WORKING PAPER 123

Water Resources and Irrigation Development in Ethiopia

Seleshi Bekele Awulachew, Aster Denekew Yilma, Makonnen Loulseged, Willibald Loiskandl, Mekonnen Ayana and Tena Alamirew

International Water Management Institute

FUTURE HARVEST
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Universität für Bodenkultur Wien University of Natural Resources and Applied Life Science, Vienna

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Acronyms and Abbreviations

ADB	African Development Bank
ADF	African Development Fund
AFD	French Agency for Development
BoA	Bureau of Agriculture
Co-SAERAR	Sustainable Agriculture and Environmental Rehabilitation in the Amhara Region
CPB	Cooperative Promotion Bureau
CSA	Central Statistical Agency
EEC	European Economic Commission
ESRDF	Ethiopian Social Rehabilitation and Development Fund
IFAD	International Fund for Agricultural Development
JICA	Japan International Cooperation Agency
LWF	Lutheran World Federation
MoWR	Ministry of Water Resources
MOFED	Ministry of Finance and Economic Development
OIDA	Oromia Irrigation Development Authority
ORDA	Organization for Rehabilitation and Development in Amhara
PASDEP	Plan for Accelerated and Sustained Development to end Poverty
RDCO	Rural Development Coordination Office
SIDA	Southern Irrigation Development Authority
SNNPR	Southern Nations and Nationalities Peoples Republic
UNICEF	United Nations Children's Education Fund
WDI	World Development Indicators
WSDP	Water Sector Development Plan

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IWMI is also grateful to officials of the Ethiopian Ministry of Water Resources and the Ministry of Agriculture and Rural Development for providing information and feedback. A number of officials from regional governments also took a lot of time to provide information and we are grateful to all of them.

With all this input, however, the authors remain responsible for the contents of this report.

Summary

This working paper provides results of a broad assessment of water resources and database of irrigation development and potential in Ethiopia. The country is blessed with ample water resources in central, western and south western parts, while most of North Eastern and Eastern parts of the country are relatively dry. The distribution and availability of water is erratic both in space and time. Hence, despite abundance in some parts the country is highly water-scarce due to lack of water control infrastructure.

Ethiopia's population is now surpassing 80 million and is the second populus country in Africa next to Nigeria. Most of the population in Ethiopia lives in highland area, with 85 percent being rural and dependent on agriculture with a low level of productivity. The population pressure in highland areas led to an expansion of agricultural land to marginal areas. Production growth (which is not equal to the population growth) in the long term mainly comes from extensification of agricultural land and little is done in terms of intensification through improved water control.

Ethiopia has 12 river basins with an annual runoff volume of 122 billion m^3 of water and an estimated 2.6 - 6.5 billion m^3 of ground water potential, which makes an average of 1575 m^3 of physically available water per person per year, a relatively large volume. However, due to lack of water storage infrastructure and large spatial and temporal variations in rainfall, there is not enough water for most farmers to produce more than one crop per year.

Frequent dry spells and droughts exacerbate the incidence of crop failure and hence food insecurity and poverty. Given the amount of water available, even while passing through the semi-arid, arid, and desert areas, it is evident that the promotion of water development technologies, especially irrigation, at both small and large-scales, can provide an opportunity to improve the productivity of land and labor and increase production volumes. To utilize the advantages of irrigation development, Ethiopia is increasingly investing in this sector. However, there is no clear information and database available. The extent of irrigation development, the locations of developed schemes, their performances, their positive and negative roles and impacts towards food security, poverty alleviation, national economy, environment, etc., are not known.

This particular paper responds to the information requirement on database of water resources, its potential, extent of irrigation development, and status. The other components of this study focus on performance and impact aspects. While obtaining data on the potential of development is relatively easy, obtaining data and information on existing development, particularly for traditional and small-scale irrigation is very difficult, and in many cases not available. This paper therefore should not be seen as a complete and exhaustive document but rather as a useful document that can be further updated and completed. Particularly, regional bureaus can utilize this document to update all the existing irrigation schemes and as a database that can feed into regional and federal information systems.

INTRODUCTION

Ethiopia is the second most populous country in Africa (Awulachew et al. 2005). According to the Central Statistical Agency of Ethiopia projection (CSA 2005) from the 1994 census, the total projected population in Ethiopia for 2006 was estimated to be 75,067,000, about 85 percent of which lives in the rural areas depending on subsistence agriculture. The projected population of the country for various regions are outlined in table 1.

Table 1. Population by region as projected in the 1994 Population Census.

No. Region	July 1/2006			2010			2015		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
1 Afar	1,26,3000	126,000	1,389,000	1,392,633	143,750	1,536,384	1,554,994	173,219	1,728,213
2 Amhara	16,925,000	2,195,000	19,120,000	18,221,429	2,439,399	20,660,828	20,345,775	2,939,474	23,285,248
3 Beninshangul	563,000	62,000	6,25,000	610,913	68,245	679,159	682,137	82,235	764,372
4 Gambella	200,000	47,000	247,000	218,183	52,273	270,456	243,620	62,989	306,609
5 Oromiya	23,030,000	3,523,000	26,553,000	24,568,695	3,844,957	28,413,652	27,433,037	4,633,171	32,066,208
6 Somali	3,594,000	735,000	4,329,000	3,912,340	813,133	4,725,473	4,368,460	979,825	5,348,284
7 SNNP	13,625,000	1,277,000	14,902,000	14,408,830	1,391,038	15,799,868	16,088,684	1,676,200	17,764,884
8 Tigray	3,519,000	816,000	4,335,000	3,830,053	903,158	4,733,212	4,276,580	1,088,305	5,364,885
9 Dire Dawa	1,02,000	296,000	398,000	110,962	332,513	443,475	123,898	400,678	524,577
10 Harari	74,000	122,000	196,000	78,546	140,846	219,392	87,703	169,720	257,423
11 Addis Ababa	0	2,973,000	2,973,000	0	3,622,798	3,622,798	0	4,365,468	4,365,468
Total	62,895,000	12,172,000	75,067,000	67,352,585	13,752,111	81,104,696,	75,204,888	16,571,283	91,776,171

Source: CSA Abstract 2005; and Ayenew et al. 2005.

Ethiopia covers a land area of 1.13 million km^2, of which 99.3 percent is a land area and the remaining 0.7 percent is covered with water bodies of lakes (MOWR 2002). It has an arable land area of 10.01 percent and permanent crops covered 0.65 percent while others covered 89.34 percent. According to the World Bank, the per capita income in 2005 was $160 per year. The agricultural sector is the leading sector in the Ethiopian economy, 47.7 percent of the total GDP, as compared to 13.3 percent from industry and 39 percent from services (World Bank 2005).

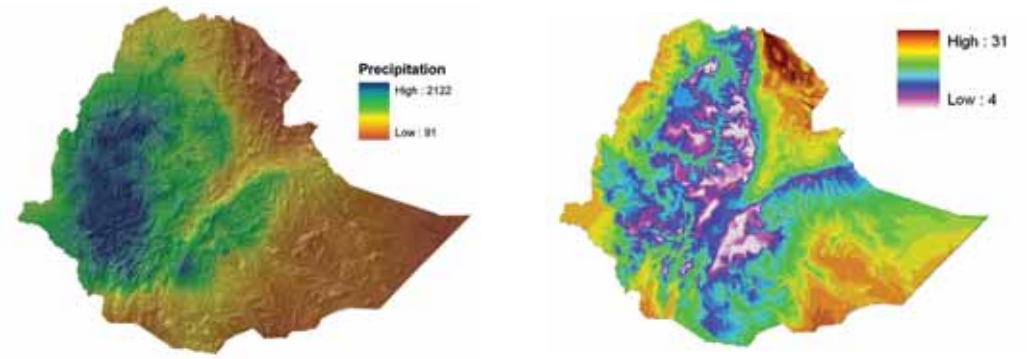
Though agriculture is the dominant sector, most of Ethiopia's cultivated land is under rainfed agriculture. Due to lack of water storage and large spatial and temporal variations in rainfall, there is not enough water for most farmers to produce more than one crop per year and hence there are frequent crop failures due to dry spells and droughts which has resulted in a chronic food shortage currently facing the country.

Ethiopia has an extremely varied topography. The complex geological history that began millions of years ago and continues, accentuates the unevenness of the surface; a highland complex of mountains and bisected plateaux characterizes the landscape. Interspersed with the landscape are higher mountain ranges and cratered cones. According to some estimates about 50 percent of African mountains, about 371,432 km^2 above 2,000 meters, are confined within Ethiopia (FAO 1984). Altitude ranges from 126 meters below sea level in the Dalol Depression on the northern border, to the highest mountain, Ras Dashen in the Semien Mountains north of Lake Tana rising to 4,620 m.a.s.l. The plateau in the northern half of the country is bisected by the Ethiopian Rift Valley, which runs more than 600 km north–northeast of the Kenyan border to the Koka Dam on

the Awash River south of Addis Ababa. The rift then descends to the northeast and its lateral escarpments begin to diverge from each other crossing the Afar Depression towards the Red Sea coast (Ayenew et al. 2005).

Based on Global Precipitation Climatology Centre (GPCC http://gpcc.dwd.de) data, we have derived climatological data. Accordingly, the mean annual rainfall is 812.4 mm, with a minimum of 91 mm and a maximum of 2,122 mm; with a highest rainfall ranging from 1,600–2,122 in the highlands of the western part of the country, and a lowest rainfall from 91-600 mm in the eastern lowlands of the country. The mean annual temperature is 22.2 degrees celcius. The lowest temperature ranges from 4-15 degrees celcius in the highlands, and the highest mean temperature is 31 degree celcuis in the lowlands at the Denakil Depression. Figure 1 shows the annual average

Figure 1. Annual rainfall and temperature distribution in Ethiopia.



precipitation and temperature in Ethiopia (derived from globally gridded monthly precipitation-data sets for the period 1951 to 2000, based on GPCC data).

It is expected that through an optimal development of water resources, in conjunction with development of land and human resources, a sustainable growth of food production can be achieved. Since the mid-1980s, the Ethiopian government has responded to drought and famine through promoting and construction of irrigation infrastructure aimed at increasing agriculture production. These are traditional, small, medium and large-scale irrigation schemes performing at different levels. Irrigation development has positive socio-economic and some negative environmental impacts. Formally accounted overall irrigation development is estimated at some 5 – 6 percent of the developable potential of 3.7 million ha.

The irrigation area in year 2002 was 197,000 hectares with a coverage distribution of 38 percent traditional, 20 percent modern communal, 4 percent modern private and 38 percent public schemes (MoWR 2002). The revised figure puts the total irrigated area at about 250,000 hectares (Awulachew et al. 2005). This number gives a per capita irrigated area of about 30 m^2. This value is very small compared to 450 m^2 globally. The targeted growth expansion (according to the 2001 Water Sector Development Plan), is also not significant and not expected to bring a significant change and the much-needed economic growth. Considering the population growth as per table 1 and the targeted development of the 2002 water sector development strategy, the per capita irrigated area only reaches 45 m^2 per head by the year 2015 and does not move the sector significantly. Therefore, given extreme meteorological and hydrological variability in Ethiopia, it is important that significant attention be

given to enhance better water control, use and management of the water resources for agricultural production through irrigated agriculture. Corollary to this, the revised strategy, according to Plan for Accelerated and Sustained Development to End Poverty (PASDEP) (MOFED 2006), puts the large and medium-scale irrigation growth by year 2010 at an additional 493,000 hectares, which is an improved plan on previous strategy.

The project related to this paper known as "Impact of Irrigation on Poverty and Environment (IIPE)" is sponsored by the Austrian Government to be executed by the International Water Management Institute (IWMI) in collaboration with Austrian and Ethiopian Universities, Research Institutions and relevant ministries in Ethiopia. One of the expected outputs of the project is to establish a comprehensive data and information database on irrigation and drainage sub-sector.

Often the availability of reliable and consistent data and information on surface and ground water is one of the basic requirements for development, use and management of water resource, in order for water managers to make well-informed decisions, as well as for researchers to make proper analysis and arrive at reasonably accurate conclusions.

In Ethiopia, the major problems associated with the generation of reliable data and information on water resources management consists of a lack of consolidated strategy, including institutional linkages, processes of collection, storage, analysis, and dissemination. A clear example of this is the lack of consistent and reliable figures on irrigated agriculture from various sources in Ethiopia.

Recognizing this fact and in an effort to contribute to the knowledge base of the water sector of the country, IWMI (together with other partners) has conducted a survey on existing small, medium and large-scale irrigation developments in Ethiopia and created a database in Geographic Information System (GIS). The creation of this database on irrigation and drainage is the first of its kind in putting together the existing data in an organized manner and make it available for end users.

The database contains spatial data of river basins, river networks and existing irrigation schemes (small, medium and large-scale) in each administrative region of Ethiopia; and the potential that can be realistically irrigated in each river basin. Although the already developed database is a very useful output, it is considered as an evolving working document which will be updated from time to time as additional information and recent developments emerge. The accompanying sections therefore discuss the general water resources information of Ethiopia and specifically discuss the potential and development of irrigation identified by regions and basins as well as aggregate values at national level. As much as possible, the irrigation potential and development are geo-referenced and mapped in GIS environment. The resulting Geospatial Database, maps and Microsoft Access database, which are already shared with regional government bureaus and federal ministries, can provide invaluable and harmonious information systems that can be updated from time to time, as new schemes are put in place.

WATER RESOURCES

Surface Water Resources: River Basins

The country has 12 river basins. The total mean annual flow from all the 12 river basins is estimated to be 122 BMC (MoWR 1999); although Table 2 shows slightly higher values. This could be further refined when data on recent master plan studies becomes available. Figure 2 below shows the map of Ethiopian River Basins.

At present, surface water and meteorological data are collected and processed on a regular basis through existing hydro-meteorological networks.

The idea of a river basin, despite its physical or natural attributes, is more than an engineering concept and encompasses the magnitude and dynamics of a resource that must be harnessed for the common good (Molle 2006). It has often been advocated that the most logical unit for water resources planning and optimum utilization of available water resources is the river basin. Accordingly, it is desirable that all major river basins in Ethiopia have an integrated development master plan study, and their potential in terms of economic development be known. The salient features of the water resources development potential of all the river basins is shown in table 2.

Figure 2. Ethiopian river basins map.

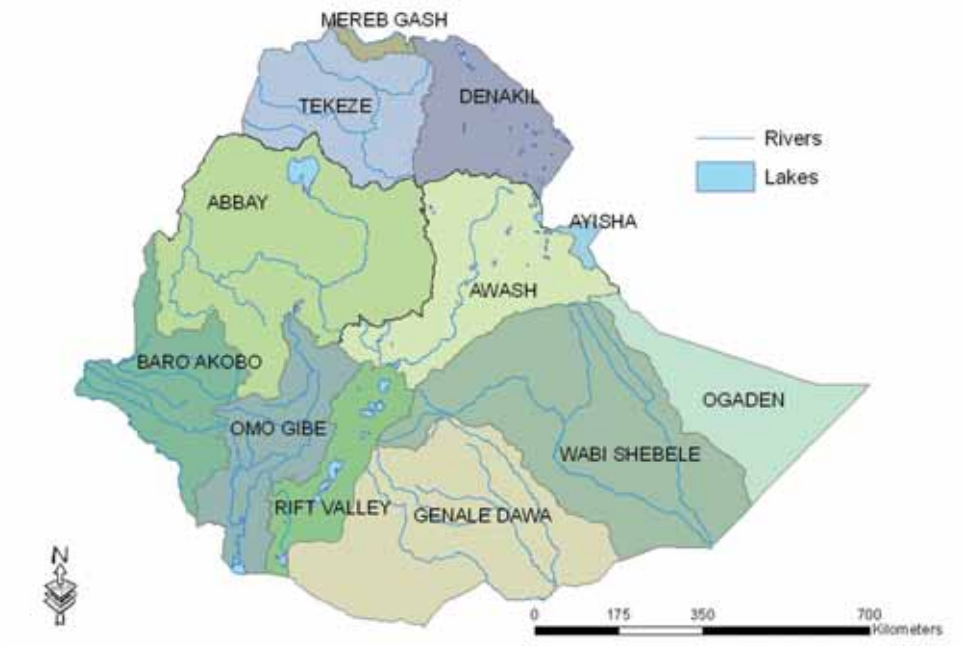


Table 2. Irrigation and hydropower potential of river basins.

River Basin	Area (Km^2)	Runoff (Bm^3)	Potential Irrigable Land (ha)	Gross Hydro-electric potential Gwh/year	Estimated ground water potential (Bm^3)
Tekeze	82,350 ***	8.2	83,368	5,980	0.20
Abbay	199,812	54.8	815,581	78,820	1.80
Baro-Akobo	75,912	23.6	1,019,523	13,765	0.28 0.13Recharge/year
Omo-Ghibe	79,000	16.6	67,928	36,560	0.42 (.10)Rech /yr
Rift Valley	52,739	5.6	139,300 *	800	0.10
Mereb	5,900 ***	0.65	67,560	-	0.05
Afar /Denakil	74,002 ****	0.86	158,776	-	-
Awash	112,696	4.9	134,121	4,470	0.14
Aysha	2,223 ****	-		-	-
Ogaden	77,121 ****	-		-	-
Wabi-Shebelle*	202,697 **	3.16	237,905	5,440	0.07
Genale-Dawa	171,042 **	5.88	1,074,720	9,270	0.14
Total	1,135,494	124.25	3,798,782	155,102	2.86

Source: Integrated River Basin Master Plan Studies, carrried out during 1997-2007 (MoWR 1996, 1997, 1998a, 1998b) Irrigable land from the IWMI irrigation database (based on – MoWR data).

* Figures need to be updated from recent studies.

** Small-scale is not included in the database, medium and large-scale is 49,700 ha.

*** Indicates the Ethiopian part of the basin area. The total basin area is 23, 932 ha.

**** Reconnaissance study

Surface Water Resources: Lakes and Reservoirs

Ethiopia has 11 fresh and 9 saline lakes, 4 crater lakes and over 12 major swamps or wetlands. Majority of the lakes are found in the Rift Valley Basin. Table 3 provides information for 19 main natural lakes and reservoirs (MCE 2001); see also Figure 2. The total surface area of these natural and artificial lakes in Ethiopia is about 7,500 km^2. The majority of Ethiopian lakes are rich in fish. Most of the lakes except Ziway, Tana, Langano, Abbaya and Chamo have no surface water outlets, i.e., they are endhoric. Lakes Shala and Abiyata have high concentrations of chemicals and Abiyata is currently exploited for production of soda ash.

Groundwater Resources System

As compared to surface water resources, Ethiopia has lower ground water potential. However, by many countries' standard the total exploitable groundwater potential is high. Based on the scanty knowledge available on groundwater resources, the potential is estimated to be about 2.6 BMC (Billion Metric Cube) annually rechargeable resource; see also table 2, which provides a little higher value. This figure appears to be extremely underestimated. (Tadesse 2004) estimated that at least 13.2 billion m^3 infiltrates into the groundwater system of which 50 percent could be extractable.

Table 3. Basic hydrological data of lakes and reservoirs of Ethiopia.

Name	Location		Elevation	Drainage	Surface	Maximum
	Longitude	Latitude	(m.a.s.l)	area (km^2)	area (km^2)	depth (m)
Tana	37^{0}23’	11^{0}36’	1,788	15,319	3,000	14
Ziway	38^{0}45’	07^{0}54’	1,636	7,380	440	8.9
Langano	38^{0}31’	07^{0}32’	1,585	2,000	230	47.9
Abiyata	38^{0}35’	07^{0}33	1,580	10,740	180	14.2
Shala	38^{0}35’	07^{0}03’	1,550	2,300	370	266
Awassa	38^{0}27’	07^{0}07’	1,680	1,300	92	22
Abaya[1]	37^{0}50’	06^{0}15’	1,169	16,342	1,140	24.2
Chamo[1]	37^{0}38’	05^{0}50’	1,110	18,575	317	14.2
Chew Bahir	36^{0}56’	04^{0}45’	500	-	308	-
Haik	39^{0}43’	11^{0}21’	1,900	83	22.5	88.2
Ardibo	39^{0}46’	11^{0}14’	2,150	53.5	14.9	64
Ashenge	39^{0}31’	12^{0}34’	2,440	129	20	25
Koka[2]	39^{0}10’	08^{0}28’	1,590	11,250	236	13
Finchaa[2]	37^{0}23’	09^{0}33’	2,219	1,391	345	7
Beseka	39^{0}53’	08^{0}54’	1,900	420	30	7
Turkana	36^{0}05’	04^{0}38’	375	-	-	-
Abhe	41^{0}45’	11^{0}10’	243	-	320	-
Gamari	41^{0}40’	11^{0}30’	339	-	63	-
Afambo	41^{0}43’	11^{0}24’	339	-	26	-

Source: MCE (2001)
Notes: [1] Awulachew (2001)
[2] reservoirs

Overview of Water Usage

Though the country possesses a substantial amount of water resources little has been developed for drinking water supply, hydropower, agriculture and other purposes. The water supply coverage was estimated to be 30.9 percent, thus the rural water supply coverage being 23.1 percent and that of urban being 74.4 percent (UNESCO 2004). PASDEP envisages that the unserved population will be reduced to 15.5 percent by 2009/10 showing more people being served than planned by MDG (Millennium Development Goals) by year 2015. The goal during PASDEP is also to reduce the share of malfunctioning rural systems from 30 percent in 2005/06 to 10 percent by 2010 (MOFED 2006). The great majority of the rural Ethiopian population community water supply relies on groundwater. The safe supply of water in rural areas is usually derived from shallow wells, spring development and deep wells. People who have no access to improved supply usually obtain water from rivers, unprotected springs, hand-dug wells and rainwater harvesting. Despite its immense relevance and importance, the groundwater sector has been given less attention until recently.

In order to utilize the ground water resource properly, understanding of the groundwater occurrence and distribution in space and time, proper management and efficient exploitation is necessary. The available studies on the groundwater resources of the country are very limited, in that, the delineation of aquifer systems, the water balance and determination of the aquifer characteristics has not been conducted. Any sustainable utilization of groundwater resources demands systematic study and raising the technical and manpower capability. In this regard the country has a long way to go, yet.

The conditions of sanitation are even worse in Ethiopia. The sanitation coverage in the capital Addis Ababa, which is believed to have better service, was estimated at 12.5 percent (MoH and World Development Report 1997). The welfare monitoring survey (CSA 1998) pointed out that, out of this, 11 percent of the households have flush toilet, 73.3 percent of the households have pit latrine, 3.1 percent of the households use household containers,10.5 percent of households use open defecation (field and forest) and 2.2 percent of the households use other means. Re-use of treated waste water could provide an additional potential of water for irrigation.

Ethiopia's energy sector, like in many other Sub-Saharan countries, depends highly on biomass despite the immense hydro-power resource of the country. According to Halcrow and MCE (2006), in 2000, 73.2 percent of energy came from woody biomass, 15.5 percent from non-woody biomass (cow dung 8.4 percent, crop residue 6.4 percent, and bio-gas 0.4 percent), petro fuels 10.3 percent and hydropower 1 percent. These are used in households, agriculture, transport, industry, service and others. By end of 2005, over 95 percent of the 1 percent of total energy coming from electricity was generated by hydropower. According to Beyene and Abebe (2006), the Interconnected System (ICS), amounts to 769 MW, coming from 8 hydro, 5 diesel-powered and 1 geo-thermal plants, and the Self-Contained System (SCS) amounts to 23 MW coming from 3 small hydro and several small diesel plants, which brings the total electrical energy generation of 791 MW. The gross hydropower potential of the country is estimated at 650 Terra Watt Hour (TWh)/year. Out of this potential, about 160 TWh/year is believed to be technically and economically exploitable. However, the total installed capacity of the ICS and SCS is 791 MW, which is less than 2 percent of the potential. The existing transmission system voltage in the ICS is 230 KV. According to MoFED 2006, the government having recognized the power shortage and its role in the economic development of the country is developing a number of hydropower projects. In total, generating capacity is to be increased to about 2,218 MW during PASDEP period (2009/10). The achievement of this is well underway from the existing systems which are under construction of large and medium-hydropower construction projects.

