27th IEK CONFERENCE

Post-COVID Economic recovery: Rethinking Kenya's road infrastructure development model

THEME: ENGINEERING A POST COVID FUTURE

SUB-THEME: BIG FOUR AGENDA AND VISION 2030

Authors:

Eng. Margaret Ogai[1],
General Manager Planning & Programming,
Kenya Roads Board

Co-authors: Dr. Eng. Timothy Oketch, Director – TIMCON Associates,

Dr. Evelyne Kihiu& James Gachanja both of KIPPRA

ABSTRACT

Infrastructure comprises public facilities in a nation, including roads, railways, national buildings and power lines. Good infrastructure raises productivity and lowers the cost of doing business (OECD, 2002). Poor infrastructure impedes a nation's economic growth and international competitiveness. In Kenya, only 58% of the citizens have access to basic drinking water, 30% have access to basic sanitation while 25% do not access to electricity and 30% are not served by an all-weather road.

Under Kenya's development plan, Vision 2030, infrastructure is identified as an enabler for Kenya's economic development. However, COVID-19 pandemic has had negative impacts on Kenya's economy disrupting its recent broad-based growth path. Real gross domestic product (GDP) is projected to decline. Since over 90% of Kenya's passengers and goods are transported by road, this sector is critical to the post COVID economic recovery strategy.

The core objective of this paper is to examine the impact of Covid-19 on the road infrastructure development in Kenya. Socio-economic factors are assessed to identify past trends and potential impacts of COVID and potential interventions in the roads sector. In light of the contracting economy and reduced travel demands, the paper concludes that in order for road network to continue serving as an enabler of economic growth, there is need for reexamination of a number priority areas including the Fuel Levy Collections and road tolling initiatives, PPP funding models, NMT initiatives, Long term master planning and a better realignment of the roads sector to devolution noting the technical capacity deficiencies at the county levels.

Key words: Road infrastructure, COVID, economic recovery,

[1] Corresponding author /presenter

CONTENTS

1 INTRODUCTION

1.1 Study Background

Infrastructure comprises public facilities in a nation, including roads, railways, national buildings and power lines. Good infrastructure raises productivity and lowers the cost of doing business (OECD 2002). Poor infrastructure impedes a nation's economic growth and international competitiveness. In Kenya, only 58 per cent of the citizens have access to basic drinking water, 30 per cent have access to basic sanitation while 25 per cent do not have access to electricity and 30 per cent are not served by an all-weather road. Under Kenya's development plan, Vision 2030, infrastructure is identified as an enabler for Kenya's economic development.

Over 90 per cent of Kenya's passengers and goods are transported by road and is hence key to the pursuit of sustainable development. The sector accounts for 6 per cent of GDP, 15 per cent of typical household financial budget and a third of the country's energy consumption and carbon emissions. The contribution of the road sector to development has grown from about KSh.235 billion in 2007 to over Ksh.7080 billion in 2018. The road sub sector is the dominant contributor to GDP among the transport sector, with modal share of over 69 per cent over the period 2007-2018.

Investments in road infrastructure have progressed well over the years, with network expansion and an increasing proportion of paved roadways, most of which have been in good or fair condition. However, some shortfall had been forecasted to keep the road network in acceptable maintenance condition.

It is against this backdrop that the occurrence of COVID-19 pandemic and its impacts on transport as well as in the general economy are of great significance to the road infrastructure sector. COVID-19 has impacted Kenya's economy and travel patterns thereby disrupting its recent broad-based economic growth path and casting doubt on availability of future funding for the transport sector. Consequently, an understanding of those impacts and the actions necessary to mitigate any undesirable results is therefore necessary.

1.2 Kenya's Road Development journey since Independence

When Kenya attained independence in 1963, the country had approximately 45,000km of roads of which 2,000km was paved and the rest were earth and gravel roads. The network, did not have the geographical reach that could enable it to serve the development objectives of the people of independent Kenya that included eradication of poverty, disease, and ignorance.

While emphasis was laid on upgrading of the principal highway arteries in the trunk road system followed by an improvement of the primary road in the 1960s, the 1970s saw a shift in emphasis towards the construction of feeder and minor roads that included the labour based Rural Access Roads Programme (RARP) and the equipment-based Gravelling, Bridging and Culverting (GBC) programmes. That continued in the 1980s when the Government instituted Minor Roads Programme to achieve the rural-oriented road development goal. During this time the primary and secondary roads started to deteriorate due to lack of maintenance.

While reforms in the Roads Sector commenced in 1950s during the colonial era, the most significant were informed by the World Bank funded Road Maintenance Initiative (RMI) in the 1990s. The RMI was formulated to address the deteriorating road networks and inadequate funding for road maintenance in Sub-Sahara Africa, and identified 4 building blocks to improve road conditions:-

- Stable and secure Funding
- Separation of financing and implementation
- Create Ownership of roads and clarifying responsibilities
- Managing roads in a Business-like manner (evidence-based decision making)

To address stable funding for road maintenance, the Road Maintenance Levy Fund (RMLF), a road user charge, was established in 1993. The fund has grown from KShs1.3 billion in 1993 (when the rate was Ksh 1.5/litre) to Ksh 76 billion levied at Ksh 18 per litre of petrol and diesel. The other pillars were however not implemented resulting in low accountability, unclear project prioritization, poor decision making and wastage with projects suffering delays in implementation.

In 2001, Kenya Roads Board was established to manage the Fuel Levy Fund and coordinate road maintenance programs. This addressed the second pillar of separating financing from implementation. Sessional Paper No. 5 of 2006 on the development and management of roads attributed road conditions to years of inadequate financing, negligence and maintenance. The policy led to the creation of dedicated agencies to bring ownership and clarity into the sector and assign responsibility. These reforms lead to establishment of three (3) Authorities (KeNHA, KeRRA, KURA), to be responsible for designated portions of the road network.

1.3 Problem statement:

Addressing infrastructure inadequacies is a key pillar for socio-economic development. Infrastructure investment is recognized as a crucial driver of economic development with impacts on social costs and benefits, the internal rate of return and negative externalities at the micro-level, and on productivity, private investment, trade facilitation and economic growth on the macro level.

With COVID 19 and its impacts on the economy and travel patterns, pertinent issues and questions that need to be addressed include:

- Effectiveness of the historical models in managing and investments in the road sector
- The pandemic has had socio-economic impacts, the magnitude of which is yet to be quantified. Measures taken to mitigate the spread of the pandemic such as lock downs, curfews, social distancing among others have affected local and global economies. What are those impacts?
- The pandemic is novel, and nobody yet knows how it will evolve. What are the likely future impacts and what can we do today to mitigate them?
- In the Post COVID-19 era, the infrastructure and development models will need to change to respond to the new normal, build back better and ensure resilience in the future to deal with shocks. Since roads are important for national development (Agriculture being the key contributor to GDP in Kenya), there is need to estimate how COVID will impact the road sector.

1.4 Study Objectives:

This paper will examine the policy and institutional framework for roads infrastructure development and management over the last decade, analyse the basic objectives of roads policies and assess the effectiveness of ongoing road programs in delivering Vision 2030 goals. The paper will discuss what kind of road infrastructure is necessary, where it is best suited, and who is to benefit from it in post COVID era. The specific objectives are as follows:

1. To review historical road sector investments, policies and resulting socio-economic factors, identify past trends.
2. To review the effects of COVID -19 on road infrastructure investment, development and use.
3. Assess mitigation measures from the effects of COVID-19 in the road sector

1.5 Study Approach:

The core objective of this paper is to examine the impacts of Covid-19 on the road infrastructure development in Kenya. To achieve that the paper will review the historical and prevailing economic and road investments in the country and its outcomes and attempt to assess these parameters for the post-COVID period. The established impact of COVID on the economy as well as on road transport are assessed and used to draw future scenarios. The discussions are around these scenarios provide opportunities to rethink investments in the road development in order to make it sustainable and effective in achieving the intended outcomes.

2 FUNDING AND ROAD NETWORK CONDITION

2.1 Policy and Institutional Framework:

Road infrastructure development is being undertaken within the framework of the 'Vision 2030', a solid strategic framework that aims to transform Kenya into a newly industrializing, middle-income country by 2030 through the development of interconnected network of roads, railways, ports, airports and waterways. The road infrastructure development is also seen as a major enabler of the Big Four Agenda of ensuring food security, affordable housing, manufacturing and affordable healthcare. It is well acknowledged that that infrastructure improvements will generally support trade, goods production and increase investments, thereby enabling the Big Four Agenda.

