THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

ABBAY BASIN AUTHORITY

Report On

Socio - Economic Characterization Of Abbay Basin

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Acronyms

ABA - Abbay Basin Authority
ABMP - Abbay Basin Master Plan
CIA - Central Intelligence Authority
CSA - Central Statistics Authority
DAP - Di - ammonium phosphate
ENTRO - eastern Nile Transboundary Regional Office
est - Established
FAO - Food for Agricultural Organization
FMD - Food and Mouth Disease
GDP - Gross Domestic Product
GTP-Growth and Transformation plan
IMF-International Monetary Fund
Km-Kilometer
MASL-Meter Above Sea Level
MOM-Ministry of Mining
MW - Mega Watt
NCD -New Castle Disease
PPP - Purchasing Power Parity
UNESCO - United Nations Education Scince and Culture Organization
USA - United Nation of America
WAPCOS - Water and Power Consultancy service

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1. Introduction

Socio economic characterization is a review of social and economic patterns. It provides data, maps as well as back ground information for the next steps of planning. It includes analytical tool for development of water quality and quantity matters and it concludes with a description of socio economic issues in the basin. the characterization focuses on the local social and economic situation which influences the quality and quantity of water in the basin.

Socio economic characterization includes a description of the pressure on water resources including population, Agriculture and industrial development, and other economic activities and water related infrastructure. These factors are the key drivers of how water is used in the river basin. Later in the basin planning process this information will be used to inform the pressure and impact analysis.

This document is also expected to show all the existing socio economic conditions that are also important to measure basin plan performance before making any changes to development project and programs that is going to take place in the basin.

It provides insight in to the base line socio economic characterization of the basin with special reference to socio economic aspects to propose appropriate basin plan documents for enhancing productivity and sustainability in the basin.

The document provides the main idea of; population and its demographic characteristics, Economy (agriculture, industry, mining and etc), Social (education, health, and tourism) and other important issues in the basin.

2. Objective

2.1 General objective

The general objective of this assessment is to provide basic socio economic information about the Abbay Basin that will use for basin planning process.

2.2 Specific objective

- To assess the current and existing situation of the basin.
- To indicate major Socioeconomic factors that exert pressure and could be impact water and other natural resources of the basin.
- To identify major issues highly concerned with socio economic situations in the basin.

3. Methodology

The methods used in the development process of the document;
 The inventory of social and economic data is accomplished by using sources of published information, including information published by local and national governments. An extensive literature review is consulted, and internet searches are also carried out. Many references are identified and reviewed.

Once all available information has been collected through the literature review and, it is compiled into a series of tables summarizing the resource characteristics, institutional and management characteristics, and user community characteristics of the basin. The data are   then analyzed and synthesized into draft document for review. the literature contains a substantial body of information, some of which might not be immediately available to users and needs further study.

4. Scope and Limitation of the Assessment

The limitations and problems encountered during the assessment are as follows:

The assessment was constrained by lack of sufficient literature and studies in every concerns we need in basin level . Poor data access from the sources, most of the documents could only accesses with limited consolidated data and some of the data are not prepared in basin level; they are either restricted to regions/some specific areas /or are as wide as national level. The other problem of the assessment is the available data are studied or gathered long time ago and are not updated and don't represent the current socioeconomic reality/ situation / of the basin.

5. Social

As indicators of well-being can be used in scientific, economic and social contexts to the quality of life of individuals, certain observations on the social and economic well-being of human development are taken.

5.1 Population

Population growth and distribution have always been linked to the availability of freshwater and the sustainability of water and other natural resources. The demand for water has grown significantly not only because of population growth, but also because of an increase in the uses of water for households, agriculture, and industrial production. Appropriate management of water resources is essential for meeting the demands of a growing population and for expanding water uses(USA Population Reference Bureau,2016).

In a river basin, population growth ultimately leads to increasing demands and competition for scarce freshwater resources, and expanding degradation of watersheds. Good water resources management must therefore deal with the relationship between population, poverty & environment, and consider the broader implications of population growth on the sustainable management and development of freshwater resources (Nile basin water resource atlas,2016).

Water resources touch so many elements of human systems and ecosystems, management must be integrated across water use sectors, across scales of governance, across space in a river basin context, and across time. Many current water problems come from the fragmented, single-issue and single-sector approaches that have characterized water resources management in the past. This requires a governance and management system that integrates science-based understanding of the natural controls on water abundance and quality with appropriate and effective human technologies and actions (Global Water Sustainability Program,2008).

Therefore, this socio-economic assessment part, reviews the status of Abbay basin population and discusses its importance with respect to the sustainable management and development of the basin. It starts with an analysis of the existing population of the basin, growth trend of the population of the basin, opportunities and challenges of large population in the basin, population distribution in the basin, demographic factors, such as age and gender structure, cultural and ethnic composition, religion and social institutions (health and education). It also considers the question of costs and benefits of the rising population, and the necessary conditions for its positive contribution to national and regional development.

5.1.1 Population of Abbay basin

The Abbay River basin population comprises parts of three regional states. These include, Amhara, Oromia and Beneshangul Gumuz . According to CSA and ANRS BoFED, in 2014 the total population of the basin was about 28,590,000, (Abbay basin atlas,2015) and in 2030, the population will be expected to increase 40,300,989. This number is expected to share about 32 percent of the total population of the country. This figure includes the major cities and towns of the basin population i.e Bahir Dar, Gondar, Deber Markose, Fiche, Assosa, Nekemete, Ambo, etc. From the total population of the basin Amhara region has the population of 60% , Oromia region 36% and Benishangul-Gumuz has the population share of 4 % in the basin. From the total basin population on average   80% of inhabitants live in rural areas of the basin while the rest 20 % population dwell in urban areas.

5.1.2 Population growth trend of the Basin

Table 1: Population growth trend in the Basin

Year	Growth rate	Male	Female	Total	Urban	Rural
2014		14,369,276	14,220,724	28,590,000	5,432,100	23,157,900
2015	0.0251	14,729,945	14,573,398	29,303,343	5,568,446	23,734,897
2016	0.0248	15,095,247	14,934,818	30,030,066	5,706,543	24,323,523
2017	0.0245	15,465,081	15,300,721	30,765,802	5,846,353	24,919,449
2018	0.0226	15,814,592	15,646,518	31,461,109	5,978,481	25,482,628
2019	0.0226	16,172,002	16,000,129	32,172,130	6,113,595	26,058,536
2020	0.0226	16,537,489	16,361,732	32,899,221	6,251,762	26,647,459
2021	0.0205	16,876,507	16,697,147	33,573,655	6,379,923	27,193,732
2022	0.0205	17,222,476	17,039,439	34,261,915	6,510,712	27,751,203
2022	0.0205	17,575,537	17,388,747	34,964,284	6,644,181	28,320,103
2024	0.0205	17,935,835	17,745,217	35,681,052	6,780,387	28,900,665
2025	0.0205	18,303,520	18,108,994	36,412,513	6,919,385	29,493,128
2026	0.0205	18,678,742	18,480,228	37,158,970	7,061,232	30,097,738
2027	0.0205	19,061,656	18,859,073	37,920,729	7,205,987	30,714,741
2028	0.0205	19,452,420	19,245,684	38,698,104	7,353,710	31,344,393
2029	0.0205	19,851,195	19,640,220	39,491,415	7,504,461	31,986,953
2030	0.0205	20,258,144	20,042,845	40,300,989	7,658,303	32,642,686

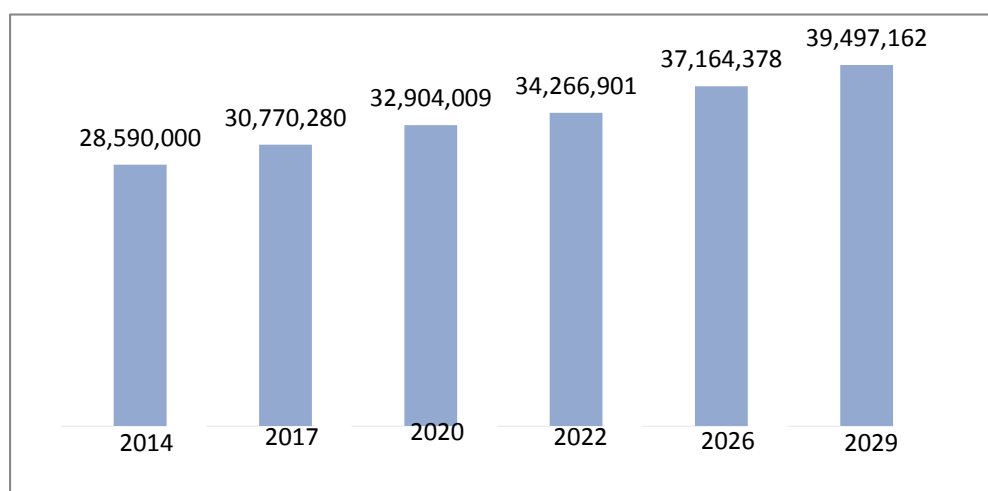Source; *Abbay basin atlas ,2015 and CSA projection,2014-2030*

Figure 1 :Graphical Representation of population

The table shows how many people have been living in the basin from 2014 to 2030. There are several discernable changes in the proportion of people in urban and rural areas . As can be seen apparently the basin population have swelled considerably from 28.59 million to 40.3 million from 2014 -2030.. This shows that, fertility manifests itself for the increment of the basin's population.

