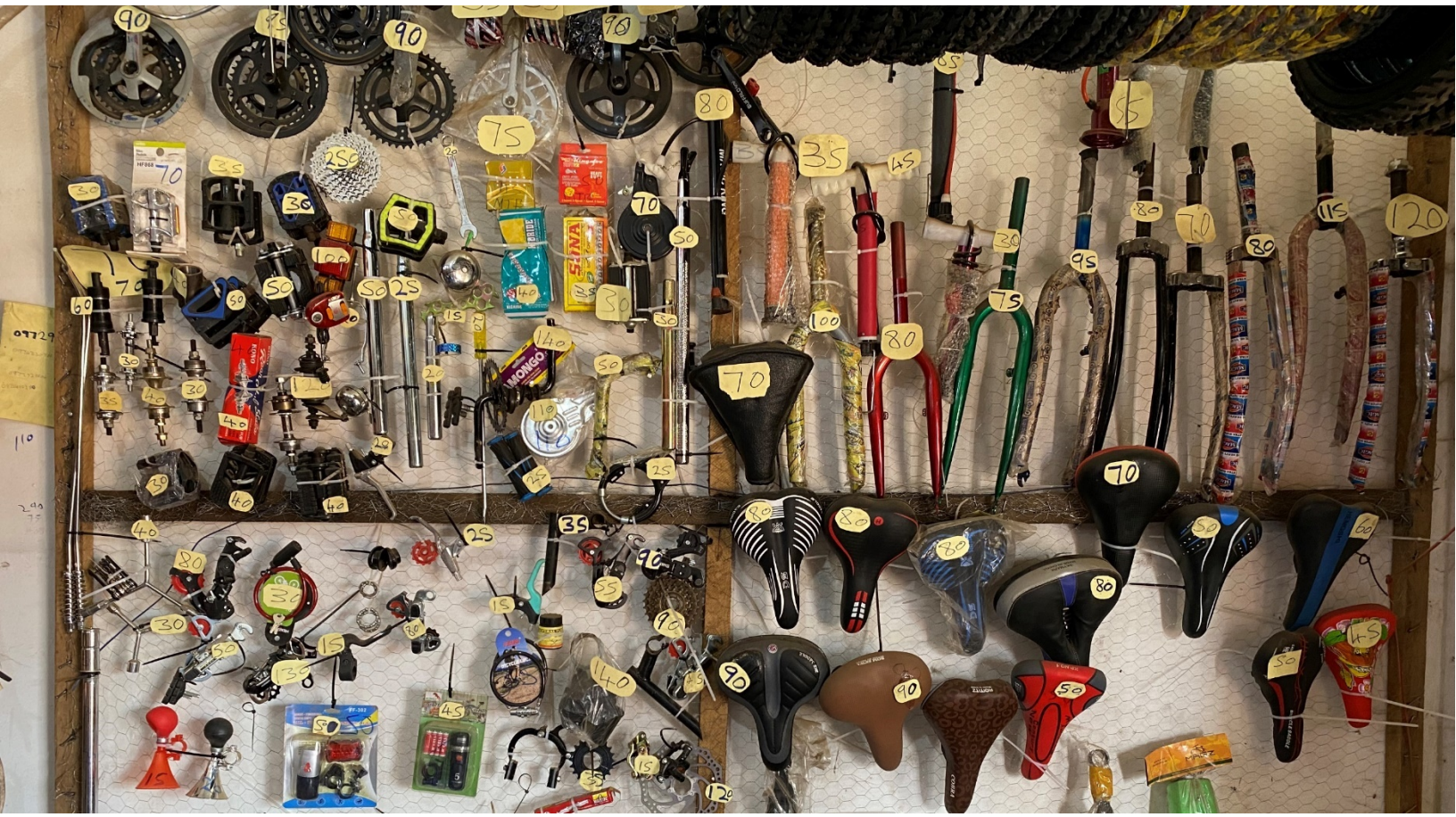

PHOTO CREDIT: J.E. AUSTIN ASSOCIATES

ZAMBIA BICYCLE MARKET SYSTEM PROFILE

USAID Bicycles for Growth Project

J.E. Austin Associates, Inc. || Contract No.: 7200AA21C00064
World Bicycle Relief || Grant No.: 7200AA21FA00019

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ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
APR	Annual Percentage Rate
BFG	Bicycles for Growth
CAZ	Cycling Association of Zambia
CEPII	Centre d'Études Prospectives et d'Informations Internationales
COVID-19	Coronavirus Disease 2019
CSO	Civil Society Organization
DHS	Demographic and Health Survey
FCDO	Foreign, Commonwealth and Development Office
FGD	Focus Group Discussion
JAA	J.E. Austin Associates, Inc.
JICA	Japanese International Cooperation Agency
KII	Key Informant Interview
LPO	Local Purchase Order
MFI	Microfinance Institution
MOTL	Ministry of Transport and Logistics
NGO	Non-Governmental Organizations
NMT	Non-Motorized Transport
PAPECA	Passenger, Pedestrian and Cyclist Association
PAYG	Pay as You Go
PGIS	Participatory Geographic Information System
RTSA	Road Transport and Safety Agency
UN	United Nations
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
USD	United States Dollar
VAT	Value-Added Tax
WBG	World Bank Group
WBR	World Bicycle Relief
ZMW	Zambia Kwacha
ZRA	Zambia Revenue Authority

Note on Currency and Exchange Rates

The Zambia kwacha (ZMW) and US dollar (USD) are both referenced in this report depending on the source of information. All ZMW figures are also presented in USD terms. The USD:ZMW exchange rate used throughout the report is 1 USD: 16.4 ZMW based on the approximate rate over the period of data collection. In some cases, USD values may be rounded.

EXECUTIVE SUMMARY

With a robust user base, strong institutional demand, diverse retailers, well-established wholesalers, and a mixed enabling environment, Zambia's bicycle market system generally allows for broad access to, and uptake of, bicycles. 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 market system's demand, supply, and systems in the subsequent sections. The report provides conclusions in the final section and includes further details (e.g., methodology) in the annexes.

MARKET SYSTEMS PROFILE KEY FINDINGS

DEMAND

There is high demand for bicycles in Zambia, primarily driven by individuals and households using bicycles for general transportation and mobility purposes. Bicycles also function as important tools in supporting the livelihoods of Zambians, including farmers, merchants, and bicycle taxi operators, all of whom frequently (or always) use bicycles to enhance their economic activity. Additionally, non-governmental organizations (NGOs), government agencies, and other institutions make use of bicycles as an affordable, practical means of increasing service delivery capacity.

Although bicycle ownership levels are also high, there are strong indications that existing barriers to bicycle ownership, most notably affordability, lead to unmet demand. Additional factors such as poor road safety further discourage bicycle use by many individuals. Addressing these barriers has the potential increase bicycle use uptake and ownership.

SUPPLY

Zambia's broader supply of bicycles is diverse, with wide-ranging categories and price points. The wholesale and retail markets are competitive, with many sellers present and limited ability for individual sellers to charge excessive prices relative to competitors. Nonetheless, bicycle affordability remains a challenge, especially for the consumer market. The National government's policy of high tariffs causes elevated prices, as does the country's geography (landlocked and geographically large country). Moreover, bicycle supplies can be limited in discrete localities, especially rural areas. In these cases, the only options for acquiring a bicycle are purchasing a used bicycle from an individual community member or traveling to the nearest town where bicycle sellers are present.

SYSTEMS

Supporting systems within the bicycle market system vary in how effectively they contribute to market system functioning. While spare parts and maintenance services are widely available and owners are generally able to find replacements when their bicycle requires servicing, bicycle users experience issues with both the cost and quality of components. This contributes to elevated costs over the lifetime of the bicycle and inconveniences owners.

INTRODUCTION

BFG conducted bicycle market system assessments in target countries to better understand the dynamics of bicycle usage and availability 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 apply to increase bicycle availability and use.

ABOUT BFG

Launched in October 2021, the BFG 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 assessment 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 (Supporting) 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. Where relevant, the report highlights the interdependence of these pillars, and their effect on one another.

ACKNOWLEDGEMENTS

BFG would like to thank Lolelanji Sinkala and Development Data for their expertise in conducting this assessment. We would also like to thank all focus group participants, interviewees, survey respondents, government officials, and the dozens of other stakeholders that 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 USAID Zambia and Wes Day from the Office of Innovation, Technology, and Research for their time, guidance, input, and support before, during, and after the assessment.

MARKET SYSTEM OVERVIEW

BFG's framework 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 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. Individuals utilizing bicycles even as non-owners also generate notable demand for bicycles, such as when borrowing or renting from neighbors. This consideration is important in the Zambia context, as a substantial share of bicycle *users* are not bicycle *owners*. In the survey conducted by BFG in eight market locations across four districts, 55 percent of respondents indicated they used bicycles at least several times per month compared to the 40 percent of respondents who reported ownership of a bicycle within their household. Importantly, a range of institutions including government agencies, donor institutions, and NGOs within Zambia make use of bicycles in the course of their activities, for example, by providing bicycles to agricultural extension workers to facilitate service delivery. Although bicycle affordability and resource considerations are typically most pressing, users and non-users consider a range of factors when deciding whether and how to use a bicycle, including road safety and transportation alternatives.

Within the Supply pillar, bicycles ultimately reach interested buyers through several channels . Virtually all bicycles within the market system are imported from international sources. These imported bicycles include new mass market bicycles typically manufactured in China and India and available at relatively low price points, new heavy-duty bicycles such as the Buffalo Bicycle[1], and (to a lesser degree) used bicycles sourced from a variety of locations including North America, Europe, and Japan. New bicycles are sold across the country in dedicated bicycle stores, hardware shops, and other outlets. Further, the secondary bicycle market is quite active, with 40 percent of bicycle owners reporting their bicycles were used at the time of purchase. Many individuals acquire their bicycles from other individuals in their community, especially in rural areas where sales outlets are limited. The supply of bicycles has faced several challenges in the last several years, particularly driven by global inflationary conditions and supply and delivery bottlenecks.

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 affect the lifespan of bicycles within the market described above, and are perhaps the most consequential element of the supporting system. The market for spares parts is healthy and like the bicycles themselves, spare parts are widely available (with some exceptions). However, market actors report affordability and quality are challenges. Bicycle mechanics are common and owners can usually find someone to address common problems.

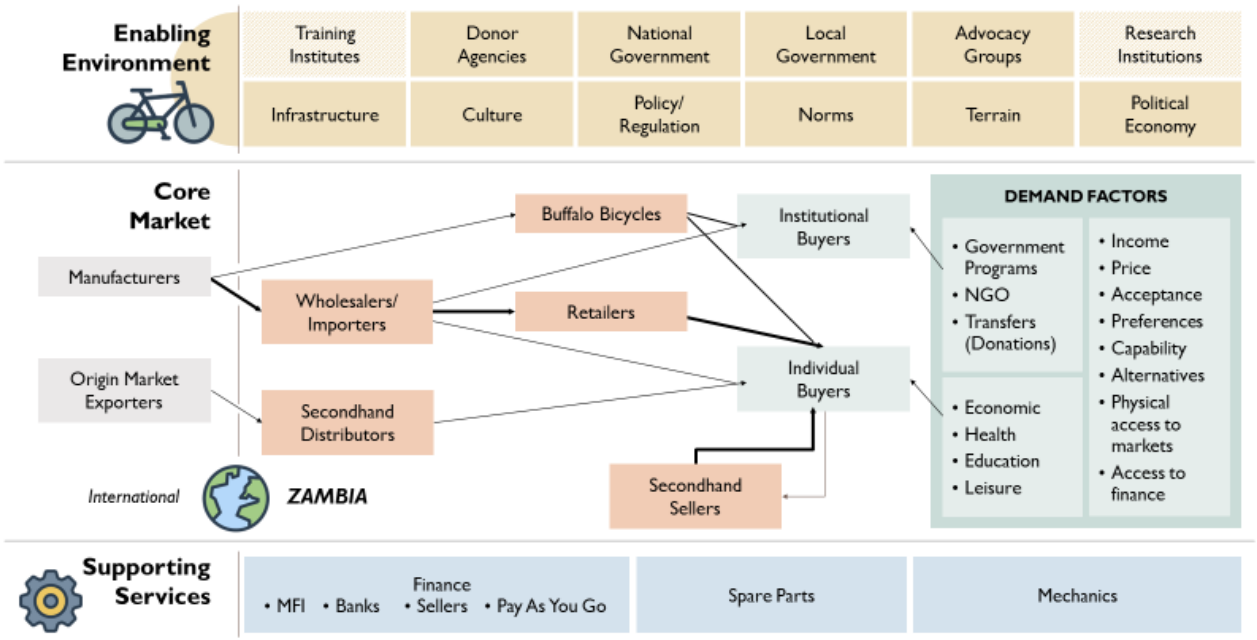
Policymakers are generally not focused on bicycles or bicycle issues and often do not make special consideration of bicycles in planning, infrastructure development, or policymaking. When they do consider

[1] Buffalo Bicycle Limited is a wholly owned, for-profit subsidiary of BFG project partner, World Bicycle Relief.

bicyclists, it is often framed in terms of road safety issues and particularly the interaction between cyclists and motorized transport. This general neglect has led to a dearth of bicycle infrastructure and often unsafe conditions on the road for bicycle users, as well as a lack of facilities for securing bicycles in public areas when not in use. Access to finance is a challenge broadly in Zambia, and financing is rarely used in the process of purchasing a bicycle. However, BFG found examples of bicycle-specific financial products and payment models that show promise in boosting access to and uptake of bicycles.

The three market system pillars interact in important ways. For example, spare part affordability and quality issues lead to well-grounded perceptions that bicycle ownership can be costly in the long-term and inconvenient as components break down. This makes bicycle ownership less appealing and effectively decreases demand, especially when alternative forms of transport are available.

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 more than 65 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 nine rural, peri-urban, and urban market sites in four districts (Chipata, Kaoma, Kasama, and Monze). 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

Zambia's population is estimated at 19 million.[2] A large share of the population (66 percent) is children and youth, while women comprise slightly more than half (52 percent) of the population.[3] The national unemployment rate is relatively low at 13.8 percent, and nearly 50 percent of those employed work in agriculture/fisheries and wholesale and retail industries.[4] Zambia has some of the highest poverty rates in Africa, with an estimated 54 percent of the population living below the country's national poverty line.[5] A much higher percentage of those living in rural areas (77 percent) are poor, compared to 23 percent in urban areas. About 44 percent of people in Zambia currently live in urban settings; this share is expected to grow to 70 percent by 2030.[6]

The majority of Zambia's adult population is financially excluded, with no access to formal (e.g., microfinance of banks) or informal (e.g., savings groups or money lenders) financial services. Some recent estimates indicate 49 percent of those aged 15 years and over have access to a financial institution account or mobile money account, but only 24 percent have access to a financial institution account.[7] Those without access tend to rely on their own home savings and acquire loans from their networks of family and friends.[8] Zambians lack of financial institution accounts for a variety of reasons, but primary causes include long distances to access them, high cost of financial services, lack of necessary documentation, lack of trust in financial institutions, religious reasons, and insufficient funds. The latter is the most commonly noted reason, cited by 85 percent of those without accounts.[9]

Zambia ranked 118th out of 183 countries on the World Bank's Sustainable Mobility Index. Only 35 percent of the country's rural residents live within 2km of an all-season road, compared to a regional average of 53 percent.[10] The demand for mobility services is expected to exceed capacity. The private vehicle population in Zambia has grown by 29 percent since 2016.[11]

MOBILITY CONTEXT

There is both a high rate of demand for bicycle travel in Zambia and significant policy and institutional support to grow this demand. Zambia's standalone Non-Motorized Transport (NMT) Strategy (2019), developed in consultation with local stakeholders and international support, such as UN Environment Programme (UNEP), focuses on urban rather than rural Zambia. The strategy's primary goal is to promote walking and cycling and improve safety through the development of safe and accessible infrastructure

[2] World Bank data – Population, total – Zambia.
[3] World Bank data – Rural population (% of total population) – Zambia.
[4] Zambia Statistics Agency and Ministry of Labour and Social Security. 2020 Labour Force Survey Report. Lusaka, Zambia: Zambia Statistics Agency and Ministry of Labour and Social Security.
[5] Zambia Statistics Agency. 2015 Living Conditions Monitoring Survey (LCSM) Report. Lusaka, Zambia: Zambia Statistics Agency.
[6] Road Transport and Safety Agency.
[7] World Bank. *The Global Findex Database 2021*.
[8] FSD Zambia and Microfinance Opportunities. *Zambia Financial Diaries: Managing Money in the Face of Risk and Uncertainty*. 2015.
[9] World Bank. *The Global Findex Database 2021*.
[10] Sustainable Mobility for All. "Zambia Country Profile, 2022."
[11] 2021 Road Transport and Safety Status Report, Zambia Road Transport and Safety Agency.

networks. The policy's intention is to keep NMT mode share (this refers to both walking and cycling) to 60 percent of trips rather than lose this share to motorized modes.

Most individuals surveyed by BFG (60 percent) report that they or a household member own at least one bicycle, and more than a third of survey participants reported they individually own a bicycle.

Although bicycles have always been a common mode for individual travel and for transport of goods and people in Zambia, as population wealth grows, bicycle use declines: bicycles are seen as a transitional mode until users are able to afford motorized transport. At the same time, respondents who do use bicycles value them highly, and report substantial cost and time-saving benefits. Walking is the most common mode for those who cannot afford to own a bicycle or use a bicycle taxi. Affordability is a key constraint to ownership, although access to bicycle taxis and borrowing means that bicycle use is not dependent on ownership. Bicycle tourism is a nascent and growing industry, particularly around Livingstone.

According to focus group respondents, the most popular type of bicycles in use are roadster-type bicycles. Roadster bicycles, which typically feature a horizontal top tube, steel construction, and limited gearing– are valued for their versatility, wide availability at multiple price points, accessible spare parts, ability to be modified, and capacity to carry heavier loads than other models. We provide additional information on the most popular models of bicycles in use in Zambia in the Supply section.

TRANSPORT MODE AND NEEDS ANALYSIS

Zambians determine travel choices primarily based on transport availability, reliability, safety, and cost factors, among others. Walking is the primary mode of travel for the majority of people, particularly in rural areas. The average amount of time spent by individuals walking or cycling for transportation purposes is estimated at 53 minutes per day.[12] Men spend more time (average of 68 minutes per day) than women (38 minutes).[13] This may explain the higher demand for bicycles from men that was observed in the BFG survey. However, the underlying factor may be that men have more flexibility to travel far from their homes to access economic opportunities compared to women, who tend to work within their communities due to care work and other responsibilities at home. In some urban areas, such as Lusaka, public transport is the second most common travel mode after walking.[14] However, in many rural areas, cycling is the second most common mode of transportation after walking.

Focus group respondents report making mode decisions based on speed or distance; longer trips are made by taxi or mini-bus (where trips are over an hour), while trips under 30 minutes are usually made by walking. Bicycle trips of two to five kilometers are common. Over 80 percent of BFG survey respondents reported use of non-motorized transportation for travel. Overall, walking is the most common mode of travel to work or market, but bicycles are more popular during the harvest season, as is animal transport, when goods are more likely to be transported.

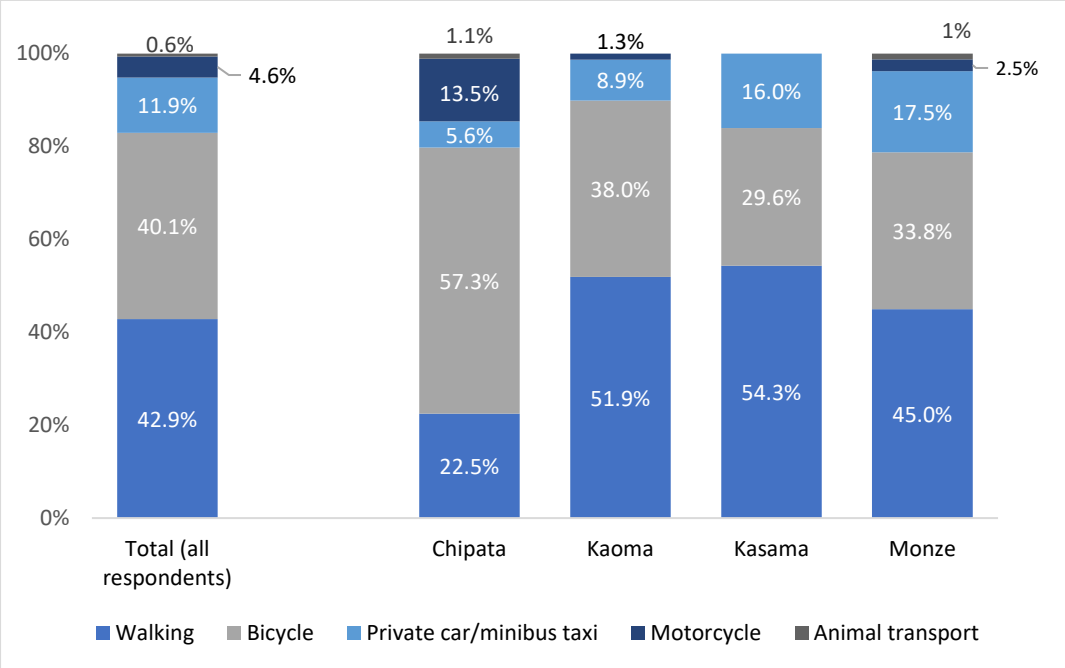
[12] UNEP. *Walking and Cycling in Africa – Evidence and Good Practice to Inspire Action*. 2022
[13] UNEP. *Walking and Cycling in Africa – Evidence and Good Practice to Inspire Action*. 2022
[14] Transaid. *Improving Public Transport in Zambia's Capital*. 2021.

Bicycles were the second most common mode of travel, used by 40 percent of respondents, to travel to work or market, and by 30 percent of respondents during the harvest season.[15] Overall, more men than women reported use of bicycles as primary mode of travel to work or during the harvest season. Walking is the most common mode of travel for women – not necessarily out of choice, but because women are less likely to own or have access to a bicycle. Women focus group respondents reported they tend to choose bicycle travel when they are running late or have goods to transport. But even men's choice of transportation mode exhibits stark differences. While 60 percent of men used bicycles as the primary mode of travel to work or market, the percentage that used them during the harvest season was significantly less (38 percent), when more men used animal transportation. This observation could relate to the weight or bulk of goods needing to be transported at harvest.

The BFG survey also found that bicycles are the main mode of travel for those who own bicycles, particularly for work and market-related travel. Eighty percent of bicycles owners used bicycles for travel to work or the market. Among non-owners, walking was the main mode of travel, reported by 63 percent of respondents, followed by motorized transportation (21 percent), and bicycles (16 percent).

