- 1) Careful assessment will be made particularly on the significance of the expected change in river flow on downstream development activities and the Abijata lake ecosystem.
- 2) Quantitative information is needed on the relationship between water level and salinity in the Abijata lake and the aquatic life.
- 3) The FDRE does not have guidelines on minimum river maintenance flow and minimum water level for optimum ecological balance. Further study will be required on this aspect.
- 4) The EIA is expected to provide a conclusive opinion on the project viability and may develop countermeasures, and a comprehensive environmental monitoring and management plan to ensure its environmental sustainability.

CHAPTER 8 VERIFICATION STUDY

8.1 Objectives

Under six (6) components, 21 projects were preliminarily formulated as stipulated in the Interim Report submitted in March 2001. The anticipated implementation agencies of the proposed 21 projects are to be not only OIDA but also OADB. Especially for improvement of rain-fed agriculture and livestock sectors, OADB will play a key role. Besides, community development and environmental conservation are to be promoted by both OIDA and OADB.

The S/W directed the Study to examine technical and financial viability of the draft Master Plan and to select pilot activities (study aspects) for the V/S as mentioned in Clause V of the S/W. All the results of the V/S will be incorporated into the final Master Plan in Draft Final Report to be submitted in March 2002. The objectives of the V/S can be summarized as illustrated below.



Objectives of Verification Study

The V/S is expected to provide a lot of valuable information for confirmation and elaboration of the Mater Plan. In addition, the V/S envisaged to contribute to the capacity building for the government staff, who will play key roles in the implementation of the Mater Plan in future and the direct benefits to target groups through the implementation of the V/S.

8.2 Selection of Programs

8.2.1 Selection Criteria of Verification Study Programs

The V/S programs were selected under the following conditions.

- (1) Pilot projects to confirm viability of the priority projects among 21 projects and identify unforeseeable constraints for their elaboration

- (2) Pilot projects to contribute effectively to the capacity building of OIDA and OADB for future smooth implementation of the Master Plan
- (3) Pilot projects to be completed within definitive time period, i.e. six (6) months from May to November 2001, for earlier commencement of the actual Master Plan

8.2.2 Selected Programs

The following six (6) programs were selected for the V/S.

Selected Verification Study Programs

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

The details of the above-mentioned programs are stipulated in Attachment 2.

8.3 Performance and Results

8.3.1 General

The V/S was carried out in the Third Fieldwork in Ethiopia of the Phase-II for six months from May to November 2001. The intensive monitoring was continued for each of the V/S programs. The evaluation was made through the analyses of the monitoring records and actual performance of the activities at the workshop and discussed by all the attendants. At the completion of the verification study, the Progress Report (2) was prepared and submitted to OIDA. Taking the study results and all the comments on the Progress Report (2) into consideration, the JICA Study Team prepared the Draft Final Report at the end of the Second Home Office Work in Japan and submitted to OIDA for final scrutiny.

The details of performance and results of the V/S are mentioned in Appendix X and summarized from page 8-6 with special attentions to (i) information fed back to the M/S, (ii) contribution to capacity building for the government staff and (iii) direct benefits as pilot project.

8.3.2 Performance and Results of Program 1

Program 1 aimed (i) to determine the present capacity and knowledge of the existing OIDA engineers on analytical hydrology for irrigation development, (ii) to optimize realistic target to meet the tasks of OIDA, and (iii) to select effective training programs necessary to fulfil the gap between (i) and (ii). The training program including 2-day general workshop for all participants and 2-weeks intensive training program on methodology of hydrological analysis for selected persons was carried out. The Program concluded that OIDA engineers need further training under the M/P as follows.

- 1) Basic training of computer use for data analysis
- 2) Estimation of missing data, crop water requirement, probability analysis, flood analysis, low flow analysis, and other hydraulic analysis needed for planning and design for irrigation development project.
- 3) Preparation of Design Report
- 4) Preparation of terms of reference for hydrological analysis

8.3.3 Performance and Results of Program 2

Program 2 aimed to establish the management information system for 96 existing irrigation schemes, of which overall irrigation performance is as low as 58%, so as to provide OIDA staff with data and information necessary for identification of prevailing constraints facing each of scheme including necessity of urgent rehabilitation works. The data and information collected through the field survey covered 27 items consisting of finance source, natural condition, water source, present condition of facilities, progress of project implementation, farming, activities of water users' association, assignment of OIDA DA. The database thus established will be utilized for more efficient scheme management and future rehabilitation program.

8.3.4 Performance and Results of Program 3

The objective of Program 3 is to initiate the long-term environmental monitoring program specified in the draft master plan. Although OIDA is the most appropriate agency to monitor irrigation water use in the Region, the budgetary arrangement and human resources are limited. The V/S envisaged formulating a realistic monitoring program under the given conditions. Three monitoring programs could be commenced during the V/S period as follows. (8.3)

- 1) The discharge measurement for the Meki and Bulbura rivers by the automatic water level recorders installed by the JICA Study Team.
- 2) Irrigation water use by operation records of the Meki-Ziway irrigation scheme.
- 3) Inventory survey of small pumps in the Meki river basin by the OIDA Wareda staff.

8.3.5 Performance and Results of Program 4

Program 4 aims to prepare a guideline for establish WUAs for small-scale irrigation development, focusing on standardization of community mobilization for establishment of the WUAs. The Community Mobilization Department of OIDA is responsible for establishment of the WUAs, assigning 31 social workers in the head office and the branch offices. Through the PRA, appropriate approaches and procedures from planning to construction have been discussed in three (3) rural comminutes of Shubi Gamo PA, which preferred to embark on a small-scale irrigation development. For each scheme, 20 householders with 5 ha of total farmlands were organized. A small pump and cost for civil works were provided by JICA, while OIDA arranged construction equipment. The number of beneficiary under the Program is 63 comprising of 315 family members, i.e. Shubi scheme (15H.H with 3.5ha), Sombo Genet scheme (28H.H. with 7.0ha) and Sombo Aleltu (20H.H. with 5.0ha).

8.3.6 Performance and Results of Program 5

The objective of Program 5 was to collect and arrange the information of rural communities by means of Community Resources Map (CRM) and to seek potentiality to apply the map to rural. The V/S prepared the entire CRM covering 54 PAs of Dugda Bora Wareda by inputs of 27 DAs of OADB. Firstly, the applicability of CRMs was analyzed for the field of agricultural extension. The V/S demonstrated the applicability of CRMs for (i) data accumulation and application to sustainable extension activities, (ii) application to EPP, (iii) collection and provision of data in uniform manner, (iv) identification of bottom-up needs and (v) preparation of strategic extension program with development targets.

8.3.7 Performance and Results of Program 6

The objectives of Program 6 were (1) to review the extension and research programs to improve farming practices in the semi-arid area, (2) to compile extension materials suitable for the Meki area, and (3) to verify the materials in the area. Because of low literacy rate in the area, it was foreseen that the extension materials to be applied in the area should be prepared visually by use of illustrate and photograph. The Study identified that the conversation language in the Meki area is Oromo but the written languages are Amharic for adults and Oromo for youth, who are given the primary education in Oromo language. The extension information seeked by farmers are different by communities. Referring to the existing 55 extension materials, Extension Handbook for DAs and 14 subject leaflets were prepared and handed over to OADB.

8.3.8 Participants in Verification Study

The number of participants in the program is 268 (3,450 man-days). Detail of

information per each program is shown below.

Number of Participants in the Program

Program	Detail of Participants			
<u>Program 1</u> Training of analytical methodology for water resources development Number of participants: 10 persons, 118 man-days	<u>Description</u> 1)Program Coordinator 2)Participants in workshop 3)Participants in intensive course Total	<u>Persons</u> 1 10 4 Total	<u>Days</u> 50 2 12 Total	<u>Man-day</u> 50 20 48 118
<u>Program 2</u> Establishment of management information system of the OIDA irrigation schemes Number of participants: 42 persons, 359 man-days	<u>Description</u> 1)Program Coordinator 2)4 branch office managers 3)Irrigation engineer in the branch offices 4)Interim appraisal workshop Total	<u>Persons</u> 1 4 4 34 Total	<u>Days</u> 125 20 30 1 Total	<u>Man-day</u> 125 80 120 34 359
<u>Program 3</u> Environmental monitoring – irrigation water use in the Meki area Number of participants: 37 persons, 374 man-days	<u>Description</u> 1)Program Coordinator 2)OIDA Wareda office 3)OIDA Meki-Ziway Operator 4)Interim appraisal workshop Total	<u>Persons</u> 1 2 1 34 Total	<u>Days</u> 150 30 130 1 Total	<u>Man-day</u> 150 60 130 34 374
<u>Program 4</u> Preparation of guideline for formation and operation of water users associations (WUA) Number of participants: 120 persons, 816 man-days	<u>Description</u> 1)Program Coordinator 2)OIDA head / branch office 3)Participants of workshop 4)OIDA Wareda office 5)Illustrate meeting 6)Interim appraisal workshop Total	<u>Persons</u> 1 3 9 3 74 34 Total	<u>Days</u> 150 120 2 60 1 1 Total	<u>Man-day</u> 150 360 18 180 74 34 816
<u>Program 5</u> Community resource mapping Number of participants: 32 persons, 1,435 man-days	<u>Description</u> 1)Program Coordinator 2)OADB Wareda Office 3)DA in Dugda Bora 4)DA workshop 5)CRM Committee 6)Interim appraisal workshop Total	<u>Persons</u> 1 4 27 74 20 Total	<u>Days</u> 90 60 30 1 1 Total	<u>Man-day</u> 90 240 810 80 195 20 1,435
<u>Program 6</u> Preparation of extension tools and research program for the Meki area Number of participants: 27 persons, 356 man-days	<u>Description</u> 1)Program Coordinator 2)OADB Wareda Office 3)DA in Dugda Bora 4)DA workshop 5)Interim appraisal workshop Total	<u>Persons</u> 1 4 3 20 Total	<u>Days</u> 120 30 30 1 Total	<u>Man-day</u> 120 120 90 6 20 356

Evaluation of Verification Study

Program	Feed back to the Master Plan
<p>□ Training of analytical methodology for water resources development</p>	<p><u>Objectives and Background</u></p> <p>The objectives of Program 1 are (1) to determine the present capacity and knowledge of the existing OIDA engineers on analytical hydrology for irrigation development, (2) to optimize realistic target to meet the tasks of OIDA, and (3) to select effective training programs necessary to fulfil the gap between (1) and (2). The above-mentioned process will be verified through the actual hydrological training for 12 participants, which includes 4 persons in the head office and 8 persons in four branch offices. Lessons obtained from the training program are expected to be taken into consideration in finalization of □5-1□ OIDA Engineers Training Program proposed under the Draft Master Plan.</p> <p><u>Activities and Input</u></p> <p>In June and July 2001, the training program including 2-day general workshop for all participants and 2-weeks intensive training program on methodology of hydrological analysis for selected persons was carried out. The number of the participants was 10. Dr. Mehta, Hydrologist of the JICA Study Team, provided them the training with aid of 4 computers supplied by JICA.</p> <p><u>Output and Feedback</u></p> <p>(1)Present capacities of hydrologist</p> <p style="padding-left: 20px;">Major finding through the program are as follows.</p> <p style="padding-left: 20px;">1) Participants□</p> <p style="padding-left: 40px;">Out of 720 OIDA staff, 38 persons need knowledge of analytical hydrology. They consist of 24 irrigation engineers and the rests are hydrologists. Out of 38 staff, 15 staffs are based in the OIDA head office, while 23 staffs in the 4 branch offices. 12 participants were selected among them, of which 8 staffs are irrigation engineers and 4 staffs are hydrologists.</p> <p style="padding-left: 20px;">2) Educational background□</p> <p style="padding-left: 40px;">Among 10 participants in the training course, four of them are MSc. Degree holders, while others had BSc. degree in engineering courses.</p> <p style="padding-left: 20px;">3) Work experience for hydrological analysis and related engineering fields□</p> <p style="padding-left: 40px;">The average technical experience of the trainees was 7.2 years. As for the analytical hydrology, the number of trainees with some experience was nine in analysis of crop water requirement, eight in flow analysis•and six in frequency / probability analysis. On the other hand, the participants had not much experienced in rainfall analysis (two persons)•flood analysis(2 of 10)•regression and correlation analysis (none).</p> <p style="padding-left: 20px;">4) Computer knowledge / experience□</p> <p style="padding-left: 40px;">Among 10 participants, four of them had some knowledge and experience of computer, while the others were beginners. It was pointed out that, in Ethiopia, computers have been used mainly for writing letters or documents as a typewriter, engineers had not sufficient computer knowledge and seldom access to computer system. So the training program under the V/S firstly envisaged providing an introduction of basic computer use. They could master basic operation of Microsoft Excel during 2-week intensive training course with high trainability.</p> <p>(2)Realistic targets</p> <p style="padding-left: 20px;">The targets to be achieved by for the hydrologists and design engineers by 2015, the target year of the master plan, are set as follows.</p> <p style="padding-left: 20px;">1) To conduct hydrological analysis for irrigation development by OIDA engineers.</p> <p style="padding-left: 20px;">2) To execute planning and design for irrigation facilities in medium and small-scale irrigation schemes, with an area of less than 100 ha.</p> <p style="padding-left: 20px;">3) To understand the technical report prepared by consultants in terms of planning and design of irrigation infrastructures in large-scale schemes.</p> <p>(3)Required training program</p> <p style="padding-left: 20px;">1) Basic training of computer use for data analysis</p> <p style="padding-left: 20px;">2) Estimation of missing data, crop water requirement, probability analysis, flood analysis, low flow analysis, and other hydraulic analysis needed for planning and design for irrigation development project.</p> <p style="padding-left: 20px;">3) Preparation of Design Report</p> <p style="padding-left: 20px;">4) Preparation of terms of reference for hydrological analysis</p>

Evaluation of Verification Study

Contribution to capacity building for the Government staff	Direct benefit as a pilot project																				
<p><u>Program Coordinator:</u> Mr. Abera Shiferaw MSc., Hydrologist of the head office, acted as the coordinator of Program 1.</p> <p><u>Participants in the program:</u> The program, consisting of workshop (10 persons) and intensive training (4 persons), was carried out for the following manners.</p> <ol style="list-style-type: none"> 1) Presentation of the water balance study in Meki-Ziway basin, which was conducted in the Phase I of the Study, focusing on the alternative study of water resource for the irrigation development. This aims to promote their understanding of the Study, showing them the sample of hydrological study. 2) Basic knowledge for computer operation necessary for the hydrological study, such as the Microsoft Excel. 3) Training and practice required for hydrological analysis to design structures, such as regression, correlation, probability analysis, crop water requirement, and so on. <p><u>Number of participants in the Program:</u> The number of Participants in the Program was 10 and amounted to 118 man-day in total as shown below.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Description</u></th> <th style="text-align: center;"><u>Persons</u></th> <th style="text-align: center;"><u>Days</u></th> <th style="text-align: center;"><u>Man-day</u></th> </tr> </thead> <tbody> <tr> <td>1)Program Coordinator</td> <td style="text-align: center;">1</td> <td style="text-align: center;">50</td> <td style="text-align: center;">50</td> </tr> <tr> <td>2)Participants in workshop</td> <td style="text-align: center;">10</td> <td style="text-align: center;">2</td> <td style="text-align: center;">20</td> </tr> <tr> <td>3)Participants in intensive course</td> <td style="text-align: center;">4</td> <td style="text-align: center;">12</td> <td style="text-align: center;">48</td> </tr> <tr> <td style="text-align: right;">Total</td> <td></td> <td></td> <td style="text-align: center;"><u>118</u></td> </tr> </tbody> </table>	<u>Description</u>	<u>Persons</u>	<u>Days</u>	<u>Man-day</u>	1)Program Coordinator	1	50	50	2)Participants in workshop	10	2	20	3)Participants in intensive course	4	12	48	Total			<u>118</u>	<p><u>Capacity building to hydrological analysis and awareness creation for OIDA staff</u></p> <p>Direct benefits in the program are as follows.</p> <ol style="list-style-type: none"> 1) Need for capacity building for hydrological analysis was recognized by OIDA. 2) Capacity of hydrological analysis for 10 persons, who participated in the intensive training course, has been improved. 3) Standardization of hydrological analysis methods led to improve accuracy, compatibility, and efficiency of the work performance in the head office and four branch offices 4) The participants of the program are expected to be core persons to transfer the technology to the other technical staff, although there are insufficient training facilities in the branch offices. 5) Four (4) sets of the computers, software for hydrological analysis, and manual edited by the JICA Study Team can be utilized for future study of irrigation development. 6) Technical exchange, between the head office and the branch offices, and among staff in the branch offices were realized. 7) It was good opportunity for all the to know concept, process, and result of the Study.
<u>Description</u>	<u>Persons</u>	<u>Days</u>	<u>Man-day</u>																		
1)Program Coordinator	1	50	50																		
2)Participants in workshop	10	2	20																		
3)Participants in intensive course	4	12	48																		
Total			<u>118</u>																		

Evaluation of Verification Study

Program	Feed back to the Master Plan
<p>□ Establishment of management information system of the OIDA irrigation schemes</p>	<p><u>Purpose and background of the program</u></p> <p>In Ethiopia, due to frequent structural changes of the government organization, the basic data and information necessary for irrigation development have not been kept in proper condition, most of which got scattered and lost. It causes difficulty to conduct monitoring and evaluation of the schemes, and consequent systematic support to the schemes based on lessons obtained from last experiences. OIDA, since its establishment in July 1999, has faced scarcity of data and information regarding planning, design, present condition of existing irrigation schemes in terms of irrigation facilities and water users' associations. Under this circumstance, in May 2000, OIDA carried out an inventory survey to gather basic information of 96 existing irrigation schemes in Oromia Region.</p> <p>Program 2 aims to establish the management information system for 96 existing irrigation schemes so as to provide OIDA staff with data and information necessary for identification of prevailing constraints facing each of scheme including necessity of urgent rehabilitation works. The management information system will be applied to •5-1• OIDA Engineers Training Program and •5-2• OIDA Community Development Experts Training Program.</p> <p>The results of the inventory survey in May 2000 became clear that overall performance of the irrigation schemes, that is ratio of actual irrigated areas to planned irrigation area, fell into only 58%. There is no prospect to commence the data collection and the necessary rehabilitation works due to financial constraints since the available fund arranged by IFAD and ESRDF are allocated mainly to new construction irrigation schemes.</p> <p><u>Activities and input</u></p> <p>In cooperation with the four branch offices in data collection covering design reports, design drawings, questionnaire, photograph was carried out. Consequently problems in relation to low performance of OIDA irrigation scheme was preliminarily analyzed.</p> <p><u>Output and Feedback</u></p> <p>1) Available data and information □ Data and information collected in the field cover 27 items, containing finance source, natural condition, water source, present condition of facilities, progress of project implementation, farming, activities of water users' association, assignment of OIDA DA.</p> <p>2) Document management □ It was found that many design reports and drawings are lost. Data management is not conducted systematically although some data are kept personally not organized systematically. The central branch office rates high in data quantity, while consciousness on data management vary in branch office, putting relative high rating on the western branch office.</p> <p>3) Technical level of OIDA staff □ The OIDA engineers could identify and clarify present constraints and problems of the existing irrigation schemes without special training and guidance.</p> <p>4) Format of the database system □ In the interim appraisal workshop held in August 2001, there was a series of discussion how to select hardware and software suitable for the management information system. The OIDA engineer pointed out that data base management system developed by OIDA should be compatible with that being formulated by the Oromia Water, Mineral, Energy Bureau. The bureau establish the system by PDF file. Through the data collection, it was observed that the data and information obtained through the field survey were too inadequate both in quality and quantity to establish computerized management information system. Thus, for the moment, the hard copy of the collected data and information with photograph are compiled into files while the data are encoded for further analysis by use of the Microsoft Excel.</p> <p>5) Application of the management information system □ Present problems and constraints prevailing in the schemes were classified according to both engineering and institutional aspects, such as deterioration of irrigation facilities, degree of WUA's activities, and so on.</p> <p>6) Cost for field investigation and system maintenance □ The most important issue on the management information system is how the cost for the system maintenance should be arranged. The data and information stored in the system shall be reviewed and updated every year. Thus, since the cost needed for the one –day field investigation is Birr 300 per scheme, OIDA shall proceed budgetary arrangement amounting to some Birr. 30,000 for the annual data maintenance. The arrangement of vehicle for the field study is required. The awareness campaign regarding necessity and importance of the management information system should also be promoted.</p>

