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RWANDA BICYCLE MARKET SYSTEM PROFILE

USAID Bicycles for Growth Project

J.E. Austin Associates, Inc. || Contract No.: 7200AA21C00064
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ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
ARCC	Africa Rising Cycling Centre
BFG	Bicycles for Growth
DHS	Demographic and Health Surveys
FERWACY	Rwanda Cycling Federation
FGD	Focus Group Discussion
GGGI	Global Green Growth Institute
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HLC-L4D	High Lands Center of Leadership for Development
IFC	International Finance Corporation
ITDP	Institute for Transportation and Development Policy
JAA	J.E. Austin Associates, Inc.
JICA	Japanese International Cooperation Agency
KII	Key Informant Interview
LPI	Logistics Performance Index
MFI	Microfinance Institution
MINECOFIN	Ministry of Finance and Economic Planning
NGO	Non-Governmental Organizations
NISR	National Institute of Statistics of Rwanda
NMT	Non-Motorized Transport
RWF	Rwanda Franc
SACCO	Savings and Credit Co-Operative
UN	United Nations
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
USD	United States Dollar
VSLA	Village Savings and Loan Association
WBG	World Bank Group
WBR	World Bicycle Relief

Note on Currency and Exchange Rates

The Rwanda franc (RWF) and US dollar (USD) are both referenced in this report depending on the source of information. All RWF figures are also presented in USD terms. The USD:RWF exchange rate used throughout the report is 1 USD: 1,030 MWK based on the approximate rate over the period of data collection. In some cases, values may be rounded.

EXECUTIVE SUMMARY

To identify constraints and potential solutions within Rwanda's bicycle market system, the USAID-funded Bicycles for Growth activity (BFG) conducted an on-the-ground market system assessment in July and August of 2022 through a market survey, focus group discussions, key informant interviews, secondary research, and market observation.

This market system profile highlights BFG's primary findings in the Executive Summary, and then offers details on the bicycle market system's demand, supply, and supporting systems in the subsequent sections. The report provides conclusions on constraints in the final section and includes further details (e.g., methodology) in the annexes.

MARKET SYSTEMS PROFILE KEY FINDINGS

Demand for bicycles in Rwanda is driven by the needs of users with two distinct purposes: (1) personal use for general travel and leisure, and (2) economic activity, including transportation of goods and people, as well as agricultural purposes. These drivers of demand shape the bicycles which are supplied to the market, with secondhand imported sport and mountain bicycles adopted for personal use, and mass market transport bicycles imported from China and India reaching economic users. Government policies promoting personal use and disincentivizing commercial use of bicycles have significantly influenced market conditions.

DEMAND

In addition to the conditions described above, several other factors contribute to or constraint demand for bicycles in Rwanda, such as bicycle affordability and local riding conditions. Many households and individuals face resource constraints which limit their capacity to purchase bicycles suited to their needs and preferences. Hilly terrain in much of the country makes cycling challenging or impractical for many users. Bicycle users and non-users also consider bicycle availability, spare parts availability and affordability, and road safety concerns. Ownership patterns vary across demographics with men and younger age groups more frequently owning bicycles.

SUPPLY

Bicycles are widely available within Rwanda. Retailers sell their wares in most population centers, while village mechanics play a facilitative role in supplying rural demand when bicycle sellers are not present. The supply of bicycles is largely divided into transport bicycles and sport/mountain bicycles; heavy-duty bicycles and cargo bicycles, which are common in other markets, are largely absent, despite previous attempts to bring them to the market.

SYSTEMS

Bicycle ownership is facilitated by a robust network of mechanics and spare parts sellers across the country. The spare parts market is substantially larger than the bicycle market, but many owners and potential owners are concerned about their cost. Finance is underutilized throughout the market system, though credit access and other forms of finance have the potential to benefit actors on both the demand and supply sides of the market. The government and other stakeholder institutions could further advance the bicycle market if they make a concerted effort to implement policies and communicate more clearly to improve conditions for bicycling.

INTRODUCTION

BFG conducted this bicycle market system assessment to better understand the dynamics of bicycle usage and availability in target countries through the application of a market systems approach. The assessments in five countries provide detailed findings that USAID, research partners, host country governments, other donors, bicycle suppliers and others in the market system, civil society organizations, and citizens can use to work together to increase bicycle availability and use.

The BFG project and this assessment is primarily focused on bicycles from an economic growth lens. Because of this, greater emphasis is placed on bicycles as productive assets that can be used for income generating activities and assisting individuals and households to overcome mobility barriers to economic opportunities.

ABOUT BFG

Launched in October 2021, the USAID Bicycles for Growth (BFG) activity is a three-year initiative to address mobility challenges in rural and peri-urban areas in sub-Saharan Africa by developing and demonstrating the means to promote functional bicycle market systems leading to rapidly increasing bicycle access and uptake. BFG has two phases. In the first phase, BFG is conducting an assessments of the supply, demand, and supporting systems for bicycles in Ghana, Malawi, Rwanda, Uganda, and Zambia, leading to reports such as this one. Based on the results of the assessment phase, Bicycles for Growth will implement pilot projects in four to six localities across two of the targeted countries. The pilots will reduce barriers to the supply and uptake of fit-for-purpose, affordable, and durable bicycles.

In addition to the assessments and pilots, BFG is identifying local partners in each country to serve as Convening Partners and members of Bicycle Market System Advisory Committees which will continue to advocate and serve the interests of bicycle market stakeholders, building on the work of the assessments.

REPORT ORGANIZATION

This report is primarily structured around three market systems pillars (Demand, Supply, and Systems) introduced in more detail in the next section. Each pillar of the market system is described in detail, providing an overview of market dynamics, issues, and structures, as well as enablers and constraints to market system functionality.

ASSESSMENT TEAM AND ACKNOWLEDGEMENTS

BFG thanks Jean Claude Nshimiyimana and High Lands Centre of Leadership for Development for their expertise in conducting the Uganda market assessment. We would also like to thank all focus group participants, interviewees, survey respondents, government officials, and the dozens of other stakeholders who generously gave their time and perspective to the BFG team. This market system profile would not have been possible without their insights and participation. Finally, BFG thanks Wes Day from USAID's Office of Innovation, Technology, and Research for his time, guidance, input, and support before, during, and after the assessment.

MARKET SYSTEM OVERVIEW

The framework used for this assessment considers three core, interrelated pillars which collectively form the bicycle market system (see Figure 1, following page):

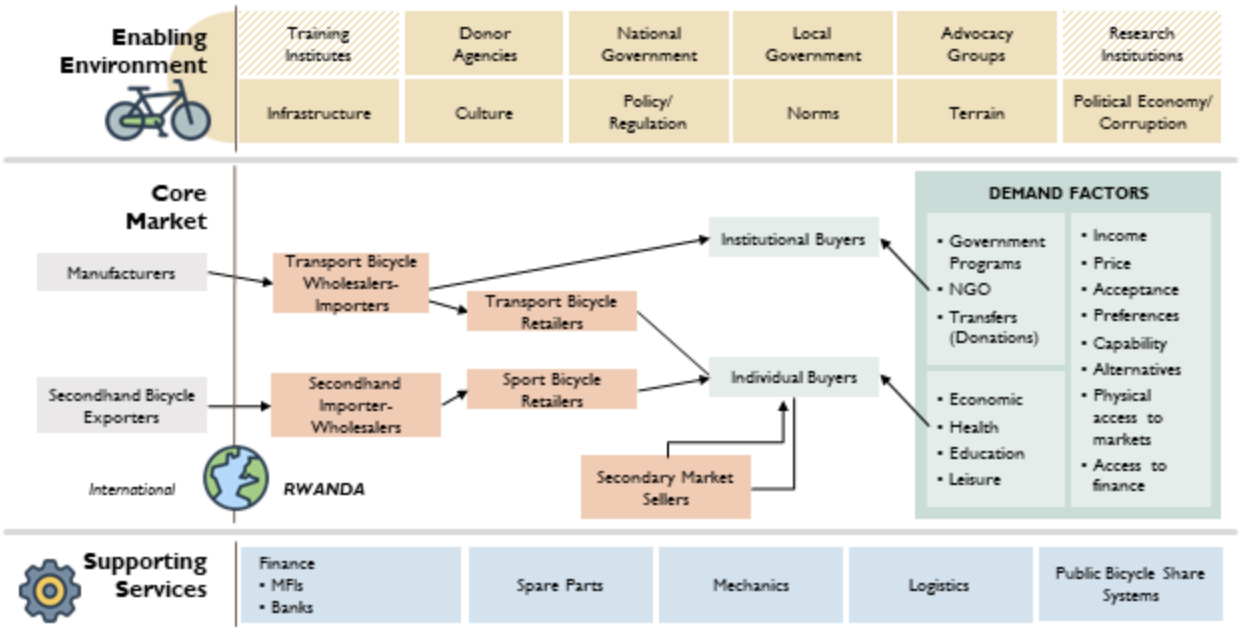
1. Demand,
2. Supply, and
3. (Supporting) Systems.

The Demand pillar of the market system consists of both the individuals and institutions that generate demand for bicycles. While the acquisition and ownership of bicycles are important aspects of demand, they are not the sole consideration. Demand for bicycles is also generated by those individuals utilizing bicycles even as non-owners, such as when borrowing or renting bicycles from neighbors or hiring a bicycle taxi for personal transportation or moving goods.

Within the Supply pillar, there are several channels through which bicycles ultimately reach interested buyers. Virtually all bicycles within the market system are imported from international sources. These imported bicycles include new mass market bicycles (typically manufactured in India and China and available at relatively low price points), secondhand imported sport and mountain bicycles (sourced from a variety of locations including Europe and Japan), and premium bicycles (typically used for sport). These bicycles are sold across the country, primarily at small retailers or in markets. Further, the secondary bicycle market is quite active, with most bicycle owners reporting their bicycles were previously owned at the time of purchase.

The Systems pillar includes actors that directly support the ongoing usability of bicycles (namely mechanics and spare parts sellers), sources of finance, and government agencies. Maintenance and repair services directly impact the lifespan of bicycles and remain perhaps the most consequential element of the market system's supporting systems. The market for spares parts is healthy and like the bicycles themselves, spare parts are widely available. However, market actors report that cost is a concern. Bicycle mechanics are common in communities of all sizes and bicycle owners can usually find someone to address common problems. Finance is little utilized outside of group lending facilitating individual bicycle purchases. Policymakers have demonstrated an awareness of bicycle and non-motorized transport (NMT) issues in transport policy and long-term planning. However, policymakers rarely prioritize bicycle-related elements or initiatives.

FIGURE 1: BICYCLE MARKET SYSTEM MAP



Assessment Methodology

In carrying out this assessment, BFG used a combination of desktop research and primary data collected through key informant interviews, focus group discussions, and a quantitative survey. The BFG team conducted nearly 60 interviews and meetings with actors representing all three pillars of the market system, including importers, retailers, institutional buyers, national and local government officials, donor agencies, donor projects, NGOs, community leaders, microfinance institutions, spare parts sellers, mechanics, logistics providers, and researchers. BFG caried out eight focus group discussions, primarily to collect insights from users – especially women – and bicycle-based businesses. The survey collected information from individual demand side actors at ten rural and peri-urban market sites in five districts (Rubavu, Huye , Ngororero, Kayonza, and Gasabo). Data collection sites were selected to provide a broad snapshot of the bicycle market and bicycle usage patterns across Rwanda. Unless otherwise noted, all references to survey data in the report refer to the survey conducted by BFG. Annex 2: Methodology and Annex 3: Questionnaire provide details on BFG's approaches to data collection.

COUNTRY CONTEXT

Rwanda is a landlocked country located at the heart of Central and East Africa. Surrounded by Uganda, Burundi, Tanzania, and the Democratic Republic of Congo, most of the country's imports arrive through the Tanzanian port of Dar Es Salaam or Mombasa in Kenya (via Uganda). Rwanda's administrative structure includes four provinces (Northern, Southern, Eastern, and Western) and the city of Kigali, which are further subdivided into 30 districts. Rwanda is commonly referred to as the "Land of a Thousand Hills" due to its hilly and mountainous terrain. Tall mountains and hills dominate the northern and western parts of the country, while plateaus and plains are more common in the eastern region.

Rwanda's population was estimated at 12.7 million in 2020 and is projected to reach 16.1 million by 2030.[1] Women comprise 51 percent of the population. Like many countries in sub-Saharan Africa, Rwanda has a youthful population, with 74 percent aged under 35 years old. Rwanda's population is largely rural: only 18 percent live in urban areas.[2] The most recent (2016) poverty estimates show 52 percent of the population is poor with a per capita income of less than $2.15 per day.[3]

Rwanda's economy grew at an impressive rate over the past two decades, with the gross domestic product (GDP) averaging 7.2 percent between 2010 and 2019.[4] In 2020, due to the COVID-19 pandemic, GDP declined by 3.4 percent. However, by 2021, the growth rate jumped to 10.9 percent. Services and agriculture represent the largest sectors in the economy, contributing 46 percent and 26 percent, respectively, to GDP in 2020.[5] Agriculture is a particularly important source of livelihood and is either the primary or secondary source of income for the majority of households in the country. Of the 80 percent of households that derive income from agriculture,[6] it is the main source of livelihood for 86 percent. More than three quarters (78 percent) of agricultural households are engaged in crop production and 61 percent in livestock agriculture.

MOBILITY CONTEXT/ TRANSPORT AND MOBILITY NEEDS

A significant share of Rwanda's population relies on walking and cycling. Since the mid-2000s, the country's government has embarked upon a systematic approach to developing policy and strategy to support retention and growth of non-motorized transport. Some estimates suggest the average time people in Rwanda spend on walking and cycling per day is 74 minutes.[7] Like many other African countries, the average time spent by men per day (87 minutes) is significantly higher than that by women (62 minutes). The bicycle modal share for travel to work or market is 41 percent, indicating that bicycles are an important mode of transportation. Walking emerged as the key mode of travel to work or market for the majority (53 percent) of respondents to BFG's quantitative survey.

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[1] National Institute of Statistics of Rwanda, Rwanda Ministry of Finance and Economic Planning. 2012. *Fourth Rwanda Population and Housing Census*.
[2] https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=RW
[3] https://data.worldbank.org/indicator/SI.POV.DDAY?locations=RW
[4] https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2021&locations=RW&start=2001
[5] National Institute of Statistics of Rwanda, *Rwanda Statistical Yearbook 2021*, December 2021
[6] National Institute of Statistics of Rwanda, Agricultural Household Survey 2020, December 2021.
[7] United Nations Environment Programme, *Walking and Cycling in Africa – Evidence and Good Practice to Inspire Action*.

Rwandans' primary use of bicycles is the transportation of goods, followed by personal travel or working as a bicycle taxi operator. The hilly topography of both Kigali and many rural areas is a deterrent to widespread bicycle use. A number of community or donor projects are seeking shared electric mobility alternatives rather than using pedal-powered bicycles to transport heavy loads (e.g. farm produce, water). The relatively flat Eastern Province has the highest bicycle mode share. In the BFG survey, more than half of respondents in Kayonza, located in Eastern province, made trips to work or the market using bicycles. By contrast, only 17 percent of respondents in Ngororero, located in the mountainous Western province, used bicycles as their primary mode of travel to work or market, the vast majority (72 percent) relied on walking.

FIGURE 2: PRIMARY MODES OF TRANSPORTATION TO WORK/MARKET[8]

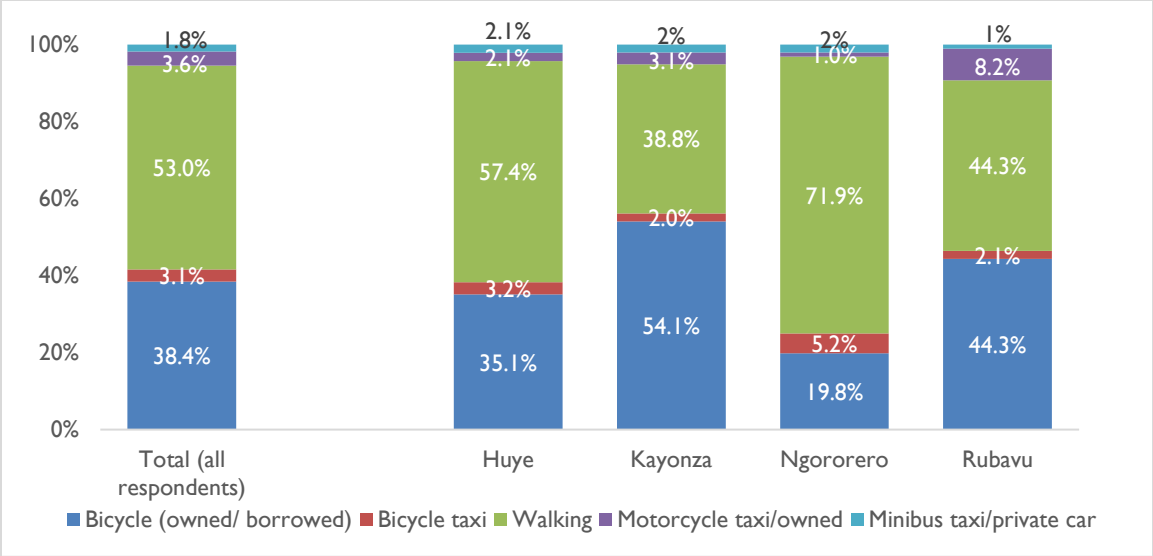
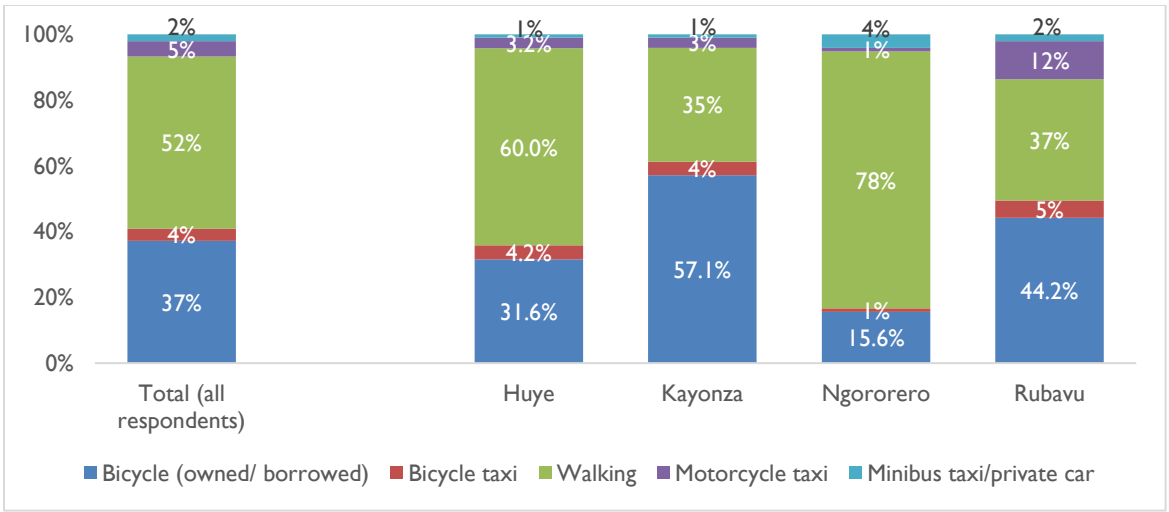


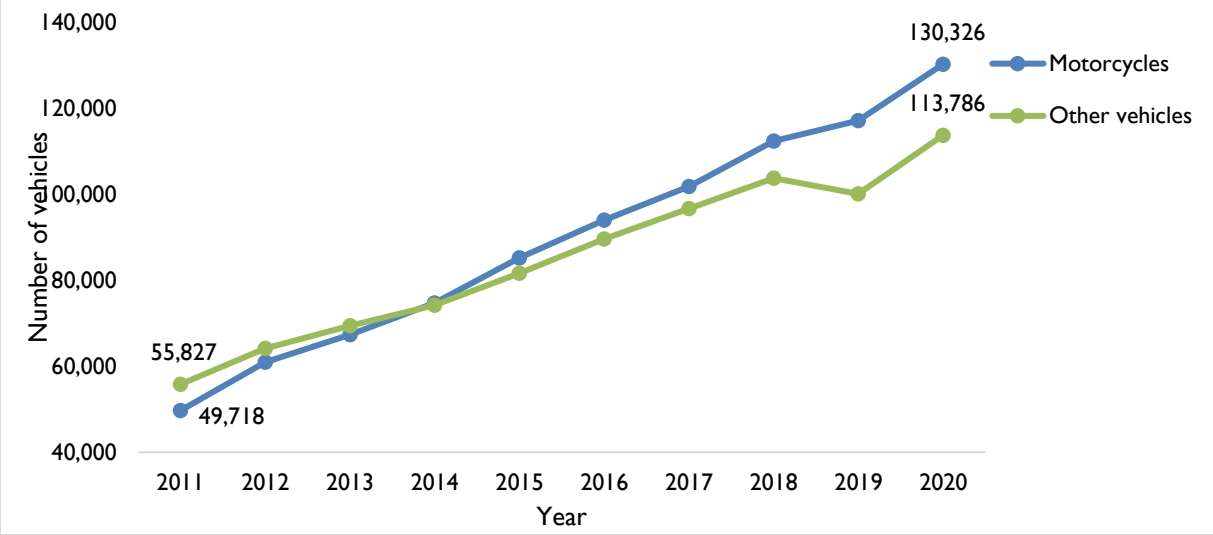
FIGURE 3: PRIMARY MODES OF TRANSPORTATION DURING HARVEST SEASON[9]



[8] BFG survey.
[9] BFG survey.

Rwanda's national government has a stated intention to increase its urbanization rate from 18 percent to 70 percent by 2050, which will lead to a dramatic increase in demand for urban mobility. The relevant government institutions are well aware of the challenges that accelerated economic growth will bring, with congestion, air pollution, and fuel imports already on the rise. Levels of particulate matter (PM2.5) are already routinely above the WHO Guideline air quality limits, and the transport sector emits half of greenhouse gas emissions (including motorcycle taxis).

FIGURE 4: TRENDS IN NUMBER OF REGISTERED VEHICLES IN RWANDA (2011-2020)[10]



To this end, Rwanda's national government has prioritized sustainable development in both its urban planning and transport sectors, with a Green Growth and Climate Resilience strategy that focuses on reducing greenhouse gas emissions and a transition to electric mobility and non-motorized transport (NMT). The Rwandan government welcomes technical, donor, and training and implementation support to meet its walking and cycling goals.

In 1999, Rwandans registered 55,000 vehicles, which increased to 244,112 by 2020.[11] Rwandans have accelerated their demand for motorcycles, which now comprise more than half (53 percent) of vehicles (NISR, 2021). Motorcycle demand is growing faster than any other vehicles, including buses and private cars, with a registration increase of 16 percent between 2018 and 2020. Kigali has the largest share of motorcycles, particularly for commercial transportation. In the second quarter of 2022, 66 percent of Rwanda's 24,038 authorized motorcycle transport services operated in Kigali.[12] Demand for motorcycle-taxis is relatively lower in the rest of the country. The BFG survey found the share of respondents who used motorcycle taxis for travel to work or the market was just 4 percent.

Unlike neighboring East African countries, Rwanda has a broader range of available public transportation options. The informal minibus taxi industry is rapidly in decline as the Rwandan government shifts to regulated in-town buses and taxis and long distance (between province) buses, many of which accept cashless payment. The bus network services the primary and secondary road networks. Where

[10] National Institute of Statistics of Rwanda. *Rwanda Statistical Yearbooks 2021, 2019, 2017.*
[11] National Institute of Statistics of Rwanda, *Rwanda Statistical Yearbook 2021*, December 2021
[12] Rwanda Utilities Regulatory Authority. 2022. *Statistics in the Transport Sector as of the Second Quarter (April – June) 2022.*

commuters require door-to-door transfer options, they typically walk, hire a bicycle, or hire a motorbike taxi for the last leg on a tertiary road.

DEMAND

Overall, demand for bicycles is higher in rural areas than in urban areas of Rwanda. The BFG survey, carried out in peri-urban and rural markets of four districts, found that nearly half of those surveyed owned bicycles. BFG found significant variations in demand across regions, largely driven by geographical terrain and economic activity: demand in Rubavu, the main border district with the DRC and a key economic hub for the region, is nearly three times that of Ngororero, despite both areas' hillier and more mountainous terrain than Kayonza.

A greater share of men own bicycles than women, although few cultural barriers prevent women from owning or using bicycles. Those in youthful age groups (18 to 34 years) are more likely than those in older age groups to own and use bicycles for income generation purposes.

Demand for bicycles is primarily driven by individuals who purchase bicycles from individual sellers and bicycle retailers. Rwandans also showed notable demand for previously owned bicycles. The BFG survey found that three quarters of bicycles acquired were pre-owned. This demand is driven by cost: the average purchase price of a used bicycle is nearly half that of a new bicycle.