The institutional framework under which the road sector operates has been shaped by the previous development plans as well as the Constitution of Kenya which was promulgated in 2010. The Constitution created a devolved system of government with two levels of government – National Government and 47 County Government which are distinct and interdependent. Further the CoK under the 4th Schedule, created two categories of roads categories: National Trunk Roads and County Roads. The management of County Roads was transferred to the 47 county governments.

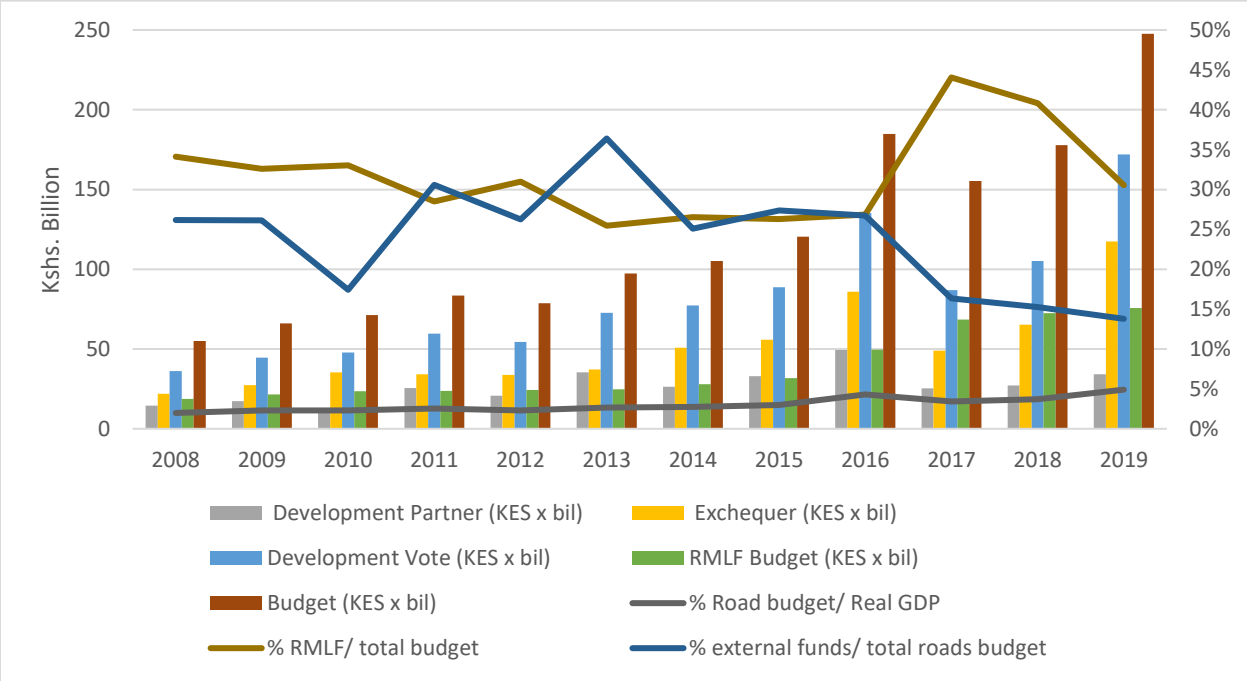
At this time, the State Department of Infrastructure is responsible for development and maintenance of road infrastructure in the country. The Department delivers the Road maintenance function through the following agencies:

- Kenya Roads Board (KRB), which is responsible for the management of the Road Maintenance Levy Fund (RMLF).
- Kenya National Highways Authority (KeNHA), which is responsible for the management, development and maintenance of National Trunk Roads in Classes S, A and B.
- Kenya Rural Roads Authority (KeRRA), which is responsible for the management, development and maintenance of National Trunk Roads in Class C.
- Kenya Urban Roads Authority (KURA), which is responsible for the management, development and maintenance of Urban Roads in Cities and Municipalities.
- Kenya Wildlife Service (KWS), which is responsible for the management, development and maintenance of roads in National Parks and National Game Reserves.
- The 47 County Governments which are responsible for the management, development and maintenance of County Roads (Classes D and below)

2.2 Historical Investments in the Road Sector:

The key sources of funding for road infrastructure development and maintenance is GoK exchequer and county government revenue funds and Road maintenance levy fund as depicted in **Figure 1**. However, the existing sources of funding are insufficient to meet the road network development and maintenance needs.

Figure 1: Road Budgets for the last 10 years



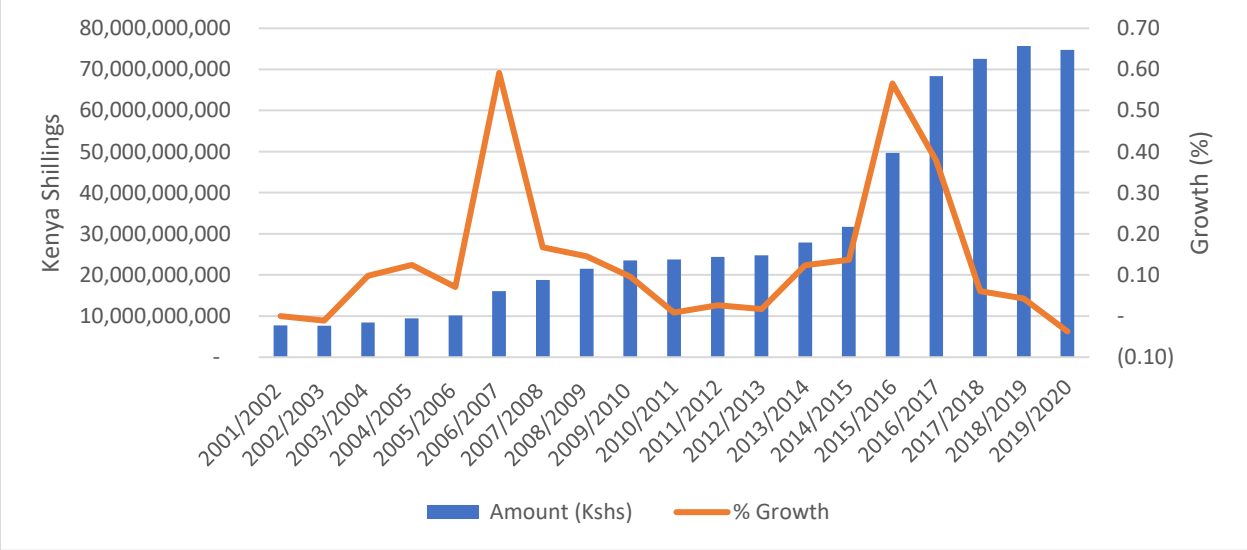
Source: KRB, 2020 and State Department of Infrastructure.

Road programs have hitherto been implemented using traditional procurement models where the Government finances the entire project cycle from design, construction to maintenance phases. To supplement government funding sources for roads infrastructure programs, the Government has created a framework for-budget financing models such as Road Annuity and privately financed Design-Build-Operate Program to facilitate partnership between the Government and the Private sector under PPP arrangements. However, none of PPP schemes have been implemented to date.

The roads budgets have significantly increased over the last 10 years from Kshs 58 billion to Kshs 187billion. The largest growth has been in the GOK development vote which increased from Ksh 16bn in 2007 to Kshs 85bn in 2016; this is attributable to the Roads 10,000 program under the component for construction of Low volume sealed roads. In FY2016-17, it is estimated that county governments used a total Kshs 15billion of county revenue funds to fund road development projects. County Governments also apply County Revenue funds for road development and are apportioned 15 per cent of RMLF for county road maintenance.

The trend in RMLF collections are depicted in **Figure 2**, where the absolute amounts collected has grown since 2001/02 to 2019/20, but the rate of growth year on year has since 2015/16 to 2019/20 has witnessed a decline. The trend in RMLF collection is anticipated to decline further due to the effects of COVID-19 on consumption and GDP brought on by constrained travel demand.

Figure 2: Trend in RMLF collections



Source : KRB 2020

The funding to Road as % to GDP increased from 1% in 2007 to 2% of GDP (est. 74bil USD, 2017). This is below the recommended 4% in Sessional Paper No. 5 of 2006. While the rate is higher than those in developed OECD countries (ranging from 0.59% Austria to 1.75% in Albania)[2] with high road network densities, it is appropriate for developing economies where road densities are still lower. It is noteworthy that China has increased spending on land transport and in 2015 spent 5% of GDP.