Evaluation of Verification Study

Contribution to capacity building for the Government staff	Direct benefit as a pilot project																														
<p><u>Program Coordinator:</u></p> <p>Mr. Teshomme Lemma., design engineer of the OIDA head office, is responsible for implementing the program, including program design, preparation of the questionnaire, data collection.</p> <p>However, he could not attend the data analysis conducted in latter half of the period since he was dispatched to the study abroad in the Netherlands.</p> <p><u>Branch Office Manager</u></p> <p>The JICA Study Team visited all four (4) branch offices to discuss present condition and constraints of project management and to exchange opinions to solve the problems. During course of the discussion, the managers understood needs to establish the management information system as well as responsibilities of the branch offices to implement the system. It was of significance that awareness creation for the managers could be promoted.</p> <p><u>Irrigation engineers in the branch offices</u></p> <p>Data collection, field survey, and filling the questionnaire for the program were carried out by irrigation engineers in the branch offices.</p> <p>Data encoding was carried out by computer operators arranged by the Study Team. The data were transferred to OIDA in January 2002.</p> <p><u>Participants in interim appraisal workshop</u></p> <p>Based on eight schemes managed by the central branch office, preliminary analysis was conducted so as to clarify cause on low irrigation performance in the OIDA scheme was conducted. Presentation of the study results in the interim workshop reached smooth implementation of the program, getting better understanding and cooperation of OIDA senior staff for the program.</p> <p><u>Number of participants in the Program</u></p> <p>The number of Participants in the Program was 42 and 359 man-day as shown below.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Description</u></th> <th style="text-align: center;"><u>Persons</u></th> <th style="text-align: center;"><u>Days</u></th> <th style="text-align: center;"><u>Man-day</u></th> </tr> </thead> <tbody> <tr> <td>1)Program Coordinator</td> <td style="text-align: center;">1</td> <td style="text-align: center;">125</td> <td style="text-align: center;">125</td> </tr> <tr> <td>2)4 branch office managers</td> <td style="text-align: center;">4</td> <td style="text-align: center;">20</td> <td style="text-align: center;">80</td> </tr> <tr> <td>3)Irrigation engineer in the branch offices</td> <td style="text-align: center;">4</td> <td style="text-align: center;">30</td> <td style="text-align: center;">120</td> </tr> <tr> <td>4)Interim appraisal workshop</td> <td style="text-align: center;">34</td> <td style="text-align: center;">1</td> <td style="text-align: center;">34</td> </tr> <tr> <td style="text-align: left;">Total</td> <td></td> <td></td> <td style="text-align: center;"><u>359</u></td> </tr> </tbody> </table>	<u>Description</u>	<u>Persons</u>	<u>Days</u>	<u>Man-day</u>	1)Program Coordinator	1	125	125	2)4 branch office managers	4	20	80	3)Irrigation engineer in the branch offices	4	30	120	4)Interim appraisal workshop	34	1	34	Total			<u>359</u>	<p><u>Basic data and information for Irrigation sub-sector in Oromia Region</u></p> <p>Database files compiling basic data and information were prepared and left for OIDA.</p> <p>The numbers of beneficiaries through making practical use of the database system is expected as shown below.</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 20%;">Present</td> <td style="width: 20%;">5,560ha</td> <td style="width: 60%;">15,763 H.H</td> </tr> <tr> <td>Future with rehabilitation project</td> <td>9,644ha</td> <td>26,984 H.H.</td> </tr> </tbody> </table>	Present	5,560ha	15,763 H.H	Future with rehabilitation project	9,644ha	26,984 H.H.
<u>Description</u>	<u>Persons</u>	<u>Days</u>	<u>Man-day</u>																												
1)Program Coordinator	1	125	125																												
2)4 branch office managers	4	20	80																												
3)Irrigation engineer in the branch offices	4	30	120																												
4)Interim appraisal workshop	34	1	34																												
Total			<u>359</u>																												
Present	5,560ha	15,763 H.H																													
Future with rehabilitation project	9,644ha	26,984 H.H.																													

Evaluation of Verification Study

Program	Feed back to the Master Plan
<p>□ Environmental monitoring – irrigation water use in the Meki area</p>	<p><u>Objective and background</u></p> <p>The Meki-Ziway Irrigation Development Project is located in the Meki area. This project is known as one of the largest irrigation schemes in the country. The design discharge of the pump station is 5 m³/sec. The station consists of 9 sets of the pump with a capacity of 0.72 m³/sec, among which 2 sets are reserved as stand-by. Actual developed area is 1,500 ha total planned area of 3,000 ha. Actual cultivated areas in recent years were 380 ha in 1999, 160 ha in 2000, and 216 ha in 2001. A private enterprise cultivated maize in 2000 while in 2001 377 households organized by the Oromia Cooperative Promotion Bureau planted seed of maize. The operation of the project is recognized to have the most influence of water level of the lake Ziway. On the other hand, estimated annual water consumption by small-scale pump irrigation scheme along the Meki river and the Lake Ziway is less than 10 MCM, which is nearly equal to 3% of annual runoff of the Meki river (291 MCM). This fact shows, at the moment, that the environmental affects on water abstraction by the schemes are negligible. However, under such background that legislative framework in terms of water right is not satisfactory, the disordered water usage in the area may lead to serious adverse environmental affect if no action is taken to restrict and monitor it carefully. Moreover it should be commented irrigation farming by large-scale landholders and private investors residing in urban area causes gap of income level in the area.</p> <p>The objective of the program is to commence □4-1□Environmental Monitoring Program specified in the draft master plan. OIDA is most appropriate agency than other governmental organizations, like bureaus of water, mineral, and energy, health, and agricultural development, and so on. It is not realistic for OIDA to formulate excessive monitoring program beyond their budgetary arrangement and human resources. It is necessary to start the monitoring program with minimal level so that OIDA can proceed the program continuously with utilizing their resources.</p> <p><u>Activities and Inputs</u></p> <p>At first, the following activities were attempted to be motored by the JICA Study team and OIDA Meki Wareda Office:</p> <ul style="list-style-type: none"> • Water level in Meki and Bulbula rivers • Water quality in Meki and Bulbula rivers • Present condition of water use and agricultural farm input in the Meki-Ziway Irrigation Project • Present water use in small-scale pump irrigation schemes • Present crop production in small-scale pump irrigation schemes • Progress of reforestation project • Present activities of donor and NGO related to water resources <p><u>Output and Feedback</u></p> <p>1) Applicable activities □The number of Activities which could commence during the verification study period was only three, namely •, •(water use only), and •, as shown below</p> <ul style="list-style-type: none"> • The automatic water level recorders installed by the JICA Study Team were utilized in the activity. • Only water usage of the irrigation project was studied by operation records of the pump. • The number of the pumps with their power were clarified through the inventory survey conducted by the OIDA Wareda staff. <p>2) Present irrigation water use□Water usage of the Meki-Ziway Irrigation Project from April to August in 2001 amounts to only 0.06% of total storage of the lake. Although The number of the small pumps was 180, with an increase of 20 sets over last year, it was impossible to estimate total water usage due to lack of their operation records.</p> <p>3) Activities which failed to proceed□ Among seven activities, five items, namely •,•,•,•, and •. Although the OIDA establishment proclamation specifies that environmental conservation and watershed management, there is no department, taking in charge of those activities. Further, items Water, Mine & Energy Resources Development Bureau is in charge of •, and •. Oromia Agricultural Development Bureau deals with •,and • while Oromia Cooperative Promotion Bureau is responsible for item •. In such circumstance, it is very difficult that to implement comprehensive environmental monitoring program under sole governmental agency.</p> <p>4) Constraints of nursery program in Meki and reforestation program in the catchment□ It was observed that implementation of reforestation program in such river basin, that its catchment is located in several Regions, is very difficult due to lack of inter-region cooperation. In addition to that, several constraints were observed such as low incentive of rural community, mitigation of damage by animals and so on.</p> <p>Based on lessons 1) to 3), □4-1□Environmental Monitoring Program would be reviewed. Further, lesson from 4) indicates that the implementation program of the master plan should be revised so that two programs of □4-2□Seedling Center Program, and□4-3□Watershed Management Program are to be implemented simultaneously.</p>
Contribution to capacity building for the Government staff	Direct benefit as a pilot project

Evaluation of Verification Study

Program Coordinator

The programme coordinator of Program 3 is Mr. Sileshi Getahun MSc., Head of Extension and Water Management Department. Mr. Sileshi. However, he had difficulty to participate in the program fully due to time constraints. Consequently, Mr. Bifa Bedhadra, Deputy head of the department, acted as the coordinator for the remaining 2.5 months, being engaged in implementation and completion of the Program.

Water Level Measurement

Mr. Abera Shiferaw MSc., Hydrologist of OIDA, and coordinator of Program 1, was in charge of the measurement of water level.

Staff in Wareda Office

The number of staff assigned in OIDA Meki Office is seven, among whom 5 persons are technical staff. An inventory survey of existing small-scale pump scheme and data collection of pump operation records in the Maki-Ziway Irrigation Project have been conducted by them from April to August 2001.

Number of participants in the Program:

The number of Participants in the Program was 37 and 374 man-day as shown below.

<u>Description</u>	<u>Persons</u>	<u>Days</u>	<u>Man-day</u>
1) Program Coordinator	1	150	150
2) OIDA Wareda office	2	30	60
3) OIDA Meki-Ziway Operator	1	130	130
4) Interim appraisal workshop	34	1	34
Total			<u>374</u>

Note:

As for the monitoring for water usage of the area, highly advanced technology is not required except for training of operation for measurement equipment. Rather than that, it was revealed that an awareness creation campaign to senior staff of OIDA should be enhanced so as to let them recognize significance and necessity of long-term environmental monitoring program.

Commencement of Environmental Monitoring:

In the Meki area, the community-based pump irrigation development project will be promoted in line with the concept of Program 4. It is essential for OIDA to carry out the long-term environmental monitoring to optimize the water usage of the area, mitigating adverse environmental impact.

It is meaningful for OIDA to commence the data collection necessary for IEE, and EIA, which execution should be obliged by EPA in terms of accountability for the project implementation.

Supply of Equipment for Environmental Monitoring:

Equipment used for the Program is as follows.

- 1) Hydrological equipment (2 sets of Automatic water level recorder with consumables, and 1 set of current meter.
- 2) Three Bicycles for transportation
- 3) Test kits for water quality measurement, pH meter, and EC meter.

Program	Feed back to the Master Plan
<u>Preparation of</u>	<u>Objectives and Background</u>

Evaluation of Verification Study

<p>guideline for formation and operation of water users associations (WUA)</p>	<p>The Master Plan proposes •1-2• Meki Irrigation and Rural Water Supply Project to introduce a gravity irrigation system to drought prone zone of the Meki area by means of proposed headwork and the irrigation system on the Meki River, covering 2,300 ha and 9,200 households. Toward a realization of the project, •1-1• Water Users Associations (WUAs) Support Program will be implemented so the beneficiary farmers will organize water users' associations (WUA), and their capacity of the project management shall be strengthened.</p> <p>Program 4 aims to prepare a guideline for establish WUAs for small-scale irrigation development, focusing on standardization of community mobilization for establishment of the WUAs. The Community Mobilization Department of OIDA is responsible for establishment of the WUAs, assigning 31 social workers in the head office and the branch offices. The community mobilization will be carried based on guidelines prepared by IFAD and ESRDF. However, preparation of practical manuals and guidelines for the community mobilization has been expected.</p> <p>Pump Irrigation schemes are broadly applied in the Meki area due to topographic constraint. Through the field investigation, taking into account sustainability of irrigated farming, it was considered that an irrigation scheme with an area of less than 10 ha, having 20 members would be appropriate. The guideline describes process and methodology for such development stages, as planning, design, construction, and scheme management, covering engineering aspects as well as social matters. The guideline will be applied •5-1• OIDA Engineers Training Program, and •5-2• OIDA Community Development Experts Training Program.</p> <p><u>Activities and Inputs</u></p> <p>A series of process from planning to construction has been verified in three (3) rural communities of Shubi Gamo PA, which preferred to embark on a small-scale irrigation development. For each scheme, 20 householders with 5 ha of total farmlands were organized. A small pump and cost for civil works were provided by JICA, while OIDA arranged construction equipment.</p> <p><u>Results and Feedback</u></p> <ol style="list-style-type: none"> 1) Present status of social workers □ The verification study identified such constraints, as community mobilization depending on personal experience of the social workers, inadequate discussion on land holding issue during planning stage and cost-benefit analysis, insufficient knowledge and experience of social worker regarding scheme management, lack of fund for O&M. 2) Present condition and constraint of Existing WUA: Major constraints on the existing WUA are low profit, imbalance of water distribution, insufficient support by OIDA, insufficient technical consideration during planning and design stage, no replacement budget for pumps. 3) Mixed approach of top-down and bottom-up: Since OIDA should be responsible for optimum resource management, the conditions to donate the pump and implement the scheme were presented to farmers by OIDA/JICA. It is essential to let them understand the background of the condition, like difficulty of irrigated farming without forcing them the condition. Further intention of the farmers are incorporated in the development plan. 4) Consensus on land allocation and fund formation: During planning stage a considerable discussion with farmers will be required on land issue and fund formation for scheme management. 5) Flexibility in WUA membership: Membership can be entitled to family members in addition to their family head. 6) Conflict management among community members: Settlement of conflict and disputes should left in hands of the farmers themselves with minimal intervention by OIDA because they have mechanism to settle them among their community. 7) Conditions for sustainable farming: The important point for sustainable scheme management is equal land allocation to each member, support for fund formation, saving for pump replacement, land consolidation and exchange for efficient water management, selection of mobile pump considering maintenance and flood, and establishment of monitoring and evaluation by OIDA. 8) Design revision □ Flexible design revision during construction period is expected so as to settle claim by the farmers arose during the construction period.
Contribution to capacity building for the Government staff	Direct benefit as a pilot project

Evaluation of Verification Study

Program Coordinator:

Mr. Birhanu Hirpo MSc., team leader of the Community Mobilization Department of the head office, acted as the coordinator of Program 4. During his absence for overseas training, Mr. Admasu and Mr. Mohamed, staff of the central branch office, coordinated the program.

OIDA Social Workers:

Two-days workshop for social workers in OIDA was held in July 2001 to discuss job description of them, constraints for project implementation, and present guideline for community mobilization. Further through a questionnaire survey, present condition and constraints for WUA establishment was also clarified. Nine staff including one woman participated in the workshop from community mobilization department in the head office and branch offices. Major findings are as follows.

- Social workers has less educational background and work experience than engineers. It is hard for the social workers to participate in decision making.
- Since social workers also hold post of accounting and procurement, they have difficulty to concentrate in community mobilization work.
- Social workers often acts to inform farmers just conditionality of Donor/NGO for project implementation without sufficient discussion with them.
- Some of social workers have insufficient knowledge and experience to inform farmers difficulties of irrigation infrastructure management and irrigated farming practice through PRA session.
- Most frequent conflict among farmers is resulting from land holding issue. And generally WUA has no fund for scheme management.

Staff in OIDA Meki Wareda Office:

Sufficient transfer to knowledge was carried out to three staff of OIDA Meki Wareda Office from PRA to construction management.

OIDA Engineers:

Planning and design works were carried out by engineers in the head office, consisting of design engineers (2), chief surveyor (1), who conducted design of irrigation canals with related structures and pump house. As for construction management, a construction engineer assigned from the central branch office for 2.5 months.

Approximate Participants in the Program:

The number of Participants in the Program was 120 and 816 man-day as shown below.

Description	Persons	Days	Man-day
1)Program Coordinator	1	150	150
2)OIDA head / branch office	3	120	360
3)Participants of workshop	9	2	18
4)OIDA Wareda office	3	60	180
5)Illustrate meeting	74	1	74
6)Interim appraisal workshop	34	1	34
Total			<u>816</u>

Members of WUAs:

The number of beneficiary under the Program is 63 as shown below.(315 family members)

Shubi	15H.H	3.5ha
Sombo Genet	28H.H.	7.0ha
Sombo Aleltu	20H.H.	5.0ha
Total	63H.H	15.5ha

Increase of income (63households):

An expected incremental benefit obtained from irrigated tomato cultivation is some Birr. 450 per member (0.25 ha)in minimum as shown below.

Gross Income

1. Anticipated Yield : 8.0 ton/ha
2. Target Production : 2.0 ton/0.25ha
3. Farm Gate Price : Birr.0.5/kg (Birr 0.5•1.0)
4. Gross Income (1) : Birr 1,000/0.25ha

Production Cost

1. Farm inputs : Birr 250
2. Diesel : Birr 200
3. Spare parts (10%): Birr 200
4. Total Cost (2) : Birr 650

Net Revenue (1)-(2) : Birr 350 (Birr 700/year)

Saving for Pump Replacement

1. Birr 5000/20HH/year = Birr 250/year

Awareness creation for farmers:

A community meeting, by use of illustration was held to study appropriate tools and technology for participatory planning in rural area of Oromia Region. The number of participants was 74 in total. The meeting was good opportunity for OIDA staff to obtain basic approach for empowerment of local community.

