

Irrigation and Water for Sustainable Development

Proceedings of the Second Forum December 15–16, 2008, Addis Ababa, Ethiopia

Summary Report, Abstracts of Papers with Proceedings on CD-ROM



Organized by
Ethiopia National Irrigation Steering Committee

Compiled by
Seleshi Bekele Awulachew, Teklu Erkossa and Yodit Balcha



Partial view of participants of the Forum (*Photo credit: Apollo Habtamu, Graphic Designer, International Livestock Research Institute (ILRI), Ethiopia.*)

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Ministry of Agriculture and Rural Development (MoARD)
Ministry of Water Resources (MoWR)
United States Agency for International Development (USAID)
Japan International Cooperation Agency (JICA)

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Project

The reports and papers included in this booklet and on the CD are part of the projects related to the Agricultural Water Management Technologies Inventory, Characterization and Suitability Assessment.

Collaborators

The forum and exhibition was organized by the Ethiopian National Irrigation Steering Committee in collaboration with the following organizations:



International Water Management Institute (IWMI)



Ministry of Agriculture and Rural Development (MoARD), Ethiopia



Ministry of Water Resources (MoWR), Ethiopia



United States Agency for International Development (USAID)

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International Water Management Institute (IWMI)



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CONTENTS

Summary	1
Session I: Opening Speeches	3
List of Abstracts and Papers on the CD	10
Session III: Policy, Strategies and Investments	12
Abstracts.....	12
Discussion.....	17
Session IV: Water-centered Growth Corridor	20
Abstracts.....	20
Session V: Current Growth Corridor Case Study Examples.....	26
Abstracts	26
Session VI: Recent Development of Irrigation and Government Policy	30
Abstracts.....	30
Discussion on Presentations Made During Sessions V and VI	33
Session VII: Experience and Impact of Irrigation in Ethiopia.....	37
Abstracts.....	37
Discussion.....	40
Group Discussion Summary	42
Closing Remarks.....	48
Annex	49

Irrigation and Water for Sustainable Development

SUMMARY

Background to the Forum

The main development objective of the Ethiopian Government and its partners is poverty eradication. Hence, the country's development policies and strategies are geared towards achieving this objective. In line with this, bilateral and multilateral donors, NGOs and various institutions share the concepts and priorities identified in the "Plan for Accelerated and Sustained Development to End Poverty" (PASDEP, Ministry of Finance and Economic Development (MoFED), 2006).

Although the economy of Ethiopia and majority of the people's livelihoods are dependent on agriculture, there are key challenges that need to be addressed in transforming agriculture by overcoming a multitude of problems, which include biophysical and water management issues to help the attainment of PASDEP and sustainable socioeconomic growth of the country. The dominant agricultural system in Ethiopia is smallholder mixed production of cereals and livestock under rain-fed conditions. This leaves the system, population and economy extremely vulnerable to effects of meteorological and hydrological variability, which manifests itself as periods of prolonged dry spells and drought occur. There is also progressive degradation of the natural resource base, especially in highly vulnerable areas of the Highlands, which aggravates the incidence of poverty and food insecurity in these areas. This dominant smallholder agriculture system of Ethiopia is not benefiting much from the technologies of water management and irrigation that could significantly reduce the vulnerability of the agricultural system to climatic variability and improve agricultural productivity.

The adoption of sustainable water management and irrigation development targeting the poor, but also with strong linkages to the private sector and markets with the necessary institutional support services, could provide ample opportunities in terms of a coping strategy against climatic externalities, poverty reduction, wealth creation, growth of economy and reducing the environmental impact of agricultural expansion to marginal land under rapid population growth. There are considerable experiences within the country, in the region and in the world that could be easily disseminated, adapted and replicated to enable the usage of appropriate technologies to overcome the stated challenges, protect the livelihoods of the people and bring about the desired growth and wealth creation. It is a critical time in Ethiopia to bring together all stakeholders who are involved in policy and decision-making, technology and knowledge generation, knowledge brokering, manufacturing, trading and users to discuss, exchange knowledge and seek mechanisms through which the technologies could be accessed and the uptakes could be enhanced.

Cognizant of the above, a national Steering Committee was established in the past few years involving many actors such as the government: Ministry of Agriculture and Rural Development (MoARD) and Ministry of Water Resources (MoWR); bilateral and

multilateral donors: United States Agency for International Development (USAID), Japan International Cooperation Agency (JICA), African Development Bank (AfDB), International Fund for Agricultural Development (IFAD), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH (formerly Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH), Food and Agriculture Organization of the United Nations (FAO), and the World Bank; private sector representatives; NGOs and international research institutions (IWMI). This national Steering Committee has been engaged in promoting sustainable agricultural water management practices in Ethiopia. One of the functions of this Steering Committee was to organize a biannual forum, which facilitates experience sharing among different stakeholders. Accordingly, a national Irrigation and Water Forum was organized during December 15-16, 2008, in Addis Ababa, Ethiopia.

Objectives of the Forum

The main objective of the Forum was to bring together and share experiences among government institutions (policymakers, technical experts and academicians), NGOs, the private sector (smallholder farmers, commercial farmers, and producers and distributors of irrigation equipment), international donors, financial institutions and related stakeholders who are working in irrigation, water, natural resources management, investment and other socioeconomic sectors.

The Forum was specifically designed to:

1. enable participants to exchange information and knowledge, and reflect on issues related to water, irrigation and agricultural policies, strategies and developments; and
2. present key challenges faced by irrigation systems and agriculture, and existing, new, innovative and indigenous knowledge and ideas related to Ethiopia's growth opportunities and enrich such thinking through discussions.

Create a platform for exchange of experiences on recent interventions in the irrigation and agricultural water management sectors. In particular, share existing knowledge; carry out focused discussions to explore opportunities and mechanisms through which the uptake of knowledge, and application, dissemination and out-scaling of Small-Scale Irrigation (SSI), Micro-irrigation (MI) and rainwater harvesting (RWH) technologies could be enhanced.

SESSION I: OPENING SPEECHES

Seleshi Bekele Awulachew

*Senior Researcher and Head, East Africa and Nile Basin Office
International Water Management Institute (IWMI), Addis Ababa, Ethiopia*

Your Excellency, Ato Teffera Deribew, Minister of Agriculture and Rural Development, dear participants of the symposium, and ladies and gentlemen...

On behalf of the technical program committee and on behalf of the International Water Management Institute, which is one of the co-organizing institutes, I would like to welcome you to the Second Forum on Irrigation and Water for Sustainable Development to be held today and tomorrow here at Ghion Hotel.

Excellencies, allow me also to introduce the program of the Forum. This Forum is organized by Ethiopian National Irrigation Steering Committee and is designed to provide presentation of papers, exhibitions, discussions, debates and put forward recommendations on irrigation and broader water management for agriculture and other sectors.

The forum is addressing key questions such as:

- What are the current policies, strategies, implementations and impact of irrigation developments including constraints?
- What are new innovations, thoughts and directions that speedup agriculture development, accelerate growth, taking natural resources endowment of Ethiopia, particularly water and land and in line with PASDEP and targets of the Millennium Development Goals (MDGs)?
- What are the various water management technologies tested, which ones are making significant impact, and what are typical impacts of past investments, and how do these investments be sustainable and out-scaled?

Based on these questions, the main objective of this Forum is to bring together and share experiences among government institutions (policymakers, technical experts and academicians), NGOs, the private sector (smallholder farmers, commercial farmers, and producers and distributors of irrigation equipment), international donors, financial institutions and related stakeholders who are working in irrigation, water, natural resources management, investment and other socioeconomic sectors.

Accordingly, the Forum themes are subdivided into three categories:

1. Recent development of irrigation subsector policy and strategies
2. Water-centered growth corridor - concepts and innovations
3. Experience and impact of irrigation development in Ethiopia

During the Forum, 25 papers from the ministries of Agriculture and Rural Development, Water Resources, and Finance and Economic Development; regions of Amhara, Tigray, Oromia and SNNPR; the Water Resources Think Tank Group; researchers from IWMI;

the private sector; and donors are scheduled to be presented. In addition, an exhibition of irrigation equipment, posters and products from over 10 organizations are on display. Over 150 people from over 50 institutions are participating in this event.

Accordingly, the two-day program includes the following (as you may also see it on your program sheet):

- Opening remark by the Chair of the Steering Committee
- Opening of the Forum by guest of honors
- After the opening we will have a group photograph
- After the photograph we will have the opening of the exhibition and a coffee break
- The rest of the program is as shown in the program sheet

Thank you very much.

According to our program, I now call on Ato Sileshi Getahun, the Director of Natural Resources of Ministry of Agriculture and Rural Development (MoARD) and Chair of the National Irrigation Steering Committee, to provide us with an opening remark on behalf of the Steering Committee and invite the guest of honor to open the Forum.



Seleshi Bekele Awulachew, welcome speech and opening address (*Photo credit:* Apollo Habtamu, Graphic Designer, International Livestock Research Institute (ILRI), Ethiopia).

HE Ato Teffera Deribew

*Minister, Ministry of Agriculture and Rural Development (MoARD)
Addis Ababa, Ethiopia*

Honorable ministers,
Distinguished guests,
Ladies and gentlemen,

On behalf of the Ministry of Agriculture and Rural Development and myself, it gives me great pleasure and an honor to welcome you all to this important Forum on Irrigation and Water for Sustainable Development Program.

Ethiopia has large water reserves that could be used for a wide range of irrigation development programs. It has 12 river basins with an annual water runoff volume of 122 billion cubic meters. In addition, the groundwater potential is estimated to be 2.6 billion cubic meters.

At present, only about 3 to 5% of the irrigable land is under irrigation while the irrigation potential has been estimated to be about 4.25 million hectares of arable land. This depicts the fact that if we maximize our efforts to utilize the untapped water resources for irrigation development, we will be able to overcome the challenges of food insecurity within the shortest time possible.

Generally, Ethiopia's water resources have not been adequately utilized to contribute to the economic and social goals of the country.

Cognizant of this, the National Water Sector Policy has been developed. This policy has the overall goal of enhancing and promoting the national efforts towards efficient, equitable and optimal utilization of the available water resources for the socioeconomic development of the country in a sustainable manner.

In this regard, the government has committed itself to take commendable intervention measures to translate policy into action.

Excellencies,
Honorable delegates,
Ladies and gentlemen,

Water is the first fundamental resource for survival and it is a key component for socioeconomic development activities including agriculture, power, transportation, fishing, wildlife conservation, health and industry.

Sustainable use of water is important for our planet and is also fundamental for both food production and well-functioning ecosystems. However, unsustainable water use is very common, especially in Ethiopia. Inefficient water use, fluctuation in water availability, increasing scarcity and declining water quality are the major challenges facing the water sector of our country.