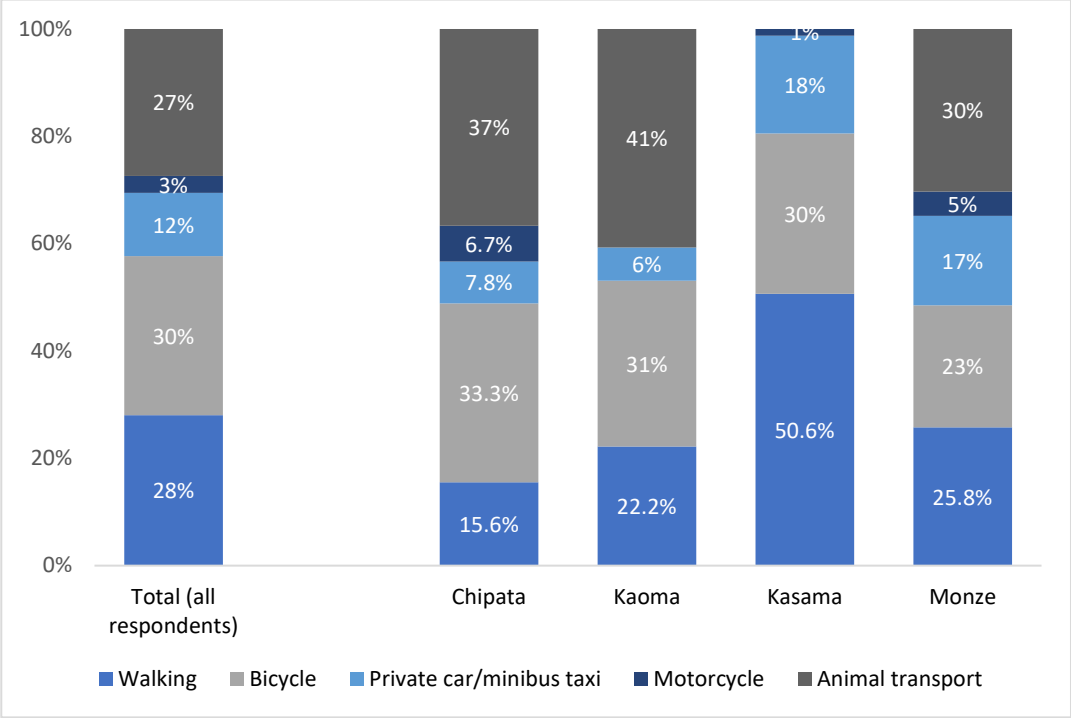
Among youth, most of whom are unemployed, walking was the most common mode of travel. Use of bicycles increases with age, reflecting in part that bicycle ownership is tied to accumulated savings; walking rates decrease with age groups. Eighty percent of 18 to 24-year-olds without bicycles reported cost as the main reason for lack of ownership. More affordable bicycles could potentially increase cycling rates among the youth.

FIGURE 2: PRIMARY MODES OF TRANSPORTATION TO WORK/ MARKET



[15] Harvest season (roughly May to August in Zambia) was used as the recall period during survey implementation in order to capture transportation usage patterns during a time period in which weather conditions are conducive to a full range transport options.

FIGURE 3: PRIMARY MODE OF TRANSPORTATION DURING HARVEST SEASON



Seventy percent of farmers reported use of bicycles for travel to work or market, but a much lower percentage (38 percent) used them during the harvest season, preferring instead to use animal transportation. Forty-five percent of farmers reported they used animal transport during the harvest season, compared to only 1 percent who reported using animal transport for regular travel to work or market. Instead, the vast majority (70 percent) of farmers used bicycles for regular travel to work or market. The use of animal transportation is especially popular among farmers during the harvest season. Again the decreased use of bicycles is likely due to increased need for animal transportation for ferrying larger volumes of produce from farms, which are often located far from residential areas and may be difficult via bicycle. These findings suggest that, in some cases, bicycles may not be well suited for transportation of the large volume of goods that farmers may need to transport during the harvest season. Overall, these findings suggest that choices about transportation are likely influenced by the need and the time or season.

Formal merchants reported private cars as their preferred mode of motorized transportation, followed by motorcycles and minibus taxis. This correlation aligns with the government's concern that as wealth increases, bicycle use decreases. Among informal merchants, nearly 90 percent of them used non-motorized transportation for travel to work or market, although the majority walk rather than use bicycles.

Bicycles are also important for accessing other transportation options. Twenty-six percent of survey respondents used bicycles to access other modes of travel. However, bicycles were still the main mode of transportation for 69 percent of those who used them to access other modes of travel. In such cases, it is likely that respondents use other modes of transportation for very long travel distances.

DEMAND

CHANNELS OF DEMAND

Individual users, commercial users (e.g., taxis and transport), and institutional purchasers constitute the main channels of demand in Zambia. Sport and leisure use is a growing market. However, the demand for bicycles is mainly driven by individual purchasers.

INDIVIDUAL

As previously noted, bicycles are an important mode of transportation of goods and people, particularly in rural areas. According to respondents, bicycles are the second most important mode of travel after walking. Two-thirds of BFG survey participants reported they used bicycles for travel. The majority used them daily or several times per week.

However, the high rate of bicycle usage does not translate to ownership. Just over a third (36 percent) of BFG survey respondents reported they currently own bicycles. Another 8 percent reported they were previous bicycle owners. Among both men and women bicycle non-owners, the most important barrier to bicycle ownership was cost. The BFG survey found that 70 percent of women non-owners and 60 percent of men non-owners cited cost as the main reason for lack of ownership. Addressing affordability constraints could, therefore, stimulate a greater demand for bicycles.

Demand for bicycles is greater in urban areas than in rural areas. The Zambia Demographic and Health Survey reported that 48 percent of households in rural Zambia owned bicycles in 2018, compared to 24 percent of urban households.[16] The BFG survey found that bicycle ownership rates varied slightly across geographical locations, with ownership highest in the Eastern Province, and specifically in Chipata (39 percent), the administrative capital of the province. Kaoma and Kasama both recorded ownership rates of 37 percent, while the rate was 33 percent in Monze. The little variation in demand across the BFG locations is likely due to the fact that the survey was mainly conducted in rural and peri-urban settings, where bicycle ownership and usage tends to be popular.

There is a high demand for bicycles among individuals who use them for economic activities, such as farm activities and transportation of goods. Farmers and informal merchants comprised 74 percent of bicycle owners in the BFG survey. Demand for bicycles was lowest among formal merchants and those employed by the government or private sector,[17] who constituted 22 percent of the survey's bicycle owners. Unemployed individuals represented less than 4 percent of bicycle owners.

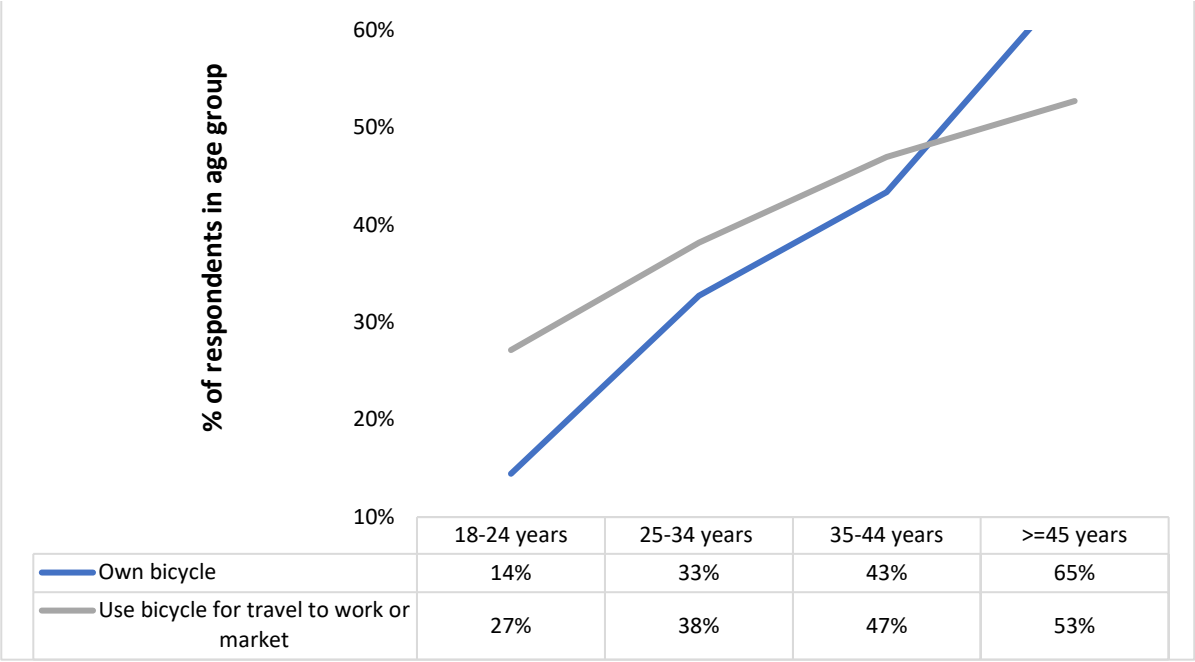
There is greater ownership of bicycles among men than women: 83 percent of all surveyed bicycle owners were men. The gender dynamics around bicycle ownership and usage are discussed further in the section on Gender & Bicycle Use and Access. Bicycles are more popular among older people than younger people. The BFG survey found that bicycle ownership rates increase with age, with the lowest ownership rates recorded for youth (18 to 24-year-olds). The percentage of bicycle owners among those aged 45 years and above (65 percent) was four times that of youth (14 percent). Low bicycle ownership and access rates

[16] Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF. Zambia Demographic and Health Survey 2018

[17] Private sector employees include casual workers.

among the youth are linked to their economic occupations: 76 percent of youth surveyed reported they were either unemployed or informal merchants, making the cost of a bicycle prohibitive. Additionally, 80 percent of youth without bicycles reported that cost of acquisition and ownership was the main reason for lack of ownership. Given that bicycles facilitate mobility and reduce the costs of informal trading, these observations point to the importance of improving youth access to bicycles.

FIGURE 4: BICYCLE OWNERSHIP AND USAGE BY AGE GROUPS



	18-24 years	25-34 years	35-44 years	>=45 years
Own bicycle	14%	33%	43%	65%
Use bicycle for travel to work or market	27%	38%	47%	53%

Individuals primarily acquire bicycles through market channels. The BFG survey found that the majority of owners (84 percent) purchased their bicycles, while the remainder reported bicycles were donated to them by family members, friends, NGOs, or employers. Bicycle retailers were the most common source of bicycles (41 percent of owners), followed by individuals (33 percent). Ten percent of bicycle owners sourced their bicycles from hardware stores and other shops.

Consumers purchase both new and pre-owned bicycles, but the demand for the former is greater: the majority of owners (58 percent) acquired new bicycles, while the rest acquired pre-owned bicycles. The high demand for new bicycles indicates consumer preference for these bicycles, perhaps driven by their quality (durability) considerations. Owners of new bicycles tended to own their bicycles for a longer time (5.1 years) compared to owners of pre-owned bicycles (3.6 years).

BFG observed significant variations across districts. While 69 percent of buyers in Kasama and 63 percent in Monze purchased new bicycles, the rate was lower in Chipata (50 percent) and Kaoma (52 percent). Possible reasons for lower uptake of new bicycles, particularly in Chipata, include income levels and price considerations; 71 percent of bicycle owners in Chipata reported cost was the most important factor in bicycle selection.

INSTITUTIONAL

Institutional buyers, including government agencies, NGOs, and donor-funded projects, represent an important segment of bicycle demand in Zambia. BFG estimates that in a typical year, institutional buyers purchase an average of 20,000 to 30,000 bicycles, primarily through public procurements and follow-on purchases after an initial public procurement award. A number of local and international organizations, particularly those in the NGO sector, use bicycles for their programs as tools to support service delivery. Such buyers tend to utilize public procurement processes to purchase large numbers of bicycles for a well-defined purpose.

Institutional buyers typically seek out heavy-duty durable bicycles (described in more detail in the Supply section of this report) because of their relative strength and ability to withstand tough terrains. Notably, institutional buyers are broadly less resource constrained than individuals or households and weigh maintenance requirements and costs in their decision-making. Institutional buyers also consider warranty length an important buying consideration. Because of these considerations, the Buffalo Bicycle is particularly popular among these buyers, despite being relatively more expensive than other options in the market.

Institutional buyers typically acquire bicycles in volume through publicly announced procurements. These procurements will include specifications on the bicycles and the volume of bicycles required. Though they do not necessarily require the brand, several institutional users indicated they closely consider the specifications of the Buffalo Bicycle when developing specifications for procurements. While volumes may vary, many are commonly in the 1,000 to 10,000-bicycle range.

For example, the GIZ Food and Nutrition Security, Enhanced Resilience (FANSER) project has purchased approximately 8,000 Buffalo Bicycles since 2016 for programmatic use by lead farmers and nutrition workers. The Catholic Health Association of Zambia (CHAZ), which runs health programs in rural Zambia, also regularly utilizes bicycles in health programming, purchasing approximately 1,000 bicycles per year. These have primarily been Buffalo Bicycles, although CHAZ has recently purchased other models of durable bicycles. MAMaZ, Medicines for Malaria Venture, a consortium of Transaid, Disacare, Development Data and Health Partners Zambia that addresses poor access to healthcare, has developed bicycle ambulances as one program solution. More than 200 community-owned and operated bicycle ambulances are part of the program.

The Government of Zambia also purchases large quantities of bicycles through public procurement processes. For example, with funding from the World Bank, the Ministry of Community Development and Social Services issued a tender for 10,000 bicycles in May of 2022 for the Girls' Education/Women's Empowerment and Livelihoods Project (GEWEL). In 2020, The Ministry of National Development and Planning acquired 20,000 bicycles for the 2020 nationwide census. USAID and other bilateral funded projects also regularly purchase bicycles. For example, several hundred health workers on USAID's Scaling Up Nutrition Technical Assistance activity utilize bicycles to conduct nutrition outreach.

The Government of Zambia has at times supported the distribution of bicycles to households, ostensibly to address mobility issues. However, this is often widely perceived as a politicized act with the purpose of attracting political support or rewarding constituencies. A recent example includes a commitment by the President under the previous government to provide 9,000 bicycles to Eastern Province in early 2021, prior to general election in August of that year.

BICYCLE OWNERSHIP AND ACCESS MODELS

Bicycles are mostly purchased through savings, or received as a donation, a bequest/inheritance, or a gift. One focus group participant mentioned receiving a bicycle as part of an election campaign, and another noted he 'grabbed' his bicycle 'from someone who owes me money' (i.e., as collateral). The government's NMT Strategy also proposes the development of bicycle-share systems in urban areas.

HOUSEHOLD AND INDIVIDUAL OWNERSHIP

Overall, the majority of individuals surveyed indicated their household owned at least one bicycle. Women and youth were less likely to own a bicycle, and within households the owner of the bicycle is most often the primary user. This points to the importance of ownership at the individual level, in addition to access to bicycles.

In BFG's survey, 60 percent of surveyed individuals stated their household owned at least one bicycle, a much higher rate than estimates reported in national surveys (38 percent in the 2018 Demographic and Health Survey [DHS]), likely due to the BFG survey's geographic focal areas.[18,19] Twenty-four percent of BFG survey respondents reported bicycles were owned by other members of their household, including spouses, children, and other relatives. Forty percent of households reported not owning a bicycle at all.

Men are more likely to be the owners and primary users of bicycles in bicycle-owning households. In the BFG survey, men were the owners of bicycles in 66 percent of households, while women were owners in 10 percent of bicycle-owning households. Similarly, men were the primary users in at least 68 percent of households, compared to 8 percent of households where women were primary users. Women were more likely to be users of the bicycles they owned, but less likely to be the users of bicycles owned by other members of their households.

Bicycle owners in the household are more likely to be older. Only 23 percent of respondents aged 18 to 24 years reported owning their household's bicycle, versus 83 percent of respondents aged 45 years or older. This difference in ownership levels between age groups may reflect general patterns of asset ownership observed across age groups in which older persons with relatively higher incomes and resources possess higher value assets.

PUBLIC BICYCLE SHARE

Formal public bicycle share programs are not present in Zambia, however Zambia's NMT Strategy (2019) proposes local authorities implement IT-based bicycle sharing systems in city centers and other dense, mixed-use areas to expand options for short trips and improve last-mile access to public transport. Local

[18] Zambia Statistics Agency, Ministry of Health (MOH) Zambia, and ICF. Zambia Demographic and Health Survey 2018.

[19] The differences between BFG and DHS estimates can be in part attributed to sampling. DHS estimates are based on a nationally representative household survey sample drawing from locations across the country. BFG is a market survey and therefore data was collected from markets and trading centers in a limited number of district. Given that the data collection sites were at market sites away from households themselves (hence entailing some level of mobility) and not nationally representative, BFG estimates may be expected to have a higher share of bicycle owners and users than DHS or similar estimates.

authorities intended to launch bicycle-share systems in 2020, but lack of funding has constrained implementation.

BICYCLE TAXIS

Compared to other sub-Saharan African countries, such as Malawi and Rwanda, bicycle taxis are not a common means of transport in Zambia. Zambia's exception is Eastern Province, particularly the towns of Chipata and Katete, where bicycle taxis are viewed as an affordable and easily accessible transportation mode. Fares are often around US$0.10.20 BFG found that in the districts surveyed, only 11 respondents (representing 3 percent of those surveyed) reported that they used bicycle taxis for work/market-related travel. Use of bicycle taxis as primary mode of travel was low among both men and women. Nearly all (91 percent) who reported use of bicycle taxis were from Chipata town. Findings from Participatory Geographic Information System (PGIS) research in Petauke District (located in the Eastern province) are that there are taboos to married women travelling on the back of bicycle taxis. School-going girls use bicycle taxis, at times having an arrangement with a particular bicycle taxi operator. Bicycle taxis outside of the main centers are on call (by phone) to provide services elsewhere. Bicycle taxis are, as elsewhere, being replaced by motorbike taxis.

Where they do operate, bicycle taxis typically do so on an informal basis and most operators are relatively young men. In Chipata, bicycle taxis typically gather at ranks where customers can easily hire them for trips. BFG observed frequent use of these taxis within the town. Not all bicycle taxi operators own their own bicycles. Those that do not own their bicycles rent them on per day basis; in Chipata, operators noted they pay 20 ZMW per day, no matter what their earnings might be.

However, there are signs that bicycle taxis are on the decline in the areas where they are most common. BFG spoke with both bicycle taxi and motorcycle taxi operators in Chipata. They stated that operating a bicycle taxi is strenuous work, often with serious risks such as theft or assault, and low financial reward and high incidence of non-payment. Among approximately 10 motorcycle taxi operators BFG spoke with in Chipata, each was a former bicycle taxi operator. They noted that motorcycle taxis offer greater earning potential, are less physically demanding, and have the benefits to customers of being able to travel further and faster. A number of bicycle taxi operators said, however, that bicycles can carry more weight than motorcycles when used in a manner similar to a wheelbarrow.

Focus group participants stated more goods can be transported by bicycle than by head-loading, a common practice among women. For load carrying, women report putting their loads on a bicycle taxi, and sending the driver ahead while they walk; carrying their loads with them on a bicycle taxi; or booking two bicycle taxis, one for themselves and one for their load.

Only 3 percent of bicycle owners in the BFG survey reported they used their bicycles for their own taxi business. Of those using bicycle taxis for income generation, they report extensive modifications to bicycles before they are fit for purpose. Modifications include installing bigger tires, smarter handles, larger saddles, reinforced forks, bigger carriers, and cosmetic improvements such as bells, bicycle horns, lights, reflectors, big comfortable seats, and ribbons. Taxi operators report conducting routine maintenance

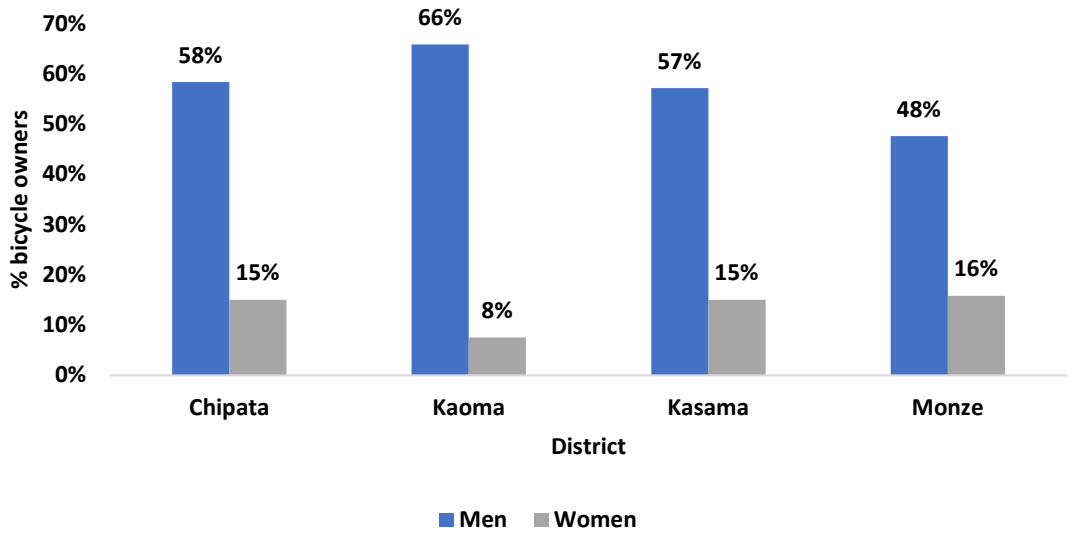
[20] Kalima, Deogracias. "Zambia's cycling city." *Africa Renewal*. 7 June 2022. United Nations.

weekly, and more extensive services monthly or less frequently. Taxi operators tend to be competent at their own repairs, but take their bicycles to mechanics for more sophisticated repairs such wheel-truing.

GENDER & BICYCLE USE AND ACCESS

As previously noted, bicycle ownership is more prevalent among men than women: just 13 percent of women surveyed by BFG indicated that they owned a bicycle compared to 57 percent of men. Low bicycle ownership rates among women were evident across all districts included in the survey.

FIGURE 5: BICYCLE OWNERSHIP RATES AMONG MEN AND WOMEN BY DISTRICT



However, BFG found high rates of bicycle use acceptability by women across all districts, ranging from 73 percent in Kaoma to 91 percent in Monze. Ninety percent of all respondents stated women would benefit from owning bicycles. Focus group respondents reported no social constraints to women riding or using bicycles other than dress codes: all women reported wearing chitengis or wraps over their skirts or trousers when riding or traveling as a passenger. With women often serving as primary caregivers, respondents highlighted the importance of women's ability to take children or others to health facilities using bicycles as a form of transport.

While women are free to use bicycles, men more frequently either own or control the use of a household bicycle; women have greater control when their husband owns another mode of transport (e.g., motorbike). Bicycle use among women is lower when compared to men, possibly because of the distribution of household tasks, with men working outside the home and more likely to use the household bicycle. Seventy-five percent of women reported they either did not use bicycles for travel or used them a few times a month or less, compared to a much lower percentage (43 percent) of men. In Petauke, there are higher levels of acceptability for women riding bicycles themselves than travelling on the back of a bicycle taxi.

TABLE 1: PERCEPTIONS REGARDING USAGE AND OWNERSHIP OF BICYCLES BY WOMEN

	Respondents agreeing that it is acceptable for women to use bicycles			Respondents agreeing that women will benefit from owning bicycles		
	% of all respondents	% of Men	% of Women	% of all respondents	% of Men	% of Women
Total (all districts)	82%	78.6%	84.4%	90%	87.3%	91.9%
Districts						
Chipata	83%	77.1%	90.5%	93%	91.7%	95.2%
Kaoma	73%	70.7%	72.5%	85%	78.0%	90.0%
Kasama	79%	73.8%	85.0%	89%	83.3%	95.0%
Monze	91%	92.9%	89.5%	91%	95.2%	86.8%

BICYCLE USAGE

FREQUENCY AND INTENSITY OF USE

Bicycles are used frequently in Zambia, particularly by those who own bicycles. In the BFG survey, 40 percent of respondents reported using bicycles regularly, either daily or several times per week. Among those who owned bicycles, 74 percent reported using their bicycles regularly. This suggests that with increased demand, there is greater propensity for frequent usage of bicycles and reduced need for other modes of travel.

Bicycle users make extensive use of bicycles. Nearly three quarters (73 percent) of survey respondents reported they used bicycles for travel, with that group of bicycle users spending an average of 7.5 hours per week traveling on a bicycle, illustrating that bicycles are an essential component of individuals' day-to-day transportation. Despite recording the lowest rate of regular bicycle use, bicycle users in Kasama recorded the highest average amount of cycling time: more than 50 percent of Kasama respondents spent at least 10 hours per week on bicycles. Where regular bicycle usage is highest–Chipata and Kaoma–60 percent of users spent less than five hours per week traveling on bicycles.