Based on the present indicative information sources, the potential irrigable land is about 3.7 million hectares. This figure is believed to be on a lower side, and could change as more reliable data emerge particularly on small-scale irrigation potential. Section "Irrigation Potential in River Basins of Ethiopia", is fully devoted to the irrigation potential of Ethiopia. The area under irrigation development to-date, obtained from different sources is estimated to range between 160,000 - 200,000 hectares. At present some 197,000 hectares of land is under irrigation Solomon 2006. Estimates of the irrigated area presently vary, but range between 150,000 and 250,000 hectares less than five percent of potentially irrigable land (Werfring 2004; Awulachew et al. 2005). In this project, we have developed a database, as a starting point of shared information. Estimates of the irrigated area according to this database (based on the data reported by the MoWR), is 107,265.65 hectares, which is less than 5 percent of the potential. This database does not contain schemes which are under construction, or inoperational/suspended for some reasons. Details of the irrigation development are provided in the section "Irrigation Development in Ethiopia".

The above figures clearly indicate the extent and magnitude of the need for accelerated development and management of the available water resources of the country. Hence, given the rapidly growing population in the foreseeable future, these resources will have to be tapped and harvested in order to attain food security, overcome the effects of climate change and variability, maintain sustainable industrial growth and improve the overall standard of living of the people of Ethiopia.

Constraints of Water Resources Development in Ethiopia are numerous. They fall in one of the general categories of legal, political, social, institutional or technical. These require careful consideration and need to be supported by applied research if the required level of development is to be ensured.

Increasing the role of applied research is one of the means to alleviate the problems encountered in the water sector. Irrigation and drainage research is considered as part and parcel of water resources research. Significant research activities have not yet been undertaken on irrigated crops. This is because, unlike the agricultural and health sectors, institutionalized water research in Ethiopia does not exist, as it is the case in most parts of Africa and underdeveloped countries.

IRRIGATION POTENTIAL IN RIVER BASINS OF ETHIOPIA

Summary of Potential

In Ethiopia, under the prevalent rainfed agricultural production system, the progressive degradation of the natural resource base, especially in highly vulnerable areas of the highlands coupled with climate variability have aggravated the incidence of poverty and food insecurity. Water resources management for agriculture includes both support for sustainable production in rain-fed agriculture and irrigation (Awulachew et al. 2005). Not overlooked should be soil protection and maintaining soil fertility.

Currently, the MoWR (Ministry of Water Resources) has identified 560 irrigation potential sites on the major river basins. The total potential irrigable land in Ethiopia is estimated to be around 3.7 million hectares.

Figure 3. Irrigation potential of the river basins in Ethiopia.

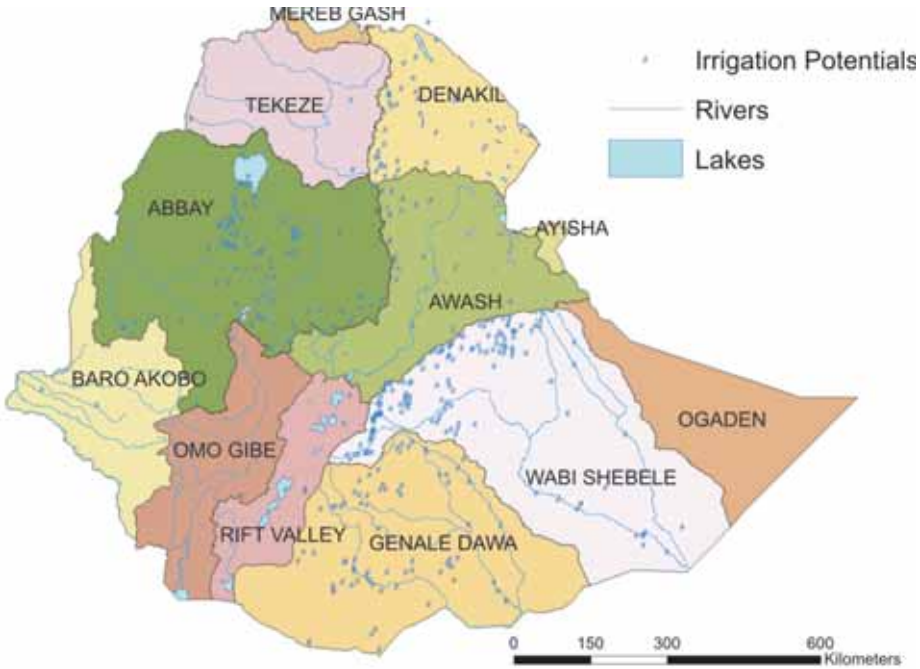


Table 4. Irrigation Potential in the River Basins of Ethiopia.

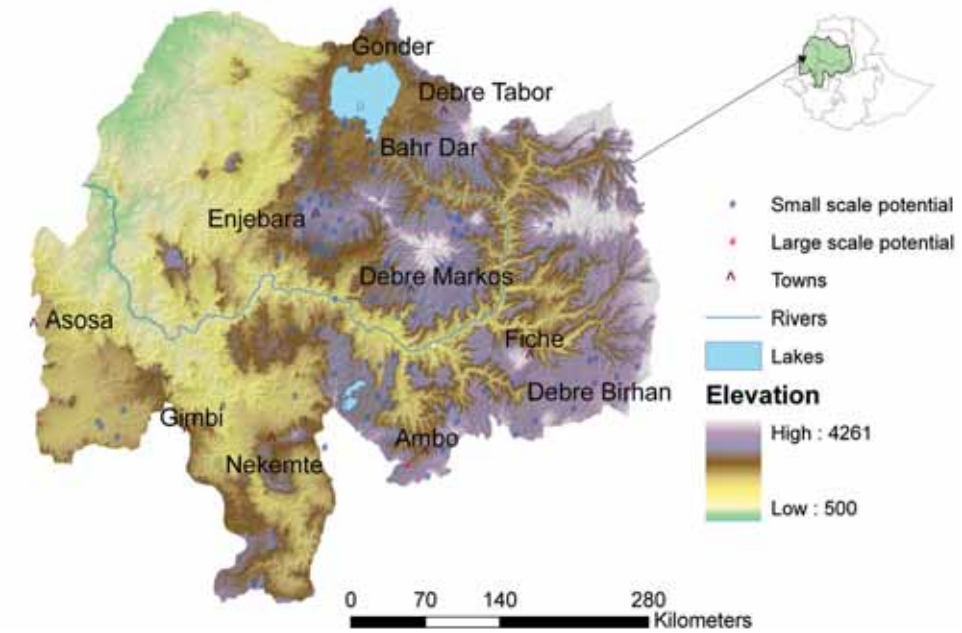
Basin	Catchment Area (Km²)	Irrigation potentials (Ha) (Respective recent master plan studies)				Irrigation Potential (WAPCOS 1995)		
		Small-scale	Medium-scale	Large-scale	Total	Total Drainage Area (km²)	Irrigable Area (Ha)	percent Irrigable Area of the Country
Abbay	198,890.7	45,856	130,395	639,330	815,581	201,346	1,001,000	27
Tekeze	83,475.94	N/A	N/A	83,368	83,368	90,001	3,17,000	8.5
Baro-Akobo	76,203.12	N/A	N/A	1,019,523	1,019,523	74,102	9,85,000	26.5
Omo-Ghibe	79,000	N/A	10,028	57,900	67,928	78,213	4,45,000	12
Rift Valley	52,739	N/A	4000	45,700	139,300	52,739	1,39,000	3.7
Awash	110,439.3	30,556	24,500	79,065	134,121	112,697	2,05,000	5.5
Genale Dawa	172,133	1,805	28,415	1,044,500	1,074,720	117,042	4,23,000	11.4
Wabi Shebele	202,219.5	10,755	55,950	171,200	237,905	102,697	200,000	5.4
Denakil	63,852.97	2,309	45,656	110,811	158,776	74,102	-	-
Ogaden	77,121				-	77,121	-	-
Ayisha (Gulf of Aden)	2,000				-	2,000	-	-
Total	1,118,074.53				3,731,222	982,060	3,715,000	100

Note: The national water resources master plan (WAPCOS 1995) was a desk study without significant field investigation.

Abbay River Basin

Abbay river basin has a catchment area of 199,812 km², covering parts of Amhara, Oromia and Benishangul-Gumuz regional states. It has the major sub-basins of Anger, Beles, Dabus, Debre Markos, Didesa, Dindir/Rahid, Fincha, Guder, Jemma, Lake Tana, Mota, and Muger. The major

Figure 4. Irrigation potential of Abbay River Basin.



river in the basin is the Blue Nile (Abbay) river, which rises in Lake Tana flowing about 1,450 km long, and merges with the White Nile to form the Nile proper. The river basin has a lowest elevation of 500 m. and a highest elevation of 4261 m. The total mean annual flow from the river basin is estimated to be 54.8 BMC.

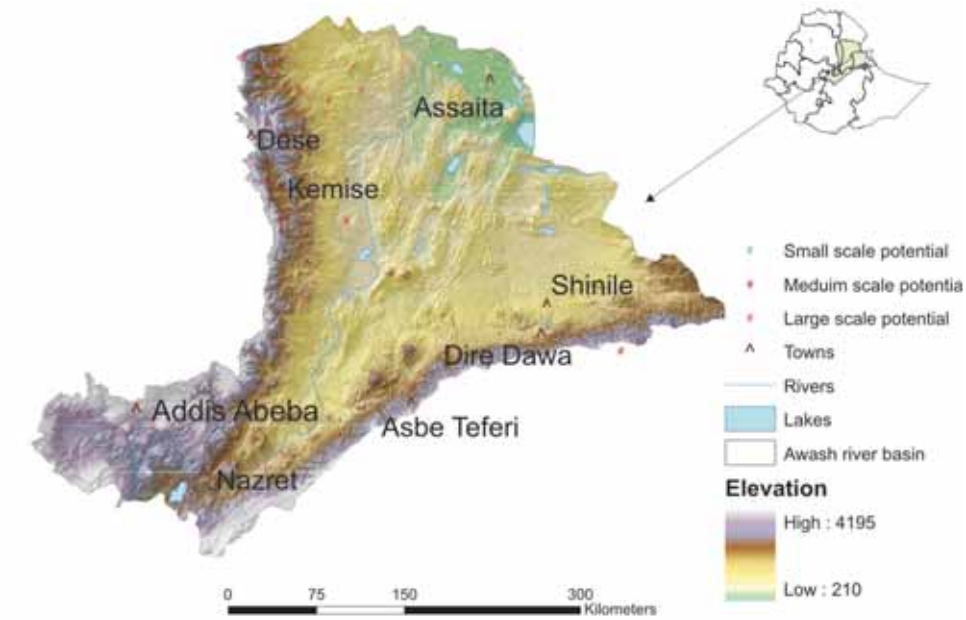
The Abbay river basin is well known as the source of Nile, a land of dramatic gorges and mountains. Abbay is the most important river basin in Ethiopia. It accounts for 20 percent of Ethiopia's land area, for about 50 percent of its total average annual runoff which emanates from the Ethiopian highlands, for 25 percent of its population and for over 40 percent of its agricultural production. The rivers of the Abbay basin contribute on average about 62 percent of Nile at Aswan; together with the contribution of Baro Akobo and Tekeze rivers, Ethiopia accounts for at least 86 percent of the runoff at Aswan.

According to MoWR data, it is identified that the Abbay river basin has a potential of 211 irrigation projects, of which 90 are small-scale, 69 are medium-scale and 52 are large-scale. A total of 815,581 hectares of potential irrigable land is estimated, out of which 45,856 ha are for small-scale, 130,395 hectares for medium-scale and 639,330 hectares for large-scale development (see Appendix, tables A15 - A17).

Awash River Basin

Awash river basin has a catchment area of 112,696 km^2. The Awash River originates from Central West part of Ethiopia, flowing 1200 Km long, and provides a number of benefits to Ethiopia. Relatively, the most utilized river basin and the only river entirely in the country, Awash covers parts of the Amhara, Oromia, Afar, Somali regional states, and Dire Dawa, and Addis Ababa City administrative states of the country. The river basin has a lowest elevation of 210 m and a highest elevation of 4195 m. The total mean annual flow from the river basins is estimated to be 4.9 BMC.

Figure 5. Irrigation potential of Awash River Basin.



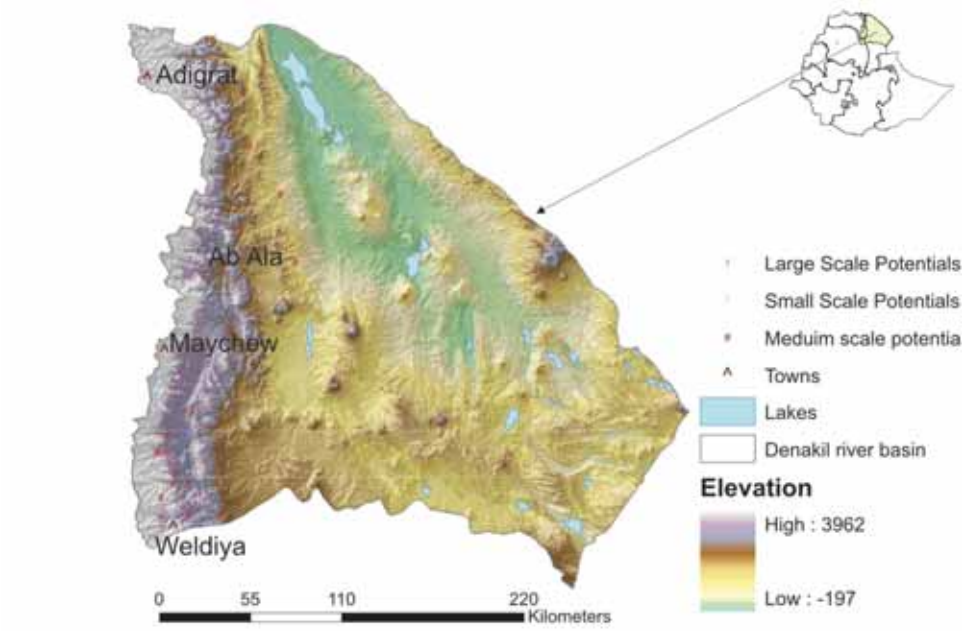
In this river basin 37 irrigation potential sites are identified out of which 5 are small-scale, 18 are medium-scale, and 14 are large-scale. The estimated irrigation potential is 134,121 hectares. Out of these, a potential, 30,556 hectares are for small-scale, 24,500 hectares for medium-scale and 79,065 hectares for large-scale development (see Appendix, tables A18 -A20).

Denakil River Basin

Denakil river basin has an area of 74,002 km^2, which covers Tigray, Amhara and Afar regional states. The basin has no major river draining out of it. The basin has a lowest elevation of -197 m at Denakil depression, the lowest altitude of the country, and a highest elevation of 3,962 m. The total mean annual flow from the river basins is estimated to be 0.86 BMC.

Around 12 small-scale, 33 medium-scale, and 8 large-scale, and a total of 53 irrigation potential sites are identified in the basin. A total of 158,776 hectares of potential irrigable area is also estimated. Out of these, a potential 2,309 hectares are for small-scale, 45,656 hectares for medium-scale and 110,811 hectares for large-scale development (see Appendix, tables A22 - A24).

Figure 6. Irrigation potential of Denakil River Basin.



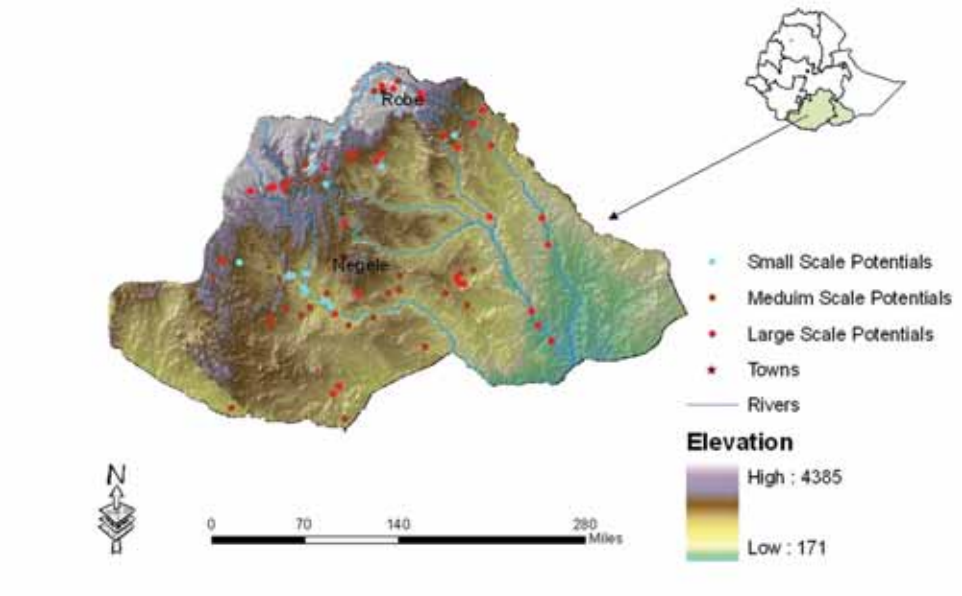
Genale Dawa River Basin

Genale Dawa river basin has an area of 171,042 Km^2, covering parts of Oromia, SSNRP, and Somali regions. It is the third largest river basin, after Wabi Shebelle and Abbay river basins. The river basin has a lowest elevation of 171 m and a highest elevation of 4385 m. The total mean annual flow from the river basins is estimated at about 5.8 BMC. The basin falls mainly in the arid and semi-arid zone and is generally drought-prone with erratic rainfall.

About 85 irrigation potential sites are identified in the basin, out of which, 18 are small-scale, 28 are medium-scale, and 39 are large-scale. The basin has an estimated total potential of 1,074,720 hectares of irrigable area. Out of these, a potential 1805 hectares are for small-scale,

28,415 hectares for medium-scale and 1,044,500 hectares for large-scale development (see Appendix, tables A25 - A27).

Figure 7. Irrigation potential of Genal Dawa River Basin.

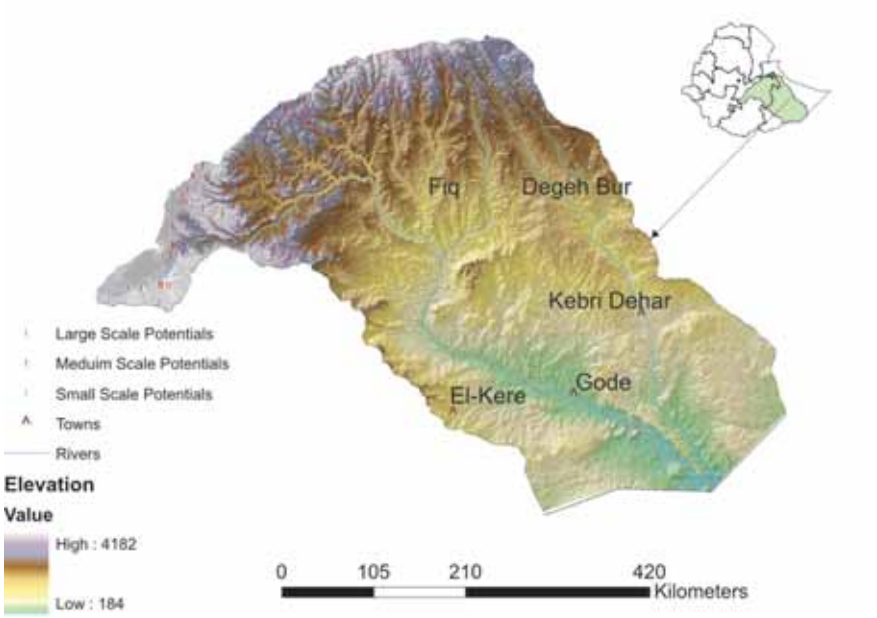


Wabi Shebele River Basin

Wabi Sheble river basin has an area of 202,697 Km^2, covering parts of the regions Oromia, Harari and Somali. This river basin has a lowest elevation of 184 m. and a highest elevation of 4182 m. The total mean annual flow from the river basins is estimated at about 3.16 BMC.

Around 41 small-scale, 77 medium-scale and 31 large-scale and a total of 149 potential irrigation sites are identified in the basin. It has an estimated potential of 237,905 hectares of irrigable area. Out of these, a potential 10,755 hectares are for small-scale, 55,950 hectares for medium-scale and 171,200 hectares for large-scale development (see Appendix, tables A28 - A30).

Figure 8. Irrigation potential of Wabi Shebele River Basin.

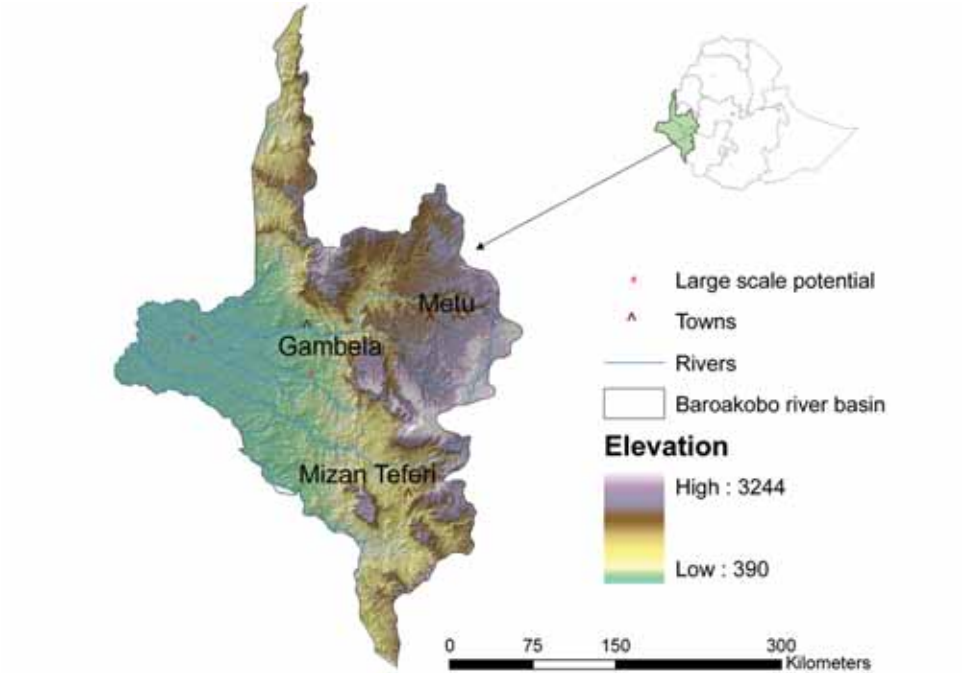


Baro Akobo River Basin

Baro Akobo river basin has an area of 75,912 Km^2, covering parts of the Benishangul-Gumz, Gambella, Oromia, and SNNPR. The basin has a lowest elevation of 390 m. and highest elevation of 3244 m. The total mean annual flow from the river basins is estimated to be 23.6 BMC. Twenty-two large-scale potential irrigation sites are identified in the basin, with an estimated irrigable area of 1,019,523 hectares (see Appendix, table A21).

The Baro-Akobo basin is the second most important basin, next to Genale Dawa, as far as irrigation potential is concerned. The population is settled sparsely in the lowlands of the basin which offers a conducive environment for water resources development. As a consequence of regular flooding, the lowland areas are mainly used as pastures for grazing and no major water resources development has taken place to-date.

Figure 9. Irrigation potential of Baro Akobo River Basin.



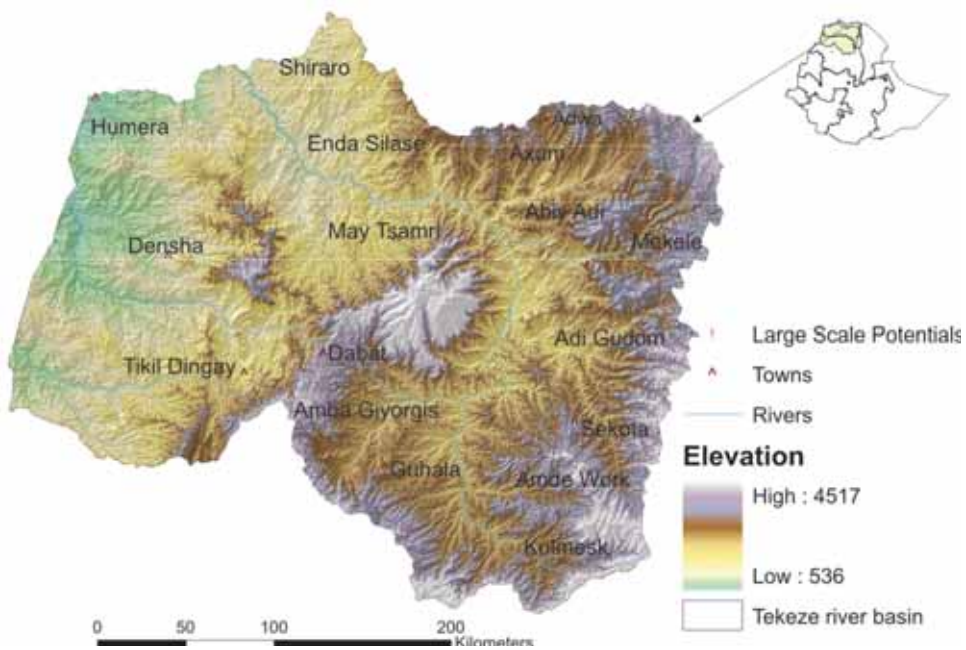
Tekeze River Basin

Tekeze river basin has an area of 82,350 Km^2, covering parts of the Amhara and Tigray regional states. There are two main tributaries (Angereb and Goang) that contribute to Tekeze River which rises in the central highlands of Ethiopia, and joins the Atbarah River, the lower course of which is a tributary of the Nile. The river basin has a lowest elevation of 536 m and a highest elevation of 4517 m. The total mean annual flow from the river basins is estimated to be 8.2 BMC.