Water and Land are the major assets for majority of the rural poor people in Ethiopia who depend on agriculture for their livelihoods. Water resources are considerable and if managed more effectively, they could make a substantial contribution to rural poverty reduction. Major opportunities to increase food security and household incomes are being missed because of inadequate investment in water for agriculture especially for smallholder land users.

One opportunity lies on utilizing experiences and knowledge, gathered through many years of project implementation, into innovative policies, strategies and actions aimed at the sustainable use of the full potential of water for agriculture in Ethiopia.

Excellencies,
Honorable delegates,
Ladies and gentlemen,

The countries of the United Nations have committed themselves to achieving the Millennium Development Goals (MDGs). One of these goals includes the target to halve the proportion of the world's people who suffer from poverty and hunger and to ensure that current trends in the loss of natural resources are effectively reversed at both global and national levels by 2015. Another Millennium Development Goal targets to halve the people who have no access to safe and reliable drinking water.

Changes are needed in the use of water in the agricultural sector. More effective and efficient use of water, more diversification of crops and better environmental adaptation are some of the possible options.

Farmers have an obligation to manage the water they need as carefully as possible. Local communities have to be in charge of development. They possess the know-how for action that truly leads to implementation, moreover, the efforts to eradicate poverty.

Let us not forget that agriculture in Ethiopia is the cornerstone for economic and social development and, therefore, in poverty alleviation.

Excellencies,
Honorable delegates,
Ladies and gentlemen,

The adoption of sustainable water management and irrigation development targeting the poor but also with strong linkages to the private sector and markets together with the necessary institutions and other support conditions could provide ample opportunities in terms of a coping strategy against climatic externalities, poverty reduction, wealth creation, growth of economy and reducing the environmental impact of agricultural expansion to marginal land under the rapid population growth.

There are considerable experiences within the country, in the region and in the world that could be easily adapted and replicable to enable usage of appropriate technologies to overcome irrigation and water associated challenges, protect the livelihoods and bring about the desired growth.

It is, therefore, high time to bring together all stakeholders in Ethiopia who are involved in policy and decision-making, technology and knowledge generation, manufacturing, trading and use of technologies to discuss, exchange knowledge and seek mechanisms through which the technologies could be accessed and the uptake could be enhanced.

It is my belief that this Forum is exemplary in terms of creating synergy and collaboration amongst different sectors including sister ministries, donors, private sectors, international institutions, NGOs and other stakeholders. With our joint effort, we will be able to bring about desirable changes in agricultural water management for the attainment of food security objectives and poverty reduction.

Please allow me to take this opportunity to thank the steering committee members of Agricultural Water Management for organizing this forum and taking the initiative to bring all stakeholders together to discuss our common agenda of water and irrigation.

I would also like to extend my appreciation to IWMI, USAID, JICA, AfDB, GIZ, World Bank, FAO and others for their technical and financial support rendered for the realization of this Forum.

Wishing you success in your deliberations and discussions, I now declare that this Forum as officially open.

I thank you all.



HE Ato Teffera Deribew, welcome speech and opening address (Photo credit: Apollo Habtamu, Graphic Designer, International Livestock Research Institute (ILRI), Ethiopia).

HE Ato Shiferaw Jarso

Basin Affairs Advisor Minister to the Prime Minister

Dear Participants

Ethiopia is a country suffering from repeated drought and poverty. Many reasons can be sighted for this. But misuse/underutilization/mismanagement of the natural resources is the main reason. The lowland parts of Ethiopia (which are hit by recurrent drought), and marginalized and unaddressed areas of the country, can have good development potential if solutions to some very limiting factors are solved. Food-insecure areas can be changed to food-surplus areas and even to development centers that relieve the pressure on the dwindling resources of the Highlands. Apart from the life-saving intervention, there is also an equity issue and balanced development to be addressed in the Ethiopian Lowlands. Major problems in the Highlands of Ethiopia, which is linked with population pressure on limited resources, improper utilization, and management of the natural resources and lack of good governance, can be taken as main areas of focus.

In a country like Ethiopia, where the use of water for development is minimal, water is definitely an entry point for development. But lack of an integrated land use plan and area-based development plan derived from the land use plan are also key limiting factors for economic development next to water.

These two are pillars of the growth corridor development approach and are inseparable. The major reasons to go for land use planning are to identify the best beneficial use of land. In doing so, potential growth corridors, growth poles and growth centers will be identified. Without this, it will be difficult to create a large-scale countrywide movement and bring the required fast economic development for the following main reasons:

- The enormity of the socioeconomic problem facing the region's demand and a huge mass movement to face it.
- The natural resource base is not well-known, mismanaged or underutilized.
- Existing land use plans are at reconnaissance levels; studies at detailed scales cover only a few pocket areas.
- Basin master plan studies need further detailed studies to be implemented.
- Development activities in newly developing areas, which were not covered even by previous regional-scale studies, shall follow the land use plan based on systematic studies.
- There is no spatial development plan to establish a strong rural-urban link and ensure sustainable urban development.
- To setup an area-based development plan, spatial development and natural resources development plan there must be a workable land use plan.
- Considering a few pocket fast-growing areas as corridors and focusing on them does not bring the required fast overall socioeconomic transformation throughout the country, and the conventional way followed to develop them does not bring huge mass mobilization.
- Addressing equity and life-saving issues of the marginalized areas is equally important when working on high potential areas.

- There are areas with high potential for development but there is no detailed plan to pick them as the development corridor right away.
- Every piece of land has its own potential but some potential areas are not easily identified; they need a more detailed study.
- Starting with, and focusing only on, a few high-potential areas may not help us to meet set development targets such as the MDGs and reaching the middle-income level by 2020.

Therefore, assessment of the potential of available resources and designing its best utilization through land use planning and implementation of an area-based development plan on a watershed level is a prerequisite to ensure sustainable development. Joining this with the immense human resources will undoubtedly lead us to the aspired development stage.

Thank you.

LIST OF ABSTRACTS AND PAPERS ON THE CD

Session III: Policy, Strategies and Investments

Taking Forward the Growth Agenda of the PASDEP: From Concept to Action

Markos Feleke

The Role of the Ethiopian Strategic Investment Framework for Sustainable Land Management (ESIF-SLM) in Irrigation Development

Sileshi Getahun

Small-Scale Irrigation Development Interventions under IFAD-supported Projects

Dejene Abesha and Abebe Zerihun

Irrigation Development, Water Management, Crop Development and Marketing: An Integrated Approach to Sustainable Agricultural Development, Experience from the Agriculture Sector Support Project (ASSP)

Tessema Legebo, Jan Twarowski and Hailemichael Taye

Session IV: Water-Centered Growth Corridor

Water-Centered Growth Challenges, Innovations and Interventions in Ethiopia

Seleshi Bekele Awulachew

Context Review and Synthesis of Water as a Major Entry Point for Agriculture and Economic Growth

Berhanu Adenew

Water-Centered Growth Corridor in the Rural Setting – Key to Social and Economic Transformation. A Case Study of Northern Ethiopia

Alemayehu Mengiste

Creating Extension Service Delivery through Public-Private Partnerships

Belay Demisse, Seleshi Bekele Awulachew, Berhanu Adenew and Alemayehu Mengiste

Session V: Current Growth Corridor Case Study Examples

The Tana Beles Growth Corridor: Opportunities and Challenges

E. V. Jagannathan and Micheal Abebe

Land Use Guided Growth Corridor Development Approach to Ensure Sustainable Development. The Case of Oromia Regional State

Taye Alemayehu

Highlights Of Irrigation and Water Supply Potential Development Interventions in the Special Economic Zones of Raya-Humera Project Areas, Northern Ethiopia

Mulugeta Gezahegn

Growth Pole Centers and Development Corridors in SNNPR

Asefa Chekol

Session VI: Recent Development of Irrigation and Government Policy

Irrigation Development in Amhara Region and the Challenges on “Irrigation and Water for Sustainable Development”

Muluken Lakachew

Strategies and Irrigation Development Potential and Existing Challenges in Tigray Regional State

Zekarias Gebereanenia

Session VII: Experience and Impact of Irrigation in Ethiopia

Inventory, Suitability Assessment, and Upscaling of Best Agricultural Water Management Practices

Makonnen Loulseged, Seleshi Bekele Awulachew, Gayathree Jayasinghe, Fitsum Hagos and Teklu Erkossa

Poverty Impacts of Agricultural Water Management Technologies in Ethiopia

Fitsum Hagos, Gayathree Jayasinghe, Seleshi Bekele Awulachew, Makonnen Loulseged and Aster Denekew Yilma

Conveyance and Drainage System in Spate Irrigation: A Case of Boro Spate Irrigation

Yohannes Geleta, Chali Edessa, Kozo Inada, Yoshiaki Otsubo, Shinji Suzuki and Hiromichi Toyoda (Abstract only)

SESSION III: POLICY, STRATEGIES AND INVESTMENTS

ABSTRACTS

TAKING FORWARD THE GROWTH AGENDA OF THE PASDEP: FROM CONCEPT TO ACTION

Markos Feleke

Ministry of Finance and Economic Development (MoFED), Addis Ababa, Ethiopia

The current five-year development strategy of the government, a “Plan for Accelerated and Sustained Development to End Poverty (PASDEP)”, has an objective to lay out the directions for accelerated, sustained and people-centered economic development as well as paving the groundwork for the attainment of the MDGs. To achieve this, from the pillar strategies adopted in the document, a massive push to accelerate growth is one of the objectives and the development of economic growth corridors are its subcomponent. Given the vast arable land, labor and water resources of the country, agriculture and water resources are natural entry points for the growth corridor approach in the country. It is well-recognized that Ethiopia is well-endowed with a diverse potential of natural and labor resources within its various regions, which will provide the basis for multi-faceted economic development and growth. However, these potential resources have to be developed with basic economic principles of efficiency and rational utilization, in order to make the best use of these resources for the country’s sustained growth and poverty alleviation. This underscores the need to employ a spatial development approach with broader geographical significance based on the respective identified potential of areas to effectively utilize the optimal benefit out of the resources, in a manner that interconnect different economic activities within the regions irrespective of geographical boundaries, and will ultimately accelerate overall national growth and poverty reduction. To facilitate this, the government is currently giving emphasis to lay out and promote spatial economic growth corridor development strategies within the framework of the national overarching strategy of Agricultural Development Led Industrialization (ADLI), which can harness the parallel and diversified resource endowments of the country and enhance the country’s growth pace further.

