International Research Journal of Human Resource and Social Sciences
ISSN(O): (2349-4085) ISSN(P): (2394-4218)
Impact Factor 5.414 Volume 4, Issue 07, July 2017
Website- www.aarf.asia, **Email** : editoraarf@gmail.com

Transport and Communication Network of Ethiopia

Deep Narayan Pandey
Assistant Professor, Department of Geography,
Dyal Singh College, University of Delh

Abstract

Transportation infrastructure plays a crucial role in shaping the social and economic landscapes of countries, facilitating access to markets, services, and resources essential for development. Ethiopia, a landlocked nation in East Africa, faces significant challenges in enhancing its transport network to support economic growth effectively. The Djibouti-Ethiopia Railway (CDE), stretching over 781 kilometers, plays a pivotal role in connecting Addis Ababa to the Port of Djibouti, facilitating international trade and regional integration. Despite geographical challenges such as steep gradients and varying terrain, Ethiopia plans to expand its railway network extensively, fostering connectivity with neighboring countries and attracting international investments. In terms of water transport, Ethiopia's landlocked status limits navigable waterways, with minimal ferry services on Lake Tana and seasonal navigability of rivers like Baro and Awash. However, strategic agreements with Djibouti and Sudan optimize the utilization of available water routes for transit trade, supporting Ethiopia's trade connectivity efforts. Moreover, Ethiopia has strategically developed dry ports in key locations such as Modjo, Semera, and Dire Dawa to mitigate the challenges of landlocked trade, enhancing efficiency in import-export operations and promoting regional economic integration

Introduction

The role of transportation in shaping social and economic landscapes cannot be overstated. Beyond mere movement of people and goods, transportation infrastructure serves as a cornerstone for broader developmental initiatives. As noted by Button (2001), transportation is integral to facilitating various aspects of economic and social progress, enabling access to land for cultivation, enhancing marketing capabilities, and ensuring the utilization of natural

resources. Moreover, it plays a pivotal role in industrial development, expanding trade opportunities, supporting healthcare and education services, and fostering the exchange of ideas.

Ethiopia, despite its vast potential, grapples with an inefficient transportation and communications network (World Bank, 2007). The country's transport infrastructure is characterized by limitations in both scope and connectivity, necessitating significant upgrades and expansions. A cost-effective and efficient transportation system is crucial for stimulating economic growth and development within the region. The integration of railways, roads, inland waterways, and air transport collectively contributes to advancing Ethiopia's developmental agenda.

Road transport plays a crucial role in facilitating economic and social development in Ethiopia, a country characterized by diverse geography and settlement patterns. This article explores the pivotal role of road infrastructure in supporting economic growth, improving accessibility to markets and services, and enhancing agricultural productivity.

1. **Road Network**

Ethiopia's road network, comprising 46,812 kilometers, is predominantly gravel with only 6,938 kilometers paved. Despite this, roads serve as the primary mode for passenger and freight transport, accommodating about 95% of all traffic across the country (RSDP, 2009). This network is vital for connecting urban centers with rural communities, enabling access to social services and fostering economic opportunities.

Expansion and Development of Road Infrastructure

Since 1997, Ethiopia has prioritized the expansion and improvement of its road network, increasing from approximately 26,550 kilometers to 46,812 kilometers by 2009. This growth has boosted road density from 24.1 to 42.6 kilometers per 1000 square kilometers and from 0.46 to 0.57 kilometers per 1000 population (RSDP, 2009). Notably, investments have focused on key arterial routes radiating from Addis Ababa towards major cities like Jimma, Adama, and Dire Dawa.

Table 1 – Road Network in Ethiopia

Year	Road Network in km				Growth Rate	Road Density/ 1000 pop.	Road Density/ 1000 km
	Asphalt	Gravel	Rural	Total			
1997	3708	12162	10680	26550		0.46	24.14
1998	3760	12240	11737	27237	4.5	0.46	25.22
1999	3812	12250	12606	28662	3.3	0.47	26.06
2000	3824	12250	15480	31554	10.1	0.50	28.69
2001	3924	12467	16480	32871	4.2	0.50	29.88
2002	4053	12564	16680	33297	1.3	0.49	30.27
2003	4362	12340	17154	33856	1.7	0.49	30.78
2004	4635	13905	17956	36496	7.8	0.51	33.18
2005	4972	13640	18406	37018	1.4	0.51	33.60
2006	5002	14311	20164	39477	6.6	0.53	35.89
2007	5452	14628	22349	42429	7.5	0.55	38.60
2008	6066	14363	23930	44359	4.5	0.56	40.30
2009	6938	14234	25640	46812	5.5	0.57	42.60