There is notable demand for bicycle taxi services, with about a fifth of BFG respondents reporting use of these services at least once in the preceding harvest season. Bicycles are used for income generation purposes, primarily transportation of goods and for taxi businesses. The income generation potential of bicycles is a likely contributor to their high demand.

Besides cost, other factors contributing to demand patterns include bicycle availability, spare parts availability, and road safety concerns.

CHANNELS OF DEMAND

Individual users (both commercial and non-commercial) and institutional purchasers constitute the main channels of demand in Rwanda. Sport and leisure users are a growing market. The national cycling team's high visibility in the country, President Kagame's participation in car-free days, and the presence of bike-share in Kigali, all raise the profile of cycling as leisure and exercise activities.

INDIVIDUAL

Demand for bicycles is predominantly driven by individual buyers, who acquire them for personal (travel and leisure) or economic (transportation of goods and people, agricultural activity) purposes. This division in underlying use leads to users' demand for divergent designs of bicycles. As detailed in the Supply section of this report, suppliers import secondhand sport or mountain bicycles for buyers using bicycles for personal use, while also importing new, mass market transport bicycles for users who use bicycles for economic purposes.

In the BFG survey, 95 percent of current and previous bicycle owners purchased their bicycles from individual sellers, bicycle dealers, or shops. The remainder received bicycles as donations/gifts from friends, family, NGOs, or employers.

Overall, Rwandans exhibit high demand for bicycles. The BFG survey found that 62 percent of respondents had, at one time or another, owned bicycles; 43 percent owned bicycles at the time of the survey, while 19 percent were previous owners. The primary sources of demand for bicycles are the Eastern province (Iburasirazuba) and some locations in the Western province (Iburengerazuba). Estimates from the 2016/17 integrated household survey show that 29 percent of households in the Eastern province owned bicycles, a much higher share than reported in other provinces: 11.5 percent in Southern, 8.9 percent in Northern, 8.1 percent in Kigali City, and 3.8 percent in Western.[13] Bugesera district, located in the Eastern province, is reported to have the greatest demand for bicycles, not only in the Eastern province, but also across the entire country.[14] In the BFG survey, bicycle ownership was highest among respondents from Rubavu district in the Western province, with more than half (59 percent) reporting they owned bicycles. In comparison, a much lower share (22 percent) of respondents in Ngororero, also located in the Western province, owned bicycles at the time of the survey. Topography is likely the key underlying contributor to the variations between the two districts. Rubavu, which is located at the shores of Lake Kivu and neighbors the Democratic Republic of Congo, is relatively flat compared to the highly mountainous and steep slopes of Ngororero district. The other two districts surveyed by BFG also exhibit high demand for bicycles. In Kayonza (Eastern province), 49 percent of respondents owned bicycles while in Huye (Southern province), 41 percent were bicycle owners.

Bicycle usage in urban areas is less pronounced, especially in Kigali. There are pockets of very high quality, fully segregated bicycle infrastructure, but the lack of a coherent network is a potential contributor to low demand. Furthermore, Kigali has fairly suitable pedestrian infrastructure coverage, and on-call motorbike taxis, both of which reduce the competitiveness of bicycles. At the same time the perception of bicycles as a tool for the poor remains one of the key factors driving urban use patterns. Stakeholders say that this perception is changing, thanks to increased focus on NMT (e.g., NMT zone and car-free days) and increased visibility of competitive cycling. However, in such cases, consumers demand more expensive sports bicycles as opposed to the roadster bicycles that are common in rural areas.

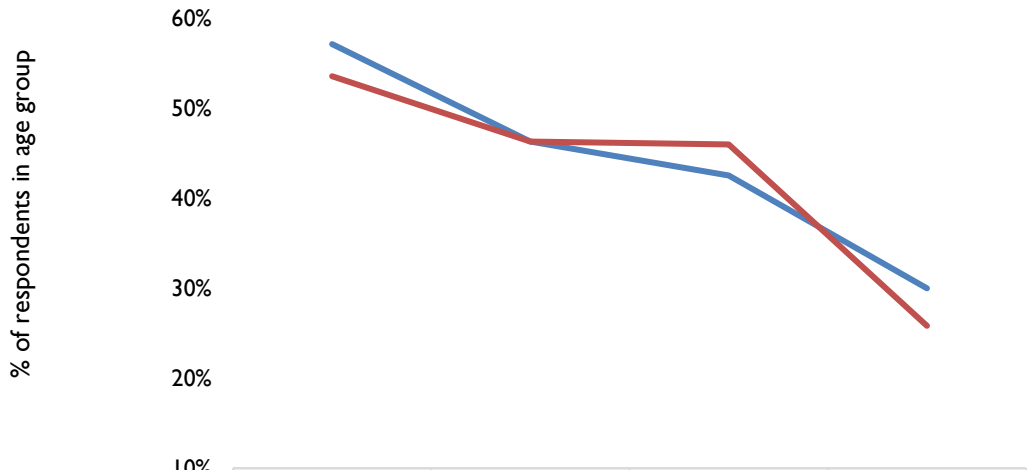
Unlike in other African countries surveyed by BFG, farmers in Rwanda BFG data collection sites are less likely to own bicycles. Rather, bicycles are in high demand among wage/salaried workers (e.g., bicycle taxi operators and other casual workers) and formal and informal merchants. The BFG survey revealed that the share of non-farmers that owned bicycles was 52 percent, nearly double that of farmers (27 percent). Farmers in Rwanda tend to farm crops on steep slopes and hillsides, making the use of bicycles for travel and transportation of farm produce a challenge. As expected, bicycle ownership rates were lowest in the hilly districts of Ngororero and Huye, where more than two thirds (67 percent) of farmers surveyed reside. In these districts, more than three quarters (80 percent) of farmers surveyed relied on walking as their primary mode of transport to their workplaces or to the market. Overall, the highest demand for bicycles was among those in private sector economic occupations, 58 percent of whom reported they owned bicycles. Many of these respondents used bicycles for commercial transportation of persons and/or goods.

Across demographic groups, men are the main source of demand for bicycles, accounting for 70 percent of all bicycle ownership. This pattern was evident across all districts. The variations in demand by gender are discussed in detail in Gender & Bicycle Use and Access. Unlike in other countries surveyed by BFG,

[13] National Institute of Statistics of Rwanda (NISR), EICV5 Main Indicators Report, November 2018
[14] Munyaka et al. 2023. Impact of Topography on Rural Cycling Patterns: Case Study of Bugesera District, Rwanda

bicycle ownership in Rwanda was highest among the youth (18 to 24 year-olds) and declined with age. Two thirds of the youth surveyed reported they were engaged in private sector work. As previously discussed, the demand for bicycles is greatest among those in private sector occupation. That the youth represented the highest proportion of bicycle ownership is therefore potentially linked to economic occupation.

FIGURE 5: BICYCLE OWNERSHIP AND USAGE RATES BY AGE GROUP



	18-24 years	25-34 years	35-44 years	>=45 years
Own bicycle	57%	46%	43%	30%
Use bicycle for travel to work or market	54%	46%	46%	26%

Used bicycles are in high demand. Among previous and current bicycle owners in the BFG survey, 75 percent acquired pre-owned bicycles and the rest new bicycles. The most commonly purchased bicycles are Indian (Eastman) and Chinese (Phoenix) brands. Bicycle owners indicated price and quality (strength) of the bicycles weighed most heavily in their selection, reported by 73 percent and 53 percent of bicycle owners. Features/designs and availability of bicycles were least considered (18 percent and 9 percent respectively).

Individual suppliers are the main source of used bicycles, which are the vast majority of bicycles in the market. New bicycles are mainly sourced from retailers and hardware stores. In the BFG survey, 90 percent of those who had at one point acquired used bicycles purchased them from individuals. In comparison, of those who acquired new bicycles, 50 percent purchased them from bicycle retailers, 23 percent from hardware stores, and 7 percent from hardware shops.

INSTITUTIONAL BUYERS

As discussed above, demand for bicycles is primarily driven by individuals. Lack of comprehensive data on institutions' bicycle acquisitions makes analysis of their share of demand challenging. However, findings from the BFG survey indicate institutional buyers represent a small share of demand. Only 4 percent of

bicycle owners acquired bicycles from institutions, either as a donation or purchased via a payment scheme (e.g., multiple payments over a specified duration of time).

Typical institutional purchasers include government departments and local and international NGOs. Examples of NGOs that have previously procured bicycles in Rwanda include World Vision, Plan International, HEIFER International, Catholic Relief Services, DUHAMIC-ADRI, and Interpeace. These organizations mainly procure a small number of bicycles for a specific use. Government departments appear to purchase bicycles in the largest volumes. The Ministry of Justice, for example, acquired and distributed 17,941 bicycles to members of Abunzis (community mediation committees), which operate at administrative cell and sector levels to support the work of the ministry within communities.[15] The Ministry of Justice acquired and began distributing the first 2,150 bicycles to the mediators in 2010. By 2021, the Ministry had provided bicycles to all Abunzi members elected in the 2015/16 election cycle. Similarly, the Ministry of Health occasionally distributes bicycles to community health volunteers,[16] while the Ministry of Agriculture procures bicycles for select extension workers and farmers. Government bicycle donations are often funded by international donors.

In many cases, bicycles donated by either government departments or NGOs become the property of the recipient who is also responsible for the bicycle's maintenance and upkeep.

Bicycle donations are often given part of an incentive program. For example, the National Agricultural Export Development Board awarded 278 bicycles in 2020/2021 to the best performing coffee farmers.[17] In 2017/2018, the government of Gakenke district donated 310 bicycles to agricultural advisers providing extension services to farmers in that district. In 2020, the Rwandan government donated 589 bicycles to village leaders in 18 sectors bordering Nyungwe National Park in appreciation of their efforts to support security initiatives within their local communities.

Bicycles are also procured by institutions to aid mobility of their staff and support community programs. For example, the main purpose of the bicycle distribution program by the Ministry of Justice was to increase service delivery by improving the mobility of Abunzi members. As a further reward, mediators could also use the bicycles for household chores (e.g., ferrying agricultural harvests, fetching water, transporting milk, etc). The NGOs Action Aid and Faith Victory Association recently acquired and donated 360 bicycles to men who support initiatives that raise awareness around domestic violence in Karongi District (Western province).

The types and brands of institutional acquisitions vary, usually as a function of cost and availability, although in some cases institutions prefer higher quality bicycles. The most commonly procured design is the standard roadster bicycle. Demand for heavy-duty bicycles (i.e., durable bicycles with carrying racks able to transport heavy loads), which are popular in many other African markets, is small.

Bicycles are typically sourced from local suppliers, who are themselves bicycle importers. Government departments and NGOs use procurement guidelines for purchasing bicycles. Often, institutions publish tender notices on their websites and via print media. Government departments must follow specific

[15] Republic of Rwanda. Ministry of Justice. 2021. *MINIJUST Handover Report.*
[16] https://medicinesforhumanity.org/news/bicycles-in-cameroon-help-save-lives/
[17] National Agricultural Export Development Board. *Annual Report FY2020/2021*.

procurement guidelines, and tenders must be published on the Rwanda online e-procurement system of the Rwanda Public Procurement Authority, in addition to other platforms.

BICYCLE OWNERSHIP AND ACCESS MODELS

Users have multiple means of accessing a bicycle: individual ownership, shared access with household or community members, informal rental from a neighbor or community member, or bicycle taxis. In Kigali, formal bicycle rental is available through a bike-share service, Guraride.

HOUSEHOLD AND INDIVIDUAL OWNERSHIP

Bicycles are important household assets in Rwanda, used for a variety of purposes by both adults and children. In the BFG survey, 45 percent of respondents reported a bicycle was present in their households. At the household level, primary users tend to be male and head of household: 97 percent of men reported they were the primary users compared to 13 percent of women.

The bicycle ownership rates found by BFG are notably higher than those from recent national household surveys, which reveal that a fairly small share of households own bicycles. For example, in the 2019/20 Rwanda Demographic and Health Survey, 13.9 percent of households owned at least one bicycle, with some small variations across rural (14.9 percent) and urban (9.7 percent) areas.[18] Similarly, the 2019/20 Rwanda Household Survey found 15 percent of households in the country owned at least one bicycle.[19]

However, BFG findings were not designed to be representative of households in locations surveyed. Although the survey used a random sampling design, respondents were identified in market settings only. Consequently, the probability of interviewing individuals with bicycles was inherently high, given that in the Rwandan context, merchants and casual workers typically source their livelihoods from markets, and many of them rely on bicycles as an affordable mode of travel.

FORMAL BICYCLE SHARE

Rwanda's Transport Policy (2021) proposed the introduction of a bicycle share system to serve short trips and enhance last-mile connectivity to public transport. In September 2021, private company Guraride launched its bike-share service in Kigali, with an MOU with Kigali City. Bicycle rental costs start at RWF 200 (US$0.19) per hour, payable using mobile money. Kigali's hilly topography and comparative lack of bicycle lanes are a reason for relatively slow uptake, but the bicycles are particularly popular during car-free days, and in the new 120-hectare Nyandungu Eco-park with its dedicated bicycle routes. Guraride, in partnership with Kigali City, intends to offer a fleet of electric bicycles as part of its bike share service.

[18] National Institute of Statistics of Rwanda (NISR), Rwanda Ministry of Health (MOH), and ICF. 2021. *Rwanda Demographic and Health Survey 2019-20 Final Report*. Kigali, Rwanda, and Rockville, Maryland, USA: NISR and ICF.
[19] National Institute of Statistics of Rwanda (NISR*), Rwanda Household Survey 2019/2020* report, March 2021

GuraRide shared bicycles at a docking station

INFORMAL BICYCLE SHARE

Focus group respondents report lending their bicycles to neighbors, mostly for no payment. Women report that lending a bicycle "build[s] a good relationship to my neighbors," a marked benefit in Rwanda. The BFG survey also found high rates of inter-household bicycle share. Just over two thirds (67 percent) of bicycle owners reported they lent their bicycle to people outside of their household. In Rubavu district, 77 percent of bicycle owners lent their bicycles to others. Even in Ngororero, where bicycle ownership rate was the lowest of all districts surveyed, 62 percent of bicycle owners lent their bicycles to persons outside their household. The sharing rate was also high in Kayonza (56 percent) and Huye (72 percent). These findings suggest high bicycle usage in communities where the respondents live. Given that bicycle cost was one of the key reasons for non-ownership, and given the popularity of bicycles as a transportation tool, these findings suggest a high unmet need for bicycles.

BICYCLE TAXIS

Almost all cities in Rwanda have bicycle-taxi services, known as 'Abanyonzi', which transport people and goods between city markets and urban centers. The BFG survey found that 22 percent of survey respondents had used bicycle-taxi services during the preceding harvest season.

The BFG survey also identified bicycle taxi businesses as one of the income generating activities practiced by both bicycle owners and non-owners (discussed further below). Nearly a fifth (18 percent) of respondents reported they had used bicycles as taxis for income generation.

Bicycle-taxis are particularly important for women as users, and men as operators. Women focus group respondents regularly use bicycle-taxis either as personal travel, to collect/deliver goods, or to take their children to school. They shared their appreciation of having a regular bicycle-taxi driver they can trust. In the BFG survey, 27 percent of women used bicycle taxis for travel during the preceding harvest period, compared to 17 percent of men. On the other hand, 29 percent of men used bicycles for taxi business, most likely as operators, compared to only 6 percent of women.

Bicycle taxi businesses are run by both bicycle owners and non-owners. The BFG survey found that 17 percent of those who used bicycles for taxi businesses did not own a bicycle. These findings confirm the existence of a bicycle rental system through which bicycle taxi operators rent bicycles from owners for a fee. This conclusion is supported by evidence from the BFG survey showing that a fifth (20 percent) of bicycle owners rented out their bicycles to others.

Between 2012 and 2014, Abanyonzi were prohibited from operating in cities, as they were said to cause traffic congestion; they are still prohibited from travel in Kigali central city. According to interviewees, Abanyonzi tend to make trips of up to 3 km one way.

GENDER & BICYCLE USE AND ACCESS

Focus group respondents report there are no cultural constraints to women owning or riding bicycles, other than a need to wear trousers or shorts underneath a skirt, dress, or kitenge as they sit astride or ride. Rubavu is an exception, where the BFG survey revealed nearly a third of women in the district reported owning bicycles, less than a tenth (9 percent) were the primary users of bicycles in the household. While Rwanda exhibits high levels of acceptability towards women owning and using bicycles, rates are lower in Rubavu than in other districts (Table 1). This observation was evident across both men and women and may be one of the key underlying drivers of the poor demand for bicycles by women from this district.

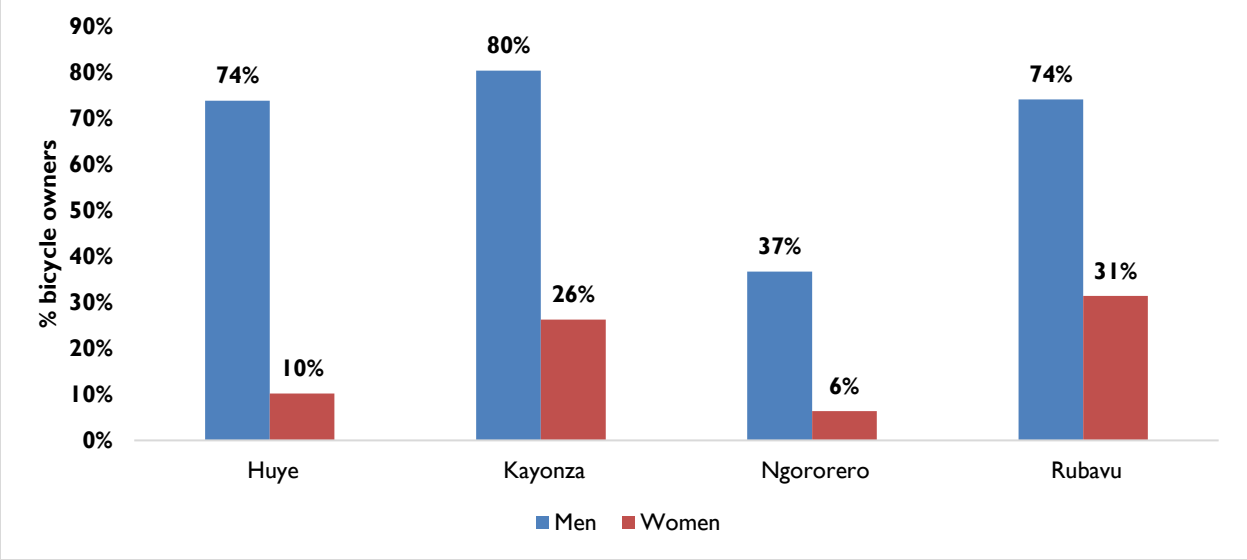
The opposite is true in Bugesera, where women are expected to bring a bicycle into a new household as part of their marriage dowry. Respondents speculated women's routine use of bicycles there is a result of the Eastern Province's relatively flat topography compared to the rest of Rwanda.

TABLE 1: PERCEPTIONS REGARDING ACCEPTABILITY OF WOMEN'S BICYCLE USAGE

	Respondents agreeing that it is acceptable for women to use bicycles		
	% of all respondents	% of Men	% of Women
Total (all districts)	87%	81.8%	92.0%
District			
Huye	94%	89.1%	98.0%
Kayonza	94%	90.2%	96.5%
Ngororero	86%	79.6%	93.6%
Rubavu	73%	72.6%	74.3%

Despite high acceptability and the absence of significant cultural barriers towards women's bicycle ownership and usage, BFG found women were less likely than men to own bicycles. Overall, two thirds (66 percent) of men reported they owned bicycles, compared to less than a fifth (18 percent) of women. BFG found significant variations in gendered demand for bicycles across locations. (see Figure 6). While women in all districts are less likely to own bicycles, the variations are striking. For example, the share of men owning bicycles in Huye (Southern province) was seven times higher than that of women. In Kayonza (Eastern province) where bicycle usage by women is common, the share of men owning bicycles was three times higher than women. For both women and men non-owners, affordability of bicycles appears to be the main constraint to bicycle ownership.

FIGURE 6: BICYCLE OWNERSHIP RATES AMONG MEN AND WOMEN BY DISTRICT



Where women ride bicycles less than men, this pattern is more likely to be related to trip purpose or gender roles within a household. Men, for example, might work as bicycle taxi operators, while women are unlikely to do so. Women are more likely to work within the home, or care for and travel with elders and children, while men are more likely to transport heavier loads of goods and animal forage, and undertake bulk purchasing. Where women carry forage, for example, they are more likely to head-load.

Some women report that girls are less likely to learn to ride a bicycle, on the assumption that they will not need to use one because of these differentiated roles. Traveling by bicycle taxi or asking a bicycle user to deliver or transport items, is common among women. Women report that even when their husbands use the household bicycle more often than they do, it "benefits the whole family."

BICYCLE USAGE

Bicycles play a key role in facilitating mobility of people and goods.

Data from focus groups suggests the primary use of bicycles is transportation of goods, followed by personal travel or working as a bicycle taxi operator. Several respondents report owning both a motorcycle and a bicycle, and choose between them based on trip purpose, distance, and terrain. Almost half of survey respondents indicated they use a bicycle for first and last mile travel to access other modes, mainly motorized public transport.

Walking and cycling as sport, leisure, and for fitness has high-visibility (and even presidential) support in the form of Kigali's car-free zone and car-free days. In 2016, Kigali began hosting monthly car-free days on Sundays, with main connecting routes closed to traffic "to encourage people to walk, jog as well as ride bicycles" according to the then city mayor. "The move [was] aimed at encouraging mass sports and exercise along the affected route through introducing the much-anticipated green transport and green city." In 2018, car-free days were expanded to secondary cities, and held every other week.

FREQUENCY AND INTENSITY OF USE

Regular and intense use of bicycles is common in Rwanda, particularly in rural areas. Those who own bicycles are the most frequent and intense users: 75 percent of bicycle owners used their bicycles regularly, either daily or several times a week. A quarter used their bicycles daily. Among bicycle owners who used their bicycles for taxi business, 30 percent used them daily. These findings suggest consumers who have access to bicycles tend to use them often, and, if they own the bicycle, even more frequently.

The BFG survey found those who use bicycles for income generation use them more frequently than those who do not; for example, 75 percent of bicycle owners who used bicycles to transport goods for income generation or for taxi business used them regularly, while 78 percent used bicycles for farm activities regularly. Bicycles owners who use their bicycles daily tend to use them for multiple income generating activities.

Bicycle owners also emerged as the most intense users of bicycles, spending an average of 20.6 hours per week using their bicycle (3 hours per day). This is nearly three times the amount of time that non-owners spent traveling on bicycles (4.4 hours per week). Across geographical locations, respondents in Rubavu and Kayonza spent 15.6 hours per week and 14.6 hours per week traveling on bicycles, significantly higher than those in Huye (10.2 hours) and Ngororero (7.2 hours) over the same period.

TRIP PURPOSES

User widely utilize bicycles for economic purposes (e.g., transport of agricultural produce), transportation of firewood, water, local beer, and animal feed (Rwanda has a no-graze policy); as well as for passengers

(including school-going children, and hospital patients). Bicycle travel for personal commuting is a less common practice.

Use of bicycles for economic purposes (mainly transportation of goods, taxi business, and farm activities) emerged as one of the most commonly reported purposes of the majority (59 percent) of users.

A user transporting goods on a Phoenix bicycle

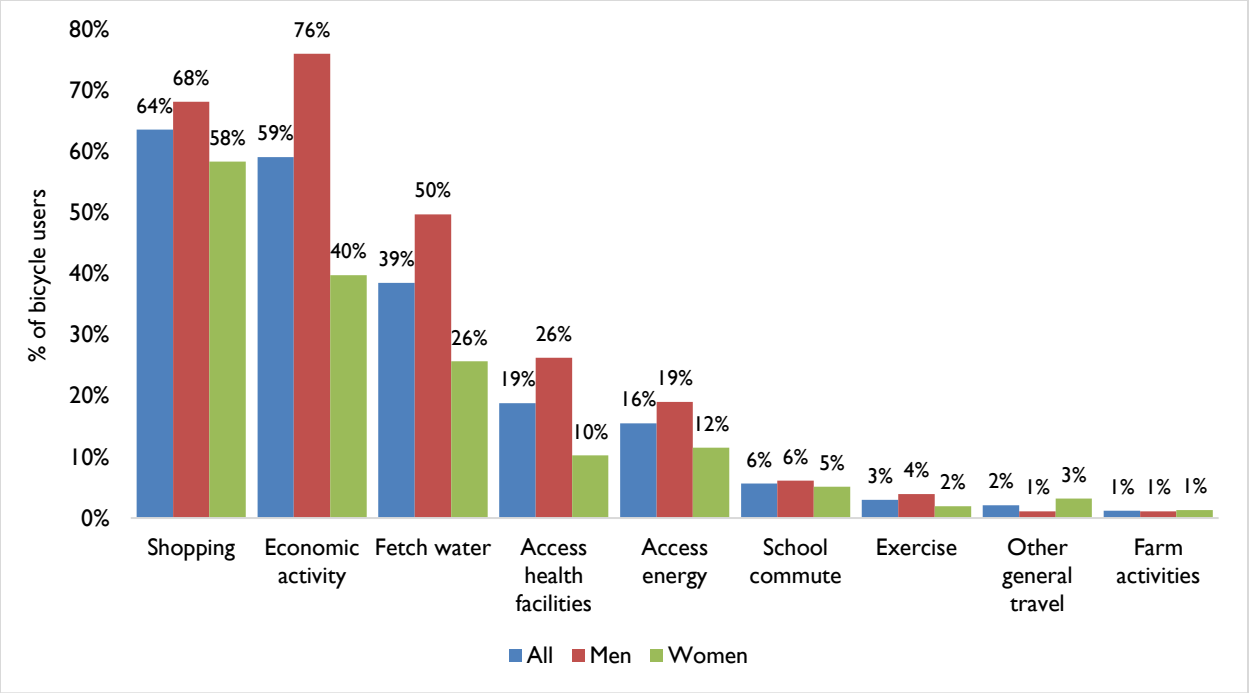
Bicycles are not only important for livelihoods, but are also commonly used for household chores. Nearly two thirds (64 percent) of bicycle users utilized bicycles for shopping, typically involving travel to a market. More than a third (39 percent) used them to fetch water, while 16 percent used bicycles to access and carry cooking fuel (mainly firewood).