Program

Feed back to the Master Plan

Evaluation of Verification Study

<p>Community Resource Mapping</p>	<p><u>Objectives and Background</u></p> <p>In 2000, the estimated population in rural area in Dugda Bora Wareda is some 125,000 with 26,400 households, amounting to 77% of total population. The Wareda consists of 54 Peasant Associations (PAs). Each PA comprises 416 households (some 1,970 persons) on an average. 27 Development Agents (DA) are assigned for front-line agricultural extension. Through frequent communication with community members, the DAs seem to hold much information in connection with rural community, especially development needs by the community members. The objective of the program is to arrange the information by use of a community resources map (CRM) and to seek potentiality to apply the map to rural. Major application of CRM is supposed to be as follows.</p> <p>(1) Application as reinforcement of government administration:</p> <ol style="list-style-type: none"> 1) Impact on extension works <ul style="list-style-type: none"> • Data accumulation and application to sustainable extension activities • Application to EPP • Collection and provision of data in uniform manner • Identification of Bottom-up needs • Preparation of strategic extension program with development targets 2) Impact on cooperative activities <ul style="list-style-type: none"> • Promotion of strengthening of existing cooperatives • Promotion of new cooperative formation 3) Data collection by Wareda administration office <p>(2) Application as empowerment of rural communities:</p> <ol style="list-style-type: none"> 1) Promotion of participatory development and NGO assisted development <ul style="list-style-type: none"> • Planning initiated by communities • Creation of exchange with other communities, motivation and awareness 2) Application to measures for disaster and disease prevention <ul style="list-style-type: none"> • Application by community to disaster relief • Community participation in local disease prevention <p><u>Activities and Inputs:</u></p> <p>In line with concept in 5-4 Community Resources Map Program proposed in the draft master plan, activities, consisting of preparation of CRM and verification of the map application, were carried out by staff in the OADB Wareda office and 27 DAs. Bicycles were provided to each DA for smooth implementation of the program.</p> <p><u>Results and Feedback</u></p> <p>Results and major finding in the program are shown below.</p> <ol style="list-style-type: none"> 1) Community as core of rural development Referring to previous literatures, Edirs were to be regarded as a core body for rural development. In the program field investigation was carried out to access the groups and identify their leaders. However, during the survey conducted in first half of the verification study period, it was concluded that Edir was a conventional mutual aid society for funeral and not suitable as core body for agricultural and other economical activities. And It was also pointed out that community leaders are not always recognized as right persons who transfer extension messengers due to their insufficient educational background and agricultural knowledge. 2) Communication channels in rural area: The results of Rapid rural Appraisal (RRA) revealed that each community conceits of 30 to 40 households and PA Chairman and community leader acts to transfer messages to villagers. There are 550 communities within Dugda Bora Wareda. 3) CRM prepared by DA Due to DA's specialty of DA, interests of DAs on the maps were to clarify the communication channel and access to rural communities, the prepared CRMs were characterized by access map to the rural area rather than resource map in rural area. •Information on the map is rural road network and major rural infrastructures including school, dispensary, wells, market, church, and natural environment and resources including forest, river, gullies. Detailed information such as variation of resource like annual variation of ground water level and water quality and socio-economic information could be obtained insufficiently through the survey. 4) CRM for extension services It was verified that the CRM could be applied to agricultural extension, distribution of improved seeds in EPP, and preparation of extension program to meet local requirement. 5) Application of CRM to other fields Potentialities of CRMs can be exploited by other experts for further useful, like health workers and cooperative it was not verified during the study period.
--	--

Evaluation of Verification Study

Contribution to capacity building for the Government staff	Direct benefit as a pilot project																																										
<p><u>Program Coordinator:</u></p> <p>The Program was carried out by Oromia Agricultural Development Bureau (OADB). The coordinator of the Program is Mr. Benti Shomina, Chief Researcher for Soil Laboratory of the Region, under supervision of Mr. Kebede Woldegiyorgis, Chief Counterpart of OADB. However, Mr. Kebede Woldegiyorgis left the job due to re-organization of the OADB, Mr. Benti Shomina acted as the chief counterpart.</p> <p><u>Staff in OADB Dugda Bora Wareda Office:</u></p> <p>Staff in OADB Dugda Bora Wareda Office, consisting of head and three experts, participated in the program, coordinating 27 DAs.</p> <p><u>Approximate Participants in the Program:</u></p> <p>The number of Participants in the Program was 32 and 1,435 man-day as shown below.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Description</u></th> <th style="text-align: center;"><u>Persons</u></th> <th style="text-align: center;"><u>Days</u></th> <th style="text-align: center;"><u>Man-day</u></th> </tr> </thead> <tbody> <tr> <td>1) Program Coordinator</td> <td style="text-align: center;">1</td> <td style="text-align: center;">90</td> <td style="text-align: center;">90</td> </tr> <tr> <td>2) OADB Wareda Office</td> <td style="text-align: center;">4</td> <td style="text-align: center;">60</td> <td style="text-align: center;">240</td> </tr> <tr> <td>3) DA in Dugda Bora</td> <td style="text-align: center;">27</td> <td style="text-align: center;">30</td> <td style="text-align: center;">810</td> </tr> <tr> <td>4) DA workshop</td> <td></td> <td></td> <td style="text-align: center;">80</td> </tr> <tr> <td>5) CRM Committee</td> <td style="text-align: center;">74</td> <td style="text-align: center;">1</td> <td style="text-align: center;">195</td> </tr> <tr> <td>6) Interim appraisal workshop</td> <td style="text-align: center;">20</td> <td style="text-align: center;">1</td> <td style="text-align: center;">20</td> </tr> <tr> <td>Total</td> <td></td> <td></td> <td style="text-align: center;"><u>1,435</u></td> </tr> </tbody> </table> <p>In addition to the above, four kinds of field investigation were carried out for rural community. The number of farm households participating in the survey was 761 as shown below</p> <table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Questionnaire survey for community leader</td> <td style="text-align: right;">550 H.H.</td> </tr> <tr> <td>Workshop in community</td> <td style="text-align: right;">74 H.H.</td> </tr> <tr> <td>Survey for information channel in rural community</td> <td style="text-align: right;">118 H.H.</td> </tr> <tr> <td>Measurement of farmland</td> <td style="text-align: right;">19 H.H.</td> </tr> <tr> <td style="text-align: center;">Total</td> <td style="text-align: right;"><u>761 H.H.</u></td> </tr> </tbody> </table>	<u>Description</u>	<u>Persons</u>	<u>Days</u>	<u>Man-day</u>	1) Program Coordinator	1	90	90	2) OADB Wareda Office	4	60	240	3) DA in Dugda Bora	27	30	810	4) DA workshop			80	5) CRM Committee	74	1	195	6) Interim appraisal workshop	20	1	20	Total			<u>1,435</u>	Questionnaire survey for community leader	550 H.H.	Workshop in community	74 H.H.	Survey for information channel in rural community	118 H.H.	Measurement of farmland	19 H.H.	Total	<u>761 H.H.</u>	<p><u>Contribution to provision of basic information for rural development:</u></p> <p>Estimated number of direct and indirect beneficiaries for the Program would be 26,400 households or 125,000 persons, who would receive the more systematic extension service by OADB.</p> <p><u>Motivation for the other sectors:</u></p> <p>The community resource map prepared by the agricultural extension staff can be applied to other sectors such as health, disaster prevention, rural infrastructure, and so on.</p> <p>It is noted that understanding and cooperation by the Higher Ministry of Agriculture and Rural Development is expected in order to extend the study results to the other agency and NGOs.</p>
<u>Description</u>	<u>Persons</u>	<u>Days</u>	<u>Man-day</u>																																								
1) Program Coordinator	1	90	90																																								
2) OADB Wareda Office	4	60	240																																								
3) DA in Dugda Bora	27	30	810																																								
4) DA workshop			80																																								
5) CRM Committee	74	1	195																																								
6) Interim appraisal workshop	20	1	20																																								
Total			<u>1,435</u>																																								
Questionnaire survey for community leader	550 H.H.																																										
Workshop in community	74 H.H.																																										
Survey for information channel in rural community	118 H.H.																																										
Measurement of farmland	19 H.H.																																										
Total	<u>761 H.H.</u>																																										

Evaluation of Verification Study

Program	Feed back to the Master Plan
<p>□ Preparation of extension tools and research program for the Meki area</p>	<p><u>Objectives and Background</u></p> <p>In 1998, under financial assistance of IFAD, the Ethiopian Agricultural Research Organization (EARO) launched the research-extension linkage program in order to increase crop productivity. Although some 310 farming techniques have been established under the program, their efforts have not sufficiently penetrated in rural areas due to shortage of budget and staff required.</p> <p>The objectives of the program are (1) to review the extension and research programs to improve farming practices in the semi-arid area, (2) to compile extension materials suitable for the Meki area, and (3) to verify the materials in the area. Because of low literacy rate in the area, it was foreseen that the extension materials to be applied in the area should be prepared visually by use of illustrate and photograph.</p> <p>Special care should be taken to introduce the recommended techniques directly into the Meki area because most of them have been established near Addis Ababa, where the agricultural potential is relatively high. It is expected thus that research program should be carried out in order to seek appropriate techniques in the semi-arid zone in Ethiopia.</p> <p>The program also aims to recommend necessary research program preparing the plan of operation. The result of the program will be applied to □2-1□ Semi-arid Farming Improvement Project.</p> <p><u>Activities and Inputs</u></p> <p>Activities in the program are shown below.</p> <ol style="list-style-type: none"> 1) Collection, review and classification of existing extension material 2) Collection and review of documents on agricultural Research and Extension Advisory Council 3) Interview to EARO, Zonal office, NGO, Ministry of agriculture 4) Study on job description of government organizations regarding preparation and distribution of extension materials 5) Study on needs of framers to the extension materials 6) Study on problems and constraints of rain-fed agriculture in the Meki area 7) Preparation extension material to SMS, DA, and farmers in semi-arid area of Oromia Region 8) Recommendation of research program to be conducted in the Meki area <p><u>Result and Feedback</u></p> <ol style="list-style-type: none"> 1) Existing extension materials□ The JICA Study Team collected 55 extension materials, of which 42 materials are written in Amharic, 12 materials are described in English. Main subjects of the materials are crop guidance and pest and disease. 2) Extension material suitable in the Meki area: In the Meki area people generally speak oromo language. An adult generation above 20 years received primary education in Amharic while education in young generation is given in oromo language. Literacy rate appears low in remote area. Taking those finding into account, it is concluded that the extension materials should be prepared in Oromo and Amharic languages as a transition period. 3) Understanding of poster□ In the Meki area, the farmers' preference is for descriptive posters rather than illustrated one. 4) Subjects needed by DA: pest control, damage by birds and animals•weeding, drought, soil erosion• improved seed, ploughing, soil control. 5) Subjects needed by farmers: soil conservation, tree planting, bee keeping, poultry farming, dairy farming, pest control, weeding, credit, improved seed, forage production, and cooperative. 6) Extension materials: The number of extension materials is 14, of which 7 materials are written in Amharic and the rest are prepared in oromo language. They consist of sorghum, haricot bean, maize, maize cropping calendar, teff, wheat, chili, sweet potato, potato, intercropping between maize and desmodium, elephant grass, heavy clay soil management technology, treatment in moisture stressed area, and water and soil conservation. 7) Preparation of extension materials: Since there is no copy writes in Ethiopian extension materials, reprinting of them depends on budgetary arrangement.

Evaluation of Verification Study

Contribution to capacity building for the Government staff	Direct benefit as a pilot project																												
<p><u>Program Coordinator:</u></p> <p>Program 6 was carried out by Oromia Agricultural Development Bureau (OADB). The coordinator of the Program is Mr.Mohamed Yaquin, Extension Department of OADB, under supervision of Mr.Kebede Woldegiyorgis, Chief Counterpart of OADB. However, Mr.Kebede Woldegiyorg left the job due to re-organization of the OADB, Mr.Mohamed Yaquin acted as the chief counterpart.</p> <p><u>Staff in OADB Dugda Bora Wareda Office:</u></p> <p>Staff in OADB Dugda Bora Wareda Office, consisting of head and three experts, participated in the program, coordinating 27 DAs.</p> <p><u>Approximate Participants in the Program:</u></p> <p>The number of Participants in the Program was 27 and 356 man-day as shown below.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Description</u></th> <th style="text-align: center;"><u>Persons</u></th> <th style="text-align: center;"><u>Days</u></th> <th style="text-align: center;"><u>Man-day</u></th> </tr> </thead> <tbody> <tr> <td>1)Program Coordinator</td> <td style="text-align: center;">1</td> <td style="text-align: center;">120</td> <td style="text-align: center;">120</td> </tr> <tr> <td>2)OADB Wareda Office</td> <td style="text-align: center;">4</td> <td style="text-align: center;">30</td> <td style="text-align: center;">120</td> </tr> <tr> <td>3)DA in Dugda Bora</td> <td style="text-align: center;">3</td> <td style="text-align: center;">30</td> <td style="text-align: center;">90</td> </tr> <tr> <td>4)DA workshop</td> <td></td> <td></td> <td style="text-align: center;">6</td> </tr> <tr> <td>5)Interim appraisal workshop</td> <td style="text-align: center;">20</td> <td style="text-align: center;">1</td> <td style="text-align: center;">20</td> </tr> <tr> <td>Total</td> <td></td> <td></td> <td style="text-align: center;"><u>356</u></td> </tr> </tbody> </table>	<u>Description</u>	<u>Persons</u>	<u>Days</u>	<u>Man-day</u>	1)Program Coordinator	1	120	120	2)OADB Wareda Office	4	30	120	3)DA in Dugda Bora	3	30	90	4)DA workshop			6	5)Interim appraisal workshop	20	1	20	Total			<u>356</u>	<p><u>Extension Material:</u></p> <p>Extension materials were prepared to sorghum, haricot bean, maize, maize cropping calendar, teff, wheat, chili, sweet potato, potato, intercropping between maize and desmodium, elephant grass, heavy clay soil management technology, treatment in moisture stressed area, and water and soil conservation.</p> <p>60 copies of DA handbooks and 500 copies of the pamphlets have been prepared and distributed.</p> <p>On November 20 2001 the extension materials produced were officially handed over from the JICA Ethiopia Office to OADB.</p>
<u>Description</u>	<u>Persons</u>	<u>Days</u>	<u>Man-day</u>																										
1)Program Coordinator	1	120	120																										
2)OADB Wareda Office	4	30	120																										
3)DA in Dugda Bora	3	30	90																										
4)DA workshop			6																										
5)Interim appraisal workshop	20	1	20																										
Total			<u>356</u>																										

Tables

Table 1.1.1 Member List of JICA Study Team and Counterpart Team

Name	Position
JICA STUDY TEAM	
1. Mr. M. Koyama	Team Leader / Organization & Institution
2. Mr. Y. Fukasaka	Rural Development
3. Mr. T. Igawa	Deputy TL / Irrigation and Rural Infrastructure
4. Mr. Z. Kurita	Agriculture and Soils
5. Dr. B.K. Mehta	Hydrology and Water Use
6. Mr. M. Shibata	Agricultural Support System
7. Dr. M. Titterton	Animal Husbandry
8. Dr. A.A. Latigo	Environment and Watershed Management
9. Mr. Y. Niikawa	Design and Cost Estimate
10. Ms. J. Kakinuma Jin	Project Evaluation
11. Mr. Y. Ando	Coordination
COUNTERPART TEAM	
1. Mr. Teshome Atnafie	Team Leader (OIDA)
2. Mr. Abera Shiferaw	Hydrology and Water Use (OIDA)
3. Mr. Abera Chala	Irrigation and Rural Infrastructure (OIDA)
4. Mr. Melesa Kare	Organization & Institution (OIDA)
5. Mr. Teshome Lemma	Design and Cost Estimate (OIDA)
6. Mr. Hasen Ahmed	Agriculture and Soils (OIDA)
7. Mr. Nigatu Bekele	Agricultural Support Services (OIDA)
8. Mr. Habtamu Teka	Animal Husbandry (Bureau of Agriculture)
9. Ms. Shitaye Lemma	Sociology (OIDA)
10. Mr. Sileshi Getahun	Environment and Watershed Management (OIDA)

Table 2.4.1 Staff Structure of OIDA

(1) Staff Number by Office

Offices	Staff Number as of November 2000				
	Total		Technical	Support	Staff with College
	No.	%			
Head Office	102	14.2	45	57	56
Branch Offices	407	56.5	187	220	143
Central	136	18.9	72	64	42
Eastern	82	11.4	32	50	29
Western	121	16.8	51	70	44
Southern	68	9.4	32	36	28
District Extension Offices	211	29.3	198	13	175
Total	720	100.0	430	290	374

(2) Staff Number by Speciality

Technical Fields	No. of Staff, as of November 2000					
	Total		Head Office	Branch Offices	Staff with	
	No.	%			BSc	MSc
I. Engineering	195	84.1	29	166	54	14
Agricultural Engineer	70	30.2	8	62	34	5
Irrigation Engineer	24	10.3	6	18	9	4
Hydrologist/Hydraulic Engineer	14	6.0	9	5	5	5
Geologist	3	1.3	1	2	3	0
Water Management Engineer	1	0.4	0	1	0	0
Building Engineer	5	2.2	0	5	0	0
Electrician	5	2.2	0	5	0	0
Mechanical, others	73	31.5	5	68	0	0
II. Other Specialist	37	15.9	16	21	27	5
Management	7	3.0	5	2	5	0
Agricultural Economist	15	6.5	6	9	13	2
Irrigation Agronomist	12	5.2	3	9	6	3
Sociologist	2	0.8	2	0	2	0
Pedologist	1	0.4	0	1	1	0
	232	100.0	45	187	78	19

Table 2.4.2 List of Existing Irrigation Schemes in Oromai Region (1/3)

Name of Scheme	Branch Office	Location		Command Area Development			Number of Beneficiaries			Construction Year (Completed)	WUA Status	Water Sources	Intake Structure
		Zone	District	Plan	Actual	%	Plan	Actual	%				
1 Kujur	Western Branch	W. Walaga	Najo	57.00	0.00	0.0	110	0	0.0	1998	D	River	Headworks
2 Borta			Sayo	40.00	7.00	17.5	120	31	25.8	1996	D	River	Headworks
3 Bondo			Sayo	50.00	8.00	16.0	150	25	16.7	1995	D	River	Headworks
4 Degaro			Nadijo	120.00	28.00	23.3	296	120	40.5	1997	D	River	Headworks
5 Gi'l			Gimbi	60.00	7.50	12.5	228	26	11.4	1996	D	River	Headworks
6 Sokoru			Rharasibu	30.00	25.00	83.3	267	37	13.9	1997	C	River	Headworks
7 Waja		E. Walaga	Limu	25.00	24.75	99.0	200	198	99.0	1996	D	River	Headworks
8 Dhangago-01			Jima-Rare	30.00	21.40	71.3	253	129	51.0	1995	C	River	Headworks
9 Jato-01			Jima-Rare	54.00	45.90	85.0	515	419	81.4	1994	D	River	Headworks
10 Gambela Tare			Guto-Wayu	150.00	58.80	39.2	235	86	36.6	1994	D	River	Headworks
11 Negeso			Bila-Sayo	30.00	30.00	100.0	128	160	125.0	1997	B	River	Headworks
12 Abono-02			Jima-Arjo	80.00	66.50	83.1	248	160	64.5	1995	B	River	Headworks
13 Tate			Leka-Dulacha	20.00	0.00	0.0	75	0	0.0	1993	In Active	River	Headworks
14 Jato-02			Guto-Wayu	60.00	0.00	0.0	157	0	0.0	1997	D	River	Headworks
15 Dhangago-02			Guto-Wayu	20.00	0.00	0.0	162	0	0.0	1997	D	River	Headworks
16 Gibe Lamu-01			Jima-Rare	53.00	53.00	100.0	250	54	21.6	1995	B	River	Headworks
17 Gibe Lamu-02			Bila-Sayo	60.00	23.40	39.0	250	37	14.8	1996	D	River	Headworks
18 Jare			Bila-Sayo	40.00	0.00	0.0	112	0	0.0	1998	In Active	River	Headworks
19 Koba Guda		Ilu Aba Bora	Gachi-Boracho	56.00	0.00	0.0	57	0	0.0	1996	In Active	River	Headworks
20 Nada Guda		Jima	Omo-Nada	120.00	31.00	25.8	340	48	14.1	1997	D	River	Headworks
21 Kawa			Dedo	120.00	54.00	45.0	270	54	20.0	1997	D	River	Headworks
22 Birbisa			Qarsa	70.00	5.20	7.4	150	52	34.7	1997	D	River	Headworks
23 Abono			Sayo Chokorsa	160.00	0.00	0.0	300	0	0.0	1994	In Active	River	Headworks
24 Waro			Dedo	180.00	25.00	13.9	300	40	13.3	1996	D	River	Headworks
25 Arara-01	Eastern Branch	E. Harar	Kersa	40.00	50.00	125.0	276	276	100.0	1994	B	Spring	Headworks
26 Arara-02			Kersa	25.00	25.00	100.0	100	100	100.0	1994	B	Spring	Headworks
27 Babi Ali			Deder	46.00	60.00	130.4	130	220	169.2	1994	B	Spring	Headworks
28 Burka Deneba			Gurawa	76.00	76.00	100.0	215	216	100.5	1997	B	Spring	Headworks
29 Chulul			Goro Gutu	75.00	64.22	85.6	275	256	93.1	1996	C	Spring	Headworks
30 Erer Meda Talila			Deder	100.00	100.00	100.0	550	550	100.0	1995	B	Spring	Headworks
31 Galan Sadi			Melka Balo	100.00	100.00	100.0	360	360	100.0	1995	B	Spring	Headworks
32 Jarjartu			Gurawa	60.00	36.00	60.0	240	240	100.0	1996	B	River	Headworks
33 Mudana Silo			Gurawa	51.00	56.00	109.8	120	175	145.8	1998	B	Spring	Headworks
34 Melba			Meta	51.00	43.68	85.6	107	107	100.0	1998	B	Spring	Headworks
35 Ramis			Gurawa	60.00	51.00	85.0	273	273	100.0	1996	B	River	Headworks
36 Burka Burbursa			Deder	40.00	0.00	0.0	100	0	0.0	1995	In Active	Spring	Headworks
37 Said Ali			Kersa	46.00	71.00	154.3	160	270	168.8	1994	B	Spring	Headworks
38 Water-01			Kersa	60.00	60.00	100.0	130	130	100.0	1993	B	Spring	Headworks
39 Water-02	Eastern Branch	E. Harar	Kersa	71.00	60.00	84.5	150	150	100.0	1994	B	Spring	Headworks
40 Water-03			Kersa	40.00	40.00	100.0	260	260	100.0	1995	B	River	Headworks
41 Harewo			Meta	40.00	15.00	37.5	133	60	45.1	1995	B	Spring	Headworks
42 Amir Nur Decho		W. Harar	Tulo	40.00	17.00	42.5	80	28	35.0	1994	B	Spring	Headworks
43 Chafe Gurati			Tulo	60.00	34.75	57.9	86	139	161.6	1995	B	River	Headworks
44 Hima			Tulo	70.00	40.00	57.1	80	63	78.8	1994	C	River	Headworks