[2] (http://stats.oecd.org/Index.aspx?DataSetCode=ITF_INDICATORS)

Absorption of roads funds have increased significantly from 46% and 67% for RMLF and development in 2007 to 88% and 67% in 2016. This is attributable to the operational efficiencies with the formation of autonomous Road Authorities in 2007. It is recommended that the efficiency gains realized under the Kenya Roads Act, 2007 should be sustained.

The proportion (%) of road maintenance budget as compared to total roads budget has gradually decreased over the period from 61% in 2007 to 31% in 2016. There has not been commensurate growth of road maintenance funds to support the aggressive roads development programs. There is a risk that these new road assets may not be adequately maintained. The per cent of roads budget supported by development partners rose from 18% in 2006 to 31% in 2016 and thereafter declined to 17% in 2016.

According to the 2nd Road Sector Investment Programme (RSIP) 2018-2022, the current budgets for road maintenance are likely to result into the deterioration of part of the network from good to fair condition and also from fair to poor condition at the end of the RSIP2 implementation period. A total of KSh. 2.27 trillion will be required to fix the backlog of maintenance and development works over the next 5-years. This translates to an additional budget of KSh. 1.47 trillion over the current available budgets of KSh. 0.806 trillion. The stretched targets on the other hand will require a total financial outlay of KSh. 1.033 trillion over the next 5-years. If the post COVID era leads to reduced collections from RMLF, there will be need to explore alternative and innovative financing options

Overall, a total of **KShs 1.205 Trillion** was spent on the road network development and maintenance over the eight year period from 2012/13 to 2019/20. A total of 12,973km of roadway was developed and maintained with the Northern Corridor accounting for 4% (507 km) at an amount of Shs 497 Billion (41 %) of the total amount spent.

2.3 Summary of Road inventory and Characteristics

Kenya has a total road network length of 160,886km as shown in **Table 1.** The network is under the responsibility of five authorities/ agencies namely KeNHA, KURA, KERRA, KWS and Counties with over 70% of the entire network. Paved road comprise 15% with Gravel and Earth surfaces accounting for the 20% and 65% respectively.

Table 1: Length of road network by surface type

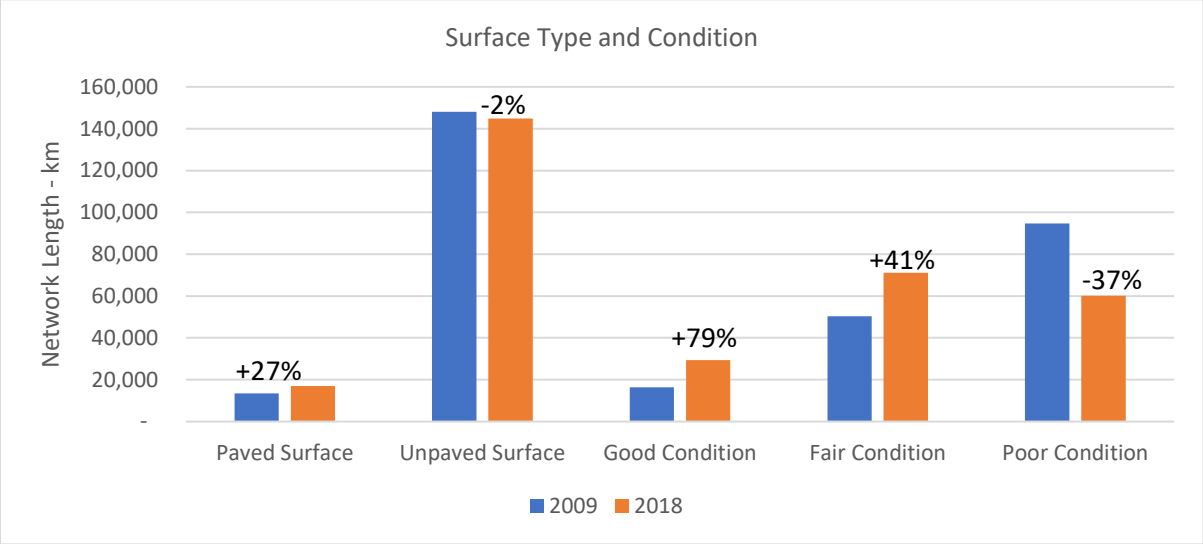
Agency	**Total(Km)**	**Paved(Km)**	**Gravel(Km)**	**Earth(km)**
KeNHA	18,224.74	9,186.76	8,457.97	580.01
KURA	2,610.06	1,172.55	245.77	1,191.73
KeRRA	19,492.94	3,908.77	3,798.98	11,785.19
KWS	6,562.07	14.00	1,456.00	5,092.07
County	113,996.20	9,594.45	17,699.69	86,702.06

Grand Total	**160,886.00**	**23,876.53**	**31,658.42**	**105,351.05**
		15%	**20%**	65%

Source: Kenya Roads Board (2019)

The state of the roads is 78 per cent of paved roads and 49 per cent of unpaved roads respectively are in good/ fair condition. There has been improvement in the overall condition of the road network over the last ten years. From 2009 to 2018, the total road network with the paved increasing by 27% with a corresponding 2% reduction in the length of unpaved roads as shown in **Figure 3**. Roadways with good and fair conditions while those in poor condition reduced. This trend is however threated due to the shortfall and impacts of COVID.

Figure 3: Changes in Network Size and Surface Condition



Source – RICS (County Data may not be well captured)

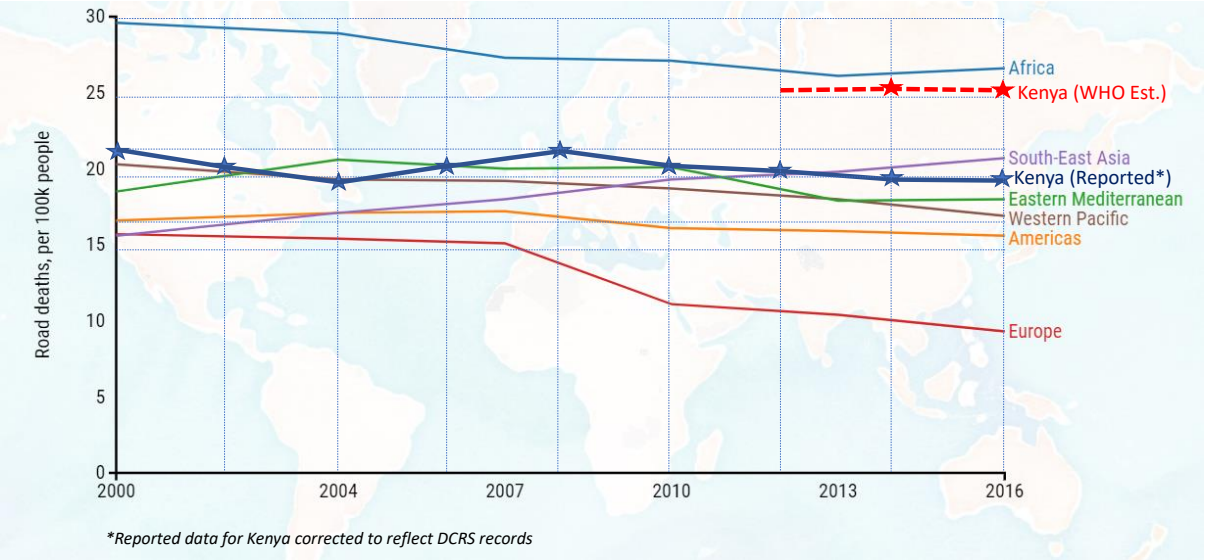
Travel demand on the country's road network has increased steadily over the years with the total travel of 85 Billion Km in 2015, mirroring the growth of motorization as measured by the number of registered vehicles in the country. This trend translates into an annual growth rate of approximately 12%.

It is noteworthy that despite the above investments in the road sector, majority of trips (50%) are made walking, 11% by matatus and 4% on owned and boda boda bicycles. Private vehicles only account and motorcycles each account for 2% (see figure in Annex).