Bicycles' utility and broad application is a likely underlying driver of high demand, particularly in rural areas: users deploy bicycles for a variety of purposes. BFG found that 77 percent of bicycle users who utilized bicycles for economic purposes also used them for household chores (shopping, fetching water, accessing energy sources, and school commute).

Among women who reported bicycle use, the most commonly cited application of bicycles was shopping (reported by 58 percent), followed by economic purposes (40 percent). A greater percentage of men (76 percent) reported they used bicycles for economic purposes than for shopping (68 percent).

Variations in bicycle usage also emerged across districts. In Rubavu, the most common use of bicycles was for economic purposes (reported by 88 percent of bicycle users). Shopping was a more common use of bicycles in the other districts; 72 percent of users surveyed in Kayonza, 61 percent in Huye, and 53 percent in Ngororero.

FIGURE 7: KEY USES OF BICYCLES AMONG USERS



BICYCLES AS HOUSEHOLD ASSETS

Bicycles are highly regarded as working assets, seen as "tools for the whole household." When individually owned, bicycles are typically loaned free-of-charge to family or household members. Neighbors or non-household members are usually asked for a small fee to borrow a bicycle (as they would be to borrow any household item, such as a shovel).

However, bicycles are less likely to be regarded as assets by financial institutions. Financial institutions view bicycles as too low in value to be considered as assets when assessing creditworthiness – a reality which was also recognized by consumers in focus group discussions. Additionally, bicycles are lightweight and hard to trace, leaving them vulnerable to theft.

On the other hand, microfinance institutions both finance the purchase of motorcycles and accept them as collateral for further loans. Relative to bicycles, motorcycles offer several key advantages as assets: they have greater value, and they are registered, with ownership codified in a way that has no analog for bicycles.

CONSUMER PREFERENCES AND DEMAND FACTORS

Key factors that influence demand for bicycles include consumer preferences around transportation modes, geographic location, bicycle affordability, availability and cost of other transportation modes, income generating potential of bicycles, accessibility of spare parts, and road safety.

BFG found that a quarter of respondents surveyed preferred to use their own bicycles for travel, rather than bicycle taxis or other modes of travel. More than one-third of respondents (36 percent) reported they would prefer to own a bicycle to use for travel. Of these respondents, the vast majority (85 percent)

were individuals who relied on walking to travel to work or market. However, BFG also found that among those who owned bicycles, 40 percent reported their preference to use motorcycle taxis, while 23 percent preferred to own a motorcycle, and only 12 percent reported they would prefer to use a bicycle. This suggests a strong desire among bicycle owners to own and use motorized modes of transportation.

A large share (70 percent) felt that better road safety would improve their usage of bicycles, a striking finding that suggests high levels of safety concerns. Availability of affordable bicycles was the second most common factor that consumers reported would increase their bicycle usage.

It is worth noting that BFG found a notable share (15 percent) of respondents who did not own bicycles reported they were not interested in owning bicycles. Of these, the majority (77 percent) were women. Additionally, the majority of those uninterested (73 percent) were from Kayonza and Ngororero.

TABLE 2: TOP FACTORS TO ENCOURAGE INCREASED BICYCLE USAGE

	% of Respondents Indicating Factor Would Increase Bicycle Use		
	All respondents	**Men**	**Women**
Better road safety	70%	71%	69%
Cheaper bicycles	67%	66%	68%
Better bicycle design	45%	49%	39%
Bicycle paths	37%	38%	35%
Secure bicycle parking/ storage	33%	39%	26%
Improved bicycle repair accessibility	31%	35%	27%

DEMAND DRIVERS AND CONSTRAINTS

Bicycles are likely attractive to consumers due to their capacity to be used for multiple income generating activities and household chores, and their affordability and accessibility relative to other motorized modes of transportation. BFG found the key barrier to uptake of bicycles is cost.

USER NEEDS AND USE PURPOSES

Bicycle demand is closely tied to the needs of users and potential users. Within Rwanda, bicycles are frequently used in two manners: as a means of transporting people and goods while riding, and as means of moving goods while pushing (essentially functioning as wheelbarrows). Further, bicycle use can be segmented between personal use (for commuting and leisure) and commercial use (transporting goods, bicycle taxi functions, and agricultural activity). These use-cases lead to consumers demanding distinct bicycle models, with demand further influenced by other market factors (such as government policies).

BICYCLE AFFORDABILITY AND QUALITY

A large number of households, particularly those living in rural areas, are poor. The most recent official estimates show that in 2016/17, the share of poverty in rural areas was nearly three times that of urban areas (43.1 percent vs. 15.8 percent). Similarly, the 2019/20 DHS reported that 63 percent of households in urban areas are in the highest wealth quintile, compared to 11 percent of households in rural areas. Given high levels of poverty and low ownership of assets, rural households are likely to have less money to spend and save.

Consequently, these individuals and households exhibit a very high demand for affordable bicycles. Focus group participants routinely indicated bicycles are 'expensive' to purchase, but are the cheapest form of transport to use. Participants also noted spare parts and accessories are also expensive, and prices fluctuate, but always get more costly: 'You can buy a spare part today, and you find that tomorrow prices have doubled.'

Therefore, affordability is likely the most important driver of the strong demand for used bicycles. In contrast, bicycle quality is more likely to drive the demand for new bicycles. Price was the most cited factor by owners of used bicycles: 82 percent of those who purchased used bicycles reported price was a consideration during acquisition, compared to 54 percent of those who purchased new bicycles. In contrast, quality emerged as the most cited factor by those who acquired new bicycles: 94 percent of those who purchased new bicycles cited quality as a factor, compared to 46 percent of those who purchased used bicycles.

The average price paid by consumers for used bicycles (RWF 60,688 [US$58.60]) was approximately half the price of new bicycles (RWF 120,000 [US$116]). Only 29 percent of buyers spent at least US$80 on bicycles (new). These findings reiterate the need for affordable bicycles. However, the relatively low cost of bicycles is still unachievable for many non-owners, 60 percent of whom reported that the main reason for not owning a bicycle was the cost of acquiring one.

TERRAIN/TOPOGRAPHY

As previously noted, Rwanda is characterized by hilly or mountainous topography which functions as a major constraint to bicycle demand in much of the country. Additionally, the country has numerous rivers and lakes, and flooding is a regular occurrence during heavy rainy seasons. Due to lack of infrastructure, roads, and bridges, access to services and livelihoods is often affected, particularly among communities in rural and mountainous areas.[20] As such, walking is often the main mode of travel in these contexts. A survey carried out by Bridges to Prosperity in six rural sites in Rwanda between August 2019 and March 2020 found that 99 percent of trips made by persons crossing tail bridges were made by foot.[21]

Although walking is a majority mode in Rwanda, the hilly topography is a challenge for both pedestrians and cyclists. Road networks typically follow the contours of hillsides, increasing travel distances. Widely accepted norms recommend road gradient for bicycle lanes should not exceed 5 percent, which would be a challenge in Kigali, for example. Integrating bicycle travel with public transport is therefore essential, and the new Bus Rapid Transit (BRT) in Kigali is likely to either permit bicycles on board or offer safe bicycle parking facilities.

Topography is among the most cited challenges for cycling in Rwanda: riders report having to push their heavily loaded bicycles (often recruiting someone else to help them) or transporting their bicycles on top of cars/taxis for one journey leg. Focus group participants frequently mention the desire for a bicycle 'with an engine' (an electric bicycle) or with gears.

The difficult terrain is one of the main contributors to low demand for bicycles in areas such as Ngororero, a hilly district in which BFG found the lowest ownership rates amongst all districts surveyed.

[20] Noriega et al. N.D. *The geographic reach of tail bridges in rural Rwanda.* Bridges to Prosperity.
[21] Ibid (Noriega et al. N.D.)

TRANSPORTATION NEEDS, ALTERNATIVES, AND COSTS

In the BFG survey, only 5 percent of respondents used motorized transportation as the primary mode of travel to work or markets, whereas 42 percent used bicycles, and 53 percent walked. Thus, bicycle travel is the second most popular mode of travel in the surveyed localities. BFG also found that bicycles are the second most affordable mode of travel, after walking. An analysis of expenditures on transportation over the 30-day period preceding the survey revealed that respondents who used bicycles to travel to work or markets spent 70 percent less than those who used motorized transportation (RWF 6601 [US$6.40] vs RWF 11,316/ US$10.90).

The affordability of bicycle travel/transportation is potentially one of the most important underlying contributors to the demand for bicycles and bicycle taxi services. Commercial transporters revealed in interviews that they used bicycles for their trade to save on transportation costs.

Strikingly, there were no significant differences in the average spending on transportation between bicycle owners (RWF 6,170/ US$6) and non-owners (RWF 6,575/US$6.40). The use of other modes of travel by bicycle owners is one potential explanation for this finding. A larger percentage of bicycle owners (56 percent) than non-owners (45 percent) used bicycles as a go-between to access other modes of transportation (mainly motorized). When asked about the travel modes they used in the preceding harvest season, 44 percent of bicycle owners had used a minibus taxi/bus at least once, while 40 percent had used motorcycle taxis. In comparison, 27 percent of non-owners had used a bicycle taxi, 35 percent had used minibus taxis, and 38 percent had used motorcycle taxis. These observations indicate potential limitations of bicycles for some types of travel, such as those covering long distances.

BICYCLE AVAILABILITY AND CONVENIENCE

Survey respondents stated they could find bicycles (used and new) from individual sellers, bicycle retailers, hardware stores, and other shops. Nearly three quarters (72 percent) of respondents reported they were satisfied with the availability of bicycles, indicating they were able to easily obtain them on demand. More than half of respondents (58 percent) reported they were aware of bicycle retailers operating in their communities. The data show that nearly three quarters of bicycles purchased were acquired from individual sellers, likely based within communities or in neighboring markets. When asked why they purchased the bicycle they owned, only 8 percent of previous and current bicycle owners reported that availability was the main consideration; cost and quality of bicycles emerged as the most common determinants.

Both bicycle owners and non-owners were satisfied with bicycle availability. Bicycle taxis are a popular mode of travel because they are easy to find compared to other modes of travel, particularly in rural areas. The wide availability and convenience of bicycle taxis for Rwandans in BFG's areas of research are likely a key driver of demand for bicycle taxi services. Across the surveyed districts, the highest level of satisfaction was found in Huye, where 81 percent of respondents reported they were satisfied with bicycle availability within their communities. In Rubavu and Kayonza, 73 percent and 70 percent of respondents, respectively, were satisfied with bicycle availability within their community. The satisfaction rate was lowest in Ngororero (65 percent), which also had the lowest bicycle ownership rate.

Focus group participants highlighted the availability of two primary types of bicycles: bicycles used specifically to transport passengers and goods (i.e., mass market bicycles described in more detail in the Supply section) and sports bicycles. In Rubavu, bicycle riders report a robust pre-owned bicycle market,

where they purchase damaged bicycles and repair them or "assemble spare parts and get a complete bicycle."

MAINTENANCE COSTS AND SPARE PART AVAILABILITY

Repair kiosks and spare parts are available "almost everywhere," and prices do not necessarily differ based on location. But spare parts are almost always cited as being "very expensive." Specialized tools for repairs are less available, including gas containers for welding, full sets of hex keys, or spoke tools, among others. Africa Rising Cycling Centre notes that spare parts for high-end sports bicycles are expensive as well as difficult to find.

The BFG survey found that the most commonly purchased spare parts were tires/tubes (reported by 72 percent of bicycle owners), chains (51 percent of owners), wheels/spokes (45 percent), and brakes (43 percent). Other common spare parts were forks (acquired by 29 percent), pedals (28 percent), and frames (acquired by 23 percent). Accessories were less in demand: carriers were acquired by 15 percent of owners, saddles 12 percent, patch/puncture kit 10 percent, and pumps 3 percent.

Nevertheless, a quarter (25 percent) of BFG bicycle owners reported it was difficult to find spare parts. However, BFG found significant variations across districts. For instance, 16 percent of bicycle owners in Kayonza reported difficulty in finding spare parts, compared to 26 percent in Rubavu and 27 percent in Huye. In Ngororero, where bicycle ownership rates were lowest, 32 percent of bicycle owners reported difficulty finding spare parts. This is potentially due to a low demand for bicycles, which in turn translates to a low demand for, and supply of, spare parts and maintenance services.

Repair services are in high demand, with 76 percent of bicycle owners reporting a need to repair their bicycles at least once per month. Slightly more than one third (35 percent) reported needing to repair their bicycles at least once per week. Both new and pre-owned bicycles required regular repair. High demand for repair services indicates that bicycle quality may be poor, and/or bicycle owners use their bicycles intensively.

BFG found that 95 percent of bicycle owners used local mechanics to repair bicycles. The remainder either repaired their own bicycles or received help from other individuals. No variations were evident across districts: local mechanics were engaged for repair services by the vast majority of bicycle owners (91 percent in Ngororero and Rubavu, 96 percent in Kayonza, and 100 percent in Huye). Only 8 percent of bicycle owners who engaged the services of local mechanics for bicycle repair reported mechanics were difficult to find. In Huye, 13 percent reported difficulty finding local mechanics, and in Kayonza and Rubavu a small percentage (2 percent in each district) had difficulty finding local mechanics. In Ngororero, where spare parts were difficult to find for a substantial share of bicycle owners, 26 percent of bicycle owners who relied on local mechanics for repairs reported difficultly finding a local mechanic.

Overall, 78 percent of bicycle owners reported concerns about maintenance costs. Bicycle owners reported spending an average of RWF 20,770 (US$20) in the six-month period preceding the survey. No significant variations in maintenance costs across new and used bicycles were observed. Bicycle owners in Rubavu spent significantly more (RWF 27,611 [US$26.70]) than those in Ngororero (RWF 16,150 [US$15.60]), Kayonza (RWF 17,589 [US$17]), and Huye (RWF 17,138 [US$16.60]). High maintenance costs in Rubavu could be indicative of the intense use of bicycles among riders in the district, mainly due to a higher share (87 percent) of owners using bicycles to transport goods. The share of owners using

bicycles for this purpose was lower in other districts: 56 percent in Kayonza, 71 percent in Ngororero and 72 percent in Huye.

High maintenance costs and high demand for spare parts and repair services likely explain the considerable share of BFG respondents who reported that ease of spare parts replacement and maintenance were factors they would give preference when considering a bicycle purchase in the future (57 percent and 22 percent, respectively).

FINANCE

The primary source of finance for bicycle acquisition is personal (home) savings or income from sale of assets. In the BFG survey, 81 percent of those who bought bicycles had used this mode of financing to acquire their bicycle. Five percent of owners made in-kind payments for their bicycles, while 3 percent paid in installments.

More than three quarters (77 percent) of adults in Rwanda have access to formal financial products and services through either banks, savings, and credit co-operative society (SACCOs)/village savings and loan associations (VSLAs), microfinance, or mobile money. This includes people living in rural areas. More than half (58 percent) of agricultural households reported at least one household member had a bank account. Of these, 72 percent held accounts at savings and credit cooperatives, 12 percent at microfinance institutions, while 16 percent had accounts at commercial banks. Despite high access to formal financial services, BFG found that only three respondents (representing 1 percent of bicycle purchasers) received loans from banks for bicycle acquisition, indicating that formal credit is rarely used, a finding requiring additional research.

BFG found no significant barriers to access financial service providers in Rwanda, as most people do not travel far to access financial services such as mobile money, savings groups, banks, and microfinance institutions. In 2020, 36 percent of adults used bank products or services, an increase of 10 percent compared to 2016.[22]

BFG found that after personal savings, the second most commonly used mode of financing was VSLA funds, reported by nearly a quarter (23 percent) of those who purchased bicycles. This informal form of financial product/service is popular in Rwanda, particularly in rural areas. In 2020, more than two thirds (68.5 percent) of agricultural households belonged to informal savings groups (tontines,[23] social solidarity funds, or money lending schemes).[24] The vast majority (70 percent) of agricultural households that applied for loans in 2020 applied to informal savings groups (tontines or solidarity funds).

SATISFACTION WITH BICYCLE TRAVEL

BFG found that 68 percent of surveyed bicycle owners felt bicycles met their transportation needs. No statistically significant variations existed across districts, indicating that overall, the majority of bicycle owners felt that bicycles met their transportation needs.

In the BFG survey, more men (74 percent) than women (47 percent) reported that bicycles met their transportation needs. When the question was explored more deeply during focus group discussions, however, women respondents reported that bicycle travel is highly satisfactory as it enables greater equity

[22] Access to Finance Rwanda. *FinScope Rwanda 2020*.
[23] Tontines are traditional informal savings organizations.
[24] National Institute of Statistics of Rwanda, Agricultural Household Survey 2020, December 2021.

in the distribution of household chores (women can assist their husbands more easily), and children have greater mobility independence (they can travel to school, or collect water, on their own).

Bicycles' on-demand service (no waiting or timetables), low operating costs, and availability are cited as primary benefits of the mode. Further, unlike cars, a bicycle "doesn't require driver vehicle licenses and other requirements as other vehicles do" (a point to bear in mind as many governments across Africa consider trying to regulate bicycle use as an attempt to improve road safety). Respondents also highlighted bicycles, whether pushed or cycled, are also able to reach areas too steep for vehicle access (despite the topographic challenges), are cheaper than motorized modes, and mitigate traffic congestion.

DESIRED CHARACTERISTICS IN A BICYCLE

A high share of both men and women in the BFG survey identified quality/durability as one of the top three factors they would consider when purchasing a bicycle. Bicycle price was the second most commonly cited factor, also identified by both women and men. Ease of acquiring spare parts emerged as the third most cited consideration, perhaps indicating difficulties with accessing spare parts in the existing market. The style and design of the bicycles was cited by 22 percent of respondents (25 percent of men and 18 percent of women). Ease of riding and lightweight bicycles were the least mentioned considerations, suggesting that these factors are not critical drivers of demand in Rwanda.

Women report preferring bicycles with gears, and with a step-through frame – neither of which are common in Rwanda. When selecting a bicycle taxi to use, women look for bicycles that are new, clean, that have brakes, a strong crossbar, and "have enough air in the tires." Bicycle transport riders are excited about the existence of electric bicycles and see "e-bikes" as offering a solution to the high exertion levels required; there is an evident gap in availability of affordable e-bikes, however. As opposed to several other regional peers, Rwanda does not have electricity shortages, and while currently relying on hydropower, there is a burgeoning solar industry.

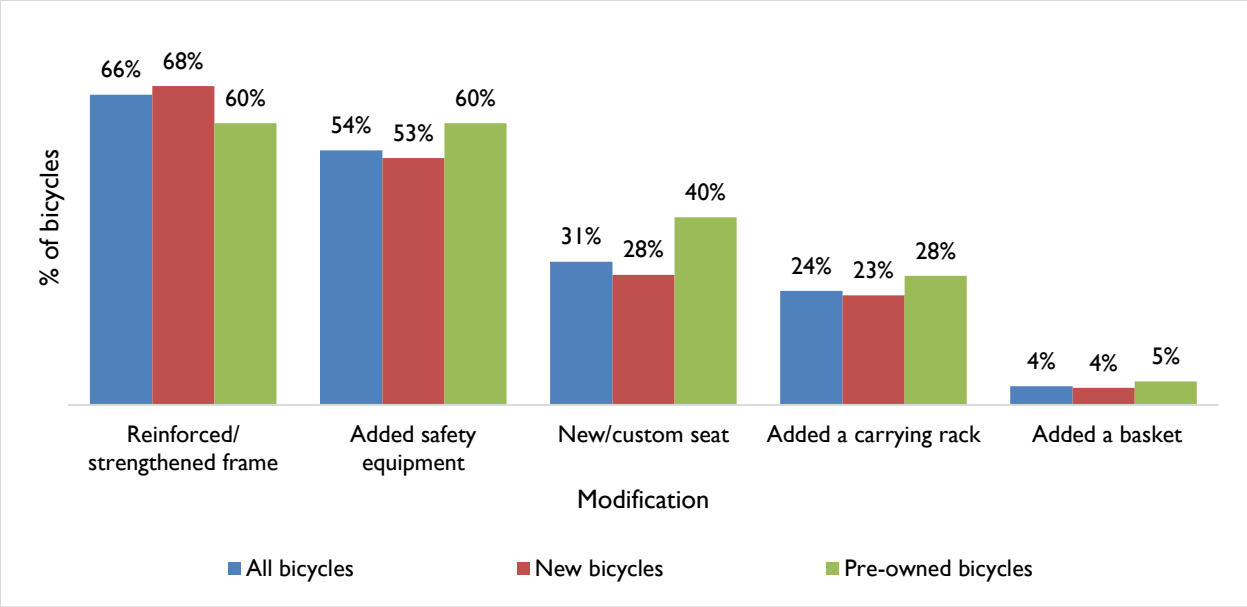
TABLE 3: KEY FACTORS FOR BICYCLE PURCHASE DECISIONS

	% of Respondents Indicating Factor Among Top 3 for Purchased Decisions		
	All respondents	Men	Women
Quality/ durability	88%	87%	88%
Cost	84%	83%	85%
Ease of acquiring spare parts	53%	56%	51%
Style/ design	22%	25%	18%
Ease of maintenance	21%	21%	20%
Ease of acquiring bicycle	14%	17%	11%
Ease of riding	8%	6%	11%
Lightweight	7%	6%	8%
Don't know	1%	1%	2%

A large share (75 percent) of bicycle owners who acquired bicycles modified their bicycles after purchasing them. Both owners of new and used bicycles made modifications to their bicycles. Of those who made modifications, the most common modification made was to reinforce/strengthen the frame. This

modification was made by owners of both new and pre-owned bicycles, and perhaps indicates an unmet demand for strong, heavy-duty bicycles. The addition of safety equipment also emerged as one of the most common modifications made, perhaps an indication of high levels of safety concerns among riders. Eighty-three percent of bicycle owners felt that it is unsafe to use bicycles on dirt roads. A third of those who made modifications added a new/custom seat while about a quarter added a carrying rack. The addition of a basket was the least reported accessory.

FIGURE 8: TYPES OF MODIFICATIONS MADE TO BICYCLES AFTER ACQUISITION



INCOME GENERATION POTENTIAL

Ninety-one percent of respondents stated that owning a bicycle would improve their ability to increase personal economic activity. Among current bicycle owners, 87 percent perceived that bicycles improve economic activity. This observation was made across all districts. The perception that bicycle ownership causes higher economic activity is potentially one of the critical factors underlying strong demand for bicycles. A notable finding from the BFG survey is that even the vast majority (94 percent) of previous (but not current) bicycle owners felt that bicycles improve economic activity, perhaps an indicator of high probability of them purchasing bicycles in the future.

Income generation potential is primarily vested in bicycles' ability to transport goods, as taxis, as an item to rent (at a marginal cost) or run errands for others. Nearly three quarters (72 percent) of bicycle owners in the BFG survey used bicycles to transport goods for income generation purposes, whereas 34 percent reported using them for a bicycle taxi business, 20 percent for bicycle rental purposes, and 44 percent for farm-related activities.