Table 2.4.2 List of Existing Irrigation Schemes in Oromai Region (2/3)

Name of Scheme	Branch Office	Location		Command Area Development			Number of Beneficiaries			Construction Year (Completed)	WUA Status	Water Sources	Intake Structure
		Zone	District	Plan	Actual	%	Plan	Actual	%				
45 Homicho			Bedesa	375.00	212.00	56.5	600	200	33.3	1991	D	River	Headworks
46 Kaseheja			Chiro	187.00	139.00	74.3	748	556	74.3	1992	D	River	Headworks
47 Midhagudu			Tulo	235.00	105.25	44.8	250	53	21.2	1997	D	River	Headworks
48 Haya Oda	Southren Branch	Bale	Mana Angetu	100.00	96.04	96.0	220	178	80.9	1995	B	River	Headworks
49 Hora Boka			Sinana Dinsho	32.00	0.00	0.0	183	0	0.0	1983	In Active	River	Free Intake
50 Gomgoma			Mana Angetu	71.00	51.00	71.8	156	182	116.7	1994	C	River	Headworks
51 Chiri			Mana Angetu	50.00	50.00	100.0	140	152	108.6	1994	B	River	Headworks
52 Dinki			Ginir	200.00	168.75	84.4	450	265	58.9	1997	B	River	Headworks
53 Melko Buta			Goro	85.00	0.00	0.0	340	0	0.0	1984	In Active	River	Headworks
54 Shaya			Sinana Dinsho	230.00	0.00	0.0	271	0	0.0	1987	In Active	River	Headworks
55 Ukuma			Dodola	100.00	0.00	0.0	400	0	0.0	1997	In Active	River	Headworks
56 Arada Tare			Ginir	120.00	120.00	100.0	288	300	104.2	1996	B	River	Headworks
57 Oda-Roba			Ginir	70.00	70.00	100.0	120	200	166.7	1997	B	River	Headworks
58 Melka Hida		Borana	Galana-Abaya	70.00	0.00	0.0	136	0	0.0	1998	In Active	River	Headworks
59 Abeda Chambe			Adola	60.00	0.00	0.0	200	0	0.0	1996	In Active	River	Headworks
60 Kawa	Central Branch	Arsi	Gedeb	200.00	20.00	10.0	500	80	16.0	1985	C	River	Pump & Headworks
61 Meti Metana			Nunesa	40.00	30.40	76.0	160	140	87.5	1993	C	River	Headworks
62 Sadi Sadi			Nunesa	60.00	49.80	83.0	221	221	100.0	1995	C	Spring	Headworks
63 Arata Chufa			Zuway Dugda	100.00	100.00	100.0	317	317	100.0	1993	A	River	Headworks
64 Shalad-01			Tiyo	50.00	47.00	94.0	196	184	93.9	1995	A	Spring	Headworks
65 Shalad-02			Tiyo	25.00	0.00	0.0	100	0	0.0	1995	Not Active	Spring	Headworks
66 Bosha-01			Tiyo	100.00	80.00	80.0	233	320	137.3	1993	C	Spring	Headworks
67 Bosha-02			Tiyo	60.00	35.00	58.3	220	140	63.6	1994	C	Spring	Headworks
68 Shobo			Munesa	100.00	60.00	60.0	279	270	96.8	1993	C	Spring	Headworks
69 Gedamso-01			Munesa	80.00	57.60	72.0	250	73	29.2	1996	C	River	Headworks
70 Gedamso-02			Munesa	90.00	9.90	11.0	320	20	6.3	1997	C	River	Headworks
71 Lafa			Munesa	80.00	63.50	79.4	150	140	93.3	1997	C	River	Headworks
72 Sole Bakekisa			Tena	100.00	40.00	40.0	300	150	50.0	1998	C	River	Headworks
73 Delali Sambaru			Munesa	60.00	40.00	66.7	160	164	102.5	1993	B	River	Headworks
74 Dagaga Sambaro			Munesa	40.00	20.00	50.0	60	40	66.7	1996	B	River	Headworks
75 Katar-01			Tiyo	100.00	100.00	100.0	400	120	30.0	1987	D	River	Headworks
76 Katar-02			Tiyo	130.00	43.00	33.1	200	200	100.0	1993	D	River	Headworks
77 Katar-03	Central Branch	Arsi	Tiyo	90.00	0.00	0.0	360	0	0.0	1992	Not Active	River	Headworks
78 Hasen Usman			Tena	230.00	280.00	121.7	527	1,000	189.8	1994	B	River	Headworks
79 Homba			Merti	100.00	10.00	10.0	400	40	10.0	-	C	River	Headworks
80 Teltele		N. Shoa	Detre Libanes	90.00	144.90	161.0	418	220	52.6	1996	C	Spring	Headworks
81 Lami			Yaya Gulale	30.00	56.20	187.3	200	225	112.5	1996	B	Spring	Headworks
82 Indris		w. Shoa	Ambo	175.00	380.00	217.1	875	1,087	124.2	1993	B	River	Headworks
83 Laku			Bako-Tibe	50.00	6.00	12.0	40	9	22.5	1994	D	River	Headworks
84 Walga			Wanchi & Waliso	150.00	517.50	345.0	637	1,070	168.0	1998	B	River	Headworks
85 Walshamo			Chaliya	50.00	0.00	0.0	160	0	0.0	1995	D	River	Headworks
86 Robi			Meta Robi	120.00	123.00	102.5	410	410	100.0	1998	C	River	Headworks
87 Chole			Ambo	100.00	200.00	200.0	464	500	107.8	1996	B	River	Headworks
88 Lugo		E. Shoa	Fentale	57.00	53.00	93.0	70	64	91.4	1996	B	River	Headworks

Table 2.4.2 List of Existing Irrigation Schemes in Oromai Region (3/3)

Name of Scheme	Branch Office	Location		Command Area Development			Number of Beneficiaries			Construction Year (Completed)	WUA Status	Water Sources	Intake Structure
		Zone	District	Plan	Actual	%	Plan	Actual	%				
89 Sogido Bandira-01.02			Fentale	140.00	110.00	78.6	117	65	55.6	1998	C	River	Headworks
90 Godino			Adama	219.00	183.00	83.6	270	182	67.4	1996	C	River	Dam
91 Balbala			Adama	100.00	42.00	42.0	400	182	45.5	1996	C	River	Dam
92 Fultino			Adama	85.00	33.00	38.8	182	165	90.7	1998	C	River	Dam
93 Laftu			Shashamene	30.00	2.50	8.3	60	14	23.3	1996	D	River	Headworks
94 Kararo Arsi			Arsi Negele	42.00	38.00	90.5	253	85	33.6	1990	B	River	Headworks
95 Tiliku Debeda			Arsi Negele	50.00	25.40	50.8	200	101	50.5	1995	D	River	Headworks
96 Meki-Zway			Meki & Duguda-Bora	1,500.00	33.00	2.2	3,375	132	3.9	1984	D	Lake	Pump
Total				9,644.00	5,559.84	57.7	26,984	15,765	58.4				
Average				100.46	57.92	-	281	164	-				
Maximum				1,500.00	517.50	-	3,375	1,087	-				
Minimum				20.00	0.00	-	40	0	-				

Table 3.2.1 Population and Household in Dugda Bora District

No.	Name of PA	1994 Statistics			2000 Estimate/ 2		Population Density (Person/km ²)		
		Population	No. of Total Households	Family Size	Population	No. of Total Households	Area (ha)	1994	2000 Estimate
1	Kersa Gambala	2,170	428	5.1	2,550	500	2,690	81	95
2	Abuno Kumoro	2,387	455	5.2	2,810	540	2,390	100	118
3	Adele Mirt	2,076	442	4.7	2,440	519	1,580	131	154
4	Biliti Balewoid	1,498	316	4.7	1,760	374	1,950	77	90
5	Koto Biliti	1,462	288	5.1	1,720	337	3,590	41	48
6	Argo Gadilala	1,696	353	4.8	1,990	415	2,660	64	75
7	Tuchi Denbel	1,662	333	5.0	1,950	390	2,170	77	90
8	Weyu Gebrael	1,874	401	4.7	2,200	468	2,520	74	87
9	Abono Gebrael	1,165	226	5.2	1,370	263	2,020	58	68
10	Dodoti Dembel	1,565	333	4.7	1,840	391	3,670	43	50
11	Mukeye 1	3,219	658	4.9	3,780	771	4,950	65	76
12	Birbisa Guda Sabolae	2,728	602	4.5	3,210	713	3,690	74	87
13	Birbisa Galae	1,895	374	5.1	2,230	437	2,460	77	91
14	Aella Gebre Dalacha	1,580	312	5.1	1,860	365	1,450	109	128
15	Menjegso Weji	1,881	338	5.6	2,210	395	3,030	62	73
16	Jero Raka	1,553	296	5.2	1,830	352	1,300	119	141
17	Korkie Adama	1,959	391	5.0	2,300	460	2,300	85	100
18	Goro Korkie	2,281	446	5.1	2,680	525	5,260	43	51
19	Kiltu Ambolae	2,611	552	4.7	3,070	653	3,370	77	91
20	Doyu Laman	1,823	388	4.7	2,140	455	3,240	56	66
21	Tutae Kormetu	2,129	468	4.5	2,500	556	3,150	68	79
22	Koyo Jejeba	1,495	346	4.3	1,760	409	3,370	44	52
23	Huafa Kemelaena	1,502	317	4.7	1,770	377	2,260	66	78
24	Weldia Hafa	1,906	422	4.5	2,240	498	2,240	85	100
25	Beymogusa	1,492	320	4.7	1,750	372	2,780	54	63
26	Dengoroita	1,166	254	4.6	1,370	298	2,140	54	64
27	Mukeye 2	1,585	319	5.0	1,860	372	2,750	58	68
28	Hate Leman	1,470	320	4.6	1,730	376	2,640	56	66
29	Taepa Cherokae	2,319	508	4.6	2,730	593	2,500	93	109
30	Geraba Korki Adi	3,177	635	5.0	3,730	746	2,480	128	150
31	Bekelae Gerisa	2,974	615	4.8	3,500	729	2,590	115	135
32	Weldiyo Mekdela	1,120	214	5.2	1,320	254	1,020	110	129
33	Woldia Kelina	4,690	1,065	4.4	5,510	1,252	3,190	147	173
34	Shubi Gamo	3,948	831	4.8	4,640	967	2,330	169	199
35	Tuchi Sumayan	1,841	392	4.7	2,160	460	2,250	82	96
36	Jewae Bofo	1,356	272	5.0	1,590	318	2,360	57	67
37	Oda Bokota	1,253	259	4.8	1,470	306	2,720	46	54
38	Saera Wakelae	1,417	312	4.5	1,670	371	2,640	54	63
39	Darara Dallecha	2,984	634	4.7	3,510	747	2,150	139	163
40	Burke Delecha	2,204	453	4.9	2,590	529	2,080	106	125
41	Jirma Bora	1,950	399	4.9	2,290	467	4,150	47	55
42	Berta Sami	1,814	402	4.5	2,130	473	3,620	50	59
43	Sori Dalesa	1,763	345	5.1	2,070	406	3,740	47	55
44	Tuka Langano	1,423	302	4.7	1,670	355	1,980	72	84
45	Gose Korke	2,093	443	4.7	2,460	523	3,390	62	73
46	Tuchi Deko	1,444	367	3.9	1,700	436	2,690	54	63
47	Elen	1,522	364	4.2	1,790	426	2,530	60	71
48	Keshi Huluko	1,453	338	4.3	1,710	398	1,730	84	99
49	Lanfesa Germeji	1,481	347	4.3	1,740	405	1,980	75	88
50	Gora Leman/ 1	(735)	(245)	3.0	(860)	(287)	2,070	36	42
51	Dodo Wedera	3,675	804	4.6	4,320	939	2,760	133	157
52	Malima Terae Beri	3,015	681	4.4	3,540	805	2,750	110	129
53	Tubae Suti	1,991	442	4.5	2,340	520	2,730	73	86
54	Dalota Mati	1,687	354	4.8	1,980	413	3,160	53	63
	Sub-total	106,424	22,476	4.7	125,080	26,419	145,210	73	86
	Meki Town	20,460	4,536	4.5	27,500	6,111	1,380	1,483	1,993
	Alem Tena Town	7,570	1,676	4.5	10,170	2,260	210	3,605	4,843
	Total	134,454	28,688	4.7	162,750	34,790	146,800	92	111

Note : /_1 ; Not listed in the Census, the population included in PA No. of 49, 51 and 52 (surrounding PAs)
The figures in () are information from the District Office.
/_2 ; Applied the population growth rate of 2.73%/year for PA and 5.05%/year for two towns
(Average growth rates of Oromia Region)

Source : The 1994 Population and Housing Census of Ethiopia for Oromia Region
Volume I, Part VI (Table 2.1, 2.4, 7.3)
Dugra Bora District Administration Office

Table 3.2.2 Distribution of Rural Households by Domestic Expenditure Classification

Class of Domestic Expenditure (Birr/year)	Ethiopia		Oromia		Addis Ababa	
	Distribution (%)	Cumulative (%)	Distribution (%)	Cumulative (%)	Distribution (%)	Cumulative (%)
Below 600	0.3	0.3	0.1	0.1	0	0.0
600 - 999	1.1	1.3	0.7	0.8	0.8	0.8
1,000 - 1,399	2.2	3.5	1.0	1.8	0.8	1.6
1,400 - 1,999	6.5	10.0	3.0	4.8	3.4	5.0
2,000 - 2,599	9.3	19.2	6.0	10.8	0.8	5.8
2,600 - 3,399	13.4	32.6	9.5	20.3	11.8	17.6
3,400 - 4,199	14.7	47.3	13.4	33.7	4.0	21.6
4,200 - 5,399	18.3	65.6	18.5	52.2	11.7	33.3
5,400 - 6,599	13.1	78.8	16.3	68.5	13.1	46.3
6,600 - 8,999	13.5	92.2	19.4	88.0	20.3	66.6
9,000 - 12,599	6.1	98.4	9.3	97.3	20.2	86.8
12,600 - 16,199	1.1	99.4	1.6	98.9	6.0	92.8
16,200 - 19,999	0.4	99.8	0.7	99.6	1.8	94.6
20,000 and Over	0.2	100.0	0.4	100.0	5.4	100.0
Total	100.0		100.0		100.0	

Source : Revised Report on the 1995/96 Household Income, Consumption and Expenditure Survey
Central Statistical Authority (Table 1r)

Table 3.2.3 Distribution of Rural Households by Income Classification

Class of Income (Birr/year)	Ethiopia		Oromia		Addis Ababa	
	Distribution (%)	Cumulative (%)	Distribution (%)	Cumulative (%)	Distribution (%)	Cumulative (%)
Below 600	0.7	0.7	0.2	0.2	0	0.0
600 - 999	2.2	2.9	1.4	1.6	0.8	0.8
1,000 - 1,399	3.8	6.7	2.2	3.9	2.5	3.3
1,400 - 1,999	8.5	15.1	5.9	9.8	1.7	5.0
2,000 - 2,599	10.1	25.2	7.8	17.6	9.9	14.8
2,600 - 3,399	14.7	39.9	11.8	29.4	7.7	22.5
3,400 - 4,199	13.3	53.3	13.4	42.8	5.8	28.3
4,200 - 5,399	16.1	69.4	17.3	60.1	11.8	40.1
5,400 - 6,599	9.9	79.2	10.7	70.8	6.6	46.8
6,600 - 8,999	11.4	90.6	15.0	85.9	19.2	65.9
9,000 - 12,599	6.1	96.7	9.0	94.9	15.5	81.4
12,600 - 16,199	2.0	98.8	2.9	97.8	6.6	88.0
16,200 - 19,999	0.7	99.4	1.1	98.8	5.9	94.0
20,000 and Over	0.6	100.0	1.2	100.0	6.0	100.0
Total	100.0		100.0		100.0	

Source : Revised Report on the 1995/96 Household Income, Consumption and Expenditure Survey
Central Statistical Authority (Table 2r)

Table 3.3.1 Crop Production in Dugda Bora Wareda (1994/95 - 1999/2000)

(1) Cultivated Area

Crop	(Unit : ha)						
	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000/1	Average/2
Teff	16,000	16,700	15,000	15,200	16,000	15,000	15,700 (28.1)
Wheat	9,000	10,800	9,400	20,000	10,500	15,400	12,500 (22.4)
Maize	22,000	13,600	16,000	4,200	15,100	2,200	12,200 (21.8)
Haricot Bean	7,000	7,000	6,100	11,700	5,800	14,700	8,700 (15.6)
Barley	2,800	2,900	2,200	2,100	1,800	2,400	2,400 (4.3)
Sorghum	3,200	3,200	3,000	2,300	2,200	900	2,500 (4.5)
Field Peas	1,000	1,000	1,000	-	700	800	900 (1.6)
Lentil	100	200	200	200	200	200	200 (0.4)
Chick Peas	-	-	-	100	2,200	200	800 (1.4)
Total	61,100	55,400	52,900	55,800	54,500	51,800	55,900 (100.0)