Challenges

Increasing population leads to increasing demands and competition for scarce resources specially for agricultural land, expanding degradation of watersheds in rural areas and urbanization rate will increase. This, in turn, will result in increased demands for better water supply, sanitation, electricity, communication and other services. Urbanization is expected to increase the pressure on natural resources and the environment as expansion of cities occurs generally at the expense of destruction of forests; there is risk of increasing pollution of water resources.

Opportunities

With regard to opportunities, large population , may attract investors and multinational companies within the basin ,stimulating investment in knowledge, generating more new ideas which improve productivity, increasing learning-by-doing due to pressures of increased production volume, to have more active labor force ,more young people energizing the economy and an absolutely larger number of outstanding, highly effective people.

5.1.3 Population distribution in the basin

The distribution of population in the basin is influenced by a number of factors among which are climate, rainfall, soil fertility, mineral resources, peace and security in the area, and social and economic infrastructure (transport, education, health, telecommunications, and etc). The influence of water availability (in the form of large water bodies or rainfall) appears to overshadow other factors in the basin (Nile basin water resource Atlas,2016) .

According to CSA,2007 highly populated areas of the basin include, the northern part of Lake Tana ,the central part of the basin and the southern ends of Didessa sub-basin but there may be variation among the rural and urban areas. The distribution of basin population as shown in the figure below depicts that, the northern, central and some southern end of the area (Tana , South & North gojjam and Didessa sub-basins) are densely populated areas.

Moderately populated area of the basin, covers majority of the central parts and Eastern parts of the basin, (Jemma, Woleka, Beshilo, Anger, Muger, Guder,and Fincha), on the other hand, most of the Weastern parts of the basin (Belese, Dinder, Rahad, Dabus and Wonbera) are characterized by sparsely populated area.
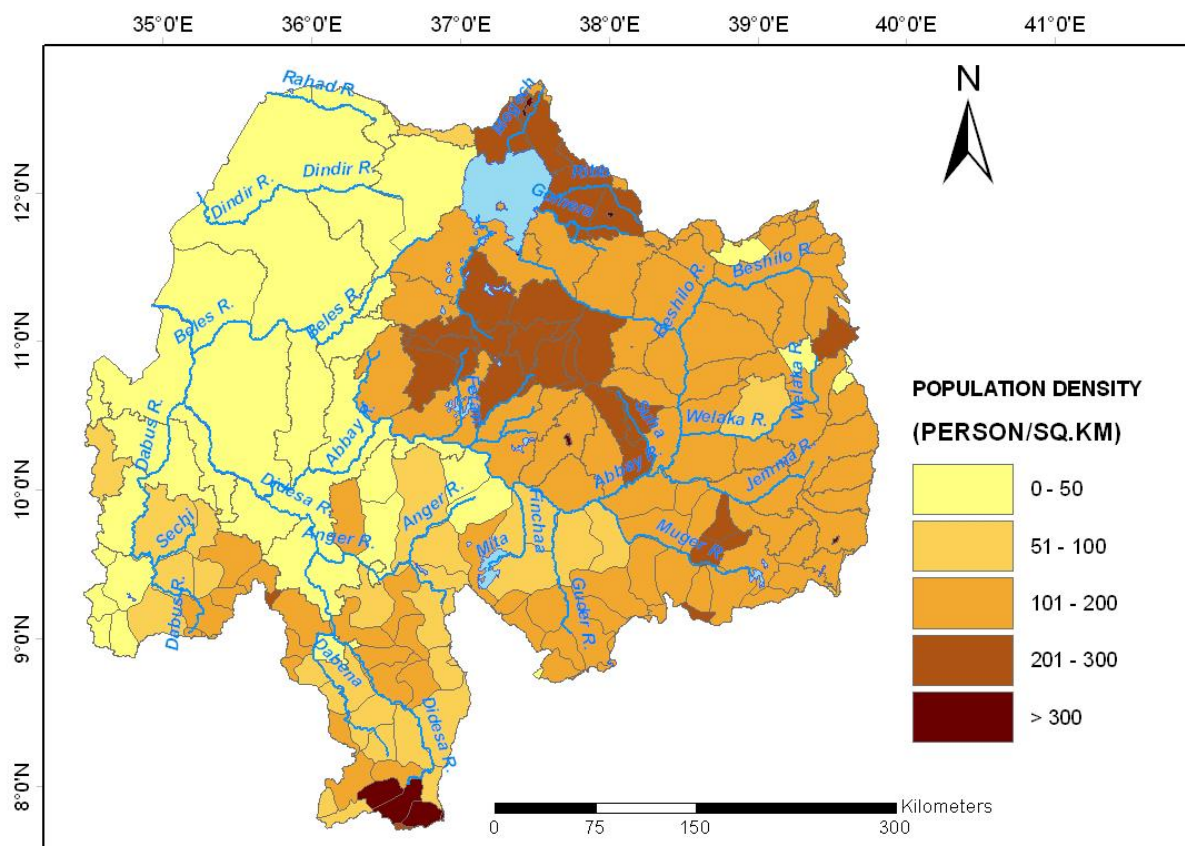

Figure 2: population distribution of the basin

5.1.4 Demographic Characteristics of the basin

Demographic factors provide insights to the causes of change in basin communities. To understand the relationship between the causes of change in demographics and how they are impacting the basin needs examine of a broader set of population indicators. These include changes in the sex profile of the population, age structure, cultural and ethnic composition, religion composition and dependence ratio.

5.1.5 Sex structure and its trend in the Basin (2014-2030)

Sex structure is the most important demographic characteristics that are captured by a census of a population. It attributes that largely influence an individual's role in society. An attempt was made in this socioeconomic assessment of the basin to examine the various aspects of sex composition of the population of Abbay basin using data obtained from CSA ,2014-2030 and other relevant literatures .

Table 1:sex structure

Year	Total population	Male	% of Male	Female	% of female
2014	28,590,000	14,369,276	50.25979713	14,220,724	49.74020287
2015	29,303,343	14,729,945	50.26711457	14,573,398	49.73288543
2016	30,030,066	15,095,247	50.26711563	14,934,818	49.73288437
2017	30,765,802	15,465,081	50.26711477	15,300,721	49.73288523
2018	31,461,109	15,814,592	50.26711233	15,646,518	49.73288767
2019	32,172,130	16,172,002	50.26711318	16,000,129	49.73288682
2020	32,899,221	16,537,489	50.26711423	16,361,732	49.73288577
2021	33,573,655	16,876,507	50.26711569	16,697,147	49.73288431
2022	34,261,915	17,222,476	50.26711437	17,039,439	49.73288563
2022	34,964,284	17,575,537	50.26711544	17,388,747	49.73288456
2024	35,681,052	17,935,835	50.26711376	17,745,217	49.73288624
2025	36,412,513	18,303,520	50.26711285	18,108,994	49.73288715
2026	37,158,970	18,678,742	50.26711451	18,480,228	49.73288549
2027	37,920,729	19,061,656	50.26711380	18,859,073	49.7328862
2028	38,698,104	19,452,420	50.26711386	19,245,684	49.73288614
2029	39,491,415	19,851,195	50.26711502	19,640,220	49.73288498
2030	40,300,989	20,258,144	50.26711379	20,042,845	49.73288621

Source; Abbay basin atlas,2015 and CSA projection,2014-2017

As shown in the above table, the basin female population constitute 14,220,724 in 2014 which was 49.74 percent of the total population of the basin while males constitute 14,369,276and covers 50.26 percent of the total population of the basin, and In 2030 the size of female population is projected to be 20,042,845 (49.73%) while males is expected to be 20,258,144 which accounting for 50.27 percent. In each consecutive year (2014-2030), the basin has almost proportional distribution of population in sex, is an important social factor for different governmental, non-governmental and community based organizational intervention to bring equity between males and females in the basin.

5.1.6 Age Structure

Age structure indicates the number of people in different age group within a given population at a time. It is one of the most basic characteristics of population of a given territory. Numbers and percentage of a population is very important to determine the social and economic structure of the population through identifying demand for schooling (schools, teachers, books, and many other schooling inputs), health care as well as other basic needs including food for those who are not able bodied to support themselves due to their ages. It also helps to know potential labor resources in the basin because the dominant age group in the basin will highly influence the priority issues and the focus of interventions in the allocation and management of resources, man power and materials in the basin.

Below are the age characteristics of the basin population by the major age categories 0-14, 15-24 , 25-54 , 55-64 , and 65+ . The data and discussions are presented based up on the projected population of 2017 CSA data and CIA world factbook,2016.