Therefore, commercial use of bicycles for transportation of people and goods is an important aspect of bicycle ownership, and potentially contributes to the high demand for bicycles, particularly among the youth. Although not required, many bicycle taxi operators belong to cooperatives, under the Rwanda

Cooperative Agency (RCA). In 2021, an estimated 145 registered cooperatives had 56,514 commercial bicyclist members (transporting people and goods).[25]

Owners who use their bicycles for income generation tend to use them for multiple activities. Sixty-four percent of bicycle owners who used bicycles for income generation utilized them for at least two income generating activities, compared to 28 percent of non-owners. This suggests that bicycle owners are more likely to engage in multiple income-generating activities, perhaps due to having control over the asset. While consumers typically mention price and quality (bicycle characteristics) as the main considerations when purchasing a bicycle, the ability to utilize bicycles for multiple income generating activities (and household chores) also likely makes bicycles especially attractive. Income generation is likely one of the key underlying drivers of demand, particularly in rural areas where the majority of the population is in vulnerable employment and income levels are poor.

Indirectly, bicycles enhance income-earning potential through reduced travel time, and enable transport cost savings: "you compensate the money you would have paid on public transport or motorcycle as you use your own bicycle."

Goods transportation pays better than casual farming, according to focus group participants in Rubavu, although they report work "dropping off" as motorized transport becomes more common. Bicycle riders report purchasing farms, building homes, and purchasing motorcycles with the income earned through transport riding. One focus group participant mentioned that his bicycle repair training taught him how to weld, and he has since expanded his work offering to include welding and other metal work.

However, bicycle transport riders report that the "job itself is hard" and that they look unkempt and sweaty, which is why "people start despising this job" as soon as they can "upgrade to another step" by purchasing or using a motorcycle. Cyclists also report challenges with meeting requirements for bicycle lights and mirrors – and having to pay fines to "security fees collectors."

BICYCLE SECURITY

Formal bicycle parking racks are rarely available outside of Kigali (17 parking stations) or at schools. Informal parking takes the form of leaving a bicycle with a guard (at the market, for example) who will produce an invoice/receipt for watching over your bicycle. Focus group respondents noted that while theft of luggage (on a bicycle taxi) or of a bicycle is possible, such incidents are immediately reported to taxi associations or market security, and the missing items are usually returned.

Nevertheless, BFG found that a substantial share (63 percent) of respondents were concerned about bicycle theft. In Kayonza, 81 percent of respondents expressed concern about bicycle theft. In Huye and Rubavu, 64 percent and 70 percent of respondents expressed concern about bicycle theft. In Ngororero, where bicycle demand was lowest of the four districts surveyed, only 35 percent of respondents were concerned about bicycle theft. Twenty percent of respondents reported concern about bicycle theft would affect their decision to purchase a bicycle. This finding suggests demand could be increased if measures to secure bicycles existed, particularly outside residential properties.

[25] Rwanda Cooperative Agency. 2021. *Role of Cooperatives in transport development and job creation in Rwanda.*

ROAD SAFETY

Cyclists constitute 10 percent of Rwanda's road fatalities, while pedestrians account for 47 percent of road fatalities. These fatality rates are higher than the mean in the region, where 3 percent of road fatalities are cyclists, and 37 percent pedestrians.[26] Speed bumps, cushions, and raised pedestrian crossings (all forms of vertical deflection) are the most commonly implemented road safety measures.

A marked share of BFG survey participants reported they were concerned about road safety. A third (35 percent) reported using bicycles on tarmac roads is dangerous, and a much higher share (77 percent) reported using bicycles on dirt roads is dangerous. This pattern was observed across all districts surveyed, including those with high bicycle ownership and usage. Additionally, there were no significant variations across districts in the share of respondents reporting safety concerns, whether on tarmac or dirt roads.

Concerns about safety while using bicycles (either tarmac or dirt roads) is a likely inhibitor to bicycle ownership. More than half (58 percent) of respondents concerned about safety reported that this would influence their decision on whether to purchase a bicycle. More than three quarters (76 percent) reported that safety would influence their decision to use a bicycle.

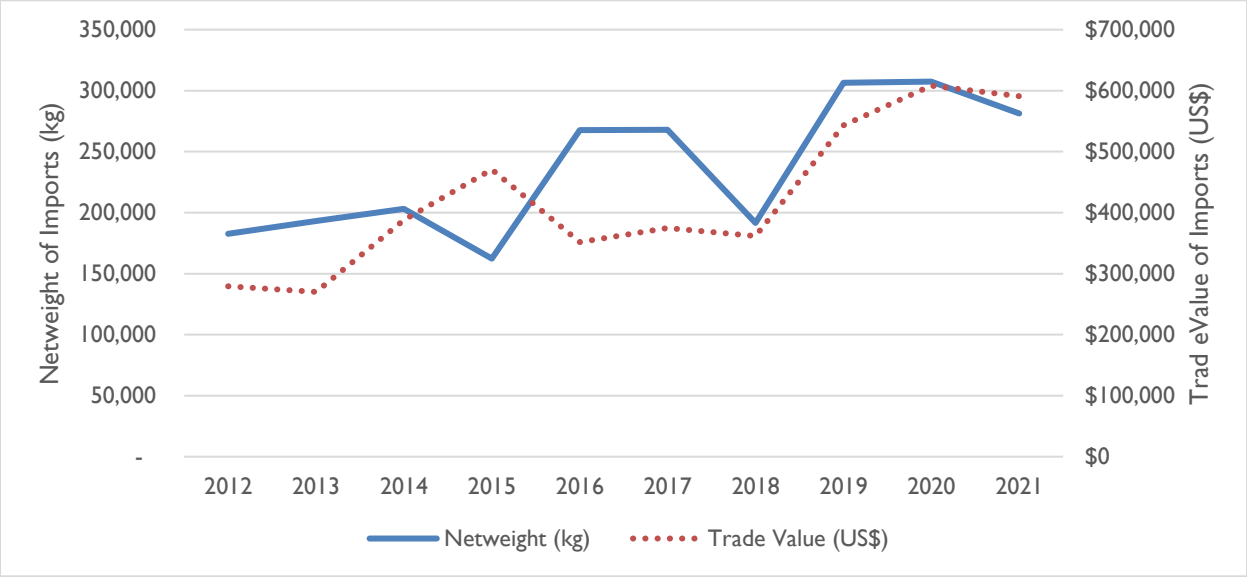
[26] Global Road Safety Facility. "Rwanda – Road Safety Country Profile."

SUPPLY

Rwanda's bicycle market supply reflects the unique conditions that drive bicycle use. Trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII) shows bicycle imports totaled US$2.0 million during the 2016 to 2020 period.[27] [28] By comparison, neighboring Uganda imported $2.1 million worth of bicycles *annually* during the same period. Comparing the value of annual bicycle imports in per capita terms, Rwanda ranks 48th out of 54 countries.[29] This makes Rwanda the smallest of the five markets BFG conducted market systems assessments, with Ghana (8th), Malawi (19th), Zambia (20th), and Uganda (42nd) all ranking higher in terms of per capita imports. New bicycles are largely sourced from centers of low-cost production in China and India. Secondhand bicycles are imported from a variety of sources, including North America, Europe, and the United Arab Emirates.

While Rwanda's bicycle market is relatively small, it has grown over time. Trade data also demonstrates that over the last decade, both the value of imports and the weight of imports (a proxy for the quantity of bicycles) have increased, as can be observed in Figure 9.

FIGURE 9: RWANDA BICYCLE IMPORTS (2012-2021)[30]



The bicycle market appears to be undergoing a transition period as the supply of bicycles shifts from primarily lower end, mass market transport bicycles to a mix of secondhand imports.

[27] CEPII. "BACI: International Trade Database at the Product-Level – Version 202201." Value figures are based on wholesale declared value at the time of export/import.

[28] UN Comtrade, the primary source for international trade data, shows higher levels of imports (US$2.2 million) for Rwanda over this some period. The reason for this appears to be discrepancies between reported imports and reported exports in origin countries, something which the CEPIII BACI dataset attempts to mitigate. In comparison to bicycle trade data for other African countries, the differences between CEPII BACI and UN Comtrade data are relatively narrow, indicating generally reliable trade data for Rwanda. Both CEPII BACI and UN Comtrade data is referenced throughout this report. A detailed discussion of discrepancies in trade data is offered by Our World in Data.

[29] This data can be found in Annex 4: Africa Bicycle Import Market Overview.

[30] UN Comtrade.

Typically, importer-wholesalers based in Kigali import bicycles from India and China, then sell these bicycles onward to small retailers across the country. Exceptions to this process are in rural areas where bicycle sales outlets may not exist and potential buyers must either turn to the local secondary market for used bicycles or travel to the nearest population center where bicycle sellers are present.

The supply side's major constraints include (1) rising/unpredictable costs of bicycles, (2) limited retailer working capital, limiting supplier growth and inventories, and (3) policies, such as import duties, which have differential impact on sport and transport bicycles. Moreover, recent global inflationary trends are exerting upward pressure on bicycle prices, as the costs of raw materials (notably steel) and shipping from production sites have risen substantially since the start of the COVID-19 pandemic. The China Bicycle Association reports the average value of all exported bicycles from China during the first six months of 2021was US$68.60, a year-on-year increase of 20 percent.[31] With these trends continuing, bicycle price inflation is likely to reflect similar or even greater increases during 2022.

BICYCLES ON THE MARKET

As part of its growth objectives, Rwanda is the only BFG assessed country actively pursuing a bicycle tourism strategy. Combined with use-cases described above, Rwandan markets offers several broad categories of bicycles, with many layers of further potential categorization.

MASS MARKET IMPORTS – TRANSPORT BICYCLES

The most widely used bicycles in Rwanda are relatively inexpensive cruiser or roadster-type bicycles. Chinese and Indian manufacturers typically produce most cruisers and roadster type bicycles in Rwanda. The most widely sold brands include Eastman (an Indian brand) and Phoenix (a Chinese brand). Manufacturers of these bicycles are large scale companies with expansive international footprints. Phoenix, for example, exported approximately four million bicycles in 2021 and is found widely across markets in Africa.[32] Prices for mass market roadsters vary. Eastman, the most widely used brand of roadster bicycles in Rwanda, retails for approximately RWF 120,000 (US$116), while prices for Phoenix are similar or slightly more expensive. Typically made of steel, single speed or with limited gearing, and sold nearly universally with carrying racks, individual users and institutions commonly purchase roadster bicycles. Cruiser and roadster-type bicycles are included in the new mass market import category of bicycles.

Sometimes categorized locally as "transport bicycles," new mass market imports are the main bicycles used for general transport and the movement of goods and passengers (i.e., as bicycle taxis). This category of bicycle is distinct from mountain bicycles or sport bicycles, which more commonly enter the domestic market through different supply chains. Generally, when used for the movement of goods, transport bicycles function similarly to wheelbarrows, with cargo loaded on and the bicycle then pushed rather than ridden (see picture below).

[31] China Bicycle Association. "Analysis of the economic operation of China's bicycle industry from January to June 2021." 12 August 2021.
[32] Chen Liubing. " Chinese bicycle exports soar during pandemic." *China Daily*. 11 February 2022.

A bicycle being used for moving cargo in Cyanzare sector, Rubavu

BFG survey and focus group respondents report variability in the quality of new mass market import bicycles , although Eastman is widely considered to be of high quality. Among the nearly 110 individuals who reported owning an Eastman bicycle in the BFG survey, 72 percent reported being satisfied with their bicycle. This compares with a satisfaction rate of just 47 percent for Phoenix bicycle owners and 57 percent for all other bicycle owners. Focus group participants and interviewees report Eastman bicycles are stronger and have more carrying capacity than other widely available bicycles.

Several government actions discouraged the use of these mass market bicycles for commercial purposes, especially in urban areas. In 2011, the government banned bicycle taxis from operating in Kigali, ostensibly as a road safety measure, though stakeholders interviewed by BFG claim this policy was implemented to create a more modern perception of the city.[33] Similarly, the government banned bicycles from main roads in Eastern Province in 2014, also on the basis of road safety concerns.[34] These broad restrictions were ultimately lifted, but commercial bicycle usage has continued to draw scrutiny from authorities, in part driven by complaints from the car driving public in urban areas. Government officials enact narrower restrictions periodically to make commercial bicycle usage less appealing. Meanwhile, the national government has eased barriers, especially import duties, on non-traditional bicycles such as electric bicycles, sport bicycles, and mountain bicycles.

SECONDHAND IMPORTED BICYCLES – SPORT AND MOUNTAIN BICYCLES

The market for secondhand sport and mountain bicycles in Rwanda is rapidly growing. Secondhand bicycles, originating from the United States and various European countries, are widely available in

[33] Terreblanch, Barrie. "Sunshine and Shadow in Rwanda's Rural Housing Programme." *Inter Press Service*. 27 April 2011.
[34] *The New Times*. "Banning bicycles from main roads is not the answer." 23 July 2014.

Rwanda. These bicycles arrive in Rwanda both directly from origin markets, as well as from exporters in third-party countries, including the United Arab Emirates (UAE), Uganda, and Tanzania. The UAE, a hub for secondhand goods to Africa, ranks as the third largest exporter of bicycles to Rwanda behind only India and China.[35]

Secondhand imported bicycles are most often sport/road or mountain bicycles intended for individual use for leisure or general commuting, as opposed to the movement of goods and passengers. Lacking features such as baskets, carriers, or modified seats, sport and mountain bikes are generally ill-suited to function as transport bicycles for goods or passengers. Better suited for mountainous terrain across large swaths of Rwanda, secondhand sport/road and mountain bikes are viewed as status symbols. It was not uncommon to hear of neighboring Congolese and Burundians traveling to Rwanda to purchase secondhand mountain bicycles for personal use in their home countries while middle-class Rwandans often take family outings on weekends to go cycling.

Retailers interviewed by BFG indicated they either refurbish secondhand imports prior to sale or assemble bicycles from parts using an internationally branded frame and components from other secondhand bicycles or brand-new imports from Chinese or Indian manufacturers. BFG observed one such case of an assembled bicycle utilizing a Specialized brand frame and additional components retailing for RWF 300,000 (US$290).

Secondhand mountain bikes are available at a wide range of outlets throughout the country where independent bicycle retail and mechanic shops frequently stock and supply fully-assembled bicycles and parts. These retail shops often sell other secondhand products in addition to bicycles, capitalizing on the rising leisure market bicycle trend. The retail shops typically do not sell new bicycles alongside secondhand sport bicycles, although this is likely a reflection of capital constraints and not market demand.

Given their origin and use in wealthier countries, secondhand bicycles are often perceived to be of higher quality than new mass market imports from India and China. Because of this perception, sport/road and mountain bicycles typically command a premium price relative to new mass market imports.

NEW PREMIUM BICYCLES

In addition to the segments described above, there is a growing supply of new, high-end sport and mountain bicycles targeted at both domestic and international leisure riders This sector of the market is directly linked to the Government of Rwanda's ambition to develop Rwanda into a premier training ground for competitive sports cycling and is actively promoting the development of the high-end leisure market. One specialty shop in Kigali, for example, has exclusive distribution rights in Rwanda for a major brand of bicycles sold in many international markets. This shop sells a mix of mountain and road bicycles starting at prices around US$300 and reaching US$4,000, with an average sales price around US$650 to US$700. The market for these bicycles is small and largely restricted to relatively wealthy individuals with a strong interest in bicycles. Reflecting this, the specialty shop notes there is very little competition in this market segment beyond some limited online, regionally-based sellers. The new, high-end sport and mountain bike market segment is expected to grow over time, with Rwanda establishing itself as a regional center for

[35] UN Comtrade.

cycling as sport, improving demand conditions (rising popularity of leisure cycling and rising incomes), and policies which promote bicycles for individual non-commercial use.

A growing number of tour operators and other businesses are expanding into bicycle tourism operations. The growth of this sector over time will in part depend on increased access to high-end sport bicycles and spare parts, as tourists in many cases currently need to provide their bicycles for events and tours.

HEAVY-DUTY BICYCLES

Heavy-duty bicycles and cargo bicycles are not widely available in the Rwandan market. In 2007, an NGO, Project Rwanda, launched an initiative to bring cargo bicycles to Rwanda for use by coffee farmers. These "Coffee Bikes" were specially designed to feature "strong metal chassis, seats, modern wheels, [18] gears and brakes" and a distinctive extended carrier with a carrying capacity of 350 pounds. [36, 37]

A Coffee Bike still in use – many modifications such as elimination of original gearing have been made given spare part availability

The USAID-funded Sustaining Partnerships to Enhance Rural Enterprise and Agribusiness Development (SPREAD) project supported distribution of Coffee Bikes through a microfinance facility. The International Finance Corporation (IFC), working with Vision Fund, provided additional support for a bicycle lease-to-own program in 2009 at a cost of approximately US$140.[38] However, these pilot programs promoting access to Coffee Bikes were not expanded upon as coffee producers did not see the value in investing their profits into leasing the bikes. The USAID SPREAD project ended in 2012 and support for Coffee Bikes or similar heavy-duty bicycles was discontinued. Approximately 2,000 of these Coffee Bikes were produced and sold, and many can still be found in use (see photo above).

[36] Project Rwanda. "The Coffee Bike." Archived 9 May 2021.
[37] Angus, Hilary. "Cargo Bikes Abound in the Land of a Thousand Hills." *Momentum Magazine*. 19 April 2018.
[38] International Finance Corporation. "IFC Leasing Program Helps Rwandan Coffee Farmers." *Access to Finance Highlights Report 2009*.

ELECTRIC BICYCLES

Most retailers do not offer electric bicycles ("e-bikes") and existing demand does not appear to be high. However, there does appear to be potential for greater e-bike adoption in Rwanda considering the mountainous topography across much of the country. The European Union-funded SOLUTIONSplus project is promoting shared, public and commercial e-mobility solutions in Kigali. As a first step, SOLUTIONSplus supported the provision of 50 shared e-bikes for Guraride, which offers the e-bikes on its public bicycle share platform, in addition to traditional push bicycles. The Government of Rwanda has recognized electric mobility options, including e-bikes, as aligned with the country's broader environmental goals and has sought to promote their use.

PRODUCT-MARKET FIT

The Rwanda bicycle market appears to be in transition, with product-market fit driving change. Sport bicycles, typically secondhand imports from developed country markets, have begun to supplant transport bicycles, which were historically the dominant bicycles in the market.

Transport bicycles are imperfectly adapted for many of their primary applications. Though widely used for transporting goods and passengers, these bicycles were not designed to be used in this manner, especially for heavy loads. This imperfect product-market fit leads to mass market transport bicycles requiring modifications or more frequent repairs due to wear. Additionally, transport bicycles often have limited gearing and are ill-suited for Rwanda's hilly terrain. Nonetheless, the bicycles are relatively affordable and available compared to heavy-duty bicycles, and the wide availability of spare parts and capable mechanics have created conditions which enable the market to function for users.

Sport bicycles are a growing segment of the market. Although they are a poor fit for users seeking to transport goods, they are an improvement relative to standard transport bicycles for general transportation needs and the terrain conditions of many communities. Further, government policies and attitudes have shifted to favor sport bicycles in a way that creates positive conditions for the market segment's long-term growth. The presence and growth of both mass market (i.e., secondhand import) and specialty sport bicycle sellers provide indications that the market is growing to meet a variety of demand conditions and user needs.

Increased market linkages between Rwandan suppliers and foreign exporters of sport bicycles should lead to greater product diversification and the ability to meet a wider range of consumer needs and preferences.

BICYCLE MARKETS

Bicycles are widely available across Rwanda. In larger population centers, substantial numbers of bicycle retailers and related businesses cluster together. Bicycle outlets may be dedicated bicycle retailers or shops selling a variety of goods. Fewer bicycle sellers operate in rural areas – especially dedicated retailers. Residents of these areas must either travel to other locations or acquire bicycles locally from individuals or village mechanics.

WHOLESALE MARKET

Bicycle and spare part importers and wholesalers are clustered in Kigali. One supplier estimated five large importer-wholesalers operate in the market, along with a slightly larger number of wholesalers which are not active in importation of bicycles but rather purchase their bicycles from importer-wholesalers. Each of the wholesalers interviewed by BFG are focused on supplying either exclusively new bicycles or secondhand bicycles rather than a mix of both. This approach flows from distinct supply chains supplying divergent bicycle types (i.e., new bicycles originating from manufacturers in China and India and secondhand bicycles originating from a distinct set of suppliers elsewhere).

The wholesale market is generally competitive, as many wholesalers sell the same or comparable products and cannot substantially deviate in terms of prices from competitors.

The institutional bicycle market in Rwanda is also tied to the wholesale market. Institutions operate primarily through tender processes in which institutional buyers provide specifications including quantities, desired characteristics, and timelines to potential offerors. Offerors are often pre-screened, such that fewer than 10 businesses, most of which are importers in Kigali, are asked to submit bids. Institutional buyers typically seek new mass market transport bicycles.

RETAIL MARKET

The bicycle retail market is highly competitive, especially at the lower end, which represents the lion's share of the overall bicycle market. Retailers frequently cluster together in population centers and are keenly aware they are selling comparable products to other retailers in the area. Bicycle retailers frequently also sell spare parts, with spare parts sales often exceeding those of complete bicycles. Similar to the wholesale market, retailers tend to specialize in either new transport bicycles or secondhand sports bicycles.

Because of competition, retailers have limited ability to substantially mark up prices beyond costs. To compete for customers, sellers emphasize product quality and rely heavily upon their reputations. Many retailers emphasized to BFG the importance of honesty and transparency in their dealings with customers. Retail transactions are typically conducted in cash and no retailer indicated to BFG that they offer bicycles to customers on a credit basis.

Significant price fluctuations challenge the retail market, and stem from conditions upstream in manufacturing and the wholesale market. Both suppliers and consumers noted to BFG that market dynamics during the pandemic period have included sharp and unpredictable increases in prices. Although price changes are driven largely by global market conditions (as described below in Supply Chain), buyers and potential buyers view these fluctuations as a major deterrent for purchases, while retailers struggle to maintain their prices.

Although bicycle shops are rare in rural areas, ubiquitous village mechanics effectively function to meet local demand for buyers unwilling or unable to travel to bicycles shops in the nearest town. When an individual in the village wants to procure a transport bike, he/she can engage his/her local mechanic, who will "build it" from parts the mechanic acquires or has in-stock.

SECONDARY MARKET

The secondary market (i.e., sale of bicycles that have been used *within Rwanda* and not an external market, like Europe) is sizable. Secondary bicycle market transactions occur in a variety of contexts, including between individuals, at shops, and at larger markets. Individual bicycle sales account for nearly 70 percent of transactions in the BFG survey.

Markets for pre-owned transport bicycles are found across the country. These are managed by either companies or bicycles sellers' cooperatives, which facilitate bicycles transactions. The cost paid to the managers of these markets for a bicycle transaction is between RWF 600 (US$0.60) (in rural areas) and RWF 2,000 (US$1.90) (in Kigali). At Murindi Market on the outskirts of Kigali, the weekly market is managed by a private company and attracts buyers and sellers from as far as 45 kilometers away. On a typical market day, approximately 150 bicycles are available for purchase, with approximately 30 sold. For each sale, the managing company takes a commission and records the transaction, including details such as the serial number. This sales and ownership transfer record is intended to prevent theft and sale of stolen bicycles.

Secondhand bicycle market in Kicukiro District, Kigali

Consumers often elect to purchase bicycles on the secondary market because of their lower costs. Used transport bicycles can be acquired for as low as RWF 40,000 (US$39).

SUPPLY CHAIN

As indicated elsewhere, several distinct bicycle supply chains exist within the Rwanda bicycle market system. At the highest level, supply chains can be categorized into new mass market import supply chains

(reaching to manufacturers in India or China) and secondhand import supply chains (reaching to origin markets in Europe or North America or intermediate points of aggregation in the UAE or regional markets).

Supply chains for imported mass market transport bicycles in Rwanda follow a relatively standard structure. Kigali-based importer-wholesalers order bicycles and spare parts at volume from overseas manufacturers. The manufacturers, primarily based in China and India, produce bicycles based on these orders or ship from inventory. Newly manufactured bicycles are then shipped via sea in containers to regional ports, usually either Mombasa, Kenya, or Dar Es Salaam, Tanzania. These containers of bicycles are offloaded from ships and placed on trucks to transport them from port inland to Rwanda. After crossing the Rwanda border, the containers clear customs and are delivered to buyer warehouses.

A box of recently imported new bicycle components to be assembled as complete bicycles

This process, from initial order placement to delivery of a complete bicycle to a retailer can approach six months. COVID-19 related supply chain disruptions have generally exacerbated lead times.

Supply chains for secondhand bicycles involve completely different actors than those involved in the import of new bicycles. Secondhand bicycle supply chains originate with exporters or aggregators in international markets. In some cases, these exporters are based in the same markets in which the bicycles originate. Frequently, secondhand bicycles are shipped from third-party countries, most notably the UAE, in which

bicycles are imported from origin countries and aggregated for onward sale. Secondhand bicycles are typically sold in mixed lots categorized by the type of bicycles being sold (e.g., mountain, road, child, etc.) and some measure of quality (often based on the completeness of the bicycles). Shipments contain a variety of bicycle brands and models.

