

Establishment of Road Network Panel data (shape file) from 1996 to 2016 G.C using Geographic Information System (GIS)

1. Background

Ethiopia has been continuously planned and implemented a huge road development program called RSDP starting from 1996 G.C till 2011 and Growth and Transformation Program called GTP starting from 2011. The programs have aimed to rapidly improve the volume and fair distribution of the road network as well as to improve the condition of the roads.

The first RSDP had started and implemented between 1997 and 2002 G.C. The second Program had been implemented between 2003 and 2007 G.C and the third program between 2008 and 2011 G.C. And under the umbrella of Growth and Transformation program GTP, In addition to Rehabilitation, Upgrading and Construction of new federal Roads, the Universal Rural Road Access Program (URRAP) has constructed a huge size of roads targeting to connect small administrative units called Kebeles to the nearest all weather roads. Currently, the government has been implemented GTP-II program to continue new and unfinished assignments under GTP-I programs.

2. How to create the Panel data

Three main sources of data were used for formation of the panel data.

2.1 Federal Road data from Ethiopian Roads Authority (ERA)

Data from ERA were collected for the formation the panel data. The data is the budget disbursement of all projects in the different road sector program. Start date and end date were extracted and an excel file is formed which contain long list of road projects by type of intervention such as Upgrading, Rehabilitation and Construction of New Link Road.

Then using the existing road network map and shape file which was created in 2005/2006 G.C by CarlBro of Denmark and Gondwana Engineering Plc of Ethiopia, matching of roads, segment by segment was done and date of construction column field is updated.

2.2 Data from Regions

There were different regional road network studies held at different time by some of the regions. Oromia, Amhara, Southern Nation Nationalities hired local consultant to make inventory and condition survey of roads under their jurisdictions. The different years of network shows the status and condition of the roads in the region. During those inventory surveys, available data were

collected regarding the date of construction of those regional and community (dry weather road constructed by local people) roads. So the panel data for some regions were established from network of survey at different times.

2.3 Data from Inventory and Condition Survey held in 2015/2016 G.C

In 2014/2015 G. C nationwide road network inventory and condition survey was done by one International and other three local companies in two lots.

The survey made by two consultants, has collected data from all regions as well as Federal roads and helps to fill the gap for date of construction for some of the roads in Ethiopia. Especially those roads which were newly constructed or upgraded from community roads were collected and registered.

So the above sources of data were used for the establishment of the Panel shape file.

3. Speed for different classes

3.1 Assigning speed for different class of roads

The following assumptions are made in assigning the speed.

Speed on different Classes and Surface types

Speed of driving on different classes of roads is adopted from Ethiopian Road Design Manual and from knowledge of the Ethiopian Network. The following table shows the assumption

<i>Road Pavement Type and Condition</i>	<i>Average Speed of Travel Before rehabilitation or upgrading or Construction</i>	<i>Average Speed of Travel After rehabilitation or upgrading or Construction</i>
<i>Asphalt Road (Expressway)</i>		<i>120km/hr</i>
<i>Asphalt Roads (Highway-Asphalt Concrete or Surface Treatment)</i>	<i>50km/hr</i>	<i>70km/hr</i>
<i>Federal Gravel Road (High Class Gravel Roads)</i>	<i>35km/hr</i>	<i>50km/hr</i>

<i>Regional Gravel Road (Intermediate Class Gravel Roads)</i>	<i>25km/hr</i>	<i>45km/hr</i>
<i>URRAP Roads-lower district level roads (low class gravel roads)</i>	<i>20km/hr</i>	<i>35km/hr</i>
<i>Earth Surfaced Roads- (very low class public roads)</i>	<i>20km/hr</i>	<i>30km/hr</i>
<i>Federal Gravel or regional rural roads to Asphalt Roads</i>	<i>25km/hr to 35km/hr</i>	<i>70km/hr</i>
<i>Town Roads (Asphalt)</i>	<i>30</i>	<i>30</i>
<i>Town Roads (Cobbled)</i>	<i>20</i>	<i>20</i>
<i>Town Roads (Gravel)</i>	<i>15</i>	<i>15</i>
<i>Town Roads (Earth)</i>	<i>10</i>	<i>10</i>