Table 2: Age structure of the basin population

No.	Age Structure	Number of population	Coverage in %
1	0-14 years	13,447,732	43.71
2	15-24 years	6,165,467	20.04
3	25-54 years	9,060,529	29.45
4	55-64 years	1,196,790	3.89
5	65+ years	895,285	2.91

Coverage in %

Coverage in %	0-14 years	15-24 years	25-54 years	55-64 years	65+ years
Coverage in %	43.71%	20.04%	29.45%	3.89%	0
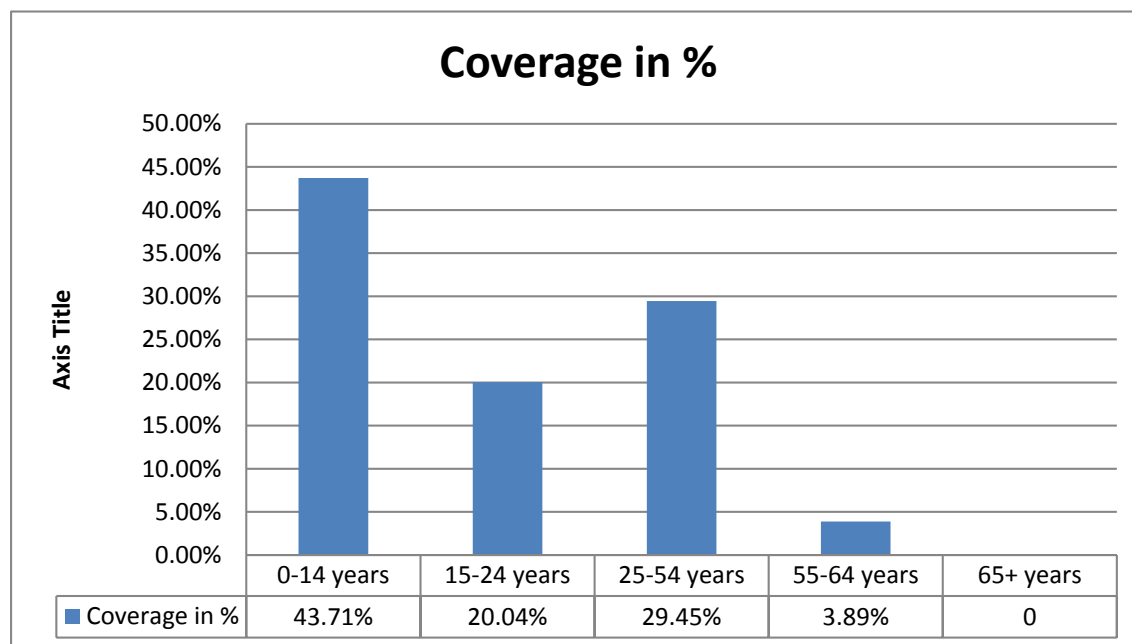
Figure 3: Age structure

Child age Population (0-14) of the basin

Child age population refers to the population aged below 15 (0-14) years . This population of the basin projected to be **13,449,567** which accounted for 43.71 percent in 2017 that requires huge investment of socio-economic issues like education and health. The size of the population in this age category in comparison with the rest of the age groups is an indirect indication of the existing fertility level of the basin in which higher size relative to other ages implying high fertility.

Working age Population(15-64) of the basin

This age group consists of the population aged 15-64 years which is the productive age group and highly helpful for the basin's socio-economic development. The basin's total population size of this working age population projected to be 16,425,026 (accounting for 53.38 percent of the total basin population) in 2017.

Old Age Population (65+) of the basin

Old Age Population of the basin, the population aged 65 and over, shares smaller proportion relative to the child and working age categories. In terms of size, this age group is projected to be **895,407** in 2017 (2.91 percent) .

Dependence ratio Age dependency ratio is the ratio of persons in the ages defined as dependent (under 15 and over 64 years) to persons in the ages defined as economically productive (15-64 years) in a population which is **0.873 : 1**. It shows the proportion of the basin's population not in the work-force who are 'dependent' on those of working-age . According CIA world factbook,2016 data realizes that, economically active population of the basin consists of 16,425,026 (accounting for 53.38 percent of the total basin population) in 2017, while economically inactive population accounts for 14,344,974 (46.62%). The basin has a dominant working age structure that indicates the basin is endowed with potential labor resources for socio-economic development .

5.1.7 Ethnic, Language and religion composition

The population of Abay River basin consists of Amhara, Oromo, Gumuz, Agew, Berta, Shinasha, Mao,Koma and other ethnic groups. The major spoken language in the basin also include Amharic, Afanoromo, Agew, Gumuz, etc. Orthodox, Protestant, Catholic, Islam, traditional beliefs and others are the most common religions found in the basin respectively.

5.2 Education

It is known that improvements in the quality and quantity of education can improve the living standard at the individual and country level. The prevalence of different education institutions/schools indicate the level of interaction for productive economic and active social integration of members of the basin population. In this part of the socio-economic assessment , we discuss the existing educational institution in Abbay basin.

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Table 3: number of school (Governmental and Non-Governmental)

No	Types of educational institution	Number of institutions	Enrolment
1	Primary school (1-8)	11981	6,324,102
2	Secondary school (9-12)	935	722,408
4	Universities	15	NA

Source; (Education Minister 2017)

As shown from the table there are 11981 primary schools, 935 secondary schools and 15 universities found in the Basin. As well as 6,324,102 and 722, 408 students are enrolled primary and secondary school respectively.

5.3 Health

 Health indicators for the basin tend to have similar patterns to those for human development, employment and poverty. The sanitation facilities are neither to the standard nor enough. Specially, The Lake Tana area is an area where frequent water borne disease outbreaks have occurred due to fecal pollution from point and diffuse sources. In 2006, the joint Government, WHO and UNICEF Rapid Assessment of drinking water quality established that about 28% of all protected rural water supplies were contaminated with fecal micro-organisms (Rapid Assessment of Drinking Water Quality, Ethiopia Country Report, March 2007 unpublished). Goraw et al. (2010) also reported high level of fecal pollution of Bahir Dar gulf of Lake Tana which is higher than WHO standard for recreation. Compared with the rural areas, the urban areas have lowest infant mortality rates and better medical services and facilities. The reason for the main problems are insufficiency of health institution and professionals. According to the national standard; health service provision institutions per population are, hospital at district level 1: 50000, zonal level 1:250000, regional level 1:500000, health center 1: 25000 and health post 1: 5000.

Table 4: Number of health service ratio

Health institution	Number	Health institution / population
Hospital	47	1 : 495610
Health centers	1125	1 : 20705
Health post	5145	3.185416667

Source; different Abbay basin woredas health office
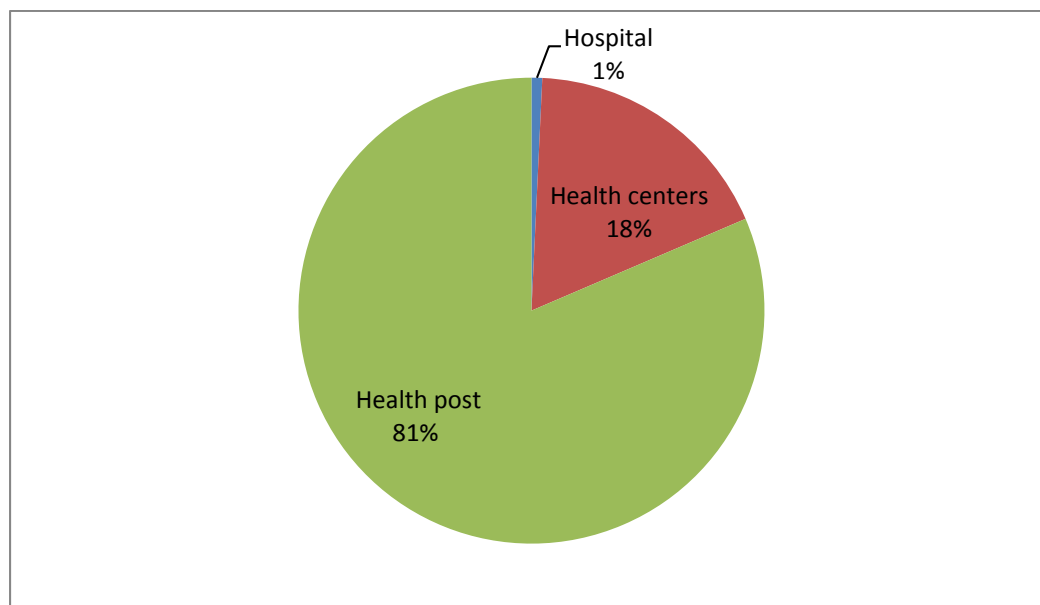
Figure 4: Heath services

As shown from the table ,there are 47 (1%) hospitals, 1125 (18%) health centers and 5145(81%) health posts with in the basin , with reference to the national standard of the number of hospitals in the basin is not achieved. but these numbers may not include those health institution under construction of both during and after data collection period. These health institutions provide necessary health services to the people of the basin.

According to the data collected from different woredas of the basin among the most common prevalent diseases that affect human are: Malaria , Typhoid Fever, Lower respiratory tract infection, ARTI (Acute Respiratory Tract Infection), Helmentitis , Dyspepsia, Diarrhea, Tuber

clauses, And Intestinal Parasite, Acute febrile illness /AFI, Trachoma, Intestinal parasite, Acute febrile illness /AFI/, thypoid, skin infection and urinary tract infection, acute feberile illness, tuberculosis /TB, , trauma, dyspepsia, rheunmantus, anemia, gasterate and etc.

6.3 Cultural uses of water

About 94% of all freshwater fisheries occur in developing countries (FAO, 2007). They provide food and livelihood for millions of the world"s poorest people, and also contribute to the overall economic wellbeing by means of export commodity trade, tourism and recreation (World fish Center, 2002).The major cultural and traditional water use in the basin includes; water therapy, traditional irrigation, religious ceremonies /Christian, Islam, Traditional Beliefs/, build traditional houses, processing traditional artifacts /leather, pottery works,etc. aquatic species as food sources Income generating activities /traditional fishery, etc./, transport using traditional boat and recreation.