As per the sessional Paper #5 of 2006, GoK has prioritized Road Safety as one of the major transportation related consideration with impacts to the economy. The paper noted that there is a need to improve road safety aspects of all road infrastructure development and maintenance including road furniture, traffic calming measures and children's traffic parks. To that end the government established the National Transport Safety Authority (NTSA) as the lead agency for Road Safety under the National Transport and Safety Authority Act (2012) in order to strengthen coordination amongst the stakeholders in Kenya.

On average over 3,000 fatalities occur on the Kenyan road each year. However, there appears to be a serious underreporting and the actual deaths are considered to be higher. In 2016, the police records showed 2,919 fatalities were reported, although the records at the Department of Civil Registration Services (DCRS) reported that 6,037 persons had died as a result of traffic accident injuries thereby pointing to significant underreporting. Based on DCRS data, a fatality rate of 17-20 per 100,000 population was obtained during the Study period against or 70.6 vehicles per 1000 population. As shown in **Figure 4**, WHO estimates of 27.8 fatalities per 100,000 population. These rates are higher than for Europe or America where there are higher rates of motorization (500-800 vehicles/1,000 population) but with significant investment of resources in Road Safety. The socio-economic cost of road trauma in Kenya represents an estimated 5.6% of the country's GDP.

Figure 4: Global Road Safety Indicators



Source: WHO and authors computations

2.4 Socio - Economic Indicators:

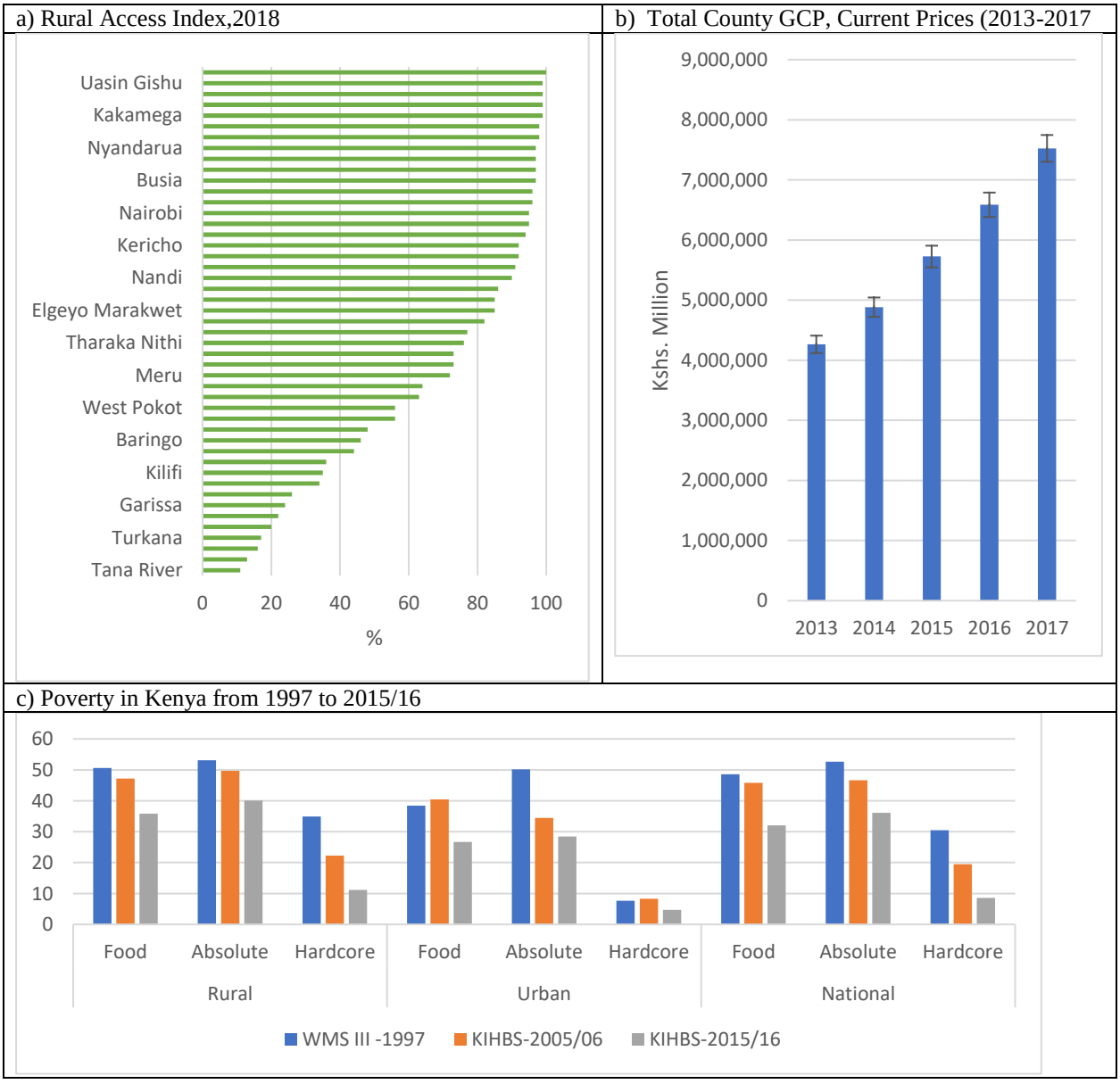
A sustained rate of investment in infrastructure is required to spur and sustain economic growth. As noted previously, an extensive network of good quality roads is a vital enabler to the production of goods, mobility of factors of production, facilitation of trade and social participation among many other uses. In Kenya, a good road network is necessary to sustain, amongst other, agricultural production that has been the backbone of the Kenyan economy. There is a strong correlation between road infrastructure and key national development indicators.

The average length of county paved roads in in Kenya is about 361km with a standard deviation of about 308 indicating high disparities of roads in good condition between counties. The disparities are further shown in the rural access index (RAI) with the proportion of the rural population who live within 2 km of an all-season road in some counties scoring as low as 11% in Tana River County, against a national average of 70%, see **Figure 5 (a)** and Annex 1. While the mainly agricultural counties along the Northern corridor, had the highest access indices ranging

between 72% - 100%, those in Northern and North Eastern had the lowest RAI ranging between 11% and 30%. Most of these counties are arid and semi-arid, and although they have large land masses, they are sparsely populated. In the "on" and "post" COVID era, the road sector will need to focus on narrowing the gaps and disparities in RAI across counties.

Counties in Kenya have experienced robust economic growth with total Gross County Product (GCP) increasing from Ksh. 4,263,910 million in 2013 to Ksh. 7,524,710 million in 2017. While the prevalence of poverty in the county has deceased over the years, the population of households living below the poverty line remains high with about 36 % of the county's population categorized as absolute poor, 32 % as food poor and 8.6 % as extreme or hardcore poor.

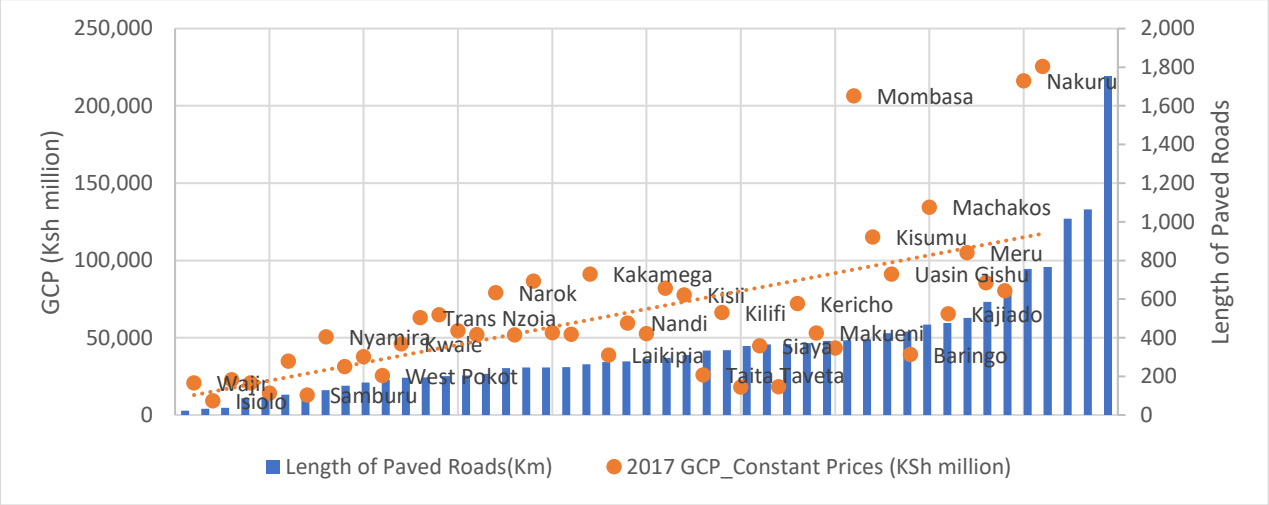
Figure 5: Key Social Economic Indicators in Kenya