Source: RSDP (2009), *Ethiopia Road Authority*, Govt. of Ethiopia

Types of Roads and Their Significance

Ethiopia categorizes its roads into Federal, Regional, and Community roads:

1.1 Federal Roads:

These are critical for long-distance travel and trade, linking major cities such as Addis Ababa to ports like Djibouti and Massawa. The Federal Roads span approximately 18,540 kilometers and are predominantly paved (RSDP, 2009).

Table 2 – Federal Roads in Ethiopia

	Federal Road	**Route**	**Length (km)**	**Surface Type**	**Routes for Port**
A1	Addis-Djibouti	Addis- Modjo-Nazert- Metehara-Awash-Gewane-Mile-Semera Serdo - Hanef – Ditcheto-Burie	827	Paved	Dijibouti Port, Asseb Massawa
A5	Addis -Metu	Addis Weliso-Welkite-Gibe river-Saja-Jima- Bedelle - Metu	597	Paved	
A6	Jimma-mizanteferi	Jimma - Bonga – Mizanteferi	221	Unpaved	
A7	Modjo-arbaminch	Modjo - Ziway- Shashemene -Alaba-Sodo-Arbaminch	433	Paved	
A8	Shashemene-Hgeremariam	Shashemene-Wgenet – Awassa –Aposto – Dilla –Yirgalem –Hgeremariam	246	Paved	

A9	Nazereth-Assela	Nazereth-Ateya-Assela	85	Paved	
A10	Awash-Degehabur	Awash Arebereketi - Kkobo –Kulubi – Dengego – Harar -Bombas – Jijiga – Degehabur	584	Paved	Berbera Port and Maogadishu
B20	Adigraant-Zalanbesa	Adigraant-Zalanbesa	35	Paved	
B21	Dessie-mekaneselam	Dessie- Mekaneselam-Gundewein	202	Unpaved	
B22	Woldia-wereta	Woldia – Gundewein – Estayish – Gashena – Flakit – Dzabit –Debretabor – Wereta.	301	Paved Unpaved	
B30	Gondar-debark	Gondar – Debark - Adi Arkay -Buya River - Shire- Axum.	385	Unpaved	
B31	Tik- B/Dar	Tik-Mota-B/Dar	252	Unpaved	
B32	Bure-Nekemte	Bure - Abay River - Gida - Guten-Nekemte	257	Unpaved	

Source: RSDP (2009), *Ethiopia Road Authority*, Govt. of Ethiopia.

1.2 Regional Roads:

Managed by state governments, these roads connect cities, towns, and district headquarters to Federal Roads. They play a crucial role in regional economic integration and agricultural transport, contributing significantly to market accessibility and industrial development (RSDP, 2009).

Table 3 – Regional Roads

Regions	Regional/ Rural Road (km)	Area (km sq.)	Road Density
Afar	1,053	96,707	0.011
Amhara	2,996	159,202	0.019
Benishangul-Gumz	1590	49289	0.032
Gambella	846	25802	0.033
Harrari		311	0
Oromia	8,123	353007	0.023
SNNP	7,343	279,252	0.026
Somali	2,097	112343	0.019
Tigray	1,404	50079	0.028
Dire Dawa	188		0
	25,640		

Source: RSDP (2009), *Ethiopia Road Authority*, Govt. of Ethiopia

1.3 Community Roads:

These essential rural arteries facilitate the transport of agricultural produce and connect villages to district roads. Despite their importance, many remain unpaved and are often impassable during the rainy season, limiting year-round access for rural communities (RSDP, 2009).

Despite significant investments, challenges persist, including inadequate road maintenance and low road density compared to regional averages. Approximately 75% of Ethiopia's land area remains more than half a day's walk from all-weather roads, highlighting persistent accessibility issues (RSDP, 2009).

Moving forward, enhancing road infrastructure resilience and expanding paved roads are critical to sustaining economic growth, improving access to markets, and reducing poverty in Ethiopia. Strategic investments and policy reforms aimed at improving road quality and connectivity will be essential to overcoming current challenges and fostering inclusive development.