7. Economy

Like The Ethiopian Economy, the basin's economy comprises:- Agriculture, Industry & Manufacturing, , Tourism, Energy, Mining and Minerals, Transport and Other. Agriculture is the back bone of Ethiopian economy and livelihood. Like the other parts of Ethiopia, agriculture in the basin is the sector where the economy and livelihood of the majority of the people mainly depends on, it is obvious that agriculture includes both the rearing of animals and the cultivation of crops based on the data collected in woreda agricultural offices of the sub basins.

7.1 Agricultural Systems

The Abay Basin economy is dominantly agricultural based, Agriculture in the Basin is predominantly crop-livestock mixed systems, practiced by independent farmers on small plots. But the sector is hampered by periodic Drought, soil degradation which is caused by overgrazing, deforestation, high population density, and poor infrastructure thus it becomes

difficult and expensive to get goods to market. Still agriculture is considered as the Basin's most promising resource and source of income. There is a huge potential existing in the Basin to become self-sufficient in grains and for export development in livestock, grains, vegetables, and fruits. (Ethiopian Economy Profile, 2016).

An average 0.5 hectares of farm land per household is owned in the basin. The prominent crops in the Basin includes coffee, pulses (*e.g.,* beans), oilseeds, cereals, potatoes, sugarcane, and vegetables. Exports are almost entirely agricultural commodities with coffee as the largest foreign exchange earner and the flower industry becoming a new source of revenue.

A defining characteristic of cropping systems in the Basin, and throughout Ethiopia , is the use of the ancient Ethiopian *maresha* plow for tillage. This simple wooden ox-drawn plow is well suited for tropical vertic soils because it breaks through hard, dry top soils . It is also, however, an instrument associated with tillage practices that lead to high rates of on-site erosion, particularly on steep slopes.

Numerous studies have noted that the stagnation of agricultural investment and innovation, exemplified by widespread use of the Ethiopian *maresha* is a strong explanatory factor for high erosion rates in the Basin, and that improved farming techniques, including more modern tillage practices, are capable of slowing, and even reversing, the cycle of erosion, low yields, deforestation, and further land degradation.

A concerted effort to improve tillage practices, to match cropping zones with optimal environmental niches, and to expand nascent sustainable agricultural techniques, including agro-forestry, has been proposed as a remedy to poor agricultural conditions in the Basin, though further analysis is required to understand the potential of these efforts to contribute to physically and economically sustainable landscapes.(Belay Simane, et al, 2012)

7.2.1 Settlement and land use

Land-use change is driven by demands for various uses. Land-use demands include settlements, food production and lifestyle needs; fodder and grazing needs; and/or nature protection/conservation needs, etc. If population increases, one may assume that demands for

settlement (especially near urban areas) and cultivation or livestock (in the rural lands) may be higher. (Seleshi G. et al, 2016).

Understanding the effects of land cover changes on the basin is of key importance since in many regions a rapid increase in population density often causes changes in land use and cover where forests and wetlands are converted to agricultural land. Studies by Bewket and Sterk (2005) and Lørup et al. (1998) showed that land cover changes cause changes in hydrological regimes that affect the stream flow volume , the pattern of stream flow and peak flows. changes in stream flow records are a result of changes in land cover and changes in the annual and seasonal distribution of rainfall.

It is noted that the population of the basin settlement historically based on livelihood, sheltering and health issues, Accordingly the present settlement and pressure on specific areas expected to be :-

- Expansion of agricultural land:- an increase in population following the decline in fertility and productivity of their surrounding farm lands usually on high lands of the basin forced the settler to expand their agricultural land by removing forests.
- Deforestation and settlement:- the expansion of towns and villages following increase in population and searching for job opportunities is also the major factors for the community to have created settlement areas.
- Highly populated and degraded areas are observed on those high lands expected by the community by health advantages. It is obvious that high land areas are not susceptible by diseases as that of malaria which is highly health problem in low land areas.

Generally, historical settlement that have been practiced for centuries in the basin is caused by dynamic increase in population, expansion of agricultural land and settlement matters.

Land use can be seen as the ultimate expression of everything else that is going on in the basin, and at national and international levels that affect the basin. It provides a starting point and integrative framework for the study of the other parameters, both in the present and for the future (planning) (ABMP)

Land use also has implications in many other sectoral studies undertaken under the master plan, including: soil characteristics and distribution, soil erosion/erodibility, agro-ecology, land suitability, farming systems, energy, population (in Ethiopia most of the population is associated with cultivated land and there is a direct relationship between population and land use/ land cover), and the economic condition of the people. Therefore, the current land use situation is a central requirement for planning development of the basin plan.

According to ABMP, the major classification identified are described as follows:

a) *Cultivation-* Cultivated land includes rain fed, irrigated, perennial and mechanized farms

b) *Afro-alpine vegetation*- This occupies zones generally above 3,200 masl. Typical of or found in high mountains Cover types include Erica /plant of heath family/, woodlands, shrub lands and scrubs.

c) *Forest-* consists of a multi storied tree community, Most forest is described as severely disturbed.

  e) **Woodland**- woodland is a single storey tree cover underlain by grass.

f) *Riparian woodland-* this category includes forest, woodland and bush land found along many major rivers.

g) *Bushland,* consists of multi stemmed woody species with a height of more than 2m.

h) *Shrubland-* Like bushland, this consists of multi-stemmed woody species, but generally less than 2m in height. It is typically mixed with grass.

i) *Bamboo;* The bamboo occurrences are lowland bamboo, in the lowlands north-east of Asosa.

j) *Grassland*; grassland was only distinguished where there was clear evidence of continuous/ permanent grassland.   In the lowlands, grasslands are more common. However, throughout the lowlands repeated burning

k) *Wetlands --* water bodies, Water bodies are self explanatory; Lake Tana is the principle water body. Swamps have scatterings of woody species while marshes are predominantly grasses and sedges. They are differentiated by the length of inundation.

l) *Bareland -* *r*ock outcrops are typically found in valley bottoms or on cliffs, with small patches of shrubs and scrubs.

m) Urban- the urban areas.

The land cover for the basin is mainly characterized by dominantly cultivated, in the eastern part, and grass land, wood lands, and forest to the western part according to the Ministry of Water Resources (Ethiopia) land cover classification.
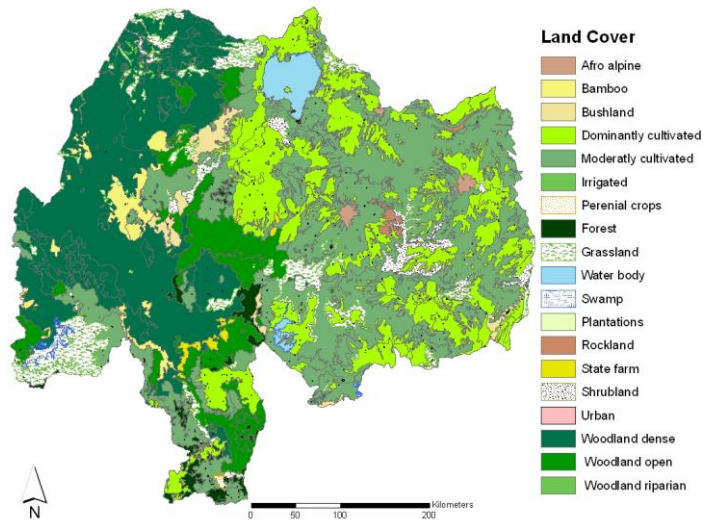
Figure 5:Land Cover in the Abay Basin
Source*: Ministry of Water Resources Ethiopia as cited by ENTRO*

7.2.2 Crop Production in Abbay Basin

Abbay Basin has diversified agro- ecology (dega,woyna dega and kola) which is suited for the production of different annual as well as perennial crops, it is well known by annual crops such as cereals, pulses and oil crops production. The major annual crops grown are teff, wheat, sorghum, maize, pea …etc. and orange, coffee and banana are perennial crops that are grown in the area.