Road Data Source: KRB5

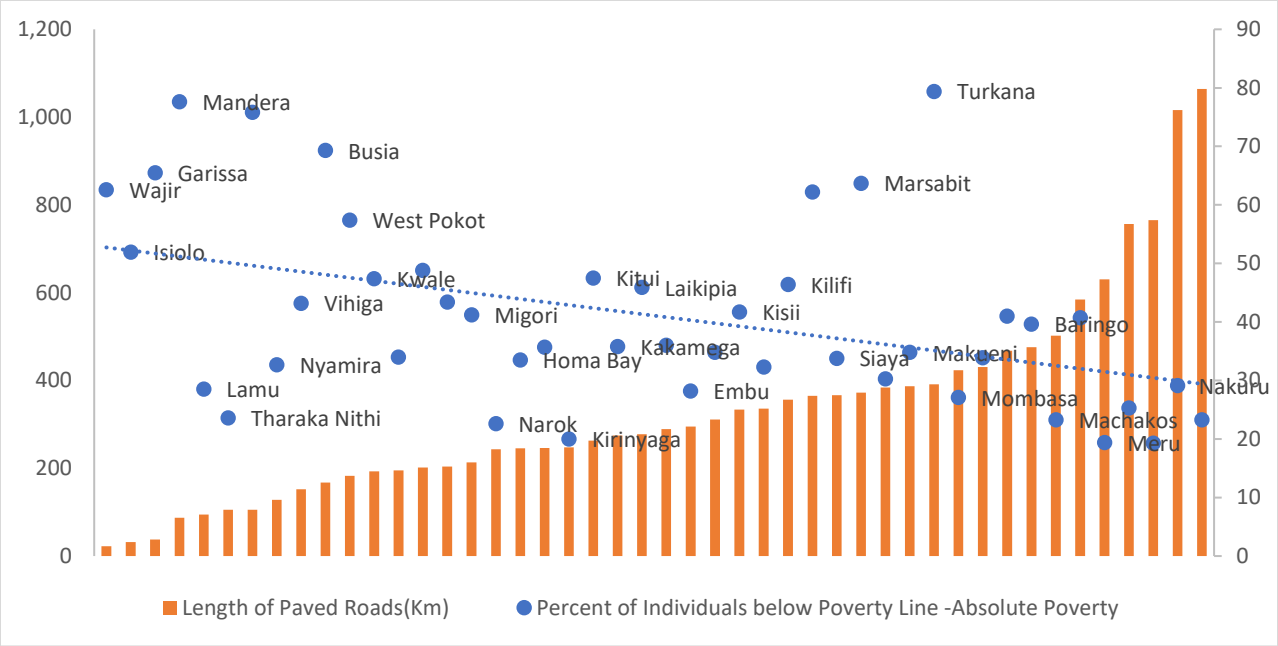
An assessment of the strength and direction of association between road infrastructure and county GCP, poverty reduction and food prices indicate presence of fairly high correlation between the variables of interest (**Figure 6 & 7**). This strong positive correlation between County's GCP and length of paved roads constitutes promising evidence that improvement in the quality of roads in counties could spur county's economic activities. The results indicate that road infrastructure is a vital enabler to county's economic performance. Further, the negative correlation results between quality of roads and poverty levels in counties is suggestive of the fact that road connectivity complements county and individual incomes. while also showing that good road infrastructure is capable of reducing transaction of markets access and hence making food prices stable and households food secure.

Figure 6:Length of County Paved Roads and GCP per County



Source: Authors computations

Figure 7: Length of County Paved Roads and County Absolute Poverty Levels



Source: Authors computations

3 COVID 19 IMPACTS ON TRAVEL AND ECONOMY

3.1 The COVID 19 Pandemic:

The COVID-19 was first reported in Wuhan China at the end of 2019 but spread quickly to rest of the world by the first quarter of 2020. To date (October, 2020) over 47 Million people have been infected worldwide with 1.2 million people dead. In Kenya, there are over 58,000 confirmed cases with over 1000 dead.

To limit the spread of Covid-19, more than 200 countries and territories worldwide imposed measures that restrict or deter people from entering their respective borders. From flight suspensions to border closures, the massive shutdown has cost countries billions of lost revenues from all sectors of the transport industry, aviation being the main one. This has led socio-economic impacts as well as impacts on the transport sector

3.2 Economic Impacts:

Recent studies show that COVID-19 pandemic has impacted Kenya's economy disrupting its recent broad-based growth path. Real gross domestic product (GDP) is projected to decline from an annual average of 5.7 per cent (2015 – 2019) to 1.5 per cent- in 2020 (World Bank, 2020).[3] KIPRA and partners estimate the April-June lockdown in Kenya estimated to have an impact of 5.6 percent in GDP in 2020 relative to the pre-COVID baseline leading to close to zero economic growth for the year, in annualised terms. The study found that the main drivers of the reduction in economic activity were the drops in labour productivity, in export commodities and in tourism. Further, the GDP decrease was accompanied by a depreciation of the Kenya Shilling; a reduction of domestic investment and an increase in government deficit; reduction in employment by 11.8 per cent; decrease in real income in urban rural households; and a decrease in domestic demand and market prices for the majority of commodities. The study also noted that the impacts of the pandemic would be amplified if a new COVID-19 wave were to emerge in the second part of 2020.

The agriculture food chain that is the backbone of rural economies was adversely affected by the COVID-19 pandemic. Measures implemented to contain the spread of the COVID-19 pandemic resulted in a decline in market operations and ability of farms to sustain their existing workforce. In addition, movement restrictions, social distancing and resulted in labour disruptions in the sector. There was marked effects on in labor participation, where hours worked in agriculture related occupations recorded a difference of 5 hours between the usual and actual hours worked in a week.

Due to the pandemic, close to 22.4 per cent of the households in the country had instances where they could not access markets/grocery stores to purchase food items, mainly because of closure of the markets/grocery stores (44.1 %) and movement restrictions (30.9 %). Further, with restrictions affecting seamless movement of food commodities, 78.8 % of households in the country indicated experiencing an increase in food prices.

[3] https://publications.jrc.ec.europa.eu/repository/bitstream/JRC121284/jrc_technical_report_-_covid-19_kenya_final.pdf

There is need to support rural development through investment in the rural road networks for recovery in the Post COVID era. Increased investment and prioritization of development of rural road networks is required as a paradigm shift to the historical focus on the traditional network. COVID-19 has made us recognize the importance of small-scale farming to the overall agricultural sector in the country. Small-scale farming contributes a significant amount to household consumption with a significant share of the small-scale farmers producing mainly for subsistence purposes. Nationally, 68.3 % of total food consumed is from purchases while 18 % is from own production. Similarly, in rural, peri-urban and core-urban areas, while households mainly source their food from purchases accounting for 57.4 %, 65.6% and 85.7% of total food consumed respectively, a significant share of food consumed in peri-urban (21.7 %) and rural areas (27.7 %) is from own production and respectively (KNBS, 2018).

The share of food consumed from own production is even higher at county level for some specific counties (Migori, 32.4%; Busia 38.1%; Elgeyo / Marakwet 35.6%; West Pokot 34.1%; and Tharaka-Nithi 32.8 % among others). In the period of the COVID -19 pandemic, lockdowns and stay at home protocols, subsistence production cushioned households' consumption, and in turn food security. Further, with labour disruptions as a result of the pandemic, workers ventured into subsistence production. Improved road networks will not only enhance producers' access to input and output markets but also enhance market connectivity, accessibility and integration which largely influence prices of traded goods, lessen transaction costs and enhances efficient price transmissions which would affected purchased consumption and hence food security in the country.

3.3 Transport Impacts:

In Kenya, the measures introduced by the Government included banning of all passenger flights, temporary closure of restaurants and bars, dusk to dawn curfew, cessation of movement in and out of some high-risk areas including Mombasa and Nairobi Metropolitan Areas. Some of those restrictions are still in place in one form or the other.