The amount of rainfall varies considerably ranging from 1300 mm in the Seimen Mountain to 600 mm in the lowland areas. The ground water resource is not so promising except in a few areas. The quality of surface water is suitable for irrigation.

Tekeze basin has a potential for three large-scale irrigation sites with an estimated potential irrigable area of 83,368 hectares.

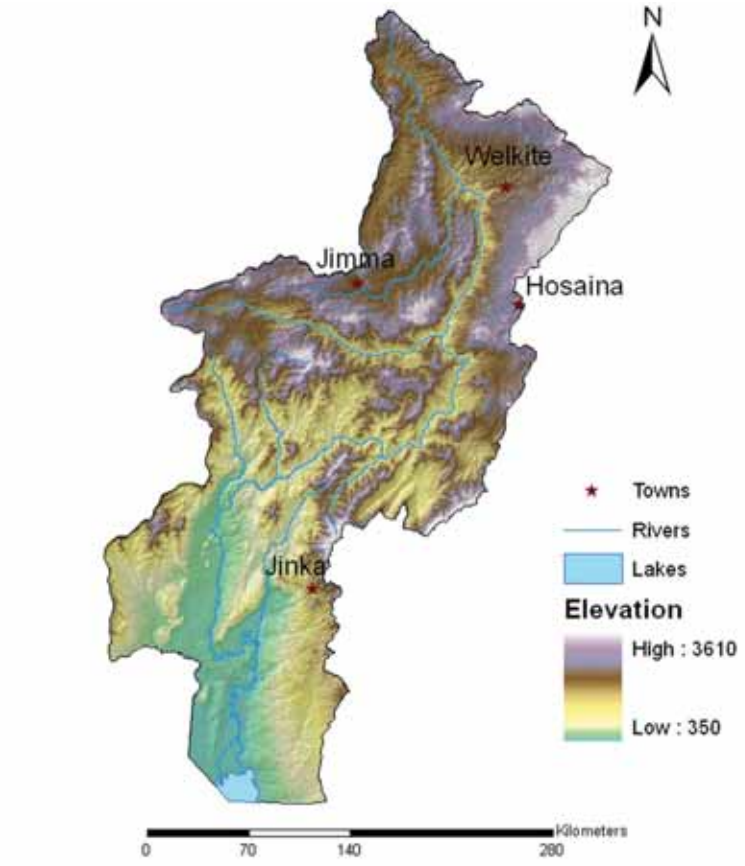
Figure 10. Irrigation potential of Tekeze River Basin.



Omo Ghibe River Basin

The Omo-Ghibe river basin has an area of 79,000 Km^2, covering parts of the SNNPR and Oromia. The total mean annual flow from the river basin is estimated at about 16.6 BMC. Large-scale and

Figure 11. Omo Ghibe River Basin.

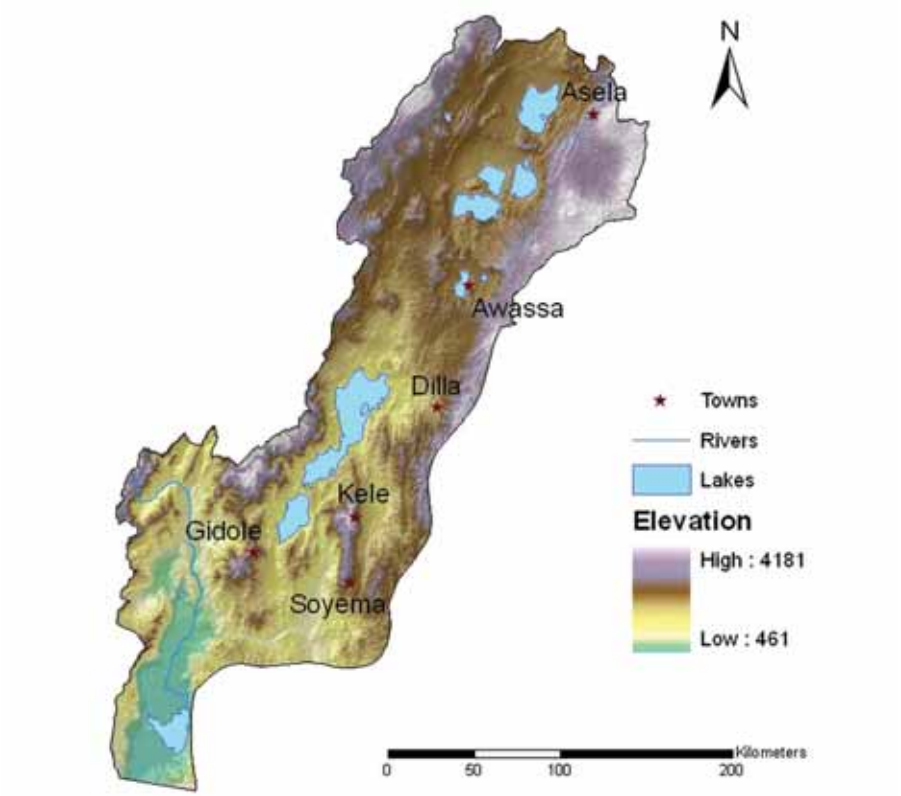


medium-scale irrigation potential are identified in the basin, with an estimated irrigable area of 57,900 and 10,028 hectares respectively, and a total irrigable area of 67,928 hectares (MoWR data). However, this figure could be much higher given the vast land area of lower Omo. In terms of hydropower development potential it is the second largest, and it is a basin in which most of the current hydropower development is taking place. The basin is also endowed with a variety of wildlife; with Omo and Mago parks being located in the basin, its tourism potential will be further exploited as infrastructure develops in the area.

Rift Valley Basin

The Rift Valley basin has an area of 52,739 Km^2, covering parts of the Oromia, SNNPR regions. The total mean annual flow from the river basins is estimated at about 5.6 BMC. Large-scale irrigation potential is estimated at 45,700 hectares with an estimated total irrigable area of 139,300 hectares. The basin is endowed with a number of lakes of varying size with high environmental significance. An integrated development master plan preparation for the basin is currently in progress and more reliable data could emerge in the near future.

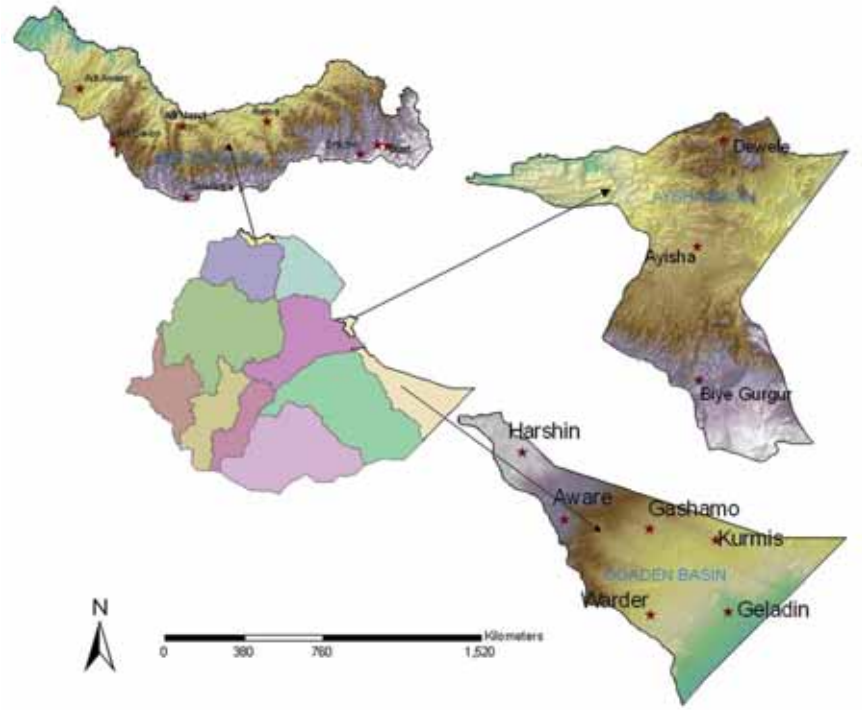
Figure 12. Rift Valley River Basin.



Other River Basins (Mereb, Aysha and Ogaden)

Aysha and Ogaden basins are relatively considered as dry in most cases with seasonal river flows. Their potential in terms of irrigation development is considered not so significant and therefore, not included here. Mereb Basin is small in size, having about 0.65 BMC and about 65,000 hectares irrigable land area.

Figure 13. Mereb, Aysha and Ogaden river basins.



IRRIGATION DEVELOPMENT IN ETHIOPIA

A better policy environment for the agricultural sector exists since March 1990: the liberalization of the economy; the encouragement of private commercial farms; the drastic reduction in public investment in state farms; the restoration of free grain trade; improvement in the role of extension agents, etc. However, the land holding of individual farmers is increasingly becoming fragmented because of the growing population. About six million private farms in Ethiopia register an average size of 0.8 hectares of arable land compared to 1.5 hectares in 1979/80.

Irrigation is one means by which agricultural production can be increased to meet the growing demands in Ethiopia (Awulachew et al. 2005). A study also indicated that one of the best alternatives to consider for reliable and sustainable food security development is expanding irrigation development on various scales, through river diversion, constructing micro dams, water harvesting structures, etc. (Robel 2005).

Irrigation is practiced in Ethiopia since ancient times producing subsistence food crops. However, modern irrigation systems were started in the 1960s with the objective of producing industrial crops in Awash Valley. Private concessionaires who operated farms for growing commercial crops such as cotton, sugarcane and horticultural crops started the first formal irrigation schemes in the late 1950s in the upper and lower Awash Valley. In the 1960s, irrigated agriculture was expanded in all parts of the Awash Valley and in the Lower Rift Valley. The Awash Valley saw the biggest expansion in view of the water regulation afforded by the construction of the Koka dam and reservoir that regulated flows with benefits of flood control, hydropower and assured irrigation water supply. In addition, the construction of the tarmac Addis-Assab road opened the Awash Valley to ready markets in the hinterland as well as for export (MCE 2004). Although, certain aspects of the development during the pre-Derg era have wrong doings in terms of property and land rights, there has been a remarkable emergence of irrigation development and establishment of agro-industrial centers.

Currently, the government is giving more emphasis to the sub-sector by way of enhancing the food security situation in the country. Efforts are being made to involve farmers progressively in various aspects of management of small-scale irrigation systems, starting from planning, implementation and management aspects, particularly, in water distribution and operation and maintenance to improve the performance of irrigated agriculture.

As shown in table 2 and discussed in section “Irrigation Potential in River Basins of Ethiopia”, Ethiopia has a significant irrigation potential identified from both available land and water resources. The country has developed irrigation schemes in many parts of the country at different scales. Data and information are not uniformly available to accurately know the existing irrigation schemes. While it is possible to capture the medium and large schemes data accurately, it is difficult to account for the small-scale irrigation development, particularly, the traditional irrigation development and the privately developed household-based irrigation schemes which use traditional diversions, water harvesting and ground water development.

In the following sub-sections, we report the irrigation development information in the following major categories:

- Existing irrigation schemes for which this document provides a database
- Irrigation schemes under construction or planned to be constructed
- Irrigation schemes which are interrupted and partially operational

Existing Irrigation Schemes with Database

Based on the Ministry of Water Resources (MoWR) classification, irrigation projects in Ethiopia are identified as large-scale irrigation if the size of command area is greater than 3,000 hectares, medium-scale if it falls in the range of 200 to 3,000 hectares and small-scale if it is covering less than 200 hectares (see also Werfring (2004); Awulachew et al. (2005)).

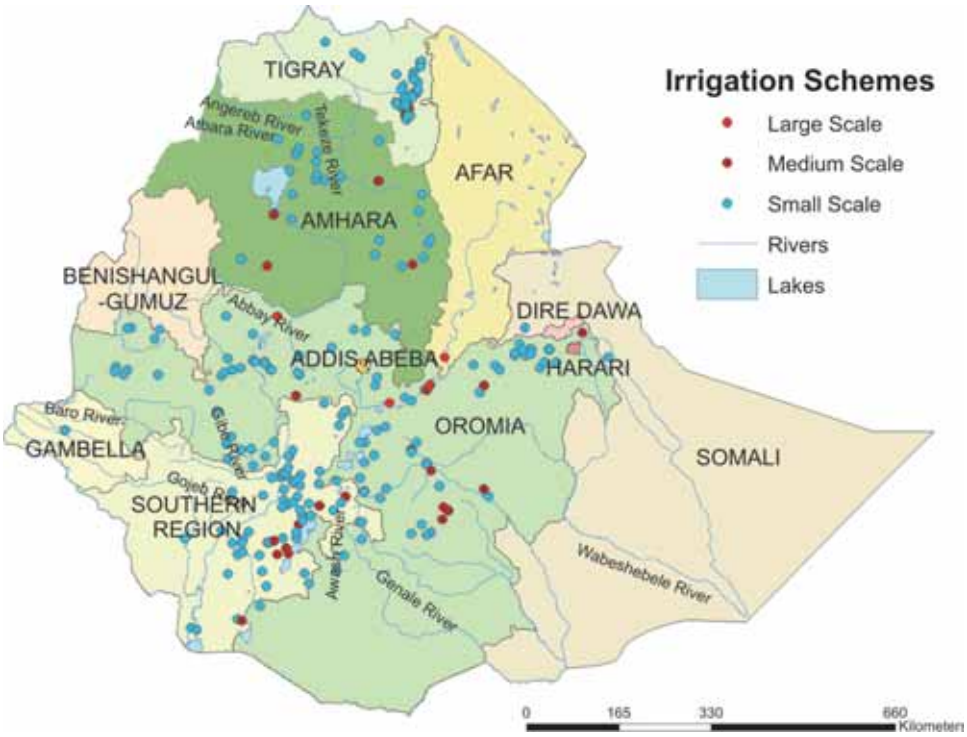
According to the database developed in this study, currently, data on 791 schemes has been collected from different regional states of Ethiopia. According to the database, the total estimated area of irrigated agriculture in the country is 107,265.65 hectares out of which 20,038.39 hectares is from small-scale, 30,291.26 hectares is from medium-scale and 56,936 hectares is from large-scale. The existing irrigation schemes in the regions by type are shown in table 5.

Table 5. Existing irrigation schemes by scale of scheme.

Regional States	No.of Schemes	Planned Irrigable Area	Total Actual Irrigated Area	Actual Irrigated Area			Planned No. of Beneficiaries
				Small-scale	Medium-scale	Large-scale	
Afar	29	56,849	48,311	0	17,713	30,598	2,320
Amhara	310	5,542	8,469.26	5,718.68	2,750.58	0	17,443
Benishangul Gumz	2	186	NA	NA	0	0	744
Dire Dawa	25	283	671	671	0	0	869
Gambella	5	NA	1,315	415	900	0	NA
Hareri	5	240	NA	NA	0	0	NA
Oromia	199	30,760.44	33,765.19	4,627.29	2,800.1	26,338	37,479
SNNPR	107	14,365	7,931.50	4,371.50	3,560.00	0	38,230
Somali	5	2,790	1,332.80	NA	1,332.80	0	3,580
Tigary	103	4,082	4,932.80	3,956.80	976.00	0	6,670
Total	790	115,097.44	107,265.65	20,038.39	30,291.26	56,936	107,335

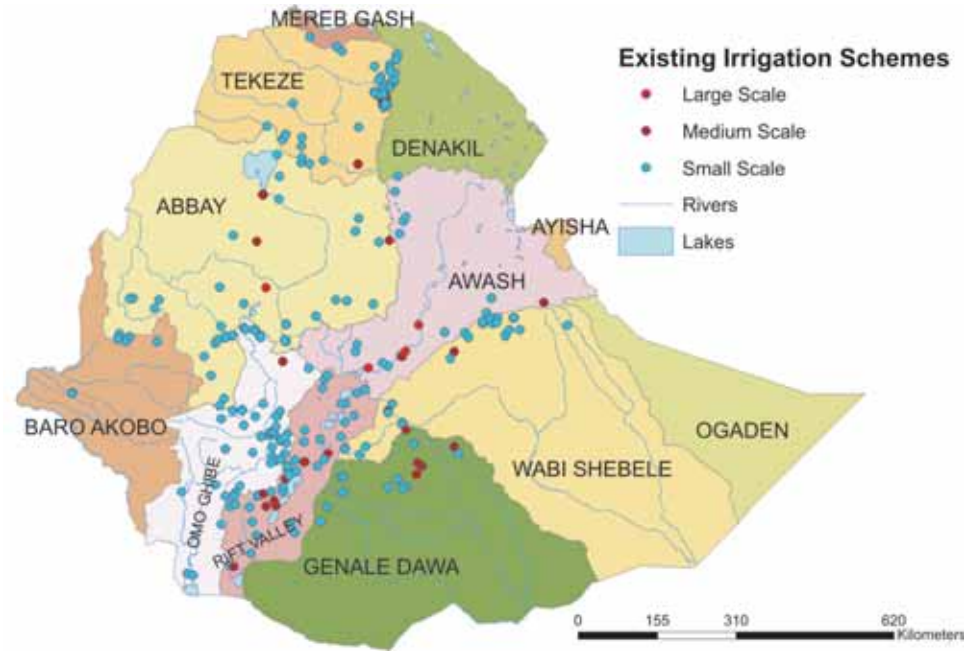
Some irrigation schemes in Amhara, Tigray, Oromia and SNNPR are geo-referenced. These are shown in the map in figure 14.

Figure 14. Existing irrigation schemes distributed in the regional states of Ethiopia.



The existing irrigation schemes, for which geo-referencing data are available, are overlaid on the basin map to show the spatial distribution in the river basins as shown in figure 15.

Figure 15. Existing Irrigation Schemes overlaid on the Basin Map.



Amhara Regional State Irrigation Schemes

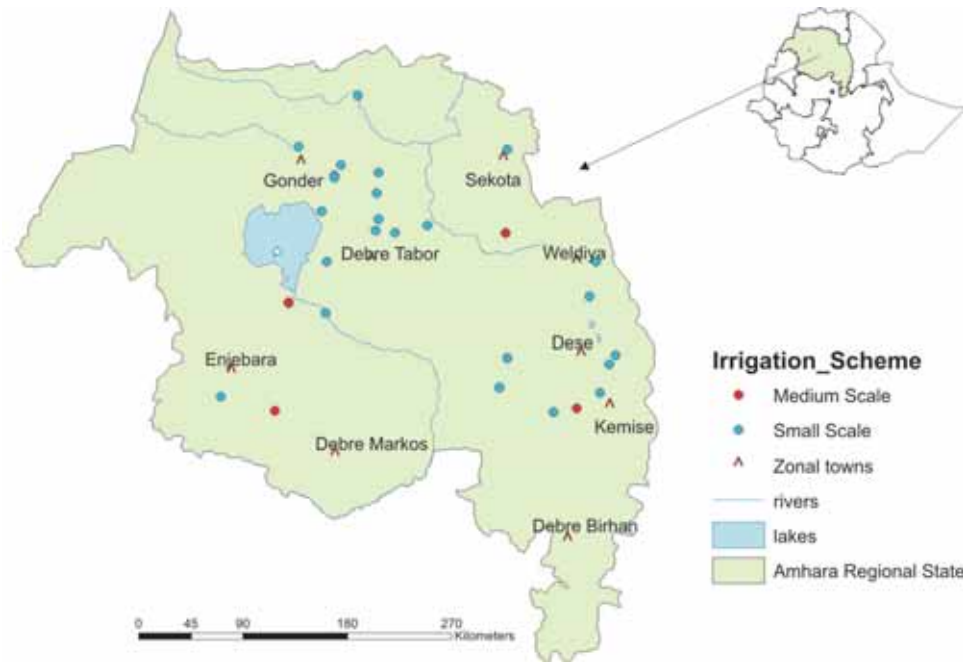
Amhara is one of the 11 regional states of Ethiopia. Amhara region has a geographical area of about 153,000 Km^2. Ethiopia's largest inland body of water, Lake Tana, as well as the Semien Mountains National Park, which includes the highest point in Ethiopia, Ras Dashan are located in Amhara region.

Based on figures from the Central Statistical Agency of Ethiopia (CSA) published in 2005 (CSA 2005), Amhara has an estimated total population of 19,120,000, of which 16,925,000 (88.5 percent of the population) are estimated to be rural inhabitants, while 2,195,000 (11.5 percent) are urban.

The region has enormous potential both in land and water resources. Different development activities have been underway to utilize these resources. Currently, there are 310 irrigation schemes developed in Amhara region. The irrigation schemes developed have covered an irrigated area of 8,469.26 hectares with 17,443 people beneficiaries. Out of these total irrigated area, 5,718.68 hectares is from small-scale and 2,750.58 is from medium-scale irrigation schemes.

The former Sustainable Agriculture and Environmental Rehabilitation in the Amhara Region (Co-SAERAR) and the current Bureau of Water are the government organs that are involved with irrigation developments in Amhara region. Other organizations that have been contributing to irrigation development in the region are Organization for Rehabilitation and Development in Amhara (ORDA), Ethiopian Social Rehabilitation and Development Fund (ESRDF), International Fund for Agricultural Development (IFAD), African Development Fund (ADF), and African Development Bank (AfDB) (Awulachew et al. 2005)

Figure 16. Existing irrigation schemes in Amhara Regional State.



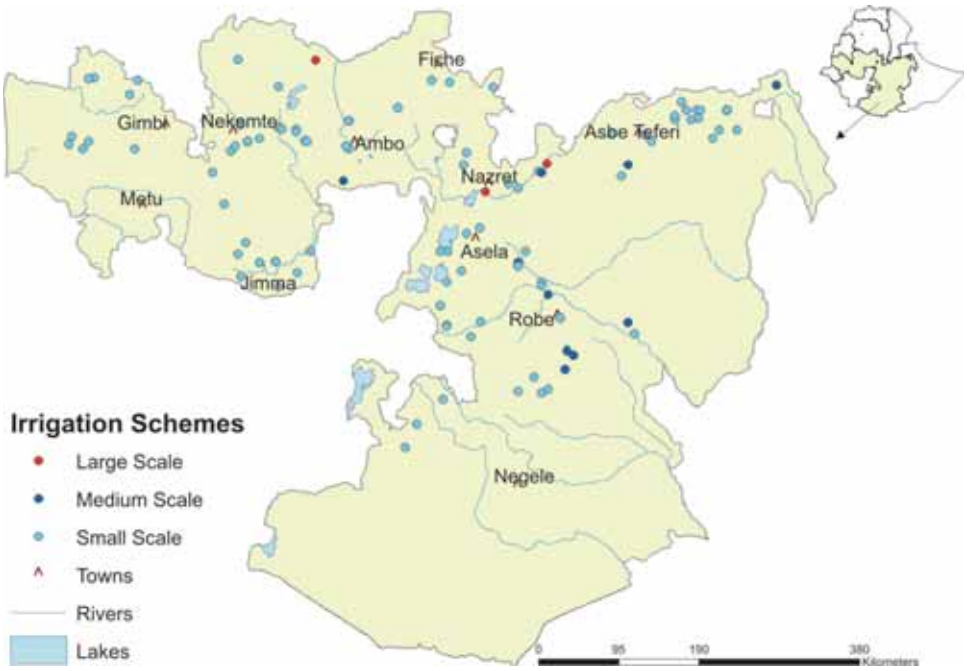
Oromia Region Irrigation Schemes

Oromia is the largest state in terms of both population and land area. It covers a total geographical area of about 355,000 km^2. The region is characterized by immense geographical diversity consisting of high and rugged contoured mountains dissected by the great East African Rift Valley. Oromia has an estimated total population of 26,553,000, of which 23,030,000 (86.7 percent) of the population are estimated to be rural inhabitants, while 3,523,000 (3.3 percent) are urban (CSA 2005).