(2) Unit Yield

Crop	(Unit : ton/ha)						
	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000/1	Average
Teff	0.85	0.58	1.00	0.36	0.90	0.70	0.73
Wheat	1.29	1.00	1.80	0.97	1.60	2.20	1.48
Maize	0.86	1.00	3.20	0.13	2.40	1.60	1.53
Haricot Bean	0.80	0.40	0.60	0.32	1.20	1.00	0.72
Barley	1.20	1.00	2.00	1.20	1.36	1.80	1.43
Sorghum	0.61	0.80	1.60	0.29	1.40	1.20	0.98
Field Peas	0.37	0.32	0.60	-	0.80	0.60	0.54
Lentil	0.20	0.26	0.30	0.10	0.10	0.30	0.21
Chick Peas	-	-	-	0.50	0.12	0.60	0.41
Total Average	0.77	0.67	1.39	0.48	1.10	1.11	0.89

(3) Crop Production

Crop	(Unit : ton)						
	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000/1	Average/2
Teff	13,600	9,700	15,000	5,500	14,400	10,500	11,500 (18.2)
Wheat	11,600	10,800	16,900	19,400	16,800	33,900	18,200 (28.8)
Maize	18,900	13,600	51,200	500	36,200	3,500	20,700 (32.8)
Haricot Bean	5,600	2,800	3,700	3,700	7,000	14,700	6,300 (10.0)
Barley	3,400	2,900	4,400	2,500	2,400	4,300	3,300 (5.2)
Sorghum	2,000	2,600	4,800	700	3,100	1,100	2,400 (3.8)
Field Peas	400	300	600	-	600	500	500 (0.8)
Lentil	0	100	100	0	0	100	100 (0.2)
Chick Peas	-	-	-	100	300	100	200 (0.3)
Total	55,500	42,800	96,700	32,400	80,800	68,700	63,200 (100.0)

Source : Zonal Agricultural Department, Nazareth 1999

Remarks /1: Hearing at OIDA Dugda Bora Wareda Office

/2: () indicating percentage in total area / production

Table 3.3.2 Horticulture Crop Production per each Peasant Association in the 1999 - 2000 Cropping Season

No	P/A name	Total Land (ha)	Farm land(A) (ha)	No of FHs/ Hort., crop	Planted area per crop 1999 - 2000 Year (ha)																	Net Area (B)	(B)/(A) (%)
					Tomato	Onion	Hot pepper	S/pepper	Cabbage	Local cabbage	Garlic	Irish potato	Carrot	Beet root	Water melon	Egg plant	Cucum ber	Mango	Avocado	Papaya	Sugar-cane		
1	Makue 1	3854	1942																			0	0.0
2	Gora Korkea	3680	1652																			0	0.0
3	Jirne Bora	3542	1501																			0	0.0
4	Birbira Glsabule	3532	2081																			0	0.0
5	Sore Doleasa	3472	1396																			0	0.0
6	Koye Jejeba	3430	1284																			0	0.0
7	Tute Koremta	3427	1561																			0	0.0
8	Berta Sami	3310	1536																			0	0.0
9	Gose Korke	3269	1610																			0	0.0
10	Welda Kalina	3033	1442		50	40	40		80		1				1	3	1			14		230	16.0
11	Graba Korke Adi	2994	1764		18	12	8	2	2		1											45	2.6
12	Menjisko Weje	2969	951										1	1								0	0.0
13	Beyimo Gasa	2872	1200																			0	0.0
14	Kiltu ombole	2856	1745																			0	0.0
15	Deyo Leman	2745	1303																			0	0.0
16	Dedo Wedera	2730	1586		45	5	19								20	1	1	1	1	5	1	99	6.2
17	Ealen	2684	1027		30	20	8	2	6	4	2							28	8	40	3	171	16.7
18	Tuchi Deko	2657	1217																			0	0.0
19	Tube Suti	2659	1223																			0	0.0
20	Dalata Mati	2658	792																			0	0.0
21	Koto Biliti	2575	1446																			0	0.0
22	Argo gadilala	2553	626																			0	0.0
23	Korke Adama	2404	1237																			0	0.0
24	Hate Leman	2400	1312																			0	0.0
25	Welda Hafa	2380	1160																			0	0.0
26	Karsa G/Gengelechii	2335	1307																			0	0.0
27	Abumo Kumro	2330	1155																			0	0.0
28	Oda Boketa	2327	1071		7	3	2		1	1												14	1.3
29	Seara Wekele	2218	1114																			0	0.0
30	Bekele Grisa	2172	1125		80	80	40	3	10		1					3	3	0.5	0.5	60	8	290	25.8
31	Derara Dalicha	2154	1501		10	5	50															65	4.3
32	Dedota Dembel	2151	804		18	12	8	2	2		1		1									45	5.6
33	Birbira Gale	2115	1057																			0	0.0
34	Dengoreta	2114	1002																			0	0.0
35	Mukuye 2	2105	1135																			0	0.0
36	Tuchi Sumeya	2060	1533																			0	0.0
37	Hafa Kemele	2058	1066																			0	0.0
38	Lafesa Germeji	2049	913		30		15															45	4.9
39	Koshi Huluka	2044	1080																			0	0.0
40	Jororaka	2040	952																			0	0.0
41	Tuka Langanu	2039	808																			0	0.0
42	Burka Debrebea	2036	1478		15	8	40	2	5													70	4.7
43	Biliti baleweld	2031	1012																			0	0.0
44	Adele Mirt Meteja	2030	1308																			0	0.0
45	Tepho Cherokee	2026	1610		16	14	9	2	2		1		1	1								46	2.9
46	Jawe	2007	1082																			0	0.0
47	Shuki Gemu	1990	1437		70	70	60	2	10	4	1		1		4	2	0.5	0.5	50	18	293	20.4	
48	Tuchi Dembel	1944	1077		10	6	6		3		1		1	1								29	2.7
49	Abuno Gebriel	1904	841		18	12	8	2	2		1		1	1								45	5.4
50	Weyo Gebriel	1842	1179		20	8	8	2	4		1		1	1								45	3.8
51	Malima Terberi	1796	972		35	4	20	2	6	2												77	7.9
52	Gora Laman	1739	534		49		20															69	12.9
53	Welda Mekdela	1735	1493		60		60		3		1		1	1								126	8.4
54	Ela Geredaleha	1725	864																			0	0.0
			0																			0	0.0
		133801	67104		581	299	421	21	136	11	12	1	10	8	21	11	7	31	11	171	30	22	1804
					32.2	16.6	23.3	1.2	7.5	0.6	0.7	0.1	0.6	0.4	1.2	0.6	0.4	1.7	0.6	9.5	1.7	1.2	100

Source: Dugda bora District Agriculture Office, Nov., 2000

Note: The production amount includes the private farmers (non-PA's member) production.

Table 3.3.3 Producers' Prices of Farm Products

(1) Selling Prices of Major Crops to Middlemen in Meki Area

No	Crop	Selling Price	Unit• Birr/100 kg	
			Selling Price to Middlemen	Other
1	Peas(Atar)	180	200	
2	Haricot Bean (White & Red)	140	150	
3	Teff / White Grain	220	230	
	Teff / Brown Grain	170	180	
4	Chickpea (nuts)	140	150	
5	Horse bean (beans)	120	130	
6	Maize	70	80	
7	Wheat	130	140	
8	Barley	120	130	

Source • JICA Study Team, November 2000

(2) Price of Farm Produce at the Thursday Market Price

No	Crop	Selling Price	Unit• Birr / 100 kg	
			Selling Price to Other Middlemen	
2	Haricot Bean (White & Red)	165	175	
6	Maize	70	80	
7	Wheat	140	150	
9	Dry Hot Chili	8 -10 /kg		
10	Ethiopian Cabbage	0.5 /bunch		
11	Green Chili Pepper	0.25/heap		
12	Sugarcane	0.50/stem		
13	Orange	2.0/kg		
14	Pumpkin	2.0/pc (big)		
		0.75 /(med.)		
15	Tomato	1.5 /kg		
16	Beet Root	1.0/kg		
17	Ginger	10 /heap (4 – 5 kg)		
18	Potato	1.0 /kg		
19	Carrot	2.0 / kg		
20	Red onion	2.5/kg		
21	Garlic	2.0 /kg		

Source • JICA Study Team, October 2000

Table 3.5.1 Grazing Management of Cattle in the Rainy Season

PA Code	Grazing Conditions	Feeding in Rainy Season		Grazing Pattern in Rainy Season (%)				
		Grazing Only	Grazing+Supple.	1	2	3	4	5
Near Lake								
8	Poor	25	50	65	25	10	35	90
40	Poor	50	40	20	70	10	80	90
9	Medium	45	40	60	25	10	35	85
30	Medium	45	55	0	15	85	100	15
7	Good	60	25	50	5	45	50	55
29	Good	100	0	25	25	50	75	50
31	Good	30	70	5	95	0	95	100
Far from Lake								
23	Poor	95	0	60	30	5	35	90
36	Poor	0	100	5	5	0	0	90
22	Medium	100	0	15	20	40	25	35
24	Medium	100	0	25	50	25	75	75
25	Good	35	65	0	0	100	100	0
42	Good	10	90	100	0	0	0	100
26	Good	50	50	0	0	100	100	0

Note:

- 1 Near PA
- 2 By the Lake
- 3 By the River
- 4 By the Lake + by the River
- 5 PA + by the Lake

Table 3.5.2 Grazing Management of Cattle in the Dry Season

PA Code	Grazing Conditions	Feeding in Rainy Season		Grazing Pattern in Rainy Season (%)				
		Grazing Only	Grazing+Supple.	1	2	3	4	5
Near Lake								
8	Poor	40	60	80	0	0	35	0
40	Poor	35	10	95	0	0	80	0
9	Medium	50	50	95	0	0	35	0
30	Medium	5	50	0	0	100	100	0
7	Good	85	10	95	0	0	50	0
29	Good	70	30	50	0	50	75	0
31	Good	15	55	95	0	0	95	0
Far from Lake								
23	Poor	5	75	100	0	0	35	0
36	Poor	10	45	0	0	100	0	0
22	Medium	15	60	20	0	30	25	50
24	Medium	10	50	25	0	75	75	0
25	Good	10	90	0	0	100	100	0
42	Good	5	45	0	0	0	0	0
26	Good	30	70	0	0	100	100	0

Note:

- 1 Near PA
- 2 By the Lake
- 3 By the River
- 4 By the Lake + by the River
- 5 PA + by the Lake

Table3.6.1 Increase in Numbers of EPP and DA in 1995-2000 (East Shewa)

Year(Crop yr.)	National	East Shewa	Dugda Bora	Nos. of DA
1995/96	40,000	n.d.	412	72
1996/97	350,000	11,109	578	99
1997/98	650,000	17,272	821	188
1998/99	2,500,000	60,117	4,721	225
1999/00	4,000,000	111,315	9,371	339
2000/01	5,000,000	130,523	10,238	359

Source: NFIA report; East Shoa AD(Nazareth); Dugda Bora AO(Meki)

Table 3.6.2 Marketing / Exchanging of Produced Seeds and Seed Transfer

Seed utilization	Quantity	Total %	Network type	Seed growers	%
Marketed	16 ton	63 %	Neighborhood	64 farmers	62 %
Reserved	2.8	11%	Friendship	27	26%
<u>Exchanged</u>	<u>6.5</u>	<u>26%*</u>	<u>Members of relative</u>	<u>12</u>	<u>12%</u>
Total	25.3 ton	100 %	Total	103 farmers	100 %

Source: "Local seed supply in Central rift valley" by A. Deressa, 1996

Table 3.6.3 Farmers' Seed Exchange Methods by Social Networks

(No. of seed growers who transferred seeds to others in methods)

Type of Social network	Lend	Sell	Exchange	Gift	%
Neighborhood	33	21	8	2	62%
Friendship	17	7	3	-	26%
<u>Members of relative</u>	<u>9</u>	<u>2</u>	<u>-</u>	<u>1</u>	<u>12%</u>
Total %	57%*	29%	11%	3%	100 %

*Farmers' mutual lending(credit) of seed counts 14.8%(0.26 times 0.57).

Source: "Local seed supply in Central rift valley" by A. Deressa, 1996

Table 3.6.4 FBSPMS Achievements in 1977-1999

	<i>Participants (farmers)</i>			<i>Acreage (ha)</i>			<i>Seed Production (qts:100kg)</i>		
	Oromia	Others*	Total	Oromia	Others	Total	Oromia	Others	Total
1997/98	276	1,176	1,452	244	497	741	4,209	6,656	10,865
1998/99	1,336	8,148	9,754	626	3,975	4,601	12,689	45,430	58,119
1999/00	2,300	13,941	16,241	1,087	6,113	7,200	25,650	135,790	161,440
Total	3,899	23,548	27,447	1,895	10,647	12,542	42,548	187,876	230,424

*6 regions• Amhara, SNNPR, Tigray, Gambella, Benshangul, and Harari.

Source: NSIA Report• Aug. 2000

Table3.6.5 Seed Distribution by Respective Producers in 1995-2000

(••: 1,000 ton)

	ESE	FBSPMS	Private Sector*	Total
1995/96	12,260(94%)	-	730(6%)	12,990(100%)
1996/97	10,490(94%)	-	630(6%)	11,120(100%)
1997/98	15,600(91%)	1,090(6%)	470(3%)	17,160(100%)
1998/99	10,930(60%)	5,810(32%)	1,450(8%)	18,190(100%)
1999/2000	<u>22,430(56%)</u>	<u>16,140(41%)</u>	<u>1,250(3%)</u>	<u>39,820(100%)</u>
Total	71,710(72%)	23,040(23%)	4,530(5%)	99,280(100%)

*Ethiopian Hybrid Seed Incorporated(only Hybrid Maize)

Source: EARO; Seed Research & Multiplication Strategy; July, 2000

Table3.6.6 Yield Difference by Local Seed and Improved Seed

(Unit: t / ha)

	Traditional practice <i>No fertilizer By local seed</i>	Traditional practice <i>With fertilizer By local seed</i>	Improved practice <i>With fertilizer & By improved seed</i>					
			<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>Av</i>
Maize	1.7	2.1	4.9	4.4	3.4	4.6	4.4	4.3
Wheat	1.2	1.6	2.7	2.4	2.2	3.1	2.5	2.6
Teff	0.7	1.1	1.1	1.4	0.9	1.4	1.3	1.2
Barley	1.0	1.5	-	2.9	1.8	2.1	2.0	2.2
Sorghum	1.2	1.5	3.1	2.7	1.8	2.5	2.4	2.5

Source: Fertilizer in Oromia • By NFIA, Nov. 2000 • See Annex 8 (2) 10 •

Table 3.6.7 Oromia Fertilizer Consumption in Every Zone in 1995-2000

(Unit: 1,000t)

<i>No.</i>	<i>Zone</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>
1.	Arsi*	26.5	24.0	24.5	27.2	23.0	22.7
2.	Bale	3.5	3.9	3.2	6.5	8.5	5.0
3.	Borena	0.1	0.3	0.2	0.4	0.7	1.3
4.	E. Hararge	5.7	5.4	2.8	4.5	7.6	4.5
5.	W. Hararge	0.5	1.8	1.0	2.6	4.2	3.6
6.	Ilubabor	1.8	2.5	1.7	3.0	3.5	3.8
7.	Jimma	10.7	9.5	6.3	6.2	8.8	8.9
8.	E. Shoa*	37.8	32.6	23.2	21.1	19.6	22.3
9.	N. Shoa	5.8	5.3	6.2	8.3	9.5	8.3
10.	W. Shoa*	29.8	32.3	19.2	24.7	29.4	30.9
11.	E. Welega	9.5	9.6	7.1	9.3	10.0	14.3
12.	W. Welega	2.6	4.2	3.5	5.7	7.1	14.1
	Oromia Total	134.4	131.4	98.8	119.7	131.7	139.6
	Three Major zones*	94.1	88.9	66.8	73.1	71.9	75.9
	(%)	70%	68%	67%	61%	55%	54%

*Three major zones mean Arsi, East Shoa and West Shoa

Source: Report; Fertilizer Marketing in Oromia(Oct. 2000, NFIA)

Table 3.6.8 Import Price and Sale Price in Fertilizer in 1997-2000

<i>Year</i>	<i>Import Price(CIF: US\$/ t)</i>		<i>Sale Price(Birr/ t)</i>			
	<i>Variety</i>		<i>Oromia Region Average</i>		<i>East Shoa (Nazareth)</i>	
	DAP	Urea	DAP	Urea	DAP	Urea
1997	275	244	2,488	2,341	2,371	2,224
1998	248	148	2,433	1,851	2,110	1,515
1999	236	98	2,536	1,620	2,240	1,330
2000	208	110	2,827	1,920	2,563	1,800

Source: The Report of The 5th Annual Fertilizer Workshop; Oct. 2000

Table 6.3.1 Development Approaches and Project Selection

Development Approaches	Candidates Projects (31)	Master Plan 21 Projects
a. Irrigation Farming Promotion Approach	1. Irrigation Development Programme	1. Irrigation Development Programme
a.1 Irrigation planning and monitoring capacity building a.2 Operation and maintenance reinforcement a.3 Participatory small-scale irrigation development a.4 Irrigation farming technique improvement	1.1 WUA Support Programme 1.2 Meki Irrigation and Rural Water Supply Project	1-1 WUA Support Programme 1-2 Meki Irrigation and Rural Water Supply Project
b. Rain-fed Agriculture Improvement Approach	2. Rain-fed Agriculture Improvement Programme	2. Rain-fed Agriculture Improvement Programme
b.1 Farming techniques optimization b.2 Optimized farming techniques extension b.3 Farm inputs supply sub-approach b.4 Post-harvest techniques optimization b.5 Price-setting improvement b.6 Supplemental irrigation water supply	2.1 Semi-Arid Zone Cereal Production Improvement Programme 2.2 Post-Harvesting Techniques Improvement Programme 2.3 Farm Pond Promotion Project	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
c. Animal Husbandry Modernization Approach	3. Animal Husbandry Modernized Programme	3. Animal Husbandry Modernization Programme
c.1 Improved breed introduction c.2 Forage production promotion c.3 Veterinary services supporting c.4 Animal husbandry techniques optimization c.5 Optimized animal husbandry extension	3.1 Demonstration Unit Project 3.2 Forage Production Project 3.3 Improved Breed Promotion Project 3.4 Biogas Plant Promotion Project	3-1 Demonstration Unit Project 3-2 Forage Production Project 3-3 Improved Breed Promotion Project
d. Environmental Conservation Approach	4. Environmental Conservation Programme	4. Environmental Conservation Programme
d.1 Watershed management d.2 Farmland conservation d.3 Environmental education promotion	4.1 Environmental Monitoring Programme 4.2 Seedling Center Project 4.3 Watershed Management Programme	4-1 Environmental Monitoring Programme 4-2 Seedling Center Project 4-3 Watershed Management Programme
e. Capacity Building Approach	7. Capacity Building Programme	5. Capacity Building Programme for OIDA and Wareda Staff
e.1 Local government staff training e.2 Community leaders training e.3 Community awareness creation e.4 Off-farm income generation	7.1 OIDA Engineers Training Programme 7.2 OIDA Community Development Expert Training Programme 7.3 Wareda Staff Training Programme 7.4 WUA Supporting Project 7.5 Group Leader Training Programme 7.6 Community Awareness Creation P. 7.7 Drinking Water Training Programme 7.8 Nutritional Improvement Training P. 7.9 Gender/Environment/Poverty Reduction Training Programme 7.10 Meki Vocational Center Establishment P. 7.11 Homestead Horticulture Crop Production Programme	5-1 OIDA Engineers Training Programme 5-2 OIDA Community Development Experts Training Programme 5-3 Wareda Staff Training Programme 5-4 Community Resource Mapping Project
	6. Cooperative Promotion Programme	6. Community Development and Cooperative Promotion Programme
	6.1 Farm Inputs Storage & Distribution Improvement Project 6.2 Village Mills Promotion Programme 6.3 Grain Bank Promotion Programme 6.4 Women Group Poultry Farming Project	6-1 Community Leader Training Programme 6-2 Visioning Workshop Programme 6-3 Drinking Water and Nutritional Improvement Education Programme 6-4 Community Center Project 6-5 Grain Bank Promotion Programme
f. Rural Infrastructure Development Approach	5. Rural Infrastructure Improvement Programme	
f.1 Rural drinking water supply f.2 Rural roads development f.3 Rural primary health care promotion f.4 School construction	5.1 Rural Water Supply Project 5.1 Farm Road Improvement Project 5.3 Multipurpose PA Center Project 5.4 School & Dispensary Establishment P.	