There are significant variations in bicycle usage across demographic groups. Of all respondents, the percentage of men who reported using bicycles regularly was nearly three times that of women. Men who used bicycles for travel spent an average of five hours more per week than women travelers; this aligns to global trip chain patterns where women generally travel less, and for shorter and more frequent trips, whatever the mode.

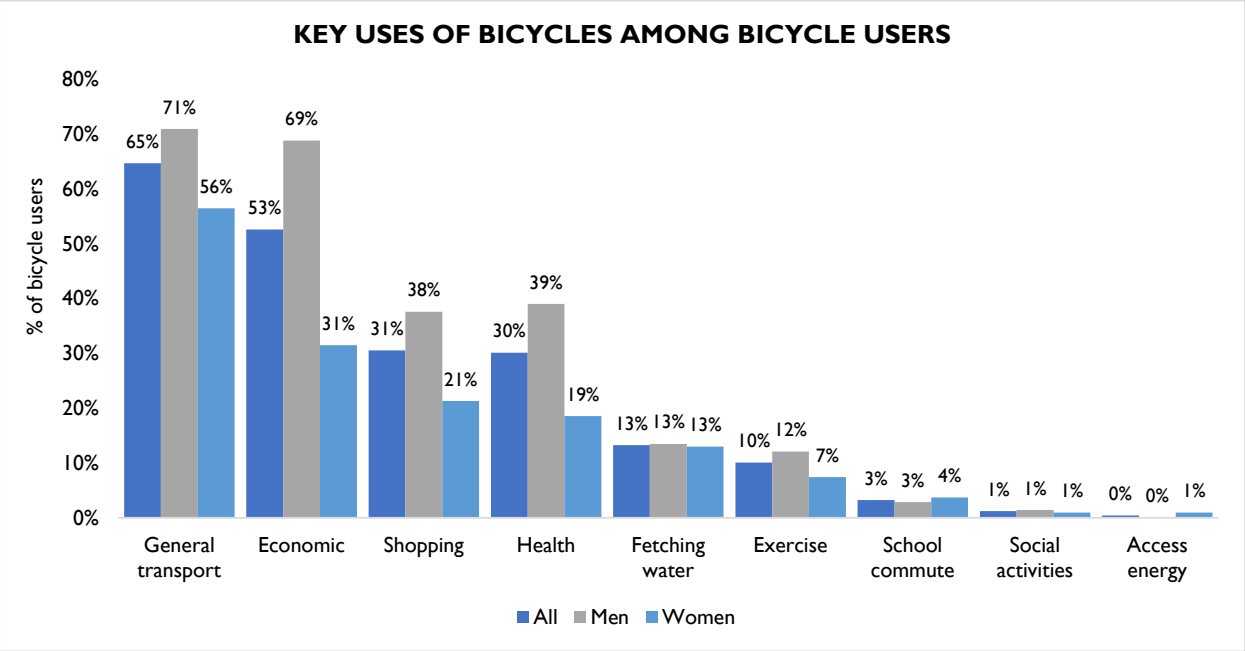
Across occupations, farmers had the highest rate (68 percent) of regular bicycle usage and also spent the highest amount of time traveling on bicycles, reporting an average of 9.3 hours per week (1.3 hours per day). Respondents who were unemployed, the majority of whom are youth and women, reported the lowest rate (20 percent) of regular bicycle usage and the lowest average amount of time (2.9 hours per week).

A full presentation of corresponding data is included as Annex 6: Survey Respondent Bicycle Usage and Intensity.

TRIP PURPOSES

The most important use of bicycles among bicycle users was for transportation/commute (65 percent) and economic activities (53 percent) (see Figure 5). Use of bicycles as exercise was important among women. More men than women used bicycles for shopping. This is possibly because the majority (74 percent) of individuals who used bicycles for shopping were farmers and informal merchants, and farmers and informal merchants are more likely to be men who travel to trading centers to acquire farm inputs and goods for trade. A much higher percentage of men than women reported using bicycles for economic purposes, for transportation, and for accessing health facilities. Women are more likely to access health-care services for those in their care.

FIGURE 6: KEY USES OF BICYCLES



CONSUMER PREFERENCES AND DEMAND FACTORS

When asked about the mode of travel they would prefer to use, bicycles were the second most preferred mode of travel by survey respondents, after private cars. Respondents, particularly bicycle owners, reported a desire to graduate to motorcycles and private cars. Only 20 percent of bicycle owners stated bicycles were their preferred mode of travel. 26 percent of respondents stated they preferred motorcycles over other modes of travel, while 30 percent preferred cars.

Respondents highlighted several factors that would increase their use and uptake of bicycles. Affordability is the top factor, with more than half of survey respondents reporting that availability of cheaper bicycles would increase their ownership and usage. Road safety was the second most commonly cited factor, particularly by male respondents who are the majority of bicycle owners and users.

TABLE 2: TOP FACTORS TO ENCOURAGE INCREASED BICYCLE USAGE

	% of all respondents	% of male respondents	% of female respondents
Cheaper bicycles	56.5%	56.6%	55.0%
Better road safety	43.2%	50.3%	35.6%
Bicycle paths	28.8%	36.4%	20.6%
Improved bicycle repair accessibility	13.5%	19.7%	6.9%
Secure bicycle parking/ storage	7.5%	12.1%	2.5%
Better bicycle design	5.7%	6.9%	4.4%

DEMAND DRIVERS AND CONSTRAINTS

Consumer preference for bicycles is driven by a variety of factors, primarily the affordability and accessibility of bicycles relative to other travel modes. Bicycles are also preferred by consumers because they can be used for a variety of purposes, including income generation, general travel for work or leisure, and household chores. Some of the key constraints to increased bicycle demand include bicycle cost and road safety concerns.

BICYCLE AFFORDABILITY

Across all respondents, cost was reported as the main barrier to bicycle ownership. Two-thirds (67 percent) of non-owners reported cost of acquisition as the main reason for lack of ownership. Cost was the most cited barrier in all districts, although it featured more prominently among non-owners in Chipata (83 percent) and Kaoma (87 percent) compared to Kasama (52 percent) and Monze (48 percent). Cost is particularly a barrier to youth ownership, the percentage of non-owners aged 18 to 24 years who identified cost as the main barrier was much higher (80 percent) than for all other age groups (56 percent), and likely explains the relatively low demand for bicycles among this age group.

The average purchase price for pre-owned bicycles (ZMK 1061 [US$64.71]) is lower than what consumers perceived as the fair price to pay for a bicycle (average of ZMK1717 [US$105]), and much lower than what consumers indicated they would be willing to pay (ZMK2039, [US$124]). However, about a third (34 percent) of respondents reported a perceived fair price of less than US$80, which is the minimum price in the market for mass market bicycles and is below the average price paid for pre-owned bicycles, suggesting that a considerable number may not consider purchasing new bicycles. It is worth noting that 30 percent of respondents reported a perceived fair price of at least US$225, near the price point for upmarket durable bicycles. This potentially indicates the likelihood of increased demand for more expensive (and potentially more durable bicycles) with better access to financial resources. The perceived fair price was highest in Kasama and Monze, where the average price consumers were willing to pay was also highest. In Monze, the average price that consumers indicated they would be willing to pay was 121 percent more than what consumers in Chipata reported. In Kasama, this was 84 percent more than in Chipata. This is likely linked to income levels. Findings from the BFG survey suggest that residents in Monze and Kasama have significantly higher incomes than those in Chipata.

Tariffs contribute to the cost of bicycles and spare parts in Zambia. Zambia's NMT Strategy addresses these tariffs by encouraging their elimination. The government's 2023 budget reduced tariffs from 25 percent to 15 percent (as described in the Regulation, Price Distortions, and Taxes section). This policy change should quickly mitigate two of the key challenges (cost of bicycles and parts) identified by BFG survey and focus group respondents.

TABLE 3: PRICE CONSIDERATIONS FOR BICYCLE OWNERS

	Purchase price		Perceived fair price		Willing to pay	
	ZMK	US$	ZMK	US$	ZMK	US$
All locations	1547.6	94.37	1716.9	104.69	2039.3	124.35
Chipata	1126.9	68.72	1073.4	65.45	1287.2	78.49
Kaoma	1687.8	102.91	1558.8	95.05	1906.1	116.22
Kasama	1895.6	115.59	2195.2	133.86	2372.4	144.66
Monze	1620.3	98.80	2365.3	144.23	2841.7	173.27

TRANSPORT AND MOBILITY NEEDS

Survey respondents and focus group participants make decisions about transport based on cost, safety, availability, speed, and reliability. In rural areas, most people walk as their main mode, as it is the cheapest and most available mode. Cycling is the second-most common main travel mode, particularly among older participants who are more likely to be able to purchase a bicycle. Bicycles are also used as feeder modes to other modes of transport. The minibus taxis that are ubiquitous in urban sub-Saharan Africa do not have the same presence and reach in rural areas. Men travel for longer time periods and more often than do women – in line with global travel patterns. Bicycles are primarily used for travel and for transporting agricultural produce and household necessities. The use of bicycles for both personal and commercial purposes is likely one of the key underlying drivers of bicycle demand.

In Petauke, the PGIS data shows that walking ('footing') is the main mode of travel, with trips taking up to 30 minutes. People walk up to 2-3 km, seldom longer. Bicycles are used for longer, more frequent, or faster trips (when similar distances to walking). Oxcarts (where available), motorbikes, and vehicles, are used for longer distances. People travel up to 40 km (by vehicle) to access grain mills and main markets. Cost and distance are the main decision points for mode choice.

COST OF TRANSPORTATION

The high cost associated with motorized transportation is a driver of the demand for non-motorized modes of travel, including walking and cycling, as these are more affordable and easily accessible. Where households do pay for transport, transport expenditure is one of the top household expenditure items in Zambia after food and housing.[21]

The average 30-day transport expenditure reported by BFG survey respondents was ZMK175 (US$10.67) However, 53 percent of BFG survey respondents did not spend on transportation over a 30-day recall period – in travel surveys this usually indicates a respondent cannot afford to pay for transport at all (and relies on walking or cycling). A greater percentage of bicycle owners (62 percent) than non-owners (48

[21] Zambia Statistics Agency. *2015 Living Conditions Monitoring Survey Report.*

percent) reported zero expenditure on transportation, a possible indication of reduced demand for paid options due to the bicycle. Car or motorcycle users have the highest average transportation spend (ZMK 420, US$25.61), while bicycles users or pedestrians report the least (ZMK 139, [US$8.48]). BFG did not find statistically significant differences in average spend on transportation between males and females, or across age groups.

MAINTENANCE COSTS AND SPARE PART AVAILABILITY

The costs and burden of ownership, distinct from acquisition, are major considerations in the decision making of owners and potential owners. High maintenance costs and difficulty finding spare parts can make bicycle ownership unappealing. In the case of Zambia, owners report that the availability of spare parts is not itself a significant issue: just 25 percent reported difficulty accessing a spare part the last time they needed to make a repair. Few focus group respondents identified specific challenges obtaining parts.

However, the costs of parts were identified as a concern by 71 percent of surveyed owners, and many focus group participants complained about spare costs, as well as the durability or quality of the parts themselves. Bicycle owners reported having to make repairs with relative frequency, with 87 percent of owners reporting having purchased spare parts of accessories since acquiring their bicycle and 40 percent of owners reporting replacing parts monthly or more frequently.

The cumulative costs and inconvenience of keeping a bicycle in working condition can be significant. Bicycle owners reported spending an average of ZMK255 (US$15.55) on spare parts and accessories in the prior six months, but repair costs can significantly exceed this. While tires and tubes are the most frequently replaced parts, damage to other components, such as the frame, can leave owners facing large outlays for both parts and labor. In some cases, the cost of repairing a bicycle can be large enough that an owner will be either unable or unwilling to make repairs and thus stop using their bicycle. Improved quality and durability of affordable spare parts on the market can increase demand for bicycles.

Similar to the availability of spare parts, bicycle repair services are typically accessible for most users when needed. Yet, affordability is a potential issue, as the cost of labor for repairs adds to the overall cost of ownership. For many minor repairs, such as fixing a tire puncture, owners will handle the issue themselves. However, more complicated and costly repairs entail a visit to a mechanic. Women and men exhibit divergent behavior regarding repairs. Women are less likely to repair their own bicycles than men. Although 46 percent of male bicycle owners reported that they repaired their own bicycles, the percentage was much lower (19 percent) among women owners. This indicates that women owners potentially face larger out-of-pocket ownership costs if they are making more frequent use of repair services (even if the need for repairs is the same as male owners).

Those individuals using their bicycles for carrying heavy loads like goods or passengers (i.e., using bicycles for income generation) have more substantial maintenance needs and face higher ongoing costs, and suffer the most if using poor quality spare parts that cause them to incur greater long-run costs. Bicycle taxi operators, for example, report repairing their bicycles weekly and conducting more extensive services every two to five months. The bearings, gears, pedals, spokes and rear wheels are the most common casualties. Taxi-businesses do minor repairs themselves while more complex repair and maintenance work is done by mechanics.

Buffalo Bicycles were noted to be highly durable and strong. But respondents also highlighted that when certain, less common Buffalo components must be replaced (e.g., coaster brakes), spares are more difficult to find, more expensive than others, and require specific mechanic skills. A number of focus group respondents mentioned the importance of the five-year warranty that comes with the sale of a Buffalo Bicycle, as this saves significant cost and concern.

ROAD SAFETY

More than half (58 percent) of BFG survey respondents reported that safety concerns influenced their decision to use a bicycle, indicating the concern may be depressing overall demand for bicycles on the basis of highly local conditions. A slightly lower percentage (50 percent) of respondents reported that safety concerns influenced the decision to purchase a bicycle.

In 2020, Zambia recorded 28,484 road traffic crashes with 1,690 fatalities.[22] Of road user types involved in crashes, 54 percent were pedestrians, 9 percent cyclists, and 3 percent cyclist passengers. Of these, 12 percent of fatalities were cyclists or passengers, and 49 percent pedestrians. The data suggests approximately six people were killed per day on Zambia's roads in 2021, and five people per day in 2020. Pedestrians and cyclists account for 77 percent of minor injuries in Lusaka, and 33 percent of serious injuries.[23] Increasing the risk is a general lack of consideration for bicycle users on the road on the part of motor vehicle operators. Many drivers make limited consideration for cyclists and view roads as belonging to motor vehicles rather than as resources to be shared by many categories of users. Among participants of the BFG survey, 80 percent reported that bicycle use on tarmac roads was dangerous. A much lower but significant percentage (45 percent) felt that bicycle use on dirt roads was unsafe.

The Zambia NMT Strategy (2019) aims to reduce fatalities of pedestrians and cyclists by 80 percent below 2018 levels through safe crossings, improved intersections, and dedicated NMT facilities. Given respondents' road safety concerns and their effect on bicycle ownership, reduced injury and fatality rates are likely to contribute to increased demand in the bicycle market system. Focus group participants, both men and women, note that road safety is not limited to vehicle-cyclist impact risk. They report anxiety about falling because of stones, drainage channels, sand, or other impediments.

ROAD CONDITIONS AND BICYCLE INFRASTRUCTURE

Globally, bicycle-specific infrastructure is an urban and peri-urban necessity, while the provision of pedestrian infrastructure, footways, safe crossings, road shoulders (when roads are tarmac) and road-speed and traffic volume reduction interventions are more appropriate and feasible on rural or gravel roads. Across sub-Saharan Africa, respondents note that with tarmac comes increased road speed and traffic volumes, and dramatically increased risk for pedestrians and cyclists. At the same time, poor quality gravel roads have a significant impact on wear-and-tear not only for bicycles but motorized vehicles, as well. Dust is off-putting to bicyclists and reduces visibility for both cyclists and drivers.

Respondents criticized road conditions, but noted roads are not sufficiently poor to prevent cycling in light of other advantages to bicycles. Feeder roads are reported to be preferred to paved roads, as the paved roads have higher speed traffic from motorized vehicles and poorly maintained shoulders in which

[22] 2021 Road Transport and Safety Status Report, Zambia Road Transport and Safety Agency.
[23] 2021 Road Transport and Safety Status Report, Zambia Road Transport and Safety Agency.

cyclists primarily ride. Focus group respondents note that roads are not wide enough to share with motorized traffic: getting knocked over by a vehicle mirror is a common concern. Several focus group respondents also noted road shoulders are too sandy to ride on, while others stated potholes are a problem on both roads and road shoulders.

The vast majority (60 percent) of BFG survey participants reported that no bicycle infrastructure was available in their communities. Eastern Province (which includes Chipata) stands out across Zambia for the presence of bicycle infrastructure (as described in the Infrastructure section). Yet even Chipata, resources like bicycle lanes are primarily restricted to main roads in district capitals. Crashes resulting from poor infrastructure have implications for livelihoods (downtime to repair the bicycle or recover from injury) and personal security. Bicycle taxi operators report that if they fall and injure a passenger, they risk getting "beaten by the mob" or family members of the injured party.

In Petauke, the PGIS findings are that participants rarely mentioned route hazards or obstacles, or road safety concerns. Footpath and track surfaces are generally unsealed but smooth; community participants did not mention surfaces as a barrier to comfort or compromising bicycle safety.

BICYCLE AVAILABILITY AND QUALITY

Bicycles are widely available on the market, but sales outlets are notably limited away from population centers. While individuals living in or near cities and towns have many retail options to acquire a bicycle, those in rural areas often have no consistent, nearby access to bicycles. This limited bicycle availability in many rural areas is a barrier to optimal market functionality.

Less than half (40 percent) of those surveyed were satisfied with the availability of bicycles in their communities. The issue is particularly acute in rural areas, as they often lack any nearby bicycle sellers and potential buyers must either acquire a pre-owned bicycle from within their community or travel to the nearest population center. More accessible bicycle sales outlets would help to meet rural demand, but this also depends on these businesses being sustainable.

In addition to the availability of bicycles, quality is an important consideration for potential buyers. Slightly more than a third (35 percent) of respondents expressed satisfaction with the quality of bicycles available in their community, while another 38 percent were unsatisfied. However, more than a quarter (27 percent) of respondents were unsure how to feel about bicycle quality, indicating that a majority of respondents either explicitly desire a higher quality bicycle or are open to better quality bicycles.

DESIRED FEATURES IN A BICYCLE

Bicycle owners and users highlighted several characteristics they wish to see in a bicycle. Many respondents reported meeting these needs through extensive bicycle modification, or not at all. A third of BFG bicycle owners in the BFG survey modified their bicycles after acquisition. Bicycle owners who use their bicycles frequently were more likely to report modifications: 77 percent of bicycle owners who made modifications used their bicycles either daily or several times a week. The most common modification reported was addition of a carrying rack, followed by reinforcements to strengthen the bicycle frame.

Among focus group participants, women reported that desirable attributes are gears, brakes with grips, lights, reflectors, easy-to-use pumps, and comfortable saddles. Back-pedal (coaster) brakes were characterized as undesirable, among other reasons because they damage one's shoes, say women respondents. Women also report the need for easier cargo or load carrying mechanisms: they reported strapping or securing heavy loads is a challenge for them.

Focus group respondents expressed a desire for bicycles that were safer, comfortable to ride and with utility. Specifically, they stated their preference for bicycles with brakes with good grip, gears that can be changed, comfortable saddles, and larger carriers. However, among survey respondents, the design (features) of the bicycle was the least cited consideration during purchase, reported by only 17 percent of respondents bicycle owners, compared to 50 percent who identified price as the most important consideration, and 56 percent who identified quality. These findings indicate that bicycle design features are not the prominent driver of demand, rather, price and quality are.

FINANCE

Finance has the potential to be a tool to overcome household resource constraints in bicycle acquisition, but its use has not been widespread in this manner. Limited access to finance and distrust of loans means that households in Zambia rely mainly on personal savings to acquire household assets. The majority of owners surveyed (79 percent) reportedly used their personal savings to purchase their bicycle. Formal loans, whether from a bank, microfinance institution, or other institution were not utilized by survey respondents or focus group participants to purchase their bicycles. Some reported borrowing from family or having repayment arrangements with sellers, but these responses were rare. As described in the Finance section under Systems, finance arrangements have been tried in the Zambia market and at least one business is offering bicycles through payments at scale, albeit not nationally, and has reported that this arrangement has been successful for both consumers and the company.

BICYCLE SECURITY

Bicycle security is a major concern related to bicycle ownership and to taxi operators who rent their bicycles. More than half (60 percent) of those surveyed reported they were concerned about bicycle theft. Theft concerns influenced the decision to purchase a bicycle among 41 percent of consumers. Secure bicycle parking and other infrastructure that could prevent theft is generally absent across Zambia. Without locks, bicycles are even stolen from churches, say focus group respondents. In Kasama, on the other hand, women report it is safe to leave a bicycle unlocked as long as it remains within sight. Bicycle taxi owners in Chipata reported that "bike-jacking" is a risk, which beyond taking away a valuable asset also directly removes their source of income. Considering the relatively high value of bicycles to households and the relatively low cost of equipment such as bicycle racks, local governments could help to mitigate this security concern with small investments in secure parking infrastructure in high traffic areas such as markets.

INCOME GENERATION POTENTIAL

Bicycles as tools for increasing income can be a driver for bicycle demand. This is primarily vested in bicycles being used to transport goods (reported by 48 percent of survey respondents) and for farm activities (18 percent of respondents). The vast majority (91 percent) of those who used bicycles to transport goods were either farmers, informal merchants or formal merchants. A much smaller

percentage (5 percent) used bicycles for bicycle taxi businesses or as items to lend (at a marginal revenue). Indirectly bicycles enhance income-earning potential through cost savings and reduced travel time. For example, in Kaoma, women note bicycles are desirable as they are quicker than walking, allowing better position at market for buying or selling. The vast majority of bicycle owners (93 percent) reported feeling that owning a bicycle would improve their ability to increase economic activity. However, it is unclear the degree to which this would be beneficial and how potential users would prioritize bicycle access or ownership relative to other income generating assets.

SUPPLY

The supply side of Zambia's bicycle market is competitive with several large importer/wholesalers (primarily based in Lusaka) and large numbers of retail outlets spread across the country. New bicycles are largely sourced from centers of low-cost production in India and China. Pre-owned bicycles come from a variety of sources, including North America, Europe, and Japan.[24]

Official data on the bicycle market is limited. Trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII) shows annual bicycle imports averaging US$3.9 million during the 2016 to 2020 period.[25] [26] This compares with $4.2 million in annual imports to neighboring Malawi during the same period, and places Zambia as the 15th largest importer of bicycles in Africa. (See Annex 4: Africa Bicycle Import Market Overview for more information on bicycle imports across Africa.)

Other datasets indicate that the supply of bicycles is growing. According to UN Comtrade, China and India exported more than 132,000 bicycles to Zambia in 2021, a 60 percent increase over 2020 (see Table 4). However, based on these data sources, imports have been highly variable from year to year and current figures are roughly in line with those from a decade ago. The multi-year drop in bicycle imports overlaps with periods of economic instability in Zambia beginning around 2014.