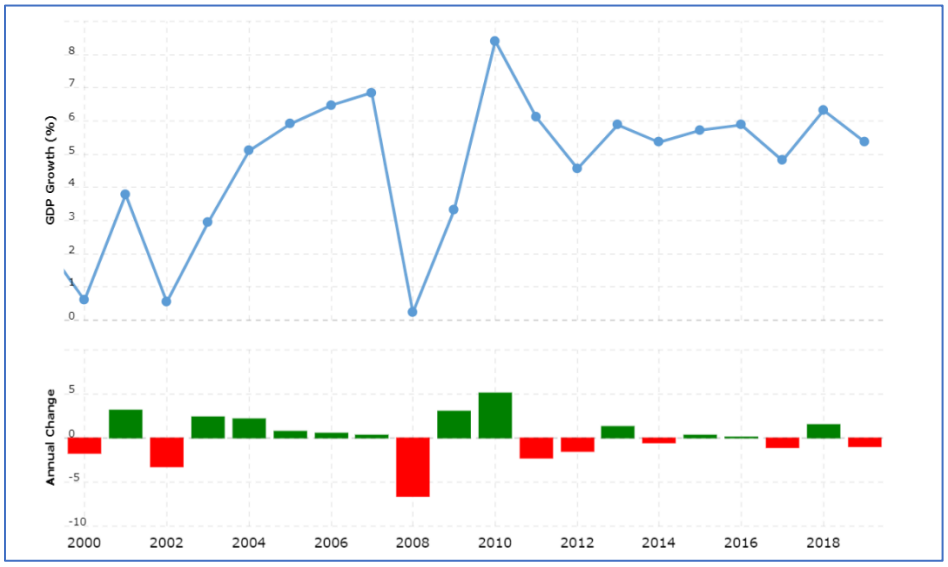
The above measures have been shown to result in significant impacts on travel and traffic volumes translating into economic impacts with reduced travel demands. With travel restrictions to Mombasa and Nairobi, cross country travel essentially came to a halt. In addition, many people in urban areas resorted to working from home, and are likely to continue doing so, even after COVID. Recent traffic volume counts indicate up to 15% reduction in traffic volumes along major highways in Nairobi. Similar trends have been reported in other countries like the UK.

The full extent of the impacts of COVID will only become clearer in the future. The Word Bank envisions a 5.2% contraction in global GDP with deep recessions triggered by the pandemic over the longer horizon leaving lasting scars through lower investment, an erosion of human capital through lost work and schooling, and fragmentation of global trade and supply linkages. In the US, The Energy Information Administration forecasts a drop in fuel consumption of at least 10% for gasoline (motor vehicles) and 30% for jet fuel respectively.

From recent history, the impacts of economic disrupting factors on fragile economies like Kenya may be greater. In 2008 for example, the GDP dropped from 7% to 0% (**Figure 8**) as a result of

the post-election violence that occurred. While it is noted that the government has put in place financial stimuli outlined above to cushion the country from the full impacts of the pandemic, similar if not worse contraction in the economy would not be surprising.

Figure 8: Historical GDP Trends



Source: WB

As noted previously, the April-June lockdown in Kenya was projected to have an impact of 5.6 percent in GDP in 2020 relative to the pre-COVID baseline leading and with the prolonged duration of the pandemic, higher contraction with longer lasting consequences are anticipated.

3.4 Government Economic Interventions:

In response to the pandemic, the Government of Kenya provided a fiscal stimulus package to help alleviate impacts of the pandemic to the vulnerable population and to spur back the economy in the long run. These measures included:

- Waiver of income taxes for those earning less than KSs 24,000 per month
- Reduction of both reduction of both income and corporation taxes by 5% from 30%
- Reducing turnover taxes to 1% from the previous 3% for all micro, small and medium enterprises while value-added tax has been reduced to 14% from the previous 16%.
- An additional KES10 billion (US$93 million) has been earmarked for social protection in the form of cash transfers to the elderly, orphans and vulnerable members of society
- Allocation of KES5 billion (US$47 million) to county governments to assist in the fight against Covid-19 to assist the various counties refurbish hospitals
- The Central Bank has also put in measures to increase liquidity the banking sector to encourage borrowing

4 FUTURE PROJECTIONS AND DISCUSSIONS

4.1 Recovery Trends from Other Pandemic:

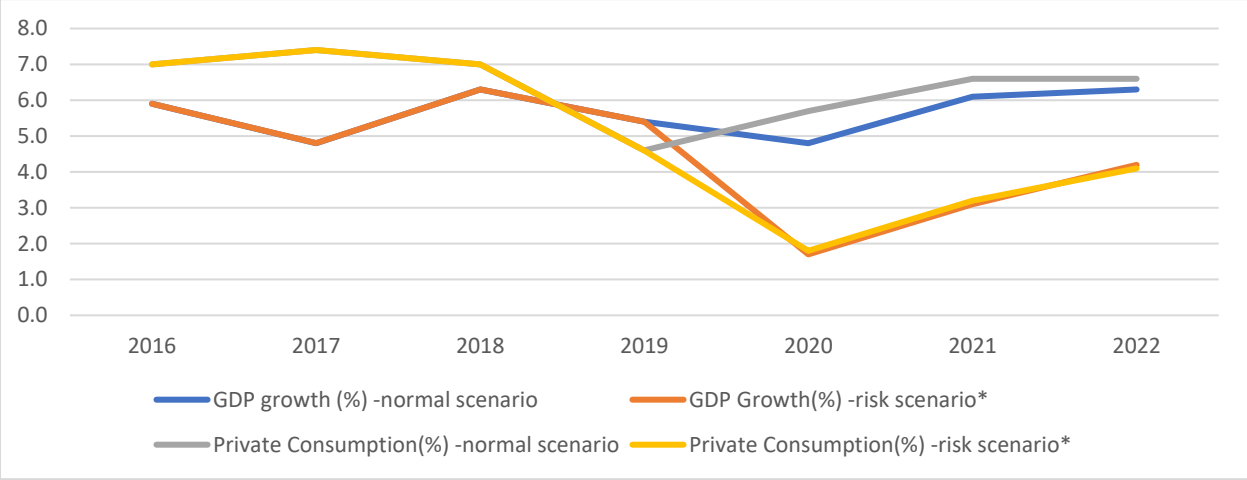
Recovery from the COVID-19 pandemic could take two general paths. One path could take the form of a 'V' shaped curve, with a sharp and short-lived dip, followed by a rapid recovery and economic growth. The second path to recovery resembles a 'U' shaped curve, with a prolonged period of economic inactivity for years to come.

Using the example of the Ebola crisis in Guinea, Sierra Leone and Liberia, the main economic impact from Ebola arose from *aversion behaviours* in which individuals who had not contracted the disease took extreme actions to avoid contracting the disease driven mostly by fear. The three affected countries stated that recovery needed to be pursued alongside, and as part of the goal of, "getting to zero and staying at zero". The key lesson from the Ebola crisis was that in order to bring an end to the crisis, recovery efforts must go beyond redressing direct development losses and build back better and stronger economies to ensure greater resilience to similar shocks. Focus will need to be on containment, treating the ill, and helping relatives and communities to recover. There will also be a need for concerted effort on economic recovery and re-engineering through strategic stimulus programmes including international response. Kenya's recovery path from COVID-19 would therefore need to include strategies to respond, recover and eventually thrive[4].

4.2 Economic and Social Projections:

The impacts of COVID-19 are projected to have significant adverse repercussions on key macro economic indicators. GDP and private consumption are forecasted to be affected, **Figure 9** depicts forecasts of GDP and private consumption for Kenya.

Figure 9: GDP and Private consumption forecasts for Kenya – normal and risk scenarios



Source :KIPPRA: Kenya Economic Report 2020[5]

[4] https://www2.deloitte.com/us/en/insights/economy/covid-19/governments-respond-to-covid-19.html#a-timeline-of-governments-action

[5] https://kippra.or.ke/index.php/publications?task=download.send&id=226&catid=4&m=0

The risk scenario, which includes effects of COVID-19 (among other risks like locusts, droughts and floods, security risks) on the economy shows that GDP growth is expected to contract to 1.7 percent in 2020 and follow a constrained growth path relative to the normal scenario up to 2022. The same case holds for private consumption.