The Network of Roads

Ethiopia's road infrastructure is woefully insufficient to meet the region's expanding needs. Even if the provinces and the federal government are directly in charge of building and maintaining roads, it is the responsibility of the populace to use them for intended purposes. Ethiopia's overall road network is intimately connected by a variety of road types. The main route for road connection runs from Addis Ababa to Neghalli and connects central and southern Ethiopia. The routes connecting Addis Abeba to Jimma, Neghelli, Dire Dawa, and Assab are other significant routes in the area. The fundamental structure of the area's road network is provided by these roads.

2. Railway

The Djibouti-Ethiopia Railway, known as the Chemin de Fer Djibouti-Ethiopien (CDE), is a vital infrastructure link that underscores the economic and strategic cooperation between Ethiopia and Djibouti. Established as the successor to the Imperial Railway Company of Ethiopia, the CDE is jointly owned by both governments, with the Djiboutian Ministry of

Equipment and Transport and the Ethiopian Ministry of Transportation and Communications overseeing its operations (African Development Bank, 2006). This railway, crucial for Ethiopia as a landlocked nation, connects its capital, Addis Ababa, to the Port of Djibouti on the coast, facilitating international trade and transport.

Stretching over 781 kilometers with a one-meter gauge, the CDE predominantly runs through Ethiopian territory, with a shorter stretch of about 100 kilometers in Djibouti (African Development Bank, 2006). The headquarters of the railway company are situated in Addis Ababa, emphasizing its strategic importance as a hub for transportation and logistics management.

2.1 Challenges and Characteristics of the Railway Lines

The terrain through which the Djibouti-Ethiopia Railway traverses presents significant engineering challenges. The railway passes through the Rift Valley and Ethiopian highlands, characterized by sharp curves, steep gradients, and varying topography. These geographical features necessitate meticulous planning and engineering expertise to ensure smooth and efficient operations. Factors such as the frequency of tunnels, bridges, and the extent of cutting and filling along the route play crucial roles in determining the railway's operational efficiency and cost-effectiveness (Knowled and Wareing, 1996).

In the plateau region, the railway often encounters broken topography, compelling frequent adjustments in course and gradient. This rugged terrain requires the deployment of powerful locomotives and, in some sections like near Addis Ababa to Nazreth, banking engines to assist trains over steep gradients (Aschenaki, 2004). Such geographical challenges underscore the costly nature of railway construction and maintenance in Ethiopia, reflecting the country's commitment to overcoming infrastructural barriers for economic development.

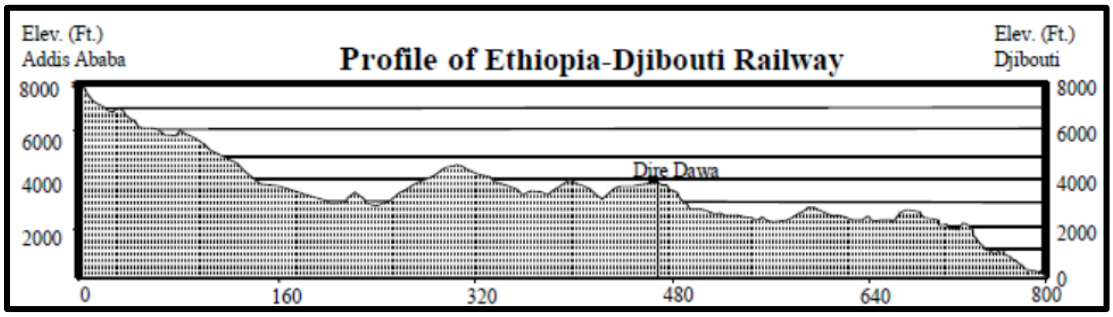
2.2 Future Expansion and Regional Integration

Ethiopia has ambitious plans to expand its railway network further, signifying its commitment to enhancing connectivity and promoting economic growth across the country. A Memorandum of Understanding was signed with prominent international firms, including China Communications Construction, China Railway Engineering Corporation, and companies from India and Russia, highlighting Ethiopia's strategic partnerships for

infrastructure development (Railways Africa, 2010). The Ethiopian Railways Corporation (ERC), established in 2007 under the Ministry of Transport and Communications, spearheads efforts to expand the railway network. The planned expansion aims to establish at least eight main railway routes extending across all compass points within Ethiopia. This extensive network is designed to connect a minimum of 49 urban centers, including major cities and state capitals, fostering accessibility and economic integration (Railways Africa, 2010).