TABLE 4: QUANTITIES OF CHINA AND INDIA BICYCLE EXPORTS TO ZAMBIA (2012-2021)[27]

Year	China	India	Total
2021	30,346	101,764	132,110
2020	29,999	52,720	82,719
2019	39,595	48,525	88,120
2018	29,275	35,895	65,170
2017	n/a	50,286	
2016	n/a	75,927	
2015	45,317	61,041	106,358
2014	56,154	110,701	166,855
2013	62,701	73,976	136,677
2012	45,562	74,292	119,854

Typically, large importer-wholesalers based in Lusaka import bicycles into Zambia from India and China, then sell these bicycles onward to retailers across the country. Some bicycle supply chains within Zambia are integrated from import to sale, but these are in the minority. The market is generally competitive at

[24] In terms of supply chain structure and dynamics, the Zambian market closely resembles that of neighboring Malawi, albeit with some differences. Details can be found in BFG's complementary study of the on the Malawi bicycle market system.
[25] 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.
[26] UN Comtrade, the primary source for international trade data, shows lower levels of imports (US$2.9 million) for Zambia 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. Both CEPII and UN Comtrade data is referenced throughout this report. Specific values, particularly on the import side, should viewed with some caution. A detailed discussion of discrepancies in trade data is offered by Our World in Data.
[27] UN Comtrade.

both the wholesale and retail level. The exceptions to this are in rural areas where bicycle sales outlets may not exist at all 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.

Major constraints on the supply side include (1) rising/ unpredictable costs of bicycles, (2) limited supplier presence in rural areas, (3) limited retailer working capital and seasonal demand, which reduce retailer capacity proactively manage inventory, and (4) underdeveloped mechanisms for transmitting market feedback. 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.[28] With these trends continuing, bicycle price inflation is likely to reflect similar or even greater increases during 2022.

BICYCLES ON THE MARKET

Sellers offer several broad categories of bicycles in the marketplace, with many potential layers of further categorization.

MASS MARKET IMPORTS

The most widely used bicycles in Zambia are relatively inexpensive roadster-type bicycles. Often colloquially referred to as "Eagle," a reference to a brand previously produced in Zambia, available roadsters are typically produced in China or India under brand names including Hero, Phoenix, and Atlas. Manufacturers of these bicycles are often very large in scale and sell many different brands. For example, Hero Cycles Ltd is the largest bicycle manufacturer in India with a manufacturing capacity of 7.5 million bicycles annually. Within Zambia, Hero Cycles Ltd sells the brands Hero, Phoenix, Roma, Hawk, and Magic.[29]

Although it is difficult to establish the market share of these and other brands, BFG survey data provides some insight. Among the 120 current bicycle owners in the survey sample, more than 80 percent reported no brand for their bicycle or a brand other than Buffalo (a heavy-duty bicycle described below). This provides a rough estimate of the share of mass market bicycles – although included in this group would be domestically manufactured bicycles and non-Buffalo heavy-duty or premium bicycles.

Roadster-type bicycles are typically made of steel, are single speed or with limited gearing, and regularly feature carrying racks. Models featuring a double top tube frame are widespread. Roadster-type bicycles are available throughout Zambia through a wide range of outlets, although sellers are less common in rural areas where the range of goods available is generally more limited. Retail prices are usually in the range of ZMW 1,300-2,000 (US$79-122). Prices vary based on brand, model, and firm-specific or market-specific factors such as transportation costs.

[28] China Bicycle Association. "Analysis of the economic operation of China's bicycle industry from January to June 2021." 12 August 2021.
[29] Hero Cycles. "About Us." Accessed 21 September 2022.

The durability of mass market bicycles is commonly raised as a shortcoming of these bicycles. However, durability is a complex matter. Owners generally report satisfaction with their own bicycles, even if the costs of maintenance and replacement parts are significant. Most complaints about the quality of these bicycles stems from the durability of components under use conditions which are more intense than their intended purpose (e.g., carrying heavy loads and additional passengers in challenging terrains). Relatively few owners report having had to repair frames, by contrast replacement or repair of components encountering friction or movement such as tires, tubes, wheels, and brakes are reported to break relatively frequently. Across the BFG survey sample, new bicycle owners of brands other than Buffalo owning their bicycles for an average of more than 5 years, with more than 17 percent reporting having owned their bicycle for at least 10 years.

A typical roadster-style mass market bicycle found in the Zambian market

Mass market roadster-type bicycles form the core of the bicycle market and are used for virtually any activity where a bicycle may be called for – from individual transportation, to carrying goods, and as bicycle taxis. In Chipata, the city with the highest concentration of bicycles in Zambia,[30] virtually all bicycle taxis are roadster-type bicycles (though often modified with an improved carrying rack/seat).

In addition to the standard roadster bicycles, mountain bicycles are also widely available, though less prevalent than roadsters. Mountain bikes are distinguished by their somewhat bulkier frames, wider/larger tires and wheels, gearing, suspension (although this is not universal), and lack of sturdy carriers or baskets. These are primarily used for individual transportation rather than the movement of goods and passengers, as users report that the design is less suited for carrying heavy loads. Mountain bikes typically enter the

[30] Kalima, Deogracias. "Zambia's cycling city." *Africa Renewal*. 7 June 2022. United Nations.

market through the same kinds of sales channels as roadsters. However, fewer sellers offer mountain bicycles and those that do offer limited options. Some suppliers expressed that mountain bicycles are likely to be an area of long-term growth in the bicycle market as the market for roadsters decline – a situation many are anticipating as current bicycle users shift to motorized transport in the long-term.

A typical mountain bike for sale for sale at a shop in Chipata

The quality of these mass market imports is highly variable. BFG respondents complained about the quality of the typical bicycle available in the market and in doing so are usually referring roadster-type bicycles. Despite these complaints, many owners interviewed reported relatively high levels of satisfaction with their personal mass market bicycle and 78 percent of all bicycle owners surveyed by BFG indicated that they were satisfied with their bicycles.

HEAVY-DUTY BICYCLES

Compared to mass market bicycles, heavy-duty bicycles are designed specifically to serve the wider range of purposes that bicycles are used for in Zambia and other contexts, such as hauling goods and additional passengers, and rugged road conditions. These heavy-duty bicycles are made with higher quality, more durable components such as heavy gauge steel, reinforced spokes, and carrier racks with high load capacities. These bicycles are more expensive than mass market bicycles, often significantly so.

The most widely known and well-established brand of heavy-duty bicycles is Buffalo Bicycles. The Buffalo Bicycle is available through 28 branded shops across all 10 provinces in Zambia and a small number of third-party outlets. Compared to other new bicycles on the market, the Buffalo is significantly more expensive (ZMW 4,260 [US$260]). However, the Buffalo's price reflects higher quality, the likelihood of lower long-term costs through fewer repairs and component replacement, and improved features relative to lower cost mass market imports, such as thicker gauge steel, a carrier with a 100-kilogram capacity, a dipping top-tube/crossbar to facilitate use for both men and women, and five-year warranty. Both

individuals and institutions indicated that Buffalo is widely perceived as the premier bicycle on the Zambian market and is highly desired by individuals. In 2021, nearly 23,000 new Buffalo Bicycles entered Zambia, most of which were sold through commercial sales rather than distributed through philanthropic channels.[31] Since establishing Zambia operations in 2007, more than 247,000 Buffalo Bicycles have been sold or donated in Zambia. Based on BFG survey data, owners of Buffalo bicycles who purchased their bicycle new owned their bicycle for an average of just over 5 years. This is similar to the longevity of ownership for non-Buffalo bicycles (which can be assumed to largely or exclusively be mass market imports based on brand names). However, a greater share of Buffalo owners report having owned theirs for more than 10 years compared to non-Buffalo owners (26 percent vs 18 percent).

Heavy-duty bicycles of various brands lined up for sale in a retail shop

In addition to Buffalo, several other heavy-duty models are available under brand names such as Hero, Rhino, Bison, and Hawk. Several of these are heavily influenced by Buffalo in terms of features, design, and branding, though none has the distribution/service footprint offered by Buffalo. BFG directly encountered

[31] World Bicycle Relief, *2021 Global Impact Report*.

these bicycles in the retail market at only one dedicated bicycle shop in Lusaka, and through an interview with one institutional buyer who had recently procured several hundred. These other heavy-duty bicycles are typically priced somewhat lower at retail than comparable to Buffalos, in the range of ZMW 3,700-4,200 (US$225-256). Retailers of these bicycles report they are of a similar quality to Buffalo, though they also note that these competitors do not typically offer the same warranty coverage offered by Buffalo. BFG observed relatively few of these non-Buffalo heavy-duty bicycles in use in Zambia.

PRE-OWNED BICYCLES

A limited but nonetheless notable volume of pre-owned bicycles are imported into the Zambian market each year, typically from North America, Japan, Europe, and Australia. Although estimating the precise volume of these is difficult, UN Comtrade data imports from these markets account for just over 6 percent of all bicycle imports in 2020 on a value basis and 9 percent on a weight basis.[32] By contrast, Japanese bicycles accounted for 18.5 percent of neighboring Malawi's bicycle imports during the same time.[33]

The government treats pre-owned bicycles in the same manner as new bicycles during the importation process, with VAT, and other costs applied (described in more detail below in Regulation, Price Distortions, and Taxes).

Second-hand bikes may be further divided into bulk bicycles and premium "brand" bicycles. The bulk bicycles are typically steel bicycles purchased in lots from origin markets with no distinction in terms of brands.[34] Importers acquire these at relatively low unit costs, though transportation costs are significant, leading them to be offered at retail in the US$100-125 range, above typical prices for comparable new mass market bicycles. Brand bicycles are typically high-quality aluminum bicycles from leading international brands, such as Biancci, Peugot, and Specialized, and represent a niche segment of the market. These are expensive to import and often sold at a retail price near US$400 and generally purchased by cycling enthusiasts for transportation and exercise rather than for economic activities.

As in many other markets, some consumers perceive these pre-owned imports as of a higher quality than new Chinese or Indian imports, creating a sustained basis for demand. Although the market for higher cost pre-owned brand bikes is relatively small, supply is limited, and it is difficult to meet demand. One challenge faced by owners of these bicycles is the more limited and inconsistent availability of spare parts, such as gearing that is not common on mass market bicycles.

NEW PREMIUM BICYCLES

In addition to the segments described above, retailers offer a small supply of new, higher cost sport and mountain bicycles targeted at leisure riders (i.e., bicycles not used for income generation). These include bicycles sold in multinational hypermarkets and select specialty shops. Prices for adult bicycles in this category start around ZMW 3,000 (US$183) for brands such as Raleigh and can reach more than ZMW 40,000 (US$2,440) under brands including Momsen. High-end bicycles sold by hypermarkets are typically

[32] Trade data for Zambia does not include quantities of bicycles.
[33] Virtually bicycles exported by Japan are secondhand, particularly those exported to developing countries.
[34] These may be the same or similar to the "home use" secondhand bicycles that are more common in markets such as Ghana, Nigeria, and Tanzania. The Japanese *mamachari* with step through frame, single or three speed, and basket is typical of these.

manufactured in China while smaller specialty sellers source from South Africa and other markets. Purchasers are typically urban sport users with relatively high incomes, a narrow segment of the market.

ELECTRIC BICYCLES

While electric bicycles ("e-bikes") have expanded in popularity globally, they are not widely available or used in Zambia. The price point of many high-quality e-bikes is near or above that of an entry-level motorcycle (which can be found secondhand for below ZMW 10,000 [US$610]), putting it out of reach for most Zambian households and presenting a poor value proposition for income generation relative to faster motorcycles with greater load capacity.

BFG interviewed one Lusaka-based importer/retailer of battery-assisted bicycles who noted that demand for these has been low so far. The supplier attributed this low demand to a lack of access to adequate replacement batteries. Batteries on the Zambian market are usually not the proper voltage for the imported bicycles. Replacement batteries can also cost more than the bicycle itself (i.e. the bicycle excluding batteries) at US$250. These factors have led this supplier to market the battery-assisted bicycles as standard push-bicycles to customers, explaining to them that they can be used manually, and the battery can be ignored or removed. These are sold by this retailer at a price of US$100, which is line with the retail price of their standard bicycles and results in a US$50 loss per sale.

DOMESTICALLY PRODUCED BICYCLES

Until 2010, a domestic bicycle manufacturer operated in Chipata. Luangwa Industries began as a state-owned enterprise for bicycle production, primarily under the Eagle brand, in 1982 before being privatized in a 1997 sale to the Tata Group, an Indian business conglomerate. Although Luangwa Industries continued to produce bicycles for several years after privatization, the company experienced a general decline when competitive pressures from imports increased. BFG was not able to interview representatives from Luangwa Industries (the manufacturer of Eagle bicycles) or Tata Zambia. Other interview subjects provided explanations for the failure of the company including poor management, lack of human and capital resources, poor product quality, and increased competition from Chinese and Indian imports – all of which are challenges a new entrant would be likely to encounter.

Luangwa Industries stopped exporting in 2004 and production ceased altogether several years later. By 2017, the Chipata factory had been repurposed as a beer warehouse.[35] Challenges to domestic production are discussed below under "Manufacturing and Shipping."

Although production of Eagle bicycles ceased, Eagle bicycles can still be found on the road in active use. Many individuals interviewed by BFG indicated they owned a locally-produced Eagle bicycle and generally view them in a positive light.

The legacy of Zambia's domestic bicycle sector was raised in several BFG interviews. Many stakeholders tie the presence of the factory in Chipata to the continued popularity of bicycle transport in Eastern Province. Further, one of the most enduring imprints of the sector is the widespread use of "Eagle" as a genericized trademark referring to a mass market bicycle, regardless of origin or brand. Users, particularly bicycle taxi operators, report that Eagle bicycles are durable and considered to be among the strongest

[35] Mills, G., Obasanjo, O., Herbst, J. I., & Davis, D. (2017). *Making Africa Work: A Handbook*. p. 2

bicycles in use in Zambia. The Eagle brand is also referenced in the names of mass market imports currently available on the market. For example, the "Zambia Eagle" branded bicycle is produced in India.

Some entities offer small-scale production or modification of bicycles, though this represents a very narrow and specialized niche. For example, Disacare, a social enterprise dedicated to empowering Zambians with mobility challenges, is one such producer. The bulk of Disacare's operations focuses on the local production of fit-for-purpose mobility aids from bicycle parts, which are often wheelchairs (70 percent of production) and tricycles (5 percent of production). Disacare welders and technicians assemble durable wheelchairs and tricycles in their Lusaka-based workshop from imported steel and locally sourced bicycle parts, particularly from Buffalo Bicycles. While sourcing steel presents a major cost and challenge to Disacare's operations, the organization uses bicycle parts because they are easy to source and enable easier user maintenance. At this time, their wheelchairs and tricycles are made to order, selling for 4,000 ZMW (US$244) and 5,500 ZMW (US$335) respectively.

Although Disacare's operations are relatively small, one implication is that a dynamic and diversified bicycle market can increase accessibility and mobility through secondary channels. Such channels reach beyond direct customers and users of bicycles through creation of a sustained supply of inputs and technical skills to innovate and adapt.

PRODUCT-MARKET FIT

Data on product-market fit is conflicting. While many interview and focus group discussion participants report the quality of bicycles available in the market is an issue (particularly with regard to mass market imports), survey data collected by BFG indicates there is a relatively high degree of satisfaction with bicycle quality. More than 80 percent of current and past owners report being satisfied with their bicycle. This discrepancy may reflect consumers adjusting their expectations to the bicycles available to them at a particular price point. The behavior of many owners indicates that the bicycles they purchase are imperfectly suited for their needs. As described in the Demand section of this report, modification of bicycles is common and several interview and focus groups subjects report desiring features such as gearing that is not universally available in the market.

Nonetheless, satisfaction rates indicate market opportunity for businesses targeting the one in five bicycle owners that are not satisfied. Among dissatisfied owners, more than 90 percent reported they were likely or very likely to spend more money for a higher quality bicycle in the future. Many owners and non-owners in BFG's focus groups, as well as individuals speaking to BFG during market visits, stated they individually aspire to own a Buffalo Bicycle or a similar, high-quality heavy-duty bicycle.

Mass market import bicycles are not generally purposefully designed for carrying heavy loads of goods or passengers, yet they are regularly used in this capacity – often quite effectively by taxi operators, farmers, and merchants. Conditions of use are important here. For example, bicycle taxi operators in Chipata reported they strongly preferred roadster-type bicycles, even over Buffalo Bicycles. The reasons cited included that these bicycles sit higher and are lighter while remaining strong (in part assisted by reinforcement of key parts such as forks and spokes).

To improve product-market fit, beyond addressing the affordability issues of heavy-duty bicycles, suppliers could employ a combination of improved market feedback mechanisms to offer more targeted supply in particular markets, as well as market based on market feedback (e.g., highlighting in-demand features).

BICYCLE MARKETS

Bicycles are widely available across Zambia. In larger population centers, substantial numbers of bicycle retailers and related businesses can be found clustered together, such as in Kamwala Market in Lusaka or Kapata Market in Chipata. In these bicycle market clusters, competitive forces mean individual sellers exercise little market power and are price takers. Although a variety of brands are available in these clusters, individual bicycles are largely similar to each other as described above under Mass Market Imports. The market clusters also include sellers of spare parts and mechanics' after-market services.

Bicycle outlets exist in many forms, yet fewer bicycle sellers operate in rural areas, especially dedicated retailers. Residents of these areas typically must travel to population centers to acquire bicycles unless purchasing a pre-owned bicycle from a community member in the secondary market.

Many bicycle sellers at the wholesale and retail level are well-established, with several having been in business for decades and handed down between family generations. However, these businesses do not tend to have fixed roles in the market over time: some businesses shift between a retail focus and wholesale lines, other diversified businesses enter and exit the bicycle market altogether, and many businesses adjust their product offering and supply chain relationships based on market signals.

WHOLESALE MARKET

The wholesale market consists of a large number of importer-wholesaler and other intermediary wholesalers purchasing from importers. These wholesalers sell onward to retailers. For mass market import bicycles, this market segment is highly competitive with smaller scale operators entering and exiting the market depending on conditions, such that supply is consistently available for retailers.

Wholesaler business models vary around certain elements including:

- *Import engagement*: Some wholesalers purchase directly from manufacturers in Asia or source markets for pre-owned bikes (especially North America, Europe, and Japan)
- *Scale*: Wholesalers range from small operations (typically middlemen) to large operations selling thousands of bicycles per year
- *Scope*: Wholesalers may specialize in specific brands or types of bicycles, while others may be more expansive and sell bicycles from multiple manufacturers. Additionally, many wholesalers are involved in the trade of spare parts alongside bicycles, though some specialized spare parts wholesalers also operate in the market systems. For some wholesalers, bicycles may be one product line of many unrelated product lines.

Importer-wholesalers are clustered in Lusaka, particularly around Kamwala Market. Many of the largest importers operate retail locations in Lusaka or, to a lesser extent, other major markets such as Chipata. These retail operations typically account for a smaller share of the business. For example, one large importer interviewed by BFG has been in business for over 25 years and operates two bicycle shops in Lusaka while supplying more than 50 retailer customers across the country.

Some suppliers outside Lusaka function as wholesalers on a more localized and opportunistic basis, such as selling to other suppliers in the same market or neighboring markets when there is immediate demand and the seller has excess inventory.

An emergent trend is international bicycle manufacturers directly entering the market in Zambia on a wholesale basis, essentially bypassing Lusaka-based importers to engage with retailers. Nonetheless, the structure of the supply chain looks very similar – with bicycles moving from the manufacturer to Lusaka before reaching end markets. Importers note that direct wholesale transactions by manufacturers are able to undercut their prices by essentially removing a link in the supply chain. It is difficult to assess how significant of a market shift this is. Most retailers interviewed by BFG indicated that they were purchasing their stock from importers in Lusaka. Additionally, at least two of these retailers had made decisions in the last three years to stop importing directly from manufacturers in Asia. On the other hand, BFG encountered a marketing representative for an Indian manufacturer in Chipata. This representative indicated the manufacturer was currently supplying four shops in town and experiencing sales growth.

The structure of wholesaler-retailer relationship varies. Many retailers engage with a wide range of wholesalers in search of the most favorable prices for a one-off transaction, which has the benefit of flexibility and potential short-term cost savings. Others establish strong, longer-term linkages with their wholesaler suppliers, which has the potential for long-term cost savings through preferential pricing based on sustained engagement. Longer-term relationships may also yield supplier credit, which is more likely to be extended when trust is established. These strong supplier linkages may also enable retailers to sell more consistent offerings, therefore enabling them to establish a brand identity for their products. It is not clear that either relationship has substantive impacts on the price or availability of bicycles for end users unless those users are looking for a specific bicycle or to purchase from a specific shop. In such cases the idiosyncrasies of individual supplier relationships will shape product options and prices.

It is also worth noting that agents of both bicycle producers and some other suppliers play a role in developing bicycle supply chains. Individual agents facilitate the establishment of supplier linkages. Effective agents can communicate the offerings of manufacturers or upstream suppliers and understand how those meet needs identified by downstream suppliers.

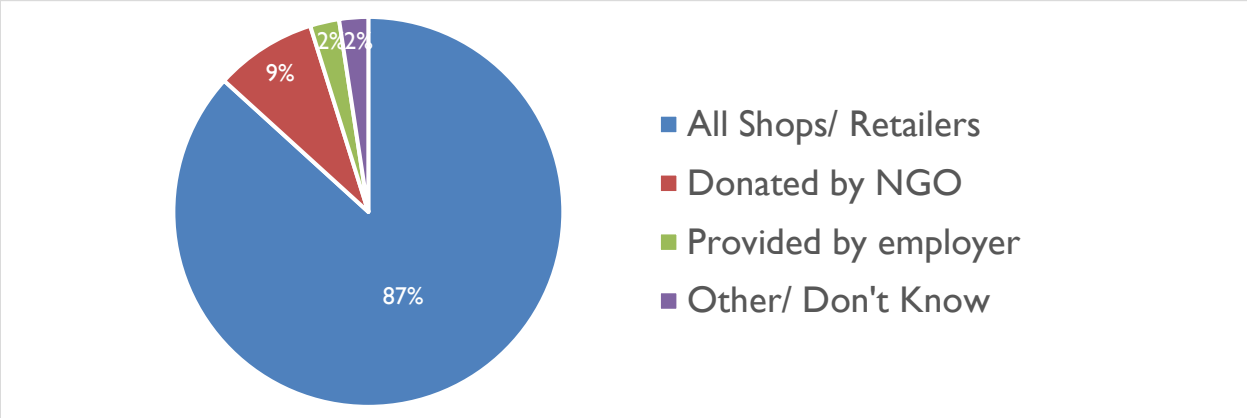
RETAIL MARKET

Bicycle retailers are present throughout the country and are the main channel for acquiring new bicycles of all types. These retailers include dedicated bicycle shops, hardware stores, agro-dealers, and other general traders. These sellers often have multiple models or brands on offer. Several bicycle outlets compete in commercial centers. Lusaka's Kamwala Market has a dense cluster of retailers corresponding to its central role in the national wholesale market. By comparison, the cluster of Kapata Market in Chipata reflects the very high level of demand for bicycles in Chipata and Eastern Province more broadly. By comparison, other urban and peri-urban markets visited by BFG had multiple bicycle sellers, though not to the degree of either Kamwala or Kapata.

Bicycles for sale at a retailer in Lusaka

Most sellers (including specialized retailers and more generalized traders) generally have new mass market imports on offer. A smaller number of sellers also engage in the sale of used bicycles. These include the sale of secondhand imports (i.e., bicycles that are "new" to Zambian market, though having been used in origin countries like Japan or the US), something that is uncommon outside of Lusaka, and pre-owned bicycles acquired locally.

FIGURE 7: ACQUISITION SOURCE – NEW BICYCLES



Retail sales are highly seasonal, reflecting the significant agricultural orientation of the economy. Sales tend to peak following harvest season, which typically ends around August. Even in urban areas, bicycle retailers report that farmers form a major part of their customer base, and these sellers are highly aware of this seasonality. Several retailers reported their sales had declined in 2022 because lower household incomes resulting from poor harvests.

Independent retailers typically order bicycles from wholesalers as they run low on inventory. They will also increase inventories in anticipation of peak season after the agricultural harvest. However, capital constraints are common, especially for the smallest traders. As a result, these sellers encounter challenges in optimizing their inventories during periods of high demand and achieving economies of scale in ordering. Sharp increases in the wholesale cost of bicycles have created an additional challenge in ordering.