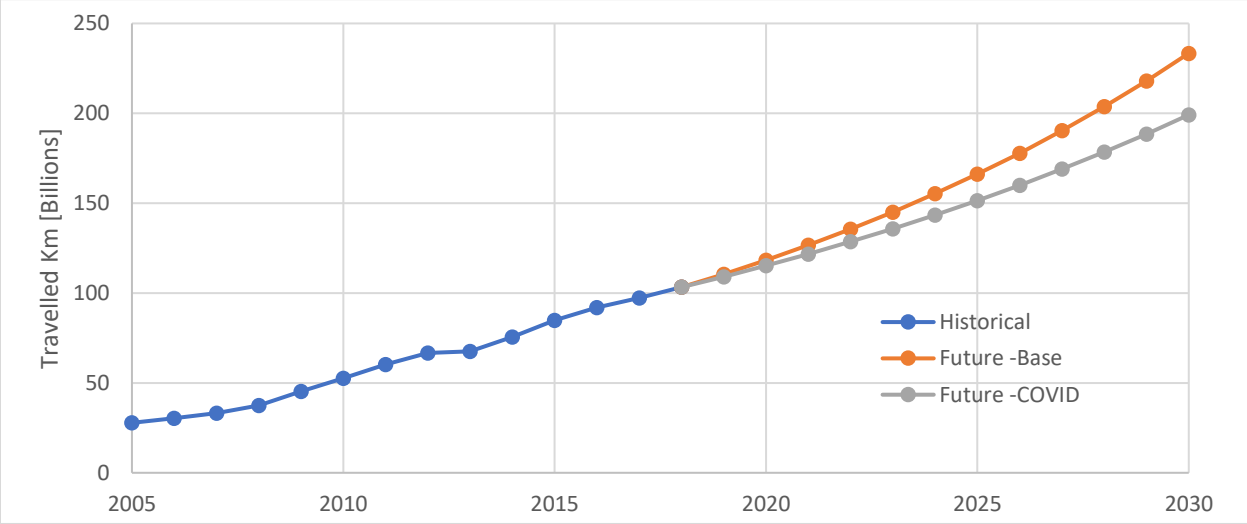
4.3 Transportation Projections:

In consideration of the above factors, we have made projections on the transportation indicators and related social outcomes with and without the impacts of COVID. The scenarios are as follows:

- **Baseline (Pre-COVID):** Without the impacts Covid-19, and in the absence of any significant policy redirection, the growth patterns experienced in the last decade would have continued.
- **COVID Reductions:** However, as a result of the contraction in the economy arising from COVID, it is expected that revenues from the transportation sector would reduce as a result of the reduced activities resulting in stifled investments in infrastructure. Where is the immediate can be well, the long term have not since the pandemic is still on-going. As such for the 10 year time frame considered for this paper, we have assumed a cumulative reduction of 10 to 20%.

Travel demands (vehicle km) projections assumed a rate that the historical rate of 7.0% that was observed for the last decade will continue. The rate, driven primarily by the growth in motor-vehicles, excludes in motorcycles that are used mostly off-road. The COVID scenario assumes a 10% suppression that rate due to the economic realities and travel demand measures like working from home that are likely to remain permanent. Projections are provided in **Figure 10**.

Figure 10: Travel Demand Projections



Source: KNBS Data and Authors Projections

COVID is also likely to have long erm impacts on household transportation choices. A recent Study by KIPPRA found that COVID restrictions impacted travel costs, trip rates and modal choice (Annex 2).

The projection in network characteristics is summarized in **Table 2** below. The growth in the reported network size has not been significant and is expected to remain relatively the same. The length of the network with paved surface is expected to increase as well, following the same trends observed in the past. However, the quality of the road surface is likely to deteriorate. The deterioration is anticipated due to the shortfall in the available funds as noted in RSIP2 and is likely to be exacerbated due to COVID. The road safety situation is also expected to deteriorate with higher fatalities rates as the available funds diminish.

Table 2: Future Road Network Projections

	2009	2019	2030 - Base	2030 - COVID
Network Size	161,451	161,820	162,190	162,005
Paved Surface	13,401	16,986	21,530	19,258
Road Length in Good Condition	16,391	29,408	33,970	<33,970
Road Length in Fair Condition	50,288	71,083	25,309	<25,309
Road Length in Poor Condition	94,671	60,042	101,938	>101,932
Km-Travelled (Billions)	45	110	233	199
Fatalities /100,000	21.00	27.69	18.38	23.06

Source: Authors own projections

4.4 Discussion of Trends and Potential Initiatives:

The analysis confirmed that improvement in the quality of roads in counties could spur county's economic activities. The results indicate that road infrastructure is a vital enabler to county's economic performance. Furthermore, road connectivity complements county and individual incomes and finally good road infrastructure is capable of reducing transaction costs of accessing markets that increase food prices making households food insecure.

A summary of the major issues identified in the discussions above include the following:

- The economy is expected to contract with less tax revenues to exchequer. This will have impacts on the socio-economic indices included poverty ratios, accessibility index and food prices as demonstrated through the GCP analytics.
- The travel demand expressed travelled veh-km is expected to reduce by up to 20% as a result of the economic contraction and due to permanent modal changes to travel behaviour with more employees choosing to work from home
- The size of the road network is not expected to change significantly in the future for both the base and COVID scenarios. However, the surface condition is expected to deteriorate primarily because of the funding shortfall. COVID therefore provides an opportunity to rethink the strategies and programmes related to infrastructure funding

- The road safety situation is also expected to deteriorate when less funding is available to in the safety programs. The trend with a sustained reduction of the number of causalities with relatively constant fatality rate is likely to deteriorate.

The findings above have implications on a number of GoK programs and priorities and hence the occurrence of the pandemic at this time offers an opportunity to rethink the strategies and the investment options. The major areas that need a closer look include:

Reduced Funding due to Contraction of the Economy: This aspect will be broad cutting across several issues. It may threaten the total amount earmarked for infrastructure development and maintenance as well as for road safety programs. The level of impact on each sub-sector will be dependent upon the allocation of funds to the specific sector.

Fuel Levy Collections: The reduced demands will impact the revenue from the Fuel Levy Fund that is intended for the road network maintenance. As highlighted above, the anticipated shortfall in available funds will cause the shrinking the network length in good or fair condition by 40% from 100,000km to 59,000km. This is likely to impact the ability the roadway network to support the Big Four Agenda of ensuring food security, affordable housing, manufacturing and affordable healthcare and calls into question the rationale for funding both road network development and maintenance.

PPP Project Financing: The reduced demands also threaten the viability of PPP projects as these are premised upon future traffic volumes. The government through this arrangement targets mobilising approximately KES 200 billion (US$ 1.85 billion) in the 2020/21 fiscal year by concluding the financing of several projects that are currently at an advanced stage of negotiations including the Nairobi-Nakuru-Mau Summit highway (USD 1.68 billion) and JKIA-Westlands expressway with an investment value of (US$ 550 million), among others. Uncertainty in future traffic volumes arising from COVID impacts could impact the terms and conditions of those agreement and especially the contract duration that is expected to be 15 to 20 years.

As funding sources shrink, the formula for distribution of the road infrastructure funds amongst the various agencies will also need rethinking. This raises question of institutional considerations and the lack of long-term planning that can allow consistent allocation of funds for future objectives in a consistent manner. As noted before roadways in the country are controlled by five agencies namely KeNHA, KURA, KERRA, KWS and Counties. Given that the Counties are now individually responsible for the bulk roadways in their jurisdiction, there may need for a better realignment of roads sector to devolution to ensure that allocations are adequate to fully address their road development and maintenance requirements. In addition, it is recognized that Counties may not have the technical capacity to manage road development and maintenance, neither would that be necessary due to economies of scale considerations. Innovative solutions should be considered to have for example KURA provide specialized technical support to counties such as in in areas of Intelligent Transport Systems, management of CBD roads in major cities and municipalities, etc.

Long term plans (such as the 50 Year National Transportation Master Plan that was not finalized) are required to guide the development of roadways and other key transportation infrastructure in the future. Although the Infrastructure Gap Study completed in 2019 provides

some guidance on the future requirements, it did not incorporate specific Master Planning processes that would enhance its acceptability by all stakeholders. To address these planning , the Ministry should restart the Master Planning process as envisaged by the Vision 2030 and Kenya Roads Board in collaboration with the Roads Agencies.