THE ROLE OF THE ETHIOPIAN STRATEGIC INVESTMENT FRAMEWORK FOR SUSTAINABLE LAND MANAGEMENT (ESIF-SLM) IN IRRIGATION DEVELOPMENT

Sileshi Getahun

*Director, Natural Resources Management Directorate, Ministry of
Agriculture and Rural Development (MoARD), Addis Ababa, Ethiopia*

In Ethiopia, agriculture is the dominant economic source. Food insecurity has long been with the country and averting this perpetuating problem has become the major concern of the country's government in recent years. A complex combination of factors leads to food insecurity, including changes in climate, widespread land degradation, limited alternative livelihood opportunities, increased population pressure, poor market integration, limited access to basic services, inputs, credit and information, technological factors, and national policies and implementation constraints. Even during the normal harvest, on average, there are some 5 million chronically food insecure people in Ethiopia. This chronic situation is frequently aggravated by unexpected shocks such as drought. With about 45% of the population affected during drought years, the extent of food insecurity has become alarming. The government has developed a strategic plan of poverty reduction, a "Plan for Accelerated and Sustained Development to End Poverty (PASDEP)," to address this problem. The struggle to secure food in the country requires an increase in agricultural productivity from rain-fed agriculture and increasing production using irrigation water from the small-scale irrigation schemes. However, due to lack of water storage and large spatial and temporal variations in rainfall, shortage of water constrains production of more than one crop per year. Hence, there seem to be frequent crop failures owing to dry spells and droughts. The country has put policy directions and strategies for ensuring sustainable agricultural production to avert problems arising from moisture deficiencies. Focus has been given to promote and strengthen small-scale irrigation and water harvesting schemes. Since the mid-1980s, the Ethiopian Government has responded to drought and famine through promotion and construction of irrigation infrastructures aimed at increasing agricultural production. These are traditional, small-, medium- and large-scale irrigation schemes performing at different levels. Formally accounted overall irrigation development is estimated at some 5–6% of the potential of 3.7 million hectares. The Ministry of Water Resources estimates that, to meet Ethiopia's cereal requirements by 2015 it would require cultivation of 1.2 million hectares of newly irrigated land. The high cost-high risk combination offered by this type of potentially very profitable investment has so far resulted in underutilization of this important resource. A number of interventions are currently under consideration or have already been launched. These include the construction of several multipurpose dams for irrigation and hydropower, a new program in the Awash and Nile basins to develop more than 100,000 hectares of land, small-scale irrigation schemes in the Highlands, and the Nile Basin Initiative (NBI). The latter is a regional initiative by the Ministry of Water Resources in 1999 including the basin countries (Egypt, Ethiopia and Sudan) to achieve sustainable socioeconomic development through equitable and efficient use of their shared water resources. In addition to these schemes, efforts are

underway to promote in situ and ex-situ water harvesting interventions as a means of coping with the shortage of water for agricultural production. In the past few years alone, about 61,810 hectares of land have been developed by water harvesting schemes in different parts of the country.

In the country, water development for agriculture is a priority, but poorly designed and unplanned irrigation undermines efforts to improve livelihoods and exposes people and the environment to risks. From the viewpoint of the physical performance of schemes, irrigation schemes are constrained by sedimentation of structures due to erosion from unprotected watersheds; flooding of the schemes including their command areas; and shortage of water during peak periods of demand for water, which is attributable to increased dry spells. These are some of the problems faced by many irrigation schemes in Ethiopia. Integration of watershed management with the development of irrigation schemes is becoming compulsory to ensure the reliability of available water, and to maintain and increase operational efficiencies of the schemes. The importance of watershed management and a watershed approach strategy while developing irrigation will be discussed in the presentation. Within irrigated agricultural settings, water management is one part of farm management. Improvements in farm water management must be viewed in the context of overall farm management. In irrigation management, the performance of the technical aspects of farm irrigation systems alone may not bring adequate results of the schemes, and identify the range of constraints that hinder farm water management and efficiencies. An interdisciplinary approach and integration of farming practices are an effective way to sustain and ensure effectiveness of the operations of irrigated agriculture and, where necessary, identify both the strengths and weaknesses in irrigation systems and their operation. More importantly, the country has recently developed a program and framework, namely Ethiopian Strategic Investment Framework for Sustainable Land Management (ESIF-SLM) involving all the partners and stakeholders under the leadership of the government. The framework is aimed at harmonization and alignment of the ongoing and future efforts in Sustainable Land Management investments. The role of this framework and its linkages to irrigation development is another point of discussion.

SMALL-SCALE IRRIGATION DEVELOPMENT INTERVENTIONS UNDER IFAD-SUPPORTED PROJECTS

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² Participatory Small-scale Irrigation Development Project (PASIDP), Ministry of Agriculture and Rural Development, Addis Ababa, Ethiopia

Irrigated agriculture is becoming increasingly important in meeting the demands of food security, employment and poverty reduction. Small-scale irrigation, as commonly defined, comprises an irrigable land area of less than 200 hectares of modern/communal schemes, which, in most cases, is developed and managed by the user groups themselves, who are predominantly smallholders. An exception to this is the spate irrigation, which exceeds the above set limits as being practiced in most regions of Ethiopia.

The International Fund for Agricultural Development (IFAD) has been supporting the construction of many small-scale irrigation schemes under the Special Country Programs, SCP-I and SCP-II, and most of these schemes are currently in operation. However, some of these schemes are not operating with full capacity due to various reasons. Such reasons, among others, include frequent reorganization and rapid staff turnover, limited staff capacity and technical know-how, problems associated with the legal empowerment of water users associations (WUAs) and the lack of community participation in the development process. The key lessons learned from these programs include:

First, SSI development should be underpinned by improved catchment area planning.

Second, acknowledging indigenous knowledge in the development of traditional irrigation structures and organization.

Third, the development of irrigated agriculture should be carried out in conjunction with rehabilitation of degraded lands.

Fourth, there is a need to strengthen linkages between WUAs, rural financial institutions, output markets, and agricultural research and extension services.

Finally, create a conducive environment for knowledge sharing.

In conclusion, Ethiopia has several years' experience with traditional irrigation schemes that have been developed and operated for centuries without any support or interference from outsiders. These traditional schemes have a highly effective organizational structure and the entire community participates in their operation and maintenance. It is important to build on this traditional wisdom in establishing the organizational structure for the irrigation schemes that will be developed in the future. WUAs should take charge of the development process in the same way it has been doing in traditional schemes.

IRRIGATION DEVELOPMENT, WATER MANAGEMENT, CROP DEVELOPMENT AND MARKETING: AN INTEGRATED APPROACH TO SUSTAINABLE AGRICULTURAL DEVELOPMENT, EXPERIENCE FROM THE AGRICULTURE SECTOR SUPPORT PROJECT (ASSP)

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In countries like Ethiopia, where multitudes of its population live in rural areas, agricultural development plays a central role not only in changing rural livelihoods but also in the nation's economic development. However, it is hardly possible for agriculture, which merely depends on rain-fed sustainable agriculture, to play a leading role in achieving this. In addition, smallholders dependent on rain-fed agriculture are vulnerable to food insecurity and poverty, especially in this time of erratic climate change. Hence, it is very important to invest in irrigation development so that the higher productivity irrigated agriculture becomes the main source of agricultural production. Out of a total irrigable potential of about 4,256,457 hectares, only a total of 247,470 hectares have been developed so far under traditional and modern small-, medium- and large-scale irrigation systems. This means that only 5.8% of the existing irrigation potential has been developed at present. In China, it is reported that the 45% of cultivable land that is irrigated, produced 75% of the nation's food in 2002. In the world, even if the irrigated area only accounts for 20% of the arable land, it comprises 40% of all crops produced. Developing irrigation infrastructure is not an end in itself. It requires integration of various supporting activities from planning and execution of the physical scheme to water management, crop production and marketing, in order to realize the potential of the investment.

This paper presents the experiences of the Agriculture Sector Support Project (ASSP) of the Ministry of Agriculture and Rural Development, funded by the African Development Bank (AfDB) and the Government of Ethiopia. The paper discusses integrated approaches used by the project to alleviate poverty and bring sustainable development through integrated irrigation development. After presenting the approaches being implemented by the project, the sustainable development framework to be applied to evaluate the project activities are explained. Finally, selected conclusions and lessons learned in the project implementation process are summarized. In general, besides the physical infrastructure, sustainable irrigation development processes have to incorporate social consensus, planning and implementing the schemes, institutional and physical mechanisms for water management, operation and maintenance cost recovery, technologies for crop development, linking production with markets and introducing post-harvesting technologies. In the entire process, it is important to see whether each activity is socially acceptable, financially viable, economically reasonable, environmentally friendly and equitable.

DISCUSSION

Question 1: Teshome Workie

The Melka Wakena Hydroelectric Power Station was constructed 18 years ago, because of which flow of the Wabi Shebele River was stabilized, creating a favorable condition for development of the Gode Irrigation Project. What is the status of irrigation in Gode?

The main canal in Alwero was destroyed before it was finalized; what is the status now?

Response: Teshome Atinafe

In collaboration between the Public Enterprises Supervisory Authority (PESA) and the Abobo Agriculture Development Enterprise, a bid is tendered for canal development.

Question 2: Tilahun Amede

Most of the planned small-scale irrigation is targeting the crop sector. On the other hand, most of these systems are crop-livestock systems. Is it not important to invest water for the livestock system, particularly in the downstream parts of the sub basins? Issues of water management target crops (instead of livestock). Is livestock not a high-value enterprise?

Response: Seleshi Bekele Awulachew

Crop production is the focus. SSI is also designed by taking into account livestock needs (cattle trough). In the pastoral systems, livestock is important and water resources development needs to take into account the livestock needs.

Response: Dejene Abesha

Focusing on crop has time, technology and ease considerations. Livestock will take a longer time to respond to food security needs. There is a lack of appropriate technologies for livestock now. Crop technologies are simple to implement and financial resources (e.g., credit is not viable for livestock) are available to promote crop technologies. Introduction of fodder crops could be important in the watershed development as an opportunity. Introduction of high-value animals in connection with irrigation development is crucial.

Response: Tessema Legebo

Focus on crop is related to feasibility. However, water-harvesting development also includes livestock water.

Question 3: Tilahun Hordofa

The lack of consistent data on water resources potential and irrigated areas is a problem. Are any efforts being made to solve this issue from the side of the MoWR in this respect?

You indicated that large- and medium-scale irrigation development is meant to ensure food security and increased export revenue. Which projects are targeting food security?

Response: Teshome Atinafe

Lack of consistent data is a major problem. There is no problem in water resources potential, as it is 123 billion cubic meters. Accessing data on irrigated area is problematic, because there is no consensus on what is meant by irrigated agriculture.

Medium- and large-scale schemes are contributing to food security at the national level. Raw material, foreign currency earnings and employment generation are all factors that contribute to national food security.

Question 4: Amare Haileselassie

The emphasis in the water resources management plan is on surface water and groundwater. What about green water?

In looking into upstream and downstream linkages, it was identified that farmers in both upstream and downstream areas were willing to contribute to improved land and water management, although farmers' contributions were not sufficient to cover the investment required.

Response: Markos Feleke

The main source of all waters is rainwater. As far as rainwater harvesting is concerned, it is emphasized in areas where there is a scarcity of rainfall.