The Oromia regional state has been involved in irrigation development. Currently, there are 199 irrigation schemes in the region. These irrigation schemes developed in the region, covered 33,765.19 hectares of irrigated area, of which 4,627.29 hectares is from small-scale, 2,800.01 hectares from medium-scale, and 26,338 hectares from large-scale, making 37,479 people beneficiaries.

The government organs currently involved with irrigation development in Oromia region include: Oromia Irrigation Development Authority (OIDA), Bureau of Agriculture (BoA), and Bureau of Water. The NGOs and donors are many but some of them are: African Development Bank (AfDB), French Agency for Development (AFD), ADF, ESRDF, European Economic Commission (EEC), IFAD, Japan International Cooperation Agency (JICA), and Oromo Self-help.

Figure 17. Existing irrigation schemes in Oromia Regional State.



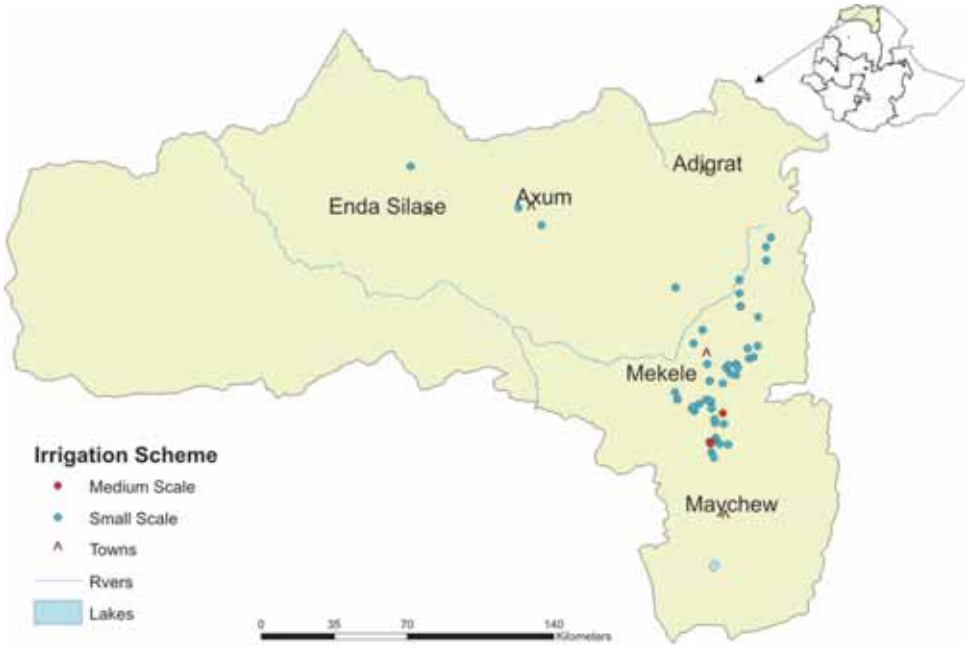
Tigray Region Irrigation Schemes

The state of Tigray has an estimated area of 56,000 km^2. Tigray has an estimated total population of 4,334,996, of which 3,519,000 or 81.2 percent of the population are estimated to be rural inhabitants, while 816,000 or 18.8 percent are urban (CSA 2005).

There are 103 irrigation schemes developed in Tigray regional state. A total of 4,932.8 hectares of irrigated area of which, 3,956.80 hectares are from small-scale, and 976 hectares from medium-scale, with 22,632 beneficiaries reported.

The organizations involved in irrigation development in Tigray region include: Sustainable Agriculture and Environmental Rehabilitation in Tigray (SAERT), Bureau of Water Resources Development and Bureau of Agriculture and Rural Development. The NGOs and donors involved in the development of irrigation schemes in the region are many; some of the major ones are Ethiopian Social Rehabilitation and Development Fund (ESRDF), Relief Society of Tigray (REST), World Vision, Raya Valley, Ethiopian Orthodox Church, ADCS (Adigrat Diocese of Catholic Secretariat) and IFAD (International Fund for Agricultural Development).

Figure 18. Existing irrigation schemes in Tigray Regional State.



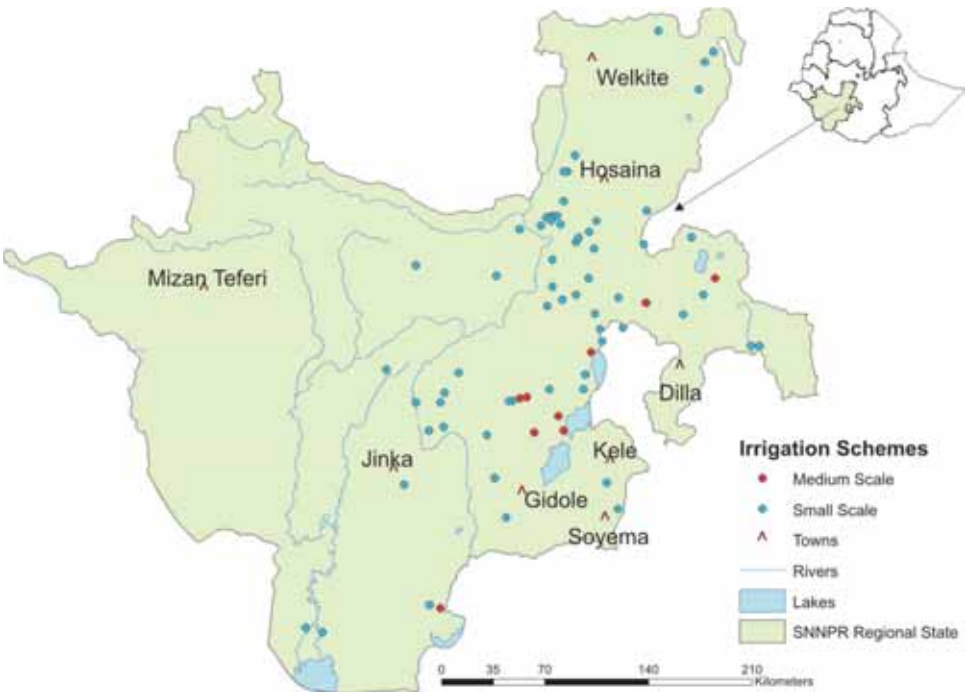
Southern Nations and Nationalities Peoples Republic Irrigation Schemes

The Southern Nations and Nationalities Peoples Region (SNNPR) is a region in the country where numerous nationalities are found. The total geographical area of the region is about 117,000 km^2. The population in the region is estimated to be 14,902,000, of which 13,625,000 or 91.4 percent of the population are rural inhabitants, while 1,277,000 or 8.6 percent are urban (CSA 2005). The larger rural population is dependent on agricultural production. A study shows that, even though the agricultural sector hosts a large population, the food production is by far less than the demand (Robel 2005).

Modern small-scale irrigation has been started recently by the Regional Irrigation Authority, NGOs and other funding agencies, though a few private and government-owned large-scale irrigation schemes had been in the region since long ago. Around 107 irrigation schemes currently exist in the SNNPR Regional State. A total of about 7,931.5 hectares of land has been cultivated by modern irrigation schemes benefiting a total of 38,230 households. Out of these, 4,371 hectares is from small-scale and 3,560 hectares is from medium-scale.

The government organs currently involved with irrigation development in SNNPR region include: Southern Irrigation Development Authority (SIDA), Bureau of Agriculture (BoA), the Cooperative Promotion Bureau (CPB), Bureau of Co-operatives and Rural Development Coordination Office (RDCO). The NGOs and donors are many and some of them include: World Vision, Lutheran World Federation (LWF), ADB, ADF, AFD, Action Aid, Greek Aid, IFAD, Food and Agricultural Organization (FAO), United Nations Children's Fund (UNICEF), the Ethiopian Social Rehabilitation and Development Fund (ESRDF) and the Government.

Figure 19. Existing irrigation schemes in SNNP Regional State.



Irrigation Schemes developed in other regional states

Other regional states have reported the existing irrigation schemes. However, these are not geo-referenced and are not mapped. The Afar Regional State has 29 irrigation schemes, out of which 20 are medium-scale and 9 are large-scale. The region reported a total of 48,311 hectares of irrigated area out of which 17,713 hectares of irrigated area are from medium-scale and 30,598 hectares of irrigated area are from large-scale irrigation development. Dire Dawa administrative state has reported a total of 671 hectares of irrigated area from small-scale irrigation development. Gambella regional state has also reported the development of irrigation schemes with total irrigated area of 1,315 hectares, out of which 415 hectares are from small-scale and 900 hectares, from medium-scale. An estimated total irrigable area of 240 hectares and 186 hectares was reported from Harari and Benishangul-Gumz regional state, respectively.

Example of Selected Irrigation Schemes

Large-scale Irrigation Schemes

The large-scale irrigation schemes consist of 53 percent of the irrigation schemes developed so far. One of the large-scale irrigation schemes is Metahara Abadiy which is located in East Shoa, in Oromia Regional State. This irrigation scheme covers an estimated irrigated area of 8,960 hectares. The area is shown in figure 20.

Figure 20. Metahara Abadiy Large-scale Irrigation Scheme.

Source: Image taken from Google Earth.

Despite the impressive performance of Metahara irrigation scheme in terms of productivity and employment opportunities, the clear contrast created compared to prevailing arid and hostile environment and the excess water lost from the irrigation, is believed to be the cause for the ever-growing Lake Beseka. This, in the future, threatens sustainability of the scheme and the future of Metahara town.

Another large-scale irrigation scheme is Finchaa. Finchaa Irrigation Farm is a mechanized farm located in Eastern Wellega Zone in Oromia Regional State; North-west of Addis Ababa. This scheme

covers an area of 8,060 hectares of irrigated area. This farm mainly produces sugar cane, which is a raw material in the Finchaa Sugar Factory.

A study (Dereje 2005) revealed that the area has the potential of producing other horticultural products and a possibility of cultivating oil seeds on large-scale, in addition to the cane plantation supplied to Finchaa Sugar Factory.

Wonji is also one of the large-scale irrigation schemes with an estimated irrigated area of 5,925 hectares. Figure 21 below shows the Wonji irrigation scheme.

Figure 21. Wonji Irrigation Scheme.

Small-scale Irrigation Schemes

Small-scale irrigation schemes consist of 19 percent of the total irrigation schemes developed in the country. Two of the small irrigation schemes developed and shown in figures 22 and 23 are the Belbela Wedecha Reservoir and the associated Godino irrigation scheme. Belbela Wedecha is located in Oromia Regional State and covers an estimated irrigated area of over 1,300 hectares including Godino.

Figure 22. Belbela Wedecha Reservoir provides improved water management for agriculture and nature.

The Hare small-scale irrigation scheme is located in Southern Nations and Nationalities Regional State and also covers about 800 hectares. Both Belbela and Wedicha schemes fall in the medium-scale in terms of command area but they are both operated by smallholders having small plots of area.

Figure 23. Smallholder irrigation in Godino, Oromia.

Figure 24. Smallholder irrigation in Hare, SNNPR.

As discussed in the previous sections, irrigation development in Ethiopia is categorized by various categories such as by irrigation typologies, performance, regions and ownership. The data and information contained in this document are dependent on the various organizations providing such information. Although efforts have been made to organize the information system as comprehensively as possible, we feel that the irrigation schemes provided in this document underestimate the overall developed irrigation schemes in the country, particularly, as it does not include small-scale traditional irrigation and water harvesting schemes. Therefore, regions are very much encouraged to take this base document and update their database and information system. Particularly, the section "Irrigation Database" provides a geo-referenced database that can be extended and further developed.

Planned Irrigation Schemes

The major source of growth for Ethiopia is still conceived to be the agriculture sector, as it is expected to be insulated from drought shocks through enhanced utilization of the water resource potential of the country, (through development of small-scale irrigation, water harvesting, and on-farm diversification) coupled with strengthened linkages between agriculture and industry (agro-industry), thereby creating a demand for agricultural output (MoFED 2006).

Irrigation development including large and medium-scale irrigation development in the form of public schemes, commercial farming etc. are getting importance under the current government, particularly, since 2004.

According to MoFED (2006) with respect to irrigation development, within the program period of PASDEP 2004/2005 to 2009/2010, pre-design studies will be carried out for 17,988 hectares; full-fledged design studies will be undertaken on 464,051 hectares, and construction work will be completed for 430,061 hectares.

In line with the above, table 6 provides the ongoing projects under the Ministry of Water Resources according to Solomon (2006). This shows that there are plans of ongoing activities that lead to development, according to PASDEP. The figures in Table 6 are plans to be implemented

for the irrigation development program period ending 2016. The table does not include additional development projects underway by regional governments, NGOs and private sector.

Table 6. List of on-going irrigation projects.

Name of the project	Irrigable area (ha)	Type of work	Status	Detail description
Kessem Tendaho	90,000	C	Under construction	
Koga irrigation and watershed	6,200	C	Under construction	
World Bank financed irrigation	177,998	IS	Under study	Megech = 31,821 ha, Ribb = 1,99,925 ha, Anger = 26,563 ha, Negesso = 2300 ha, Upper Beles = 53,700 ha, and Angereb = 23,000 ha
Awash river flood and watershed mgt	-	FS	Under study	
IFAD SCP-II/AFD	3,340	SC	Under study and construction	IFAD/French Govt. financed
Gumera Irrigation	23,000	FSD	Under study	
Lake Tana shore irrigation	37,000	FSD	Expecting financial and technical proposal from WWDSE	Gilgel Abbay, North-west South-west, North-east
Arjo Dedessa	14,280	FS	Under study	
Humera	42,965	FS	Under study	
Errer & Gololcha	11,920	FS	Expecting financial and technical proposal from WWDSE	
IIo-uen & Bulddoho	32,000	FS	Under signing of the contract agreement with WWDSE	
Lake Abbay basin irrigation	21,900	FS	Under contract negotiation	(Gelana, Gidabo and Bilate)
Raya valley pressurized irrigation	18,000	FSD	Expecting financial and technical proposal from WWDSE	
Kobo-Girana pressurized irrigation	17,000	FSD	Preparation of RFP has been finalized. Discussion with regional government has been started to decide upon the continuation of the project	
Ziway irrigation	15,000	FSD	Expecting financial and technical proposal from WWDSE	
Total	510,603			

Note: C = Construction; IS = Identification study; FS = Feasibility study; SC = Study and construction; FSD = Feasibility study and detailed design.

Interrupted and Partially Operational Schemes

Interrupted Large and Medium-scale Schemes

A number of medium and large irrigation schemes, with a total area of 44,050 hectares, that were under construction during the previous government, were suspended by the present one. The underlying reason seems to be a policy of market economy precluding government involvement in such economic activities. However, the wisdom of the decision, to abandon of development schemes on which hundreds of millions have been invested, remains to be questionable. It would have been wiser to finalize the schemes and settle smallholders of the area and encourage private operators to takeover under an attractive/ acceptable arrangement. On the contrary, private initiatives to takeover and finish some of the schemes - Meki-Zeway, Belbela and Wedecha, Alwero – either, have not been accepted or have failed of their own accord. Some of the schemes have been turned over to party-affiliated companies with limited success. These projects represent priority schemes for rehabilitation and completion (MCE 2004). Table 7 shows the details of these schemes, according to MCE (2004) quoting Water Sector Review.

Table 7. Suspended large and medium-scale irrigation schemes.

Project	Area (ha)	Completed Works
Gode Implemented.	8,000	Dam (Melka Wakena) and Diversion weir 19,4600 ha designed; 1000 ha.
Alwero	10,000	Dam and Mead works; 1000 ha designed.
Meki-Zewai	3,000	Pumping station, main canal, housing, all design, and 1000 ha. implemented.
Lower-Omo	10,000	Diversion, canal and 1200 ha.
Alaba-Kulito	3,700	Dam started and abandoned.
Borkena	3,000	Dam started but abandoned, 1000 ha designed and 150 ha. implemented.
Angelele-Pasture	3,000	All designed and 1000 ha, implemented.
Jijiga	3,000	Dam completed, lack of water.
Belbela & Wedecha	350	Dams (2), supply canals, irrigation network, operated and abandoned.
Total	44,050	

The above are suspended or abandoned schemes, although no updated data on the extent is available; some of these are under reconsideration and utilization due to the shift in emphasis by the government. Among these the use of Belbela and Wedecha by floriculture, the Meki-Zeway, Lower- Omo and Alwero partial development by private sectors are notable examples.

Transferred Irrigation Schemes

Transferred schemes are those schemes that were operative under public enterprises during the past government but, are now transferred to either the communities in the surrounding areas (by the government) or to private developers through the Privatization Agency. Many of these schemes are located in the Awash Basin. The idea of transferring some of these farms to the communities was decided by the government as a compensation for lost cropping and grazing lands. However, in most cases, the communities themselves did not use the land as it was intended for. Instead, some investors made arrangements with the communities/clan leaders, and are currently operating the farms growing cotton, broomcorn and other crops (MCE 2004).

What should be noted here is that large tracts of developed/irrigated lands have been left fallow/ abandoned for a number of years. Many of these lands have now been covered with bushes and trees requiring huge rehabilitation and construction works. The reasons behind these phenomena are reflected in the following factors (MCE 2004):

- The communities have no capacity, or were not ready, at the time, to take over and manage the irrigation farms;
- As most of these lands are claimed by a number of clans/tribes, conflicts were inevitable amongst the communities in some of the areas;
- The regional government has no power over the communities' land and has not yet developed a policy for land that will accentuate its use and management.

As a result, private investors were not encouraged to embark into the development and operation of these farms. Table 8 shows the inventory of these schemes based on MCE (2004) data.

Table 8. Transferred schemes-Local communities.

A) Awash Basin

No.	Farm/Scheme	Area (ha)	Community	Current Operation
1	Amibara Settlement	2,014	Afar Clans	Private (Amibara Ag. Dev. Plc)
2	Melka Sadi (SF) (Unit 3)	625	Afar Clans	Private (Africa Ag. Dev. Plc)
3	Amibara Angelele (SF)	3,269	Afar Clans	Private
4	Doffan Bolhamo (SF)	1,390	Afar Clans	Mostly abandoned and some run by private firms
5	Gewane (SF)	2,000	Afar Clans	Mostly abandoned and some run by private firms
6	Gewane (RRC)	1,200	Afar Clans	Leased to private firms
7	Dubti (SF)	3,800	Afar Clans	Very small area leased to private firms but most is fallow with intermittent crop cultivation by communities
8	Sembeleta (SF)	2,502	Afar Clans	Part of which is leased to private firms
9	Assita (SF)	2,651	Afar Clans	Part of which is leased to private firms
10	Tangayekuma (SF)	4,000	Afar Clans	Leased to a private firm but not operative
11	Mille (SF)	946	Afar Clans	Some used by the communities but mostly abandoned

B) Other Basins

No.	Farm/Scheme	Area (ha)	Community	Current Operation
1	Gode Settlement	750	Somali	Unknown
2	Gode (SF)	1,200	Somali	Unknown

It is important to note here that, although well intentioned as a principle in transferring schemes to the communities that were mistreated during the development of such schemes, it is also important to make proper irrigation transfer including capacitating the beneficiary communities to operate the schemes. Otherwise, the result, (as it has happened) is a nearly complete loss of developed schemes. This also calls for further study, investigation and research on how to make appropriate irrigation management transfer for the existing and newly emerging schemes.

Irrigation transfer has also been made to private sectors through the Ethiopian Privatization Agency, which is undertaking privatization of public enterprises. MCE (2004) provide the inventory of such schemes in table 9.

Table 9. Privatized schemes.

No.	Farm/Scheme	Area (ha)	Leased	Sold
1	Tseday (SF)	250	-	Private firm
2	Ellen (SF)	60	-	Private firm
3	Cheffa (SF)	200	-	ELFORA
4	Melgue Wondo	160	-	ELFORA
5	Wajifo (SF)	1,400	Private firm	-
6	Billate-Abaya (SF)	2,322	Handed over to the military public enterprise.	A certain portion is still managed by the

IRRIGATION DATABASE

The development of the Irrigation Database started in 2005, as part of the project "Impact of Irrigation on Poverty and Environment". The main objectives of the developing GIS database are the following:

- Data in the country are found scattered and are usually unable to provide required basic information. In other words, data in the country are of low quality and their availability is also meager. Database building will help in combining the already available data & fill up missing data so that all concerned may be able to use it for various works. In addition, it will create a mechanism for inserting new information as attributes of new projects to be developed in the future and avoid inconsistency of information.

- The database helps gain information on what has been done in irrigation development in Ethiopia (this can be in terms of investment incurred, area cultivated, stakeholders benefited etc.). The GIS database also provides information on the existing potential in the country.

- The database also provides a benchmark for researchers to take up a specific subject and conduct research in the context of existing schemes.

- The thematic maps and elevation model are useful to carry out spatial analysis and generate several information on the GIS environment.

Data on existing schemes were collected from Ministry of Water Resources, Ministry of Agriculture and Rural Development, Regional Government Bureaus and IWMI-Ethiopia. In addition to data on existing schemes, data on irrigation potential of the country have also been obtained from Ministry of Water Resources. Both, the data for the existing irrigation and irrigation potential have been provided in MS-Excel (spreadsheet format) from the regional offices and the Ministry of Water Resources, containing the necessary attributes.

The important attributes included in the database are the following:

- Name of scheme

- Regional state, Zone, Wereda and Kebele

- Latitude (N), Longitude (E), Northing (UTM), Easting (UTM)

- Irrigation type

- Water sources
- Abstraction systems
- Planned and actual command areas
- Planned and actual beneficiaries
- Scheme Typology
- Actual and planned storage capacity of dam (for storage type of water control)
- Dam/weir height
- Start and dates of construction
- Implementer
- Source of fund
- Planned investment (Birr)
- Actual investment (Birr)
- Regional State

At the beginning of the database development, data was handled using ArcView. After acquiring the software ArcGIS version 9.1, it is transferred to ArcGIS Geodatabase, to facilitate automatic updates from the database. Most of the irrigation schemes are not geo-referenced. Therefore, they are not shown in the map. However, data is captured in the database for those schemes without their location information.

We trust that this database creates an important information system and a foundation for a complete and comprehensive database that can be updated continuously for irrigation schemes. The database is also made available to regional irrigation development bureaus and federal institutions for use and further updating. This information system establishes a public good and any interested institution or individual can receive a copy. The available formats for sharing include Microsoft Excel or Microsoft Access database categorized as per typology, river basins and regions. These data are also provided as Appendices of this document.

CONCLUSIONS AND RECOMMENDATIONS

This paper, which is related to the wider impact of irrigation on poverty and environment project, provides information and database on the water resources of Ethiopia, potential of development and extent of existing development focusing on irrigation development. It identifies existing irrigation development categorized by various river basins and regions. Identifications were also made on schemes that are non-operational or transferred to community and private sector and their implication on performance.

A specific database is also developed for existing irrigation schemes having a number of attributes. The developed database has information about the existing irrigation schemes and potential. The database under GIS environment, maps their spatial distribution, using point maps from those schemes for which geo-referenced data is available.

The theme attributes for individual irrigation projects are incomplete due to lack of data. Accordingly, the remaining information should be collected from concerned regional bureaus and Wereda level offices. The main attributes to be collected include: investment costs, actual irrigated areas, geodetic data (coordinates), beneficiary numbers, etc. This document, if fully taken up and updated by the regional bureaus, can provide an invaluable information base on irrigation development in Ethiopia.

It is known that different sources of information have been used to compile the existing database of irrigation projects in the country and this has created some discrepancies in terms of important attributes such as command area and beneficiary size. Accordingly, further checks have to be made at regional level bureaus to get the appropriate values.

It is also necessary to accurately quantify the area irrigated so that we can understand the extent, distribution and possible impact and contribution of irrigation agriculture to food production. Satellite remote sensing offers the technology to estimate the irrigated areas. Therefore, mapping irrigated areas is recommended for the entire country, starting from smaller areas and up-scale it to the larger areas, the national level and to the whole of the Nile basin.