Hypermarkets, which sell bicycles as only one product among a range of consumer goods, are available in large cities and serve a narrow slice of the market. For one large hypermarket, BFG estimates that the outlet sells approximately 250 bicycles per year. In addition to selling more expensive bicycles (namely New Premium Bicycles), these hypermarkets and specialty stores offer the full suite of supporting goods for cyclists, such as spare parts and safety equipment.

In many rural areas, buyers must travel to the nearest town to obtain a bicycle. Rural residents highlighted the absence of local bicycle sellers as a major deficiency in the bicycle market system, which serves as a practical constraint on their ability to act on their demand for bicycles. Community leaders in rural sites in Monze and Chipata Districts expressed optimism about the viability of bicycle retail businesses in their communities, in part citing the success of recently established spare parts sellers. Nonetheless, operating a specialized business with relatively high working capital needs in areas of low population density is challenging and not unique to bicycles.

Mobile trading businesses that would sell bicycles in communities on a part time basis, such as on market days, could be one means of addressing this supply issue in rural areas or testing the viability of a fixed presence. In other markets studied by BFG, namely Rwanda, village mechanics played the role of supplier in addition to service provider. In the case of Rwanda, rural mechanics often take orders for bicycles and will assemble a bicycle using parts on hand or ordered during their normal business practices. Some mechanics engaged in this will allow their customers to pay for parts and assembly over time, thereby spreading out the costs and mitigating the challenge of having to face a large outlay all at once. These practices could be promoted and adopted by mechanics to fill the rural supply gap, but would depend on access to a comprehensive range of spare parts.

INSTITUTIONAL BUYER MARKET

As described in the Institutional section within Demand, institutional buyers, such as donor-funded projects and NGOs typically make purchases through structured procurements rather than through purchases in the retail market. A narrower segment of suppliers engage in the institutional market than the retail market. Given the volumes involved, these transactions also more closely resemble wholesale market activity, with suppliers such as Buffalo Bicycles or Rhino Bicycles engaged in the import and sale.

Many large retail suppliers note that they do not pursue institutional procurements because of the bureaucratic complications associated with pursuing them and payment terms that create extra working capital requirements (i.e., only partial upfront payment by buyers). These suppliers will nonetheless be willing to sell to institutional buyers in volume from inventory on standard cash and carry terms.

A new Roma brand heavy-duty bicycle recently procured by an institutional buyer

NON-MARKET SUPPLY

In addition to traditional market channels, bicycles reach owners through non-market channels. Nearly 14 percent of surveyed bicycle owners reported not paying for their bicycles. This non-market supply is closely tied to market channels, with bicycles initially acquired through market transactions and transferred through other mechanisms. These non-market transfers occur through several channels including purchase by NGO and then donation to the end user, bestowals by institutions, and transfers between individuals. Several institutions have mechanisms to transfer ownership of program bicycles to bicycle custodians (e.g., community health workers) at the conclusion of a program.

Non-market transfers are more prevalent in rural areas, as donor programs and the public sector utilize bicycles more intensively in rural areas. For example, BFG observed that an NGO had recently distributed Buffalo Bicycles to households in one rural market community (Bweengwa in Monze District) as part of an initiative to address mobility challenges for schoolchildren. By an informal count, nearly half of the bicycles passing through the market during data collection were Buffalos – a concentration which would be unusual under other circumstances.

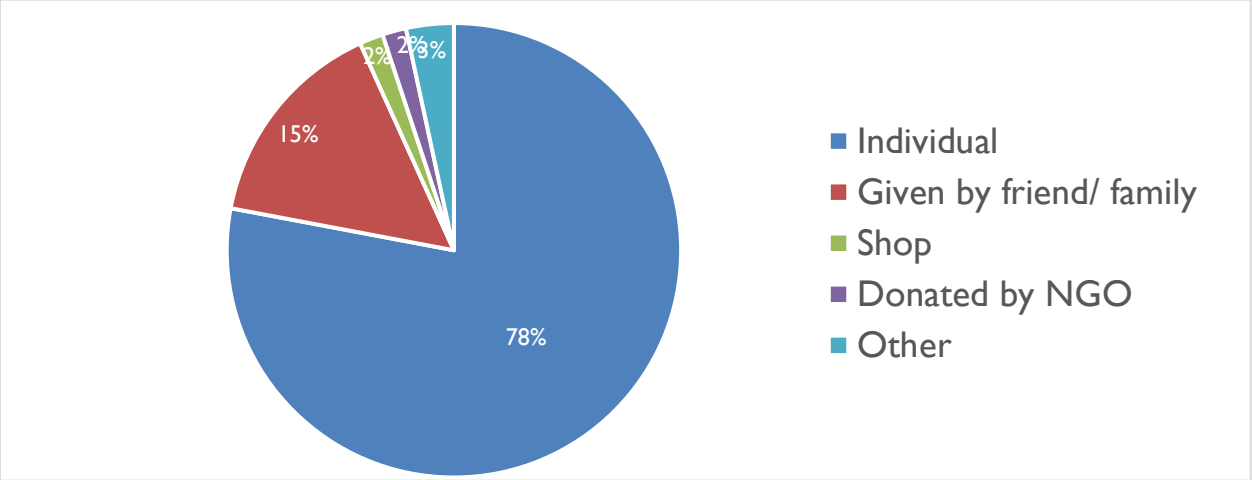
In addition to NGO donations and institutional bicycles being used (or ultimately owned) by individuals and households, donations by politicians are another non-market channel of bicycle acquisition for households.

SECONDARY MARKET

Zambia's market for pre-owned bicycles is substantial. Just over 40 percent of surveyed bicycle owners indicated their bicycle was used at the time they acquired it. A wide majority (78 percent) of these owners reported that they purchased their bicycles from individuals in their communities, by comparison, only a

single survey respondent reported acquiring their used bicycle from a shop (see **Error! Reference source not found.**). Interpersonal acquisition is a critical pathway to bicycle ownership, especially in rural areas where bicycle sellers are not present and household resources are more constrained. Several rural community members expressed that the absence of outlets for new bicycles and the associated burden of traveling to town to purchase one created the conditions for a more active local secondary market. A potential implication of this is that bicycles in these areas have experienced more wear than those in areas with a greater supply of new bicycles, and may require more servicing and replacement of components.

FIGURE 8: ACQUISITION SOURCE - PRE-OWNED BICYCLES



Although the secondary market is sizable, it appears to largely complement the market for new bicycles through multiple channels. First, it operates in areas where the primary market (e.g., bicycle sellers/retailers) do not operate, like many rural communities. Second, it provides an entry point for individuals and households with limited financial resources to acquire bicycles at relatively low price points. Additionally, it provides a mechanism for current bicycles owners to offload an asset with some value if they seek to upgrade to a different bicycle in the primary market. Through the first two channels, the secondary market is effectively serving different segments than the primary market, and through the third channel the secondary market facilitates access to bicycles in the primary market.

SUPPLY CHAIN

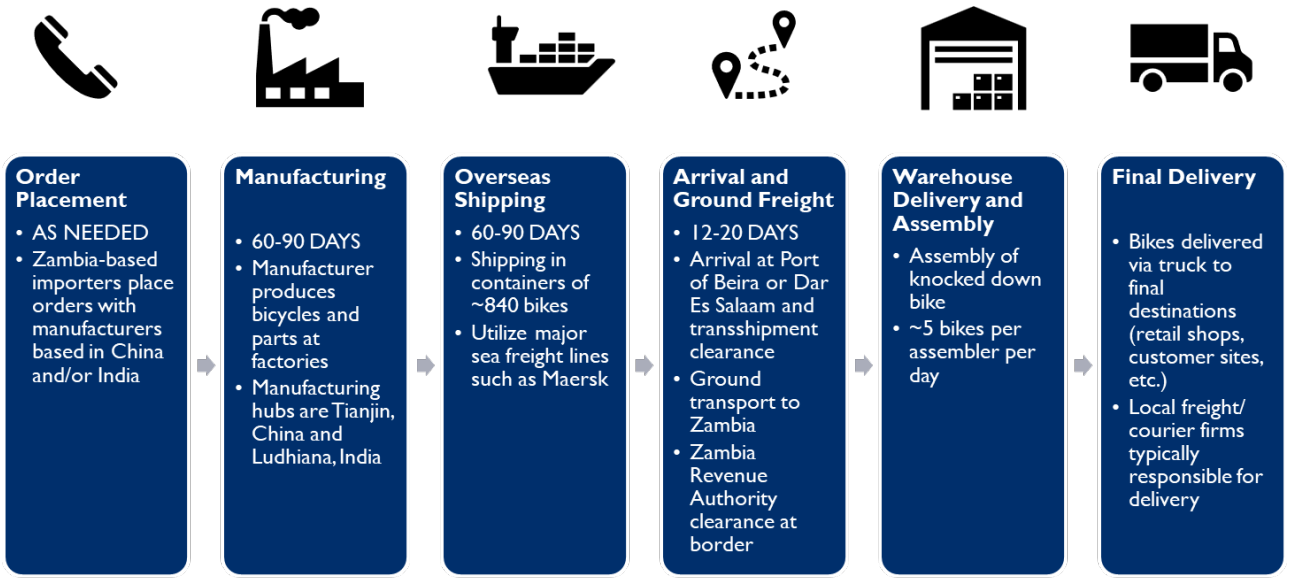
The bicycle supply chain in Zambia follows a relatively standard structure. Importer/wholesalers order large volumes of bicycles and spare parts from overseas manufacturers. These manufacturers, primarily based in China and India, produce bicycles based on these orders. Newly manufactured bicycles are then shipped in containers via sea between origin countries and major regional ports in boxes of complete knockdown (CKD) bikes. A full 40-foot container can fit approximately 840 CKD bikes. For used bicycles, which are usually shipped only partially disassembled, the number of bicycles in a container is typically much smaller. Depending on the buyer, shipping arrangements, and other factors, bicycles may be mixed with other goods in a container. Once containers depart the origin country they travel over the ocean for 60 or more days. The length of this journey is dependent on the point of departure, whether there are transshipment points, the port of arrival, and global shipping conditions. Beira, Mozambique, is the

most common port of entry, with Dar Es Salaam, Tanzania, as second the most common. Containers of bicycles are offloaded from ships and placed on trucks to transport them from port inland to Zambia.

The Zambia Revenue Authority (ZRA) handles customs procedures at the border. These standard procedures entail ensuring that shipments have complete and accurate documentation, taxes are paid, and goods are ultimately cleared to travel onward to their destination. ZRA is digitizing processes and shifting away from paper-based systems. While these changes are designed to streamline workflows, reduce clearance times, and prevent fraud and abuse, the initial rollout has IT system bugs and other issues, which have created new frictions and frustrated traders. ZRA has moved to address these issues as they have been identified, and will likely be resolved in time. One logistics firm interviewed by BFG noted that despite the growing pains, the electronic system is a substantial improvement over the previous paper-based system; clearance at the Zambia border should take less than a day in many cases.

Transport from Dar Es Salaam to Lusaka is typically 18 to 20 days, while the journey from Beira to Lusaka typically requires12 to 15 days. Wholesalers then assemble CKD bicycles and arrange with retailers for delivery to retail outlets, at which point the bicycles are sold to consumers. In the case of institutional sales, fully-assembled bicycles travel from warehouses to sites agreed to with the buyer.

FIGURE 9: ILLUSTRATIVE ZAMBIA BICYCLE SUPPLY CHAIN



According to CEPII, Zambia imported approximately US$3.3 million worth of bicycles in 2020. China is the origin of nearly 60 percent of Zambian bicycle imports on a trade value basis, with the value of Indian imports just under half those of Chinese imports.[36]

[36] It should be noted that related UN Comtrade export data shows India exporting a higher *quantity* of bicycles than China in 2020 (as show in Table 4). It is difficult to determine exactly why this is, as these data points are related, but not perfectly linked. One possible explanation, beyond statistical particularities across reporters, is that Buffalo Bicycles, which are relatively high cost and represent an important share of the Zambia market are manufactured and exported from China.

TABLE 5: ZAMBIA BICYCLE IMPORTS 2020[37]

Trading Partner	Trade Value (US$)	Share of Total Value
China	$ 1,953,972	58.4%
India	$ 924,449	27.6%
South Africa	$ 222,556	6.7%
USA	$ 87,099	2.6%
Rest of the World	$ 156,929	4.7%
Total	***$ 3,345,005***	***100.0%***

The data from CEPII (based on UN Comtrade) presented above captures *formal* trade. Market participants noted the existence of informal crossborder trade, particularly with Malawi. By its nature, the scale of this informal market is difficult to estimate. However, it does appear to be mostly limited to border communities.

MANUFACTURING AND SHIPPING

Bicycle supply chains face several challenges at this time, including several driven by COVID-19 and the war in Ukraine. Interviewees emphasized that supply chain challenges have increased costs and manufacturing lead times in the last two to three years. One supplier reported encountering lead times of more than six months from initial order to delivery. Though this appears to be a longer than typical supplier lead time, shipping times from Asia alone now regularly require upwards of 60 days to reach Zambia, whereas 35 days from India and 45 days from China were typical in 2019.

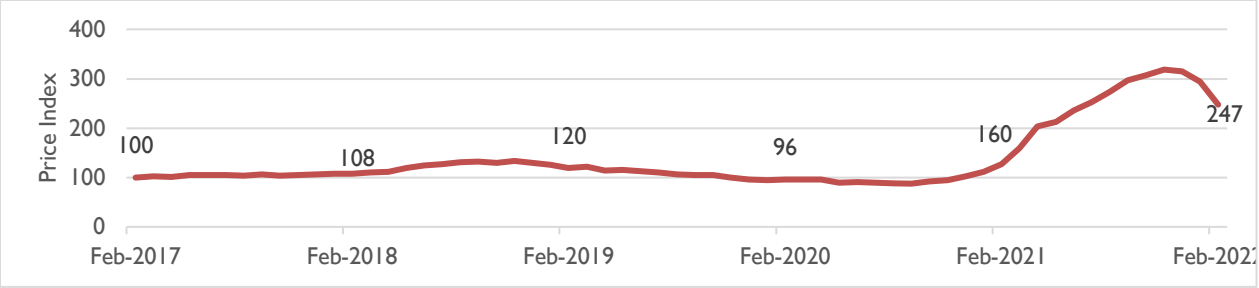
Global bicycle demand increased substantially during the pandemic. Frequently cited reasons include a desire to maintain social distancing, fewer transport options, and health goals. Increased global demand led to notable bicycle shortages during 2020-21, particularly at the lower end of the bicycle market. With manufacturing concentrated in China and India, and manufacturers already operating at or near maximum capacity, importers in Zambia compete with importers elsewhere for supply.

Suppliers in Zambia have felt this increased global demand in the form of substantial increases in manufacturing lead times. In some cases, lead times doubled between when a bicycle order is submitted to when the bicycle rolls off the production line. Although some suppliers have indicated that lead times are improving, virtually every supplier interviewed by BFG made note of these changes since 2019.

Raw materials, particularly steel, account for 70 to 80 percent of the cost of bicycles.[38] Steel costs have risen sharply since 2020, after several years of relative price stability (see **Error! Reference source not found.**). These and similar rising material costs have created upward pressure on wholesale and retail bicycle prices in Zambia. Suppliers indicated that they expect bicycle costs will remain elevated in the short- to medium-term.

[37] CEPII. "BACI: International Trade Database at the Product-Level – Version 202201."
[38] KPMG. *Pedaling India's Growth: Cycling into the future.* June 2021.

FIGURE 10: STEEL PRICE INDEX (FEBRUARY 2017=100)[39]



In line with the rising cost of inputs and extended manufacturing lead times, the cost and time required for shipping has also risen substantially during the COVID-19 pandemic. One supplier reported the cost of shipping a container from Asia to Lusaka tripled from about US$5,000 in 2019 to US$15,000 in 2022. This implies that the cost of shipping from manufacturer is close to $17 per bicycle when shipping a full container of CKD bicycles, a significant amount considering the wholesale price from the factory for mass market bicycles is often less than US$50.

Consumers have noticed these rising costs. Many focus group participants related to BFG that the cost of bicycles (as well as spare parts) has increased recently. While it is hard to determine how much of an impact these increases are having on demand, they are exacerbating affordability issues – the top concern of individuals in the market. Many suppliers also noted their sales are down year-over-year. Most generally attributed this decline to falling household incomes rather than rising prices.

The outlook for shipping costs appears to be improving: many actors expect these costs are near peaking and should return to more normal levels in 2023, particularly as the pressures from COVID-19 abate. Market actors appear to be adapting to conditions and increasing capacities for shipping. Nonetheless, the conflict in Ukraine has created uncertainty and could create further disruptions by either creating bottlenecks in global shipping routes or putting upward pressure on fuel prices.

DOMESTIC MANUFACTURING

As discussed above, bicycles were manufactured on a commercial scale in Zambia for nearly 40 years under the Eagle brand. Reestablishing a bicycle manufacturing sector would be challenging, but several institutions have expressed interest in seeing this occur, including the Ministry of Finance, Zambia Development Agency (ZDA), and Zambia Chamber of Commerce. One large bicycle business interviewed by BFG specifically indicated it is exploring the possibility of manufacturing in Zambia. Any bicycle manufacturer in Zambia would have to learn from the decline of Eagle, which was ultimately unable to effectively compete in the marketplace once direct government support was pulled away and Chinese and Indian imports entered the market in volume (despite protectionist policies).

There are several other crosscutting challenges to domestic manufacturing. The World Bank has noted that Zambia's manufacturing sector faces consistently higher costs of exporting relative to neighbors in East and Southern Africa.[40] The Zambian electric grid is unreliable: firms experience 13.3 electrical outages

[39] 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."
[40] World Bank. *Republic of Zambia Systematic Country Diagnostic*. 2018.

per month and 57 percent identify electricity as a major constraint to operations.[41] Underdeveloped trade logistics networks further decrease competitiveness for Zambian producers. Additionally, manufacturing at scale is capital intensive, requiring high upfront and operating costs of equipment in an environment with high capital costs.

MARKET INFORMATION TRANSMISSION

Bicycle retailers report that collection of customer feedback is typically conducted unsystematically. None of the smaller sellers interviewed by BFG had proactive processes for soliciting feedback. At the very least, most retailers observe which products are moving and which are not and adjust future orders based on actual sales. They will also listen to feedback from customers, most frequently about specific quality issues, but this is often not relayed up supply chains or acted upon.

Related to this, within markets, retailers observe the pricing and product offerings of competitors and adjust their own sales tactics based on these observations. While pricing reflects local market conditions and sellers report market forces put downward pressure on them, prices more substantially reflect supply chain conditions and the cost of goods.

The gaps in market information transmission, both from consumer to retailer and retailer to wholesaler, is a potential source of imperfect product-market fit. More deliberate market research and feedback collection on the part of retailers and improved upstream supply chain linkages may have the potential to address feedback gaps and bring more targeted products to customers. However, due to the costs and effort involved, retailers and wholesalers would require an effective incentive, such as demonstrable increases in sales, in order to enact such a feedback system.

Upstream supplier agents (including those of both manufacturers and importers) can be effective for market information transmission if they develop strong relationships with downstream suppliers closer to consumers by matching their knowledge of potential product offerings with market information. However, this depends on both the capacity and knowledge of individual agents and effective information collection and communication on the part of retailers or intermediate suppliers.

Buffalo has an integrated supply chain running upstream from the market, including a close relationship with its manufacturer, and multiple mechanisms for soliciting user feedback within Zambia (and the other countries it operates in). This information is collected and analyzed by Buffalo's product development team, who then iterate the Buffalo bicycle's design to address user feedback.

Interestingly, the availability of Buffalo-like bicycles on the market indicates that market information is being transmitted and acted upon by manufacturers. However, it is not obvious that this market information is being used to improve existing products at the margin or innovate with new products.

Similarly, multinational hypermarkets also have clear market feedback mechanisms reaching from retail locations to manufacturers, with whom the hypermarkets have close relationships and substantial influence. A hypermarket interviewed by BFG indicated that manufacturers have been responsive to quality issues identified with specific models in the past.

[41] World Bank Enterprise Surveys. 2019.

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, brand, and the specifics of individual bicycles. However, survey data and market observations lend insights into the market segments, trends, and local market prices of bicycles at the time of data collection. Figure 10 and 11 illustrate the distribution of the prices paid for new and used bicycles. Used bicycle prices are clustered at the relatively low end of the spectrum, while new bicycles skew towards higher prices. Used bicycles in the secondary market tend to be the lowest priced, though the prices for these are highly variable and reflect the idiosyncrasies of individual bicycles, timing, and even the personal relationship between buyer and seller.

Among new bicycles, BFG found a multimodal distribution, reflecting the different market segments. Mass market imports of the roadster variety are the most inexpensive segment widely available on the market and the most widely used. The least expensive models are priced at about ZMW 1,300 (US$79) and run upwards of ZMW 1,800 (US$110). BFG observed the most common price among sellers at data collections sites was around ZMW 1,500 (US$91). Mountain bicycles, the other prominent variety of mass imports, are slightly more expensive than roadster bicycles, beginning around ZMW 1,800 (US$110) and extending past ZMW 3,000 (US$183), with typical prices in the low to mid-point of that range.

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

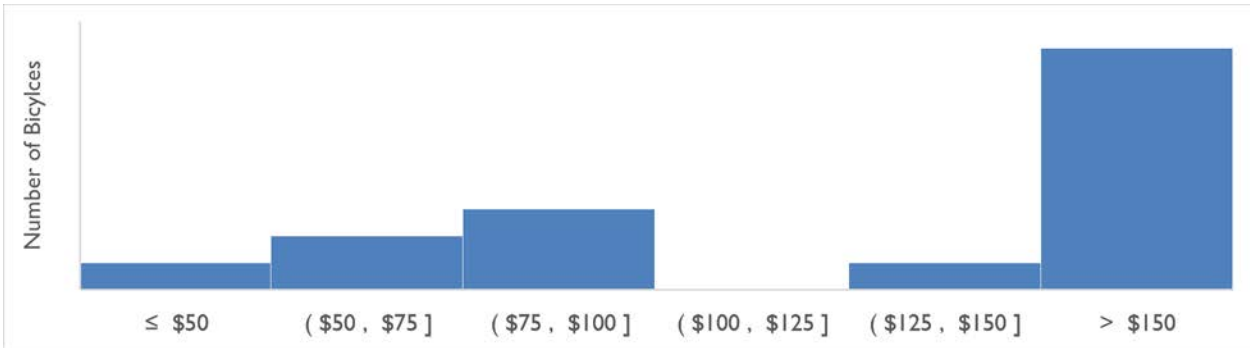
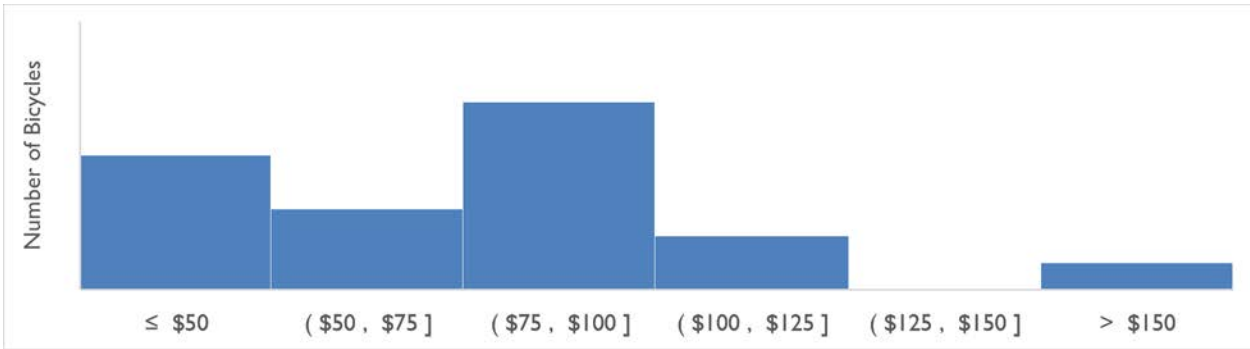


FIGURE 12: DISTRIBUTION OF PRICES PAID FOR PRE-OWNED BICYCLES (USD)[43]



[42] BFG survey. Prices converted from ZMW to USD; Data includes only bicycles purchased in the last 24 months. Does not include donated or gifted bicycles.
[43] BFG survey. Data includes only bicycles purchased in the last 24 months.