Response: Seleshi Bekele Awulachew

The beneficiaries are those having access in the command area while the source of water is the catchment. When you develop the catchment to minimize the externalities upstream communities could be reluctant. Holistic and integrated watershed management and income generation, etc., is needed to take the interest of the upstream into account. Sustainable land management is to be implemented based on watershed management.

Comments: Dejene Abesha

Interventions need to focus on cropland, provide alternative technological options, and holistic and integrated watershed management with a clear definition of priority areas.

Response: Tessema Legebo

Integrated watershed management should focus on the upstream catchment areas not only to minimize downstream effects but to also improve the welfare of upstream farmers, including livestock issues. Community cost recovery issues – the regional government and the community should avail resources from maintenance.

Question 5: Solomon Bekure

One of the strategy gaps mentioned in the presentation is land compensation and relocation. The right to compensation for land expropriated for development purposes is enshrined in the federal and regional constitutions. Proclamation no. 455/2005 lays down the right to compensation for expropriated land. Councils of Ministers' regulation of 2007 lays down the procedures for compensation. So what is the problem?

Response: Markos Feleke

In some large-scale schemes, we are facing problems related to compensation. There are delays due to demands for compensation.

Question 6: Yohannes Geleta

1. The principle of integrated water resources management (IWRM) needs the synergy of other stakeholders. How is this addressed in the water resources management plan? There are water policies, land policies, etc. How are these integrated?
2. Lack of focus by the government on medium- and large-scale systems is understandable due to factors such as cost, impact and sustainability. Please comment.
3. Sustainability requires allocation of water to the ecosystem. That is not addressed in the policy.

Response: Markos Feleke

Indeed water has different uses. Unless all uses are brought into the picture, it will be problematic. All issues are taken into account in project development.

Response: Teshome Atinafe

After 1991, it has become one of the top focuses of the government. Donors (e.g. the World Bank) have also shown growing interest in this. Schemes fail for various reasons. Besides the schemes that have failed, there are also schemes that have been successful in Ethiopia.

Indeed, they are capital and knowledge intensive, but this is the only way to develop our nation.

Question 7: Chuol Biel Ghoan

1. SSI development and implementation is very low in developing regions. Is there a special consideration for such regions?
2. The main problem of the Alwero scheme was lack of participatory planning. In addition, it was done without a proper environmental impact assessment (EIA), which created water shortages to the downstream people. The Abobo Agriculture Development Enterprise is using rain-fed water sources and not irrigation, and is not making an effort to improve irrigation.

Response: Tessema Legebo

There is an awareness problem; only pilot projects are to be supported in Gambella and to be implemented by the regional government. However, the implementation was inadequate. The regional steering committee is expected to take up this issue and identify the gaps. Once pilot projects are implemented, the AfDB could support full-fledged projects in Gambella and other developing regions.

Response: Teshome Atinafe

Planning was a problem when it was implemented early on. Now there are efforts to redress some of the problems and it is in the pipeline for implementation.

Question 8: Teklu Erkossa

1. Among the challenges for irrigation development in Ethiopia is lack of research support. What are the research gaps recognized by the MoWR?
2. Is the data problems you mentioned related to the differences in mandates regarding irrigation: SSI irrigation is under MoARD while medium- and large-scale irrigation schemes are under the MoWR? Are any efforts being made to integrate the database management?
3. Livestock versus watershed management – lessons from Tigray on controlled grazing needs to scale-up?

Response: Teshome Atinafe

No research on irrigation and drainage, no study on hydraulic structures, or empirical models are adapted from elsewhere, etc.

There is no coordination up to this moment. Efforts are underway to compile the database for irrigation by FAO, IWMI, etc.

SESSION IV: WATER-CENTERED GROWTH CORRIDOR

ABSTRACTS

WATER-CENTERED GROWTH CHALLENGES, INNOVATIONS AND INTERVENTIONS IN ETHIOPIA

Seleshi Bekele Awulachew

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Ethiopia's economy and majority of the people's livelihoods are dependent on agriculture. To develop the socio-economy of Ethiopia and eradicate poverty, the policy and interventions should focus on agriculture as an entry point. In line with this, the government, bilateral and multilateral donors, NGOs and various institutions share the concepts and priorities identified in the "Plan for Accelerated and Sustained Development to End Poverty (PASDEP)." There are key challenges that need to be strongly addressed on transforming agriculture by overcoming a multitude of problems including biophysical and water management issues to help achieve the targets of PASDEP and sustainable socioeconomic growth in Ethiopia. This particular paper aimed at addressing the water management challenges that Ethiopia has faced in the past and is facing today, and to stimulate ideas on how to manage water resources to meet the growing needs for agricultural products, to help reduce poverty and food insecurity, and to show how water can be used as an important entry point to transform its socio-economy and contribute to sustainable development and the environment. The issues discussed will focus on innovations, policies and technologies that enable better investment and management decisions in water use, particularly focusing on agriculture and irrigation but also briefly looking into other water-related subsectors such as hydropower, water supply, watershed, drought and flood management as well as other biophysical aspects. It has also been attempted to make the paper suitable for decision-makers rather than scientists, in order to raise useful ideas for dialogue and further discussions, studies and researches. The paper, therefore, does not claim exhaustiveness. The target audiences of this paper are the people who make the investment and management decisions in water and water management for agriculture, and other subsectors - agricultural producers, water managers, investors, policymakers and civil society. The paper has benefited from the review of key policy and strategy documents of Ethiopia, outputs of various outcomes of research, civil society meetings and workshops, data and information available in government institutions, and global knowledge. The key major issues that are discussed in the paper include the following:

- Socioeconomic development challenges of Ethiopia, viewed from a water resources perspective.
- The water resources endowment, development extent, potentials and economic/socioeconomic development linkages.
- Water-related innovations and agriculture.

- Water-related interventions in various agro-ecologies.
- Policy and strategy actions needed.

This paper should also be viewed with other components such as river basin growth pole/corridor concept, institutional reform and research capacity building. It focuses on analyzing key problems and associated interventions, and can be applicable in the contexts of the current situation and the future possible reform under growth zones that can be taken as plausible pathways for development.

CONTEXT REVIEW AND SYNTHESIS OF WATER AS A MAJOR ENTRY POINT FOR AGRICULTURE AND ECONOMIC GROWTH

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This paper provides a brief account of the socioeconomic context focusing on the macroeconomic aspects in relation to the water sector. An argument is created by raising the following questions regarding the place and role of water resources for the national economic development in Ethiopia.

- Do the Ethiopian development policies and strategies give equal place for water as much as they do for land and labor as primary resources?
- How can one bring the third pillar - water (between land and labor) - as a key resource into focus for national economic development?

The underdevelopment of Ethiopia's vast amount of water resources is one of the underlying factors of the socioeconomic challenges that the country faces.

"The challenges facing Ethiopia are daunting: the dynamics of population growth, very low productivity, structural bottlenecks, dependence on unreliable rainfall and being landlocked, combine to pose challenges almost unequalled anywhere in the world. Government efforts to accelerate progress as rapidly as possible, including a big push on education, expanding infrastructure, opening the economy, building institutions and devolving administration, are like those of an athlete running uphill - extra efforts are required just to keep the pace" (PASDEP).

WATER-CENTERED GROWTH CORRIDOR IN THE RURAL SETTING – KEY TO SOCIAL AND ECONOMIC TRANSFORMATION. A CASE STUDY OF NORTHERN ETHIOPIA

Alemayehu Mengiste

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Majority of the Ethiopian population, constituting about 85% of the total population and 90% of the poor, live in the rural setting; where agriculture is the dominant way of life. Out of this population, a significant number of people (85%) are settled in the Highlands of Ethiopia, which is made up of 35% of the total landmass areas, which are mostly humid and wet, and are involved in cultivating crops and rearing livestock in a mixed farming system. The remaining population (15%) is pastoral and cattle herding community that has remained in the Lowlands of the country, which, in most cases, is hot and dry. Here, rearing herds of livestock and moving constantly in search of feed and water for cattle makes it a way of earning a living.

The rural setting, which is responsible for agricultural production (60% of the country's gross domestic product (GDP)), is characterized by frequent drought, less productivity, unbalanced and minimal growth, food insecurity, and multifaceted vicious production and social crises due to poverty. Apparently, agricultural production is highly constrained by the absence of moisture/water, implying that there is a clear economic role for water in any meaningful development.

Due to the backward production system, population pressure, poor infrastructure development, etc., the agriculture sector is yet unable to lay the basis for industrialization, despite the fact that the government has an agricultural development-led industrialization policy. Thus, the forward linkage to industrialization appears to demand a well-thought-out development theory and framework that will link the rural setting of agriculture with the urban setting (industrial, service, trade, etc.) for sustainable and assured socioeconomic development.

Here the challenge is to ascertain the usefulness of the growth corridor as the most viable theory of growth that would bring, among other things, the forward and backward linkages and to articulate the following:

- a) Its inputs/pillars, e.g., natural resource base such as water, minerals, etc.
- b) Process (interventions that make use of resources), irrigation development, urban development, social and economic infrastructure development (health, education, water supply, etc.).
- c) Output/objective, e.g., social and economic development, etc.

Working in the water and irrigation sector for the last 24 years, it has been possible to closely observe that there is a need to contribute to a sound and scientific approach to solve the problems at hand and, therefore, to reorient the development process on a right track to reach at a holistic development rather than the prevailing piecemeal approach of independent, discredited interventions/projects of various magnitudes.

CREATING EXTENSION SERVICE DELIVERY THROUGH PUBLIC-PRIVATE PARTNERSHIPS

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Agricultural extension services have been used and practiced a long time ago in different countries of the world, having different objectives, definition and changing approaches. Initially, it was linked with expanding the research work of the universities beyond the campus. There were more than ten definitions given for extension during the last 50 years. In 2004, it was defined as: Extension is a series of embedded communicative interventions that are meant, among others, to develop and/or induce innovations which supposedly help to resolve (usually multi-actor) problematic issues. Scholars are still giving their working definition for 'extension' based on their local specific knowledge and conditions. According to the World Bank, extension is defined as a "process that helps farmers become aware of improved technologies and adopt them in order to improve their efficiency, income and welfare." The effectiveness of agricultural services depends on a number of factors that include the relationship between extension service activities and changes in the attitude of farmers, the skills to use technologies and improved practices, farmers' access to information and availability of technology, input supply, and other support mechanisms.

Globally, the agricultural extension service delivery has not been free from problems. The major challenges are: problem of coverage, lack of appropriate and relevant technologies, poor policy environment for agriculture and rural development, weak institutional arrangements, inefficient institutional support services such as supply of inputs, credit and agricultural markets, lack of political support and commitment, shortage of funds, etc.