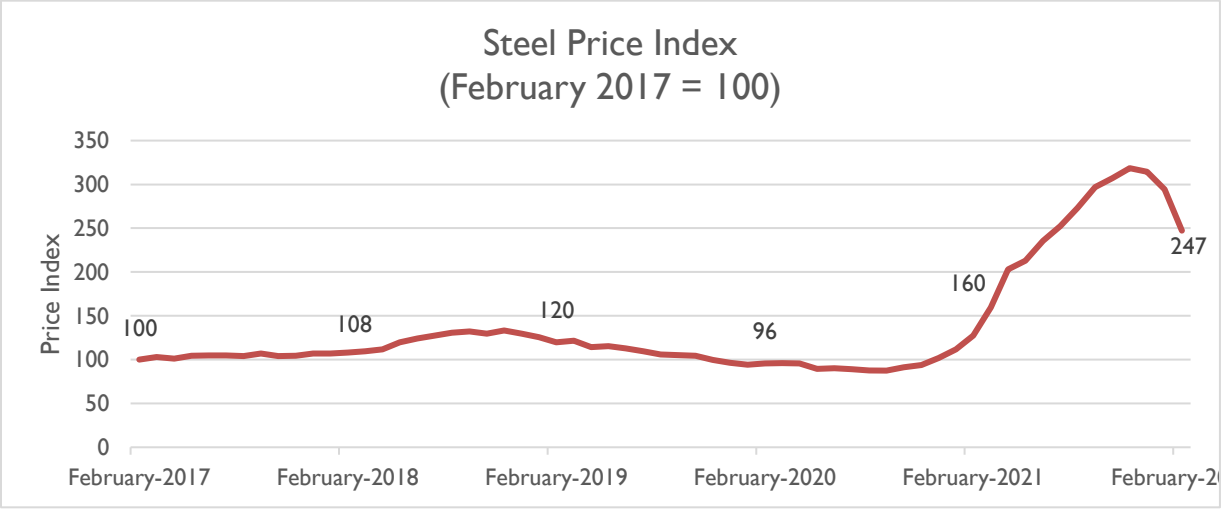
NEW BICYCLE MANUFACTURING

As previously noted, India and China manufacture most new mass market bicycles imported to Rwanda . The cities of Ludhiana, India, and Tianjin, China, are the main hubs for production.

Global bicycle demand increased substantially during the pandemic. Frequently cited reasons for increased bicycle use include a desire to maintain social distancing, fewer transport options, and the desire to realize health benefits. Increased global demand led to notable bicycle shortages during 2020 and 2021, particularly at the lower end of the bicycle market. With manufacturing concentrated in China and India, and manufacturers already operating at or near maximum capacity, importers in Rwanda compete with importers elsewhere for supply. Suppliers interviewed by BFG emphasized that COVID-19 related supply chain disruptions have increased costs and manufacturing lead times.

Raw materials, particularly steel, account for 70 to 80 percent of the cost of bicycles.[39] Steel costs have risen sharply since 2020, after several years of relative price stability (see Figure 10). One Rwandan importer noted that the wholesale unit cost of their bicycles rose from approximately US$25 to US$37 between 2021 and 2022, an increase of 48 percent largely driven by rising metal costs. Several other suppliers noted they faced similar rising and unpredictable product costs, citing price fluctuations as a major constraints on business.

FIGURE 10: STEEL PRICE INDEX[40]



[39] KPMG. *Pedaling India's Growth: Cycling into the future.* June 2021.
[40] Federal Reserve Bank of St. Louis. "Producer Price Index by Commodity: Metals and Metal Products: Hot Rolled Steel Sheet and Strip, Including Tin Mill Products, Index Dec 2003=100, Monthly, Not Seasonally Adjusted."

MARKET INFORMATION TRANSMISSION

Most bicycle sellers interviewed by BFG collect some degree of feedback from customers, though their efforts are usually limited in scope and often only reflect instances of customers actively providing feedback rather than sellers proactively soliciting feedback. In most cases, consumer-facing sellers do not consistently share information with upstream suppliers, such as wholesalers or manufacturers.

The nature of secondhand import supply chains limits effective, targeted market feedback mechanisms and actions, as bicycles are sold by upstream aggregators and exporters as lots with limited differentiation beyond high level categories (e.g., "mountain bicycles") and limited sorting by quality. While consumers can indicate demand for particular features or brands, there is limited ability for suppliers to act upon this except by purchasing from exporters which offer the greatest likelihood of offering the desired characteristics or brands. Further filtering at the wholesale level could potentially improve differentiation.

PRICE ANALYSIS

Bicycle prices in the market are generally segmented along the lines of the types of bicycles described above and their new or used condition. Capturing specific price data is challenging for several reasons, including the ongoing trend of rising costs from manufacturers, currency fluctuations over time, and differences in the types of bicycles on the market. Analyzing survey data on price is further complicated because pre-owned bicycles are widely sold both by individuals disposing of their personal bicycles and retailers or other sellers offering used imports, which may be considered "new" by buyers.

BFG observed retailers commonly offering new roadster transport bicycles for sale at prices of around RWF 120,000 (US$116), with prices varying depending on the brand, features, and context. At the secondhand bicycle market near Kigali, BFG observed prices in the range of RWF 40,000 (US$39) to RWF 120,000 (US$116), with prices varying according to the age and condition of the bicycle, as well as modifications reflecting uses. Bicycles used for transporting goods (and often not ridden, but pushed) are generally sold for lower prices than those to be used for transporting people.

TABLE 4: RWANDA AVERAGE REPORTED BICYCLE PURCHASE PRICES (USD)[41]

	All bicycles	New bicycles	Pre-owned
Overall	$ 77.86	$ 132.25	$ 66.70
Province			
Kigali City	$ 86.67	$ 123.19	$ 75.44
Eastern	$ 76.65	$ 123.67	$ 61.95
Western	$ 78.63	$ 148.15	$ 66.72
Southern	$ 67.44	$ 115.94	$ 63.97

Despite the challenges with price data, survey data and market observations lend insights into the market segments, trends, and local market prices of bicycles at the time of data collection. When considering the subset of bicycle owners in the BFG survey reporting they purchased a bicycle in the last 24 months, several patterns emerge. First, pre-owned bicycles are broadly priced lower than new bicycles. Figure 11 and Figure 12 below detail the distribution of prices paid for new and used bicycles. Used bicycle prices

[41] BFG survey. Prices converted from RWF to USD. Data includes only bicycles purchased in the last 24 months.

both start at a lower price relative to new bicycles, and are mostly clustered below the low end of new bicycle prices.

Additionally, although some fluctuation exist across regions, prices mostly fall below US$75 for secondhand bicycles with many purchased for less than US$50. Kigali stands out for having the highest prices for secondhand bicycles. This is likely due, in part, to more restrictions in Kigali on lower cost transport bicycles and greater prevalence of both relatively high-cost sport or mountain bicycles.

Finally, secondhand bicycles are prevalent in the market and, as such, their prices weigh heavily on the average price observed for all bicycles.

FIGURE 11: DISTRIBUTION OF PRICES PAID FOR NEW BICYCLES (USD)[42]

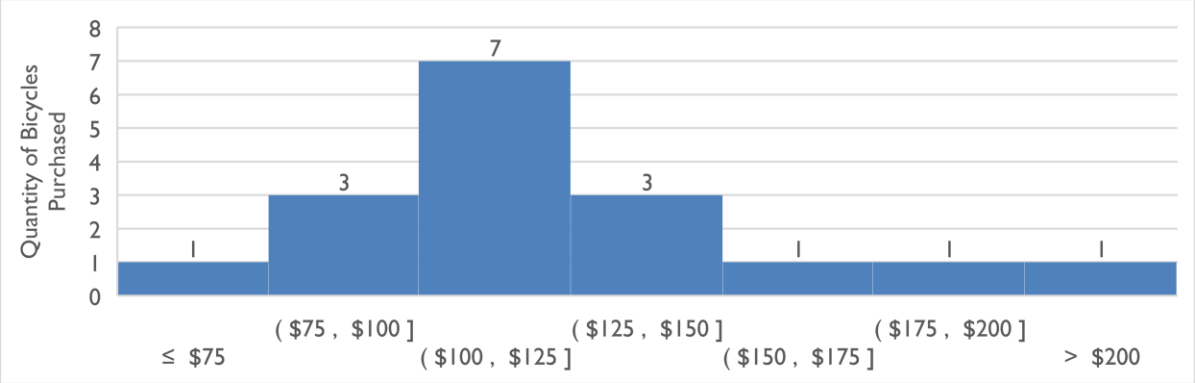
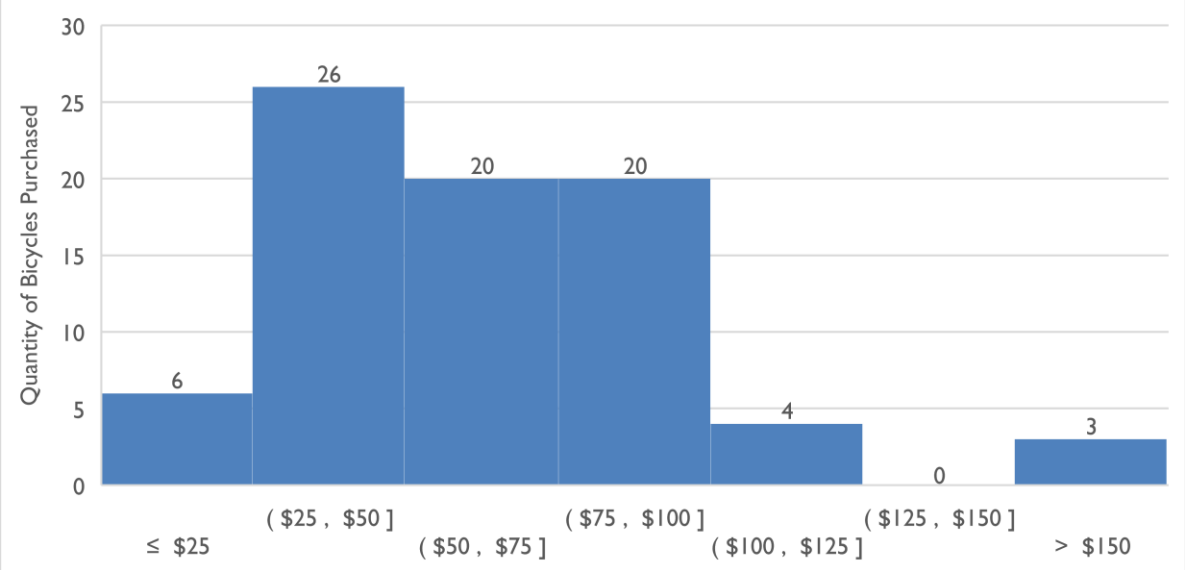


FIGURE 12: DISTRIBUTION OF PRICES PAID FOR USED BICYCLES (USD)[43]



[42] Data includes only bicycles purchased in the last 24 months. Does not include donated or gifted bicycles.
[43] Data includes only bicycles purchased in the last 24 months.

REGULATION, PRICE DISTORTIONS, AND TAXES

In recent years, government policy has pushed the bicycle market in two directions. First, government policy has encouraged the use of bicycles for sport and leisure. In 2018, the Government of Rwanda waived the 25 percent duty then applicable to sports bicycles. This tax exemption was done in order to promote bicycle usage for sport and was hailed by the Rwanda Cycling Federation (FERWACY) as supporting the growth of cycling by reducing affordability barriers.[44] This waiver of duty was not extended to new transport bicycles, in effect making sport bicycles more affordable and transport bicycles less affordable. Other government initiatives have sought to position Rwanda as a hub within Africa for sport cycling and have elevated the status of bicycle use by individuals for sport and personal transportation. Second, government policy has frequently discouraged or restricted commercial use of bicycles, particularly in urban areas. Traffic regulations have limited where and how bicycle taxis and bicycle goods transporters can operate. Although regulations have changed and even relaxed at times after periods of major restrictions, policymakers and local officials do not appear inclined to promote commercial bicycle use.

[44] Mpirwa, Elisee. "Rwanda takes bold step to become a cycling powerhouse." *The New Times*. 18 June 2018.

SYSTEMS

Underlying demand and supply are the supporting systems in the bicycle market system. Key to the functioning of the bicycle market systems are providers of spare parts and maintenance services (i.e., mechanics), which keep bicycles themselves functioning. The spare parts market, as represented by import figures, is substantially larger than the market for new bicycles – unsurprising given the prevalence of secondhand bicycle sales and demand conditions described in previous sections.

Finance has potential to help address affordability and resource challenges for individuals and households, while also assisting SMEs to overcome working capital constraints. Group lending mechanisms are commonly used for individual bicycle acquisition, but other forms of individual lending and formal finance are under-utilized by buyers and suppliers.

Policymakers and government agencies consider bicycles in transport policy and strategies, although cycling is not necessarily prioritized. Government agencies are generally positively inclined towards bicycle use as a means of sustainable individual transport and healthy leisure activity. Bicycle-focused advocacy is limited, although several institutions and structures are in place to promote NMT themes or, in the cases of bicycle taxi cooperatives, advocate for user-specific related interests but do not engage in advocacy.

SUPPORTING SERVICES

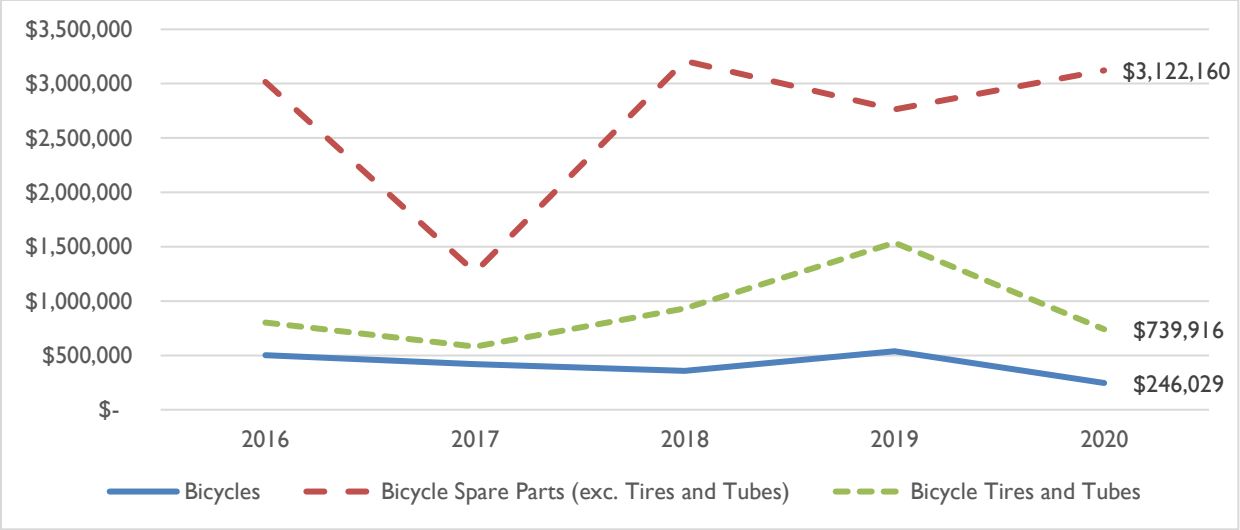
Several services complement the bicycle market system and support its functioning. Most critical to the Rwanda bicycle market system, as elsewhere, are the spare parts suppliers and mechanics that directly keep bicycles themselves functioning. Finance is a tool that serves as a bridge to affordability. While limited in scale and with mixed results, there are examples of bicycle financing which hint at the potential for greater finance utilization. A dynamic transport and logistics sector enables trade and supplier linkages across Rwanda.

MAINTENANCE

SPARE PARTS

The spare parts market is substantially larger than the bicycle market on the basis of imports. As can be seen in Figure 13, the combined value of all bicycle spare parts, tires, and tubes imports during 2020 was more than 15 times that of bicycle imports. Considering the sum of imports over the five years between 2016 and 2020, the spare parts markets was more than eight times the size of the bicycle import market. This is an imperfect comparison, as some spare parts may be imported for the express purpose of bicycle assembly, making use of secondhand bicycles as described in the Supply section. Nonetheless, the spare parts market is substantial. BFG's conversations with suppliers reinforce trends observed in the data: most bicycle sellers offering both bicycles and spare parts reported spare parts sales substantially exceed bicycle sales.

FIGURE 13: RWANDA BICYCLE AND SPARE PART IMPORTS (2016-2020)[45]



As with bicycles, the prices of spare parts have increased since the COVID-19 pandemic began. This change was noted by several focus group participants who, for example, cited increases in bicycle tire costs from RWF 5,000 (US$4.80) to RWF 8,500 (US$8.20)

MECHANICS

Mechanics are readily available in the market. The standard practice in Rwanda is to have every bicycle seller associated with an onsite mechanic(s), who will likely pay rent to the seller for use of their location to offer mechanic services. Mechanics and bicycle shops often operate in a symbiotic manner with mechanics offering complementary services to bicycle sales and shops offering necessary spare parts and creating the necessary conditions (i.e., bicycles in the market) for mechanics' businesses. Most mechanics have not received formal training. Instead, most are either self-taught, learned on the job from other mechanics, or rely on tutorials from websites such as YouTube.

Cooperatives are a primary organizational structure promoted in Rwanda's development planning under Vision 2020. As such, bicycle mechanics often operate as members of cooperatives. A mechanics cooperative consisting of 20 members active in Rubavu is typical in offering repair services, bicycle assembly, and spare parts sales. Within this cooperative, 18 men function as mechanics and two women focus on the sale of parts. Members contribute RWF 500 (US$0.50) per month, which is deposited into a savings account with a local microfinance institution. While the cooperative facilitates sharing of some resources and collaboration, it does not provide formal training for its members, nor does it currently facilitate access to finance. However, the cooperative aspires to own a physical shop and increase the benefits of membership.

Common repair requests include fixing flat tires, bent rims, and damaged spokes, all of which can be attributed to poor road conditions or common practices such as carrying heavy loads. Mechanics report they are able to readily address these issues. In addition to repairs, mechanics also commonly provide

[45] CEPII. "Bicycle Spare Parts" includes all imports under HS Codes within 8714.9 range. "Bicycle Tires and Tubes" includes imports under HS Codes 401329 and 401150.

basic maintenance services including oiling chains and greasing ball bearings. Mechanics charge varying prices for services depending on the location and mechanic.

One mechanic interviewed in rural Rubavu reported charging RWF 200 (US$0.20) to repair a tire and RWF 300 (US$0.30) to repair a bent rim or damaged spoke. This particular mechanic reported receiving an average of 10 customers per day. By comparison, a spare parts shop in Kigali with affiliated mechanics reported that mechanics earn RWF 1,000 (US$1) to RWF 10,000 RWF (US$9.70) per day depending on the volume of customers and provided services.

In addition to offering repair services, many suppliers of new bicycles report hiring mechanics to assist with bicycle assembly. One importer-wholesaler reported that a mechanic assembling seven bicycles per day can earn up to RWF 20,000 (US$19.30). In another instance, a retailer reported that customers would pay RWF 8,000 (US$7.70) for a mechanic to assemble a single bicycle at the time of purchase. Collectively, interviewees viewed the mechanic profession as a profitable one with a marketable set of skills.

FINANCE

DEMAND-SIDE FINANCING

Bicycle owners in Rwanda typically purchase their bicycles using household savings – with 64 percent of surveyed owners having purchased their bicycles outright exclusively using savings and an additional 21 percent having used savings in combination with some other sources (as shown in Table 5 below). Use of formal financing for bicycle acquisition is nearly nonexistent, however buyers frequently utilize funds from village savings and loan associations (VSLAs) for bicycle purchases. Over one-quarter of surveyed buyers made use of VSLA funds.

TABLE 5: PAYMENT MODE FOR BICYCLE PURCHASES[46]

Mode of Payment	Percent of Total	Number of Responses
Single Source		
Own Savings	64.3%	117
VSLA	11.0%	20
Payments to Seller	1.6%	3
In-Kind Payment	1.1%	2
Borrow from Family/Friends	1.1%	2
Multiple Sources		
Savings plus VSLA	14.3%	26
Savings plus In-Kind Payment	3.8%	7
Other Combinations	2.7%	5
Total	*100.0%*	*182*

Several of the financial institutions interviewed by BFG confirmed they had bicycle-based businesses as clients, though most frequently as savers not utilizing loan products, or as members of group borrowing funds. Financial service providers, focus group participants, and survey respondents all noted that loans to

[46] BFG survey. Does not include owners who did not pay for their bicycles or provided no response.

individuals for the acquisition of bicycles are rare, although some microfinance institutions (MFIs) were aware of isolated cases of loans being used in this manner.

While none of the MFIs interviewed by BFG currently offer bicycle-specific loan products, several organizations have attempted bicycle-specific programs in the past. As referenced previously, in 2009, IFC supported a lease-to=own initiative administered by Vision Fund (one of the largest MFIs in Rwanda) through which coffee farmers could purchase a bicycle for approximately US$140 with repayment occurring in installments over one year.[47] This pilot was not expanded, partly because of the combination of relatively expensive bicycles for the market and limited support networks for spare parts.

As it stands, most individuals seeking loans or others means of financing a bicycle must leverage group lending mechanisms. There are potential opportunities to expand upon group lending by working more closely with bicycle transport cooperatives and other organizations of commercial bicycle users. Such organizations can facilitate financial service access and support lending mechanisms tied to high quality bicycles with the greatest income generation potential (and hence repayment potential). Further, cooperatives can provide screening and oversight of member borrowers, thereby reducing risk faced by lenders. Additional potential exists to explore partnerships between these groups and suppliers to create installment plans for bicycle purchases by group members with the backing of the group.

SUPPLY-SIDE FINANCING

Suppliers commonly use financing, according to suppliers interviewed by BFG. Several of the larger and more established retailers shared that they had made use of bank loans to fund business operations or expansions. Bank financing is generally used selectively when suppliers make use of it; most suppliers do not make use of loans on a revolving basis. Suppliers said they do not have a strong appetite for increased finance utilization even when they identified working capital as a constraint.

Two retailers highlighted that commercial banks remain unwilling to accept bicycle inventories as collateral, a notable challenge for suppliers. This bank policy resulted in one of the suppliers failing to secure a loan and the other receiving a smaller loan than desired.

Wholesalers report they do extend supplier credit to retail partners in many cases, though this is largely dependent on the presence or absence of an established and trusting relationship. New retailers or those in recently established business relationships are thus largely required to pay for goods on a cash and carry basis.

TRANSPORT AND LOGISTICS

Transports and logistics service providers are important to effective functioning of bicycle supply chains. Such service providers are numerous in Rwanda and suppliers benefit from Rwanda's relatively well developed logistics networks. The World Bank's most recent Logistic Performance Index (LPI) ranks Rwanda second in Sub-Saharan Africa behind only South Africa and first among low-income countries globally for performance in trade logistics. In every scoring category considered by the LPI, including infrastructure, international shipments, and logistics competence, Rwanda exceeds regional benchmarks.[48]

[47] International Finance Corporation. "IFC Leasing Program Helps Rwandan Coffee Farmers." *Access to Finance Highlights Report 2009.*
[48] World Bank. "Logistics Performance Index – 2018."

None of the bicycle suppliers interviewed by BFG identified transport and logistics as constraints to their businesses, while several noted that logistics matters were generally efficient. Most importers hire customs clearance agents to ensure efficient processing of goods at the border and these service providers were broadly reported to be effective and suppliers were satisfied with their performance. Some suppliers noted they faced delays or extended shipping times during the COVID-19 pandemic. However, these delays are declining in most cases.

POLICY AND INSTITUTIONAL ENVIRONMENT

Bicycle transport is part of Rwanda's Green City/Green Economy initiative. As part of this effort, bicycle policy itself is driven by the need to improve road safety, to promote equitable spending and provision for all road users, to reduce road congestion, and to reduce greenhouse gas emissions and reliance on fossil fuels. Bicycle travel must also show evident positive economic impact. Encouraging a shift from motorized travel to walking and cycling are among the most cost-effective ways in which to reduce emissions from the transport sector, which currently emits 13 percent of the country's emissions. In 2021, the cabinet formally approved an e-mobility adoption strategy.

Although bicycle transport was not prioritized in policy until recently, government officials are optimistic about the chances of implementing the new policy direction that supports NMT, particularly as President Kagame supports the change in attitude toward sustainable transport. Further, the country has a history of meeting policy commitments and mobilizing funds. Although funding is always a concern, clear audit processes and a culture of "getting things done" are cause for confidence within government structures. With sufficient oversight, government implementing agencies are more likely to know and follow policy direction rather than traditional approaches.

Government representatives stated their mandates are very clear for each department within the relevant ministries, with joint sector reviews and joint technical teams ensuring intra-governmental decision-making. The Ministry of Infrastructure (MININFRA) develops transport policy and implements and monitors infrastructure and transport services through the Rwanda Transport Development Agency (RTDA). All transport (including public transport) is regulated by the Rwanda Utilities Regulatory Authority (RURA). The Rwanda National Police focus on road safety. The 2021 Transport Policy provides for dedicated Transport Authorities, which develop infrastructure. Local governments develop transport and urban master plans and implement national policy. The Rwanda Cooperative Agency (RCA) registers cooperatives, including those of bicycle taxis.