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APPENDICES

Table A1. Medium-scale irrigation schemes in Amhara Region.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual benefi Cciaries
1.	Alawuha			Diversion	River	360.00	41.57	610	706
2.	Aba Golege			Diversion	River		311.01		115
3.	Andassa	11.51	37.365	Pump	River	210.00	0.78	840	1
4.	Andassa	11.51	37.365	Pump	River	NA	0.81	NA	3
5.	Andassa	11.51	37.365	Pump	River	NA	0.78	NA	2
6.	Betho	10.7	39.6	Diversion	River	250.00	144.63	900	335
7.	Fettam			Diversion	River	400.00	0.00	434	0
8.	Fettam			Diversion	River	NA	322.00	NA	
9.	Geray	10.68	37.26	Diversion	River	618.00	114.68	480	583
10.	Gimbora			Diversion	River	310.00	206.27	1024	872
11.	Golina	12.05	39.05	Diversion	River	NA	219.00	NA	1957
12.	Golina	12.05	39.05	Pump	River	NA	4.95	NA	8
13.	Layi Alawuhe			Diversion	River	NA	395.51	NA	702
14.	Leman			Diversion	River	NA	332.15	NA	406
15.	Sewer			Diversion	River	NA	294.44	NA	328
16.	Silala			Diversion	River	NA	208.00	NA	366
17.	Zingni			Diversion	River	270.00	154.00	720	77

Table A2. Small-scale irrigation schemes in Amhara Region.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual benefi Cciaries
1	Abrhmi	NA	NA	Diversion	River	NA	83.29		100
2	Acharen	NA	NA	Diversion	River	NA	18.02		60
3	Adofeet	NA	NA	Pump	River	NA	0.94	NA	1
4	Adrako	12.11	38.44	Dam	Dam	75.00	0.17	300	13
5	Aekli	NA	NA	Pump	River	NA	7.70	NA	76
6	Ajewa	NA	NA	Diversion	Spring/ Stream	NA	14.20	NA	55
7	Akim Atsilia			Diversion	River	NA	3.00	NA	40
8	Alcha			Diversion	Spring/ Stream	NA	0.42	NA	
9	Alem			Pond	River	NA	0.50	NA	15
10	Ali Asfaw			Diversion	Spring/ Stream	NA	37.52	NA	115
11	Aloy			Pump	River	NA	18.76	NA	94
12	Abachacha			Diversion	River	NA	6.44	NA	37
13	Abanewo			Diversion	River	NA	1.77	NA	1
14	Abbay			Pump	River	NA	9.64	NA	NA
15	Abbay			Pump	River	NA	0.50	NA	1
16	Abbay			Pump	River	NA	8.75	NA	6
17	Abbay/Water Pump			Pump	River	NA	0.16	NA	3
18	Abaya			Diversion	River	NA	37.95	NA	108
19	Abaye			Pump	River	NA	1.50	NA	28
20	Abaye			Pump	River	NA	0.28	NA	1

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
21	Abebo			Pump	Spring/ Stream	NA	1.26	NA	2
22	Aberneb			Diversion	River	NA	45.50	NA	405
23	Amiden			Pond	Pond	NA	0.28	NA	16
24	Anato			Diversion	Spring/ Stream	NA	0.35	NA	226
25	Angereb			Pump	River	NA	4.94	NA	2
26	Angereb			Pump	River	NA	3.92	NA	1
27	Angereb			Pump	River	NA	2.31	NA	1
28	Angereb			Pump	River	NA	9.15	NA	1
29	Angereb			Pump	River	NA	4.00	NA	1
30	Angereb			Pump	River	NA	5.97	NA	2
31	Ankerkit			Diversion	River	NA	18.93	NA	250
32	Anshel			Diversion	River	NA	25.28	NA	150
33	Anto River			Diversion	River	NA	52.85	NA	273
34	Arde			Pump	River	NA	0.24	NA	
35	Ardibo			Diversion	Lake	150.00	14.05	436	15
36	Ardiro			Diversion	Lake	150.00	69.90	436	436
37	Arino	12.72	37.44	Diversion	River	24.00	15.13	98	172
38	Aryat			Diversion	Spring/ Stream		7.89	NA	58
39	Asera /Semeta	13.12	37.9	Diversion	River	80.00	55.00	320	319
40	Atemune Minch			Diversion	Spring/ Stream	NA	5.91	NA	87
41	Atimna			Diversion	River	NA	5.00	NA	41
42	Atlikayina	12.36	38.05	Dam	Dam	NA	21.41	NA	47
43	Awuta			Diversion	Spring/ Stream	NA	28.81	NA	67
44	Azuari			Diversion	River	150.00	104.78	688	610
45	Bebekis			Diversion	Spring/ Stream	55.00	16.78	200	152
46	Bebu			Diversion	River	NA	3.40	NA	85
47	Behima Sirba			Pump	Spring/ Stream	NA	3.51	NA	10
48	Beira			Dam	Dam	NA	20.70	NA	116
49	Berbara			Pump	River	NA	0.97	NA	2
50	Berisa			Diversion	River	NA	17.00	NA	92
51	Bisekolel			Pump	River	NA	1.77	NA	30
52	Borekena			Pump	River	NA	5.24	NA	30
53	Borkena			Pump	River	NA	2.96	NA	3
54	Borkena			Pump	River	NA	4.46	NA	5
55	Borkena			Pump	River	NA	10.39	NA	25
56	Borkena			Pump	River	NA	2.00	NA	1
57	Borkena			Pump	River	NA	2.68	NA	41
58	Borkena			Pump	River	NA	9.24	NA	14
59	Borkina			Pump	River	NA	2.00	NA	9
60	Bosena			Pond	Spring/ Stream	NA	0.25	NA	26
61	Buchcsie			Diversion	River	90.00	11.29	200	27
62	Buchiksy			Diversion	River	NA	174.00	NA	85
63	Burka			Diversion	Spring/ Stream	NA	30.22	NA	163

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
64	Busou	10.86	39	Diversion	River	60.00	8.21	340	240
65	Certie River			Diversion	River	NA	11.02	NA	46
66	Chache			Pump	River	NA	0.45	NA	1
67	Chanchutie			Diversion	Spring/ Stream	NA	75.11	NA	103
68	Chefa Wonz			Diversion	River	NA	58.78	NA	96
69	Chefe			Pump	River	NA	8.75	NA	38
70	Chereti			Diversion	River	NA	72.78	NA	345
71	Chero			Diversion	Spring/ Stream	NA	73.87	NA	234
72	Corie			Diversion	River	NA	15.49	NA	75
73	Dana	11.83	39.75	Dam	Dam	70.00	54.83	280	97
74	Dare			Diversion	Spring/ Stream	NA	0.60	NA	20
75	Dariga			Diversion	River	NA	155.96	NA	294
76	Debek Beyo Menc			Diversion	Spring/ Stream	NA	3.76	NA	22
77	Denidehu			Diversion	River	NA	25.12	NA	92
78	Derewa			Diversion	River	NA	36.22	NA	76
79	Dirma			Pump	River	NA	7.14	NA	2
80	Dirma	10.82	39.78	Diversion	River	180.00	46.28	576	265
81	Dug Well			Pump	Ground Water	NA	0.10	NA	2
82	Endege			Pump	Spring/ Stream	NA	0.30	NA	1
83	Enselale			Diversion	Spring/ Stream	NA	0.03	NA	8
84	Erza			Pump	River	32.00	3.77	128	15
85	Erza			Diversion	River	NA	1.15	NA	4
86	Fasiledes			Pond	Pond	NA	0.30	NA	20
87	Fedengua			Pump	River	NA	0.73	NA	13
88	Finchitu			Diversion	River	NA	29.94	NA	99
89	Folefoliti			Diversion	Spring/ Stream	NA	12.85	NA	123
90	Futan			Diversion	River	NA	5.15	NA	27
91	Futan			Diversion	River	NA	0.95	NA	10
92	Garno	12.22	37.62	Diversion	River	37.00	7.14	148	55
93	Gazzo			Diversion	River	18.00	2.28	725	54
94	Gebreal			Pump	Ground Water	NA	0.10	NA	1
95	Gedalls			Diversion	River	NA	2.37	NA	150
96	Gedeb			Diversion	River	NA	25.00	NA	101
97	Gelda			Pump	River	NA	0.21	NA	1
98	Gelgele Mena			Diversion	River	NA	31.65	NA	65
99	Gendedem			Pond	Pond	NA	0.07	NA	30
100	Gendeweha			Pump	River	NA	0.41	NA	
101	Gendewha			Pump	River	NA	3.92	NA	10
102	Gendwha			Pump	River	NA	0.62	NA	6
103	Gendwuha			Pump	River	NA	0.67	NA	14
104	Genkaba			Dam	Dam	NA	14.64	NA	110
105	Gente Baher	12.054	38.19	Diversion	River	NA	2.67	NA	66
106	Gerbi			Diversion	River	NA	23.45	NA	300

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
107	Gideb			Diversion	Spring/ Stream	NA	0.08	NA	1
108	Gofefe			Pond	Pond	NA	1.34	NA	25
109	Golbo Dima			Diversion	Spring/ Stream	NA	7.20	NA	26
110	Gota	11.43	37.65	Diversion	River	NA	32.66	NA	32
111	Gotu Modea	11.56	39.7	Diversion	River	NA	115.28	NA	352
112	Grane			Diversion	River	NA	11.91	NA	108
113	Guarqua			Pump	River	7.00	1.47	28	37
114	Gudguad			Diversion	River	NA	4.64	NA	83
115	Gult			Pump	River	NA	0.56	NA	1
116	Gumara			Pump	River	NA	9.84	NA	200
117	Gumara			Pump	River	NA	8.78	NA	30
118	Gumara			Pump	River	NA	17.96	NA	120
119	Gumara			Pump	River	NA	9.46	NA	60
120	Gumara			Pump	River	NA	7.64	NA	40
121	Gumara			Pump	River	NA	10.85	NA	63
122	Gumara			Pump	River	NA	7.90	NA	30
123	Gumara			Pump	River	NA	6.23	NA	50
124	Gumara			Pump	River	NA	5.91	NA	60
125	Gumara			Pump	River	NA	11.62	NA	55
126	Gumara			Pump	River	NA	1.01	NA	2
127	Gumara			Pump	River	NA	16.99	NA	98
128	Gumara			Pump	River	NA	23.95	NA	117
129	Gumara			Pump	River	NA	1.91	NA	15
130	Gumara			Pump	River	NA	29.35	NA	66
131	Gumara			Pump	River	NA	16.79	NA	55
132	Gumara			Pump	River	NA	14.78	NA	45
133	Gumara			Pump	River	NA	21.75	NA	69
134	Gumara			Pump	River	NA	13.86	NA	67
135	Gumara			Pump	River	NA	7.04	NA	62
136	Guna Gunit			Diversion	River	NA	142.23	NA	347
137	Gunda			Diversion	River	127.00	11.02	508	144
138	Gurnbaba	12.5	37.72	Diversion	River	70.00	14.43	280	113
139	Haik			Pump	Lake	150.00	0.77	436	50
140	Hand-dug Wells			Hand-dug Well	Ground Water	NA	0.86	NA	20
141	Hand-dug Wells			Hand-dug Well	Ground Water	NA	0.58	NA	10
142	Hirmata			Diversion	River	NA	62.86	NA	8
143	Hormat			Diversion	River	34.00	73.22	163	296
144	Hund Dug Wells			Pump	Ground Water	NA	0.34	NA	5
145	Jeweha Negeso			Pump	River	NA	154.64	NA	308
146	Jeweha River			Pump	River	NA	26.72	NA	1
147	Jor			Diversion	Spring/ Stream	NA	0.28	NA	2
148	Jowuha Wenz			Pump	River	NA	35.09	NA	1
149	Kahaw			Diversion	River	NA	0.25	NA	7
150	Kassena			Diversion	River	NA	1.94	NA	7
151	Kebero Mieda			Pond	Pond	NA	61.76	NA	76
152	Kechine Abebe			Diversion	River	NA	99.35	NA	404

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual Benefi-ciaries
153	Kelti			Diversion	River	NA	36.84	NA	670
154	Kereb Wasa			Diversion	River	NA	31.47	NA	215
155	Kerkeso			Diversion	Spring/ Stream	NA	8.28	NA	83
156	Kersmider Wuha			Pump	Ground Stream	NA	2.19	NA	3
157	Kersole			Diversion	River	NA	4.99	NA	79
158	Kinete Ameba			Diversion	Spring/ Stream	NA	2.18	NA	24
159	Koba			Diversion	Spring/ Stream	NA	13.36	NA	109
160	Kobo	11.04	39.85	Diversion	River	25.00	69.33	100	50
161	Koki			Diversion	River	NA	0.15	NA	1
162	Kokona			Diversion	River	NA	65.67	NA	327
163	Korka Wonz			Diversion	River	NA	5.25	NA	60
164	Kulanty	10.79	36.84	Diversion	River	65.00	0.00	460	0
165	Kuleach			Diversion	River	45.00	115.52	NA	197
166	Kulqual Enba			Diversion	Spring/ Stream	NA	0.04	NA	1
167	Lamber			Pond	Spring/ Stream	NA	0.97	NA	30
168	Leancha			Pump	River	NA	1.68	NA	1
169	Lomider	11.83	37.66	Diversion	Spring/ Stream	34.00	9.25	136	62
170	Lomoa Bosheu			Diversion	River	NA	1.46	NA	73
171	Mahbere Genet			Dam	Dam	NA	3.30	NA	30
172	Mandel			Diversion	River	NA	30.29	NA	80
173	Mandel			Pump	River	NA	7.76	NA	22
174	Mandel			Pump	River	NA	5.19	NA	14
175	Mankiet			Pump	River	NA	0.13	NA	1
176	Marikan			Diversion	Spring/ Stream	NA	0.21	NA	14
177	Mayibar			Diversion	Lake	NA	64.12	NA	142
178	Megenagna			Diversion	River	NA	122.74	NA	307
179	Mehon	12.07	38.04	Diversion	River	42.00	10.46	168	126
180	Meka			Diversion	River	NA	8.80	NA	109
181	Mekawonze			Pump	River	NA	0.84	NA	10
182	Melka Jebedu			Diversion	River	NA	0.38	NA	63
183	Menedale			Diversion	River	100.00	45.44	390	104
184	Mersa			Diversion	River	65.00	107.88	315	113
185	Meskel			Diversion	River	NA	13.19	NA	290
186	Mesno Water			Diversion	Spring/ Stream	NA	33.33	NA	95
187	Moludam			Dam	Dam	NA	9.29	NA	82
188	Mshela			Diversion	River	NA	26.62	NA	100
189	Muga			Diversion	River	200.00	163.00	800	
190	Muga			Pump	River	NA	0.44	NA	1
191	Muga			Diversion	River	NA	3.37	NA	15
192	Muga			Diversion	River	NA	0.56	NA	24
193	Muma			Diversion	Spring/ Stream	NA	29.71	NA	99
194	Mumie			Pump	Spring/ Stream	NA	1.60	NA	13

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual Benefi-ciaries
195	Nechelo			Diversion	River	NA	1.37	NA	12
196	Nega Workie			Diversion	Spring/ Stream	NA	89.58	NA	287
197	Nile	12.52	38.061	Diversion	River	NA	8.51	NA	86
198	Reb			Pump	River	NA	22.71	NA	80
199	Reb			Pump	River	NA	21.18	NA	72
200	Rebe			Pump	River	NA	7.29	NA	70
201	Rebe			Pump	River	NA	8.50	NA	22
202	Regrey			Diversion	River	NA	1.56	NA	5
203	Ribe			Pump	River	NA	18.30	NA	52
204	Ribe			Pump	River	NA	18.70	NA	96
205	Ribe			Pump	River	NA	56.17	NA	114
206	Sale			Diversion	River	NA	29.09	NA	325
207	Sama			Diversion	Spring/ Stream	NA	3.06	NA	45
208	Sanja River			Pump	River	NA	3.80	NA	4
209	Saregachi			Pump	River	NA	21.60	NA	5
210	Seeba			Diversion	Spring/ Stream	NA	8.93	NA	14
211	Selgi	10.67	39.42	Diversion	River	70.00	7.16	440	156
212	Sengue			Pump	River		22.38		48
213	Sewak	12.48	37.72	Diversion	River	100.00	69.50	400	117
214	Sewer			Pump	River	NA	53.31	NA	172
215	Shaye Woniz			Diversion	River	NA	5.06	NA	100
216	Shemamatebya			Diversion	Spring/ Stream	NA	9.13	NA	46
217	Shemelco			Diversion	Spring/ Stream	NA	1.29	NA	52
218	Shenat			Diversion	River	NA	0.38	NA	22
219	Shihent			Diversion	River	NA	26.70	NA	108
220	Shinfa			Pump	River	NA	0.45	NA	1
221	Shinfa			Pump	River	NA	0.61	NA	1
222	Shoa Robit			Pump	River	NA	3.90	NA	
223	Showa Robit			Pump	River	NA	0.51	NA	1
224	Siba			Diversion	Spring/ Stream	NA	13.54	NA	111
225	Sowar			Pump	River	NA	39.71	NA	48
226	Spring Gerabift			Diversion	Spring/ Stream	NA	4.61	NA	16
227	Suya			Diversion	River	NA	2.87	NA	51
228	Talia			Pump	River	NA	0.47	NA	2
229	Talia			Pump	River	NA	0.19	NA	1
230	Talia			Pump	River	NA	0.37	NA	1
231	Talia			Pump	River	NA	2.14	NA	1
232	Talia			Pump	River	NA	1.44	NA	2
233	Talkia			Pump	River	NA	0.47	NA	1
234	Tana			Pump	Lake	NA	55.55	NA	98
235	Tana			Pump	River	NA	11.80	NA	
236	Tana			Pump	Lake	NA	13.80	NA	491
237	Tana			Pump	Lake	NA	1.63	NA	39
238	Tana			Diversion	Lake	NA	0.01	NA	2
239	Tana			Pump	Lake	NA	0.12	NA	1

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual Benefi-ciaries
240	Tana			Pump	Lake	NA	2.98	NA	1
241	Tanikwa			Diversion	Spring/ Stream	NA	18.34	NA	57
242	Tape Water			Hand-dug well	Ground water	NA	0.03	NA	
243	Tarsena			Diversion	River	NA	1.34	NA	24
244	Tebi			Dam	Dam	200.00	178.27	720	551
245	Tebtebta	12.58	37.77	Diversion	River	75.00	36.66	240	210
246	Temket Bahir			Diversion	Spring/ Stream	NA	3.06	NA	24
247	Terafea			Diversion	River	NA	8.84	NA	16
248	Tikin	12.16	38.06	Diversion	River	60.00	21.58	220	113
249	Tikur Wuha			Pump	River	NA	0.44	NA	1
250	Tikure Woha	11.11	39.9	Diversion	Spring/ Stream	175.00	267.76	700	256
251	Tikurewoha			Diversion	Spring/ Stream	117.00	29.70	408	142
252	Tikurit			Diversion	River	NA	73.35	NA	300
253	Tilku Chefa			Diversion	Spring/ Stream	NA	5.95	NA	28
254	Mahbere Genet	12.7	39.06	Dam	Dam	70.00	3.30	280	30
255	Tule			Pump	River	NA	0.19	NA	1
256	Tule			Pump	River	NA	0.27	NA	1
257	Tulu Bera			Diversion	River	NA	19.18	NA	5
258	Tuluti	11.09	39.06	Diversion	River	80.00	7.18	200	44
259	Wasa Gedeb			Dam	Dam	NA	2.83	NA	56
260	Wlawle			Pond	Spring/ Stream	NA	0.38	NA	3
261	Wondata			Pump	Spring/ Stream	NA	0.72	NA	16
262	Wonka Wonze			Diversion	River	NA	33.48	NA	150
263	Woriho			Pond	Spring/ Stream	NA	0.57	NA	6
264	Work Wuha			Diversion	Spring/ Stream	NA	12.32	NA	49
265	Worka			Diversion	River	NA	44.60	NA	75
266	Woymat			Diversion	Spring/ Stream	NA	8.05	NA	37
267	Wptetoshe			Pump	River	NA	1.90	NA	7
268	Wuker			Pump	Other	NA	0.11	NA	3
269	Yedemo River			Pump	River	NA	0.59	NA	4
270	Yediamo			Pump	River	NA	0.71	NA	2
271	Yegigna			Diversion	River	NA	21.27	NA	105
272	Yethegne			Diversion	Spring/ Stream	NA	0.81	NA	83
273	Zala			Diversion	Spring/ Stream	NA	16.27	NA	142
274	Zana			Diversion	River	NA	10.35	NA	78
275	Zana			Dam	Dam	NA	20.35	NA	78
276	Zeha			Diversion	River	42.00	10.25	168	63
277	Zelesa			Diversion	River	NA	39.51	NA	125
278	Zuqua			Diversion	River	NA	1.10	NA	67

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
279				Pump	Ground Water	NA	36.95	NA	147
280				Hand-dug Well	Ground Water	NA	0.39	NA	54
281				Hand-dug Well	Ground Water	NA	0.20	NA	23
282				Hand-dug Well	Ground Water	NA	0.74	NA	32
283				Hand-dug Well	Ground Water	NA	1.37	NA	21
284				Hand-dug Well	Ground Water	NA	0.15	NA	56
285				Hand-dug Well	Ground Water	NA	0.11	NA	9
286				Hand-dug Well	Ground Water	NA	0.22	NA	8
287				Hand-dug Well	Ground Water	NA	0.47	NA	11
288				Hand-dug Well	Ground Water	NA	0.42	NA	16
289				Hand-dug Well	Ground Water	NA	0.22	NA	10
290				Pump	Lake	NA	7.82	NA	31
291				Pump	Lake	NA	31.30	NA	300
292				Pump	River	NA	3.55	NA	21
293				Pump	River	NA	0.28	NA	1

Table A3. Large-scale irrigation schemes in Oromia Regional State.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned command Area (ha)	Actual command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
195	Nura Era (UV2)					3576.00	3393.00	NA	NA
201	Wonji Shoa (UV1)	8.46	39.23			5925.00	5925.00	NA	NA
202	Fincha	9.52	37.25			NA	8060.00	NA	NA
196	Metahara-Abadiy (UV3)	8.76	39.89			8960.00	8960.00	NA	NA

Table A4 .Medium-scale Irrigation Schemes in Oromia Regional State.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
3	Hasan Usman	7.71	39.58	Gravity	River	230.00	NA	367	NA
13	Ketar-II			Gravity	River	200.00	NA		NA
29	Ambentu	7.37	39.9		River	200.00	117.00	523	486
30	Dugda Adu II	6.73	40.17	Gravity	River	400.00	NA	642	NA
31	Sirma	6.73	40.17	Gravity	River	240.00	240.00	800	800
32	Dugda Adu	6.73	40.17	Gravity	River	400.00	400.00	612	612
33	Hambella1	6.58	40.08	Gravity	River	200.00	200.00	400	400
35	Gabe	6.78	40.1	Gravity	River	200.00	222.00	400	440
41	Shayya				River	230.00	0.00	271	

S No	Name of scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
43	Dinik	7.07	40.75	Gravity	River	200.00	200.00	450	450
46	Shanaka			Gravity	River	420.00	420.00	2039	2039
72	Alif	9.6	42.33	Gravity	Spring	230.00	NA	708	NA
84	Midhegdu-Saka	8.75	40.75	Gravity	River	200.00	NA	250	250
114	Sera weba	8.67	39.83	Gravity	River	280.00	NA	500	NA
169	Kulit	8.58	37.72	Gravity	River	200.00	200.00	234	NA
197	Ziway Horticultural Enterprise					NA	801.10	NA	NA

Table A5. Small-scale irrigation schemes in Oromia Regional State.