In order to solve the problems, different researchers and experts have worked a lot to bring about applicable and sustainable solutions. In this regard, there are emerging views on extension services that includes no longer a unified service and top-down approach; it is a network of knowledge and information support for the rural population; extension needs to be viewed within a wider rural development agenda (since market, social and environmental production systems need a differentiated set of services); stage of extension's transformation - from innovation to execution; and providing a menu of options for innovation, information and investment. As a result of these views and consensus reached, there are expected policy changes that governments should take under their specific conditions. Governments need to act in defining and implementing

a coherent extension policy for the pluralistic system (a change in role) – pluralistic extension system that includes growth of multiple service providers, reduced public sector responsibilities, requires change in nature of agriculture research and structure of the agricultural sector. The actors involved in establishing a creative partnership in providing the extension services include the government, private sector, civil society, NGOs, etc. In general, the creation of public-private partnerships (PPPs) is the key under any extension policy reform process. The goals of the extension system should encompass transferring knowledge from researchers to farmers; educating and advising farmers on their decision making; enabling farmers to clarify their own goals and possibilities; and stimulating desirable agricultural development.

SESSION V: CURRENT GROWTH CORRIDOR CASE STUDY EXAMPLES

ABSTRACTS

THE TANA BELES GROWTH CORRIDOR: OPPORTUNITIES AND CHALLENGES

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The Government of Ethiopia's "Plan for Accelerated and Sustained Development to End Poverty (PASDEP)" seeks to build on, and broaden, the previous development strategy, which had focused on expanding support to smallholder agriculture, basic education, access to water and sanitation, primary health services, access to roads and electricity and safety nets for the poorest in all parts of the country. PASDEP complements this equity-oriented thrust by focusing public investment and policies to exploit comparative economic growth advantages located in different agro-ecological zones. PASDEP identifies the Tana and Beles zones as the first of five proposed growth zones in the country, and envisions complementary investments in infrastructure, appropriate levels of basic inputs and agricultural technology to increase productivity and facilitate market systems, particularly for high-value crops targeted at local and foreign markets. PASDEP lays a multi-sector, integrated vision as a conceptual foundation for this Plan, leading to the formation of growth zones to accelerate growth.

LAND USE GUIDED GROWTH CORRIDOR DEVELOPMENT APPROACH TO ENSURE SUSTAINABLE DEVELOPMENT. THE CASE OF OROMIA REGIONAL STATE

Taye Alemayehu

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In mid-2006, the Oromia Regional State decided to implement a development corridor approach, which is in line with the Rural Development Strategy and PASDEP, to address its development objectives. Recurrent drought which is challenging the life of more than 1.5 million people of the region, the worsening poverty situation and the need for societal transformation forced the Regional Government to think strategically to address these issues. It is also imperative to bring about a reliable development in the coming few years as a basis for the fulfillment of the country's vision to be among the medium income countries by 2020. It is understandable that with the growth potential, the geographical location and the population it has, the role of Oromia is vital to attain this objective.

The first and foremost activity to test the growth corridor approach was to identify available resources to start with. The lowland parts of Oromia, which are hit by recurrent droughts, marginalized and unaddressed areas of the region, are found to be of good development potential if solutions to some very limiting factors are given. Experiences gained from the encouraging results from the lowlands led to an improved approach to address key problems of the Highlands of Oromia.

A steering committee led by His Excellency the Regional President and constituting active regional bureaus, was established at the initial stage to lead the overall process and aggressively start to bring a concrete strategy advanced for the intended paradigm development concept shift in order to change the existing scenario. It is believed that the so-called 'food insecure' areas can be changed to food surplus areas and even to development centers that relieve the pressure on the dwindling resources of the Highlands. In addition to this intervention in these areas, it is believed to ensure equity and balanced development in the region. Major problems in the Highlands of Oromia, which is linked with population pressure on limited resources, improper utilization, and management of the natural resources and lack of good governance, are taken as main areas of focus.

As a strategic advantage, the concept was first tested and exercised in the southeast economic development zone, and with experiences gained from this development zone the region was further classified into additional economic development zones based on their socioeconomic ties and agroecological settings, thereby bringing the total number of economic development zones to three. Further reclassification of the zones into subzones was also made to facilitate various focused interventions.

The continuous communications made with all stakeholders is creating a huge mobilization of our human resources. Awareness has been created in efficiently using and managing our natural resources, particularly land and water. Impacts of the approach have only started to show in these past few years. There are remarkable and visible changes in people's attitude towards poverty and the life-saving projects have demonstrated the viability of the path towards sustainable economic development.

HIGHLIGHTS OF IRRIGATION AND WATER SUPPLY POTENTIAL DEVELOPMENT INTERVENTIONS IN THE SPECIAL ECONOMIC ZONES OF RAYA-HUMERA PROJECT AREAS, NORTHERN ETHIOPIA

Mulugeta Gezahegn

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As is the case in many parts of Ethiopia, Tigray's main economy is based on agriculture. The food requirement of the region is in a wider gap to production, due to the dependence of farmers in traditional rain-fed agriculture. Moreover, rainfall in the region is not dependable in amount, distribution and uniformity. In order to alleviate the existing problem of food shortage and to reach a level of food self-sufficiency, the Tigray Regional Government has given much emphasis to overall water-centered agricultural development interventions. To this effect the southern zone (Raya Valley) and the western zone plain area (includes Humera and Wolkait plains), which are believed to be potential areas for crop production and livestock development, are considered and delineated as special economic zones of the region. Therefore, the integration of rain-fed and irrigation development could play a major role in economic corridors for food self-sufficiency, security and for an agriculture-led industrial development program.

The Regional Government launching the Raya-Humera special economic zone has a paramount importance to utilize all the available water resource potentials in the economic zones. Therefore, based on the above and other available irrigation development options, the projected water resources development (potential) interventions by the water sector is hoped to be implemented in the near future to improve the lives of the people at both special economic zones and regional level. The major objective of the paper will be, therefore, to give highlights of the major available irrigation water potentials and other water harvesting mechanisms (groundwater, reservoirs, spates, etc.), in respect of their implementation approaches in the coming years to promote agricultural productivity and production in the special economic corridors of the region.

GROWTH POLE CENTERS AND DEVELOPMENT CORRIDORS IN SNNPR

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It is known that starting from the year 1994, the Southern Nations, Nationalities, and People's Region (SNNPR) had started implementation of different development programs. These development programs/interventions had brought significant economic and social changes in the region. Even though encouraging results were achieved in the past, they did not meet the actual development demand of the Regional State/people as a whole.

In order to resolve the above-mentioned problem, serious discussions had been carried out by the Regional Cabinet. The point of discussion mainly focused on how to make maximum utilization of the regional potential and enhance regional as well as national economic growth. After several serious discussions, consensus among members was made on the key existing constraints for development and then solutions were proposed to alleviate those prominent development challenges.

Based on the consensus made by the Regional Cabinet, the direction for implementing activities was stated, complementing the existing national and regional development policies and strategies. The main directions laid down are identifying growth pole centers, areas, zones and corridors. To achieve activities based on the above directions, there was a need to establish the regional steering and technical committees. The steering committee comprised of regional bureau heads (cabinet members), whereas members of the technical committee comprised of experts from the bureaus of Agriculture and Rural Development, Finance and Economic Development, Water Development, Investment Agency, Trade and Industry and Office of the President. After establishing the technical committee, there was a need to provide the tasks and objectives that had to be achieved, and then this was carried out through the steering committee.

SESSION VI: RECENT DEVELOPMENT OF IRRIGATION AND GOVERNMENT POLICY

ABSTRACTS

IRRIGATION DEVELOPMENT IN AMHARA REGION AND THE CHALLENGES ON “IRRIGATION AND WATER FOR SUSTAINABLE DEVELOPMENT”

Muluken Lakachew

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The Amhara National Regional State is known to have a high potential of water and land resources, but people live below the poverty level because these resources are not properly used for food production except in the case where traditional methods are used. Therefore, bringing highly fluctuating water yields as close as possible to a steady state should be one of the major objectives of water resources development. Doing this will allow systematic and steady regional development. An indicative point of the wealth of the region's undeveloped water resources are, first, it is thought that most of the renewable water resources constitute surface water rather than groundwater, although the understanding and quantification of the latter is rather limited. As stated in the MoWR 15-year Water Sector Development Program, the availability of groundwater in Ethiopia in hard rock formations shows great variability from location to location, depending on recharge, degree of fracture, permeability, obstacles to water movement, concentration and nature of chemicals in the water, and depth of groundwater level; the case is true for the region as well. Second, the estimated potential land area available for large- and medium-scale irrigation in the region is about 650,000-700,000 hectares, and for small-scale irrigation it is about 200,000-250,000 hectares (of which less than 10% has been developed). This indicates the magnitude of water and land resources available for development. Based on the potential availability of resources, the overall goal of the National Water Resources Management Policy is to enhance and promote all national efforts towards the efficient, equitable, optimum utilization of the available water resources of the country for significant socioeconomic development on a sustainable basis, of which irrigation development is one.

The extent of regional water use for irrigation is at a rudimentary stage. Modern small-scale irrigation projects constructed by the Government of Ethiopia and NGOs until 2007 are about 197 schemes covering about 16,000 hectares of land area. All these small-scale irrigation projects are using surface water only, i.e., baseflow of streams and harvesting runoff. There is one modern pressurized (drip and sprinkler) irrigation

project, Kobo-Girana Valley, which uses groundwater. The proposal indicates, about the irrigable area, that the potential exists to supply for 3,600 hectares of land; at this time, the installation covers only 250 hectares of land. Irrigation development requires planning, design, construction, and operation and maintenance facilities to control, protect and utilize water efficiently for the economy of the country as well as the well-being of the generation. Institutional instability, less community participation in these processes, poor skills in water management, impacts on the environment, and absence of strong and holistic applicable regulations could be mentioned as important challenges for the region's irrigation development, which is still in its infant stage.

STRATEGIES AND IRRIGATION DEVELOPMENT POTENTIAL AND EXISTING CHALLENGES IN TIGRAY REGIONAL STATE

Zekarias Gebereanenia

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The State of Tigray is located in the northern part of Ethiopia, has an estimated area of 56,000 square kilometers (km²), and has an estimated total population of 4,334,996, of which 3,519,000 (or 81.2%) are estimated to be rural areas dependent on subsistence agriculture, while 816,000 (or 18.8%) are urban areas.

Tigray Regional State is relatively dry, and the distribution and availability of water is erratic in both space and time. Hence, despite abundance in some parts of the Region, it is highly water scarce due to lack of water control infrastructure. The problem of water scarcity in the region is attributed to either low rainfall availability or an uneven distribution of water throughout the crop-growing season or a combination of both. This makes rain-fed agriculture risky or unreliable. Use of untapped sources of water for irrigation is, therefore, mandatory to increase agricultural productivity and provide a sustained or reliable economic base. This is to be realized through the adoption of different water harvesting techniques.

DISCUSSION ON PRESENTATIONS MADE DURING SESSIONS V AND VI

Question 1: Mesfin Shenkent

Large rainwater harvesting systems need detailed evaluation, involving those trained in agriculture, groundwater and irrigation.