The Institute for Transportation and Development Policy (ITDP), a global organization working to mitigate the impacts of climate change and support sustainable cities, is assisting RTDA to develop Rwanda-specific NMT infrastructure design standards and an urban street design manual. These proposals are due to be reviewed and approved in late 2022. Until now Rwanda's NMT standards have been based on draft manuals drawn from the US context (AASHTO). The proposed standards need not be ratified by the Cabinet to become mandatory. In Kigali City, a bicycle master plan is in development, which will set out plans for NMT infrastructure development.

Across the country, any local authority must spend 33 percent of its transport capital expenditure on NMT infrastructure, while expenditure on infrastructure for personal vehicles may not constitute more than 33 percent of total spending. According to officials interviewed by BFG, building bicycle facilities where they will have quick uptake is a key success factor; their focus is first on providing safer facilities

for current users before building bike lanes in hilly terrains where uptake may be slower. Stakeholders express disappointment in the pace of urban bicycle infrastructure development and feel that prioritization processes are inadequately communicated to stakeholders.

Rwanda does not yet have a standalone NMT Policy or Strategy, but there is a substantial government commitment to walking and cycling, including indicators for evaluation, in the National Transport Policy and Strategy. The Policy commits to "urgent steps" to provide for NMT users. This includes designing street space for all modes of transport, including pedestrians and cyclists, with a focus on systematic traffic calming, and segregated infrastructure. The Policy states sustainability (both environmental and social) principles must underpin all transport intervention, and investments should leverage private sector financing as much as possible. NMT improvements must be included in all major public transport investments, and tariffs on bicycles will be reduced (and possibly removed entirely on electric bicycles).

ADVOCACY AND SUPPORTING INSTITUTIONS

Development partners and lenders (such as the World Bank, UN Environment, Global Green Growth Initiative, and ITDP) play a key role in driving the Green Economy agenda and bringing in project funding. The Global Green Growth Initiative (GGGI), an international organization founded in 2012 to facilitate member countries' transition to a low-carbon green economy, has an important presence in Rwanda. The GGGI is currently implementing a project, funded by UN Environment, to strengthen, prioritize, and invest in NMT infrastructure in the country. Among other outcomes, the project aims to enable data-driven, evidence-based city planning by providing detailed information on the status of NMT infrastructure, including gaps, needs, and opportunities for expansion. GGGI was instrumental in developing Kigali's car-free zone (established in 2015) and supporting the development of GuraRide.

FERWACY established the internationally known Africa Rising Cycling Centre (ARCC) in Musanze in collaboration with the Ministry of Sports and Culture (MINISPOC) to become a training hub for cycling, not only for Rwanda, but for other African countries as well. Although their work is primarily sport, Africa Rising plays an important role in raising the status of cycling, training mechanics, advocating for bicycle lanes and infrastructure, and bicycle tourism.

Rwanda has a number of road safety and low-carbon advocacy organizations but no formal representation or lobby group. Focus group participants who make a living as transport riders or bicycle taxi riders mention the need to address "the oppression of bicycle users" and wish for "advocacy on bicycle pricing" and lobbying for investors who can provide support similar to that received by motorcyclists. Furthermore, donor and investor-backed programs compete with bicycle transport in areas such as agricultural produce collection, in which priority is given to large volume sales and motorized transport is preferred.

Rwanda's lead road safety agency, the National Road Safety Committee, is funded within the national budget, and has a road safety strategy which is partially funded. The functions of the agency include coordination, legislation, and monitoring and evaluation of road safety strategies. The Rwanda National Police as well as civil society actors – such as the Rwanda National Authority for Motor Sport and Healthy People Rwanda – are particularly active in road safety sensitization and training. In terms of stakeholder consultation, requests for road or transport interventions converge on decision-makers via local cell, sector, and district participation. The most urgent and frequent requests usually relate to access to markets. This participation is facilitated via the concept of *umuganda*, where on the last Saturday of every

month officials spend time in their own neighborhoods (a "cell") on social and community work. Cell leaders document requests made during these monthly activities, and from there "the requests go up and up and up" until policymakers decide on prioritization and funding allocations .

ROAD CONDITIONS AND INFRASTRUCTURE

Overall, road quality in Rwanda is good, in terms of CPAF (Common Performance Assessment Framework) indicators: 95 percent of national paved roads (trunk network) are in good condition, although unpaved roads were in less satisfactory condition.[49] Rwanda's total road network is 44,671 km of which 1,973 km is paved; 72 percent of the total paved roads are national roads.

However, deterioration of road quality is a concern to bicycle users, who report that tires and rims are damaged on trips. Transport riders then report losing a day's income, as they must pay a motorbike taxi to transport themselves and their bicycle to "the city" to find a skilled mechanic for repairs.

BICYCLE INFRASTRUCTURE

Although pedestrians have access to pedestrian facilities in many parts of urban Rwanda, most cities have no bicycle lanes. Overall, only 11 percent of respondents in the BFG survey reported bicycle lanes in their communities, the vast majority of these respondents were based in the peri-urban sites and in Huye district. Although a few bicycle lanes exist in Huye and Rubavu, these locations do not have high quality connections and access points. Kigali City offers several high quality segregated bicycle lanes. Musanze also has curb-separated lanes. Yet, open drainage channels are a risk to both pedestrians and cyclists in most cities.

Based on government reports and policies, and comments from officials, the government recognizes that lack of bicycle infrastructure is a critical challenge affecting cyclists in the country. In rural areas where cycling lanes are rare, cyclists use road shoulders (typically 1.5to 2.0 meters wide) along highways and local roads or use dirt roads that are shared with pedestrians. A notable share (33 percent) of respondents reported that street lighting was available within their communities, with some variations across locations. Areas with high bicycle ownership rates (Huye, Kayonza, and Rubavu) also had a sizable share of respondents reporting availability of street lighting. Nearly half (47 percent) of respondents in Huye (Eastern province) and 39 percent in Kayonza reported that street lighting was available. In Rubavu (Western province), where bicycle ownership rates are highest, 42 percent of respondents reported street lighting was available. In contrast, despite the fact that it is also located in the Western province, only 13 percent of those surveyed in Ngororero reported availability of street lighting. Generally, availability of basic infrastructure (including electricity) is lower in Ngororero than in other districts surveyed by BFG.

DONOR SUPPORT

While international donor organizations historically provided substantial support and resources for transportation infrastructure development, recent trends have shifted focus away from transportation infrastructure. The shift was driven by a mix of interventions being successful and changing donor priorities. The AfDB noted that it "successfully supported Rwanda to improve its energy and transport

[49] Rwanda Ministry of Infrastructure, *National Transport Policy and Strategy for Rwanda, 2021*.

infrastructure" following the implementation of its 2012 to 2016 Country Strategy Paper.[50] Meanwhile, the European Union pivoted to emphasizing green energy and transition during this period. Although transport infrastructure receives less attention than in the past, donors such as the AfDB are still supporting related work through urban development initiatives and policy or strategy development assistance, as needed. The UN Environment Programme (UNEP) and the GGGI have both been particularly active in supporting NMT and cycling plans, strategies, and initiatives.

Notable among donors, Germany's GIZ has taken a particular interest in supporting bicycle=related initiatives. The GIZ-funded Promotion of Economy and Employment (Eco-Emploi) project has worked with both FERWACY and the Rwanda Development Board (RDB) to promote bicycle tourism in the country. This has included GPS mapping and erection of signs on trails, marketing and event management support for cycling events, and training for bicycle tour guides and mechanics.[51]

TRAINING AND CAPABILITY

Although budget is often cited as a challenge to policy implementation, stakeholders also note lack of technical skills, poor interpretation of policy and action points, and a legacy of engineers and decision-makers trained in a car-oriented era are also challenges within the bicycle market system. Traditionally, infrastructure comprised "just pouring the asphalt;" now there is a requirement that infrastructure considers both highway engineering interventions and complete street approaches, and stakeholders and engineers feel inadequately skilled in terms of the latter.

Thus, skills development and post-graduate academic programs in collaboration with universities outside of Rwanda are highly valued. Stakeholders and government engineers are receptive to training and new directions beyond highway or civil engineering, and many have now studied transport planning and transport engineering.

[50] African Development Bank. *Rwanda Bank Group Country Strategy Paper 2017-2021*. 2016.
[51] GIZ. "Supporting Sustainable Growth and Employment in Rwanda's Tourism Value Chain."

CONCLUSION

The Rwanda bicycle market system is complex and essentially consists of two related but distinct constituent markets: the transport bicycle market and the sport bicycle market, each with different demand conditions and bicycle supply. These markets within the market system generally respond to the same conditions in different manners and appear to be on different trajectories, with the transport bicycle market slowing as the sport bicycle market grows. While demand is reasonably high, Rwanda's bicycle market is small in comparison to others in sub-Saharan Africa in both absolute and relative terms.

Some of the constraints facing the market system are challenging and multicausal, such as affordability – which brings together issues ranging from rising global steel prices, trade policy, insufficient local infrastructure, and limited access to finance. Some, such as Rwanda's topography, reflect conditions which are fundamental to the context and can only be integrated rather than solved.

Other constraints may be more straightforward to address, such as the lack secure of parking facilities in public areas. Regardless of their complexity, BFG sees multiple opportunities for market system actors, including the private sector, government, donor agencies and projects, and NGOs, to make an impact and improve the functionality of the market system.

BFG distilled the highest potential areas for interventions in response to market system constraints in Annex 1: Constraints Matrix.

Additionally, further research could explore issues or utilize approaches including:

- **Cooperatives in the bicycle market system:** Bicycle taxis and mechanics are both frequently organized into cooperatives in Rwanda. Additional research could examine variations among these cooperatives and identify particularly successful practices or innovations that could be more widely adopted to promote the effective functioning of the bicycle market system.
- **Crossborder bicycle trade:** Several market system actors reported to BFG that consumers from neighboring Burundi and DRC travel to Rwanda to purchase bicycles. Meanwhile, some bicycle suppliers indicated long-term aspirations to expand their supply chains into these countries. Additional research could focus on understanding the existing crossborder dynamics and potential for expanded regional bicycle market linkages.
- **Transitioning of the commercial bicycle sector:** Commercial use of bicycles appears to be on the decline due to a range of factors including policy, changing economic conditions, and the growth of alternatives. At the same time, several initiatives are promoting bicycle use in different forms including sport and tourism. These initiatives or others building on them could look at the impacts of these changes on commercial users (such as bicycle taxi operators) and their livelihoods, and identify strategies for maintaining or growing their incomes while embracing the transition of the sector and potential to adopt new bicycle products.
- **Bicycle share in Kigali:** With the launch of GuraRide in Kigali, further research could assess the program's successes, areas for improvement, profitability, and potential for bike share expansion given the government's urbanization goals.
- **Bicycle use and mobility issues – geography and temporal trends:** While BFG conducted research across a broad swath of the Rwandan bicycle market system, BFG's assessment was not necessarily comprehensive or representative given that data was not collected in all of the country's regions, and only eight districts were represented in the sample. Additionally, the report

does not comprehensively address the underlying factors driving temporal dynamics in bicycle usage and mobility patterns, as this was not a key focus of the assessment.

- **Expanded or enhanced surveys:** BFG was limited to relatively small samples of respondents at a particular location (i.e., a market). Future surveys could follow similar lines of inquiry as BFG, but could expand the sample size for greater explanatory power and utilize approaches such as household surveys to create more representative samples.
- **Financial products for bicycles**: Past initiatives to finance specialized durable bicycles were not scaled up, while financial products for bicycles are generally absent from the market. However, bicycle buyers have utilized funds from savings groups with some regularity, suggesting potential for financing to partially address affordability constraints for some consumers. Further studies could examine the challenges to financing based on past experience and strategies for building upon group lending.

Following the publication of this report and similar reports covering the bicycle market systems in Ghana, Malawi, Uganda, and Zambia, BFG will design and implement pilot activities to address constraints or scale up successes identified through the assessment process in two BFG-targeted countries. In addition, BFG will support the formation of Bicycle Market System Advisory Committees in each of the five countries to build on these assessments and continue advocacy around identified issues.

Development agencies, NGOs, the private sector, and other parties are also invited to use the work of BFG as a catalyst for their own activities to promote bicycle uptake and access as an affordable means of linking individuals, households, and companies with opportunities by overcoming mobility challenges.

ANNEX 1: CONSTRAINTS MATRIX

Constraint Symptom	Causes	Potential Solutions
DEMAND		
Perceived high prices of bicycles	Limited household resources	Financing for bicycle purchases through microfinance institutions, banks, or group lending
Reduced demand in hilly or mountainous areas	Hilly and mountainous terrain in many regions not suited to bicycle usage	Increased availability and promotion of mountain bicycles and other geared sports bicycles for general purpose cycling
Concerns about bicycle security	Limited facilities in public areas to lock or secure bikes, especially outside Kigali	Increased construction of bicycle racks and similar low-cost security measure in high traffic areas such as markets and workplaces Awareness campaigns and marketing around security devices such as locks
Concerns about road safety	Dangerous behavior on the part of drivers Lack of dedicated infrastructure for bicycles and pedestrians leading to increased interface with motorized transport Limited awareness of road rules on the part of bicyclists Low levels of safety device usage	Advocacy by bicycle users and suppliers to raise government awareness and follow through on commitments to infrastructure development Awareness campaigns to promote familiarity with road rules Awareness campaigns to promote helmets, reflective material, and other safety measures
SUPPLY		
Limited knowledge of consumer preferences and feedback on the part of upstream supply chain actors	Limited information collection by retailers Weak linkages between retailers and wholesalers	Creation of deliberate market information collection process Strengthened retailer-wholesaler linkages

Constraint Symptom	Causes	Potential Solutions
		Creation of market information systems
Elevated cost of transport bicycles	High duty rate applied to transport bicycles	Advocacy to remove or reduce bicycle duties across the board building on the previous duty exemption granted to sport bicycles
Suboptimal retailer inventory management and offerings	Limited retailer working capital	Support to retailers for improved business process and skills to facilitate access to finance
Rising bicycle prices and uncertainty	Rising input costs in global markets	Limited viable options under market conditions
SYSTEMS		
Low utilization of finance for bicycle purchases	Limited MFI and bank awareness of bicycles as income generating tools Loose structure of associations for bicycle-based businesses	Promote linkages between financial institutions and bicycle cooperative to expand access to quality bicycles (for commercial users) and necessary equipment or inventory (for mechanics)
Restrictions on commercial bicycle use and disfavored treatment of transport bicycles in policy	Desire for government to promote cycling for sport Growing use of motorized transport in urban areas	Advocacy to promote inclusion of commercial user interests in policy development Development of strategies to transition commercial bicycle users into new livelihood opportunities
Lack of consideration or tailored measures for bicycle users in policy decisions	Limited awareness of cycling issues and viewpoints on part of policy makers	Engagement and advocacy with policymakers by market system actors Increased organization of bicycle actors through associations and civil society groups Creation of platforms for public-private dialogue

ANNEX 2: METHODOLOGY

OVERVIEW

The BFG Rwanda Bicycles Market System Assessment was a cross-sectional, mixed-methods data collection activity across five districts in Rwanda. The assessment used primary and secondary data sources to answer research questions around supply, demand, and systems in the Rwanda bicycles market system.

Primary data was collected through qualitative and quantitative methods, including a quantitative survey of 417 respondents in five districts, 26 key informant interviews (KIIs) and 8 focus group discussions (FGDs). Data collection districts included: Kayonza in the Eastern province, Rubavu, Ngororero in the Western province, Huye in the Southern province and Gasabo in the City of Kigali.

Primary quantitative data was collected and managed by BFG's Rwanda research partner, the High Lands Centre of Leadership for Development (HLC-L4D) from June 10, until September 2, 2022.

Secondary data was sourced during desktop research, examining existing literature and reports on cycling and non-motorized transport in Rwanda, as well as existing data on relevant trade and economic activity in Rwanda.

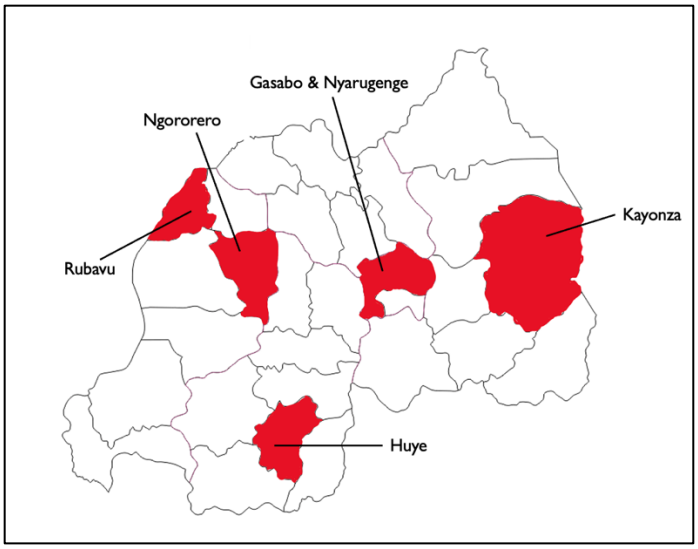
SELECTING STUDY SITES AND DATA COLLECTION LOCATIONS

HLC-L4D led the selection of study and data collection sites with guidance from the project. The BFG selected implementation districts based on criteria include:

- User demographics – income, age, gender, transportation needs, etc.
- Interest of local leaders and stakeholders
- Bicycle distribution available – volume and variety of bikes
- Transport alternatives, terrain, and geography
- Cycling culture, perceptions and gender norms

Rubavu, Huye, Ngororero, Kayonza, and Gasabo were selected as the districts of interest because they represented a broad range of economic, social, and geographic characteristics across the country.

FIGURE 14: DISTRICTS OF FIELD DATA COLLECTION



BFG collected survey data at two sites in each of the six primary assessment districts, taking into consideration the project research questions and criteria for data collection sites. The descriptions of each site and explanations of their relevance to the evaluation are described below in Table 6.

TABLE 6: FIELD DATA COLLECTION SITES

District	Sector	Geographical characteristics	Sites	Brief description of the location
Rubavu	Gisenyi	Peri-urban	Commercial area, Border post/ petite barrier	Gisenyi sector is one of the 12 sectors that make up the Rubavu district. The sector lies on the shores of Lake Kivu, and it the capital city of the Rubavu district. Gisenyi has two borders with Goma, the Petite Barrière and the Grand Barrière. The city features a resort on the shores of Lake Kivu, with several hotels and sandy beaches. The Centre of Gisenyi lies by foothills at the northeast corner of the lake, and low-density expansion is taking place in the hills. The site has good quality and conditions tarmac roads with public lighting. The site is congested with high population density. Primary economic activities in the sector include small business, cross border trade with DRC.
	Cyanzarwe	Rural	Cyanzarwe center	Cyanzarwe is one of the rural sectors that make up the Rubavu district. It has no tarmac road. The roads in the sector are gravel. This makes it difficult for the riders and other drivers to use them. The main economic activity in this sector is farming and livestock. The sector also involves in cross border trade with DRC in agriculture and

				livestock products. It has about 29,615 population with population density of 851.
Huye	Ngoma	Peri-urban	Matyazo	Ngoma sector is the capital city of the Huye district. The sector has tarmac roads in the Centre of the city and in other cells of the sector. The majority of the tarmac roads in the sector have light. The sector has high movement of people. It has different markets where people access different types of food products. The key economic activities in the sector include agriculture, trading businesses, and transportation, among other. This sector is the second in Huye district after Tumba sector. It has a population density of 1,345 and population about 27,705.
	Maraba	Rural	Maraba	Maraba is one of the sectors bordering Ngoma which is the central city. The sector has about 24,685 population with 471 inhabitants/Km^2. In this sector there is one continuous tarmac road to Nyaruguru district. The sector is in process of change from rural to urban ways of living, in physical-spatial, social and economic terms. Farming is the dominant economic activity performed by the people in the sector.
Ngororero	Ngororero	Peri-urban	Rususa	Ngororero is a sector in the center of the district and it is where a district office is build. The sector. This sector does not have many tarmac roads except for the road around Lake Kivu (Kivu belt road). The sector is made up of mountains. It has about 34,559 population and 591 Inhabitants /km^2. The major income generating activities in the Ngororero sector include agriculture, small business in the city. Furthermore, small segments of tarmac roads have lighting.
	Matyazo	Rural	Matyazo center	Like the Ngororero sector, there is only one tarmac road passing in Matyazo. The part of the tarmac road in this sector has no light. Agriculture and mining are the major income generating activities for the majority in the sector. This sector is also made up of mountains. It has about 25,914 population with 632 density (Inhabitants /km^2). Other unpaved roads in the sector are

				generally in bad condition because they have no aqueducts.
Kayonza	Mukarange	Peri-urban	Kayonza city center	Mukararange sector is a sector that makes up the city of Kayonza district. It is also the most populated area in the district with 42055 population. It has a population density of 781. The city in this sector is expanding day by day. The infrastructure in this sector, especially the roads, are seen as one of the priorities of the district as it where the district office is build. The major economic activities in the sector include small businesses in the city, farming and livestock, house construction, and transportation, among others.
	Rwinkwavu	Rural	Kabarondo	Rwinkwavu sector is one of the sectors that make up Kayonza district. This sector seems to be isolated from the city because it is close to the Akagera park. The sector has only one tarmac road. The rest of the roads in this sector are not tarmac. The sector has about 28,225 population with a population density of 306. The major economic activities in the sector include farming and livestock.
Gasabo	Kimironko	Urban	Kimironko Market	Kimironko market is one of the congested area in Gasabo district. In this commercial area, they exist supermarket, market for fruits and vegetables, market for garments, among other products. In this site, people use all modes of transportation including bicycle.

STUDY PARTICIPANTS

The selection of study participants varied depending on the data collection tool being used. The quantitative survey was administered as an intercept survey in markets in the selected data collection sites. Respondents included bicycle users and non-users, as well as individuals that use other forms of non-motorized and motorized transportation. The sample was balanced according to respondent gender (52 percent male respondents, 48 percent female respondents).

Participants in Focus Group Discussions were approached based on the purpose of a given focus group. These included women (bicycle users and non-users), as well as mechanics and livelihood groups.

Key Informant Interviews targeted stakeholders and government agencies within the bicycle market system who can provide deeper insights into the bicycle market system in Rwanda according to the

three pillars of the assessment: demand, supply, institutions/policy environment. Key informants interviewed included government officials, wholesales, bicycle retailers, donor institutions, and civil society groups.

TABLE 7: DATA COLLECTION OVERVIEW BY DISTRICT

District	Completed FGDs	Completed KIIs	Completed Surveys
Rubavu	2	5	97
Huye	2	6	95
Ngororero	2	6	96
Kayonza	2	6	98
Gasabo	-	3	31
Total	**8**	**26**	**417**

DATA COLLECTION INSTRUMENTS

Each tool collected responses to the key research underlying this study. The data collection instruments were drafted in English and were translated into the relevant local languages by accredited translators. Translations will remain true to the nuances of the way in which questions have been drafted and structured in the original as far as possible. A copy of the quantitative questionnaire is available in Annex 3. KII and FGD guides were tailored to the targeted respondents.

DATA ANALYSIS METHODS

Descriptive and bivariate analysis was applied to quantitative data to provide average estimates on key demographics and socio-economic status, and bicycle ownership and utilization. Where possible, the analysis presents results stratified across gender, age groups, socio-economic levels, occupation, and location. Through statistical analysis, BFG also explored associations between bicycle ownership/use and other variables of interest, including demographic and geographical characteristics, transportation needs, bicycle acquisition and ownership, enabling conditions, and attitudes and perceptions.

The qualitative data was translated or recorded in detailed notes. These notes and translations were reviewed thoroughly and organized into the key themes represented in this assessment report. Other methods such as literature reviews were used for the desktop, secondary data research phase of this assessment.