Table 6.3.2 Project Summary Sheets (1 / 21)

Program	1. Irrigation Development Program	
Sub-Program	1-1 Water Users Associations (WUAs) Support Program	
Target Group	Both existing and candidate water users associations (WUAs) for future small-scale pumping irrigation development	
Background & Objectives :		
<p>[1-1] Water Users Association Support Program aims at supporting small farmers' irrigation activities through technical and institutional capacities building for WUAs as well as local staff of OIDA. Some 160 small pumps are currently operated for irrigation purposes in the Dugda Bora Wereda. Out of 160 units, 75 are installed along both the Meki river and the Ziway lake. These pumps supply irrigation water mainly to horticultural crops throughout the year. Most of these pumps are owned by rich farmers, who generally hire small farmers as farm labor force. On the other hand, the community-based irrigation activities are limited in terms of both number of farmers and extent of irrigation area. This situation implies that the on-going irrigation farming contribute more to poverty alleviation along the national policy but profit generation for pump owners. There are only 15 WUAs in the Dugda Bora Wereda. They are organized by 400 farmers in total and manage 500 ha for cereal and horticultural crops mainly for local consumption. This sub-program will place emphases more on reinforcement of the existing 15 WUAs and further establishment of new WUAs in line with a long-term strategy. All those WUAs are expected to integrate under the proposed large-scale gravity irrigation system, i.e. [1-2] Meki Irrigation and Rural Water Supply Project. This sub-program will also support the capacity building of OIDA, who will play a leading role in community mobilization. Encouraged by performance in the existing irrigation areas, some 20 farmers' groups already expressed urgent needs of government supports to them. The sub-program consists of two (2) phases. In Phase I from September 2002 to December 2003, the capacity building program will be provided by OIDA to the existing 15 WUAs. In Phase II from January 2004 to December 2005, the new schemes will be developed. The sub-program will embark on community mobilization, financial arrangement, technical guidance and pump installation and on-farm construction.</p>		
Activities :		
<ul style="list-style-type: none"> • To make inventory of existing small-scale pumping irrigation schemes in the Meki area and prepare their data-base for monitoring • To strengthen supporting system of OIDA at the wareda level • To provide technical and financial support to the existing 15 water users association (WUA) in the Meki area, which comprise 400 householders with 500 ha. • To investigate defects of the existing pumps of the Meki-Ziway irrigation scheme and rectified them. • To make assistance to communities for establishment of new WUAs and their by-laws and operation rules including cost sharing • To assist new WUAs to access fund sources of donors and NGOs for project implementation • To support installation of new pumps and devilmont of on-farm irrigation facilities • To make a technical guidance for irrigation farming and water management • To strengthen all the WUAs in order to facilitate their integration for future development of a large-scale gravity irrigation scheme, i.e. [1-2] Meki Irrigation and Rural Water Supply Project 		
Input : Donor		Input : Ethiopian side
<ul style="list-style-type: none"> • Participatory Development Expert (24 men-months) • Irrigation Expert (24 men-months) • Small pumps and related equipment (20 units) • O&M cost for initial stages • Vehicles 		<ul style="list-style-type: none"> • Counterpart personnel from OIDA • Wareda staff of OIDA and Bureau of Agriculture • Translators
Executing Agencies : Oromia Irrigation Development Authority (OIDA)		
Project Benefits :		
<ul style="list-style-type: none"> • Institutional reinforcement of the existing 15 WUAs (500 members) and establishment of new 20 WUAs (600 members) • Improvement of farm income and living conditions of WUA members • Expansion of drinking water availability • Capacity building of OIDA staff 		

Table 6.3.2 Project Summary Sheets (2 / 21)

Program	1. Irrigation Development Program	
Sub-Program	1-2 Meki Irrigation and Rural Water Supply Project	
Target Group	Small farmers in the Meki area	
Background & Objectives :		
<p>The main objective of the project is to introduce a gravity irrigation system, which is more sustainable in comparison with pump irrigation system, particularly to drought prone zone of the Meki area by means of proposed headwork and the irrigation system (tentatively 3,200 ha) on the Meki River. The project is expected to contribute to promotion of stable food production and poverty alleviation in the area. Currently, the water uses in the Meki area concentrates geographically only along the Meki river and on the lakeshore of Ziway due to the capacity of small pumps. Potentials for future expansion are highly limited as far as only small pumping irrigation will be sustained. This means that majority of local farmers will be able to access to stable water resources and continue unstable rain-fed agriculture and cattle grazing under the semi-arid conditions with an annual rainfall of 760 mm. Domestic water as well as irrigation water is very limited in the Meki area. Most of local communities obtain drinking water from existing wells along the lakeshore and running water in the Meki river basin. Due mainly to low density of wells and low yield of groundwater, farmers are forced to devote several hours a day for fetching water. Furthermore, water-borne diseases are prevailing as a result of use of stagnant water without awareness of water quality.</p> <p>In order to tackle the chronicle problems, i.e. low and unstable agricultural production and lack of domestic water, OIDA envisages constructing a dam of 40 m high on the Meki river to supply water to 8,000 ha throughout the year. However, the water balance study carried out through the JICA study verified serious negative impact to the downstream ultimately the water resource system of the Abijata lake, which is located within the Abijata-Shella National Park. The study tentatively selected the intake weir at some 3 km upstream of the Meki town and divert river water to the lakeshore area. The water users will be organized into a union of the WUAs to be set up under [4-1] Environmental Monitoring Program.</p> <p>The study also clarified the necessity of the long-term environmental monitoring system for the entire water resource system from both Meki and Katar rivers to the Abijata lake through the Ziway lake and the Bulbula river. The project will be formulated and periodically reviewed taking into consideration the monitoring results to be obtained through [1-1] Water Users Associations (WUAs) Support Program.</p> <p>Community mobilization will be the key factor of successful implementation of the project. Prior to the project, therefore, the capacity building for the OIDA staff will be encouraged under [5-1] OIDA Engineers Training Program and [5-2] OIDA Community Development Experts Training Program.</p>		
Activities :		
<p>The project will be carried out according to the following procedures.</p> <ul style="list-style-type: none"> • To monitor and analyze both hydrological data and water use within the Meki-Ziway-Abijata system • To assess environmental impact of the proposed large-scale irrigation project. • To carry out a feasibility study including Environmental Impact Assessment (EIA) • To prepare the detailed design and tender document • To promote community mobilization and awareness creation • To establish a WUA, in which all the WUAs trained under “1-1 WUA Support Program” 		
Input : Donor	<ul style="list-style-type: none"> • Cost and professional inputs for F/S • Cost and professional inputs for design • Capacity building programs • Project costs 	Input : Ethiopian side
		<ul style="list-style-type: none"> • OIDA counterpart personnel • OIDA’s supervision units • OIDA’s sociologist social workers • Translator
Executing Agencies : Oromia Irrigation Development Authority (OIDA)		
Project Benefits :		
<ul style="list-style-type: none"> • Stable and increased crop production and domestic water supply • Reinforcement of WUAs’ management capacity and empowerment to the WUA members • OIDA’s capacity building 		

Table 6.3.2 Project Summary Sheets (3 / 21)

Program	2. Rain-fed Agriculture Improvement Program	
Sub-Program	2-1 Semi-Arid Farming Improvement Project	
Target Group	Development Agents (DAs) and small farmers in Dugda Bora Wareda	
<p>Background & Objectives :</p> <p>The project aims to establish the optimum farming system suited to local conditions of the Meki area under the semi-arid climate through the actual three-year research in situ. The research will fully take into consideration the traditional farming techniques prevailing among local farmers and research results worked out by the Ethiopian Agricultural Research Organization (EARO). The research network will be established with the Melkasa Research Center as well as NGOs in order to exchange the knowledge on research experiences and other related information. The research aspects to be undertaken will include the followings;</p> <ul style="list-style-type: none"> • Crop selection, cropping patterns, mixed cropping, crop seasons, etc. • Preservation and pureline selection of traditional varieties, multiplication of improved varieties, etc. • Improvement of farming practices and implements • Mulching and soil conservation practices • Optimization of fertilization suitable for the local conditions of the Meki area • Precaution of pests and disease out-break • Optimum post-harvesting techniques for maximum use of crop residues as animal feed • Improvement of soil fertility by applying organic matters and effective micro-organisms (EM) • Improvement of soil fertility by introduction of more legumes in crop rotation • Soil diagnosis and assessment to prevent from salinity hazard and soil erosion • Establishment of supplemental irrigation and drainage method by optimizing water supply amount and interval <p>The above-mentioned experiments will be carried out in the temporary research station set up in the Meki area. The techniques to be optimized will be transferred to local farmers through the existing extension channel of Development Agents (DA). In addition, group leaders will be trained at the research station for introduction of community-based extension channels.</p> <p>The research will be carried out in the three-year period from 2003 to 2005. The results will be incorporated into extension materials.</p> <p>At the completion of the research, the project will set up further research program including organizational and administrative arrangement to be undertaken by the Ethiopian side.</p>		
<p>Activities :</p> <p>The research will be carried out for three years paying particular attention to the following aspects;</p> <ul style="list-style-type: none"> • To design the research activities • To establish the temporary research station within the Meki area • To carry out the research under supervision of expatriates researchers • To establish optimum farming techniques • To demonstrate the research activities to DAs and key farmers • To prepare extension materials for DAs and key farmers 		
<p>Input : Donor</p> <ul style="list-style-type: none"> • Agriculturist (18 men-months) • NGO or local consultants (6 men-months) • Vehicles • Research equipment • Soil survey equipment 	<p>Input : Ethiopian side</p> <ul style="list-style-type: none"> • Counterpart personnel from Bureau of Agriculture • Wareda staff • Translator • Research plot (approximately 2 ha) 	
<p>Executing Agencies : Oromia Irrigation Development Authority (OIDA) and Bureau of Agriculture (OBA)</p>		
<p>Project Benefits :</p> <ul style="list-style-type: none"> • Establishment of semi-arid farming system suited to local conditions of the Meki area • Extension materials suited to local farmers in the Meki area • Promotion of the extension activities 		

Table 6.3.2 Project Summary Sheets (4 / 21)

Program	2. Rain-fed Agriculture Improvement Program	
Sub-Program	2-2 Community Seed Bank Project	
Target Group	Communities and small farmers	
Background & Objectives :		
<p>Crop productivity and quality are basically declined by continuous use of homemade seeds without renewal. Especially deterioration of seeds is significant after three generations (crop seasons). Limited use of certified seeds is one of the constraints against reasonable crop yields in the Meki area. Although quality seeds are introduced to the Meki area through the extension program, its coverage is still limited. Some reasons are identified. Firstly, the financial situation of farmers does not allow full use of quality seeds. Secondly, availability of quality seeds is sometimes too low to meet local requirement due to limited seed stocks in Ethiopia Seed Enterprise (ESE), especially for teff and haricot beans. Thirdly, poor accessibility to seed distribution points in the Meki area hinders timely procurement of farm inputs. Although local farmers traditionally reserve some amounts of produces as seeds for next crop seasons, they often sell all produces immediately after harvesting. Therefore, seed stock in the area is chronically in short.</p> <p>The project aims at preservation of second generation seeds to be harvested from plots sown with quality seeds instead of consumption. Currently, the following certified seeds are widely introduced to the Meki area.</p> <ul style="list-style-type: none"> • Maize (early maturing variety) AW511 • Maize (late maturing variety) BH660 • Wheat(early maturing variety) Paran • Teff CR37 • Haricot beans Awash <p>The project will be promoted by community-based approach with minimum government supports. Quality seeds will be procured by communities and released to peasants timely. Orthodox churches, i.e. two in Meki town and 30 in the Wareda, will also be able to coordinate seed marketing between communities.</p>		
Activities :		
<p>The project will select farmers who would obtain certified seeds under Extension Package Program (EPP) and select well-maintained plots in which EPP seeds by DAs and community leaders. Community will make a contract on seed procurement with farmers, purchase seeds and store them. Prior to crop seasons, communities supply farmers who can not access official seed sources. It is essential to take the following necessary actions for smooth operation.</p> <ul style="list-style-type: none"> Price setting •Purchase and selling prices Seed storage • Use of existing storage and installation of new storage Guarantee • Seeds should be virus free without mixture of weeds and ensure at least 70% of germination. 		
Input : Donor		Input : Ethiopian side
<ul style="list-style-type: none"> • Agriculturist (12 men-months) • NGO or local consultants (12 men-months) • Vehicles • Storage and weighing machines 		
Executing Agencies : Communities and Orthodox church		
Project Benefits :		
<ul style="list-style-type: none"> • Increased crop production by improvement of seed quality • Timely distribution of quality seeds • Contribution to food security 		

Table 6.3.2 Project Summary Sheets (5 / 21)

Program	2. Rain-fed Agriculture Improvement Program	
Sub-Program	2-3 Post-Harvesting Techniques Improvement Project	
Target Group	Small farmers in Dugda Bora Wareda	
Background & Objectives :		
<p>Post-harvest loss is significant in Ethiopia. According to the FAO staff in Addis Ababa, the total loss in the nation is estimated as much as 25% of the total production at on-farm level. The project aims at minimization of post-harvest loss at several processes, namely threshing, transport, milling and storing. The basic strategy is mentioned below.</p> <ul style="list-style-type: none"> •Storage: On-farm grain storage is widely used in the rural area of Oromia Region. They are basket-type storage made by locally available materials and contribute to food security at farmers' level. DAs provide farmers technical guidance for installation of their improved model. The project aims at assisting procurement of construction materials. The project will be integrated with [6-5] Grain Bank Promotion Program in future. □Transport: Grains are threshed, bagged and transported from farm to market by hand. Loss through the processes is significant. Bagging materials and carts will be promoted under the project. •Flour mills: Maize is generally pounded at home and mechanical milling is limited. There are nine (9) flourmills within the wareda. They are old and deteriorated. The project will assist the financial arrangement for millers to renew milling machines. •Threshing: Grain crops are threshed by tramping of cattle and winnowed. During this process, substantial amounts of grains are lost. Melkasa Research Center focuses on minimizing losses by introduction of multi-grain threshers. The research has been carried out for development of machines by the JICA expert for two years and transferred to SG2000 afterward. At present, some 60 units of threshers are introduced in the domestic markets. The project envisages more introductions in future. 		
Activities :		
<p>The project included the following activities;</p> <ul style="list-style-type: none"> • To promote modified on-farm storage by supplying construction materials to local farmers • To promote bagging materials and ox-carts • To promote small flourmills by supporting cooperatives and micro- entrepreneurs • To promote multi-grains threshers <p>To assist the above-mentioned components, multi-financial schemes including grant-aid and short-and long-terms credits will be required.</p>		
Input : Donor	<ul style="list-style-type: none"> • Rural infrastructure expert (12 men-months) • Vehicles • Construction materials for on-farm grain storage • Provision of ox-carts • Credit schemes for procurement of threshers and milling machines 	Input : Ethiopian side
		<ul style="list-style-type: none"> • Counterpart personnel • Translator
Executing Agencies : Oromia Bureau of Agriculture (OBA)		
Project Benefits :		
<ul style="list-style-type: none"> • Mitigation of post-harvest losses • Improvement of farm family income • Promotion of micro-enterprises for post-harvest sector • 		

Table 6.3.2 Project Summary Sheets (6 / 21)

Program	2. Rain-fed Agriculture Improvement Program	
Sub-Program	2-4 Community Pond Project	
Target Group	Small farmers in Dugda Bora Wareda	
Background & Objectives :		
<p>World Food Program (WFP) promoted development of community ponds as one of the components of the nationwide soil and moisture conservation programs since 1980s. The development has targeted the rural communities in and around Nazareth and completed. Most of ponds are currently under full responsibility of the relevant communities and supply domestic water to villagers and animals. The daily management of ponds is generally entrusted from communities to caretakers of ponds with regular payment of about Br. 150 per month. Desilting sediment accumulated in settling basins is also organized by communities.</p> <p>In Nazareth, ponds are generally constructed with embankment and storage of less than 500 m³ dug within old river courses and ox-bow lakes with micro-catchment of less than 5 km². Development potential of ponds in Meki may as same as that in Nazareth since climatic and physiographical conditions of both Meki (annual rainfalls : 760 mm) and Nazareth (870 mm) are similar. Rather than natural development potentials, social factors may be more important for successful community pond development. Mutual agreement among the community is prerequisite for land acquisition for pond area and land use of catchment (natural vegetation and cereal farms have to be maintained). Negative impact, e.g. water-borne diseases, should be assessed.</p> <p>The project aims at development of community ponds in remote areas far from stable water resources such as the Meki river and the Ziway lake. The potential sites will be selected in the areas with the following conditions.</p> <ul style="list-style-type: none"> • Footslopes along the uplands; ponds combined with check-dam construction • Swamps and marsh • Drains along rural roads 		
Activities :		
<p>The project will be carried out according to the following procedures.</p> <ul style="list-style-type: none"> • To make inventory of existing community ponds • To investigate water bodies and possible sites for future pond development • To set up planning and design criteria • To assist community by technical guidance and provision of materials • To assist water quality monitoring 		
Input : Donor		Input : Ethiopian side
<ul style="list-style-type: none"> • Rural infrastructure expert (12 men-months) • Community development expert (6 men-months) • Vehicles 		<ul style="list-style-type: none"> • OIDA counterpart personnel • Topographic surveyors • Translator
Executing Agencies : Oromia Irrigation Development Authority (OIDA) and Bureau of Agriculture (OBA)		
Project Benefits :		
<ul style="list-style-type: none"> • Domestic water source for drinking, animal and supplementary irrigation purposes • Mitigation of workload for fetching water 		

Table 6.3.2 Project Summary Sheets (7 / 21)