I would also like to see the encouragement of groundwater irrigation coupled with groundwater recharge.

- i) Institutional issue – can't retain skilled people in the government sector – we need incentives to keep people in place.
- ii) Issue of transboundary-rivers – have not been an opportunity in the past and have been an enemy. We need to explain to downstream countries that we have benefits for all.

Response: Seleshi Bekele Awulachew

Groundwater irrigation is not sustainable without recharge. It requires proper watershed management.

Institutional brain drain is a concern. In addition, internal migration of people from the public to the private sector is a problem that needs attention. This does not mean that people skills are lost, but the private sector has better skills. Implementation should be carried out mainly by the private sector and the public sector should facilitate this. We need to consider all capital dimensions.

Transboundary rivers need to consider potential, what can be developed and identify our needs before going into negotiations with downstream countries. We have to give priority to investment in basins that do not have any problems (e.g., Omo-Gibe, etc.).

Question 2: Alemayehu Habte

There are different activities in the Tana-Beles including irrigation projects. Overall, 600 million cubic meters (Mm³) of water will be used for irrigation. In addition, there is a diversion to the Beles hydropower activity. There is also the Tis Issat waterfall, a national heritage, but its attractiveness is being destroyed by the Tis Abay Power Station. Is there any overall coordination (e.g., between MoWR and Ethiopia Electric Power Corporation (EEPCo) and Tana Transport Enterprise, etc.) and any integrated study of all aspects?

We also know that some watersheds cross two or more regions. Is there any integrated study in those watersheds?

Response: Abebe Zerihun

Rather than subbasin organization, we must first know what we have, because best institutional arrangements for planning have not yet been identified.

Question 3: Solomon Baraku

I am struck by the contrast of the presentations of the regions. We do have only one growth corridor in the Oromia Region. Other regions have presented several growth corridors.

Response: Alemayehu Habte

Tana-Beles is the only growth corridor defined so far in this region. More may come. Other regions may follow, but it needs to be defined better.

Response: Abebe Zerihun

Tana Beles goes across regions. Hence, it has a national vision. The Federal Government identified Tana-Beles as an important growth corridor.

Question 4: Yitayew Abebe

BCEOM (a consulting company) – worked on the Abbay Master Plan and made detailed studies. For example, many development projects were identified and detailed analyses were conducted including issues of extension and needs for research, etc. Now after 10-12 years, we have growth corridor projects – some updating might be expected, but are we repeating ourselves? How is implementation of the master plan seen? What is the value of these old studies? What is the difference between growth corridors and the master plan?

Response: Alemayehu Habte

The Think Tank Group was working in parallel with the regions – but this wasn't convergent. Much of the homework is not done yet. We cannot resolve issues using a piecemeal approach. We need an integrated/holistic strategy (Marshall Plan). We believe that the growth corridor can do this. It is a logical extension of PASDEP. Growth corridors' synergize past efforts, but do not replace them. So master plan studies can be used as an input for growth corridors. The Oromia growth corridor has looked at very specific entry points – workable in a national framework.

Question 5: Dejene Abesha

An issue for clarity - population is growing very fast. Agriculture is not growing fast enough. Is population growth a threat or an opportunity?

Should the extension approach be bottom-up or top-down? I believe in participation, but is the bottom-up approach really the best approach at all times? Should we think about hybrid models?

Response: Seleshi Bekele Awulachew

Population based on the settlement patterns (highland, etc.) can be a problem, but can also be an opportunity that can be mobilized (e.g., lower river valleys, etc.). We can link resettlement with development.

Response: Belay Demisse

Extension needs to follow both a bottom-up and top-down approach. A purely top-down approach does not work. Participation is needed, though political/strategic direction must come from the top. We must demonstrate what works.

Public-private partnerships (PPPs) - the private sector should be supported so that it can provide the products needed and provide extension (e.g., Wonji has demonstrated successful out-grower schemes). We need to learn from such projects (also international experiences, e.g., South Africa, Ghana, USA, North Africa, etc.). The private sector is an engine of growth, thus the government must create an enabling environment. Public extension must exist, but its role should be reduced with more focus on regulation.

Response: Abebe Zerihun

We need local and national involvement and believe that we have this in Tana-Beles.

Question 6: Andisse Teshome

Ethiopia has been grouped in a number of ways in the past. No shortage of models. We have changed from one to another very frequently. New growth corridors: how long will these last? How long does it take before we move to another model?

Irrigation in pastoral areas: in what context? Pastoralism is under considerable stress at the moment, including nature and human activities. Why irrigation in pastoral areas?

Response: Berhanu Adenew

Rangelands need a lot of improvement to suppress invasive plants, etc. Indigenous mechanisms need to be considered. Water services are needed, but not necessarily for irrigation of crops.

Question 7: Fitsum Hagos

Trade-offs - one observation in the Amhara Region – there are serious trade-offs in terms of water resources. Do we have adequate study on water availability?

Growth corridor with water as an entry-point: But is there a growth corridor based on another entry point. I am very curious. Can't we think of anything else? You tried to show that irrigation is the promising intervention. What about alternatives? You need to quantify the benefits of different typologies. Need to quantify benefits in relation to rain-fed agriculture, etc.

Response: Berhanu Adenew

Irrigation is not the only factor to be considered. The country can exploit all diverse opportunities including rain-fed agriculture.

Response: Belay Demisse

We have a complete study on the water balance of Tana Beles. Hydrology is well understood and outflow is also worked out. Growth corridors with things other than water as an entry point have been considered, for example, tourism. Irrigation is clearly a necessary condition to increase agricultural production, which is a priority.

Response: Getachew Adem (MoFED)

1. Environmental Impact Assessment (EIA) is embedded in the issue of sustainable development. Environmental conservation and maintenance of natural resources has been taken care of.
2. Growth corridors – is a road map for development of the country. I talked about the crosscutting growth corridor that goes into various regions like that of Tana Beles. This needs coordination between the regions maybe by the Federal Government. Coordination among the different sectors like the road, electricity, and the federal and regional governments defining the roles of the public and private sectors are necessary. The growth corridor coordinates all these and provides a road map for implementation.

Response: Samuel Hussein

EIA is included in the document, but for the sake of time saving it was not presented here. Groundwater irrigation is included, but most of the activities are focused on surface water. In order to ensure sustainability of schemes after handover, we are planning scheme management through involvement of professionals and investors. The private

sector is welcome; we are considering their involvement in the study. We are not only providing land and water to the private sector, but also to develop infrastructure based on the cost recovery principle. The drainage problems - we are going to drain and develop only croplands to increase agricultural productivity, but not pasture or rangelands.

Response: Muluken Lakachew

There is no involvement of the private sector in agricultural/irrigation extension services. Extension services are provided only by the government. In the new structure, irrigation is temporarily set as a process, but I do not know what will be next. It was suggested to be an independent body.

Farmers are not willing to maintain the irrigation schemes for two reasons: (1) although they recognize the importance of irrigation and are benefiting, they do not consider themselves as the owners of the schemes, especially 'the modern irrigation schemes'. The main reason for this may be because they are not fully involved in the planning through to construction process. Besides, their contribution during construction in terms of labor or construction was almost none; and (2) the water fee collected during operation is not sufficient to cover the maintenance cost.

Response: Zekarias Gebereanenia

As compared to other regions, there is a shortage of rainfall. We are engaged to explore groundwater potential of the area. We want to use all technologies depending on their use and advantages if we get the opportunity to introduce them. We can use both surface and subsurface schemes, but surface schemes are greater in quantity.

SESSION VII: EXPERIENCE AND IMPACT OF IRRIGATION IN ETHIOPIA

ABSTRACTS

INVENTORY, SUITABILITY ASSESSMENT, AND UPSCALING OF BEST AGRICULTURAL WATER MANAGEMENT PRACTICES

Makonnen Loulseged¹, Seleshi Bekele Awulachew², Gayathree Jayasinghe³, Fitsum Hagos⁴ and Teklu Erkossa⁵

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It is the belief of many analysts that agrarian countries like Ethiopia that depend on rain-fed agriculture are significantly vulnerable to rainfall variability, the risk which tends to aggravate with global climate change. Consequently, it is believed that future increases in food supplies and economic prosperity depend heavily on effective agricultural water management. It is with this in mind that the use of low-cost technologies for rainwater and runoff control, storage, water lifting, conveyance and application have become more widespread in Ethiopia since the recent drought of 2002/2003. A range of technologies are currently used with varying levels of impacts. This paper outlines an inventory, characterization, suitability and upscaling aspects of Agricultural Water Management Technologies (AWMT) in Ethiopia. Particular characteristics of each of the technologies, their suitability for a given environment, and the necessary conditions for their successful adoption and scaling up are identified. Furthermore, a variety of combinations of technologies used for control or storage, lifting, conveyance and application of rainwater are documented.

Suitability of a technology in a particular environment depends on many factors, such as, the nature of technical complexity, the existing institutional and individual capacity to implement, the costs and benefits, etc. Technical considerations include implementation (set up), operation and maintenance, affordability and environmental impact. The results of a ranking exercise of the technical complexity of a given technology are presented. Concerns related to waterborne and water-related diseases due to stagnation, water quality and possibility of mosquito breeding are discussed.

Households in some parts of Ethiopia, who have practiced improved agricultural water management suitable to their local conditions, have managed to diversify their incomes through beekeeping, livestock, intercropping cash crops with food crops and setting up shops, hotels and flour mills in the nearby towns or villages. Therefore, AWMT at smallholder level meet the intended purpose, provided that they are suitable and adaptable to the local circumstances. The question is which of the technologies are suitable to which area under what socioeconomic conditions?

POVERTY IMPACTS OF AGRICULTURAL WATER MANAGEMENT TECHNOLOGIES IN ETHIOPIA

Fitsum Hagos¹, Gayathree Jayasinghe², Seleshi Bekele Awulachew³,
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Farmers in rural Ethiopia live in a climate-related shock-prone environment. The major source of climate shock is the persistent variation in the amount and distribution of rainfall. The dependence on unreliable rainfall increases farmers' vulnerability to shocks while also constraining farmers' decisions to use yield-enhancing modern inputs, exacerbating the vulnerability of households to poverty and food insecurity. As a response, the Government of Ethiopia has embarked on massive investment in low-cost agricultural water management technologies (AWMTs). Despite these huge investments, their impact remains hardly understood.