ANNEX 3: QUESTIONNAIRE

Hello. My name is ..... and I am working with the Bicycles for Growth (BFG) Project, funded by USAID. We want to learn about how your community uses bicycles and what your personal experience with bicycles is. We are conducting a survey and would appreciate your participation. I would like to ask you about your transportation and mobility experiences. This information will help the BFG project to assess whether there is a healthy market for bicycle use in your community. Whatever information you provide will be kept strictly confidential and will not be shown to other persons. Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. You can also choose to stop participating at any point in the survey. However, we hope that you will participate in this survey since your views are important. There is no compensation for participating in the survey. If at any time during this survey you have any questions about our study, please feel free to ask to speak with our manager.
The interview will last between 30-45 minutes. Would you be willing to participate in the survey? Do you agree? Yes_____ No_____

A11	Enumerator:	A15	[Insert sub-national unit]:
A12	Date:	A16	City/town:
A13	Start/Finish Time:	A17	Village:
A14	Geography Type:	A18:	Cooperative/ Association:

Demographic							
B1	B2	B3	B4	B5	B6	B7	B8
Household status	Marital status	Gender	Annual household income	What was your age at your last birthday?	How many individuals live in your household for at least four nights a week?	How many children under the age of 15 live in your household for at least four nights a week?	What is the highest level of education you have completed?
[1] Head of Household [2] Other adult in the house [3] Youth (under 24) in house	[1] Single [2] Married [3] Divorce [4] Widowed	[0] M [1] F [95]Other	* *Local currency* _____x 52 Weekly *Or* _____x 12 Monthly	_____ *Years [98] I don't know [99] No response	_____ # male _____ # female	_____ # male _____ # female	[1] Less than primary [2] Completed primary [3] Less than secondary [4] Completed secondary [5] Certificate/ Diploma [6] University Degree

Demographic (continued)			
B9	B10	B11	B12
Primary economic activity *(choose only ONE)*	Do you or anyone in your household currently own a bicycle?	If B9=yes, who in your household owns the bicycle?	If B9=yes, Who is the primary user of the bicycle?
[1] Farmer [2] Informal merchant [3] Formal merchant [4] Private sector employment (including casual worker) [5] Gov't employee [6] Unemployed [95] Other (specify) [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Myself [2] Spouse [3] Child [4] Other relative [95] Other (specify) [98] I don't know [99] No response	[1] Myself [2] Spouse [3] Child [4] Other relative [95] Other (specify) [98] I don't know [99] No response

Transportation Needs							
C1	C2	C3	C4	C5	C6	C7	C8
During the last 30 days, how much did you spend on transportation?	In the previous harvest season, what types of transportation did you use? *(check ALL that apply)*	In the previous harvest season, what was your primary form of transportation? *(choose only ONE)*	Are you satisfied with your primary form of transportation on a scale of 1 (very dissatisfied) to 5 (very satisfied)?	If you had the option, what would be your preferred form of transportation? *(choose only ONE)*	What is your primary form of transportation to your place of work or market?	How much time do you currently spend on a one-way trip using your primary form of transportation to your place of work or market?	Does your primary form of transportation prevent you from working more/ expanding your business?
**Price in Local Currency*	[a] Walking [b] Bicycle (owned/ borrowed) [c] Animal transport [d] Bicycle taxi [e] Private car [f] Minibus taxi [g] Motorcycle taxi [h] Motorcycle (owned/ borrowed) [95] Other (specify) [99] No response	[a] Walking [b] Bicycle (owned/ borrowed) [c] Animal transport [d] Bicycle taxi [e] Private car [f] Minibus taxi [g] Motorcycle taxi [h] Motorcycle (owned/ borrowed) [95] Other (specify) [99] No response	[1] Very dissatisfied [2] Dissatisfied [3] Neutral [4] Satisfied [5] Very satisfied	[a] Walking [b] Bicycle (owned/ borrowed) [c] Animal transport [d] Bicycle taxi [e] Private car [f] Minibus taxi [g] Motorcycle taxi [h] Motorcycle (owned/ borrowed) [95] Other (specify) [99] No response	[a] Walking [b] Bicycle (owned/ borrowed) [c] Animal transport [d] Bicycle taxi [e] Private car [f] Minibus taxi [g] Motorcycle taxi [h] Motorcycle (owned/ borrowed) [95] Other (specify) [99] No response	[1] Less than 30 minutes [2] 30 minutes to an hour [3] More than an hour [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response

Transportation Needs (continued)					
C9	C10	C11	C12	C13	
Do you think that owning a bicycle improves/ would improve your ability to increase your economic activity?	Are you familiar with any bicycle retailers in your area?	If C10=yes, Does the retailer offer bicycles that you would be interested in purchasing?	Do you currently or have you in the past ever owned a bicycle?	If you do not currently own a bicycle, what is the primary reason? *(choose only ONE)*	
[1] Yes [0] No [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Currently own [2] Owned in the past [3] Never owned [99] No response	[1] Cost of acquisition [2] Cost of ownership [2] Disabled/ physical [3] Not interested [4] Unsafe [5] No place to ride [6] Lack of bicycles available near me [95] Other (specify) [98] Don't know [99] No response	

If C12 = CURRENTLY OWN OR OWNED IN THE PAST, GO TO SECTION D ..... If C12 = NEVER OWNED, GO TO SECTION F

Bicycle Ownership – Acquisition							
D1	**D2**	**D3**	**D4**	**D5**	**D6**	**D7**	**D8**
If C12= CURRENTLY OWN, how long have you owned your primary bicycle?	What is the brand of your primary bicycle? *(open ended)*	Where did you acquire your primary bicycle? *(choose only ONE)*	When you acquired your primary bicycle was it new or previously owned?	Why did you select the bicycle you acquired? *(check ALL that apply)*	When you first acquired your bicycle, did you make any modifications or customize it for your use?	If D6 = YES, what modifications did you make? *(check ALL that apply)*	Are you satisfied with the quality of the primary bicycle?
_____ * months [98] I don't know [99] No response	_____ [98] I don't know	[1] Bicycle retailer [2] Hardware shop [3] Other shop [4] Individual [5] Provided by employer [6] Donated by NGO [7] Given by friend/ family [95] Other (specify) [98] I don't know	[1] New – never used [0] Used/ pre-owned [98] I don't know [99] No response	[a] Price [b] Quality/ durability [c] Availability (only option) [d] Features/ design [95] Other (specify) [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[a] Added a carrying rack [b] Added a basket [c] New/custom seat [d] Added safety equipment [e] Reinforced/ strengthened frame [95] Other (specify) [99] No response	[1] Yes [0] No [98] I don't know [99] No response

Bicycle Ownership – Acquisition (continued)			
D9	**D10**	**D11**	**D12**
If D8 = NO, would you spend more money next time for a higher quality bicycle? *(choose only ONE)*	How much did you pay for your primary bicycle?	How did you pay for the purchase of your bicycle? *(check ALL that apply)*	What is the maximum amount of money you would be willing to pay for a bicycle today?
[1] Very likely [2] Likely [3] Unlikely [4] Very unlikely [98] I don't know [99] No response	* *price in local currency* [98] I don't know [99] No response	[a] Own savings/ sale of goods or assets [b] In kind payment [c] Borrowed from bank [d] Borrowed from family [e] Microfinance [f] VSLA [g] Making payments to seller [h] Borrowed from informal lender [i] I did not pay [95] Other (specify) [98] I don't know [99] No response	* *price in local currency* [98] I don't know [99] No response

Bicycle Ownership – Parts							
E1	**E2**	**E3**	**E4**	**E5**	**E6**	**E7**	**E8**
Is your bicycle currently in working order?	Have you ever needed to buy replacement parts or accessories for your bicycle?	If E2 = yes, the last time you needed to repair, what was the part or accessory you needed to replace? *(check ALL that apply)*	If E2 = yes, the last time you needed to repair, were you successful in finding the spare part or accessory?	If E2 = yes, how difficult was it to find the spare part or accessory?	In the last 6 months, how much money did you spend on maintenance of your bicycle, including purchase of spare parts and accessories, and mechanic costs?	On average, how frequently do you take your bicycle to a mechanic for repair? *(choose only ONE)*	Are you concerned about the maintenance costs of your bicycle?
[1] Yes [0] No [98] I don't know	[1] Yes [0] No [98] I don't know [99] No response	[a] Tire/ tube [b] Saddle [c] Chain [d] Pedal [e] Carrier [f] Fork [g] Frame [h] Brakes [i] Wheel/ spoke [j] Pump [k] Patch/ puncture kit [8] Other (specify) [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Very easy [2] Easy [3] Difficult [4] Very difficult [98] I don't know [99] No response	_____ **Price in Local Currency* [99] No response	[1] Daily [2] Several times a week [3] Weekly [4] Several times a month [5] Several times a year [6] Once a year or less [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response

Bicycle Ownership – Parts (continued)		
E9	**E10**	
Who usually fixes your bicycle? *(choose only ONE)*	If E9 = local mechanic, how difficult is it to find a mechanic to fix your bicycle?	
[1] Self [2] Household member [3] Local mechanic [4] Other (specify) [98] I don't know [99] No response	[1] Very easy [2] Easy [3] Difficult [4] Very difficult [98] I don't know [99] No response	

Bicycle Utilization							
F1	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**
How often do you use a bicycle?	What is the average amount of time you spend traveling by bicycle per week?	What activities do you use a bicycle for? *(check ALL that apply)*	Do you ever use a bicycle to access other forms of transportation? (e.g. transport to main road)	If you own a bicycle, do you ever lend your bicycle to people outside of your household?	Do you use a bicycle for your business?	What income generating activities have you used a bicycle for? *(check ALL that apply)*	Does a bicycle meet your transportation requirements?
[1] Daily [2] Several times a week [3] Several times a month [4] Monthly [5] Very infrequently [6] Never [98] I don't know [99] No response	* *time in minutes* _____x_____ Days Min	[a] Economic [b] Health facilities [c] School commute [d] Shopping [e] Exercise [f] Fetching water [g] Access energy [95] Other (specify) [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Yes [0] No [97] Never owned [98] I don't know [99] No response	[1] Yes [0] No [97] Do not own a business [98] I don't know [99] No response	[a] Transporting goods [b] Bicycle taxi [c] Bicycle rental [d] On farm activity [e] I don't use a bicycle to generate income [95] Other (specify) [98] Don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response

Bicycle Utilization (continued)						
F9	**F10**					
What would help increase the frequency with which you use a bicycle? *(check ALL that apply)*	What do you think is a fair price to pay for a bicycle?					
[a] Bicycle paths [b] Cheaper bicycles [c] Better road safety [d] Secure bicycle parking/ storage [e] Improved bicycle repair accessibility [f] Better bicycle design [g] I have no need to increase my bicycle usage [95] Other (specify) [98] I don't know [99] No response	* *price in local currency* [98] I don't know [99] No response					

Enabling Conditions							
G1	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**
What kinds of bicycle infrastructure or facilities exist in your community? *(check ALL that apply)*	Do you think using a bicycle on the tarmac roads is dangerous?	Do you think that using a bicycle on a dirt road is dangerous?	If G2 or G3 = yes, does your concern influence your decision to use a bicycle?	If G2 or G3 = yes, does your concern influence your decision to own a bicycle?	Are you concerned about bicycle theft in your community?	If G6 = yes, does your concern influence your decision to own a bicycle?	Do any organizations or institutions encourage or promote bicycle use in your community?
[a] Dedicated bicycle lanes [b] Dirt pathways shared with walking [c] Paved shoulder on main road [d] Street lighting [e] Secure bicycle parking/ storage [f] Other (specify) [g] None [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response

Enabling Conditions (continued)							
G9	**G10**						
If D4=yes, how do these organization(s) promote bicycle use? *(check ALL that apply)*	Do you think the government should do more to encourage bicycle use?						
[a] Public awareness campaigns [b] Financial incentives [c] Giving bicycles for free [d] Dedicated infrastructure [e] Formal policies [95] Other (specify) [98] I don't know [99] No response	[1] Yes [0] No [98] I don't know [99] No response						

Attitudes and Perceptions							
Z1	**Z2**	**Z3**	**Z4**	**Z5**	**Z6**	**Z7**	
In general, I feel bicycle use is looked upon favorably in my community.	In general, I feel (would feel) safe while using a bicycle around my community.	In general, I feel that it is acceptable for women in my community to use bicycles.	In general, I feel that women in my community would benefit from having a bicycle.	I am satisfied with the availability of bicycles in my community.	I am satisfied with the quality of bicycles available in my community.	From this list below, which are the three most important reasons you would choose a particular bicycle. (*Choose THREE options*)	
[1] Strongly agree [2] Somewhat agree [3] Somewhat disagree [4] Strongly disagree [98] I don't know [99] No response	[1] Strongly agree [2] Somewhat agree [3] Somewhat disagree [4] Strongly disagree [98] I don't know [99] No response	[1] Strongly agree [2] Somewhat agree [3] Somewhat disagree [4] Strongly disagree [98] I don't know [99] No response	[1] Strongly agree [2] Somewhat agree [3] Somewhat disagree [4] Strongly disagree [98] I don't know [99] No response	[1] Strongly agree [2] Somewhat agree [3] Somewhat disagree [4] Strongly disagree [98] I don't know [99] No response	[1] Strongly agree [2] Somewhat agree [3] Somewhat disagree [4] Strongly disagree [98] I don't know [99] No response	[a] Cost [b] Quality/ durability [c] Ease of acquiring bicycle [d] Ease of maintenance [e] Ease of acquiring spare parts [f] Lightweight [g] Ease of riding [h] Style/ design [i] Other [98] I don't know [99] No response	

~ Thank you for answering our questions ~

ANNEX 4: AFRICA BICYCLE IMPORT MARKET OVERVIEW

Presented in below Figure 15 and Table 8 is a summary of 5 years of bicycle import data for 54 African countries. All data is sourced from the CEPII BACI dataset and includes all reported imports for bicycles (HS Code 871200) during this period. Figure 15 displays the annual average imports for countries during this period, while Table 8 includes the annual figures for all countries as well. Countries in which BFG has conducted market systems assessments are highlighted in orange on the data table.

FIGURE 15: AFRICA REGION BICYCLE IMPORTS - ANNUAL AVERAGE (2016-2020)

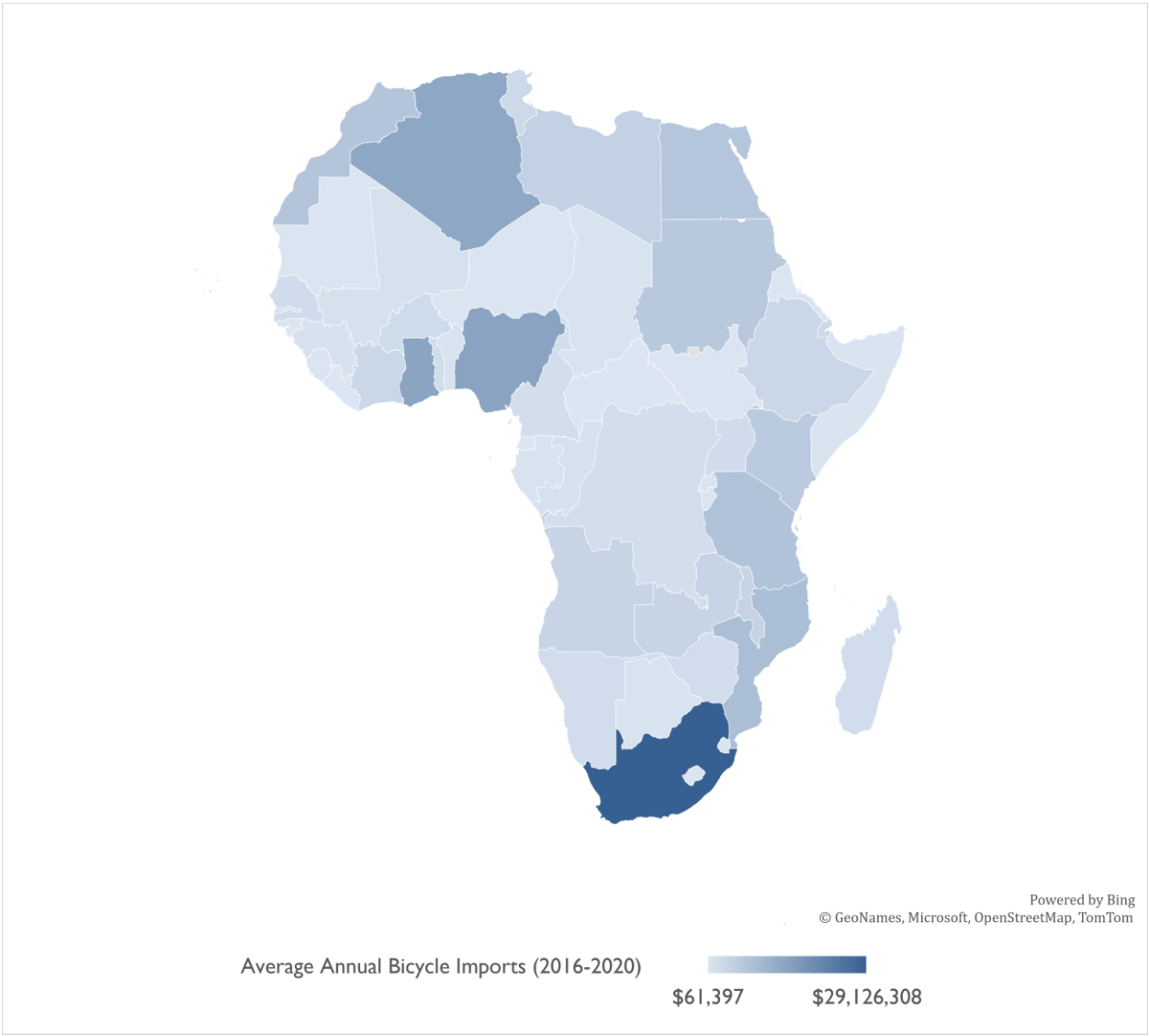


TABLE 8: AFRICA BICYCLE IMPORTS (2016-2020)

	Country	2016	2017	2018	2019	2020	5-Year Total	Avg. Annual Bicycle Imports (2016-2020)
1	South Africa	$25,990,303	$28,226,146	$37,102,643	$28,592,130	$25,720,320	$145,631,542	$29,126,308
2	Nigeria	$10,192,040	$10,248,451	$10,230,851	$25,773,142	$16,069,218	$72,513,702	$14,502,740
3	Ghana	$16,742,609	$14,755,735	$12,759,652	$13,212,675	$14,892,034	$72,362,705	$14,472,541
4	Algeria	$12,444,043	$12,057,572	$10,296,356	$14,032,083	$19,834,305	$68,664,359	$13,732,872
5	Mozambique	$7,292,303	$6,366,513	$10,044,355	$10,979,843	$9,396,424	$44,079,438	$8,815,888
6	Tanzania	$8,489,858	$6,644,234	$6,958,100	$6,532,608	$9,198,815	$37,823,615	$7,564,723
7	Morocco	$5,106,090	$5,737,478	$7,303,912	$7,379,293	$10,031,271	$35,558,044	$7,111,609
8	Egypt	$4,300,480	$6,827,729	$8,585,210	$7,515,549	$7,903,046	$35,132,014	$7,026,403
9	Sudan	$5,251,113	$9,077,093	$4,288,168	$6,299,589	$6,449,419	$31,365,382	$6,273,076
10	Kenya	$4,167,532	$4,769,939	$5,999,576	$6,429,504	$8,275,221	$29,641,772	$5,928,354
11	Libya	$3,087,576	$1,069,377	$3,970,860	$9,044,195	$5,751,769	$22,923,777	$4,584,755
12	Malawi	$3,766,841	$4,970,306	$4,559,601	$4,398,389	$3,161,075	$20,856,212	$4,171,242
13	Angola	$2,286,648	$10,898,840	$2,251,232	$1,958,585	$2,437,130	$19,832,435	$3,966,487
14	Zambia	$4,267,402	$4,518,752	$3,672,414	$3,893,269	$3,345,005	$19,696,842	$3,939,368
15	Ivory Coast	$3,232,611	$3,095,580	$2,824,464	$2,675,685	$5,136,468	$16,964,808	$3,392,962
16	Ethiopia	$1,981,251	$1,575,996	$2,765,823	$5,891,177	$3,817,870	$16,032,117	$3,206,423
17	Tunisia	$2,157,317	$2,813,738	$2,921,115	$2,449,095	$4,416,499	$14,757,764	$2,951,553
18	Djibouti	$1,604,803	$1,651,118	$2,495,285	$2,725,898	$6,242,944	$14,720,048	$2,944,010
19	Mauritius	$2,814,768	$2,232,388	$2,276,431	$1,617,400	$3,579,411	$12,520,398	$2,504,080
20	Burk. Faso	$3,303,002	$3,357,047	$2,174,987	$1,965,933	$1,579,727	$12,380,696	$2,476,139
21	Uganda	$1,206,686	$1,251,521	$1,810,114	$1,828,413	$4,678,026	$10,774,760	$2,154,952
22	Senegal	$2,885,784	$1,440,177	$1,810,890	$1,912,681	$2,711,539	$10,761,071	$2,152,214
23	Namibia	$1,823,839	$2,388,746	$2,223,118	$1,784,478	$1,847,145	$10,067,326	$2,013,465
24	Zimbabwe	$2,645,361	$1,911,208	$2,439,115	$1,393,568	$1,562,085	$9,951,337	$1,990,267
25	Madagascar	$1,354,851	$2,157,633	$2,335,326	$1,538,211	$2,496,864	$9,882,885	$1,976,577
26	Togo	$1,305,773	$1,760,797	$2,197,867	$2,540,809	$1,944,608	$9,749,854	$1,949,971
27	DR Congo	$1,266,250	$1,815,312	$2,207,373	$2,510,727	$1,291,733	$9,091,395	$1,818,279
28	Cameroon	$1,983,261	$1,265,404	$1,198,166	$1,975,579	$2,481,541	$8,903,951	$1,780,790
29	Congo	$1,592,705	$643,919	$1,186,648	$983,239	$1,792,146	$6,198,657	$1,239,731
30	Mali	$1,696,678	$1,123,121	$1,362,391	$835,868	$684,806	$5,702,864	$1,140,573
31	Gambia	$990,855	$1,176,420	$903,133	$953,723	$885,430	$4,909,561	$981,912
32	Guinea	$819,951	$813,565	$743,655	$923,452	$814,130	$4,114,753	$822,951
33	Gabon	$820,447	$589,083	$924,100	$858,936	$904,982	$4,097,548	$819,510
34	Botswana	$875,110	$804,346	$702,430	$707,960	$768,658	$3,858,504	$771,701
35	Benin	$669,276	$710,545	$605,483	$878,408	$876,357	$3,740,069	$748,014
36	Chad	$254,822	$422,102	$745,169	$843,286	$1,206,380	$3,471,759	$694,352
37	Somalia	$448,130	$347,835	$494,079	$894,329	$755,788	$2,940,161	$588,032
38	Seychelles	$466,136	$494,931	$534,871	$398,717	$201,472	$2,096,127	$419,225
39	Rwanda	$501,620	$419,537	$357,153	$537,931	$246,029	$2,062,270	$412,454
40	Burundi	$64,974	$126,757	$186,348	$1,306,168	$200,220	$1,884,467	$376,893
41	Cape Verde	$212,624	$340,016	$477,011	$266,409	$466,251	$1,762,311	$352,462
42	Sierra Leone	$636,061	$330,053	$293,258	$59,354	$108,068	$1,426,794	$285,359
43	Eswatini	$334,921	$272,067	$343,699	$265,841	$184,020	$1,400,548	$280,110
44	Eritrea	$124,646	$90,533	$153,679	$336,161	$604,774	$1,309,793	$261,959
45	Mauritania	$163,647	$181,860	$300,751	$426,485	$216,936	$1,289,679	$257,936
46	Eq. Guinea	$694,585	$111,389	$168,028	$134,567	$122,496	$1,231,065	$246,213
47	Niger	$201,906	$206,559	$121,339	$271,352	$273,600	$1,074,756	$214,951
48	South Sudan	$216,862	$269,180	$165,042	$154,742	$195,438	$1,001,264	$200,253
49	Lesotho	$216,972	$166,936	$188,132	$195,916	$100,725	$868,681	$173,736
50	Liberia	$39,040	$95,473	$152,436	$175,472	$248,024	$710,445	$142,089
51	Comoros	$126,355	$77,703	$87,839	$150,921	$70,204	$513,022	$102,604
52	Guinea-Bis.	$137,079	$17,533	$118,653	$142,340	$56,375	$471,980	$94,396
53	C. Afr. Rep.	$41,624	$122,854	$114,464	$6,547	$75,825	$361,314	$72,263
54	São Tomé	$37,726	$57,786	$45,213	$76,476	$89,786	$306,987	$61,397
	Region Total	*$155,349,092*	*$164,905,573*	*$171,185,539*	*$191,637,102*	*$198,418,464*	*$881,445,628*	*$176,289,126*

ANNEX 5: AFRICA BICYCLE SPARE PART IMPORT MARKET OVERVIEW

Presented in below Figure 16 and Table 9 is a summary of 5 years of bicycle spare part import data for 54 African countries. All data is sourced from the CEPII BACI dataset and includes the sum of all spare part imports inclusive of tires and tubes (HS Codes 87149X, 401320, and 401150) during this period. Figure 16 displays the annual average imports for countries during this period, while Table 9 includes the annual figures for all countries as well. Countries in which BFG has conducted market systems assessments are highlighted in orange on the data table.