Heavy-duty bicycles are exemplified by the Buffalo, which commands a premium price of ZMW 4,260 (US$260) compared to others on the market in the ZMW 3,700-4,200 (US$225-256) range. Additionally, some bicycles cost substantially less (closer to ZMW 2,000 [US$122]) than these higher quality models, which sellers have attempted to position as Buffalo-type alternatives. However, it is not clear how directly the products compare. The upper end of the price distribution for new bikes consists mostly of buyers of Buffalo bicycles and a smaller number of mountain bicycle owners. Similarly, the highest cost pre-owned bicycle in the sample was a Buffalo.

The prices described above all refer to advertised retail prices for individual sales, but it should be mentioned that dynamics of pricing on institutional markets deviate from these in ways that lower the per unit price of bicycles through two mechanisms. First, because institutional buyers are buying in volume, sellers typically offer some kind of volume discount on the retail price. Secondly, certain buyers are exempt from duty and other taxes, which can substantially lower the price they face. This is described in greater detail in the following section on taxes.

As mentioned above, rural sellers and those far from wholesale hubs (namely Lusaka) face increased costs of goods due to transportation. These costs can be mitigated through high volume purchases to spread out transportation costs, however doing so is challenging given the capital constraints of most sellers. Some rural sellers also benefit when they are located along major transportation routes (e.g., along a major road from Lusaka).

Table 6 presents evidence of additional pricing nuances within the market. Some owners of recently acquired new bicycles report the price between new and used bicycles is small, and , in the case of Kapata Market (urban Chipata), owners report paying more for used bicycles. This appears to be a reflection of BFG's relatively small sample size, though it may also indicate an illustrative market where more expensive, heavy-duty bicycles are less common (such as was observed in Chipata). In such cases, new bicycle prices are on average significantly lower than elsewhere because there are few sales at the upper end of the price distribution (as seen in Figure 11: Distribution of Prices Paid for New Bicycles (USD)). At the same time, the price for used bicycles in some case may be higher are close to the price of new mass market imports because the used bicycles have been modified in ways that add to their value or their ongoing use serves as a testament to their durability.

TABLE 6: ZAMBIA AVERAGE REPORTED BICYCLE PURCHASE PRICES (USD)[44]

	All Bicycles	New Bicycles	Pre-owned Bicycles
Overall	$ 106.33	$ 146.34	$ 75.20
Geography Type			
Peri-urban	$ 128.05	$ 160.98	$ 73.17
Rural	$ 105.18	$ 147.87	$ 76.73
Urban	$ 68.60	$ 60.98	$ 71.14

[44]BFG survey. Prices converted from ZMW to USD; Data includes only bicycles purchased in the last 24 months. Does not include donated or gifted bicycles or outliers. Kapata Market (Chipata) is the only urban data collection site.

REGULATION, PRICE DISTORTIONS, AND TAXES

A duty of 15 percent is currently applied to imports of both new and used, effective January 1, 2023. A 25 percent duty had been applied prior to 2023 and was relatively high by global and regional standards (mean tariff of 14.7 percent globally and bicycles are duty exempt in Malawi).[45] The reduction in the bicycle duty rate is the culmination of a long-term advocacy effort by a coalition of many different stakeholders, notably World Bicycle Relief (WBR) Zambia. Since 2011, WBR Zambia submitted letters to the Ministry of Finance advocating for duty reduction, noting the impact that duties have had on bicycle affordability and, by extension, accessibility. After years of advocacy, WBR Zambia was invited to present on duty reduction to the Ministry of Finance Budget Committee in 2022, leading to the institutional support for reduction from the Ministry and National Assembly. The Minister of Finance noted in the 2023 Budget Address to the National Assembly that the reduction of the duty "will directly benefit our people who rely on [bicycles]." Although WBR Zambia led this process, other actors, including the NMT Working Group,[46] Zambia Chamber of Commerce and Industry, Zambia Chamber for Small Enterprises, and Zambia Development Agency supported the effort.

For spare parts, the customs duty is variable depending on the specific part. Rates include:

- Tires: 0 percent
- Seats, Rims, Pedals, and Brakes: 5 percent
- Frames and Forks: 15 percent
- Tubes: 25 percent[47]

Spare parts duties were not included in the successful advocacy effort to reduce bicycle duties, largely because they were generally lower in relative to bicycles.

In addition to duty, a value-added tax (VAT) of 16 percent is applied to bicycles and spare parts. This is the standard rate for goods and services in Zambia.

The Zambia Revenue Authority (ZRA) provides some exceptions to duty and VAT for diplomatic and UN missions, donor agencies, and approved NGOs through a "Local Purchase Order" (LPO). This essentially only applies to the institutional bicycle market, particularly through public tenders. Individuals do not directly benefit from this unless they are the beneficiary of a related program.

Although suppliers reported the tax regime as something they would like to see reformed, they did not report policy and regulation as a major challenge for their operations. General enabling environment issues do impact business decisions of suppliers, such as whether or not a trader will register. However these issues are not unique to businesses in the bicycle sector; more economically and politically oriented sectors are likely to drive general enabling environment policy discussions.

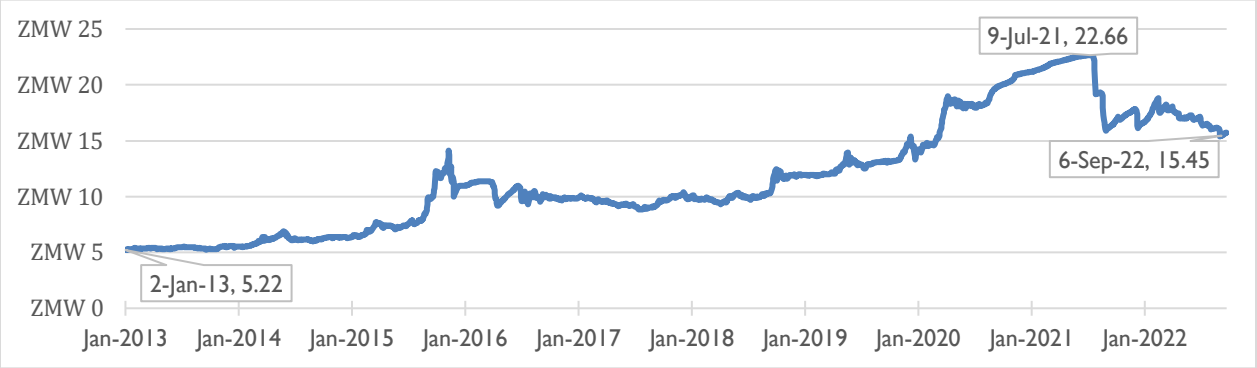
Foreign exchange is a major factor for the bicycle market system, especially given the lack of domestic production. The Zambian kwacha has historically been volatile. More recently, the kwacha has devalued

[45] Observatory of Economic Complexity. Global tariff rate refers to HS Code 8712.
[46] The NMT Working Group is described in more detail in the Systems section.
[47] Zambia Ministry of Commerce Trade and Industry. "Zambia Trade Information Portal." All duty values are accurate as of September 22, 2022. Applicable HS Codes include 8712 (bicycles), 87149X (spare parts), 401320 (bicycle tubes), and 401150 (bicycle tires).

versus the US dollar, the currency in which most import transactions are denominated. Exchange rate volatility creates uncertainty for traders and, over time, can erode the value of transactions and profits held in Zambia, an especially acute problem when there are months-long supply chain delays and customers prefer to pay for bicycles over time.

The exchange rate has somewhat stabilized since August 2022, when it surged in value following Zambia's election results. Exchange rate stabilization is particularly notable considering the kwacha's poor performance since the start of the COVID-19 pandemic, debt default in 2020, and surging US dollar in 2022. Several suppliers interviewed by BFG indicated they were increasingly optimistic about the exchange rate and improving macroeconomic conditions, reducing hesitation to engage in international transactions. Nevertheless, this remains a long-term challenge and risk for suppliers who must regularly engage in months-long transactions in foreign currency.

FIGURE 13: ZMW:USD EXCHANGE RATE (2013-2022)[48]



[48] Bank of Zambia.

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 functioning and sustain bicycle utilization rates. The spare parts market, as represented by import figures, is actually substantially larger than the market for new bicycles.

Notable within the Systems pillar are those elements or actors which are not present or performing to their fullest potential to support the functioning of the bicycle market system. Financial institutions, especially in the microfinance space, have great potential to help address affordability and resource challenges for individuals and households and assist SMEs to overcome working capital constraints. However, financial institutions are minimally active in the bicycle market system at this time. Bicycles and related NMT transport issues have often been neglected by policymakers in their efforts to address transportation, infrastructure, and mobility in Zambia. Additionally, international donor agencies – serving as key sources of expertise and resources for Zambia's development – have also largely overlooked the role of bicycles and needs of bicycle users.

SUPPORTING SERVICES

Several services complement and support the functioning of the bicycle market system. Most critical to the Zambia bicycle market system are the spare parts suppliers and mechanics that keep bicycles functioning. Additionally, financing can serve as a bridge to affordability. While limited in scale and with mixed results, BFG found examples of bicycle financing that hint at the potential for greater finance utilization. Finally, a dynamic transport and logistics sector enables trade and supplier linkages over Zambia's sometimes challenging terrain and relatively large surface area.

MAINTENANCE

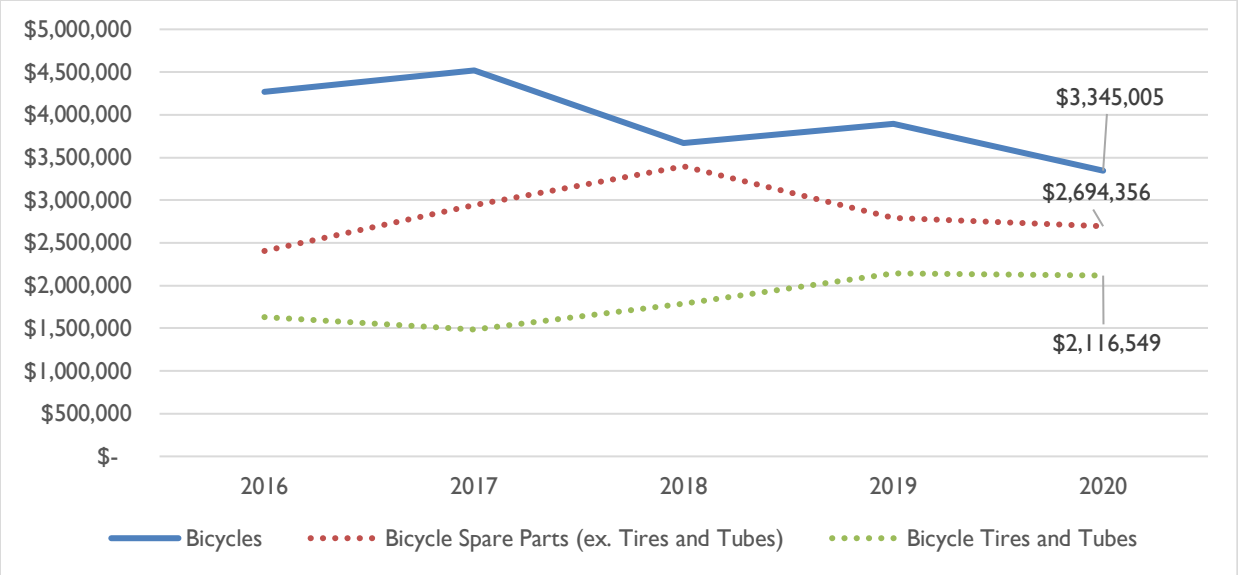
SPARE PARTS

Available and affordable spare parts are critical to the functionality of Zambia's bicycle market system. Among surveyed bicycle owners, 86.5 percent indicated they purchased replacement parts for their bicycles at some point. Further, repairs are a common occurrence, with 60 percent of owners stating their bicycles required replacement of parts several times per year. And almost 40 percent of respondents said their bicycles require replacement multiple times per month. Among the most needed spare parts are tires, tubes, chains, and spokes – i.e., the parts in motion incurring daily wear and tear. Thirty percent of survey respondents indicated the last time they went to a mechanic was to replace a tire or tube, a likely underestimate of the wear of tear on tires and tubes, as many bicycle owners do simple repairs themselves.

Many users emphasize the connection between poor road conditions and damage to bicycles. Over the most recent five years of available data, more than US$4.8 million worth of spare parts have been imported annually in Zambia – indicating that this market is larger than the new bicycle market.[49] As can be seen in Figure 14 below, approximately 40 percent of the spare parts import market is in tires and tubes.

[49] CEPII. "BACI: International Trade Database at the Product-Level – Version 202201."

FIGURE 14: ZAMBIA BICYCLE AND SPARE PART IMPORTS (2016-2020)[50]



Bicycle spare parts are widely available in the Zambian market. Most commonly, spares are relatively inexpensive parts manufactured in China or India. While the quality and durability of spare parts is highly variable, most bicycles available in the market have standardized components which are widely available. Thus, they do not require specialized or brand-specific parts and standardization increases accessibility. Exceptions to this include certain components on the Buffalo bicycle, which can require specialized parts. Buffalo is known for having high-quality, durable parts and these may be used on non-Buffalo Bicycles (and often are because of their quality), but the inverse is not always true. This can lead to spare part availability being a constraint for Buffalo users.

Spare parts sellers, whether dedicated shops or non-specialized traders, are present in virtually all urban and peri-urban markets. Acquiring spare parts in these markets is not challenging: if a seller is out of stock of a particular part, customers can easily seek out alternative purveyors.

Sellers are also commonly found in rural markets, including all rural markets visited by BFG during data collection, though this experience is not universal. In one of the rural data collection sites, two spare parts sellers recently began operations. Prior to this, community members had to travel to the nearest town for parts – a costly inconvenience. Rural spare parts sellers typically sell a full suite of bicycle parts but may be out of stock of a given part at any time. This reflects the small scale and limited capital of these businesses. Small spare parts sellers in rural markets typically purchase their goods from suppliers in population centers, often the district capital. When suppliers are out of stock, customers will often place an order with the spare parts seller and the spare parts seller will then order from their supplier for inclusion in a future delivery or will pick up the part the next time they are purchasing stock in town. In either case, the timelines of acquiring the spare part are uncertain.

Bicycle owners and mechanics interviewed by BFG more often reported that spare parts costs (rather than availability) were a constraint. Both owners and mechanics noted that due to the costs, owners will

[50]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. Dollar value is based on wholesale costs reported by traders.

not spend the money to repair their bicycles and instead the bicycles will sit at home in an unusable state. Although individual spare parts are often inexpensive, regular replacement of parts can lead to a high overall cost of bicycle ownership. This is connected to issues with both the quality of spare parts in the market, bicycle design, and usage patterns.

The price of a selection of spare parts as advertised by sellers in the greater Lusaka area is presented below in Table 6. Urban and peri-urban shops tend to sell parts of the sort that are widely available in most markets (i.e., lower cost products manufactured in China or India) while the Buffalo shop and hypermarket are selling higher cost parts advertised as being higher quality. Prices included in Table 6 are the lowest among comparable goods, although in many cases the spare parts shops have multiple types of the same kind of part for sale.

TABLE 7: ADVERTISED PRICE OF SELECT SPARE PARTS IN LUSAKA AREA SHOPS

	Urban Shop	Peri-urban Shop	Buffalo	Hypermarket
Tire	$ 9.15	$ 6.10	$ 11.52	$ 14.33
Tube	$ 3.05	$ 1.83	$ 3.96	$ 5.30
Pedal	$ 4.88	$ 3.05	$ 4.15	$ 9.45
Saddle	$ 9.15	$ 4.27	$ 8.84	$ 12.20
Patch Kit	$ 1.40	$ -	$ 1.40	$ 4.82
Pump	$ 4.88	$ 2.13	$ 3.96	$ 20.73
Chain	$ 5.79	$ 2.13	$ 4.57	$ -
Rear Hub	$ 2.44	$ 2.44	$ 13.72	$ -
Crank	$ 7.62	$ 4.57	$ 7.32	$ -
Fork	$ 4.57	$ 4.27	$ 19.88	$ -

Spare parts costs are particularly of concern among users such as bicycle taxi operators that must regularly carry passengers and heavy loads. Compared to commuter bicycle users, load hauling users (e.g., taxi operators) use their bicycles more frequently (hence greater wear on moving parts such as tires and chains) and under more stressful conditions, leading to the failure of more expensive parts like hubs.

According to market stakeholders, cost issues are amplified in rural areas, as the stretched supply chains lead to increased transportation costs, less competition, and few economies of scale.

MECHANICS

According to focus group participants, for minor maintenance, such as patching a tube, owners often address the issues themselves. For more complex issues, hiring a mechanic is common. Mechanic services are widely available, with 90 percent of owners that use mechanic services reporting it is easy or very easy to find a mechanic. Mechanics often provide both repair and modification services. Typical modifications include reinforcing spokes and adding carriers. Many mechanics also offer preventative maintenance services, though what these consist of is variable and typically not comprehensive checks of bicycles.

Most mechanics operate informally and without a dedicated workshop space. In small markets, there may be one or two mechanics offering services, while in larger markets with many bicycle suppliers clustered and a steady supply of customers, there may be dozens of mechanics available. Many shops selling spare

parts will have affiliated mechanics either stationed at the shop or on call to conduct repairs. In larger markets, some mechanics form informal workshops in which they share tools and space and may collaborate on more complex repairs. Within these groups, individual mechanics will keep all funds received from customers rather than distributing them collectively or passing through a company.

According to mechanics interviewed by BFG, formal mechanic training is rare and nearly all mechanics are often self-taught or learned from other mechanics on the job. Experienced mechanics are highly skilled and report being able to fix virtually any maintenance or repair issue that customers present to them. Buffalo Bicycles does offer multi-day mechanic training programs focused on repairing and maintenance the Buffalo bicycle, however the number of mechanics trained by this program (1,245 since 2007) is small relative to the total number of mechanics in the market.

Considering that ongoing repair costs are a major barrier to bicycle ownership and utilization, and that these costs can be inflated due to cascading maintenance problems (e.g., poor tire maintenance leading to extra stress on wheels and hubs), improved preventative maintenance services are an opportunity for mechanics to expand their service offerings and incomes. To do this effectively, mechanics would have to provide comprehensive checks of bicycles and corresponding advice and troubleshooting to users and market these as a means of long-term savings.

FINANCE

DEMAND-SIDE FINANCING

Some bicycle and spare parts sellers offer goods to retail customers on credit or layaway, but such offerings are not universal and often done in an unsystematic way. Under layaway arrangements, customers will put down an initial payment to reserve a bicycle and then make regular contributions to the seller over time. Once the buyer has paid off the full cost of the bicycle, the sale will formally take place and the buyer will take ownership. No interest is charged on layaway arrangements. Customer credit arrangements in which the customer takes ownership of the bicycle upfront and makes payments over time typically have no standard terms and the conditions are made on a case-by-case basis. Although the mechanisms described here are limited in scale, they indicate a high degree of trust between market actors even in the absence of formal mechanisms for enforcement; there is potential for expansion or increased structure.

With affordability being a major barrier, formal financing is a high potential tool for increasing bicycle ownership and access. Currently, most individuals purchase through savings, while financing purchases through any means is relatively rare (see Table 8). The financial sector in Zambia has developed over time to meet the needs of households. The 2020 FinScope Survey found that 69 percent of Zambian adults are financially included – an increase of 10 percentage points since 2015.[51] Among financial services and products, mobile money is particularly prevalent, with FinScope finding nearly 60 percent of adults making

[51] Bank of Zambia. *FinScope 2020 Top Line Findings*.
Financial inclusion defined as: "Access to and informed usage of a broad range of quality and affordable savings, credit, payments, insurance and investment products and services that meet the needs of individuals and businesses (formal or informal)."

use of such services, a four-fold increase since 2015. As such, increased availability of finance for bicycles would likely increase access to and uptake of bicycles in Zambia.

TABLE 8: PAYMENT MODE FOR BICYCLE PURCHASES

Mode of Payment	Overall	Urban	Peri-Urban	Rural
Own Savings	80.4%	91.3%	68.1%	85.3%
In Kind Payment	3.6%	0.0%	6.4%	2.9%
Borrowed from Family/ Friend	3.6%	4.3%	6.4%	1.5%
Own Savings Plus Other Mode	2.2%	0.0%	0.0%	4.4%
Did Not Pay	10.1%	4.3%	19.1%	5.9%

The microfinance sector has matured since forming in the 1990s. Although initially driven by donor support, the sector now consists of 37 microfinance institutions (MFIs) registered with the Bank of Zambia. Most of these are commercially-oriented firms offering paycheck loan-type products for salaried customers in need of short-term liquidity. About seven of these MFIs are either focused on serving rural customers or have social missions. These MFIs are likely the most well-suited to meet the needs of customers seeking bicycles.

Microfinance is well-aligned with the bicycle market. First, socially-oriented MFIs are generally familiar with the kind of customer which would most benefit from a bicycle (farmers and microentrepreneurs in rural or peri-urban areas) and have a footprint in the relevant geographies. These MFIs also typically offer loan products for customers to increase income generation – such as agricultural inputs. Finally, the cost of a high-quality durable bicycle, which is most suited to income generating activities, is in line with the typical microfinance loan size.[52]

BICYCLE FINANCING AND LOAN PRODUCTS

BFG identified just one Zambian firm actively offering tailored financing for bicycles in rural areas. Onyx Connect specializes in financial inclusion for low-income earners and farmers in rural areas, using bicycles specifically as tools for increasing their clients' productivity and incomes. Since its inception in 2018, Onyx has diversified into other asset-based financing for small household goods like cooking stoves and solar lights, but their central business is around pay as you go (PAYG), also known as "credit sale," bicycle financing products. Under these arrangements, ownership is immediately transferred to the client upon the initial payment. Onyx offers a range of bicycles to suit various customer preferences and needs.

Onyx's bicycle payment plan is usually structured on a four-to-six-month schedule, and PAYG products are made to cooperatives and village banking associations to limit risk of default and as a control for client creditworthiness. Onyx's payment plans are structured such that they have an implicit interest rate of 2 percent per month. Onyx also holds an insurance policy on their bicycles, which covers the bicycle against loan default, theft, and accidents. Onyx has put these measures in place to protect the sustainability of their business, but also to ensure that their clients are protected and can maintain possession of their asset. Onyx has demonstrated flexibility and innovation in their business model, oftentimes accepting in-kind goods such as produce and livestock as loan payments, to better accommodate the needs and real-

[52] The Association of Microfinance Institutions of Zambia (AMIZ) reports that the average loan disbursed by member MFIs is US$263.

life circumstances of their clients. According to Onyx, they are not able to meet demand for their PAYG bicycle product due to capital constraints, a common challenge for smaller asset leasing companies and microfinance institutions, and they are looking for means to scale-up their operations.