The main focus of this paper was to explore whether access to selected AWMTs, such as deep and shallow wells, ponds, river diversions and small dams, has led to a significant reduction in poverty and, if they did so, to identify which technologies have higher impacts. The study also calculated the net present value of the selected AWMT, to assess which of the AWMTs are worth investing in given that they have the promise of reducing poverty. In measuring impact we followed different approaches: mean separation tests, propensity score matching and poverty analysis. The study used a unique dataset from a representative sample of 1,517 households from 29 Peasant Associations (*Kebeles*) in four regions of Ethiopia. Findings indicated that the estimated average treatment effect on per capita income was significant and amounted to USD 82. Moreover, there was 22% less poverty incidence among users of AWMTs compared to non-users. The poverty impact of AWMT was also found to differ by technology type. Accordingly, deep wells, river diversions and micro-dams have led to 50, 32 and 25%, respectively, reduction in poverty incidence compared to the reference, i.e., rain-fed systems. Although, the selected AWMTs were found to contribute to poverty reduction, we found that ponds, deep wells and small dams were not attractive from a social cost-benefit analysis perspective, implying that choices need to be made considering their relative financial viability and poverty reduction impacts compared to other available options that could improve rain-fed agriculture. Finally, our study identified the most important determinants of poverty, on the basis of which we made policy recommendations: i) build assets (AWMT, livestock, etc.); ii) human resources development; and iii) improve the functioning of labor markets and access to these (input or output) markets for enhanced impact of AWMT on poverty.

CONVEYANCE AND DRAINAGE SYSTEM IN SPATE IRRIGATION: A CASE OF BORO SPATE IRRIGATION

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The total area of Oromia State of Ethiopia is 36 million hectares, out of which 1.7 million hectares is suggested to be suitable for surface irrigation with 0-8% of slope, while only 0.2 million hectares has been developed. Previously, the irrigation development was mainly focusing on diversion from perennial river flow. However, it is required to promote agricultural development utilizing seasonal wadi floods for supplemental irrigation (called spate irrigation) in regions where rainfall is insufficient for crop production. Currently, many spate irrigation development schemes are underway particularly in the eastern part of the Oromia State where there are limited perennial river flows. The Boro Dodota Spate Irrigation Project is the first case of the modern spate irrigation in the State initiated in 2004 having 5,000 hectares of command area. The current report discusses contexts, constraints and prospects of the project, focusing on the designing and function of the system, in particular.

DISCUSSION

Question 1: Solomon Bekure

- 1.1 To Fitsum Hagos: Although the topic is on socioeconomic impacts, the analysis is only on the economic aspects. What about nutritional status and impacts in improving health and labor productivity?
- 1.2 To NETAFIM (private company supplying irrigation facilities): All I heard is that drip irrigation is good for the plant, soil and the investors. As drip irrigation is capital intensive I would like to see some financial analysis and payback period. Has any financial analysis been done with reference to the Ethiopian situation in terms of investment cost and return?

Question 2: Alemayehu Mengiste

- 2.1 Observation on a paper by IWMI. Both papers from Makonnen Loulseged and Fitsum Hagos were interesting. They described different types of storage and storage-based irrigation systems. I suggest including it in our next forum on dams as they have multiplying effects. There are many dams and to show their multipurpose uses, like fisheries and others.
- 2.2 I wish if you could include the food self-sufficiency. In the Ethiopian context it may have a better relevance.
- 2.3 Poverty has several dimensions. When you talk about poverty, which dimensions are you considering?

Question 3: Lakew Desta

To Makonnen Loulseged and Fitsum Hagos - there was mapping and characterization on the irrigation infrastructure. Before storage there are other needed systems like silt removal. Therefore, such parts should be considered.

To Fitsum Hagos - the economic analysis starts from structure; why not start from the catchments/water shade?

Question 4: Berhanu Adenew

Fitsum Hagos and Deborah Bossio's presentation on socio-economy should be congratulated.

- 4.1 Fitsum Hagos: In your sensitivity analysis, why did you not relate to resources in selecting different technologies?
- 4.2 Poverty analysis: Is the poverty incidence higher than the national figure?

What does it mean with regard to large-scale irrigation systems?

- 4.3 Paper on out-growers: water, land and expertise are mentioned. How do you engage the out-growers? How do the commercial farmers benefit from the out-growers scheme?

Absence of extension service from the government sector has been mentioned. Do you mean it is not possible to utilize with payment/incentive to service providers?

- 4.4 To NETAFIM: Are you providing technical support? What is your program in promoting drip irrigation?

Question 5: Chuol from Gambella

To NETAFIM: It seems that you are comparing drip irrigation to other systems like sprinkler. To what extent are you discouraging that?

Responses:**Makonnen Loulseged**

Suggestion accepted. Given the opportunity of the technologies; first ponds, cisterns, etc., and second shallow wells. When we do have the capacity, dams are also important. Water storage facility: it is considered from watershed/catchments to storage. It is captured in the study.

Fitsum Hagos

Social aspect: We didn't look into the nutrition aspect but to food self-sufficiency and gender dimension. Another dimension is access to AWTM. Whether it is accessible was not reflected in the presentation.

Financial analysis: The analysis has considered crop income, comparison of households which do have access and not. There are other dimensions to be considered in the next analysis.

Poverty measurement: Measurements used are consumption, expenditure, official poverty and adjusted for inflation.

The poverty incidence is high. When looking in a PASDEP document there is no indication on considering inflation.

Taye Alemayehu

The engagement of the out-growers:

- Benefiting the smallholders to secure their land
- Know-how transfer
- Sanitation on the farm (disposing areas, toilets)

Absence of the support: Institutionalized and strategically guided professional support is not in place.

Impact: Code of practices is mentioned, which is an initiative of the association. Most of the farmers are internationally acknowledged farms for international standards. They are also environmentally audited regularly.

Tzahy Faybish

We did not go into financing. The idea is to put one's financing and get better quality and quantity of production and profit.

Work in the private sector. We see products such as fruits and vegetables. We provide support to the installation and maintenance of drip irrigation systems.

We discourage sprinkler irrigation, as it is more or less like flood irrigation, it consumes a lot of water.

GROUP DISCUSSION SUMMARY

One of the most important parts of the Forum was the group discussion section, its plenary presentations and discussions. The group discussions and presentations focused on the following three themes:

Group 1: Recent development of irrigation subsector policy, strategy and investment

Group 2: Water-centered growth corridor, concepts and innovations

Group 3: Experience and impact of irrigation development in Ethiopia

The lead questions for the three groups were the following:

Group 1: POLICY, STRATEGIES AND INVESTMENTS

1. What are the key points summarizing the policy and strategies in Ethiopia in relation to water resources and irrigation development?
2. Identify policy gaps, if any, that constrained irrigation development in Ethiopia.
3. Revisit the existing strategies and identify implementation difficulties and bottlenecks as well as suggest mechanisms to overcome these difficulties.
4. Identify major constraints for private sector participation in irrigation development and roles of the government to encourage investment in irrigation.
5. Research gaps/issues needing further research.
6. Way forward.

Group 2: WATER-CENTERED GROWTH CORRIDOR

1. How do you see the concept of water-centered growth corridor?
2. What opportunities, constraints and challenges will be faced in the implementation of the growth corridor?
3. Is there a gap between the concept of the growth corridor and the current exercise by various bodies?
4. What are the study needs or research gaps/issues needing attention?
5. Way forward.

Group 3: EXPERIENCE AND IMPACT OF IRRIGATION

1. What are the key points summarizing AWMT and irrigation development in reducing poverty, promoting market-oriented production and its contribution to the economy?
2. Suggest measures on how on-farm water management can be improved and how farmers can best benefit from their produce (market).
3. Challenges and viable options for effective service (extension, technology, credit, improved seed) delivery to small-scale irrigation development.
4. Suggest measures for effective implementation of monitoring and evaluation (M&E) system.
5. What are the study needs or research gaps needing attention?
6. Way forward.

Participants were divided into three groups based on the above themes. The groups made extensive discussions and have come up with a list of suggestions and recommendations in the presence of HE the Minister of Water Resources. The summary contents of the discussion results and recommendations of each group are as shown below.

Group 1

The following are major conclusions of the Group 1 discussion:

- SSI is under MoARD; medium- and large-scale irrigation in the MoWR. The current institutional arrangement (extension, market, WUA, etc.) preferably to be put under the Ministry of Agriculture and Rural Development is to be reviewed and come up with an appropriate institutional arrangement from the apex to the grassroot level.
- Coordination, harmonization of federal, regional and local offices in terms of planning/management.
- Irrigation classification is based mainly on an area basis, but technological aspects requiring high capital, dam height, storage capacity, management aspects of the scheme need to be considered.
- Water and land rights enforcement (natural resources belong to the government). As a result, land is an impediment to irrigation development; land redistribution on command area; experience of the Amhara Region could be of benefit.
- Irrigated agriculture mainly focuses on high-value crops but it should also include food crops for food security.
- WUA is currently organized on the basis of cooperative directive, but they should be legally instituted for the purpose of water management.
- Marketing aspect should have special emphasis with regard to infrastructure development, information to farmers and value chain approach.
- Ecohydrology approach needs to be considered.
- Information and database is generally insufficient.
- Integrated approach should be followed in irrigation development, with more attention on social factors.
- With increasing awareness of water use; conflict between upstream and downstream users is increasing, hence clear regulatory framework and implementation may require more attention.
- Lack of capacity to implement the water policy.
- Private sector involvement in the sector should be supported by policy with clear incentive mechanisms in place.
- In view of the potential for groundwater use in agriculture; an accurate assessment of the potential is important.
- Harmonization of other sectoral policy that affect irrigation development such as environmental policy.
- Agricultural/water management-related research needs to be enhanced and, therefore, an independent water research agenda is proposed.
- Agreement on transboundary rivers needs to be expedited in order to implement

bankable projects.

- Cost recovery principle should be implemented in order to enhance ownership of users.
- Foreign investment is constrained in land acquisition, telecommunication and energy provision.

Discussion

Presenter: Makonnen Louseged

It was reported that the group comprised of participants from multidisciplinary and multiple institutions. The presentation focused on policy and strategies that the group thought are necessary for the envisaged development efforts to succeed. Among the issues raised:

- The need for irrigation institution.
- Classification of irrigation should not only focus on the size of command area but also consider the management aspects.
- The importance of a centralized database was appreciated, and it was suggested that information and database should be strengthened, but did not say who should take the responsibility for this.
- The group recommended strengthening of Agricultural Water Management Research, and suggested establishment of an Independent Water Research Group for the country.

Group 2

The concept of growth corridor understanding

- Based on the old basin/river master plans.
- Growth stimulating/poverty and food insecurity alleviation tool (Oromia experience).
- Geographically identified area that links effective natural potential and market area to accelerate growth: value chain approach.
- Catalytic planning and investments.

Characteristics

- It can be transnational/regional/zonal..., not limited to certain areas.
- It should be multifaceted; should be flexible and dynamic.
- It could be used to lift an economically depressed area or enhance a naturally endowed area or with both purposes, however, this has to be articulated initially.
- Growth corridors should be seen as a basic framework, and given a spatial context.
- Different from regional planning (physical planning): Growth corridor is a bit elastic, clear in forward and backward economic linkages in time framework. PASDEP proves that growth corridor is viable direction.
- No concerned regions should be left out.

- The regional growth corridors may/can/will be unique.
- Among other things, the growth corridor is a realigning/streamlining planning and synergetic implementation tool.