Table 5:Major Food Crops in the Basin

S/n	Crop Type	Amhara		Oromia		Benishangul Gumuz		Total	
		Hectare	Quintal	Hectare	Quintal	Hectare	Quintal	Hectare	Quintal('000)
1	Grain Crops	2725196	54635345	1849247	42948971	209152	4025992.6	4,783,595	101610
2	Vegetables	34819.6	678398.5	22398.23	874749.4	1788.63	20896.026	59,006.50	1574
3	Root Crops	21170.62	2745630	18790.65	4738968	554.997	78223.036	40,516.30	7563
4	Fruit Crops	2533.811	84514.82	11126.56	782348.4	1537.46	97286.821	15,197.80	964
5	Chat	4895.917	35132.27	19074.13	144451.6	0	0	23,970	180
6	Coffee	3339.379	11986.86	183064.5	1130851	242.023	1228.2532	186,646	1144
7	Hops(Gesho)	13065.94	137652.7	1916.099	192994.9	46.2774	0	15,028.30	331
	Total	2805021	58328660	2105617.2	50813334	213321.39	4223626.8	5,123,959.90	113366
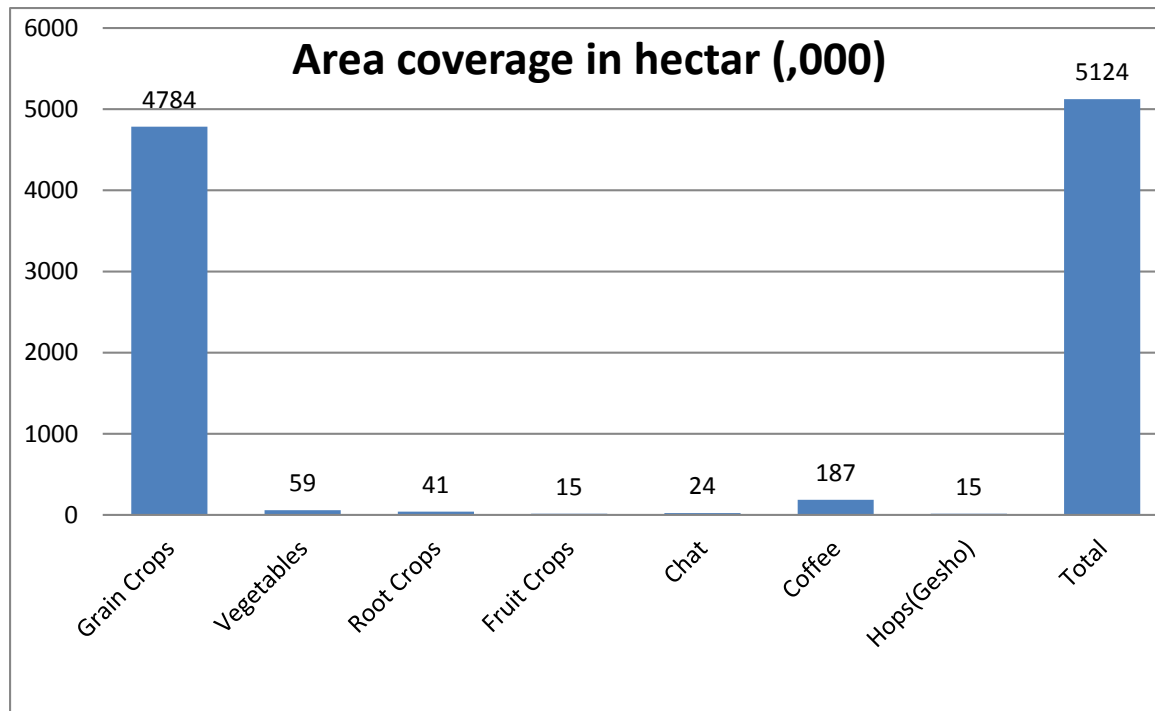
Figure 6:area coverage
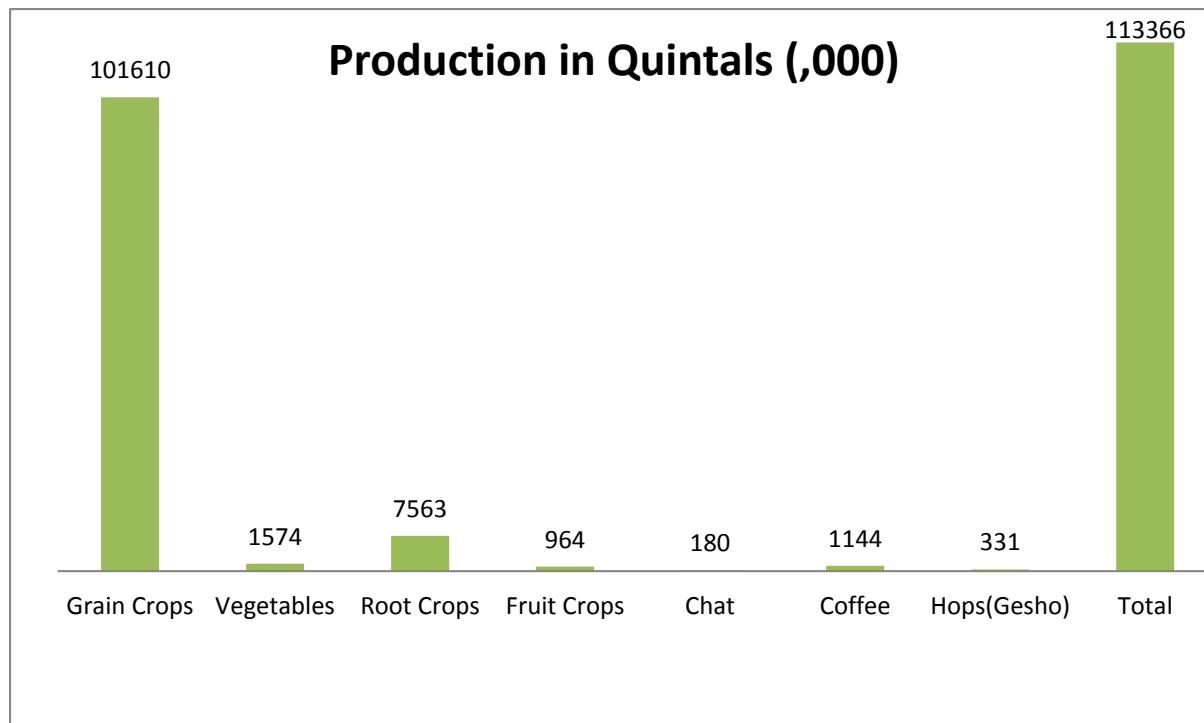
Figure 7: area coverage of major crops

The graph shows there are about 5 million hectare of land is used for major crop production and has got about 113 million quintal of produce in the specified 2015/2016 production year.

Also the graph shows the different crops coverage and there volume of production, it is clear that from the graph grain crop coverage and its volume of production is significantly higher as compared to other crops grown in the basin which is about 4.8 million hectare of coverage and 101.6 million quintal of production. Even if the coffee crop area is high next to grain crops, root crop`s production is high next to grain crops in volume of production. Generally, khat, hops and fruit crops are those major crops which their production in million quintal and area coverage in million hectare are lower in the basin which is 24qtl /180ha, 15qtl/331ha and 15qtl/ 964ha respectively.

The graph shows major food crops that are produced in almost all areas of the basin in spite of the variation in volume of production across the basin. The variation may be attributed to the

extent of area devoted to each crop type, weather change and a shift in preference for the crops grown. The food crops on which data is collected are the ones that are commonly grown by the majority of peasant holders. In the statistical tables these crops have been categorized into seven groups for simplicity of description and comparison purposes. Crop yield per area (amount of crop harvested per amount of land cultivated) is the most commonly used impact indicator for agricultural productivity activities. Crop yields are inevitably affected by many factors, these are weather, input price, changes in farming practices, amounts of fertilizer used, quality of seed varieties, and use of irrigation.

Grain Crops :-

Refers to the major crop category that includes cereals, pulses and oilseeds, which not only constituted the major food crops for the majority of the basin's population but also served as a source of income at household level and a contributor for the basin's foreign currency earnings, among others. Within the category of Grain crops, its area coverage is higher than those crops listed above, implies great economic share of the basin crop production sector.

Cereals:- are the major food crops both in terms of the area they are planted and volume of production obtained. They are produced in larger volume compared with other crops because they are the principal staple crops (Teff, Barley, Wheat, Maize, Sorghum, Finger-millet, Oats/'Aja') and Rice .

Pluses:- are also among the various crops produced in all areas of the basin after cereals (Faba beans, Field peas, White Haricot beans , Red Haricot beans, Chick-peas, Lentils, Grass, peas, Soya beans, Fenugreek., Mung bean and /"Masho", Gibto.)

Oilseeds:- refer to crops which are also classified within grain crops category**,** nonetheless**.** oilseeds are grown to flavor the food consumed at home and earn some cash for peasant holders in the area (Neug, Linseed, Groundnuts, Sunflower, Sesame, Rapeseed)

Vegetables

Holders living near to urban centers largely practice vegetable farming. Most vegetables are not commonly practiced by the rural private peasant holders. (Lettuce, Head Cabbage, Ethiopian Cabbage, Tomatoes, Green peppers, Red peppers, and Swiss chard)

Root Crops

Some root crops like onion and garlic are indispensable to improve the taste and scent of the food we eat. others like potatoes, sweet potatoes and taro/ godere are among the list of major food crops that are consumed across the basin. These and other economic importance prompt the peasant holders to grow many of the root crops (beetroot, carrot, onion, potatoes, yam/'boye', garlic, taro/'godere', and sweet potatoes).

Fruit Crops

Fruit crops grown by the private peasant holders cover only a small token area and production in the basin. the number of holders practicing fruit farming is much less than that of grains or cereals (avocados, bananas, guavas, lemons, mangoes, oranges, papayas, and pineapples)

Stimulant crops

Ethiopian economy is more dependent on agricultural sectors whereas now on the time of transformation. Farmers engaged in growing and producing stimulant crops such as coffee and Chat are greater in number than those growing fruits. In agricultural products coffee is the largest export production which earns the majority of the export income. The sub basin Didessa is the major area where country's coffee is produced. That is why the sub-basin coffee producing has granted their locality names as trade names for their locally produced coffee as Jima, Limu, Nekemte & Gimbi. Similarly in the basin, important areas of coffee production and origin of arbica coffee (Zege, Wonbera, which are known for their unique test).

7.2.3 Agricultural Input

Fertilizer and pesticide inputs per crop are not well known for the basin. In general, however, the purchased agricultural inputs on crops in this area are few, and risks to water quality are

believed to be low. The productivity of the soil is deteriorating from time to time because of soil erosion, deforestation and other related factors.