Program	3. Animal Husbandry Modernized Program	
Sub-Program	3-1 Demonstration Unit Project	
Target Group	Small farmers in Dugda Bora Wareda	
Background & Objectives :		
<p>The animal population in the Dugda Bora Wareda amounts to 206,000 heads of cattle and 89,000heads of sheep and goats. The biggest constraint encountered the livestock sector is chronicle shortage of animal feed sources. The carrying capacity of the wareda is estimated to be as low as 0.13TLU/ha (TLU- tropical livestock unit: 270kg). In contrast, actual stocking rate in the same wareda is as high as 0.25TLU/ha on an average. In one of PAs, the grazing sources are intensively consumed at the rate of 0.58TLU/ha or nearly 5 folds of the carrying capacity. Overgrazing is the direct cause of low animal productivity and environmental deterioration. In view of environmental conservation, there is an urgent need to optimize the animal husbandry in the wareda.</p> <p>Zebu and Sanga represent the prevailing cattle breed in the Meki are highly tolerant to drought and diseases. They environmental conservation, the regional livestock sector needs to be optimized under the zero-grazing system. They provide animal power for farming practices and income source. Although farmers are interested in introduction of improved breeds, modernization of animal husbandry is hindered due to lack of both forage and animal health services in the Meki area. It is important to convince farmers high profitability of modernized animal husbandry under the zero-grazing system with crossbreeds and improved forages.</p> <p>The basic concept of the livestock modernization program is the increased livestock productivity by (1) introduction of cross-bred integrated with (2) forage production and improvement of husbandry techniques. Adamitulu Research Station has performed the livestock research focusing on adaptability of two types of crossbred, i.e. Boran x Jersey and Boran x Holstein-Friesian.</p> <p>Since farmers' husbandry technique are still insufficient to ensure modern animal husbandry, the project envisages to introduce the crossbreeds through the demonstration units. In parallel, forage production by utilizing crop residues (one-bag silage) and environmental education will be promoted.</p>		
Activities :		
<p>The project will establish the Demonstration Units under the government management in three-year period from 2003 to 2005. The Demonstration Units consist of the following components;</p> <ul style="list-style-type: none"> • Cow-sheds for two heads of cow and storage for one-bag silage* • Irrigated plots of 0.5 ha for forage production • Paddock of 0.5 ha <p>*One-bag silage are prepared by mixing chopped crop residues and morasses in small parasitic bags</p> <p>In parallel to the demonstration units, crossbreeds will be introduced to 30 farmers with financial supports similar to Smallholder Dairy Development Program (SDDP).</p>		
Input : Donor	<ul style="list-style-type: none"> • Livestock expert (18 men-months) • Vehicles • Facilities and equipment for Demonstration Units • Small pump for irrigation and straw chopper, etc. 	Input : Ethiopian side
		<ul style="list-style-type: none"> • OBA counterpart personnel • Translator
Executing Agencies : Oromia Bureau of Agriculture (OBA) and Adamitulu Research Station		
Project Benefits :		
<ul style="list-style-type: none"> • Creation of community-based initiative for livestock modernization • Improvement of farm family income • Environmental conservation 		

Table 6.3.2 Project Summary Sheets (8 / 21)

Program	3. Animal Husbandry Modernized Program	
Sub-Program	3-2 Forage Production Project	
Target Group	Small farmers in Dugda Bora Wareda	
Background & Objectives :		
<p>Ethiopian farmers generally attach a priority to crop production than animal husbandry. Since animal husbandry in Ethiopia has been dependant largely upon natural grazing resources, it is highly difficult for farmer to accept to allocate their farm land and other resources for animal husbandry.</p> <p>Agricultural support system such as research, marketing, credit and extension also directs more efforts to improvement of crop production. The support system for the animal husbandry has been less established. The gap between crop production and animal husbandry is also recognized in allocation of farmland at farmers' level.</p> <p>Animal population has sharply increased in recent years. It is crucial for the livestock sector to meet rapidly increasing forage demand not only in Ethiopia but also in the Meki area. Firstly improvement of forage productivity is urgent issue in Ethiopia.</p> <p>Secondly, more efficient use of crop residues is important to make up the gap shortage of forage. Crop residues contribute to 11% of the total animal feed consumption in Ethiopia. It is estimated that the average farmer produces 2.6 ton of crop residues including straws and shells with 1.5 ha of farmland in the Meki area. In addition, by-products of agro-industries are also valuable animal feed. The existing sugar factories at three locations including Wenji near Nazareth produce morasses and the edible oil factory at Mojo produces cake of cottonseeds after oil extraction. These by-products are not fully utilized for animal feeds.</p> <p>The project aims at •introduction of forage crops to the Meki area and •promotion of efficient use of crop residues and by-products by agro-industries. The project envisages to extend the experience obtained through [3-1] Demonstration Unit Project.</p>		
Activities :		
<p>The project will include the following activities.</p> <ul style="list-style-type: none"> • To educate farmers on necessity and technique of forage production • To distribute grass seeds (napiar grass and elephant grass) and legumes seedlings (dismodem, lovelove and cowpea) to farmers • To promote more use of by-products of agro-industries, e.g. morasses and cotton seed cake. • Introduction of straw choppers for promotion of on-bag silage 		
Input : Donor	<ul style="list-style-type: none"> • Livestock expert (12 men-months) • Vehicles • Receiving units of morasses and seed cakes • Straw chopper 	Input : Ethiopian side
		<ul style="list-style-type: none"> • OAB counterpart personnel • Translator
Executing Agencies : Oromia Bureau of Agriculture (OBA)		
Project Benefits :		
<ul style="list-style-type: none"> • Motivation for animal husbandry modernization • Contribution to environmental conservation • Improvement of animal production 		

Table 6.3.2 Project Summary Sheets (9 / 21)

Program	3. Animal Husbandry Modernized Program	
Sub-Program	3-3 Improved Breed Promotion Project	
Target Group	Small farmers in Dugda Bora Wareda	
Background & Objectives :		
<p>Adamitulu Research Station, which is located in the south of the Ziway lake, has played a leading role for livestock development in East Showa Zone of Oromia Region. The Station was established in 1968 by Ethiopia Agricultural Research Organization (EARO) and has carried out practical animal researches to improve the husbandry techniques and productivity. The Station was transferred to Oromia Region in 1993. Some 15 researchers currently make their efforts mainly for improved breeds and their introduction. The Station embarked on the research for breed improvement with traditional breeds such as Barka and Boran and imported breeds such as Jersey, Holstein-Friesian, Simental, etc. So far, the Boran cross-bred (F1, 50•62.5%) with Jersey and Holstein Friesian is recognized to be the most suitable for local conditions of the Meki area.</p> <p>The crossbred of Boran and Jersey is highly tolerant to drought and high temperature. They are advantageous from the viewpoint of animal health control but less suitable for draft animal. Therefore, the relevant education is essential for local farmers when the Boran and Jersey crossbred is introduced. In contrast, the Boran and Holstein cross-bred is high milk yielding and advantageous as animal power sources but less resistant to unfavorable climatic conditions and diseases.</p> <p>Under the project, the priority is tentatively given to the Boran and Holstein crossbred. In association with researchers from Adamitulu Research Station, the project will promote the Boran and Holstein crossbred in the Meki area.</p> <p>The project envisages multiplying the Boran and Holstein crossbred and introduce them. For successful introduction of the crossbred, the animal health services will be reinforced. Prevailing animal diseases include Anthrax, Black Leg (Quarter Evil), Pasteurellosis and Lumpy Skin Disease. There is one veterinary clinic in Meki town and one health post with 10 veterinary crushes distributed around the wareda. The project promotes introduction of more veterinary services and installation of crushes.</p>		
Activities :		
<p>The project consists of the following activities.</p> <ul style="list-style-type: none"> • To assist Adamtulu Research Station for multiplication of cross-bred (Boran x Friesian and Boran x Jersey) • To distribute cross-bred cows to farmers at reasonable conditions • To promote veterinary services with more installation of crushes • To supply vaccine and veterinary equipment including technical training 		
Input : Donor	<ul style="list-style-type: none"> • Livestock expert (12 men-months) • Vehicles • Receiving units of morasses and seed cakes • Equipment and medicines for animal clinic • Installation of 10 units of crushes • Receiving units of morasses and seed cakes 	Input : Ethiopian side
		<ul style="list-style-type: none"> • OAB counterpart personnel • Veterinary doctor • Translator
Executing Agencies : Oromia Bureau of Agriculture (OBA)		
Project Benefits :		
<ul style="list-style-type: none"> • Increased dairy products • Increased farm family 		

Table 6.3.2 Project Summary Sheets (10 / 21)

Program	4. Environmental Conservation Program	
Sub-Program	4-1 Environmental Monitoring Program	
Target Group	Small farmers in Dugda Bora Wareda	
Background & Objectives :		
<p>The hydrological analyses verified that the water resources development of the Meki river for the proposed irrigation development with a dam would result in serious adverse impact to the Abijata lake. The water resources of the Abijata lake is influenced by several water resources including the Meki and Katar rivers, the Ziway lake, the Bulbula river and the Langano lake. Therefore, the overall environmental monitoring system is required for conservation of the Abijata lake.</p> <p>The project aims at execution of the environmental monitoring which will cover all these water resources under the same program. The results will fully be utilized for optimum use of the water resources in the Meki area with minimum influence to the natural environment. Within the framework of Environmental Monitoring Program, progress of the WFP watershed management program and other environmental factors including drinking water quality, disasters such as drought, floods and flash water, frequency and area of epidemic diseases. The project will focus not only on establishment of environmental monitoring system and capacity building for the government staff and communities.</p>		
Activities :		
<p>The environmental monitoring will be carried out for the following aspects.</p> <ul style="list-style-type: none"> • Guidance of environmental policies and guidelines to OIDA and Wareda staff • Preparation and distribution of environmental monitoring manuals • Educational leaflets and posters for environmental conservation • Follow-up observation of water level recorders on the Meki and Bulbula rivers in collaboration with Ministry of Water Resources • Periodical water quality analyses • Periodical monitoring of water use (drinking, irrigation and others), community ponds, rehabilitation and expansion of water facilities, which will affect water use in quantity and quality • Progress monitoring of afforestation and other land conservation programs • Monitoring of natural disasters including droughts, floods, flash water • Monitoring of water-borne diseases and out-patients • Establishment of data-base storing the above-mentioned data and information • Report preparation 		
Input : Donor	<ul style="list-style-type: none"> • Environmentalist (6 men-months) • Vehicles • Computer for data-base 	Input : Ethiopian side
		<ul style="list-style-type: none"> • Environmentalist counterpart personnel • Recurrent cost for hydrological observation
Executing Agencies : Oromia Irrigation Development Authority (OIDA)		
Project Benefits :		
<ul style="list-style-type: none"> • Establishment of the environmental monitoring system and data-base • Awareness creation and education about watershed management and disaster controls • Optimum water resources development in the Meki area 		

Table 6.3.2 Project Summary Sheets (11 / 21)

Program	4. Environmental Conservation Program	
Sub-Program	4-2 Seedling Center Project	
Target Group	Small farmers in Dugda Bora Wareda	
Background & Objectives :		
<p>The Dugda Bora wareda office of Oromia Agricultural Bureau (OAB) established the tree nursery (0.75ha) in Meki town by obtaining technical and financial assistance of United Nation World Food Program (UNWFP) in 1989. The main objective of the tree nursery is to supply tree seedlings to communities in the wareda. Currently, the nursery is under the control of Subject Matter Specialist (SMS) for soil conservation for the wareda. Although fluctuation is observed, the nursery annually produces and distributes some 200,000 nos. of tree seedlings of 24 species including Eucalyptus and Leucaena.</p> <p>Tree seedlings are transplanted for several purposes such as fencing, fire woods, construction materials, parceling, windbreakers and others. They are basically sold to local farmers and generated profits are allocated for operation costs of the tree nursery. However, due mainly to lack of the operation budget, its past performance in seedling supply is still low compared to their actual requirement.</p> <p>The project aims at reinforcing capability of the existing tree nursery in order to encourage environmental conservation activities. In addition to tree species for afforestation purposes, it is envisaged to produce seedlings for tree crops such as papaya and coffee in the nursery. They are expected to contribute to expansion of agroforestry and alley cropping system and to improve farm family income through cash crop production.</p>		
Activities :		
<p>The project aims at supply of necessary facilities, equipment and tools for the existing tree nursery linked with the capacity building and transfer of technology for appropriate tree seedling production. The main activities include;</p> <p><u>Physical components</u></p> <ul style="list-style-type: none"> • Office space and fences • Shading house • Irrigation pumps • Pick-up track for seedling transportation <p><u>Capacity buildings</u></p> <ul style="list-style-type: none"> • Selection of tree crops suited to the Meki area • Procurement of virus-free seedlings from EARO and international organization, i.e. ICRAF • Transfer of technology for tree seedling raising and afforestation • Seedling production • Production of extension materials including leaflets and posters • Establishment of demonstration plots for afforestation 		
Input : Donor	<ul style="list-style-type: none"> • Agricultralist (12 men-months) • Vehicles • Facilities and equipment 	Input : Ethiopian side
		<ul style="list-style-type: none"> • OAB counterpart personnel • Land acquisition • Translator
Executing Agencies : Oromia Irrigation Development Authority (OIDA)		
Project Benefits :		
<ul style="list-style-type: none"> • Capacity improvement of the existing tree nursery • Expansion of afforestation area • Increased farm income through tree crop production 		

Table 6.3.2 Project Summary Sheets (12 / 21)

Program	4. Environmental Conservation Program			
Sub-Program	4-3 Watershed Management Program			
Target Group	Small farmers in Dugda Bora Wareda			
Background & Objectives :				
<p>The nationwide soil conservation program phase-IV is in progress in Ethiopia by World Food Program (WFP). Under the program, local farmers are involved in afforestation by providing labor force. Farmers are provided wheat flour and edible oil as wages. In the past, Nazareth (Adama) and Lume Wareda of East Showa Zone were covered by the program. As a continuation of the program, WFP embarked on soil conservation practices in Dugda Bora Wareda in 2000. Out of nine (9) candidate micro-catchments, the following four (4) were selected and the afforestation program will be started for the target year of 2005.</p>				
	Micro-catchments	Peasant Association (PA)	Beneficiaries	Area(ha)
	•Mati	Dalota Mati (54)	955	787
	•Wede Weji	Menjegso Weji (15)	451	1,493
	•Lube	Menjegso Weji (15)	450	1,100
	•Jero Raka	Jero Raka(16)	360	1,157
<p>The project will introduce two (2) categories of soil conservation measures. The agronomic conservation measures include water harvesting, contour farming, grassed waterways, mulcting, etc. The engineering conservation measures include terrace channel with stepped chute, erosion and torrent control, sedimentation tank, waterway-road, bench terrace, gully protection dam, disaster preventing dam, hillside works, etc. WFP (Food for Work) applies mainly agronomic conservation measures by farmers, while few engineering conservation measures are applied. The project envisages establishing the model scheme in which both measures are effectively integrated in order to supplement each others and enhance their benefits. In line with a long-term strategy, the participatory approach such as PRA will be fully utilized to involve more farmers in the program.</p>				
Activities :				
<p>The project includes the following activities;</p> <ul style="list-style-type: none"> • To select typical micro-watersheds within the Meki River basin as model areas • To prepare planning and design criteria • To install suitable measures and works including terrace channel with stepped chute, erosion and torrent control, sedimentation tank, waterway-road, bench terrace, gully protection dam, disaster preventing dam, hillside works, etc. • Procurement of vehicles and heavy equipment • To promote and expand the protection measures with farmers participation in line with experiences in the model watershed 				
Input : Donor		Input : Ethiopian side		
<ul style="list-style-type: none"> • Rural Infrastructural Expert (12 men-months) • Participatory Development Expert (12 men-months) • Vehicles • Heavy equipment 		<ul style="list-style-type: none"> • OAB counterpart personnel • Translator 		
Executing Agencies : Oromia Irrigation Development Authority (OIDA)				
Project Benefits :				
<ul style="list-style-type: none"> • Expansion of soil protection area and agroforestry • Watershed conservation 				

Table 6.3.2 Project Summary Sheets (13 / 21)

Program	5. Capacity Building Program for OIDA and Wareda Staff	
Sub-Program	5-1 OIDA Engineers Training Program	
Target Group	OIDA engineers	
Background & Objectives :		
<p>The OIDA cadres and engineers in both the headquarters and branch offices are generally highly qualified with higher educational background. It is important, however, to accumulate work experiences through actual irrigation and drainage development. The OIDA Engineers Training Program aims at providing the training program to the OIDA engineers. The small-scale irrigation development for poverty alleviation is main stream of the irrigation sector of Ethiopia. Therefore, the OIDA engineers are required to basic knowledge for participatory development approach. The program targets to train up some 50 engineers of senior and middle classes. The training aspects include;</p> <ul style="list-style-type: none"> • Lectures on national and regional agricultural policies, irrigation development strategies, etc. • Review seminars and educational tours to existing irrigation projects in Oromia and other regions • Joint workshop with other government agencies concerning water resources, meteorology, mapping, etc. • Practices on methodology for hydrological and meteorological analyses • Practices on irrigation planning, designing and construction supervision • Lectures on transaction of tendering for irrigation project implementation • Practices on research design for improved irrigated farming techniques • Capacity building for construction supervision according to FIDIC • Lectures on environmental and watershed management including engineering protection measures • Practices on O&M of small pumps prevailing in the Meki area • Establishment of database for irrigation schemes for project benefit monitoring and evaluation (PBME) • Lectures and practices for participatory development and gender issues • Review of organizational set up of OIDA for decision-making and smooth day-to-day operation • Study on budgetary arrangement and financial management • Capacity building for report preparation • Practices on the basic technology to access international data sources through internet facilities 		
Activities :		
<ul style="list-style-type: none"> • To have a series of technical seminars on several aspects including policy and plans of water/irrigation sector, hydrological analysis methods, civil engineering, preparation of tender documents, environmental and watershed conservation, water management • To provide basic knowledge and experiences on participatory development, community mobilization, institutional management, budgetary arrangement • To make guidance for irrigation farming techniques • To train for report preparation • To prepare training materials for wareda staff • To organize educational tours 		
Input : Donor	<ul style="list-style-type: none"> • Irrigation Engineer (12 men-months) • Participatory Development Expert (3 men-months) • Vehicles • Audio-visual facilities 	Input : Ethiopian side
		<ul style="list-style-type: none"> • OIDA engineers • Training rooms
Executing Agencies : Oromia Irrigation Development Authority (OIDA)		
Project Benefits :		
<ul style="list-style-type: none"> • Capacity building of OIDA engineers • Training program for OIDA wareda staff by applying training materials • Systematic and efficient implementation of OIDA projects 		

Table 6.3.2 Project Summary Sheets (14 / 21)