In addition to Onyx Connect, several other organizations have attempted to offer financial products catered to bicycles, though these efforts have largely been unsuccessful. Most notably, a large socially-oriented MFI developed a bicycle loan product in 2018. Using this product, customers would take out a bicycle loan, the MFI would pay for the bicycle in whole directly to the supplier, the supplier would deliver the bicycle to the customer, and the MFI would manage the loan. Loan terms included repayment over 3 to 12 months at interest rates of 5.5 percent per month (66 percent APR). Uptake of this loan product was low and the MFI stopped promoting the product after one year.

An asset leasing social enterprise providing access to productive assets for farmers and rural business also attempted to offer bicycles under a financing scheme. Customers would lease the bicycle with ownership ultimately transferred to the customer after a period of 12 to 24 months of payments under terms functionally similar to a loan at 15 to 20 percent interest.[53] This company ultimately ceased operations as result of the COVID-19 pandemic. Compared to other higher value assets that they offered, the bicycle product was less viable. The margin earned on bicycle products was low compared to other product offerings and the relatively low cost of the bicycle meant that case management costs were disproportionately high. In many cases the organization found it easier to write off products as a loss rather than attempting to restructure arrangements with customers struggling to pay. Additionally, maintenance of bicycles was a major issue and the company noted that the moment a bicycle broke, customers would frequently stop making payments. Indeed, the nature of bicycles as movable assets means they are at greater risk of misuse or theft than fixed assets such as a pump. Although the financial product was similar to Onyx Connect's PAYG bicycle product, it differed in terms, its placement within the respective company product portfolio, and by not having safeguard measures like insurance protection in place.

A challenge facing any organization offering bicycle loan products is customers' comparison of the total cost of the loan (i.e., principal plus interest and fees) to the cost of the bicycle only, without customers recognizing financing as an additional service they are paying for. This challenge is not unique to bicycles and similar issues arise with other asset and consumer finance products. Effective customer education and marketing can help to address this.

Other than tailored bicycle loan products, lenders could use other existing standard loan products such as asset loans for bicycles. MFIs interviewed by BFG were not aware of any cases of this.

SUPPLY-SIDE FINANCING

The financing situation for bicycle suppliers diverges between retailers, who face substantial challenges in accessing finance, and wholesalers, who are largely well-capitalized and able to access commercial loans.

In interviews, many micro and small enterprises involved in the sale of bicycles and spare parts reported that a lack of capital was a constraint to the growth of their business, and limited their ability to optimize

[53] This company was not a registered financial institution and differed from MFIs and banks in several operational aspects. This was technically not a loan with interest rates.

management of inventories. None of the independent retailers interviewed indicated that they had formal business loans or had even pursued one. Several small sellers indicated a strong aversion to bank or microfinance loans driven by concerns about repayment challenges and onerous terms.

Although bank finance is limited for small retailers, several of those interviewed noted that they regularly or occasionally received supplier credit from wholesalers. Assessing the scale of this is difficult and interview subjects were vague about terms, indicating that arrangements are often flexible or determined on a case-by-case basis. Two common considerations for these arrangements are trust between wholesalers and retailers and the volume of a sale, with some wholesalers incentivizing larger purchases by retailers by extending credit.

TRANSPORT AND LOGISTICS

Transportation and logistics service providers are important to the effective functioning of bicycle market system. The system of service providers that facilitate the importation of bicycles into Zambia, notably shipping providers and customs clearing agents, is well-developed. Many service providers compete for business along the supply chain, whether in the import process or distribution to end markets.

Currently, the biggest challenge for bicycle importation is the increase in shipping times and limited capacity on shipping routes. Importers and logistics firms are broadly aware that this is a global issue affecting supply chains everywhere. One long-established logistics firm noted to BFG that a local shortage of trucks in Zambia has created upward pressure on bicycle costs and lead times.

Once bicycles have reached wholesaler warehouses within Zambia, domestic transporters are utilized for distribution to final destinations. These include both professional transporters and more informal "briefcase firms," which are small in scale and of questionable reliability. The logistics firm referenced above also estimated there may be approximately 300 firms operating in the transportation and logistics sector, creating a highly competitive market. Local operators often use containerized vans or open trucks for transportation purposes. Additionally, Zambia's disparate geography leads to high transport costs to locations outside of population centers and major road networks.

Although competitive pressure limits the ability of any particular firm to charge substantially elevated prices compared to others, transportation costs are still a significant factor in the cost of bicycles. Zambia also ranks poorly in global studies on infrastructure and logistics, for example ranking 111th among 160 countries in the World Bank's Logistics Performance Index.[54]

POLICY AND INSTITUTIONAL ENVIRONMENT

In Zambia the Ministry of Transport and Logistics (MOTL) is responsible for transport policy. The Ministry of Finance mobilizes resources for transport infrastructure development, and budgets for stakeholder engagement. The RDA (Roads Development Agency) falls under the Ministry of Infrastructure and Housing, and was instituted in order to design, implement, care for, maintain, and construct roads (and associated NMT facilities).

[54] World Bank. *Logistics Performance Index – Country Scorecard: Zambia 2018.*

The National Road Fund Agency (NRFA) manages the Road Fund, the national government's primary funding source to build and maintain roads. The NRFA allocates resources for the annual program of the RDA and for the Road Transport and Safety Agency (RTSA). The Road Fund includes income from fuel levies, road user charges, and license fees.

The RTSA, through its Road Safety Engineering Unit, conducts road safety audits and road safety inspections and makes recommendations to the RDA to incorporate these into road designs. However, the RTSA is an advisory body only in this context; it is not mandatory for the RDA to take these recommendations on board. The RTSA is also under-staffed: the agency has only staffed 650 of the 1,070 total posts, according to key informants. With insufficient education officers, the Agency relies on stakeholder bodies to carry out largely unfunded road safety activations and sensitizations (see Advocacy). Small-scale interventions, such as traffic calming, may legally be undertaken by organizations such as the Zambia Road Safety Trust; the RTSA itself cannot construct interventions. The NMT Strategy notes that the bulk of new NMT infrastructure – such as bicycle lanes and intersections – falls short of best practices.

Community-based requests for road projects are made to the Road Fund via the NRFA and the regional offices of the RDA, through stakeholder engagement and from the wards. Such requests are usually for paving of gravel roads, fixing of potholes, and for traffic calming, traffic signals, and safer crossings. Government representatives shared that they rarely receive requests for NMT facilities, as 'people focus on the hardcore'. The Road Safety Committee, which is led by the Road Safety Engineering Unit, prioritizes interventions and reviews road designs during its meetings. The Committee includes a broad range of stakeholders, including local government representatives, the Zambian police, and national government departments, among other stakeholders (see Advocacy). The Safety Committee advocated for and celebrated the passage of 2020 legislation reducing road speeds from 40 to 30 km/h around built-up areas, markets, and schools.

This fragmentation of authority is a challenge to developing and facilitating an improved NMT environment, although the National Transport Policy (2019) aims to harmonize the various road classifications, mandates, and pieces of legislation that result in overlapping authority and coordination challenges. In particular, the Policy intends to promote the devolution of basic transport infrastructure and service provision to local authorities, through the establishment of Public Transport Authorities in all local authorities.

Further institutional challenges across all government agencies and units include attrition in terms of staff movement, which affects institutional memory, and how envisioned plans are implemented. New staff do not necessarily know the policy or strategic priorities. At times NMT policy and plans seem too ambitious, and consequently, little happens at all, such as the target of all new road projects to incorporate universal access, and all cities with a population of more than 300,000 to have a bicycle share system with at least 200 bicycles by 2029. At other times, plans are under-ambitious and poorly executed, such as the implementation of safe crossings at schools. Very often, designs might start off well, but modifications are made mid-project due to cost, such as the abrupt ending of footpath, and the result does not serve the intended NMT users.

There are no particular departments or ministries that deal directly or specifically with bicycle transport and the bicycle market system (neither in Zambia nor in any other country in sub-Saharan Africa), as this is a cross-cutting arena that includes ministries of health, housing, rural development, economic development, performance management, tourism, education, roads and stormwater, transport, and urban

and rural planning. Where bicycle transport features in policy or strategy, it is part of either a general Transport Policy, or an NMT Policy; the latter includes walking as well as cycling. It is rare in sub-Saharan Africa for a country or city to develop a standalone bicycle policy or strategy. When policy-makers budget for NMT infrastructure, the bulk of the allocation is usually spent on pedestrian facilities, as pedestrians constitute a substantially higher mode share.

Overall, these departments or ministries would separately contribute to a bicycle-transport enabling environment through policy development, resource allocation, road design, road safety audits, road maintenance, road surface improvements, promotion and legitimization of the mode, enforcement, and training and regulation if appropriate, among others. A coordinated approach is most likely to achieve success, and there is some evidence of this with the new NMT Working Group, developed as one outcome of the NMT Strategy (described below in the Advocacy section).

POLICY

The development of Zambia's NMT Strategy (2019) is largely a consequence of extensive stakeholder engagement in 2018 (in Lusaka, Kitwe, and Ndola) and in-country support by UNEP's Share the Road program (based in Nairobi, Kenya). The strategy, "owned" by the Ministry of Transport and Logistics, primarily focuses on the development of urban walking and cycling infrastructure interventions, including parking and vendor management. The Pave Kitwe walkways project is an example of the most successful NMT project to date, with high-quality footways in the central city. International advocacy organization Amend, with funding from Michelin, Shell, Toyota, and Total, have had success in building pedestrian facilities at schools.

ADVOCACY AND SUPPORTING INSTITUTIONS

As described in the section entitled Regulation, Price Distortions, and Taxes, a recent advocacy effort led by WBR Zambia and supported by a range of other actors was successful in obtaining a reduction in the import duty rate applied to bicycles. Duty reduction is a positive example for market system actors to effect change. However, it should be noted that suppliers outside of WBR Zambia (and Buffalo Bicycles) have generally not been active in advocacy efforts or even aware of them.

Local advocacy organizations are based primarily in Lusaka and focus largely on road safety (including public transport), not necessarily framing NMT within the global discourses of inclusivity, urban quality, or low-carbon transport In many instances the key role of local NGOs is to raise awareness of concerns, to function as stakeholders in policy and strategy development, and to conduct road safety education and training where government is unable to do so because of capacity or funding challenges. A concern among advocacy organizations is that they, too, face funding constraints, which dramatically limits their ability to function effectively.

One such stakeholder body is the Cycling Association of Zambia (CAZ), which governs cycling as a sport. The organization was revived in 2020, and aims to obtain a formal affiliation with the Union Cycliste Internationale (UCI) as a next step. Similar to other advocacy organizations, CAZ partners with RTSA for safe cycle events and programs (with driver education a high priority).

Another such organization is the Passenger, Pedestrian and Cyclist Association (PAPECA), founded in 1993. PAPECA is also primarily focused on road safety (in public transport as well as NMT), and promotes

cycle paths and footpaths, pedestrian crossings, speed calming, and appropriate foot bridges. Like ZRST, PAPECA is based in Lusaka but has representatives across the country (for example in Kitwe, Ndola and Livingstone). The Association is active within government ministry stakeholder structures and plays a key role in enabling the Education and Publicity Unit of the RTSA to fulfill their mandate; until recently PACECA was represented on the RTSA Board.

The Zambia Road Safety Trust (ZRST) is one of the leading NMT-focused civil society organizations in Zambia; it is a member of the Global Alliance of NGOs for Road Safety, and its participation as a civil society stakeholder in the RTSA is mandatory in terms of the Zambia Road Traffic Act (2002). ZRST facilitates a number of NMT projects and programs, including car-free days in Lusaka, school area road safety assessments and improvements, data-collection and community mapping, and campaigns about low-carbon transport. The NGO works with national and local government and is among the recipients of 2020-2022 funding from the UK Foreign, Commonwealth and Development Office (FCDO)'s High Volume Transport (HVT) Applied Research Programme, to develop skills among road technicians for building safer, climate-resilient roads. The organization is based in Lusaka but has a network of some 1,000 volunteers across the country.

The Commuter Magazine is likewise based in Lusaka, with key partners in the Zambia Agency for Persons with Disabilities, the Ministry of Health, Ministry of Tourism, and Ministry of Local Government and Rural Development. Their direction differs from the above organizations, with more explicit advocacy around bicycle commuter facilities (such as public bathrooms and safe bicycle parking),

Zambia's newly established (2022) NMT Working Group is chaired by the Zambia Road Safety Trust and includes World Bicycle Relief, the Ministry of Transport and Communication, Ministry of Local Government, Ministry of Health, the Passengers and Pedestrian Association of Zambia, and UNDP. It meets weekly to deliberate NMT issues.

The group is currently lobbying the Ministry of Energy and the Zambia Electricity Corporation (ZESCO) for the construction of a 38-kilometer cycling lane in Lusaka, along high voltage electricity lines. If the Ministry of Energy supports this idea, the proposal will go to the Ministry of Infrastructure which oversees road design and construction. The Ministry of Local Government and Ministry of Transport are supporting this proposal. The funding for this project, if approved, is expected to come from donors (a potential donor in The Netherlands has been identified). The NMT group is also behind the car-free days held regularly in Lusaka.

Other key stakeholders able to play an advocacy and activist role are academia, and institutes of planners, engineers, and other allied professions. International agencies such as UNEP have provided significant support to the government in NMT policy and strategy development.

As previously noted, one key exception in Zambia in respect of direct causality is the role of World Bicycle Relief (WBR) in successfully advocating for the government to reduce import tariffs on bicycles. Given its mission to increase access to critical services and opportunities through bicycle transport, WBR Zambia has taken on an advocacy role to improve Zambia's broader bicycle market system, with particular emphasis on low-income populations. Over the past five years, the organization's country director and leadership team have made progress in encouraging the Ministry of Finance—along with line ministries whose missions are affected by limited access to transport—to reduce or eliminate duties on bicycles. The duty on bicycles and spare parts are typically passed directly on to consumers, reducing the

affordability and accessibility of bicycle transport, and burdening the lowest income people who often rely on more affordable bicycle transport with an additional tax.

World Bicycle Relief has also partnered with UNDP, ITDP, CRS Network and others to advocate for safe cycling with the Lusaka City Council. WBR Zambia has also sought to raise awareness of bicycle mobility as a critical element in community development, including by generating and disseminating evidence illustrating the efficacy of bicycles as an amplifier of development impact. For example, in 2020, Innovation for Poverty Action published a randomized controlled trial of a WBR Zambia education program. WBR has since disseminated the study's results through webinars, presentations at conferences, op-eds, and with the Ministry of Education in Zambia.

INFRASTRUCTURE

Road conditions and surfaces present several challenges for the bicycle market system. While Zambia has one of the largest roads networks in Africa with more than 67,000 kilometers of paved and unpaved roads, this network is spread over a large geographic area and Zambia's road network density ranks low within Africa.[55] This presents a dual challenge for Zambia's connectivity: a large network of isolated roads leads to high maintenance costs and practical monitoring challenges, while at the same time the road network does not provide sufficient connectivity for rural areas.[56]

These conditions lead to more isolated markets with higher costs for bicycles, spare parts, and other goods. On the other hand, it can contribute to increased demand for bicycles by effectively limiting motorized alternatives and increasing the relative utility of bicycle ownership.

The Government of Zambia has invested heavily in road infrastructure over the last decade, although the World Bank has noted that this "scale-up in public investment was rather haphazard" and has not been able to address the underlying connectivity issues.[57]

Like with most Sub-Saharan African countries, engineering training is focused on highway engineering, not complete, holistic street design. According to one government official, "bicycle lanes are a by-the-way-thing." Engineers are highly skilled and well-qualified in their areas of expertise, but they are not necessarily trained in approaches the emphasize non-motorized users. Likewise, contractors who design and construct infrastructure are under-exposed to the nuances and necessity of NMT design and infrastructure.

Stakeholders have identified that a key to increasing bicycle mode share in cities is the development of bicycle lanes and street lighting. However, flooding during the rainy season and encroachment by property owners upon road reserves leave little space for pedestrian and cycling infrastructure. Urban cyclists currently use the few pedestrian sidewalks, or travel with mixed traffic.

While the Zambian government recognizes these challenges, and provides for incremental mitigation and implementation in the 2019 NMT Strategy, budgets and political will are inadequate. It must be noted,

[55] International Road Federation. "IRF Data Warehouse." All IRF data is from 2020.
[56] World Bank Group. *Country Partnership Framework for Zambia for the Period FY19 - FY23*. 2019.
[57] World Bank Group. *Country Partnership Framework for Zambia for the Period FY19 - FY23*. 2019.

though, that budget challenges are not only a concern for walking and cycling interventions, but also for proposed public transport and other urban/rural interventions.

Bicycle infrastructure is featured in Zambia's transport and NMT policies. Zambia's current National Transport Policy (2019) which is a review of the 2002 iteration, aims to develop "systems to facilitate non-motorized transport." The National NMT Strategy (2019), developed as a consequence of the Transport Policy, envisions that Zambian cities and towns provide 'safe, efficient, and accessible walking and cycling networks to improve mobility for all residents, enhance access to opportunities, and promote equitable allocation of street space.' The Strategy pays less attention to rural areas and rural travel. In a bid to alleviate road congestion, Zambia's NMT Strategy requires that cities with a population of over 400,000 develop Sustainable Mobility Plans, which direct actions toward an 80 percent mode share for walking, cycling, and public transport. To this end, the Strategy proposes that 1 percent of city transport budgets be directed towards NMT awareness campaigns. The NMT Strategy also proposes that smaller towns develop NMT Plans that are consistent with the country wide NMT Strategy.

As is the nature of policies and strategies, implementation is not a one-off activity; the Zambia NMT Strategy includes an implementation plan across a ten-year timeframe. The pace of achieving these goals has been slow, to some extent because of the interruption of Covid-19 and redirected energies and funding, but also due to capacity, capability, and overall resource allocation challenges that are not unique to Zambia.

Where road speeds are lower than 50 kilometers/ hour, it is acceptable practice for bicycle and motorized traffic to share the road. For this reason, a discussion around improving travel conditions for bicycle users in rural areas is not so much about hard infrastructure but about enforcement, maintenance, and complementary safety facilities.

The call for walking and cycling infrastructure and policy measures in Zambia was galvanized by the increase in road fatalities, where 57 percent of road deaths are pedestrians (1,900 individuals in 2021). To this end, the government has incorporated a policy commitment to implement walkways and bicycle lanes on every new road. The challenge is primarily twofold: first, according to a government representative, 'the moment we include NMT, we exponentially blow the budgets', and second, in terms of current road priority, 90 percent of funding is directed to road maintenance and not new roads. Further, bicycle-specific infrastructure is not feasible on unpaved roads, and other interventions are more appropriate, such as reduced traffic volumes and speed.

In many road projects, with some recent exceptions, drainage has not been a priority due to its "onerous" cost. However, government representatives shared they have plans (but not budget) to upgrade drainage, cover open drainage channels in cities, and use the newly created space for NMT infrastructure.

In 2019, Japan International Cooperation Agency helped develop Lusaka's Comprehensive Urban Development Plan, which proposed two NMT infrastructure projects. However, city agencies deemed the projects to be of 'high technical difficulty' while having 'low economic impact and medium or low relevance' and thus of low priority. City agencies did not select either as a priority project. Although the plans are ready, there is not yet sufficient funding for implementation.

Thus, NMT facilities are likely to be sacrificed to stay within budget. And although road space is often cited as the reason for few NMT facilities, officials suggest that this reflects values rather than reality: space

has been 'found' to increase the number of vehicle lanes in Lusaka, for example. The bulk of infrastructure investment is directed toward motorized travel.

Further, NMT infrastructure can only be built where there is enough land to do so. In 2002, although road reserves were increased in width, many property owners had already purchased land and developed it prior to reserve expansion. Expropriating this land for NMT facilities becomes both a rights and a cost issue.

Officials caution that not all problems have engineering solutions: "You can have these good-looking cycling paths but if nobody is using them, then people will be worrying about whether it was a wise investment. There has to be that demonstration that the money has been well spent." Overall, NMT facilities are thus provided on a case-by-case basis: where there is a clear demand, such as in Chapata, separate bicycle and pedestrian facilities have been built. Where there is deemed to be less demand, funds and energy are directed elsewhere.

The 2019 Zambia NMT Strategy provides basic guidance on NMT infrastructure standards and recommends a Zambia-specific urban street manual design be developed. Currently, standards are based on the SADC code of practice for rural roads, which are not appropriate in rapidly urbanizing Zambia.

DONOR SUPPORT

There are several donors actively engaged in supporting transportation and infrastructure development in Zambia. The World Bank, African Development Bank (AfDB), European Union, and Japan International Cooperation Agency (JICA) are among the donors that have been most involved in this space.

The engagement and priorities of specific donors have varied over time depending on internal donor priorities, as well as conditions within Zambia. In 2011, Zambia was officially categorized as a "lower-middle income country" by the World Bank. This impacted the country's eligibility for certain types of development assistance – notably by limiting access to grant funding from many multilateral development agencies and some other development partners. In the time since then, the Government of Zambia also faced major challenges with debt, ultimately defaulting on debt in 2020, and Zambia was reclassified by the as a "low income country" in July 2022.

The European Union was historically very involved in road and transport development, including support for the rehabilitation and enhancement of the Great East Road linking Lusaka with Chipata and onward to the Malawi border. The Great East Road project is notable in this context because it included the creation of dedicated bike lanes through Chipata and Katete. Despite this past support for roads and funding of bicycle-specific infrastructure, the European Union has shifted away from road development within Zambia as part of a global institutional focus on renewable energy within infrastructure portfolios.

Donor institutions have noted there is a strong bias towards motorized transport in infrastructure development. Generally, infrastructure development has focused on major road linkages and urban areas. Main road development naturally emphasizes motorized transport because of the long distances between population centers and a usual focus on facilitating the movement of goods. There is greater consideration of NMT in urban development projects. The AfDB, for example, requires NMT considerations for development under their Road Sector Investment Program. However, bicycle users are often either paired

with pedestrians or largely overlooked. With the exception of Eastern Province, this likely reflects the more limited use of bicycles in urban environments relative to peri-urban and rural areas.

Although donors have the ability to provide guidance and ultimately approve funding decisions, they typically defer to local priorities and desires. This was true for the Great East Road rehabilitation referenced above, in which the bicycle infrastructure was a response to local demand rather than a donor suggestion. Yet, in most cases, the national government and local governments are not focused on bicycle users and such dedicated infrastructure is not considered for development.

Donor institutions have done relatively little to actively promote bicycle adoption and use, although they acknowledge the benefits of bicycle use in terms of mobility, health, and environmental considerations. Some donor institutions also indirectly promote bicycle use by making funding available for the procurement of bicycles for programmatic use, as this is typically done by providing funding to a project or third-party implementing partner such as an NGO.

CONCLUSION

Based on the findings of this report, BFG identified many constraints that inhibit the functioning of the bicycle market system. Some of these constraints are multicausal and would be challenging to address, such as affordability, which is impacted by issues ranging from the seasonality of household incomes in Zambia, to rising global steel prices, to trade policy, to poor local infrastructure, to limited access to finance. Others constraints are more straightforward to address, such the lack secure of parking facilities in public areas. Regardless, there are many openings for market system actors, including the private sector, government, donor agencies and projects, and NGOs, to make an impact and work towards improving the functionality of the market system.

There are several potential areas for interventions in response to market system constraints. These are summarized in Annex 1: Constraints Matrix.

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

- **Financial products for bicycles**: Recent experience in the Zambian market has included both successes and failures while indicating that there is potential for financing to at least partially address affordability constraints for some consumers.
- **Potential for domestic manufacturing:** The experience of Luangwa Industries offers important lessons for the viability of future efforts to manufacture bicycle components, and/or spare parts in Zambia (or similar contexts elsewhere). Additional research could examine lessons from the failure of Luangwa Industries and whether conditions have changed or could be managed in a way to overcome those challenges.
- **Bicycle use and mobility issues across a larger geography:** While BFG conducted research in a manner across a broad swath of the Zambian bicycle market system, it was not necessarily comprehensive or representative given that data was collected in just half of the country's provinces[58] and omitted a number of important regions that may vary from those observed.
- **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 inquiry as BFG,

[58] This count includes Lusaka, where no survey data was collected but a substantial number of interviews were held.

but expand the sample size for greater explanatory power and utilize approaches such as household surveys to create more representative samples.