Challenges of growth corridor

- Concern for limitation of the growth corridor planning in the major regions.
- Piloting a growth corridor involves implementing the entire growth corridor and is, therefore, costly.
- Limited background knowledge on concept and enabling policies.

The way forward

- Iterative planning process.
- Taking stock of past policies.
- Creating comprehensive background information on the growth corridor concept.
- Knowledge sharing of ALL policies at ALL political and technical levels.
- Integrated interregional activities in growth corridor identification and development.

Discussion

Presenter: Berhanu Adenew

The group discussed the concept and implementation of the growth corridor.

It was suggested that no region in Ethiopia should be left out in the growth corridor approach for development.

Some challenges and limitations of growth corridor planning in the major regions have been discussed.

In the way forward, it was suggested to consider the following:

- Iterative planning process.
- Taking stock of past policies.
- Creating comprehensive background information on the growth corridor concept.
- Knowledge sharing of all policies at all political and technical levels.
- Integrated interregional activities in growth corridor identification and development.

Group 3

Consensus

- Development of irrigation in Ethiopia has a positive impact on the livelihoods of the people and the system.
- How could we increase the beneficial effects of irrigation while minimizing the negative environmental and social effects?

Key recommendations for various clients

Environmental impacts must be equally considered

- Negative impacts (e.g., salinization, water quality, resettlement of people).
- Positive impacts (rehabilitating upper watersheds, collective action, local capacity).
- Weak institutional capacity to monitor and evaluate the positive and negative impacts.
- The potential role of the Environmental Protection Authority (EPA).
- Who should monitor small-scale irrigation systems (regions?), and medium- and large-scale systems - MoWR?

Develop and maintain a reliable database

- Soil quality, fertility, salinity.
- Groundwater recharge.
- Microclimate studies.
- Land use change.
- Baseline data (Site characterization/socioeconomic data).

Improve water use efficiency of crops, farms and systems

- Water pricing? Economic vehicles.
- Access to infrastructures/investment.
- Agronomic efficiency.
- Subbasin planning/coordinated water resources development.

Improved extension services for irrigated agriculture

- The need for particular science/recommendations.
- Economic assessment in choosing enterprises.
- Moving towards private extension? Whether it will attract them? Would farmers be able to pay?
- Strengthening public extension.
- Learn from good practices.
- Need for practical training, communication be a priority.

Research gaps

- Water requirement of crops.
- Profitable enterprises.
- Marketing strategies.
- Improved design of schemes.
- Institutional learning and filtering good practices.
- Strategies to link producers with markets and other services.
- Coordinating actions on the ground, extension and marketing.

Discussion

Presenter: Tilahun Amede

The group was convinced that irrigation has a significant positive impact in Ethiopian agriculture and economic development. Therefore, the discussion focused on how to make irrigation more effective, efficient and sustainable. A strong extension service focusing on irrigation was recommended to be provided through the public extension system. The group agreed that continued monitoring of irrigation projects for their impact on environment should be taken seriously. It was suggested that the MoWR take the responsibility for medium- and large-scale irrigation projects, while regions can monitor small-scale irrigation projects. Similar to group 1, this group also felt the need for a strong centralized database and research support for irrigation projects to attain the desired goal of sustainable agricultural development; and several issues seeking research were suggested.

CLOSING REMARKS

HE Ato Asfaw Dingamo

Minister of Water Resources

Dear participants of the symposium

It is indeed my great pleasure to be here with you today on the occasion of the conclusion of your two days deliberation on an important subject, “Irrigation and Water”. Irrigation and water are indeed very important at a time when our growing population is increasingly food insecure and poverty has become prevalent among our people.

The economy of Ethiopia is significantly agricultural based and is greatly affected by climate variability. During the drought seasons the agricultural GDP is lowered significantly; sometimes up to 40%. Poor environmental management and rapidly rising population are threatening the socioeconomic livelihoods of our people. Watershed degradation has negatively affected water resources infrastructure which has resulted in dams that were built in the past have acted as siltation basins, and as a result power generation and agricultural production have reduced significantly.

Among other factors, capacity building at all levels stands as a key factor to implement water infrastructure and use them sustainably. I also believe that knowledge sharing among practicing professionals, and sharing of national, regional and international experiences can greatly contribute towards expediting our development needs in the water sector. In this regard, this Forum, which brought together practitioners from the government, NGOs, the private sector, international organizations, donors, researchers and farmers, with particular emphasis on the management of irrigation and drainage systems is a timely event and highly appreciated. When we act together we can make a difference!

Ladies and Gentlemen

The Ministry of Water Resources is committed to water infrastructure development and the government investment in irrigation and drainage has significantly increased during the past few years. Accordingly, 487,000 hectares of land are planned to be irrigated during the PASDEP period (2009/2010), in addition to the existing one. Some of these projects are ready for detailed design and construction, and some are already under construction. Of course, there are issues to be addressed and constraints to be overcome if investments in water infrastructure are to achieve viability and sustainability. I am sure during your deliberation you have given due emphasis to some of these issues and provided sound recommendations. At this juncture, I would like to reiterate the commitment of the Ministry of Water Resources to look seriously into your recommendations and work closely with all the stakeholders.

Finally, I would like to thank MoARD, USAID, IWMI, JICA and others who have played a lead role and for taking the initiative that they have taken in support of agricultural water management in Ethiopia. The Ministry of Water Resources would like to reiterate its commitment to collaborate and closely work with all stakeholders who are interested in promoting and developing the water resources of this country. Finally, for those of you who came from outside of Addis, I wish you a safe journey back home. I now declare the Forum closed!

God bless you!

ANNEX: SYMPOSIUM AND EXHIBITION PROGRAM

December 15, 2008 (Monday)

Time	Activity	Reporter
8.30-9:00	Registration	Organizers
SESSION I: Opening Address		
9:00-9:30	Welcome address by organizers Opening remarks – Sileshi Getahun, Chair of SC Opening by Chief Guest – <i>HE Teffera Deribew, Minister, MoARD</i>	Seleshi Bekele Awulachew
SESSION II: Exhibition		
9:30-10:00	Opening of exhibition and visit to exhibition	Organizers
10:00-10:30	Coffee break	
SESSION III: Policy, Strategies and Investments		
10:30-10:45	Policy and strategies of irrigation sector in Ethiopia – <i>Markos Wijore</i>	Alemayehu Mengiste/ Fitsum Hagos
10:45-11:00	Federal large-scale irrigation projects: Opportunities and challenges they faced - <i>Teshome Atinafe</i>	
11:00-11:15	SLM program with focus on irrigation and WSM – <i>Sileshi Getahun</i>	
11:15-11:30	Federal small-scale projects-IFAD-supported - <i>Dejene Abesha</i>	
11:30-11:45	Federal small-scale projects-AfDB-supported - <i>Tessema Legebo</i>	
11:45-12:30	Discussion	
12:30-13:30	Lunch break	
SESSION IV: Water-Centered Growth Corridor		
15:30-15:40	Setting the scene – <i>HE Hailemariam Desalegn</i>	HE Shiferaw Jarso/ Dejene Abesha
15:40-15:55	Water-centered growth challenges, innovations and interventions in Ethiopia - <i>Seleshi Bekele Awulachew</i>	
15:55-16:10	Water as a major entry point for agriculture and economic growth - <i>Berhanu Adenew</i>	
16:10-16:25	Socioeconomic development using growth pole/corridor with interface to river basin system - <i>Alemayehu Mengiste</i>	
16:25-16:40	Creating irrigation extension service delivery, through PPP - <i>Belay Demisse</i>	
16:40-17:30	Discussion	
18:00-20:00	Cocktail	

Time	Activity	Reporter
SESSION V: Current Growth Corridor Case Study Examples		
8:30-8:45	<i>MoFED overall presentation Getachew Adem</i>	Bayou Chane/ Matthew McCartney
8:45-9:00	Tana Beles growth corridor – <i>Michael Abebe/Fekahmed Negash/E. V. Jagannathan</i>	
9:00-9:15	Oromia growth corridor study – <i>Taye Alemayehu</i>	
9:15-9:30	Tigray growth corridor – <i>Mulugeta Gezahegn</i>	
9:30-9:45	SNNPR growth corridor – <i>Aseffa Chekol</i>	
9:45-10:15	Discussion	
10:15–10:35	Coffee break	
December 16, 2008 (Tuesday)		
SESSION VI: Recent Development of Irrigation and Government Policy		
13:30-13:45	Oromia region irrigation development – <i>Samuel Hussein</i>	Sileshi Getahun/ Tilahun Amede
13:45-14:00	Amhara region irrigation development – <i>Muluken Lakachew</i>	
14:00-14:15	Tigray region irrigation development – <i>Zekarias Gebereanenia</i>	
14:15-14:30	SNNPR irrigation development – <i>Mitiku Bediru/Amare Abate</i>	
14:30-15:00	Discussion	
15.00–15.30	Coffee break	
SESSION VII: Experience and Impact of Irrigation in Ethiopia		
10:35-10:50	Inventory of SSI in Ethiopia - <i>Makonnen Loulseged/Seleshi Bekele Awulachew</i>	Yacob Wondimkun/ Mulugeta Gezahegn
11:15-11:30	Socioeconomic impact of SSI – <i>Fitsum Hagos/Makonnen Loulseged/Seleshi Bekele Awulachew/Gayathree Jayasinghe</i>	
11:30-11:45	Performance and impact of irrigation projects in Ethiopia and elsewhere – <i>Deborah Bossio/Seleshi Bekele Awulachew/Fitsum Hagos</i>	
11:45-12:00	Horticulture and floriculture investment and promotion of out-growers concept – <i>Tilaye Bekele/Tsegaye Abebe</i>	
12:00-12:15	Low pressure drip irrigation systems - <i>Itamar Israeli/Tzahy Faybish</i>	
12:15-12:30	Conveyance and drainage system in spate irrigation: A case of Boro Spate Irrigation - JICA Project - <i>Yohannes Geleta</i>	

Time	Activity	Reporter
12:30-13:00	Discussion	
13:00–14:00	Lunch break	
SESSION VIII: Group Discussion		
14:00-15:30	<ul style="list-style-type: none"> • Policy, strategies and investments • Water-centered growth corridor • Experience and impact of irrigation in Ethiopia 	Teshome Atinafe/ Makonnen Loulseged/ Dejene Abesha/ Berhanu Adenew/Deborah Bossio/Teklu Erkossa
15:30–16:00	Coffee break	
SESSION IX: Group Report, Discussion and Recommendations		
16:00-17:00	Group 1 report Group 2 report Group 3 report Facilitated discussion Summary by the Chair	Alemayehu Mengiste/ Teklu Erkossa
SESSION X: Closing		
17:00-17:30	<ul style="list-style-type: none"> • Closing remarks • Closing speech – <i>HE Asfaw Dingamo, Minister, MoWR</i> 	



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