S No	Name of scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
1	Gedemso-02				River	97.00	10.67	320	141
2	Chiklfata(Bosha-02)				River	60.00	34.80	220	NA
4	Arata Chufa	8.02	39.03	Gravity	River	100.00	100.00	317	NA
5	Meti Metana	7.5	39.83	Gravity	River	NA	NA	180	NA
6	Dalele Simbro	7.46	39.83	Gravity	River	NA	NA	162	NA
7	Dagaga Simbro			Gravity	River	NA	NA	270	NA
8	Bosha-Dera	8.08	39.17	Gravity	Spring	100.00	NA	233	NA
9	Gedemso-01				Dam	80.00	NA	250	109
10	Legeden Shoba	7.04	38.82	Gravity	River +	100.00	NA	NA	NA
11	Sole Bekeksa			Gravity	River	100.00	NA	300	NA
12	Ketar-I			Gravity	River	100.00	100.00		NA
14	Homba			Gravity	River	60.00	60.00	300	NA
15	Kewa	7.08	39.18	Gravity	River / Spring	NA	20.00	500	NA
16	Ketar-III			Gravity	River / Pond	90.00	90.00	360	NA
17	Argeda	7.03	38.82	Gravity	River	80.00	NA	NA	NA
18	Sadi Sadi			Gravity	River/ Spring	60.00	NA	221	NA
19	Sheled-01			Gravity	River	50.00	NA	200	NA
20	Lafa	7.5	38.82	Gravity	Spring / River	60.00	NA	260	NA
21	Sheled-02			Gravity	Spring/ River		25.00	100	NA
22	Dodicha	7.83	39.66	Gravity	Lake/River	69.00	69.00	160	NA
23	Alage Dore	8.5	39.58	Gravity	River	104.00	NA	493	NA
24	Chafe Jila*	7.83	38.83	Gravity	Lake	75.00	NA	256	NA
25	Kobo Malmale*	8.55	39.48	Gravity	River	60.00	NA	NA	128
26	Sedicho	7.83	38.75	Gravity	River/Lake	NA	NA	NA	NA
27	Unshete	7.62	38.98	Gravity	River	65.00	NA	149	NA
28	Solechisa*	7.67	39.58	Gravity	River	50.00	50.00	468	468
34	Dayu	6.5	39.75	Gravity	River	124.00	136.93	210	250
36	Malka Buta	6.95	40.82	Gravity	River	85.00	NA	340	NA
37	Hora Boka			Gravity	River	32.00	9.60	183	NA
38	Okuma	6.92	39.08	Gravity	River	NA	43.00	420	400
39	Oda Roba	7.12	40.03	Gravity	River	70.00	75.50	150	386
40	Haya Oda	6.37	39.9	Gravity	River	100.00	23.06	370	220

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual Benefi-ciaries
42	Arada Tare		40.78	Gravity	River	120.00	125.13	368	432
44	Gomgoma	6.35	39.58	Gravity	River	71.00	71.00	150	150
45	Chirri	6.33	39.83	Gravity	River	50.00	50.00	140	140
47	Afelata	5.75	38.38	Gravity	River	100.00		166	
48	Hila	6.27	35.93	Gravity	River	40.00	40.00	100	130
49	Melka Hidda	6	38.5	Gravity	River	70.00	NA	136	136
50	A/Chambe	6.26	38.78	Gravity	River	60.00	56.00	200	120
51	Water-01	9.33	41.8	Gravity	Spring		60.00	130	130
52	Ramis			Gravity	River	60.00	NA	273	NA
53	Burka Birbirsa	9.2	42.75	Gravity	Spring	40.00	40.00	100	100
54	Babi Ali	9.33	41.48	Gravity	Spring	NA	NA	130	130
55	Arara-02			Gravity	Spring	16.00	NA	100	100
56	Gelan Sedi	9.68	41.41	Gravity	Spring	100.00	NA	360	360
57	Water-02	9.33	41.8	Gravity	Spring	NA		150	150
58	Arara-01	9.33	41.8	Gravity	Spring	56.00	40.00	276	276
59	Harow			Gravity	Spring	40.00		130	
60	Chulul 03			Gravity	Spring	75.00	75.00	275	275
61	Hara Deneba			Gravity	Spring	102.00	102.00	376	370
62	Erer Meda Telila	9.42	41.32	Gravity	Spring	100.00	100.00	600	600
63	Burka Weldiya			Gravity	Spring	30.00	30.00	127	127
64	Said Ali	9.33	41.52	Gravity	Spring	45.00		160	160
65	Nadhi Gelan Sadi	9.23	41.42	Gravity	Spring	75.00	75.00	375	375
66	Water-03	9.33	41.8	Gravity	River	40.00	40.00	260	260
67	Jerjertu			NA	River	60.00	60.00	119	119
68	Burka Deneba	9.03	41.65	Gravity	Spring	76.00	76.00	215	215
69	Mudena Selo	9.07	40.93	Gravity	Spring	51.00	51.00	120	120
70	Melba	9.12	41.91	Gravity	Spring	40.00	51.00	170	107
71	Erer Goda	9.33	41.37	Gravity	Spring	103.00	NA	466	NA
73	Oda meda**			Gravity	Spring	70.00	NA	244	NA
74	Mojo asha**	9.12	41.72	Gravity	River	65.00	NA	129	NA
75	Lega kosta**	9.25	41.5	Gravity	River	55.00	NA	372	NA
76	Erer Goda				Spring	103.00	103.00	466	NA
77	Mumicha				River	60.00	60.00	596	NA
78	Oda Meda					70.00	NA	420	NA
79	Hara 1 and 2					59.60	NA	376	376
80	Wachu Gilley					40.00	NA	189	NA
81	Dobba					75.00	NA	326	NA
82	Kaseheja			Gravity	River	187.00	NA	375	748
83	Homicho			Gravity	River	NA	NA	600	600
85	Hirna	9	41	Gravity	River	NA	NA	240	NA
86	Amnur Datcho	9.23	41.25	Gravity	Spring	40.00	NA	80	80
87	Hirna Midhegdu			Gravity	Spring	20.00	20.00	90	90
88	Chafe Gurati	9.27	41.25	Gravity	River	NA	NA	220	86
89	Midhegdu-Burka			Gravity	Spring	60.00	60.00	160	
90	Meiso eba	9.08	40.58		River	100.70	NA	244	NA
91	Saketa	8.63	40.68	Gravity	River	128.00	NA	309	NA
92	Kanteki Michael				Lake	6.00	6.00	24	NA
93	Taticha Elan				Lake	3.00	3.00	12	NA
94	Bade Gosa				Lake	5.00	5.00	19	NA
95	Oda Chisa				Lake	5.00	5.00	21	NA
96	Oda Bilbila				Lake	4.00	4.00	18	NA

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual Benefi-ciaries
97	Taticha Golba				Lake	3.00	3.00	12	NA
98	Shubi				Lake	6.00	6.00	17	NA
99	Sombo Genet				Lake	6.00	6.00	23	NA
100	Sombo Aleltu				Lake	5.00	5.00	20	NA
101	Goha Workie	8.88	39.03	Gravity	Run-off	150.00	150.00	308	309
102	Sogido Bandira-02			Gravity	River	85.00	85.00	73	39
103	Wayu Seriti			Gravity	Lake	17.00	17.00	34	NA
104	Meki Zeway01			Gravity	Lake	NA	NA		NA
105	Godino-02			Gravity	River /Dam	95.00	NA	346	145
106	Godino-01			Gravity	River	83.00	NA	300	125
107	Sogido Bandira-01	8.68	39.8	Gravity	River	NA	NA	150	78
108	Tepo			Gravity	Lake/River	10.00	NA	NA	NA
109	Daddeba Guda			Gravity	River	46.00	NA	200	NA
110	Kararo Arsi			Gravity	River	40.00	NA	160	NA
111	Fulitino	8.75	39	Gravity	Run-off/Dam	85.00	NA	NA	117
112	Lafto			Gravity	River	30.00	NA	120	NA
113	Lugo			Gravity	River	NA	NA	100	NA
115	Lepis***	7.25	38.75	Gravity	River	100.00	NA	400	NA
116	Chirecha	8.9	36.52	Gravity	River	50.00	50.00	100	100
117	Indiris	9.03	36.83	Gravity	River	40.00	40.00	93	93
118	Basaka1*	8.02	34	Gravity	River	60.00	60.00	281	281
119	Basaka2*	8.02	34	Gravity		42.45			
120	Gabar	9.58	37.03	Gravity	River	NA	40.00	63	63
121	Dengego-01	9.22	37.78	Gravity	River	30.00	NA	91	158
122	Dengego-02	9.22	37.78	Gravity	River	20.00	12.00	NA	95
123	Tate			Gravity	River	20.00	NA	248	40
124	Gibe Lemu-01	9.15	37.03	Gravity	River	NA	NA	NA	169
125	Jeto-02	9	36.7	Gravity	River	NA	NA	NA	NA
126	Gibe Lemu-02	9.15	37.03	Gravity	River	60.00	NA	NA	81
127	Jare	9.42		Gravity	River	NA	NA	112	112
128	Jato-01	9	36.7	Gravity	River	54.00	NA	NA	NA
129	Abono-02	8.95	36.57	Gravity	River	NA	NA	248	248
130	Waja	9.87	36.6	Gravity	River	NA	NA	NA	NA
131	Gambela Tare			Gravity	River	NA	NA	NA	NA
132	Nagesso			Gravity	River	NA	NA	NA	NA
133	Wachu	9.18	36.63	Gravity	River	60.00	60.00	NA	NA
134	Aleltu#	9.05	34.83	Gravity	River+	65.00	NA	NA	NA
135	Belbela*			Gravity	River	NA	NA	NA	NA
136	Sokoru	9.68	35.07	Gravity	River	30.00	NA	265	267
137	Muchuchatu	9.5	35.45	Gravity	River	NA	NA	138	NA
138	Melka Alati				River	38.00	38.00	83	83
139	Kella	3		Gravity	River	47.00	47.00		90
140	Degero	9.65	35.53	Gravity	River	120.00	NA	296	296
141	Bondo			Gravity	River	50.00	NA	NA	NA
142	Gi'ii	9	35.01	Gravity	River	60.00	NA	NA	228
143	Borta			Gravity	River	40.00	NA	NA	120
144	Kujur	8.92	35.5	Gravity	River	57.00	57.00	110	110
145	Sichiri	8.92	34.95	Gravity	River	48.00	48.00	NA	90
146	Burar#	8.97	34.8	Gravity	River	112.00	NA	353	NA
147	Melka alati	9.67	35.01	Gravity	River	38.00	38.00	83	83
148	Loko	8.67	36.33	Gravity	River	NA	NA	240	240

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
149	Koba Guda	8.33	36.45	Gravity	River	60.00	56.00	NA	NA
150	Goji#					60.00		84	
151	Gulufa*	7.56	36.63	Gravity	River	25.00	25.00	60	60
152	Chilalo	7.833	37.37	Gravity	River	NA	NA	NA	NA
153	Kersa	7.72	37	Gravity	River	NA	70.00		150
154	Waro	7.71	36.83	Gravity	River	NA	NA	NA	NA
155	Nadda Guda	7.6	37.23	Gravity	River	NA	NA	NA	NA
156	Abono-01			Gravity	River	NA	NA	NA	NA
157	Kawa	7.45	37.03	Gravity	River	120.00	NA	270	270
158	Birbirsa	7.72	37	Gravity	River	70.00	NA	NA	NA
159	Tamsa'a#	7.8	36.6	Gravity		72.00	NA	211	NA
160	Kolmbo	7.92	36.68	Gravity	River	53.00	NA	NA	NA
161	Lami	9.65	38.66	Gravity	River/ Spring	NA	NA	682	200
162	Teltele	9.63	38.85	Gravity	Spring	90.00	NA	418	418
163	Abayi	9.43	40.28	Gravity	Spring	26.00	26.00	100	100
164	Chole	8.92	37.78	Gravity	River	100.00	NA	304	464
165	Ijaji	9.01	37.31	Gravity	River	48.00	48.00	160	160
166	Indiris	8.95	37.75	Gravity	River		NA	300	300
167	Walga			Gravity	River	150.00	NA	637	637
168	Robi	9.36	38.3	Gravity	River	120.00	NA	349	410
170	Abuko	9.13	37.22	Gravity	River	80.00	80.00	NA	92
171	Leku	9.1	37.22	Gravity	River		50.00	NA	NA
172	Omicho			Gravity	River	40.00	40.00	190	NA
173	Alenga	9	37.33	Gravity	River	NA	NA	NA	NA
174	Bako	9.13	37.07	Gravity	River	118.00	118.00	1200	1200
175	Green Denbel				Lake Ziway	30.00	NA	NA	NA
176	Tuchi Denbel				Lake Ziway	15.00	7.00	NA	NA
177	Weyo Gabriel				Lake Ziway	13.75	10.00	NA	NA
178	Weyo Sereti				Lake Ziway	17.00	17.00	NA	NA
179	Dodota Denbel				Lake Ziway	18.06	15.00	NA	NA
180	Celeleka Denbel				Lake Ziway	10.87	2.40	NA	NA
181	Ada Bokota				Meki River	5.00	4.00	NA	NA
182	Melka Aba Godera				Meki River	7.75	4.00	NA	NA
183	Kelina Dembel				Meki River	8.63	4.00	NA	NA
184	Melka Korma				Meki River	16.63	4.00	NA	NA
185	Lagi Meki				Meki River	32.00	NA	NA	NA
186	Jara Weya				Meki River	8.00	NA	NA	NA
187	Meki Zeway-02				River/ Lake	100.00	100.00	100	100
188	Meki Zeway-03				River/ Lake	100.00	100.00	NA	NA
189	Blde Gosa				Lake	5.00	NA	19	NA
190	Oda Chisa				Lake	5.00	NA	21	NA
191	Shubi				Lake	6.00	NA	17	NA
192	Melka Hidi				River	89.00	89.00	NA	NA
193	Belbala				River	100.00	740.00	NA	NA

Table A6. Medium irrigation schemes in SNNP Regional State.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
1	Harre	6.116	37.566		River	1,000.00	800.00	2,000	1876
2	Zagae	6.233	37.375		River	450.00	900.00	1,600	1077
3	Woyto	4.946	36.85		River	250.00	600.00	650	800
4	Arbaminch	6.03	37.6		River	800.00	NA	600	NA
5	Kedoboga	6.95	38.52		River	230.00	200.00	460	210
6	Upper Bilate	6.8	38.1		River	1,200.00	NA	2,200	NA
7	Lower Bilate	6.8	38.1		River	648.00	NA	1,955	NA
8	Sille	6.016	37.42		River	310.00	310.00	570	NA
9	Masta	6.225	37.333		River	450.00	450.00	1,800	NA
10	Wajifo	6.5	37.766		River	300.00	300.00	1,200	NA
11	Wozeka					300.00	NA	600	NA
12	Raya					560.00	NA		NA

Table A7. Small-scale irrigation schemes in SNNP Regional State.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
1	Bissare	6.65	37.96		River	164.00	NA	600	600
2	Balle	6.9	37.53		River	100.00	100.00	400	NA
3	Soke	7.172	37.674		River	NA	100.00	400	100
4	Menisa	6.82	37.59		River	200.00	200.00	800	142
5	Megera	7.064	37.53		River	110.00	NA	NA	200
6	Eballa	7.28	37.58		River	120.00	85.00	200	NA
7	Lamo	7.25	37.33		River	120.00	NA	400	168
8	Hombancho	7.33	37.53		River	80.00	80.00	320	160
9	Wamole	6.85	38.45		River	120.00	45.00	110	110
10	Zenti	6.2	36.85		River	120.00	100.00	NA	NA
11	Osone	6.21	37.29		River	100.00	100.00	147	147
12	Betto	6.05	36.87		River	100.00	50.00	400	70
13	Goymo	6	37.133		River	55.00	55.00	220	92
14	Maze	5.74	37.18		River	200.00	200.00	800	254
15	Woldiya	8.33	38.51		River	80.00	10.00	320	150
16	Kako	5.7	36.63		River	120.00	100.00	480	60
17	Duano	5.71	37.86		River	100.00	50.00	400	200
18	Segengete	5.18	37.15		River	200.00	200.00	800	402
19	Bedene Alemtena	7.36	38.104		River	200.00	200.00	800	800
20	Gonjo	7.33	37.56		River	100.00	21.00	400	49
21	Rebo	6.54	38.79		River	50.00		100	NA
22	Ongoto	6.78	37.5		River	150.00	70.00	200	72
23	Ella	6.733	37.791		River	80.00	120.00	320	140
24	Lasho	6.566	37.833		River and Pond	120.00	80.00	320	100
25	Bedessa	6.833	37.933		River	100.00	100.00	400	322
26	Woibo	6.95	37.75		River	150.00	150.00	600	NA
27	Shafite	6.28	37.72		River	150.00	50.00	600	NA
28	Erbore	4.966	36.783		River	100.00	NA	400	NA
32	Tekecha	6.85	37.675		River	NA	NA	NA	400
33	Sezga	6.26	36.875		River	60.00	50.00		165

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual Benefi-ciaries
34	Mendelkie	6.38	36.96		River	150.00	NA	600	NA
35	Kankara	6.03	36.78		River	112.00	100.00	180	
36	Lebu	8.267	38.458		River	100.00	50.00	260	260
37	Dobi	8.458	38.175		River	40.00	40.00	160	48
38	Shoshuma	7.03	36.7		River	45.00	7.50	180	NA
39	Kette	7.27	37.46		River	60.00	NA	240	200
40	Ameka	7.6	37.62		River	153.00	100.00	612	40
41	Wore	6.2	36.7		River	100.00	100.00	400	135
44	Lobet-2	4.83	36.03		River	100.00	100.00	400	
45	Meshkere	6.4	36.52		River	NA	100.00	NA	185
46	Kapsuye	4.8	36.13		River	100.00	NA	200	NA
47	Dobena	8.1	38.42		River	150.00	NA	600	NA
49	Aynola	5.55	37.93		River	100.00	NA	160	NA
50	Falame	7.3	37.8		River	60.00	NA	240	NA
51	Damte	6.64	37.82		Run-off	NA	NA	NA	NA
54	Gelana	6.54	38.74		River	100.00	100.00	162	NA
55	Gidabo	6.73	38.328		River	150.00	150.00	600	NA
56	Goha	6.208	37.266		River	200.00	200.00	595	NA
60	Lenda	7.157	38.088		River	NA	80.00	NA	NA
61	Goche	7.131	37.783		River	NA	4.00	12	NA
62	Lezembara	7.323	37.504		River	18.00	18.00	74	NA
63	Hazembara	7.31	37.526		River	NA	70.00	NA	NA
64	Zegaminch	7.31	37.525		stream	2.00	2.00	4	NA
65	Jelaka	7.32	37.492		River	NA	12.00	50	NA
66	Hao	7.3	37.524		River	NA	28.00	NA	NA
67	Satame	7.241	37.583		River	NA	NA	NA	NA
68	Doje	7.198	37.691		River	NA	NA	79	NA
69	Ufute	7.233	37.755		River	NA	25.00	NA	NA
70	Wondowesha	7.2	38.375		River	200.00	200.00	400	NA
71	Gatto	5.5	37.25		River	200.00	200.00	800	NA
72	Hinchine				River	16.00	16.00	102	NA
73	Yosha				River	NA	25.00	NA	NA
74	Senbeta				River	NA	20.00	NA	NA
75	Bekera				River	NA	28.00	NA	NA
76	Toni	6.967	37.191		River	70.00	70.00	280	NA
77	Doshe	6.37	37.73		River	100.00	100.00	160	NA
78	Mesho	6.28	37.513		River	20.00	NA	NA	NA
79	Horuwa	7.7	37.67		River	NA	NA	400	NA
80	Awshona	7.42	37.6		River	100.00	NA	250	NA
81	Hao	7.6	37.6		River	NA	NA	NA	NA
82	Lomate				River	150.00	NA	620	NA
83	Chore					60.00	NA	68	NA
84	Mulita					40.00	NA	53	NA
85	Shapamo				River	60.00	NA	40	NA
86	Gordena					60.00	NA	25	NA
87	Bajo					45.00	NA	15	NA
88	Busha					60.00	NA	56	NA
89	Zengerina					10.00	NA	20	NA
90	Gingita					70.00	NA	280	NA
91	Abushuna					100.00	NA	200	NA
92	Gewada					100.00	84.00	400	179

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area	Actual Command Area	Planned Benefi-ciaries	Actual Benefi-ciaries
95	Oshume					150.00	NA	300	NA
96	Adele					70.00	NA	120	NA
97	Kulit					84.00	NA	89	NA
98	Jole					100.00	NA	400	NA
99	Rinzaf					60.00	NA	240	NA
100	Darge					60.00	NA	180	NA
101	Argoba					150.00	NA	600	NA
102	Lebeko					50.00	NA	NA	NA
103	Delbena					150.00	NA	600	NA
104	Sago					100.00	NA	NA	NA
105	Bazne				River	70.00	NA	300	NA
106	Lentala				River	60.00	NA	240	NA
107	Furfuro					153.00	NA	612	NA
108	Yetebon/Rinzaf					60.00	26.00	NA	105

Table A8. Medium-scale irrigation schemes in Tigray Regional State.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual Benefi-ciaries
1	Shilant III	552530	1449712		Run-off	282	7	NA	NA
2	Haiba	558774	1463392		Run-off	218	250	824	NA
3	Shilanat I	553575	1449540		Run-off	282	108	NA	NA
4	Shilanat IV	552895	1448765		Run-off	282	181	NA	NA
5	Shilanat II	NA	NA		Run-off	282	30	NA	NA
6	Hara	NA	NA		River	400	400	NA	NA

Table A9. Small-scale irrigation schemes in Tigray Regional State.

S No	Name of Scheme	Longitude	Latitude	Irrigation	Water Source	Planned Command Area	Actual Command Area	Planned Benefi-ciaries	Actual Benefi-ciaries	Planned_ ST
1	Mejae	555100	1458732		Run-off	14	14	NA	NA	NA
2	Gereb-Mihiz	552606	1478638		Run-off	80	80	NA	NA	NA
3	Mai-Gassa	553270	1468823		Run-off	100	80	1220	NA	NA
4	Mai-Delle	566832	1513897		Run-off	90	90	NA	NA	NA
5	Gum-Sellasa	554847	1460489		Run-off	110	110	NA	NA	NA
6	Adi-Kenafiz	555402	1451594		Run-off	60	60	NA	NA	NA
7	Mai-Haidi	559073	1458213		Run-off	9	9	36	NA	NA
8	Gra-Shito	536582	1522601		Run-off	16	16	NA	NA	NA
9	Filiglig	545484	1464371		Run-off	20	20	56	NA	NA
10	Dur-anbessa	547768	1467671		Run-off	61	61	NA	NA	NA
11	Gereb-Segen	550908	1469715		Run-off	24	24	NA	NA	NA
13	Meskebet	413436	1580511		Run-off	70	100	NA	NA	NA
14	Mai Gundi	474241	1552390		Run-off	46	46	NA	NA	NA
15	Ruba Feleg	578704	1542132		Run-off	80	100	NA	NA	NA
16	Felaga	580773	1546642		Run-off	75	75	NA	NA	NA
17	H.W.Cheber	558675	1477430		Run-off	80	80	NA	NA	NA
18	Era Quhila	564770	1486761			0	87	NA	NA	NA

S No	Name of Scheme	Longitude	Latitude	Irrigation	Water Source	Planned Command Area	Actual Command Area	Planned Benefi-ciaries	Actual Benefi-ciaries	Planned_ ST
20	Mai-Ela	537459	1470020		Run-off	100	100	452	NA	NA
21	Adi-Amharay	562231	1482228		Run-off	60	60	NA	NA	NA
22	Teghane	578801	1535611		Run-off	60	60	NA	NA	NA
23	Mai-Negus	463493	1560733		Run-off	150	150	977	NA	NA
24	Laelay-Wukro	566279	1526418		Run-off	55	50	200	NA	NA
25	Korir	566212	1519876		Run-off	84	100	NA	NA	NA
26	Gereb-Awso	560089	1485026		Run-off	9	9	NA	NA	NA
27	Adi-Hilo	575061	1508711		Run-off	9	9	NA	NA	NA
29	Gindae	549115	1502476		Run-off	28	53.5	NA	NA	NA
30	Adi-Shihu	544296	1465527		Run-off	40	40	NA	NA	NA
31	Endazeoy	570876	1489334		Run-off	13	13	100	NA	NA
32	Hashenge	573105	1490150		Run-off	120	120	1335	NA	NA
33	Arato	570198	1494180		Run-off	120	120	815	NA	NA
34	Mai-Serakit	574866	1495438		Run-off	31	31	NA	132	NA
35	Adi-Akor	565680	1485068		Run-off	30	30	NA	NA	NA
36	Adi-Gela	561405	1486352		Run-off	100	100	NA	NA	NA
37	Embagedo	564814	1481367			80	80	175	NA	NA
38	Zamra Diversion	553400	1444674			NA	NA	NA	NA	NA
39	Gereb-Beati	551413	1486698		Run-off	88	90	440	NA	NA
41	Gereb Shegal	553404	1465567			NA	50	NA	NA	NA
64	Mai-raeta	NA	NA			NA	16.5	NA	NA	NA
65	Gereb-Manda	NA	NA			NA	10	NA	NA	NA
66	Mai-Kuntso	NA	NA			NA	7	NA	NA	NA
67	Adi-Selesto	NA	NA			NA	10	NA	NA	NA
68	Mai-Demeto	NA	NA			NA	5	NA	NA	NA
69	Mai-Egam	544750	1466337		Run-off	10	10	40	NA	NA
70	Hirgale	NA	NA			NA	10	NA	NA	NA
71	Adi-Azabie	NA	NA			NA	23	NA	NA	NA
72	Mai-Aygi	NA	NA			NA	10	NA	NA	NA
73	Gorenguah	NA	NA			NA	17.5	NA	NA	NA
74	Mai-Alekti	NA	NA			NA	80	NA	NA	NA
75	Werkit	NA	NA			NA	18	NA	NA	NA
77	Gereb-Hinche	NA	NA			NA	35	NA	NA	NA
78	Mai-Serra	NA	NA			NA	17.3	NA	NA	NA
79	gereb-Belesat	NA	NA			NA	20	NA	NA	NA
80	Mai-Fellhi	NA	NA			NA	54	NA	NA	NA
81	Gereb-Agulae	NA	NA			NA	15	NA	NA	NA
82	Mai-Haira	NA	NA			NA	37	NA	NA	NA
83	Mai-Kemem	NA	NA			NA	50	NA	NA	NA
84	Aquishala	NA	NA			NA	75	NA	NA	NA
85	Waria	NA	NA			NA	2.5	NA	NA	NA
86	Balaku	NA	NA			NA	10	NA	NA	NA
87	Mariam Tsebat	NA	NA			NA	13	NA	NA	NA
88	Halengo	NA	NA			NA	12	NA	NA	NA
89	Mai-Workit	NA	NA			NA	3	NA	NA	NA
90	Golab	NA	NA			NA	4	NA	NA	NA
91	Mai-Tewaru	NA	NA			NA	8.5	NA	NA	NA
92	Mai-Korbet	NA	NA			NA	30	NA	NA	NA
93	Zeco	NA	NA			NA	63	NA	NA	NA
94	Mai-Delem	NA	NA			NA	35	NA	NA	NA
95	Basilose	NA	NA			NA	60	NA	NA	NA