Following the publication of this report and similar reports covering the bicycle market systems in Ghana, Malawi, Rwanda, and Uganda, BFG will design and implement pilot activities in two countries, in coordination with local partners and USAID, to address constraints or scale up successes identified through the assessment process. 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 the constraints identified.

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 or banks Support to sellers to structure and scale consumer credit
Concerns about costs and burdens of maintenance	Affordability of quality spare parts Poor road conditions	Advocacy to promote improved infrastructure for bicycle users
Concerns about bicycle security	Limited facilities in public areas to lock or secure bikes	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 Bicycle seller packages including locks with bicycles
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	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
SUPPLY		
Lack of suppliers in rural areas	Uncertainty about profitability of bicycle sales	Develop or validate new business models for rural

Constraint Symptom	Causes	Potential Solutions
		bicycle suppliers – potentially to include non-fixed suppliers Support to rural entrepreneurs to establish bicycle businesses
Incomplete knowledge of consumer preferences and feedback on the part of upstream supply chain actors	Limited information collection by retailers and information sharing within supply chains	Support to businesses to systematize market feedback and sales data processes Creation of market information systems
Consumers dissatisfaction with available bicycles	Cases of poor product-market fit	Improved market research and market information transmissions in supply chains Improved/ expanded marketing based on market feedback Increased presence of suppliers in unserved markets
High cost of imported bicycles and spare parts	High import duties	Creation of platforms for advocacy and public-private dialogue Scaling up and amplification of existing/emergent advocacy groups, especially to include private sector actors
Suboptimal retailer inventory management and offerings	Limited retailer working capital Weak linkages between retailers and wholesalers Long distances between rural sellers and suppliers in towns/ cities	Strengthened retailer-wholesaler linkages Support to retailers for improved business process and skills to facilitate access to finance and supplier trust Improved national road networks

Constraint Symptom	Causes	Potential Solutions
	Seasonal demand based on household income patterns	Improved financing options for consumers, including retailer credit offerings
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	Support MFIs to develop bicycle lending products to offer directly to buyers or to sellers as intermediaries Support to associations of bicycle-based businesses to formalize and engage with MFIs Link MFIs with sources of low-cost working capital, such as development bank funds to support SMEs
Unsuccessful bicycle loan products	Poor tailoring of products within broader company product portfolios Macroeconomic conditions and COVID-19 disruptions	Support specific MFIs and other relevant firms to develop bicycle finance products Support scale up of successful existing models while incorporating lessons from unsuccessful products
Limited coordinated advocacy efforts	Market actors and advocates operate in a siloed manner Suppliers do not participate in advocacy efforts	Support to existing organic platforms for dialogue and engagement to scale up and incorporate a broader set of actors with aligned interests Strategic communications highlighting the success of bicycle duty reduction advocacy
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

Constraint Symptom	Causes	Potential Solutions
		Increased organization of bicycle actors through associations and civil society groups Creation of platforms for public-private dialogue
Limited consideration of cyclists and pedestrians in infrastructure construction	Lack of awareness of such considerations by engineers and contractors Lack of corresponding training for engineers	Development of holistic street design curriculum for training programs for new engineers Inclusion of NMT modules in continuing education for engineers Generation of resources for contractors, engineers, and other relevant implementers on road construction

ANNEX 2: METHODOLOGY

OVERVIEW

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

Primary data was collected through qualitative and quantitative methods, including quantitative survey of 333 respondents in four districts, 68 key informant interviews (KIIs), 8 focus group discussions (FGDs), and one Participatory Geographic Information System (PGIS) activity (in Petauke). Data collection districts included Chipata, Kaoma, Kasama, and Monze, representing a broad cross section of the Zambian market system. Additionally, BFG conducted a pre-test in Chongwe district and a large number of KIIs within Lusaka. Survey data from the pre-test is not included in BFG's analysis, though market observations and other qualitative data was used as appropriate.

The quantitative survey, focus group discussions, and a portion of the key informant interviews were implemented by BFG's Zambian research partner, Development Data during late July to early August of 2022.

Secondary data came from a variety of sources including existing literature and reports on cycling and non-motorized transport in Zambia, news reports, industry association materials, domestic and international datasets on relevant trade and economic activity in Zambia, and others.

SAMPLING DETAILS

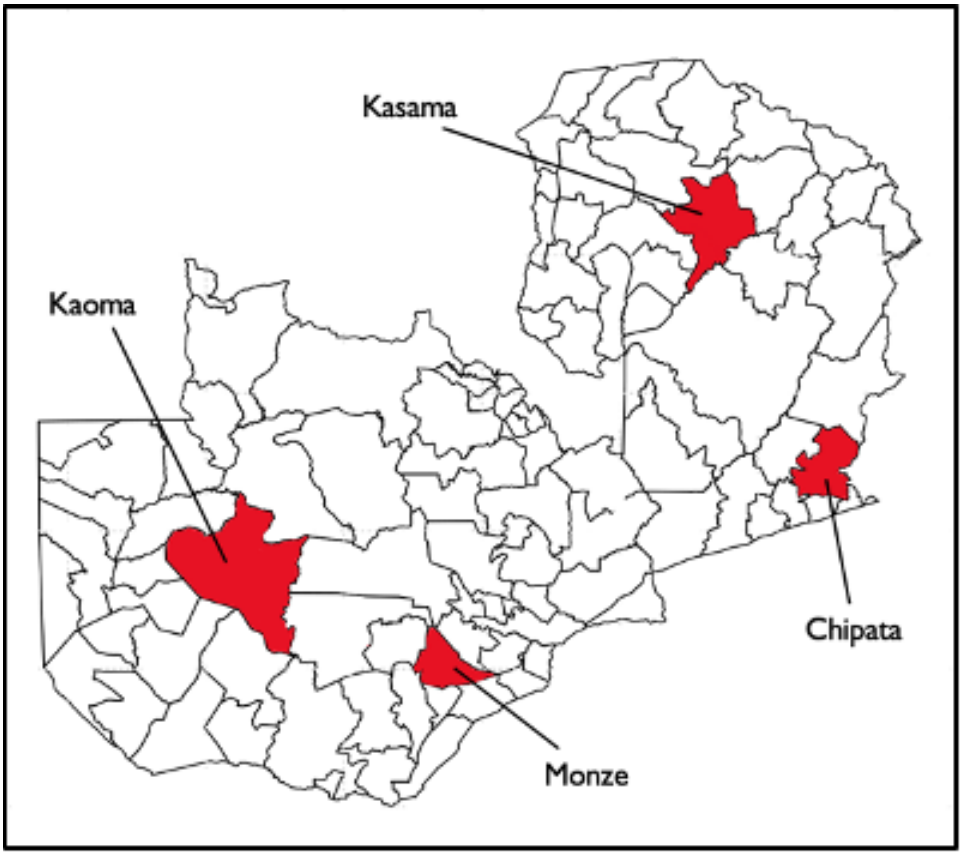
SELECTING STUDY SITES AND DATA COLLECTION LOCATIONS

Development Data led the selection of study and data collection sites with guidance from the project. The BFG selected implementation districts based on the following criteria:

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

Chipata, Kaoma, Kasama, and Monze were selected as the districts of interest because they represented a broad range of economic, social, and geographic characteristics across the country. BFG aimed to capture information about a broad cross-section of the Zambian market system by collecting data in geographically distinct districts. Further, within each district BFG collected data at both rural and peri-urban/ urban market locations, providing insights into differences within districts.

FIGURE 12: DISTRICTS OF FIELD DATA COLLECTION



BFG collected survey data at two sites in each of the four primary assessment districts (with the exception of Kaoma where there were three sites), 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 9.

TABLE 9: FIELD DATA COLLECTION SITES

District	Market	Description
Chipata	Kapata	An urban market located west of Chipata town before the Civic centre. It is a busy market and occupies traders from all the communities within the district.
	Mutenguleni	A rural market located near the site for the Ngoni people traditional ceremony on great east road. This makes the market seasonally busy during the time of the traditional ceremony.
Kaoma	Chitwa	A small rural market mainly used by farmers when the harvest is ready to sale their produce to other buyers. It is located North-West of the Kaoma district council.
	Kalukungu	A peri-urban market located just as you enter district centre. It is a busy market with wholesale and retail shops. It is full of people trading from morning until evening.
	Mangango	A rural market on the south-east part of Kaoma district. It is a small but busy market and caters for large community. It only houses small retail shops and does not have a built market for traders.

District	Market	Description
Monze	Bweengwa	A rural market located in in the Southern Province frequented by dairy and vegetable farmers
	Njola	A small trading but busy market located along Livingstone Road. Most traders are charcoal traders.
Kasama	Tazara	A small trading centre located at the entrance of Kasama district.
	Chambeshi	A trading centre located along the road. A new shelter in the markert was opened in 2020.

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.

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 Zambia 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 10: DATA COLLECTION OVERVIEW BY DISTRICT

District	Completed FGDs	Completed KIIs	Completed Surveys
Chipata	2	12	90
Kaoma	2	5	81
Kasama	2	7	82
Monze	2	7	80
Chongwe[59]		3	
Lusaka		32	
Virtual		2	
Total	8	68	333

DATA COLLECTION INSTRUMENTS, MANAGEMENT, AND ANALYSIS SAMPLING DETAILS

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 for implementat Translations will remain true to the nuances of the way in which questions have been drafted and structured in the

[59] As part of the pre-test, BFG conducted surveys and an FGD in Chongwe which were excluded from analysis.

original as far as possible. A copy of the quantitative questionnaire is available in Annex 3: Questionnaire. 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	District:	
A12	Date:	A16	City/town:	
A13	Start/Finish Time:	A17	Village:	
A14	Geography Type:			

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 (age 24 or under) 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? **Price in Local Currency*	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? *(choose only ONE)*	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?
	[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] Walking [2] Bicycle (owned/ borrowed) [3] Animal transport [4] Bicycle taxi [5] Private car [6] Minibus taxi [7] Motorcycle taxi [8] Motorcycle (owned/ borrowed) [95] Other (specify) [99] No response	[1] Very dissatisfied [2] Dissatisfied [3] Neutral [4] Satisfied [5] Very satisfied	[1] Walking [2] Bicycle (owned/ borrowed) [3] Animal transport [4] Bicycle taxi [5] Private car [6] Minibus taxi [7] Motorcycle taxi [8] Motorcycle (owned/ borrowed) [95] Other (specify) [99] No response	[1] Walking [2] Bicycle (owned/ borrowed) [3] Animal transport [4] Bicycle taxi [5] Private car [6] Minibus taxi [7] Motorcycle taxi [8] 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 sellers in your area?	If C10=yes, Does the seller 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] Hub [k] Pump [l] 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] Transportation/ commute [e] Shopping [f] Exercise [g] Fetching water [h] 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 11 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 11 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)

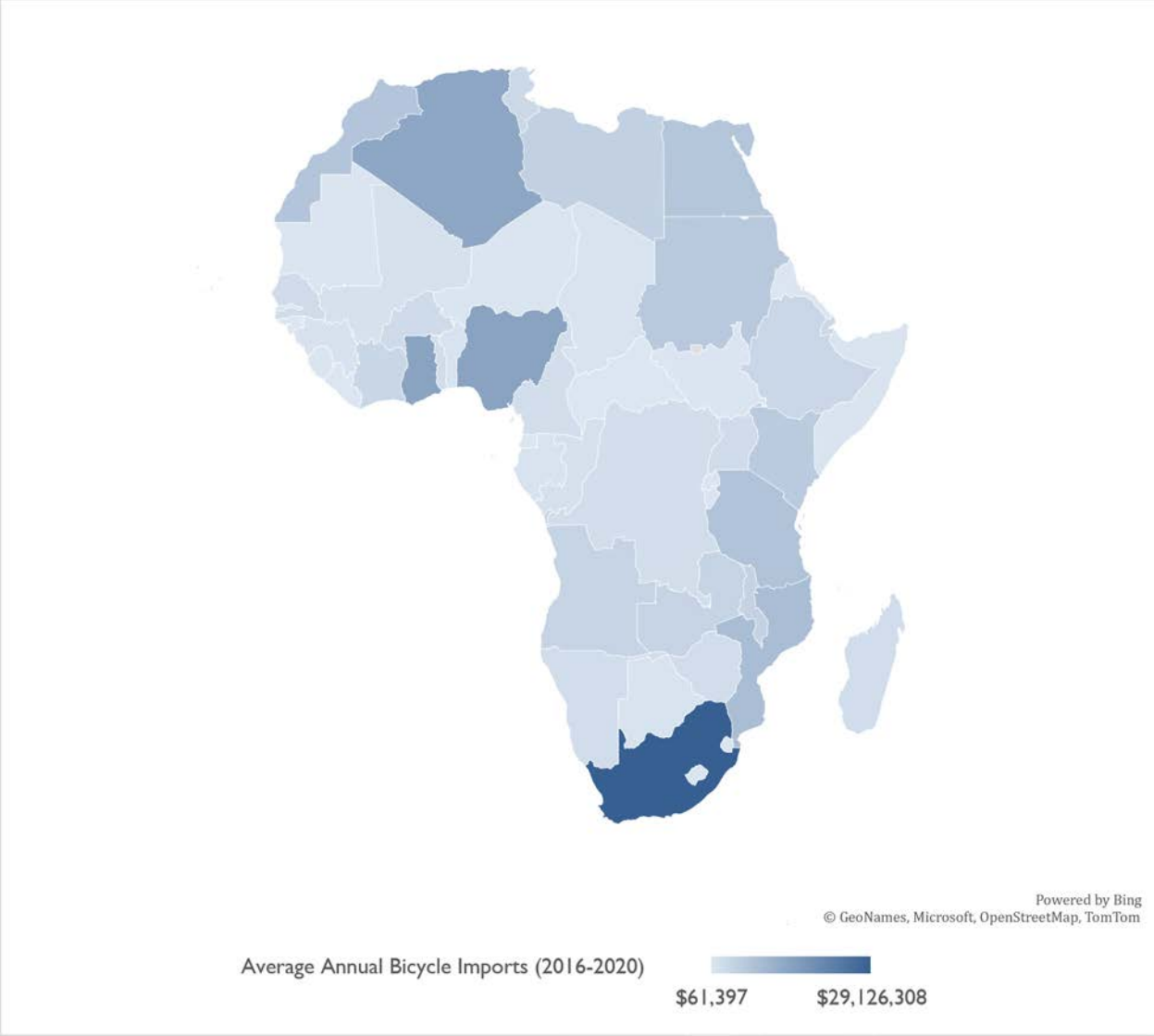


TABLE 11: AFRICA BICYCLE IMPORTS (2016-2020)

	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 12 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 12 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)

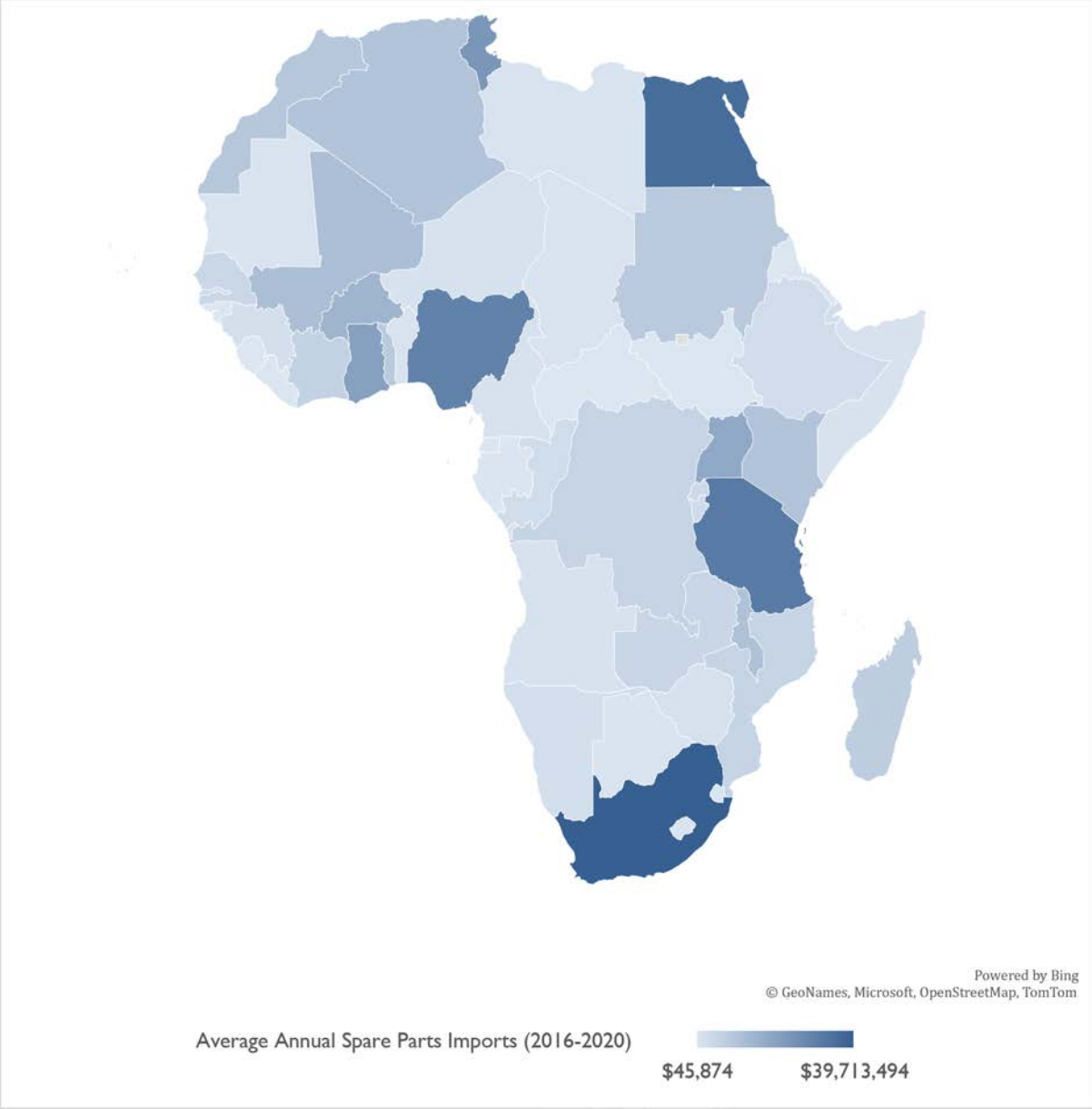


TABLE 12: AFRICA BICYCLE SPARE PARTS IMPORTS (2016-2020)

	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 13: AFRICA AVERAGE ANNNUAL 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 6: SURVEY RESPONDENT BICYCLE USAGE AND INTENSITY

TABLE 14: BICYCLE OWNERSHIP RATES

	Number of BFG survey respondents	% Bicycle owners
All respondents	**333**	36.3%
Districts		
Chipata	90	38.6%
Kaoma	81	37.0%
Kasama	82	36.6%
Monze	80	32.5%
Geography Type		
Urban	69	37.7%
Peri-urban	143	34.9%
Rural	121	36.5%
Gender		
Male	173	57.2%
Female	160	13.3%
Age Group		
18-24 years	85	14.5%
24-34 years	110	32.7%
35-44 years	83	43.4%
45 years+	55	65.5%
Economic Activity		
Farmer	92	66.3%
Informal merchant	104	26.2%
Formal merchant	37	37.8%
Private/government/NGOs	47	25.5%
Unemployed	52	9.8%

TABLE 15: BICYCLE USAGE FREQUENCY AND INTENSITY

	Number of respondents	Reporting regular bicycle usage (daily or several times a week)	Average hours per week spent travelling on bicycle - bicycle users
All respondents	**333**	39.7%	7.51
Bicycle ownership			
Owner	211	73.9%	10.21
Non-owner	120	18.5%	4.42
Districts			
Chipata	90	52.8%	5.69
Kaoma	81	51.5%	5.87
Kasama	82	21.8%	12.80
Monze	80	32.0%	8.87
Geography Type			
Urban	69	29.2%	11.90
Peri-urban	143	45.5%	5.95
Rural	121	40.3%	7.40
Gender			
Male	173	56.4%	9.59
Female	160	20.7%	4.38
Age Group			
18-24 years	85	19.5%	6.12
24-34 years	110	41.7%	6.53
35-44 years	83	48.7%	7.96
45 years+	55	55.3%	10.22
Economic Activity			
Farmer	92	68.2%	10.74
Informal merchant	104	36.1%	6.57
Formal merchant	37	22.9%	5.44
Private/government/NGOs	47	32.5%	5.25
Unemployed	52	14.3%	2.88

TABLE 16: AVERAGE TRANSPORT EXPENDITURE

	Number of respondents	% Of respondents reporting zero expenditure	Average expenditure for all respondents (ZMK)	Average expenditure for all respondents (USD)
All respondents	**333**	53.2%	174.54	10.64
Districts				
Chipata	90	48.9%	93.76	5.72
Kaoma	81	77.8%	44.57	2.72
Kasama	82	54.9%	270.39	16.49
Monze	80	31.3%	302.53	18.45
Geography Type				
Urban	69	34.8%	504.06	30.74
Peri-urban	143	59.4%	71.97	4.39
Rural	121	56.2%	97.65	5.95
Gender				
Male	173	57.2%	181.1	11.04
Female	160	48.8%	167.43	10.21
Age Group				
18-24 years	85	62.4%	87.01	5.31
24-34 years	110	46.4%	204.45	12.47
35-44 years	83	49.4%	162.76	9.92
45 years+	55	58.2%	265.49	16.19
Economic Activity				
Farmer	92	32.8%	87.63	5.34
Informal merchant	104	25.4%	192.55	11.74
Formal merchant	37	5.6%	466.57	28.45
Private/government/NGOs	47	10.7%	262.26	15.99
Unemployed	52	25.4%	17.58	1.07
Primary Mode of Travel to Work/ Market				
Walking	141	56.0%	130.62	7.96
Bicycle	132	61.4%	127.02	7.75
Vehicle/Motorcycle	54	24.1%	420.38	25.63

TABLE 17: PRIMARY MODES OF TRAVEL

	Number of respondents	Mode of travel to work or market			
		Walking	Bicycle	Vehicle or motorcycle	Animal transport
All respondents	**333**	42.9%	40.1%	16.4%	0.6%
Districts					
Chipata	90	22.5%	57.3%	19.1%	1.1%
Kaoma	81	51.9%	38.0%	10.1%	
Kasama	82	54.3%	29.6%	16.0%	
Monze	80	45.0%	33.8%	20.0%	1.3%
Geography Type					
Urban	69	12.0%	66.0%	22.0%	
Peri-urban	143	41.7%	33.9%	24.3%	
Rural	121	53.0%	36.6%	9.1%	1.2%
Gender					
Male	173	23.8%	58.7%	16.9%	0.6%
Female	160	63.7%	19.7%	15.9%	0.6%
Age Group					
18-24 years	85	65.4%	27.2%	7.4%	
24-34 years	110	44.5%	38.2%	17.3%	
35-44 years	83	31.3%	47.0%	19.3%	2.4%
45 years+	55	23.6%	52.7%	23.6%	
Economic Activity					
Farmer	92	25.0%	69.6%	4.3%	1.1%
Informal merchant	104	52.9%	34.6%	12.5%	
Formal merchant	37	35.1%	27.0%	37.8%	
Private/government/ NGOs	47	27.7%	27.7%	42.6%	2.1%
Unemployed	52	77.1%	18.8%	4.2%	