Furthermore, Ethiopia's railway ambitions extend beyond national borders. The proposed railway lines are set to cross regional boundaries, connecting neighboring countries such as Sudan, Kenya, and Djibouti. These cross-border connections are integral to regional integration efforts, promoting trade, and enhancing economic cooperation among East African nations.

Rail Profile of Ethiopia – Djibouti Railway



Source: Hence, William A., *The Geography of Modern Africa*, New York

2.3 International Support and Investment

The development of Ethiopia's railway infrastructure has garnered international support and investment. During the 2nd African-Indian Summit held in Addis Ababa, India pledged $300 million towards the construction of the railway linking Ethiopia to Djibouti Port, underscoring the importance of strategic partnerships in infrastructure development (Abiye, 2011). Additionally, Kenya has plans for railway branches that will connect it with its neighboring Horn of Africa countries, including Ethiopia and Sudan, further enhancing regional connectivity and economic prospects (Business Daily, South Africa, 2008).

3. Pipelines

Pipeline transportation plays a crucial role in the supply of commodities such as oil and natural gas across various regions globally. However, in Ethiopia, a landlocked and economically developing nation, the implementation of pipelines has been limited due to terrain challenges and the absence of domestic oil and gas resources.

3.1 Current Landscape

Ethiopia, one of Africa's least developed nations, lacks significant reserves of oil and natural gas. This absence contributes to a limited demand for pipeline infrastructure within the country itself. The undulating terrain of Ethiopia poses a further challenge, as constructing pipelines across such landscapes is both technically complex and economically unfeasible without a clear demand for the transportation of these resources.

3.2 Regional Initiatives

Despite Ethiopia's internal limitations, regional dynamics have prompted discussions and agreements regarding pipeline construction. For instance, in February 2012, Ethiopia, South Sudan, and Djibouti signed a Memorandum of Understanding (MoU) to explore the construction of an oil pipeline. South Sudan, a neighboring country to Ethiopia, is rich in oil resources but landlocked, necessitating alternative transport routes for its exports.

3.3 Economic Implications

The proposed oil pipeline from South Sudan through Ethiopia to Djibouti holds significant economic implications for Ethiopia. By facilitating the export of oil from South Sudan, Ethiopia stands to benefit economically through transit fees and potentially enhanced regional cooperation. Moreover, while Ethiopia itself does not currently produce oil for export, the pipeline could potentially serve as a future conduit for imports, thereby bolstering the country's energy security strategy.

4. Waterways

Ethiopia, a landlocked nation in East Africa, faces significant challenges in developing its water transport infrastructure due to geographical constraints and the absence of extensive navigable waterways. Despite these limitations, strategic agreements and efforts have been made to utilize existing water bodies for transit trade and transportation. Ethiopia has

primarily relied on the port of Djibouti for its transit trade, facilitated through agreements with Djibouti and Sudan. However, the country's geography restricts the development of both inland and marine transport systems. Ethiopia lacks significant navigable rivers, with only limited ferry services operational on Lake Tana. The Baro and Awash rivers, while navigable during the rainy season, present seasonal challenges due to fluctuating water levels. Additionally, the Abay River (Blue Nile) remains non-navigable due to falls, cataracts, and rapids, further limiting potential waterway routes.

The rugged terrain of Ethiopia, characterized by highlands, valleys, and steep gradients, inhibits the establishment of extensive water transport networks. Unlike some of its coastal neighbors in the region, Ethiopia's landlocked status compounds the logistical challenges associated with waterborne trade and transportation. In light of these challenges, Ethiopia has pursued strategic agreements to optimize the use of available water transport options. The Port Utilization Agreements with Djibouti and Sudan are crucial in facilitating efficient transit trade routes, leveraging Djibouti's strategic location.

5. Dry Ports and their significance

Landlocked countries face significant challenges in international trade due to their geographical constraints. Ethiopia, positioned in the Horn of Africa, has strategically invested in developing dry ports to enhance its trade connectivity and economic competitiveness. This article explores the pivotal role of dry ports in Ethiopia's trade infrastructure and their implications for regional development.