S No	Name of Scheme	Longitude	Latitude	Irrigation	Water Source	Planned Command Area	Actual Command Area	Planned Benefi-ciaries	Actual Benefi-ciaries	Planned_ ST
96	Wazga	NA	NA			NA	60	NA	NA	NA
97	Mai-tekeharia	NA	NA			NA	35	NA	NA	NA
98	Tekhewe	NA	NA			NA	NA	NA	NA	NA
99	Mai-geday	NA	NA			NA	NA	NA	NA	NA
100	Hatset	NA	NA			NA	NA	NA	NA	NA
101	Gereb-Tirki	NA	NA			NA	23	NA	NA	NA
102	Gra-Ara-Area	NA	NA			NA	21	NA	NA	NA
103	Maidaero	NA	NA			NA	22	NA	NA	NA
104	Ziban albe	NA	NA			NA	19	NA	NA	NA
105	Gereb Baekel	NA	NA			NA	14	NA	NA	NA
106	Bahre weira	554647	1442026		River	43	43	NA	NA	NA
107	Nazre	561195	1448368			NA	43	NA	NA	NA
108	Hizati Afras	557316	1448823		River	54	54	NA	NA	NA
109	Gereb Didik	NA	NA		River	36	36	NA	NA	NA
110	Ayne Buzuh	NA	NA			NA	28	NA	NA	NA
111	Hiwane	NA	NA			NA	20	NA	NA	NA
112	Gereb Kokhi	NA	NA		River	48	48	NA	NA	NA
113	Adi Babur	NA	NA			NA	20	NA	NA	NA
114	Falla-1	NA	NA			NA	22	NA	NA	NA
115	Falla-2	NA	NA			NA	30	NA	NA	NA
116	Zatta	NA	NA			NA	15	NA	NA	NA
117	Shaina	NA	NA			NA	50	NA	NA	NA
118	G. Merken	NA	NA			NA	25	NA	NA	NA
119	G.Kuiha	552606	1478638			NA	25	NA	NA	NA
120	Laelay Agulae	566832	1513897		River	33	32	NA	NA	NA
121	Mai-Gassa2	552489	1469364			NA	NA	NA	NA	NA
122	Betqua	536383	1473244			NA	70	NA	NA	NA
123	Meala	537459	1470020			NA	100	NA	NA	NA
124	Sewhineda	544964	1496550			NA	23	NA	NA	NA

Table A10 . Irrigation schemes in Afar.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Benefi-ciaries	Actual Benefi-ciaries
1	Berga				Awash River	560.00	518.00	NA	NA
2	Bokayitu				Awash River	580.00	457.00	NA	NA
3	Kerebuda				Awash River	514.00	514.00	NA	NA
4	Karadura				Awash River	370.00	163.00	NA	NA
5	Algana				Awash River	465.00	432.00	NA	NA
6	Wonse				Awash River	420.00	397.00	NA	NA
7	Golgota				Awash River	567.00	255.00	NA	NA
8	Amibara				Awash River	1973.00	434.00	1500	NA
9	Gelila Dura					270.00	270.00	NA	NA

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
10	Awara Melka				Kesem River	1285.00	1140.00	NA	NA
11	Yalo				Kebena River	630.00	410.00	NA	NA
12	Angele irrigated pasture				Awash River	2000.00	2000.00	NA	NA
13	Bolhamo				Awash River	1390.00	1390.00	NA	NA
14	Gewane /Maro Gela				Awash River	2171.00	2071.00	NA	NA
15	Mile				Awash River	940.00	580.00	NA	NA
16	Dubti				Awash River	1845.00	600.00	NA	NA
17	Dit Bahri					950.00	950.00	820	NA
18	Awssa Assaita					2651.00	2631.00	NA	NA
19	Sembeleta Garni					765.00	765.00	NA	NA
20	Sembeleta sahele					1736.00	1736.00	NA	NA
21	Amibara irr. Project II				Awash River	10300.00	7596.00	NA	NA
22	Melka Sadi				Awash River	4212.00	3047.00	NA	NA
23	Amibara Melka Werer				Awash River	3815.00	3815.00	NA	NA
24	Angelele pump scheme					3296.00	3296.00	NA	NA
25	Dubti					5600.00	5300.00	NA	NA
26	Dit Bahri					3506.00	3506.00	NA	NA
27	Tagna Kuma					4038.00	4038.00	NA	NA
28	Mashugae								
29	Abbala								
30	Melka Sedi and Amibara	9.22	40.12						

Table A11. Irrigation schemes in Benishangul-Gumz.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
1	Bulenegero				River	106.00	NA	424	NA
2	Sasibadi				River	80.00	NA	320	NA

Table A12. Irrigation schemes in Gambella.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
1	Bonga				River	NA	140.00	NA	NA
2	Baro				River	NA	75.00	NA	NA
3	Bonga				River	NA	500.00	NA	NA
4	Baro				River	NA	200.00	NA	NA
5	Bonga				River	NA	400.00	NA	NA

Table A13. Irrigation schemes in DireDawa.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
1	Adada				River	25.00	18.00		205
2	Chiri Miti				Spring	33.00	18.00		40
3	Fechassi				Spring	70.00	36.00	512	150
4	Gerba Aneno				Spring	34.00	8.00	357	24
5	Koriso				Spring	31.00	15.00	NA	239
6	Awale				Spring	90.00	25.00	NA	65
7	Hulul Mojo				Spring	NA	70.00	NA	376
8	Hula Hulul				Spring	NA	53.00	NA	279
9	Bishan Behe				Spring	NA	45.00	NA	200
10	Belawa				Spring	NA	14.00	NA	123
11	Beke Halo				Spring	NA	18.00	NA	49
12	Kortu				Spring	NA	8.00	NA	60
13	Laga Bira				Spring	NA	8.00	NA	40
14	Eje Anani				Spring	NA	12.00	NA	226
15	Adada				Spring	NA	18.00	NA	205
16	Lega Oda				Spring	NA	50.00	NA	400
17	Wahel				Spring	NA	35.00	NA	346
18	Dujuma				Spring	NA	41.00	NA	256
19	Melka Kero				Spring	NA	30.00	NA	150
20	Kulalu				Spring	NA	55.00	NA	82
21	Jaldesa				Spring	NA	8.00	NA	22
22	Asseliso				Spring	NA	30.00	NA	69
23	Laga Hare				Spring	NA	15.00	NA	140
24	Malea Jabdu				Spring	NA	29.00	NA	76
25	Eje Anani				Spring	NA	12.00	NA	95

Table A14. Irrigation schemes in Harari.

S No	Name of Scheme	Latitude	Longitude	Irrigation	Water Source	Planned Command Area (ha)	Actual Command Area (ha)	Planned Beneficiaries	Actual Beneficiaries
1	Werteb				River	30.00	NA	NA	NA
2	Sofi Lugo				Spring	40.00	NA	NA	NA
3	Sofi				Spring	20.00	NA	NA	NA
4	Burka				Spring	30.00	NA	NA	NA
5	Erer Melka Ida				Spring	120.00	NA	NA	NA

Table A15. Small-scale irrigation potential sites in Abbay Basin.

S No	Project Description	River	Lattitude	Longitude	Potential (Ha)
1	Chekorsa	Chekorsa	9.036	36.983	325
2	Abbay	Abbay	11.516	37.384	550
3	Feres Weda & Gubritvillage		11.368	37.394	725
4	Chigwall Abo		11.047	36.757	350
5	Aderajita Mariam		11.038	36.783	625
6	Abla Lidcla		11.119	36.852	550
7	Idewha Yohanis		11.022	36.913	325
8	Kidata Jegola		11.085	36.956	425
9	Wazand Kunta		11.164	36.957	300
10	Zege town		11.768	37.314	400
11	Tari Plain		10.665	37.046	500
12	Ginamba & Ambeshena Mariam		10.665	37.045	525
13	Inwasq Plain		11.557	37.016	450
14	Shuta	Shuta	11.68	37.049	800
15	Gilgel Abbay	Gilgel Abbay	11.733	37.225	425
16	Lake Tana		12.273	37.159	325
17	Shahantaj	Shahantaj	11.075	37.02	575
18	Abbay	Abbay	11.174	37.022	675
19	Tekele Terara		11.146	37.168	450
20	Sostu Dambisi		10.781	36.814	600
21	Bata lemeramia		10.983	36.885	650
22	Sahuy Plain		10.897	36.978	675
23	Bari	Bari	10.018	36.714	425
24	Gilgel Abbay	Gilgel Abbay	11.759	37.143	600
25	L.Tana		11.795	37.146	500
26	Ambo Plain		11.379	37.027	800
27	Hawasha	Hawasha	11.453	37.035	600
28	Dike	Dike	11.27	37.084	400
29	Asbile	Asbile	11.413	37.22	725
30	Bilka	Bilka	10.685	36.853	500
31	Chara Abo Village		10.735	36.902	450
32	Inkwachey	Inkwachey	10.725	36.943	375
33	Duba Plain		10.676	36.944	400
34	Dima Plain		10.672	36.982	550
35	Kasket	Kasket	10.847	37.064	600
36	Gugri	Gugri	10.948	37.113	525
37	Aswa Gudera Village		10.847	37.241	475
38	Bilkit	Bilkit	10.278	37.072	725
39	Kulech	Kulech	10.414	37.66	500
40	Witem	Witem	10.286	37.695	575
41	Yeberet	Yeberet	10.568	38.066	400
42	Dengab Plain		10.283	37.4	700
43	Yemehil Abo		10.536	37.418	375
44	Dembech		10.572	37.5	500
45	Debit	Debit	10.978	38.046	725
46	Tigdar	Tigdar	10.861	38.072	550
47	Ascir Plain		10.833	38.073	725
48	Bata	Bata	10.964	38.096	525
49	Anjeb		10.82	38.127	500
50	Inegale Giyorgis		10.95	38.127	450
51	Bina	Bina	10.879	38.184	450

S No	Project Description	River	Lattitude	Longitude	Potential (ha)
52	Zend Wina	Zen Wina	11.111	37.88	700
53	Muga,Wendeb Iyesus	Muga	10.554	37.971	537
54	Gula	Gula	10.579	37.51	425
55	Chemoga	Chemoga	10.124	37.602	475
56	Kechin Wedene Plain		10.138	37.736	375
57	Sikor	Sikor	10.906	38.888	525
58	Angolola	Angolola	9.629	39.451	425
59	Guna Gunit	Guna Gunit	9.717	39.623	475
60	Ajima	Ajima	9.436	39.527	450
61	Deneba Town		9.773	39.224	375
62	Gamenya	Gamenya	9.782	39.275	550
63	Kita River(GUDO)	Kite	9.139	38.597	400
64	Chimbsi	Chimbsi	9.581	39.267	775
65	Kore Roba Town		9.256	38.761	325
66	Muka Turi Town		9.571	38.571	425
67	Likma plain		9.523	38.928	475
68	Honku	Honku	9.515	38.339	500
69	Chancho Rv.(Tinish and Tilku)	Tinishu and Tilku Chancho	9.359	39.085	800
70	Haro Plain		8.788	37.854	325
71	Gondo plain		9.015	37.977	370
72	Cheleleki Plain		9.712	37.698	375
73	Kobo Plain		9.459	37.429	300
74	Weran Delo Plain		9.401	37.482	800
75	Kolu Plain		9.381	38.043	575
76	Gojo		9.254	38.1	300
77	Watiyo plain		9.392	37.546	450
78	Asendabo plain		9.802	37.565	725
79	Guder	Guder RV.	9.39	36.117	625
80	Erer	Erer Rv.	9.283	37.338	350
81	Abuna Bale Igziabiher		9.727	37.446	300
82	Chambu	Chambu Rv.	9.654	37.063	774
83	Gorochan	Gorochan Rv.	9.465	36.732	450
84	Keli	Keli Rv.	9.349	35.281	575
85	Aleltu	Aleltu Rv.	9.207	35.093	525
86	Wayu	Wayu Rv.	9.122	35.226	350
87	Werebo	Werebo Rv.	9.248	35.064	350
88	Lugo Swamp		7.888	36.389	450
89	Debir town		10.63	36.589	650
90	Sharka and Mednta		10.023	36.934	375

Table A16. Medium-scale irrigation potential in Abbay Basin.

S no	Project Description	Sub-basin	River	Latitude	Longitude	Potential(ha)
1	Anonu (ANO-1)	Guder	Anonu			1,890
2	Huluka Debis (HUL-2)	Guder	Debis			2,180
3	Huluka Debis (HUL-1)	Guder	Huluka			1,879
4	Robi	Muger	Homecho			1,564
5	Aleltu Shoa (ALE-1)	Jemma	Tilku Aleltu			1,589
6	Aleltu N.Shoa (ALE-2)	Jemma	Aleltu			2,569
7	Duber	Muger	Duber			680
8	Chacha (CHA-1)	Jemma	Robi Rikicha			1,676

S no	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
9	Weserbi (WES-1)	Jemma	Weserbi			2,310
10	Biyo (ANG-4)	Anger	Biyo			2,231
11	Dembi Gusu	Anger	Waja			1,051
12	Leku uke (LEK-1)	Anger	Leku			1,285
13	Leku uke	Anger	Uke			1,025
14	Dimitu	Didesa	Dimitu			1,500
15	Dale	Anger	Aleltu			1,316
16	Felmitu Dila	Dabus	Meki			1,285
17	Upper Dabane	Didesa	Dabana			1,300
18	Hida	Didesa	Hida			1,400
19	Urgessa	Didesa	Urgesa			3,450
20	Azena/Ayo	Debre Markos	Ayo			1,834
21	Azena/Zingini	Debre Markos	Zingini			1,290
22	Guchis	Debre Markos	Guchis			2,065
23	Timbi	Debre Markos	Timbi			1,756
24	Yemshot	Mota	Tis Abbay			1,430
25	Sebatami	Mota	Tis Abbay			3,430
26	Tenba	Mota	Tis Abbay			2,490
27	Tis Abbay Bata	Mota	Tul			1,510
28	Durbete-1(DUR-1)	Lake Tana	Amini			1,219
29	Durbete-2(DUR-2)	Lake Tana	DibanKubar			2,569
30	Fettam (FET-1)	Debre Markos	Feham			2,170
31	Ambo Plain (GIL-1)	Lake Tana	Gilgel Abbay			660
32	Gug and Insewi(GIL-3)	Lake Tana	Gilgel Abbay			2,430
33	Kongera/Debi plain(GIL-4)	Lake Tana	Gilgel Abbay			2,750
34	Chimba (GIL-5)	Lake Tana	Gilgel Abbay			2,260
35	Diyaleg (GIL-6)	Lake Tana	Gilgel Abbay			1,371
36	Lijome Riste (Gil-7)	Lake Tana	Gilgel Abbay			428
37	Dimbk Plain (GIL-8	Lake Tana	Gilgel Abbay			1,984
38	Istumit (SWIT-1)	Lake Tana	Lake Tana			1,225
39	Asinwara (SWIT-1)	Lake Tana	Lake Tana			2,207
40	Kunzla (SWIT-3)	Lake Tana	Lake Tana			2,306
41	Lijome Gabplel(SwIT-4)	Lake Tana	Lake Tana			300
42	Amri plain (GIL-2)	Lake Tana	Gilgel Abbay			3,470
43	Lah (LAH-1)	Debre Markos	Lah			3,314
44	Tisabbay Bata (TIS-5)	Mota	Tul			1,510
45	Chemogo Kola	Debre Markos	Chemoge			3,429
46	Jedeb	Debre Markos	Jedeb			1,610
47	Lumame(LUM-2)	Debre Markos	Bogena			1,400
48	Debre Guracha	Jemma	Debre Guracha			940
49	Selgi	Welaka	Selgi			1,271
50	Kola Diba (MEG-5)	Lake Tana	Megech			3,030
51	Bebeha Abo (NWT-1)	Lake Tana	Lake Tana			2,809
52	Gawarna (NET-2)	Lake Tana	Lake Tana			1,266
53	Fentay (NNT-3)	Lake Tana	Lake Tana			830
54	Delgi (NWT-4)	Lake Tana	Lake Tana			3,000
55	Mitrah (NET-1)	Lake Tana	Lake Tana			1,920
56	Gubay Mariam (NET-2)	Lake Tana	Lake Tana			2,080
57	Kirnya (NET-3)	Lake Tana	Lake Tana			990
58	Agid /kab (NET-4)	Lake Tana	Lake Tana			1,450
59	Ribb Right Bank 1820(RIB-2)	Lake Tana	Ribb			3,060
60	Ribb Left Bank 1820(RIB-4)	Lake Tana	Ribb			3,370

S no	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
61	Guramba (GUM-1)	Lake Tana	Gumara			2,049
62	Mene Guzer (GUM-2)	Lake Tana	Gumara			1,623
63	Aba Kiro (GUM-3)	Lake Tana	Gumara			499
64	Bebeks (GUM-4)	Lake Tana	Gumara			2,795
65	Bar (BAR-1)	Wembera	Bar			1,968
66	Chigsa (CHI-1)	Anger	Gerbe Guracha			1,144
67	Jema Agnati (JEN-2	Dabus	Gember			2,304
68	Lower Debus - 1(DAB-3)	Dabus	Dale			2,700
69	Lower Debus - 2(DAB-4)	Dabus	Bilistu			2,700

Table A17. Large-scale irrigation potential in Abbay River Basin.

S no	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
1	Anger (ANG-1)	Anger	Anger			1,700
2	Neshe (NES - 1)	Fincha	Fincha			8,490
3	Nedi (NES - 2)	Fincha	Bilicha			4,631
4	Nekemte (ANG - 2)	Anger	Anger			13,200
5	Didiga (DID - 2)	Didesa	Didiga			5,450
6	Negeso (NEG - 1)	Didesa	Negeso			26,846
7	Gumbi (ANG - 3)	Anger	Gumbi			15,550
8	Argo-Didesa (ARJ-1)	Didesa	Didesa			16,800
9	Debana (DAB-1)	Didesa	Dabana			19,280
10	Wama (WAM-1)	Didesa	Wama			3,808
11	Robi (ROB-3)	Jemma	Robi Rikicha			15,360
12	Weserbi (WEB-1)	Jemma	Robi Jida			12,480
13	Upper Guder (GUD-1)	Guder	Guder	8.883333	37.683333	5,760
14	Kale (KAL-1)	Guder	Kale			19,125
15	Homecho (ROB-2)	Muger	Homecho			5,200
16	Upper Dila (DAB-6)	Debus	Dila			4,081
17	Deboila (DEB-1)	Debre Markos	Debohila			5,456
18	Didesa Pumping (DID-1)	Didesa	Didesa			5,650
19	Upper Beles (BEL-1)	Beles	Beles			0
20	Chagni (CHA-2)	Debre Markos	Ardi			3,734
21	Lower Beles (BEL-2)	Beles	Beles			100,000
22	Upper Beles (BEL-1)	Beles	Beles			0
23	Lower Dindir (DNI-2)	Dindir-Rahad	Dindir			58,300
24	Lugo (LUG-1)	Didesa	Lugo			3,730
25	Dabus (DAB-2)	Dabus	Debus			5,100
26	Upper Beles (BEL-1)	Beles	Beles			63,200
27	Wendata Iyesus (TIS-2)	Mota	Andasa			4,430
28	Middle Birr (BIR-1)	Debre Markos	Birr	10.683336	37.298611	10,000
29	Lower Birr (BIR-2A)	Debre Markos	Birr			9,010
30	Lower Birr (BIR-2B)	Debre Markos	Lah			9,010
31	Lower Birr (BIR-2C)	Debre Markos	Fetam Res.			9,010
32	Durbete 3 (Dur 3)	Lake Tana	Kiliti			7,309
33	Koga (acres) 1(Kog-1)	Lake Tana	Koga			6,000
34	Lumame (LUM-1)	Debre Markos	Gella			4,720
35	Yetmen (YET-1)	Mota	Muga			4,280
36	Yetnora (YET-2)	Debre Markos	Bechet			4,280
37	Yetmen (YET-3)	Mota	Suha			4,460
38	Galegu (GAL-1)	Dindir /Rahid	Galegu			11,600
39	Saraba (MEG-1)	Lake Tana	Lake Tana			5,710

S no	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
40	Robit (MEG-2)	Lake Tana	Lake Tana			6,465
41	Guramba (MEG-3)	Lake Tana	Lake Tana			6,640
42	Jarjer (MEG-4)	Lake Tana	Lake Tana			10,020
43	Jiwana (MEG-6)	Lake Tana	Megech			5,570
44	Rahad (RAH-1)	Dindir/Rahd	Rahad			53,100
45	Upper Beles (BEL-1)	Beles	Beles			0
46	Lower Dindir (DIN-2)	Dindir-Rahd	Dindir			0
47	Upper Dindir (UD-1)	Beles	Beles			10,000
48	Ribb Right Bank 1800 (RIB-1)	Lake Tana	Ribb			7,650
49	Ribb Right Bank 1800 (RIB-3)	Lake Tana	Ribb			9,360
50	Jigna (GUM-5)	Lake Tana	Gumera			4,940
51	Hod Gebeya (GUM-6)	Lake Tana	Gumera			4,535
52	Lower Dura Debere (LDU - 1)	Debre Markos	Dura			8,300

Table A18. Small-scale irrigation potential in Awash River Basin.

S No	Project Description	River	Lattitude	Longitude	Potential (Ha)
1	Senbete		10.28333	39.91667	200
2	Barak		9.7	41.9	200
3	Nura Era (UV2)	Awash			
4	Lower Valley (LV2)	Awash			
5	Lower Valley (LV2)	Awash			

Table A19. Medium-scale irrigation potential in Awash River Basin.

S No	Project Description	River	Lattitude	Longitude	Potential (Ha)
1	Kite (upper Mile)	Borkena RV.	11.65	39.65	1,000
2	Jara (Borkena)	Lake	10.48333	39.86667	2,000
3	Hardibo		11.23333	39.76667	1,000
4	Becho		10.76667	39.76667	3,000
5	Borkena				3,000
6	Cheleleka		10.08333	39.88333	770
7	Gimbora		11.76667	39.5	430
8	Weama		11.3	39.98333	1,000
9	Burka		11.5	40	1,800
10	Waketu				2,500
11	Jerviha		10.41667	39.86667	3,000
12	Aba Samuel				3,000
13	Sodome		9.2	40.88333	1,000
14	Harero		9.48333	42.46667	1,000
16	Abadir extension (UV3)				
17	Metahara extension (UV3)	Arba			
18	Arba	Awash			
19	Dijilu (MV2)				

Table A20. Large-scale irrigation potential in Awash River Basin.