Finally, given the disproportionate modal split in favour of NMT, priority should be given to funding NMT facilities both in rural and urban areas. All road projects should include adequate NMT provisions. A sizable proportion of the budget should be intentionally earmarked for NMT.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions:

The COVID-19 pandemic has disrupted the normal ways of life with severe restrictions in travel and reduced economic activities thereby resulting in imminent economic down-turn. Although the GoK has responded with a raft of economic stimuli, the low down in economic activities will persist with reduced tax revenues thereby impacting the ability of the government to continue funding infrastructure development is the same levels as before. These circumstances thereby provide an opportunity to rethink the models for funding road infrastructure development and maintenance.

Analysis of past trends clearly shows that funding has not been adequate to cater for the development and maintenance requirements fully and a shortfall has been identified leading to a backlog of maintenance projects. The impacts of COVI-19 with a contracted economy, less revenue for the exchequer and reduced travel demands will only act to exacerbate the problem. A number of priority areas need to be re-examined to mitigate the anticipated negative trends in transportation and socio-economic factors.

5.2 Recommendations:

With reduced funding for road development and maintenance coupled with reduced travel, there is need to revisit the government models in plans funding for road development and maintenance. The following recommendations are made to address the various priority areas identified:

- A more detailed assessment of the impacts of COVID on road travel demands and hence on fuel consumption should be undertaken in the short and medium term in order to facilitate reassessment of the **RMLF revenue** uptake scenarios and thereby realign the maintenance schedules with the expected revenues

- **PPP Project Financing and Tolling:** The planned rollout of tolling on a number roadways should be reassessed. Moreover, impacts of reduced traffic volumes on the on-going and concluded PPP contracts should be reviewed to ensure that the contractual provision remain valid in view of reduced traffic demands

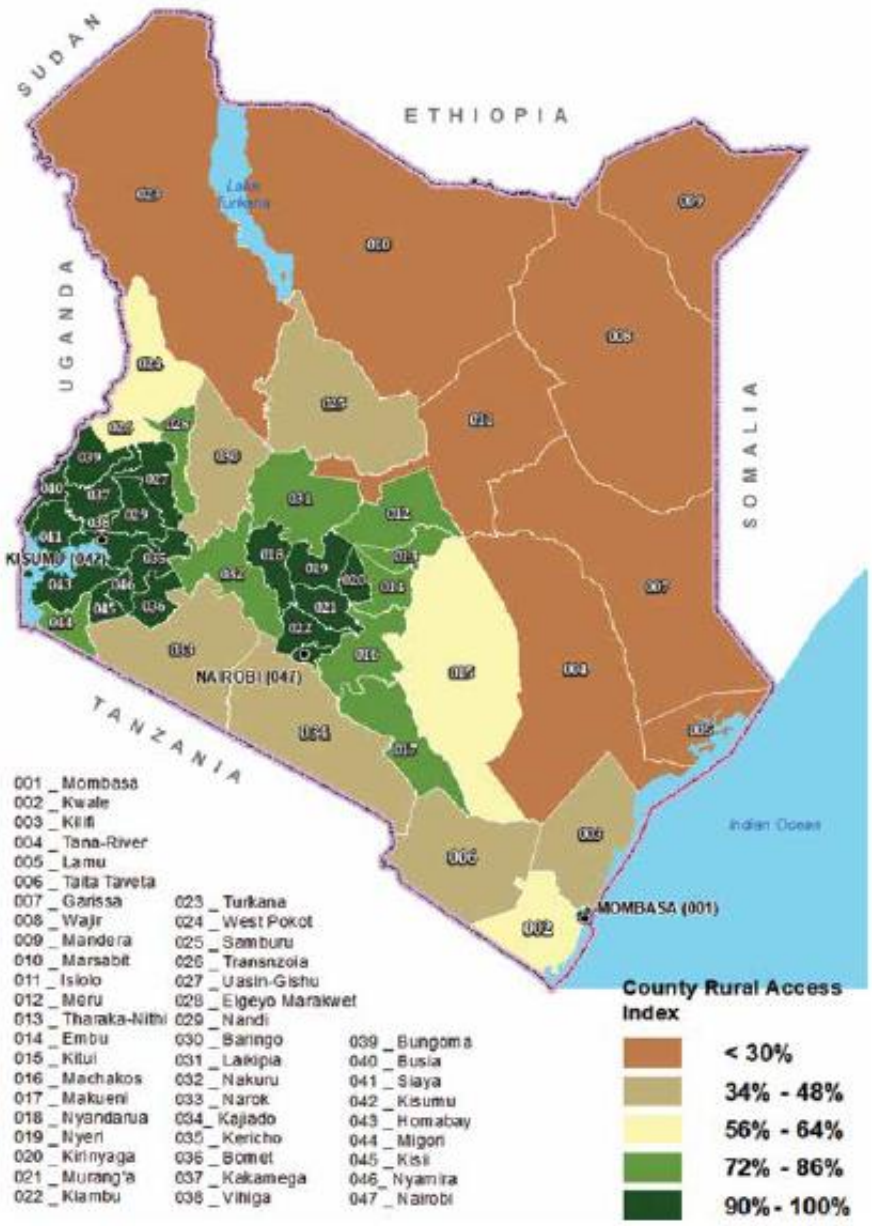
- Realignment of roads sector to devolution should be undertaken to ensure that allocations to counties are adequate for their share of responsibilities. In the same token, the technical capacity deficiencies of the counties should be addressed through suitable arrangements with KURA or other road agencies so that they can execute their mandate effectively.
- Related to the above and in view of the relationships between road network sizes on the one hand and GCP and poverty in the various counties on the others, intentional initiatives should be started to attract road infrastructure funds in the various counties to increase the road network sizes.
- Consideration should be given to the disproportionate modal split in favour of NMT by allocating specific funding for NMT facilities not tied to road projects. In addition, a sizable portion of all road project funds should be allocated to NMT facilities both within and outside the main road corridors. KURA could spearhead development of NMT facilities in urban areas, while those in the rural areas should undertaken by counties
- MoTIHUD should restart the long term Transportation Master Planning for Infrastructure with individual capital programs prepared by KRB in collaboration with the various road authorities

REFERENCES

1. Brooks, D., Hasan, R., Lee, J. W., & Son, H. H. (2010). Closing development gaps: challenges and policy options. *Asian Development Bank Economics Working Paper Series*, (209).
2. Canning, D. & Bennathan, E. (2000). The Social Rate of Return on Infrastructure Investments. Policy Research Working Paper Series 2390. Washington, DC: World Bank.
3. Fan, S., & Chan-Kang, C. (2008). Regional road development, rural and urban poverty: Evidence from China. *Transport Policy*, *15*(5), 305-314.
4. KIPPRA, Kenya Economic Report 2013
5. Ministry of Transport and Infrastructure, Kenya Roads Sub-Sector Policy, 2014
6. Nechifor V., Ferrari E., Kihiu E., Laichena J. Omanyo D., Musamali R., Kiriga B., COVID-19 impacts and short-term economic recovery in Kenya, EUR 30296 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-19424-8,doi:10.2760/767447, JRC121284.

ANNEXE - 1

ANNEX 1: Map of Rural Access Index by County



ANNEX 2 –

Modal Split and indicator analysis of COVID -19 impacts on transport

Impacts of COVID -19 on transport -household perspective

Indicator	Value
Proportion of population reporting a change in transport cost -%	58
Proportionate increase in transport cost -%	51.7
How transport cost changed -%	
Increased fare (PSV, Boda Boda, Tuk Tuk)	89.2
Decreased due to lower frequency of travel	6
Increased due to change from PSV to private	1.7
Increased due to change from PSV matatu to taxi	0.6
Decreased due to lower fuel cost	1.5
Increased due to change of residence /job	0.19
Decreased due to cheaper means of transport	0.74
Change in mode of transport -%	17.6
Modal split during COVID -19 - %	
Walk	32.2
Matatu	24.3
Motorbike	18.9
Bicycle	10.7
Private Vehicle	6.4
Own Bicycle	2.8
Tuk Tuk	1.9
Employer provided	1.5
Bus	1.2
Other	0.2
Travel outside in last 2 weeks (May 2020)	6.8
Change in travel pattern due to COVID-19 -%	
Unable to travel	17.2
Travel less often	15.1
Delivery of good and services to home affected negatively-%	30.4

Source: KNBS 2020: Survey on Socio Economic Impact of COVID-19 on Households Report

ANNEX 3: MODE SPLIT