Therefore application of fertilizers to the soil is very important. So as to get better result in agricultural output pesticides, herbicides and fertilizer are among the very important inputs required. DAP and UREA fertilizers are applied in every year .But the rate of application of DAP and UREA has not been used based on the recommended rate which is much smaller than the normal recommendation, though the recommendation varies from place to place.

This is because the farmers fail to add the required amount owning to their economic problem & lack of awareness. The larger part of the basin areas are covered by cereal crops, by virtue of this fact to overcome the problem they use high amount of chemicals.

In addition to improve production and productivity pesticides and herbicides should be used appropriately as unwise use of these chemicals lead to compromising the lives of other precious animals and insects and also contributes to ecosystem disturbance.

7.2.4 Irrigation

Improving food security through irrigation affects or is affected by the soils, crops, livestock, weather, water, nutrients, pests, markets, income, outgoings, shelter, transport, fuel, property, family and social networks, and much more, all form part of the integrated environment in which farmer makes a livelihood.

A major challenge is to design meaningful integrated solutions to the real problems faced by farmers. Irrigation is an especially complex solution to the problem of food insecurity, and it requires a good understanding of the concepts of each other's disciplines or run the risk of being irrelevant. Provision of irrigation water without strengthening markets; encouraging crop diversification without also addressing public demand for produce; intensifying production without tackling the issue of soil nutrient management; constructing weirs without carrying out soil conservation measures upstream; or commercializing without improving physical access to

markets, all these examples show how disintegrated solutions fail to tackle the full scope of the problem.

The emergency of modern agriculture had led to the development of irrigation and use water resources for means of lively hood improvement. To this respect irrigation has played great role in confronting poverty and drought significantly. Although, different irrigation potentials are not exhaustively identified, according to different sources, the basin has large irrigation potential;

➤ 523,000Ha, (FAO, information system on water and agriculture),
➤ 815,581Ha, (Master plan studies, water resource and development in Ethiopa (Sileshi Bekele, et al, 1998).
➤ 1,001,000Ha, (WAPCOS,water and power consultancy services India limited, Sileshi Bekelew) and , but out of this economic irrigation potential only 3% is Under cultivation. The basin water resources are used for traditional irrigation which result in low productivity and water wastage. This shows that irrigation practices in the basin is not exploited its maximum potential cultivation and seems more traditional. So in order to improve the economy and the lively hood of the local community, every concerned body should give special attention to modern irrigation as result irrigation can play significant role in the economy. According to the basin socio economic study document, Abbay basin is primarily a fruit, root and grain crop production area.

Some of the most important grain, fruit and root crops are wheat, barley, banana, papaya, tomato. Mango, avocado, potato, onion and garlic. Water for irrigation is majorly supplied from Rivers and smaller streams. Abbay Basin for its highly populated character the demand for irrigation productions increases from time to time this trend intern demands higher amount of water calls for special attention in the area.

7.2.5 Livestock

According CSA, 2015 the population of animals found in the basin, are about (71.48 million heads) cattle 29 million, sheep 10million, goat 8million, horse more than half million, mule 0.15million, donkey 2.5million, poultry 19million and beehive 2.33million. constitute the bulk of

the livestock sector. Livestock in the Abbay basin could be classified into extensive, semi-intensive, and intensive systems depending on types of animals reared and whether for subsistence, traction or market.

The extensive system is entirely dependent on natural pasture and is physically, socially and economically fragile. The system accommodates the vast majority of herders in the dry lands of the basin.

Unlike the extensive system, the intensive system requires considerable skills, efficient management and a great deal of animal feeds. It is common in the irrigated and urban areas. The semi-intensive lies between the two systems cited above.

Livestock are primarily for draught power, meat production, milk and milk products ,eggs, wool, meat, hides and skins. Farmers in the basin also keep bees for honey production. the density (animals per square kilometer) in the basin is (cattle 147.46, sheep 50.85, goat 40.68, horse 2.54, mule 0.76, donkey 12.71, poultry 96.61 and beehive 11.85).

Diseases have numerous negative impacts on productivity of herds i.e. death of animals, loss of weights, slow down growth, poor fertility performance, decrease in physical power and the likes. pashiolosis, sheep & goat pox, blackleg, anthrax, mastitis, internal & external pasteurolosis Fashiolosis, FMD, NCD, gorersa, Bovine pasteurolosis, ovine pasteurolosis, African horse sickness, foot rot, and lung worm (Socio economic studies of sub - basins.

Livestock Productivity

Milk	Meat	Mutton and goat meat
✓ milk production for indigenous cow *milk yield : 500 lt/lactation* ✓ Lactation days in milk: 200 days ✓ Age at first calving: 4-5 years ✓ Calving interval: 2 years ✓ Overall calving rate:45-55% ✓ Seasonal calving: (rainfall, feed availability and cow nutritional status) ✓ milk off take for human consumption local: 1.3 kg and crossbred: 2.8 kg	✓ Slow growth rates and poor condition at slaughter ✓ De-boned meat: 58 % of carcass weight and 28% of live weight ✓ Carcass weight: 167 kg ✓ Annual direct losses due to mortality for cattle: 8-10 percent of the national herd	✓ Birth weight : 2.5 kg ✓ Weaning weight : 15 kg ✓ Yearling weight : 22 kg ✓ Carcass weight : 40-45% of empty body weight (10-12 kg) ✓ Annual direct losses from mortality Sheep: 14-16 % Goat: 11-18 %

Economic Contribution Of The Sector And Per Capita Consumption

Based on Ministry of Agriculture and Rural Development of Ethiopia, 2010, Percentage contribution of Agricultural GDP, National GDP and foreign exchange are from 30-40, 16-20 and 14-16 respectively. Beef per capita Kg per person per year 4.6, mutton per capita Kg per person per year 2.8 and Milk per capita Kg per person per year is16.

LIVESTOCK NUMBER WITH IN THE BASIN

Table 6 :Tropical Live stock Unit (2017)

Type	TLU factor	Tropical livestock unit	TLU/Individual
cattle	0.7	20271106.1	0.659
sheep	0.1	950890.9	0.031
goat	0.1	775118.4	0.025
Horse	0.7	415091	0.013
mule	0.7	106905	0.003
donkey	0.5	1232542	0.04
Total		**23751653.4**	**0.774327797**
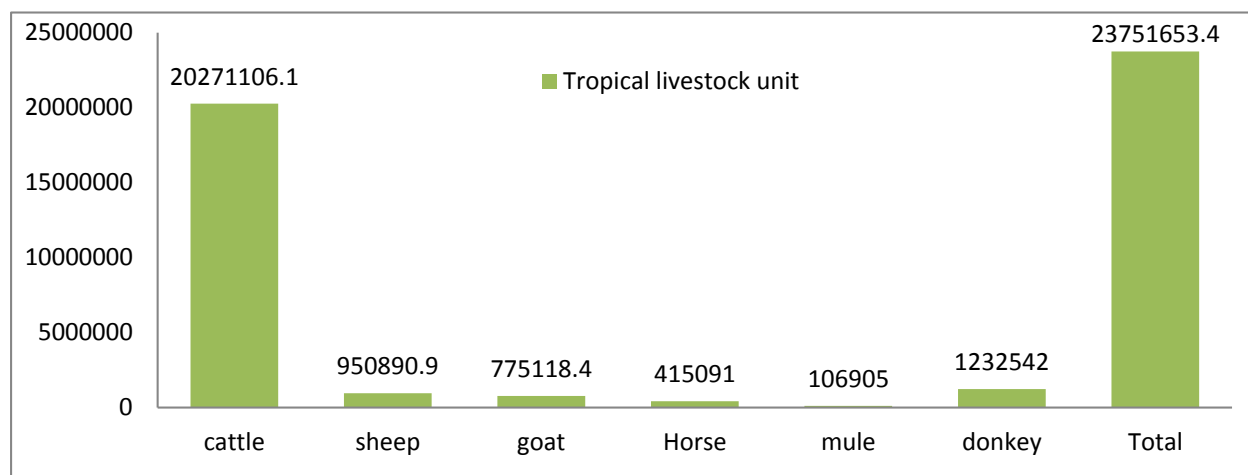
Figure 8: Tropical livestock in the Basin

Table 7:Livestock number

Type	Total number of Livestock
cattle	28958723
sheep	9508909
goat	7751184
Horse	592987
mule	152721
donkey	2465083
poultry	19086258
beehive	2325789
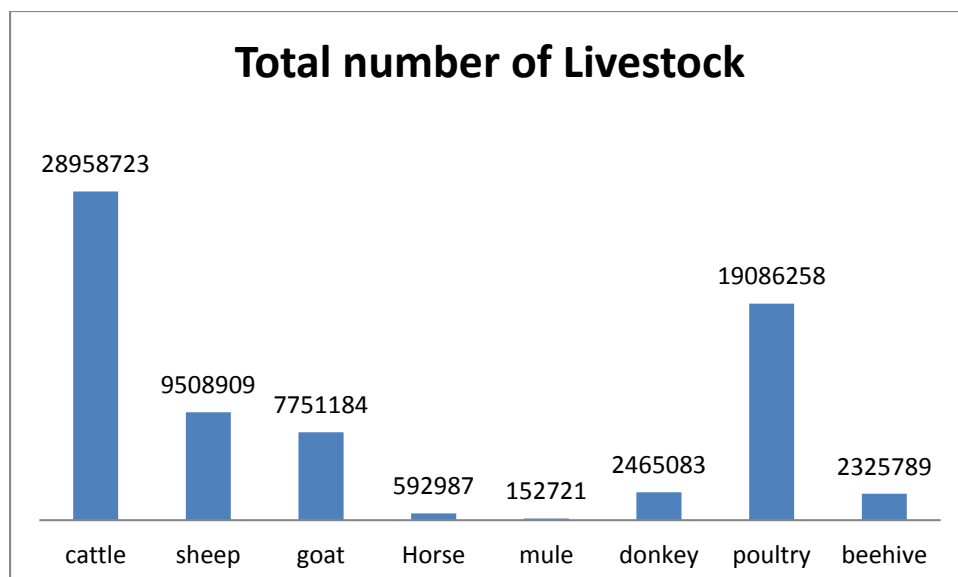
Figure 9: Livestock number

the figuer presents major livestock found in the basin in 2015 as can be seen the cattle population is higher in TLU than other livestock's, it is about 20.27 million 85 % of the total.