S No	Project Description	River	Lattitude	Longitude	Potential (ha)
1	Indrisa		11.48333	40.48333	3,500
2	Mile		11.63333	39.80000	20,000
3	Werenso		11.40000	40.23333	6,000
4	Weki		10.48333	40.36667	7,000
5	Dirma		10.76667	39.76667	5,000
6	Bantu (Teji)				10,000
7	Wonji Shoa Expansion (UV1)	Awash			4,000
8	Nura Era Expansion	Awash			5,965
9	Kesem (MV1)	Awash			17,600
10	Angelele Bolhamo (NV2)	Awash			
11	Maro Gala irrigation (NV3)	Awash			
12	Maro Gala Swamp extension (MV3)	Awash			
13	Lower Vally Expension (LV2)	Awash			
14	Lower Vally Expension (LV3)				

Table A21. Large-scale irrigation potential in Baro Akobo River Basin.

S no	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
1	Baro RB, Itang Dam, Gravity	Lower basin	Baro	8.157500	33.641667	66,581
2	Baro RB, Itang River, Pumping	Lower basin	Baro			41,267
3	Baro RB, Gambela Dam	Lower basin	Baro			17,335
4	Baro, RB, River Pumping, gravity Conveance	Lower basin	Baro			17,338
5	Baro, LB, Itang Dam, Gravity	Lower basin	Baro			61,900
6	Baro, LB, Pumping		Baro			15,832
7	Baro, LB, Gambela Dam		Baro			57,018
8	Baro, LB, River pumping		Baro			57018
9	Alwero project, Abobo Dam Gravity		Alwero			13,600
10	Alwero, Chiru Dam		Alwero			17,054
11	Gilo, RB, Gilo-1 Dam		Gilo			81,346
12	Gilo, LB, River pumping		Gilo			79,652
13	System 2+Relift Station	Lower basin	Baro			57,495
14	System 3+ Low lift	Lower basin	Baro			41,016
15	System 3A+ High lift	Lower basin	Baro			67740
16	System 4+ Low Lift	Lower basin	Baro			41,016
17	System 4A+High lift	Lower basin	Baro			67,740
18	Alwero, RB Dumbong		Alwero	7.875000	34.608333	23192
19	Alwero, Chiru and Dumbong Dams		Alwero			34,665
20	Gilo, LB, River pumping		Gilo			65,538
21	Gilo, LB, Gilo 2 Dam		Gilo			33,855
22	Gilo, RB, Gilo 2 Dam		Gilo			61,325

Table A22. Small-scale irrigation potential in Denakil River Basin.

Sno	Project Description	River	Latitude	Longitude	Potential (ha)
1.	Tengego	Tengego			109
2.	Abe Amder	Aba Amder	13.33333	39.75	200
3.	Weate	Weate	13.36667	39.75	200
4.	Wetalis	Wetalis	12.01667	39.91667	200
5.	Irbeti	Irbeti	13.23333	39.08333	200
6.	Gira-ad	Gira-ad	13.11667	39.8	200
7.	Genu	Genu	12.16667	39.9	200
8.	Arkele	Arkele	13.16667	39.88333	200
9.	Dekni Golo	Dekni Golo	13.33333	39.76667	200
10.	Weynat	Weynat	13.01667	39.66667	200
11.	Hida	Hida	12.01667	39.11667	200
12.	Shibta	Shibta	12.71667	39.68333	200

Table A23. Medium-scale irrigation potential in Denakil River Basin.

S No	Project Description	River	Head Work	Latitude	Longitude	Potential (ha)
1	Berbere Gedo	Berbere Godl	Div/Dam	14.48333	39.81667	4,400
2	Saba	Saba	Div/Dam	13.9	40.01667	2,800
3	Tifozo	Tifozo	Div/Dam	13.63333	40.18333	4,300
4	Gegeya	Gegeya	Div/Dam	13.26667	40.26667	2,700
5	Lehol	Lehol	Div/Dam	13.2	39.76667	1,700
6	Hum	Hum	Div/Dam	12.46667	39.66667	3,400
7	Oda	Oda	Dam			457
8	Dayu	Dayu	Dam			444
9	Harosha	Harosha	Dam			443
10	Haya	Haya	Dam			447
11	Utu	Utu	Dam			340
12	Hara	Hara	Dam			340
13	Ula-Ule	Ula-Ule	Spate/Div			340
14	Bufe	Bufe	Spate/Div			340
15	May Akinso	May Akinso	Spate/Div			340
16	Fage	Fage	Spate/Div			340
17	Burka	Burka	Spate/Div			340
18	Guguf	Guguf	Spate/Div			340
19	Baro	Baro	Spate/Div			340
20	Trike	Trike	Spate/Div			340
21	Fokisa	Fokisa	Spate/Div			340
22	Ashiya	Ashiya	Spate/Div			340
23	Beryu	Beryu	Spate/Div			340
24	Golina 1	Golina 1	Div/Dam	12.06667	39.6	2,300
25	Harmat	Hormat	Div/Dam	12.11667	39.61667	6,200
26	Ale Wiha	Ale Wiha	Div/Dam	11.9	39.68333	1,000
27	Selahu	Selahu	Div/Dam	13.45	39.96667	700
28	Ume Jele	Ume Jele	Div/Dam	12.33333	39.56667	2,200
29	Hormat - Golina	Ground water	Pump	12.06667	39.68333	2,540
30	Waia - Golesh	Ground water	Pump	12.23333	39.56667	2,205
31	Kelkelit	Kelkelit	Div/Dam	11.99167	39.53333	1,500
32	Gobu	Gobu	Div/Dam	12.23333	39.51667	1,500
33	Awara	Awara	Div/Dam	11.9	39.86667	

Table A24. Large-scale irrigation potential in Denakil River Basin.

Sno	Project_Description	River	Latitude	Longitude	Potential (ha)
1.	Berber	Berber	14.61111	40.44444	7,600
2.	Adi Aro	Adi Aro	14.30556	40.58333	9,200
3.	Demale	Demale	14	40.22222	6,200
4.	Shigela	Shigela	13	40.30556	12,900
5.	Agn	Agn	13.38889	40.22222	20,300
6.	Kubi Tabato	Kubi Tabato	12.66667	40.58333	24,,900
7.	Alamata Mehoni	Ground Water			6,711
8.	Golina 2	Golina	12.13889	40.41667	23,000

Table A25. Small-scale irrigation potential in Genale Dawa River Basin.

Sno	Project Description	Sub Basin	River	Latitude	Longitude	Potential (ha)
1	Wabi Mena	Genate	W.Mena	6.650000	40.766667	0
2	Daye	Genate	Daye	6.928056	39.068889	50
3	Dareha		Dareha	6.537500	39.234167	70
4	Fechie		Komisa	6.638611	39.411111	90
5	Dayu		Dayu	6.300000	39.966667	100
6	Chebi		Nyekisa	6.300000	39.234444	110
7	Kuba Chena		Kochena	6.728333	39.564444	120
8	Youko		Likimsa	6.115278	39.371944	165
9	Dawa	Dawa	Dawa	4.850000	39.35	75
10	Dawa	Dawa	Dawa	4.800000	39.416667	85
11	Dawa	Dawa	Dawa	5.000000	39.133333	90
12	Dawa	Dawa	Dawa	5.116667	38.966667	110
13	Dawa	Dawa	Dawa	5.133333	39	135
14	Dawa	Dawa	Dawa	4.950000	39.15	135
15	Awata	Dawa	Awata	5.150000	39.15	135
16	Asume	Dawa	Asume	5.266667	38.433333	135
17	Lola		Lola	7.053889	39.950556	65
18	Shaya	Weyb	Shaya	7.188056	35.990556	135

Table A 26. Medium-scale Irrigation Potential in Genale Dawa River Basin.

Sno	Project Description	Sub- Basin	River	Latitude	Longitude	Potential(ha)
1	Korke		Leedadi	6.155833	39.26639	210
2	Bedesa		Hodem	6.336389	39.15222	275
3	Derba		Derba	7.124167	39.90111	310
4	Menisa Guda	Genale	Menisa Gvala	6.383333	39.6	420
5	Elgole Goga	Genale	E. Goga	6.4	39.7	1,100
6	Fode		Lango	7.169444	39.25194	475
7	Sade	Weyb	Weyb	7.233611	40.15889	475
8	Beke	Dawa	Dawa	5.133333	38.15	450
9	Gunway	Dawa	Gunway	5.133333	40.16667	550
10	Masiyay	Dawa	Masiyay	4.783333	39.2	550
11	Tirawa Guda	Dawa	T.Guda	4.933333	39.38333	700
12	Agersu Wabufte	Dawa	A.Wabufte	4.7	39.1	800
13	Harakesa	Dawa	Harakesa	4.933333	40.05	850
14	Chobi	Dawa	Chobi	4.6	39.61667	850
15	Ardayide	Dawa	Ardayide	4.683333	39.88333	900

Sno	Project Description	Sub- Basin	River	Latitude	Longitude	Potential (ha)
16	Adendury	Dawa	Adendury	4.966667	40.16667	1,000
17	Dekera Kelo	Dawa	D.Kelo	4.766667	38.93333	1,500
18	Tile	Dawa	Tile	4.7	38.76667	1,600
19	Galbo Meka	Dawa	G.Meka	4.633333	38.76667	1,600
20	Bali	Dawa	Bali	4.583333	38.78333	1,700
21	Chumo	Dawa	Chumo	3.7	38.35	1,850
22	Melka Awala Nedeni		M.Awalg N.	3.7	38.35	2,000
23	Kokon	Genale	Kokon	5.183333	40.96667	700
24	Jenay	Genale	Jenay	5.15	40.83333	2,000
25	La Uno	Dawa	La uno	4.933333	40.66667	1,000
26	Elben	Dawa	Elben	4.8	40.9	1,250
27	Alobabo	Dawa	Alobabo	4.366667	40.45	1,300
28	Teso Tedecha	Dawa	T.Tedecha	3.583333	39.58333	2,000

Table A27. Large-scale irrigation potential in Genale Dawa River Basin.

Sno	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
1.	Iya			6.283333	39.366667	3,700
2.	Yadot	Genale	Yadot	6.366667	39.916667	5,000
3.	Wabe Mena	Genale	Wabe Mena	7.033333	40.416667	6,000
4.	Wabe Mena	Genale	Wabe Mena	6.516667	40.8	6,000
5.	Wabe Mena	Genale	Wabe Mena	5.766667	41.15	8,500
6.	Wabera	Genale	Wabera	6.65	40.65	36,000
7.	Dumal	Genale	Dumal	4.433333	41.816667	46,000
8.	Welmel	Genale	Welmel	6.466667	39.65	62,000
9.	Deyu	Genale	Deyu	6.45	39.983333	80,000
10.	Tegona	Wayb	Tegona	7.15	40.1	2,500
11.	Shaya	Wayb	Tegona	7.183333	39.983333	3,000
12.	Wayb (Bale Gardula)	Wayb	Weyb	7.1	40.4	4,500
13.	Tebel	Wayb	Tebel	6.916667	41.066667	35,000
14.	Weyb	Weyb	Weyb	6.533333	41.166667	38,000
15.	Weyb	Weyb	Weyb	6.766667	40.966667	62,000
16.	Genale	Genale	Genale	5.7	39.566667	5,000
17.	Didiga	Dawa	Didiga	5.283333	38.25	2,500
18.	Hadesa	Dawa	Hadesa	4.933333	39.716667	2,500
19.	Lege Sure	Dawa	Lege Sure	3.85	39.45	3,800
20.	Lebu Wale	Dawa	Lebu Wale			3,800
21.	Chulul	Dawa	Chulul			4,200
22.	Bururi	Dawa	Bururi	3.933333	39.516667	4,200
23.	Chembe		Ababa	6.083333	38.905	4,300
24.	Berecha		Berecha	7.555278	38.959722	5,000
25.	Raro Kobo		Raro	6.092222	38.804444	5,200
26.	Raro Wiha		Raro	6.073333	38.759444	6,200
27.	Michicha	Genale	Genale	6.145833	38.970556	7,000
28.	Solemo		Dida Hora	6.043611	38.550833	7,500
29.	Dorso		Dorso	6.361389	38.280833	11,000
30.	Dawa	DAWA	Dawa	4.716667	39.466667	12,000
31.	Megere		Mejego	6.400278	38.272778	12,000
32.	Awulay	Genale	Awulay	5.033333	40.866667	2,100
33.	Dibraw	Genale	Dirban	5.1	40.783333	3,000
34.	Bifetu	Genale	Difetu	5.05	40.816667	3,000

Sno	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
35.	Genale	Genale	Genale	4.75	41.6	30,000
36.	Genale	Genale	Genale	4.6	41.666667	41,000
37.	Genale	Genale	Genale	4.433333	41.816667	54,000
38.	Weyb	Weyb	Weyb	5.75	41.716667	137,000
39.	Weyb	Weyb	Weyb	5.466667	41.783333	280,000

Table A28. Small-scale irrigation potential in Wabi Shebele River Basin.

Sno	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
1	Lebu Kejewa		Lebu Kejewa	7.708333	40.666667	500
2	Aynag		Aynag	7.8	40.741667	200
3	Kome		Kome	7.9	40.783333	200
4	Ferekesa	Hulul	Ferekesa	7.633333	39.466667	400
5	Chele - 1	Hulul	Chele	7.683333	39.516667	400
6	Ameto	Hulul	Ameto	7.633333	39.483333	350
7	Elel - 3	Manya	Elele	7.9	40.083333	150
8	Elel - 1	Manya	Elele	7.883333	39.95	150
9	Angadicho	Hulul	Angadicho	7.75	39.6	450
10	Denebesho - 2	Hulul	Denebesho	7.733333	39.583333	1,000
11	Denebesho - 1	Hulul	Denebesho	7.716667	39.6	600
12	Mine - 1	Manya	Mine	8.283333	40.016667	250
13	Mine - 2	Manya	Mine	8.266667	40.116667	200
14	Manya - 3	Manya	Manya	8.016667	40.116667	200
15	Manya-1	Manya	Manya	8.016667	40.116667	150
16	Elel - 2	Manya	Elele	7.883333	40.033333	200
17	Hararge - 1	Hulul	Hararge - 1	7.716667	39.533333	200
18	Furda	Up.Wabw Ahebele	Furda	7.4	39.45	500
19	Sirba			7.616667	39.466667	300
20	Tilku Bedesa	Ramis	Tilku Bedeso	8.666667	40.35	200
21	Awi Seyed	Dhungete	Awi Seyed	8.8	40.5	400
22	Cheko	Ramis	Cheko	9.25	40.166667	400
23	Kora Gorma	Dhungeta	Kora Gorma	8.616667	40.3	250
24	Debeso - 2	Ramis	Debeso	9.083333	41.066667	150
25	Debeso - 1			9.1	41	200
26	Dembi	Dhungeta	Dembi	8.55	41.608333	150
27	Berihamo	Ramis	Berihamo	8.875	41.033333	200
28	Kara Kurkura	Dhungeta	Kara Kurkura	8.85	40.683333	250
29	Weleso	Ramis	Welenso	8.95	40.866667	200
30	Dhungeta - 2	Dhungeta	Dhunegta	8.55	40.6	200
31	Kortu			8.516667	40.35	300
32	Jerjertu	Ramis	Jerjertu	8.866667	41.233333	100
33	Obicha	Ramis	Obicha	8.866667	41.216667	200
34	Dawe	Erer	Dawe	9.266667	41.85	100
35	Melba	Erer	Melba	9.166667	41.938333	105
36	Ebicha	Erer	Ebicha	9.15	41.7	400
37	Gobele	Erer	Gobele	9.166667	41.983333	150
38	Geba	Ramis	Geba	9.091667	41.508333	200
39	Golu	Ramis	Golu	9.25	41.433333	200
40	Denan	Lower Wabe Shebele	Wabe	6.433333	43.566667	
41	Fafam II	Fafem	Fafem	7.366667	43.916667	

Table A29. Medium-scale irrigation potential in Wabi Shebele River Basin.

Sno	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
1	Herero	Upper Wabi Shebele	Herero	7.033333	39.333333	250
2	Gondedo	Upper Wabe Shebele	Godedo	7.033333	39.45	400
3	Leliso	Upper Wabi Shebele	Leliso	7.033333	39.366667	400
4	Furuna	Upper Wabi Shebele	Furuna	7.033333	39.416667	600
5	Birbirsa	Upper Wabi Shebele	Birbirsa	7.591667	40.516667	700
6	Laga Jala	Middle Wabi Shebele	Laga Jala	7.566667	40.6	800
7	Mergefa	Middle Wabi Shebele	Mergefa	7.641667	40.633333	1,000
8	Meribo	Upper Wabi Shebele	Meribo	7.033333	39.35	1,000
9	Lensho	Upper Wabi Shebele	Lensho	7	39.15	1,200
10	Torbi	Gololcha	Torbi	7.55	40.983333	500
11	Lale	Gololcha	Lale	7.866667	40.85	500
12	Gololcha II	Gololcha	Gololcha	7.45	40.85	2,000
13	Gololcha III	Gololcha	Gololcha	7.466667	40.966667	2,000
14	Kecheno	Upper Wabi Shebele	Kecheno	7.883333	39.583333	600
15	Habe	Upper Wabi Shebele	Dengezela	7.816667	39.783333	300
16	Hafi Arebo	Upper Wabi Shebele	Hafi Arebo	7.833333	40.1	300
17	Arfetu	Upper Wabi Shebele	Arfetu	7.416667	39.466667	500
18	Anfote	Hulul	Anfote	7.633333	39.466667	400
19	Legna	Upper Wabi Shebele	Legna	7.3	39.45	600
20	Anjage	Manya	Anjage	8.133333	39.816667	400
21	Elel 4	Manya	Elele	7.916667	40.116667	500
22	Teji	Upper Wabi	Teji	7.433333	39.483333	500
23	Samara	Upper Wabi	Samara	7.266667	39.416667	500
24	Gumelo	Hulul	Gumelo	7.583333	39.5	600
25	Leku	Upper Wabi	Leku	7.35	39.45	600
26	Hararge - 2	Hulul	Hararge - 2	7.716667	39.566667	650
27	Serbona	Hulul	Serbona	7.733333	39.533333	700
28	Gofergiba	Manya	Gofergiba	7.758333	39.983333	700
29	Mechi	Manya	Mechi	8.25	39.783333	800
30	Robe - 1	Manya	Robe	7.95	39.575	1,000
31	Gawela	Manya	Gawela	8.016667	39.616667	1,000
32	Manya - 2	Manya	Manya	8.016667	40.05	250
33	Azule	Manya	Azule	7.983333	40.033333	250
34	Chulul	Manya	Chulul	8.283333	40.15	250
35	Gololcha	Manya	Gololcha	8.083333	40.05	400
36	Gimbicho	Manya	Gimbicho	8.05	39.066667	2,500
37	Sedoka	Manya	Sedoka	8.15	39.65	2,500
38	Mechitu	Upper Wabi	Guracha	7.45	39.466667	2,500
39	Guracha	Manya	Guracha	8.133333	39.683333	2,000

Sno	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
40	Denebesho - 1	Hulu	Denbesho	7.716667	39.6	600
41	Talo	Dhungeta	Talo	8.225	40.816667	400
42	Sakota - 2	Ramis	Sakota - 2	8.675	40.883333	400
43	Sakota - 1	Ramis	Sakota - 1	8.716667	40.791667	400
44	Wolargi	Ramis	Wolargi	8.916667	40.833333	500
45	Haro Kuni	Ramis	Kuni	8.84	40.693333	500
46	Melka Belo	Ramis	Hawena	8.841667	40.566667	500
47	Wachu - 1	Dhungeta	Tilo	8.8	40.633333	550
48	Lebu	Dhungeta	Lebu	8.216667	40.6	800
49	Bati	Ramis	Bati	8.766667	40.816667	800
50	Midhagdu	Ramis	Midhagdu	8.9	40.816667	1,000
51	Wachu - 2	Dhungeta	Wachu	7.966667	40.683333	400
52	Dhungeta - 1	Dhungeta	Dhungeta	8.316667	40.8	300
53	Eja'e - 2	Ramis	Eja'e	8.816667	41.366667	400
54	Kosum	Ramis	Kosum	9.316667	41.85	300
55	Itisa Kolo	Ramis	Guta	9.358333	41.583333	300
56	Burka Geba	Ramis	Anageli	9.366667	41.508333	700
57	Gurguf Gola Timtu	Ramis	Gurguf	8.75	41.925	400
58	Mudena Seyle	Ramis	Mudena Seyle	9.066667	41.95	400
59	Gelan Sede	Ramis	Gelan Sede	9.116667	41.75	800
60	Lega Dima	Ramis	Lega Dima	8.8	41.466667	750
61	Eja'e - 1	Ramis	Eja'e	8.916667	41.333333	1,000
62	Deneba - 1	Ramis	Deneba	8.966667	41.65	500
63	Dolis	Daketa	Dolis	9.25	42.416667	500
64	Belina	Ramis	Woter	9.4	41.766667	500
65	Deneba - 2	Ramis	Deneba	9.083333	41.65	500
66	Welabu	Daketa		9.266667	42.333333	600
67	Gefera Gogesa	Daketa	Gefera Gogesa	9.183333	41.933333	600
68	Gole Muda	Erer	Kersa	9.4	41.883333	600
69	Doroba	Erer	Doroba	8.883333	41.808333	600
70	Mojo - 2	Erer	Mojo	8.8	41.7	700
71	Mojo - 1	Erer	Mojo	8.916667	41.733333	700
72	Burke - 1	Ramis	Burke	9.283333	41.35	700
73	Chulul - 2	Erer	Chulul	8.916667	41.8	800
74	Chulul - 1	Erer	Chulul	9.033333	41.791667	800
75	Burka - 2	Ramis	Burka	8.85	41.583333	1,000
76	Chulul - 3	Erer	Chulul	8.783333	41.783333	1,000
77	Santala	Fafem	Santala	9.366667	42.433333	1,000

Table A30. Large-scale irrigation potential in Wabi Shebele River Basin.

Sno	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
1	Gololcha - 1	Gololcha	Gololcha	7.4	40.766667	10,000
2	Gololcha - 4	Gololcha	Gololcha	7.533333	41.266667	10,000
3	Kora	Upper Wabi	Kora	7.016667	39.216667	2,300
4	Ukuma	Upper Wabi	Ukuma	7	39.016667	2,500
5	Dhakafu	Gololcha	Dhakafu	7.366667	40.933333	3,000
6	Keserera	Gololcha	Keserera	8.258333	39.775	3,000
7	Kombolcha	Gololcha	Kombolcha	8.25	39.7	3,500
8	Robe 2	Gololcha	Kombolcha	7.883333	39.616667	4,000
9	Umecho	Ramis	Umecho	8.133333	40.883333	10,000

S no	Project Description	Sub-basin	River	Latitude	Longitude	Potential (ha)
10	Erer	Erer	Erer	9.266667	42.083333	4,000
11	Kungo-1	Erer	Erer	6.316667	42.35	4,600
12	Gode West	Erer	Erer	6.133333	43.133333	10,000
13	Gode South	Erer	Erer	6.133333	43.133333	23,000
14	Bohd-bar	Erer	Erer	6.05	43.066667	5,000
15	Madiso	Erer	Erer	6.2	42.733333	12,000
16	Lio-Uen	Erer	Erer	5.726667	44.916667	18,000
17	Upper - R1	Erer	Erer	5.583333	44.233333	4,800
18	Mustahie	Erer	Erer	5.283333	44.65	3,800
19	Bul - doho	Erer	Erer	5.583333	44.233333	21,000
78	Bisidmo	Erer	Bisidmo	9.183333	42.266667	1,000
79	Ijalola	Erer	Ijalola	8.783333	42.166667	1,000
80	Reko Alola			8.816667	41.933333	600
81	Reko Berbala			8.883333	41.916667	700
81	Jerer	Fafem	Jerer	8.983333	43.016667	1,000
82	Segeg	Daketa	Daketa	7.733333	42.9	1,500
83	Daketa	Daketa	Daketa	8.3	42.6	2,500
84	Fafem - I	Fafem	Fafem	8.583333	43.016667	1,500
85	Alimad	Lower Wabi Shebele	Wabi Shebele	5.583333	44.116667	1,200
86	Gedow	Lower Wabi Shebele	Wabi Shebele	5.583333	44.233333	1,000
87	Digni	Lower Wabi Shebele	Wabi Shebele	5.633333	44.266667	2,100
88	Lower-R1	Lower Wabi Shebele	Wabi Shebele	5.4	44.233333	2,600

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