Dry ports serve as critical nodes in the logistics chain of landlocked countries, facilitating the efficient movement of goods between maritime ports and inland destinations. For Ethiopia, where direct access to ports is limited, the development of robust dry port facilities becomes essential. According to Ethiopia Review (2009), the benefits of efficient dry ports extend to streamlined customs procedures, reduced transit times, and enhanced competitiveness in global markets.

5.1 Strategic Locations of Dry Ports

The federal government of Ethiopia has strategically established dry ports in key locations across the country:

Modjo Dry Port: Located 73 km east of Addis Ababa in the Oromia Regional State, Modjo serves as a crucial link connecting the capital to the port of Djibouti. This facility plays a vital role in easing congestion at Djibouti port and enhancing the efficiency of import-export operations.

Semera Dry Port: Situated 550 km northeast of Addis Ababa in the Afar Regional State, Semera serves as a gateway for trade along the eastern corridor, linking Ethiopia with the Red Sea ports and facilitating regional economic integration (Giorgis, 2010).

Dire Dawa Dry Port: Dire Dawa emerges as a key strategic location for a dry port in Ethiopia:

Proximity to Djibouti Port: Dire Dawa, located 313 km from the port of Djibouti, offers a significant advantage as the nearest Ethiopian city to a major maritime port.

Capacity Expansion: With Djibouti port facing constraints in container handling capacity, Dire Dawa's dry port provides essential additional space, enabling smoother transportation of goods into central Ethiopia and the eastern regions (Kili, 2008).

5.2 Future Expansion Plans

The Ministry of Trade and Industry and the Ministry of Transport and Communication are actively planning the establishment of additional dry ports in northern and southern Ethiopia: New dry ports in northern Ethiopia will enhance connectivity and logistics efficiency in regions such as Tigray and Amhara. In southern Ethiopia, dry ports will serve as gateways for trade routes linking Ethiopia with Kenya and beyond, supporting regional economic integration.

Conclusion

Ethiopia's ongoing efforts to enhance its transport infrastructure represent a strategic imperative for economic development and regional integration. The country's road network expansion, despite challenges in maintenance and accessibility, has significantly improved connectivity between urban centers and rural communities, fostering economic opportunities and social development (RSDP, 2009). Furthermore, the Djibouti-Ethiopia Railway (CDE) serves as a vital artery for international trade, linking Addis Ababa to the Port of Djibouti and

facilitating regional economic cooperation. Despite Ethiopia's landlocked status and limited navigable waterways, strategic agreements with neighboring countries and investments in dry ports like Modjo, Semera, and Dire Dawa underscore its commitment to overcoming logistical barriers and enhancing trade efficiency. Looking forward, Ethiopia's plans to expand its railway network and improve water transport infrastructure are poised to further bolster its role as a regional hub for commerce and connectivity.

However, challenges such as inadequate maintenance of roads, low road density in rural areas, and technical complexities in railway construction necessitate continued investment and policy reform. Addressing these challenges will be crucial for sustaining Ethiopia's economic growth trajectory, promoting inclusive development, and leveraging its strategic geographical position in East Africa. By prioritizing infrastructure development across multiple transport modes, Ethiopia not only aims to strengthen its domestic economy but also to enhance its integration into global and regional markets. The transformative potential of these efforts cannot be overstated, as they promise to unlock new opportunities for trade, investment, and socio-economic advancement throughout the region.

REFERENCE

Abiye, B. (2011). Ethiopia-India Relations: A Strategic Partnership. Addis Ababa Press.

African Development Bank. (2006). Transport Sector Policy Paper. African Development Bank Group.

Aschenaki, M. (2004). Transport Infrastructure Development in Ethiopia. Addis Ababa University Press.

Business Daily, South Africa. (2008). Railway Expansion in East Africa. Business Daily Publications.

Button, Kenneth J. (2001), Handbook of Transport Systems and Traffic Control, Oxford: Emerald Group Publishing.

Knowled, W., & Wareing, J. (1996). Transport Economics. Oxford University Press.

Railways Africa. (2010). Rail Development Strategy. Railways Africa Publications.

RSDP (2009). Ethiopia Road Sector Development Program. Ethiopia Road Authority, Government of Ethiopia.

The World Bank (2008), Doing Business in Landlocked Economies, Washington, D.C.: The World Bank