Cattle

Out of the total population of cattle 99.26 percent are local breeds. The remaining are hybrid and exotic breeds that accounted for about 0.64 percent and 0.1 percent, respectively. the average lactation period per cow at country level is estimated to be about *six* months, and average milk yield per cow per day is about 1.37liters.

Sheep And Goat Populations

As pointed out in this table, about 18 million sheep and goat are estimated to be found in the basin. With respect to breed, almost all of the sheep and the goats are indigenous (99.85 percent and 99.96 percent, respectively).

Horse, Donkey and Mule

As indicated in the same table, donkeys are the overwhelming majority compared with the other draught animals. they are used for transportation, draught and other purposes.

Poultry Population

Data on poultry population are collected as part of the livestock , With regard to breed, 97.3 percent,0 .38 percent and 2.32 percent of the total poultry were reported to be indigenous, hybrid and exotic, respectively.

The average number egg-laying period per hen per year is about 4, 5 and 1 for the local, hybrid and exotic breeds, respectively. The average length of a single egg-laying period per hen is estimated to be about 21, 35 and 142 days for local, hybrid and exotic breeds, in that order. The average number of eggs laid per hen per egg- laying period in the country is about 12, 30 and 126 eggs, correspondingly.

Beehive Population

According to the Ministry of Agriculture, there are three types of beehives, and these are traditional, intermediate, and modern. The average honey harvest is 1.61, 1.95, and 1.64 times during the reference period from traditional, intermediate and modern hives, respectively of which the greater portion is harvested from traditional hives (CSA, 2015).

Major Gaps :-

  Diseases, poor nutrition, un improved genetic base, poor product handling and processing, socio economics and market information, technology transfer and lack of understanding its impact

7.2 Tourism Development

The tourism industry in the Basin contributes a lot for the country economy. The government in Ethiopia is proving its commitment and willingness to develop the tourism sector through a

number of initiatives, to deal with poverty and encourage economic development in the country as well as in the Basin.

According to ABMP, the specific attractions of the basin divided in to four major tourist destination areas.

I. **The Northern part**; this scenery includes Bahirdar, Lake Tana, Gonder and their surroundings.

- Bahir Dar, the town has great economic importance, hosts regional government, factories, Bahirdar University and a number of social and economic institutions.

- Lake Tana, its islands monasteries, and the Tisisat .

- Gondar**;** the only place in sub-Saharan Africa where large historical castles can be visited, Gondar is also the normal base for excursions to Simien Park.

II. **The Abay Gorge Area and the central part of the basin**

- Abay Gorge, the crossing of the Blue Nile on the road Addis Ababa-Debre Markos is one of the most spectacular attractions.

- Muger Sub Basin**,** this circuit is blessed with an abundance of material, non-material cultural resources and historical sites;

- Debre Libanos Monastery, the main monument is a modern church, it offers some good examples of Ethiopian contemporary art, the most important museums are religious based: Addis Alem and Debrelibanos museums.

III. **Eastern Edge of Abay Basin; t**he most promising tourist destination area around this circuit includes Dessie, Debre Birhan and their surroundings.

- Dessie, the town has a strategic position to join central part of the country to northern . It is located on the edge of the highlands in a nice valley at the foot of Mount Tossa.

- Debre Birhan, the road from Debre Birhan to Kombolcha is scenic, with its tunnels and views on the Rift Valley. It often gives the impressive opportunity to meet gelada baboons trooping along the road. The most interesting point in the area is Ankober, Ankober has been the capital of the rulers of Shewa until Addis Ababa was founded in 1878. Ankober still offers some remains of the old palace.

IV. **The Southern part of Abay Basin / the coffee producing areas/.**

This scenery, known by its coffee production and wealth of wild life and forest, So that it is found to be the prominent tourism circuits.

- Nekemte, Wollega museum and Kumsa Moreda palace located in the town. The museum is one of the major museums with ethnographic and historical collection in the country.
- Didessa Wild Life Reserve: middle and lower part of Dedessa River, it is believed to be a habitat for more than 50 plant, 30 mammal species and a number of birds.
- Didessa Tropical Forests:- The main priority forest areas in the sub-basin are Belete Gera, Sigmo and Babya which are registered in the World database of protected areas. Yayu forest, which is named as one of UNESCO biosphere reserve in July, 2010 is partly found in the sub-basin. These forests are Afro-Montane rain forest biodiversity hot spots and are the larger remaining tracts of forest life in Ethiopia and also fragments with wild Coffee Arabica populations in the world found.
- Agaro /Jimma/ The highest quality Arabica coffee has been produced for long by the local people who have an established tradition in coffee cultivation.
- Ambo and Surrounding town, Lake of Wonchi and Chilimo forest, A dry Afro-Montane Forests on the Ethiopian Central Plateau, located near Ginchi,.
- (GERD)The Great Ethiopian Renaissance Dam is located approximately 500 km north west of the capital Addis Ababa, in the region of Benishangul - Gumaz along the Blue Nile. At the end of the works, the Grand Ethiopian Renaissance Dam will be the largest dam in Africa: 1,800 m long, 155 m high and with a total volume of 74billion cubic meter.

7.3 Mining and Minerals

Currently the contribution of the mining sector to export income is limited to being generated from gold and gemstone exports with potash exports expected to come on line in the next few years. Production of industrial minerals is limited to domestic consumptions (MoM), the current mineral production is small, which in turn explains a low level of existing linkages with the rest of the economy as cement production and construction.

According to ABMP The most important metallic minerals found in the basin are; Gold, Platinum, Copper, Nickel, Iron and Molybdenum on the other hand most abundant non metallic minerals are marble deposits, limestone, construction stones, Gypsum, sandstone, Clay and lignite deposits are also found in the Abbay Basin.

The major occurrences, deposits and mines of the Basin :-

- Asossa;   Daleti marbles, Babo belesa primary gold occurrence, Ebilcha primary gold occurrence, Abumareh gold-carbonate occurrence, Abetsello gold occurrence, Shungun primary gold occurrence, Ondonoc gold , Baruda marbles

- Gimbi /Billikal apatite, ilmenite and magnetite deposit, Katta copper-zinc-gold prospects, Degero Valley alluvial gold deposit, Korka-Metti gold bearing quartz lode, Tulu-Dintu ultramafic body, Wabera-Kiltu magnetite, hamatite and limonite occurrences, Nejo lignite.

- Bure; Mora marbles

- Debre Markos; Wonchit limestone deposit

- Debre Birhan;Mush valley lignite deposit

- Muger valley; limestone deposit

  According to MoM (2014 Report) , licenced areas in Abay basin for exploration of minerals are listed as follows;

  1. Awi / Gwangwa/ Base Metal, Gold, Iron, And Rare Metals

2. Metekel / Dibate / Base Metal, Gold, Iron, And Rare Metals

3. Asossa / Sherkole/ Gold and Base Metals

4. Asossa /Kemashi Menge and Odagodere/ Golg and Base metal

5. Asossa /Kurmuk/ Gold and Base Metal

6. Metekel /Bulen, Baruda / Precise Base And Rare Metals

7. Weset Wollega /Tulu Kapi, Anchore/ Gold And Platinium Group Metals

8. West Wollega /Boji, Gimbi, Haru, Laloasabi, Nolecaba, Yubdo/ Gold, Silver, Copper, Lead, Zink and Nickel

Figure 10: Some quarries

7.4 Industry and manufacturing

Industrialization is the engine for socio-economic transformation of countries. It is favored for creating employment opportunity, bringing competitive advantage, and generating dynamism in the economy (Sonobe and Otsuka, 2011).

The industry sector is emerging in the Basin and Promising to contribute the overall economy, as it has shown some growth and diversification in recent years. Food and beverages constitute some percent of the sector though textiles and leather are also important segments the latter especially for the export market.

Like all other developing countries, Ethiopia has been striving to transform the structure of its economy since the end of the 19th century. Modern manufacturing factories were emerged in the country in the 1920s (as of 1927 about 25 were set up mostly by foreigners) though a conscious effort towards developing a modern industrial sector did not start till the 1950s. And the sector got momentum since then during which a comprehensive plan to promote industrialization and economic development was commenced (Mulu, 2013).

The basin hosts a number of industries as cement factory, beverage industries, milling industries, textile and a number of micro industries found in the basin, these industries create employment opportunities, generate tax revenue, employment, income tax and sales tax revenue. They also have a foreign exchange saving effect to the country by substituting the current imports.