FIGURE 16: AFRICA REGION BICYCLE SPARE PARTS IMPORTS - ANNUAL AVERAGE (2016-2020)

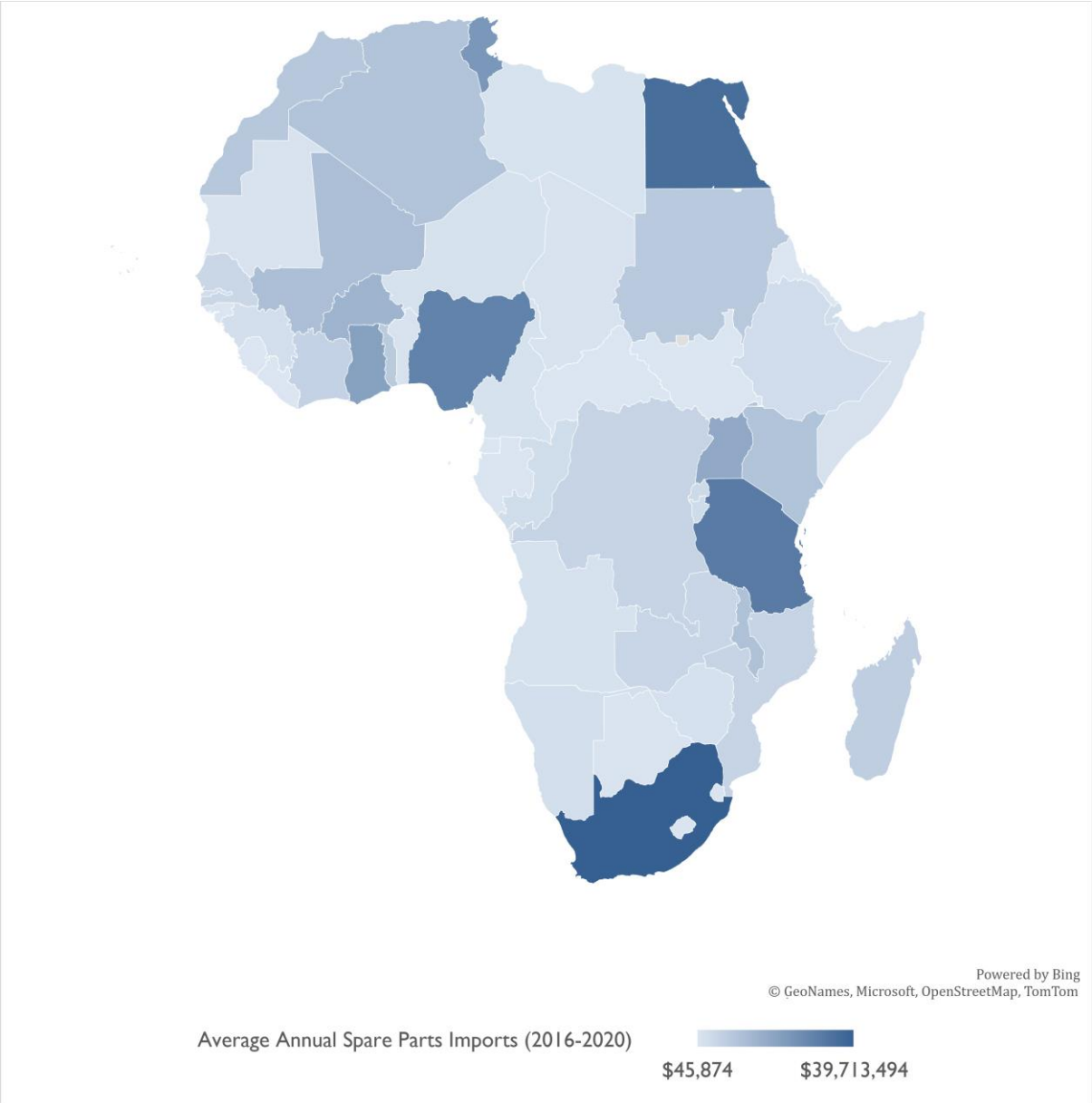


TABLE 9: AFRICA BICYCLE SPARE PARTS IMPORTS (2016-2020)

	Importing Country	2016	2017	2018	2019	2020	Total	5-Year Avg Annual Spare Parts Imports
1	South Africa	$46,408,079	$49,505,649	$41,504,224	$36,395,593	$24,753,923	$198,567,468	$39,713,494
2	Egypt	$31,227,720	$20,776,614	$35,171,342	$36,381,685	$54,032,261	$177,589,622	$35,517,924
3	Tanzania	$33,396,488	$25,929,936	$27,300,280	$36,275,217	$35,075,124	$157,977,045	$31,595,409
4	Nigeria	$28,098,719	$29,807,015	$29,499,073	$35,054,019	$24,203,709	$146,662,535	$29,332,507
5	Tunisia	$30,177,985	$22,161,852	$17,875,854	$20,669,137	$25,795,643	$116,680,471	$23,336,094
6	Ghana	$21,633,096	$21,542,074	$16,264,326	$16,246,475	$27,307,411	$102,993,382	$20,598,676
7	Uganda	$18,725,301	$21,335,824	$18,733,089	$15,679,169	$15,339,201	$89,812,584	$17,962,517
8	Burkina Faso	$15,011,864	$14,687,526	$12,868,306	$16,909,725	$13,648,657	$73,126,078	$14,625,216
9	Mali	$16,884,515	$10,525,922	$10,337,971	$13,543,614	$6,410,611	$57,702,633	$11,540,527
10	Malawi	$10,153,343	$12,264,161	$10,786,719	$12,378,623	$8,128,423	$53,711,269	$10,742,254
11	Algeria	$9,758,261	$9,306,602	$9,218,351	$9,546,171	$12,573,834	$50,403,219	$10,080,644
12	Kenya	$9,568,897	$9,648,047	$9,828,527	$9,625,118	$11,553,242	$50,223,831	$10,044,766
13	Morocco	$9,252,768	$7,632,076	$9,192,290	$8,945,450	$9,645,558	$44,668,142	$8,933,628
14	Sudan	$8,870,492	$9,877,308	$5,754,065	$7,713,711	$9,384,728	$41,600,304	$8,320,061
15	Togo	$6,228,065	$5,764,336	$9,444,944	$11,758,467	$7,720,673	$40,916,485	$8,183,297
16	Madagascar	$7,466,506	$7,112,418	$7,555,846	$6,523,189	$6,428,894	$35,086,853	$7,017,371
17	Ivory Coast	$4,477,774	$7,057,035	$4,852,939	$6,799,095	$6,834,711	$30,021,554	$6,004,311
18	DR Congo	$4,908,692	$4,872,698	$5,821,268	$5,364,240	$6,236,474	$27,203,372	$5,440,674
19	Mozambique	$4,994,759	$4,222,501	$5,660,064	$7,051,367	$4,603,450	$26,532,141	$5,306,428
20	Zambia	$4,036,908	$4,425,308	$5,185,661	$4,935,123	$4,810,905	$23,393,905	$4,678,781
21	Senegal	$5,346,951	$4,128,225	$4,279,936	$4,083,153	$4,546,668	$22,384,933	$4,476,987
22	Rwanda	$3,818,570	$1,846,377	$4,140,315	$4,298,788	$3,862,076	$17,966,126	$3,593,225
23	Burundi	$3,079,020	$2,995,580	$3,041,446	$2,957,629	$3,219,473	$15,293,148	$3,058,630
24	Congo	$2,203,745	$2,131,883	$3,200,845	$3,287,129	$3,226,568	$14,050,170	$2,810,034
25	Gambia	$2,144,881	$2,569,204	$3,047,682	$3,032,915	$2,535,910	$13,330,592	$2,666,118
26	Ethiopia	$1,678,677	$3,137,217	$1,932,329	$3,235,615	$3,137,966	$13,121,804	$2,624,361
27	Djibouti	$1,435,201	$2,279,394	$2,437,769	$3,183,565	$2,381,695	$11,717,624	$2,343,525
28	Namibia	$2,614,839	$2,678,742	$1,992,682	$2,135,216	$1,438,974	$10,860,453	$2,172,091
29	Guinea	$2,291,051	$2,163,350	$1,858,269	$1,778,174	$1,995,620	$10,086,464	$2,017,293
30	Mauritius	$1,617,361	$1,511,706	$1,824,755	$1,686,230	$1,634,376	$8,274,428	$1,654,886
31	Zimbabwe	$2,184,953	$1,778,913	$1,686,615	$589,071	$673,961	$6,913,513	$1,382,703
32	Niger	$1,552,504	$1,538,850	$1,372,610	$977,981	$1,087,375	$6,529,320	$1,305,864
33	Angola	$1,117,748	$1,408,306	$1,531,261	$1,236,185	$676,594	$5,970,094	$1,194,019
34	Cameroon	$1,031,077	$673,063	$844,652	$1,344,242	$1,971,197	$5,864,231	$1,172,846
35	Somalia	$2,045,137	$1,156,017	$1,505,135	$350,725	$473,272	$5,530,286	$1,106,057
36	Libya	$1,190,402	$685,686	$848,590	$1,207,359	$814,747	$4,746,784	$949,357
37	Benin	$1,091,442	$1,286,667	$874,061	$589,180	$502,409	$4,343,759	$868,752
38	Mauritania	$553,565	$1,047,878	$1,185,905	$679,930	$845,162	$4,312,440	$862,488
39	Chad	$419,316	$437,283	$909,655	$1,202,536	$1,159,966	$4,128,756	$825,751
40	Botswana	$946,558	$959,313	$602,249	$504,806	$656,192	$3,669,118	$733,824
41	Eswatini	$371,715	$650,392	$573,604	$326,461	$238,186	$2,160,358	$432,072
42	Gabon	$90,123	$45,499	$32,195	$442,229	$1,412,943	$2,022,989	$404,598
43	Lesotho	$335,364	$485,434	$321,714	$229,322	$136,305	$1,508,139	$301,628
44	Cape Verde	$109,883	$217,425	$198,939	$436,920	$275,836	$1,239,003	$247,801
45	Seychelles	$277,555	$314,686	$305,827	$152,432	$165,412	$1,215,912	$243,182
46	So. Sudan	$52,615	$129,539	$167,839	$415,123	$151,733	$916,849	$183,370
47	Liberia	$217,742	$40,481	$109,409	$172,681	$107,848	$648,161	$129,632
48	Sierra Leone	$59,160	$111,547	$209,490	$80,454	$65,124	$525,775	$105,155
49	S. Tomé	$68,847	$88,379	$95,001	$125,036	$14,983	$392,246	$78,449
50	Eq. Guinea	$116,087	$98,220	$59,725	$16,916	$69,091	$360,039	$72,008
51	Comoros	$39,625	$43,205	$111,793	$51,911	$59,539	$306,073	$61,215
52	Guinea-Bissau	$172,024	$12,562	$106	$79,802	$25,806	$290,300	$58,060
53	Eritrea	$32,303	$31,293	$17,564	$46,185	$161,808	$289,153	$57,831
54	Cen. Afr. Rep.	$15,617	$99,651	$81,795	$9,388	$22,919	$229,370	$45,874
	Regional Total	*$361,601,890*	*$337,236,869*	*$334,256,901*	*$358,740,477*	*$354,235,166*	*$1,746,071,303*	*$349,214,261*

TABLE 10: AFRICA AVERAGE ANNUAL IMPORTS BY SPARE PART CATEGORY (2016-2020)

	Importing Country	Bicycle Tires	Bicycle Tubes	Frames, and Frames	Brakes	Hubs	Saddles	Wheel Rims and Spokes	Pedals and Cranks	Other Parts	*All Spare Parts*
1	So. Africa	$3,082,363	$1,602,072	$10,807,890	$1,889,617	$1,898,282	$852,557	$4,349,221	$2,733,466	$12,498,024	*$39,713,494*
2	Egypt	$3,883,672	$2,697,725	$6,130,849	$1,331,611	$1,118,057	$1,981,410	$3,398,740	$1,607,117	$13,368,742	*$35,517,924*
3	Tanzania	$7,787,754	$4,915,461	$2,138,769	$1,621,591	$1,611,385	$1,314,273	$2,396,062	$2,308,316	$7,501,797	*$31,595,409*
4	Nigeria	$5,930,581	$5,274,007	$989,474	$1,319,880	$3,448,704	$785,483	$3,153,450	$1,823,415	$6,607,513	*$29,332,507*
5	Tunisia	$2,344,232	$934,695	$5,020,261	$1,077,302	$854,979	$710,270	$755,573	$1,369,436	$10,269,347	*$23,336,094*
6	Ghana	$3,457,554	$4,098,849	$1,026,499	$968,619	$653,338	$1,605,211	$760,812	$943,328	$7,084,467	*$20,598,676*
7	Uganda	$2,912,500	$2,746,413	$1,788,306	$739,422	$2,174,044	$354,028	$1,307,747	$1,489,593	$4,450,462	*$17,962,517*
8	Bur. Faso	$1,916,796	$2,170,907	$2,067,534	$635,668	$1,509,759	$929,923	$775,847	$1,799,214	$2,819,568	*$14,625,216*
9	Mali	$2,455,493	$729,495	$595,765	$178,183	$2,065,408	$288,911	$289,632	$550,544	$4,387,095	*$11,540,527*
10	Malawi	$2,556,292	$1,475,762	$1,127,017	$410,900	$975,658	$336,520	$906,091	$603,252	$2,350,761	*$10,742,254*
11	Algeria	$1,505,463	$1,716,901	$483,075	$626,004	$338,361	$486,433	$541,254	$473,054	$3,910,099	*$10,080,644*
12	Kenya	$1,558,580	$1,575,630	$543,323	$418,109	$652,996	$377,246	$1,372,458	$595,483	$2,950,941	*$10,044,766*
13	Morocco	$2,229,541	$1,694,309	$176,525	$368,911	$356,978	$358,900	$525,395	$353,145	$2,869,925	*$8,933,628*
14	Sudan	$1,020,857	$1,191,965	$164,984	$186,686	$227,227	$288,308	$234,486	$358,156	$4,647,390	*$8,320,061*
15	Togo	$1,988,740	$1,499,819	$167,517	$368,475	$189,570	$457,694	$235,044	$444,525	$2,831,913	*$8,183,297*
16	Madag.	$1,257,144	$526,621	$382,675	$257,618	$318,791	$380,627	$599,578	$546,492	$2,747,826	*$7,017,371*
17	C.d'Ivoire	$1,835,129	$606,367	$903,639	$209,282	$210,604	$433,525	$642,898	$322,275	$840,591	*$6,004,311*
18	DRC	$1,220,967	$606,979	$753,176	$186,280	$311,243	$83,190	$330,738	$117,386	$1,830,716	*$5,440,674*
19	Mozamb.	$747,823	$681,200	$249,428	$119,603	$433,212	$148,853	$365,258	$307,051	$2,254,001	*$5,306,428*
20	Zambia	$870,094	$963,089	$300,725	$82,825	$453,890	$86,936	$243,686	$271,793	$1,405,744	*$4,678,781*
21	Senegal	$720,444	$822,364	$437,022	$130,268	$161,023	$311,381	$238,259	$242,867	$1,413,358	*$4,476,987*
22	Rwanda	$728,811	$189,484	$321,361	$94,445	$190,569	$63,725	$500,666	$231,442	$1,272,721	*$3,593,225*
23	Burundi	$827,166	$256,006	$326,036	$76,008	$174,034	$83,519	$148,030	$257,179	$910,652	*$3,058,630*
24	Congo	$58,570	$35,520	$457,156	$135,456	$526,150	$48,637	$387,753	$580,550	$580,242	*$2,810,034*
25	Gambia	$510,302	$448,677	$137,471	$85,949	$197,867	$173,431	$142,299	$254,396	$715,727	*$2,666,118*
26	Ethiopia	$157,062	$266,935	$204,789	$191,041	$151,473	$32,117	$292,671	$37,834	$1,290,439	*$2,624,361*
27	Djibouti	$429,058	$278,765	$84,030	$80,812	$72,339	$112,035	$197,906	$83,668	$1,004,912	*$2,343,525*
28	Namibia	$165,636	$59,118	$354,281	$51,710	$71,835	$28,436	$614,393	$46,495	$780,187	*$2,172,091*
29	Guinea	$409,748	$389,971	$62,748	$126,853	$101,196	$52,841	$79,161	$144,816	$649,959	*$2,017,293*
30	Mauritius	$277,324	$209,740	$53,985	$58,483	$134,807	$21,688	$74,554	$28,616	$795,688	*$1,654,886*
31	Zimba.	$476,942	$240,762	$23,857	$56,837	$125,519	$22,222	$35,888	$78,742	$321,936	*$1,382,703*
32	Niger	$764,435	$24,997	$38,945	$8,036	$11,256	$70,683	$18,058	$18,979	$350,476	*$1,305,864*
33	Angola	$98,517	$43,392	$50,118	$105,777	$44,376	$17,260	$50,663	$58,058	$725,857	*$1,194,019*
34	Camer.	$86,838	$132,709	$77,442	$35,337	$138,416	$21,616	$226,278	$61,565	$392,644	*$1,172,846*
35	Somalia	$26,705	$590,778	$11,720	$28,800	$5,343	$1,160	$41,004	$3,875	$396,672	*$1,106,057*
36	Libya	$158,526	$199,061	$17,115	$23,653	$33,179	$39,728	$84,753	$42,432	$350,910	*$949,357*
37	Benin	$78,410	$67,430	$215,635	$54,891	$97,168	$8,415	$136,056	$10,350	$200,396	*$868,752*
38	Mauritan.	$25,562	$173,000	$26,451	$8,258	$10,690	$6,606	$42,871	$10,387	$558,665	*$862,488*
39	Chad	$100,023	$130,180	$79,075	$21,485	$105,976	$27,283	$85,525	$127,590	$148,614	*$825,751*
40	Botswana	$88,153	$51,722	$33,548	$103,940	$28,389	$17,174	$127,996	$24,922	$257,978	*$733,824*
41	Eswatini	$27,862	$12,404	$58,786	$22,956	$29,877	$1,770	$100,578	$25,150	$152,689	*$432,072*
42	Gabon	$12,859	$2,718	$2,635	$4,752	$110,715	$174	$10,365	$533	$259,847	*$404,598*
43	Lesotho	$3,931	$2,813	$34,283	$29,880	$3,904	$3,355	$100,050	$3,560	$119,853	*$301,628*
44	C. Verde	$30,621	$27,508	$3,521	$112,536	$2,152	$2,183	$12,346	$1,050	$55,883	*$247,801*
45	Seych.	$13,606	$11,614	$11,791	$21,969	$5,668	$2,447	$77,723	$5,052	$93,313	*$243,182*
46	So. Sudan	$8,058	$4,778	$2,304	$8,660	$10,795	$0	$20,756	$3,547	$124,470	*$183,370*
47	Liberia	$14,753	$8,924	$2,306	$8,929	$1,198	$157	$5,624	$2,243	$85,498	*$129,632*
48	S. Leone	$18,802	$2,823	$19,473	$4,715	$15,007	$92	$8,585	$1,623	$34,034	*$105,155*
49	S. Tomé	$4,440	$2,667	$1,141	$6,375	$1,710	$555	$13,636	$2,218	$45,708	*$78,449*
50	Eq. Guinea	$22,181	$5,125	$4,190	$424	$13,266	$71	$15,560	$149	$11,043	*$72,008*
51	Comoros	$4,035	$1,890	$470	$3,089	$913	$23	$2,458	$2,521	$45,816	*$61,215*
52	Guinea-B.	$42,732	$6,059	$754	$0	$2,505	$2	$662	$49	$5,296	*$58,060*
53	Eritrea	$11,545	$37	$617	$100	$4,533	$39	$6,431	$27	$34,502	*$57,831*
54	Cen. Af. Rep.	$397	$4,093	$3,014	$1,404	$363	$0	$2,638	$0	$33,965	*$45,874*
	Regional Total	*$3,082,363*	*$1,602,072*	*$10,807,890*	*$1,889,617*	*$1,898,282*	*$852,557*	*$4,349,221*	*$2,733,466*	*$12,498,024*	*$39,713,494*

ANNEX 5: ADDITIONAL STATISTICAL TABLES

TABLE 11: BICYCLE OWNERSHIP RATES

	n	% Bicycle owners
All respondents	**386**	42.7%
Bicycle Ownership		
Owner	165	100.0%
Non-owner	221	0.0%
Districts		
Huye	95	41.1%
Kayonza	98	49.0%
Ngororero	96	21.9%
Rubavu	97	58.8%
Geography Type		
Peri-urban/urban	203	45.8%
Rural	183	39.3%
Gender		
Male	198	66%
Female	188	18%
Age Group		
18-24 years	84	57%
24-34 years	95	46%
35-44 years	87	43%
45 years+	120	30%
Economic Activity		
Farmer	129	27%
Merchant	51	35%
Private sector (including casual)	190	58%

TABLE 12: BICYCLE USAGE INTENSITY

	n	Average hours per week that frequent and infrequent users spend on bicycle travel
All respondents	**386**	12.2
Bicycle Ownership		
Owner	165	20.6
Non-owner	221	4.4
Districts		
Huye	95	10.2
Kayonza	98	14.6
Ngororero	96	7.2
Rubavu	97	15.6
Geography Type		
Peri-urban/urban	203	12.7
Rural	183	11.5
Gender		
Male	198	17.5
Female	188	6.3
Age Group		
18-24 years	84	14.1
24-34 years	95	12.5
35-44 years	87	12.6
45 years+	120	10.2
Economic Activity		
Farmer	129	8.0
Merchant	51	6.8
Private sector (including casual)	190	16.8

TABLE 13: AVERAGE TRANSPORT EXPENDITURE

	n	% of respondents reporting zero expenditure	Average 30-day expenditure (RWF)	Average 30-day expenditure (USD)
All respondents	**386**	15.0%	6343.1	6.1
Districts				
Huye	95	17.9%	4741.7	4.6
Kayonza	98	7.1%	8465.6	8.2
Ngororero	96	20.8%	5153.1	5.0
Rubavu	97	14.4%	6978.6	6.7
Geography Type				
Peri-urban/urban	203	15.8%	6407.7	6.2
Rural	183	14.2%	6271.4	6.1
Gender				
Male	198	18.2%	6460.4	6.2
Female	188	11.7%	6220.9	6.0
Age Group				
18-24 years	84	9.5%	6845.4	6.6
24-34 years	95	9.5%	7323.4	7.1
35-44 years	87	24.1%	5338.8	5.2
45 years+	120	16.7%	5939.2	5.7
Economic Activity				
Farmer	129	17.1%	4400.0	4.3
Merchant	51	5.9%	8774.5	8.5
Private sector (including casual)	190	16.7%	6726.8	6.5
Primary Mode of Travel to Work/ Market				
Walking	204	16.2%	5691.8	5.5
Bicycle	160	15.0%	6600.9	6.4
Car/ Motorcycle	21	4.8%	11315.8	10.9
Bicycle Ownership				
Owner	165	15.2%	6575.3	6.4
Non-owner	221	14.9%	6170.32	5.96

TABLE 14: PRIMARY MODES OF TRAVEL

		Mode of travel to work or market		
	n	Walking	Bicycle	Motorised (motorcycle/private car/minibus)
All respondents	**386**	53.0%	41.6%	5.5%
Districts				
Huye	95	57.4%	38.3%	4.3%
Kayonza	98	38.8%	56.1%	5.1%
Ngororero	96	71.9%	25.0%	3.1%
Rubavu	97	44.3%	46.4%	9.3%
Geography Type				
Peri-urban/urban	203	46.0%	48.0%	5.9%
Rural	183	60.7%	34.4%	4.9%
Gender				
Male	198	34.3%	59.1%	6.6%
Female	188	72.7%	23.0%	4.3%
Age Group				
18-24 years	84	45.2%	53.6%	1.2%
24-34 years	95	45.3%	46.3%	8.4%
35-44 years	87	49.4%	46.0%	4.6%
45 years+	120	67.2%	26.1%	6.7%
Economic Activity				
Farmer	129	72.9%	24.8%	2.3%
Merchant	51	58.8%	31.4%	9.8%
Private sector (including casual)	190	37.2%	56.0%	6.8%
Bicycle Ownership				
Owner	165	20.6%	75.2%	4.2%
Non-owner	221	77.3%	16.4%	6.4%

TABLE 15: MOST REPORTED SPARE PARTS ACQUIRED

	% of all bicycles	% of new bicycles	% of pre-owned bicycles
Total Count	**237**	**60**	**177**
Tire/ tube	71.5%	73.5%	70.9%
Wheel/ spoke	51.0%	55.1%	49.7%
Saddle	44.0%	51.0%	41.7%
Carrier	42.5%	38.8%	43.7%
Pedal	29.5%	36.7%	27.2%
Brakes	28.0%	28.6%	27.8%
Frame	21.5%	18.4%	22.5%
Fork	14.5%	10.2%	15.9%
Chain	13.5%	8.2%	15.2%
Patch/ puncture kit	9.0%	12.2%	7.9%
Pump	2.5%	0.0%	3.3%