Program	5. Capacity Building Program for OIDA and Wareda Staff	
Sub-Program	5-2 OIDA Community Development Experts Training Program	
Target Group	OIDA community development experts and social workers	
Background & Objectives :		
<p>The concept of the program is Training-of-Trainers (TOT). Firstly, the community development experts of the OIDA headquarters and branch offices will be provided qualified training program. Secondly, the experts trained up through the program will train social workers at the wareda level. The program envisages to train 20 community development experts including, at least, 5 female staff. The program consists of (1) lectures, seminars and workshop and (2) on-the-job training of Participatory Rural Appraisal (PRA) and Project Cycle Management (PCM) covering the following aspects.</p> <ul style="list-style-type: none"> • National and regional policies on agriculture and rural development, etc. • Concepts and procedures of participatory development • Gender issues and poverty reduction strategy • Environmental and watershed conservation • Fundamental knowledge of irrigation farming, O&M of irrigation facilities, etc. • Post-harvest techniques and marketing of agricultural products • Agricultural supports particularly for micro-credit • NGO's activities in Oromia Region • Capacity building for report preparation and statistical analysis • Practices on the basic technology to access international data sources through internet facilities <p>The particular attention will be paid to NGOs' activities in the program. With current financial constraints, it is important for OIDA and other governmental agencies in Ethiopia to coordinate with NGOs in the grass roots development activities for poverty reduction. The program will establish a database of NGOs accessible for the people of Oromia Region. The database will consist of names, address and contact persons, past and on-going activities, future plan and program, application form for assistance, etc. OIDA will utilize the database for assisting rural communities when they seek development aids from NGOs.</p> <p>The gender issue will be highlighted in the program. The program will provide the trainees a series of lectures and organize the workshop in which the trainees will learn</p> <ul style="list-style-type: none"> • current position of gender issues in Ethiopia and Oromia Region and • awareness of gender imbalance among the OIDA staff. They will also participate in • preparation of guideline for gender in irrigation development, • joint seminar with Omomia Women's Affairs Sector and NGOs, • on-the-job training for gender analyses and • practices in line with operation guideline for gender in development. 		
Activities :		
<ul style="list-style-type: none"> • To have a series of seminars and workshop on several social aspects organized by donors and NGOs • To have PRA and PCM workshops with several stakeholders • To prepare training materials for wareda staff, which include leaflets, posters and video-episodes • To prepare Plan of Operation of [5-3] Wareda Staff Training Program 		
Input : Donor	<ul style="list-style-type: none"> • Community Development Expert (12 men-months) • Local social workers (12 men-months) • Vehicles • Audio-visual facilities 	Input : Ethiopian side
		<ul style="list-style-type: none"> • OIDA staff • Training rooms • Translators
Executing Agencies : Oromia Irrigation Development Authority (OIDA)		
Project Benefits :		
<ul style="list-style-type: none"> • Trained 20 community development experts • Accumulated knowledge and work experience of systematic training for community development • Democratic operation and management of WUA and other rural communities • Improved performance in the OIDA irrigation projects 		

Table 6.3.2 Project Summary Sheets (15 / 21)

Program	5. Capacity Building Program for OIDA and Wareda Staff	
Sub-Program	5-3 Wareda Staff Training Program	
Target Group	Wareda staff under OIDA and Bureau of Agriculture	
<p>Background & Objectives :</p> <p>Capacity building program will be provided to the wareda staff by utilizing the training materials to be prepared by the OIDA staff through [5-1] OIDA Engineers Training Program and [5-2] OIDA Community Development Experts Training Program. Around the concept of Training of Trainers, senior staff will firstly be trained and provide the training program to the wareda staff. The program will target the staff of Dugda Bora Wareda at initial stage of the program and envisage covering other waredas of East Showa Zone and furthering Oromia Region. The major training aspects include the followings.</p> <p>(1) Engineering aspects</p> <ul style="list-style-type: none"> • Improvement of crop productivity under irrigation farming system • Capacity building for construction supervision • Guideline and criteria for environmental and watershed management • O&M of small pumps and generators • Project monitoring and evaluation <p>(2) Sociological aspects</p> <ul style="list-style-type: none"> • Basic concepts and procedures of participatory development • Gender imbalance, poverty reduction, rural development, etc. • Post-harvest techniques and marketing of agricultural products • Agricultural supports particularly for micro-credit • Access to NGOs in Oromia Region particularly Dugda Bora Wareda <p>The master plan to be prepared through the JICA study will be explained. Roles and responsibilities of the wareda office for the action program will also be explained.</p>		
<p>Activities :</p> <ul style="list-style-type: none"> • To explain the implementation procedures of the master plan • To make necessary guidance on wareda's responsibilities in implementation of the master plan • To make specific training on participatory development improved techniques of rain-fed agriculture and animal husbandry, irrigation technology especially for O&M and water management, environmental conservation, etc. 		
<p>Input : Donor</p> <ul style="list-style-type: none"> • Community Development Expert (12 men-months) • Local social workers (12 men-months) • Vehicles • Audio-visual facilities 		<p>Input : Ethiopian side</p> <ul style="list-style-type: none"> • OIDA staff • Translators
<p>Executing Agencies : Oromia Irrigation Development Authority (OIDA)</p>		
<p>Project Benefits :</p> <ul style="list-style-type: none"> • Improvement of work capacity of the wareda staff of OIDA and OBA • Promotion of participatory development 		

Table 6.3.2 Project Summary Sheets (16 / 21)

Program	5. Capacity Building Program for OIDA and Wareda Staff																																									
Sub-Program	5-4 Community Resource Mapping Project																																									
Target Group	Small farmers in Dugda Bora Wareda																																									
Background & Objectives :																																										
<p>Peasant Associations (PAs) are the lowest administrative societies to exert community development in association with the government services. Dugda Bora Wareda consists of 54 PAs. Each PA comprises some 500 households on an average (804 at maximum and 154 at minimum). The PA representatives are appointed by the Wareda (District) Administrator with prior consent of relevant rural communities in PAs. In addition to PAs, there are several communities in rural areas of Ethiopia. These traditional communities play important roles in communication among inhabitants and decision making in rural activities. They also settle several arbitration among inhabitants and between communities.</p>																																										
<table border="1"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Area (km²)</th> <th colspan="3">Population</th> <th rowspan="2">Density (person/km²)</th> <th rowspan="2">Household (no.)</th> <th rowspan="2">Family (person/ HH)</th> </tr> <tr> <th>Male</th> <th>Female</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Wareda Total</td> <td>1,468.0</td> <td>64,523</td> <td>62,051</td> <td>126,574</td> <td>44.0</td> <td>27,013</td> <td>4.7</td> </tr> <tr> <td>PA(max)</td> <td>38.5</td> <td>1,879</td> <td>1,796</td> <td>3,675</td> <td>167.9</td> <td>804</td> <td>5.6</td> </tr> <tr> <td>PA(min)</td> <td>17.3</td> <td>387</td> <td>338</td> <td>725</td> <td>27.8</td> <td>154</td> <td>3.8</td> </tr> </tbody> </table>									Area (km ²)	Population			Density (person/km ²)	Household (no.)	Family (person/ HH)	Male	Female	Total	Wareda Total	1,468.0	64,523	62,051	126,574	44.0	27,013	4.7	PA(max)	38.5	1,879	1,796	3,675	167.9	804	5.6	PA(min)	17.3	387	338	725	27.8	154	3.8
	Area (km ²)	Population			Density (person/km ²)	Household (no.)	Family (person/ HH)																																			
		Male	Female	Total																																						
Wareda Total	1,468.0	64,523	62,051	126,574	44.0	27,013	4.7																																			
PA(max)	38.5	1,879	1,796	3,675	167.9	804	5.6																																			
PA(min)	17.3	387	338	725	27.8	154	3.8																																			
<p>The JICA Study carried out the preliminary studies on traditional communities in cooperation with Development Agents. Family-based groups are called 'Ukobo' or 'Edir' in rural areas of Oromia Region. Some 500 edirs are identified within 54 PAs of Dugda Bora Wareda. Each edir consists of 20 to 100 households (40 HH on average).</p>																																										
<p>The JICA Study focuses on these existing communities as nucleus bodies for future rural development. In order to verify their geographical positions, community members, natural resources, social conditions, etc., this program aims at preparation of Community Resource Maps.</p>																																										
Activities :																																										
<ul style="list-style-type: none"> • To survey PAs and list existing communities within PAs for data-base • To prepare community resource map indicating existing conditions of land use/vegetation, rural facilities, road networks, erosion process, etc. • To utilize the maps for various community activities 																																										
Input : Donor				Input : Ethiopian side																																						
<ul style="list-style-type: none"> • Participatory Development Expert (6 men-months) • Vehicles • Motor-cycles and bicycles for DA 				<ul style="list-style-type: none"> • Bureau of Agriculture (Staff training section) • 27 DAs • Translator 																																						
Executing Agencies : Bureau of Agriculture																																										
Project Benefits :																																										
<ul style="list-style-type: none"> • Community Resource Maps to cover the entire Dugda Bora Wareda • Promotion of participatory development • Smooth operation of administrative services including extension services 																																										

Table 6.3.2 Project Summary Sheets (17 / 21)

Program	6. Community Development and Cooperative Promotion Program	
Sub-Program	6-1 Community Leader Training Program	
Target Group	Community leaders	
Background & Objectives :		
<p>The program aims at systematic capacity building of community leaders in order to promote democratic operation of community activities and participatory development. Community leaders will organize the Community Leaders' Committee and exchange their opinions about constraints encountered and their own experiences how to solve the problems each other in the Committee. Through these practices, each leader will enhance their knowledge on appropriate community management. Wareda Officers and DAs will occasionally attend the meeting and provide advises when required.</p>		
Activities :		
<p>Community leaders will be selected by applying the community resource maps to be prepared through [5-4] Community Resource Map Project. The main aspects concerned are;</p> <ul style="list-style-type: none"> <input type="checkbox"/> Establishment of Community Leaders' Committee and registration to District Offices <input type="checkbox"/> Concepts and procedures of participatory community development <input type="checkbox"/> Exchange of opinions on problems and needs in group activities <input type="checkbox"/> Gender imbalance encountered <input type="checkbox"/> Group operation with democracy and high transparency <input type="checkbox"/> Coordination of the Input Credit scheme <input type="checkbox"/> Price information of agricultural products and marketing channels <input type="checkbox"/> Operation and maintenance (O&M) of community's assets, e.g. multi-purpose sheds, sprayers, etc. <input type="checkbox"/> Group farm operation and marketing especially for fruits farmers of Type C <input type="checkbox"/> Daily record keeping and accounting reports <input type="checkbox"/> Presentation of group activities in the Committee <input type="checkbox"/> Village functions such as agricultural show, movie show, football games, etc. <p>Through these activities mentioned above, the community members will communicate more frequently and discuss their problems. In addition, the Committee will discuss and attain mutual agreement how to implement the community-based projects.</p>		
Input : Donor	<ul style="list-style-type: none"> • Participatory Development Expert (6 men-months) • Vehicles • Audio-visual equipment 	Input : Ethiopian side
		<ul style="list-style-type: none"> • 27 DAs • Translator
Executing Agencies : Wareda staff from OIDA and OBA		
Project Benefits :		
<ul style="list-style-type: none"> • Capacity building of community leaders • Promotion of participatory development 		

Table 6.3.2 Project Summary Sheets (18 / 21)

Program	6. Community Development and Cooperative Promotion Program	
Sub-Program	6-2 Visioning Workshop Program	
Target Group	Small farmers in Dugda Bora Wareda	
<p>Background & Objectives :</p> <p>In the rural societies of Oromia Region, problems and needs were regularly discussed at the PA level under the previous government. Currently, however, bottom-up needs are not officially discussed at the PA level but collected by DAs and other government agencies. This implies that opinions of poverty groups including women and youth are hardly reflected in the communities and taken up by the government due to low accessibility to the public services for them.</p> <p>[6-2] Visioning Workshop Program aims at awareness creation for advocacy for quality of life among community and empowerment especially of poverty groups of community. The objectives of the program include:</p> <ul style="list-style-type: none"> • Provision of opportunity for awareness creation • Exchange of opinions among generations of communities • Problem analyses and development approaches • Discussion concerning irrigation and rural development • Application of proposed projects to be selected among the community • Awareness creation for environmental conservation • Clarification of responsibilities and cooperation • Establishment of operation rules for community facilities 		
<p>Activities :</p> <ul style="list-style-type: none"> • To explain the necessity of visioning workshop to every group including women and youth • To organize the workshop and show the video-episodes on successful community activities in the other regions • To discuss how to implement community-based development • To implement the infrastructure development • To prepare an action program for participatory development 		
<p>Input : Donor</p> <ul style="list-style-type: none"> • Participatory Development Expert (6 men-months) • Vehicles • Audio-visual equipment 		<p>Input : Ethiopian side</p> <ul style="list-style-type: none"> • 27 DAs • Translator
<p>Executing Agencies : Wareda staff from OIDA and OBA</p>		
<p>Project Benefits :</p> <ul style="list-style-type: none"> • Empowerment of rural communities • Promotion of participatory development • Improvement of farm income and living standard 		

Table 6.3.2 Project Summary Sheets (19 / 21)

Program	6. Community Development and Cooperative Promotion Program	
Sub-Program	6-3 Drinking Water and Nutritional Improvement Program	
Target Group	Small farmers in Dugda Bora Wareda	
<p>Background & Objectives :</p> <p>Drinking water supply in the Meki area is highly relying on groundwater. There are four (4) deep wells in Meki town, while there are 45 deep wells, 16 shallow wells and 2 hand pumps in the rural area. The availability of potable water to rural people is 70%, which is much higher than that of the national average, i.e. 16% to 20%. However, considerable number of the existing wells are deteriorated and local farmers obtain water from the Meki river and other water bodies. The average groundwater table in Meki town (El. 1,620) is some 30 m in depth. Water quality of groundwater is characterized by high Floride content.</p> <p>Local farmers in the Meki area are at subsistence level. They broadly produce main staple grains including maize, teff, wheat, etc. and haricot beans, while horticultural crops are planted to the limited extent. For small farmers, availability of animal protein as well as horticultural crops is far below for their requirement resulting in malnutrition among rural peoples according to the JICA Study.</p> <p>[6-3] Drinking Water and Nutritional Improvement Program aims at the following:</p> <ul style="list-style-type: none"> • Transfer of knowledge about prevention against water-borne diseases and drinking water quality control • Improvement of nutritional status especially for pregnant and infants (below 24 months old) • Distribution of seedlings and seeds for horticultural crops 		
<p>Activities :</p> <p>The program will promote the following activities:</p> <p>(1)Public health and hygiene</p> <ul style="list-style-type: none"> • To visit communities and organize mini-workshop with small farmers including women, youth and landless farmers • Consultation to staff of Bureau of Health • Introduction and distribution of water filters • Follow-up and project monitoring <p>(2)Improvement of nutritional status</p> <ul style="list-style-type: none"> • Meal survey and cropping calendars • Discussion with social workers and extension workers • Workshop on food processing and cooking • Distribution of free seedling and seeds of horticultural crops to women • Set-up of nursery schools • Introduction and distribution of flour mills • Educational tours 		
<p>Input : Donor</p> <ul style="list-style-type: none"> • Participatory Development Expert (6 men-months) • Primary Health and Nutrition Expert (6 men-months) • Vehicles • Water filters, Flour mills • Audio-visual facilities 		<p>Input : Ethiopian side</p> <ul style="list-style-type: none"> • Counterpart personnel under wareda office (Bureau of Health, OIDA and OBA) • Translator
<p>Executing Agencies : Wareda office (Bureau of Health, OIDA and OBA)</p>		
<p>Project Benefits :</p> <ul style="list-style-type: none"> • Awareness on water quality and nutritional improvement • Improvement of water quality • Improvement of nutritional status • Reduced infant motility ratios 		

Table 6.3.2 Project Summary Sheets (20 / 21)

Program	6. Community Development and Cooperative Promotion Program	
Sub-Program	6-4 Community Center Project	
Target Group	Small farmers in Dugda Bora Wareda	
Background & Objectives :		
<p>The rural communities in the Meki area are geographically scattered and have no facilities for assemble. [6-4] Community Center Project aims at provision of conventional shed-type building to rural communities so as to encourage the community activities. The facilities will be utilized for the following purposes:</p> <ul style="list-style-type: none"> • Meeting by communities • PA assembly and record keeping • Capacity building and training program • Administrative services including visiting medical doctors' services • Cooperative activities • Supplemental use for schooling • Exchange of information (notice board) • Recreation (football games, movie show, etc.) • Demonstration farm for vegetable productions • Weighing machines • Wells • Temporary post office • Temporary storage of seedlings and seeds <p>The operation rules of facilities will be discussed and agreed among communities. In principle, building materials will be supplied by the project, while the communities will provide labor power.</p>		
Activities :		
<p>••••••• Activities •••••••</p> <ul style="list-style-type: none"> • To have community' meeting and functions including capacity building, training, etc. • To use for temporary schooling, health post, marketing activities, etc. • To use as emergency purposes including temporary storage, etc. • To provide demonstration of horticultural farm • To store communities' assets 		
Input : Donor	<ul style="list-style-type: none"> • Participatory Development Expert (6 men-months) • NGO or Local Expert (12 men-months) • Vehicles • Building materials 	Input : Ethiopian side
		<ul style="list-style-type: none"> • Wareda staff • Translator
Executing Agencies : Wareda Office		
Project Benefits :		
<ul style="list-style-type: none"> • Empowerment of local farmers • Democratic operation of PAs and communities • Promotion of participatory development 		

Table 6.3.2 Project Summary Sheets (21 / 21)

Program	6. Community Development and Cooperative Promotion Program	
Sub-Program	6-5 Grain Bank Promotion Program	
Target Group	Small farmers in Dugda Bora Wareda	
<p>Background & Objectives :</p> <p>This sub-program aims basically at securing food grains during the lean season through lending and borrowing products among the surplus and deficit farmer producers at PA level. The products in the peak harvesting season shall be kept by the farmers at a grain bank warehouse. During the lean season, the deficit farmers who need to purchase food grains shall borrow the food grains from the grain bank and return the grains in the next harvesting season with a certain additional quantity as an interest. These grain lending and borrowing practices shall accrue the following benefits:</p> <ul style="list-style-type: none"> □ Surplus farmers are able to minimize post harvest losses at an improved storage facility. The stored grains remained shall be sold out in the lean harvesting season at a higher price that could be expected from seasonal price fluctuation and bulk trading. □ Deficit farmers are able to purchase and /or borrow required food grains from the grain bank. In case of purchase, grain price shall be set lower than prevailing retail price because of a less cost of transportation and trading margins. Borrower farmers shall return the grains in kind with an interest quantity from their products in the next harvest season. The deficit farmers could minimize their livelihood expenditure burden compared with relying on the retail markets. □ The farmers can secure staple food grains within the vicinity of village areas. □ The grain bank could generate village fund that accrue from storage charges collecting from the surplus farmers and trading benefit. • The village fund generating from the grain bank operation could be used for maintenance of storage facilities, incentives for grain bank management staff, welfare investment at PA level, etc. 		
<p>Activities :</p> <p>The grain bank shall be installed at selected pilot PAs (3 sites according to different types of farming) that will have a certain surplus products in a year, acceptance of majority farmers, existence of leadership and preliminary operating knowledge. The sub-program shall be implemented as follows :</p> <ul style="list-style-type: none"> □ Identification of pilot PAs : a) presentation and explanation of the system, b) receiving an interest from the PAs, c) selection of pilot Pas through PA's resource verification by PBME benchmark survey, d) confirmation of participating farmers at selected Pas. □ Participatory planning for installation of grain bank at the selected pilot Pas : explanation and receiving farmers' concerns to reflect a design and operational plan, joint preparation of facility and implementation plan including required organization, confirmation of the final plan by farmers, and selection of management farmers. □ Joint construction of facilities, training for operation, monitoring and evaluation of activities to reflect expansion of the sub-program 		
<p>Input : Donor</p> <ul style="list-style-type: none"> □ Market and post harvest specialist 3 M/M □ Agronomist 2 M/M □ Institutional expert 2 M/M □ Local Expert/Post harvest 10 M/M □ Computer, printer, copy machine 1 sets □ Post harvest facilities (warehouse, thresher, Cleaning and drying space, etc.) 3 sets 		<p>Input : Ethiopian side</p> <ul style="list-style-type: none"> □ Superintendent staff of both central and district levels, e.g. OIDA (1) and DA (1 district, 3 PA DAs) in charge, etc.
<p>Executing Agencies : Wareda Office</p>		
<p>Project Benefits :</p> <ul style="list-style-type: none"> • Installation of food grain security system at village level and grain marketing by the farmer groups □ Contribution to increase farmers' income and village welfare 		