1. Agro- Processing Industries - Ambo Mineral Water S.C.(Ambo)
2. Pulp and Paper:-, D.M.S.K General Trading (Burayu), Huang Shang Cement Plc (Oromia), Main Project) (Derba), Mugher Cement Enterprise(existing) (Muge), Jema Cement Plc (Muketure), Industry Plc.(Holeta), Habesha Cement Sh.Co.(Holeta), Dangote Industrial Plc. (Muger, Ada berga), East Cement Plc. (North Shewa, Feche), C.H Clinker Manufcturing Plc. (Gerba Gurache)
3.   Textile Factories, Bahirdar Textile S.C (Bahir Dar)

4. Tanning Industries, Abay Tannery (Bahir Dar), Bahir Dar Tannery (Davimpex) Enterprise, P.l.c Bahir Dar, DebreBerhan Tannery DebreBerhan, Dessie Tannery, P.l.c (Dessie)

5. Agro-Processing Industries, Ashraf Agricultural and industrial plc (Bahir Dar

6. Pharmaceuticals, ElieLaboratoire P.L. (Gondar)

7. Cement , Dejen Project) (Dejen)

8.
9.
10
11

Figure 11: Industries sites

7.5 Energy

Apart from the water power and forests, the Basin is not well endowed with energy sources. The Basin is deriving its electricity needs from hydropower thus explaining that electricity generation along with agriculture is dependent on abundant rainfall. The Basin rely on forests for nearly all of its energy and construction needs, the result has been deforestation of much of the areas.

8. Major Issues

- The basin is characterized by high fertility and higher population density, causes increases degradation of natural resources, puts pressure on economic infrastructure (transport, education, health, water, and power and telecommunication facilities), increases food security concerns, and leads to rural urban migration, with the attendant problems of rapid urbanization.

- Urban and town centres are predominantly service centred, Industrial development is low and Low productivity and lack of alternative employment opportunities.

- Agriculture is the main source of employment and livelihood. /south part depends on coffee, north on cereals...../, but, the productivity is generally low.

- Water scarcity for traditional irrigation and lack of irrigation structure.

- The industries in the basin are with mostly associated with agriculture products/ as beverage, textile, oil food...these industries do not pose serious environmental threats if they are implemented properly/

- Sand and stone mining is one of the major economic activities of the Basin.

- Cost of agricultural input have risen /reduction in farmers family income/

- Regarding tourism; Absence of protection of most of the sites, lack of coordination, in sufficient lodging facilities, lack of experience and The Basin has no wildlife park.

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Annex 1: Livestock population in Abbay river basin

Zone name	density								Area (km2)	Population of the basin							
	cattel	sheep	goat	Horse	muel	donkey	polutry	beehive		cattel	sheep	goat	Horse	muel	donkey	polutry	beehive
Asosa	5.1756168	1.2193655	12.013684	0	0	1.8960536	43.063377	2.5235331	8053.274	41681	9820	96749	0	0	15269	346801	20323
Awwi/Agew	115.86549	54.145833	13.949105	7.1534818	1.9558898	8.2077519	116.18385	11.855852	8961.647	1038346	485236	125007	64107	17528	73555	1041199	106248
East Gojjam	133.14645	98.555308	38.58366	7.1426165	1.3153536	26.2983	94.515278	11.28658	14249.4	1897257	1404354	549794	101778	18743	374735	1346786	160827
East Wellega	66.786721	17.245259	11.08063	0.3708457	0.3381494	6.2699602	64.399885	9.5213136	12938.72	864135	223132	143369	4798	4375	81125	833252	123194
Horo Guduru	81.495989	24.569922	20.479036	4.9759567	0.4286868	9.1715724	63.952227	14.083974	8060.757	656919	198052	165077	40110	3456	73930	515503	113527
Ilubabor	74.208599	26.354007	15.275041	3.2373495	1.0155056	3.2440296	75.191989	38.433835	5100.332	378488	134414	77908	16512	5179	16546	383504	196025
Jimma	119.94189	44.932863	224.12678	5.0205799	1.0909279	3.9186397	99.144256	31.087493	4668.723	559975	209779	1046386	23440	5093	18295	462877	145139
Kelem Wellega	54.598994	26.015428	11.96567	1.1299048	0.7961723	5.2966066	98.562505	10.331793	2070.607	113053	53868	24776	2340	1649	10967	204084	21393
Kemashi	4.1446076	0.8422113	4.0255329	0	0.016785	0.5765148	12.089731	3.5057908	10127.14	41973	8529	40767	0	170	5838	122434	35504
Metekel	20.672446	2.7087181	8.0909218	0.0648776	0.0677102	1.2668984	21.838225	4.053881	25764.74	532620	69789	208460	1672	1745	32641	562656	104447
North Gondar	75.005064	29.117544	41.297351	0.7684355	0.3036907	10.308953	130.11637	8.0443463	16470.63	1235381	479584	680193	12657	5002	169795	2143099	132495
North Shewa(R3)	86.106051	110.2825	50.7594	2.9232748	0.8211064	25.543828	102.75844	3.9749464	9297.186	800544	1025317	471920	27178	7634	237486	955364	36956
North Shewa(R4)	136.99401	95.398162	23.909894	8.8609082	0.5240303	23.630483	90.110697	6.8853611	10205.83	1398138	973617	244020	90433	5348	241169	919654	70271
North Wollo	70.414487	53.156714	39.301792	2.4922417	0.9679268	15.235861	80.504639	3.7583008	3428.009	241381	182222	134727	8543	3318	52229	275971	12883
Oromia	77.008645	29.338705	50.149994	0.1031702	0.0828007	13.611064	71.936373	1.9274316	1.926864	148	57	97	0	0	26	139	4
South Gondar	120.68221	67.583933	38.665767	1.7448863	1.1643884	22.419389	141.04777	8.8652267	10418.9	1257376	704150	402855	18180	12132	233585	1469563	92366

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South W/shewa	174.05779	82.424561	53.735128	9.4187597	0.940457	31.773381	153.16283	14.573728	13.89653	2419	1145	747	131	13	442	2128	203
South wollo	95.587858	114.61229	45.637008	4.9638344	1.7470443	25.416238	111.23149	9.3047495	14301.42	1367042	1639118	652674	70990	24985	363488	1590768	133071
West Gojjam	170.71846	94.538192	26.490815	2.498481	2.4834037	22.166555	214.36139	21.848357	13331.28	2275896	1260315	353156	33308	33107	295509	2857712	291267
West Shewa	1357.5961	64.048927	28.214672	8.8473451	0.7853743	15.298624	113.95031	13.387442	9833.497	13349917	629825	277449	87000	7723	150439	1120530	131645
West Wellega	79.323757	19.870578	10.075043	0.1392881	0.3706322	9.3706788	117.45141	17.883877	9357.466	742269	185938	94277	1303	3468	87686	1099048	167348
Total	147.2562	48.353159	39.415061	3.0153632	0.776591	12.53504	97.054339	11.826723	196655.38	28958723	9508909	7751184	592987	152721	2465083	19086258	2325789

source CSA, March,2015

Zone name	cattel	sheep	goat	Horse	muel	donkey	polutry	beehive
Asosa	41681	9820	96749	0	0	15269	346801	20323
Awwi/Agew	1038346	485236	125007	64107	17528	73555	1041199	106248
East Gojjam	1897257	1404354	549794	101778	18743	374735	1346786	160827
East Wellega	864135	223132	143369	4798	4375	81125	833252	123194
Horo Guduru	656919	198052	165077	40110	3456	73930	515503	113527
Ilubabor	378488	134414	77908	16512	5179	16546	383504	196025
Jimma	559975	209779	1046386	23440	5093	18295	462877	145139
Kelem Wellega	113053	53868	24776	2340	1649	10967	204084	21393
Kemashi	41973	8529	40767	0	170	5838	122434	35504
Metekel	532620	69789	208460	1672	1745	32641	562656	104447
North Gondar	1235381	479584	680193	12657	5002	169795	2143099	132495
North Shewa(R3)	800544	1025317	471920	27178	7634	237486	955364	36956
North Shewa(R4)	1398138	973617	244020	90433	5348	241169	919654	70271
North Wollo	241381	182222	134727	8543	3318	52229	275971	12883
Oromia	148	57	97	0	0	26	139	4
South Gondar	1257376	704150	402855	18180	12132	233585	1469563	92366
South W/shewa	2419	1145	747	131	13	442	2128	203
South wollo	1367042	1639118	652674	70990	24985	363488	1590768	133071
West Gojjam	2275896	1260315	353156	33308	33107	295509	2857712	291267
West Shewa	13349917	629825	277449	87000	7723	150439	1120530	131645
West Wellega	742269	185938	94277	1303	3468	87686	1099048	167348
Total	**28958723**	**9508909**	**7751184**	**592987**	**152721**	**2465083**	**19086258**	**2325789**

Abbay Basin Land use Characteristics

Land use	Area _m2	Area _ km2
Agriculture	39754339076	39754.33908
Agro - Pastoral	55614115449	55614.11545
Agro - sylvicultural	15597416278	15597.41628
Marsh	648292720	648.29272
Pastoral	14589232408	14589.23241
State Farm	968329490	968.32949
Silvo - Pasture	24715552194	24715.55219
Traditional	43492021993	43492.02199
Urban	104106347	104.106347
Water	3502662950	3502.66295
Total	*1.98986E+11*	*198986.0689*